

U.S. Department of Transportation
Federal Highway Administration
and
Virginia Department of Transportation

ENVIRONMENTAL ASSESSMENT

Northstar Boulevard Project

Loudoun County
Federal Project No.: #9999-053-R29, P101, R201
State Project No.: 106994
From: Existing Shreveport Drive & Northstar Boulevard Intersection
To: Route 50

Submitted Pursuant to 42 USC 4332(2)(C)

Approved for Public Availability

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Date

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for: Division Administrator
Federal Highway Administration

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1.0 INTRODUCTION

In accordance with the Revised 2010 Countywide Transportation Plan and Revised 2030 Countywide Transportation Plan Map (CTP)¹, Loudoun County is evaluating potential improvements to extend Northstar Boulevard north from the existing termini at the intersection with Shreveport Drive, and to the south for approximately 1.7 miles to Route 50. Improvements also include reconstructing Youngwood Lane from its new Northstar Boulevard connection to the existing intersection with Racefield Lane and reconstructing and widening Racefield Lane from its intersection with Youngwood Lane to the VDOT Arcola Area Headquarters and maintenance yard. The project area is located in southern Loudoun County, Virginia, approximately 4 miles west of the Dulles International Airport (Figure 1). This project is currently being funded by both Regional and Local Northern Virginia Transportation Authority (NVTa) funds, Revenue Share monies, and a \$25 million Federal Transportation Investment Generating Economic Recovery (TIGER) Grant.

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, an Environmental Assessment (EA) is the appropriate level of documentation to analyze the Northstar Boulevard project. The EA was prepared in accordance with FHWA's regulations implementing NEPA (23 CFR §771.119).

1.1 Study Area

The project study area for the proposed roadway spans approximately 350 acres in area and extends approximately 8,880 feet in length between Northstar Boulevard's current terminus at Shreveport Drive and Route 50, 1,700 feet along Youngwood Lane to its intersection with Racefield Lane, and 2,000 feet in length along Racefield Lane between its intersection with Youngwood Lane to the VDOT Arcola Area Headquarters. As shown in Figure 1.1, the study area consists mainly of undeveloped fields, forest stands, and active agricultural fields, with both gas and power utilities along the proposed roadway corridor. The study area includes one major tributary crossing of Broad Run which includes a FEMA regulated floodplain. The project study area is located in the southern region of Loudoun County, approximately 4 miles west of Dulles International Airport and 9 miles south of Leesburg.

The CTP indicates that the project area falls within the Suburban Policy Area, which seeks to offer a mix of residential, commercial and employment uses. Specifically, the project area includes locations designated for suburban neighborhoods and suburban employment centers, which are intended to be a mix of office spaces, flex spaces, warehouses and open spaces.

¹ Throughout the document the 'Revised 2010 Countywide Transportation Plan and Revised 2030 Countywide Transportation Plan Map' (<https://www.loudoun.gov/1068/Countywide-Transportation-Plan>) will be referred to as the 'Revised Countywide Transportation Plan' or '(CTP)'.



Figure 1.1 - Map of the Northstar Boulevard Extension Project Area and Local Landmarks

2.0 PURPOSE AND NEED

2.1 History

In May of 2011, the Virginia Commonwealth Transportation Board (CTB) designated a new Corridor of Statewide Significance in Northern Virginia: the Northern Virginia North-South Corridor. The ‘North-South Alignment’ portion (representing the northern third of the proposed corridor) encompasses the project area. In October of 2011, the CTB initiated a study plan to investigate this corridor (as defined by the Corridor Master Plan (CMP) dated May 2010). During the 2012 amendments to the Loudoun County 2010 CTP, plans to extend Northstar Boulevard and define an ultimate condition of 6-lanes for the route were adopted.

The Loudoun County CTP serves as a guide for future transportation infrastructure investments and aims to address mobility needs and potential impacts of transportation systems on specific locales. The proposed project is located in the Dulles Community, which is included in the CTP’s Suburban Policy Area as a region with a substantial need for major road construction projects.

VDOT conducted an Environmental Assessment for the Dulles Air Cargo, Passenger, and Metro Access Highway in 2013. The intent of that project was to address the growing transportation needs west of Dulles Airport. A substantial portion of that project’s study area overlapped with the Northstar Boulevard Extension project study area, and the data provided in the study illustrated the need for transportation improvements in the area. A Revised EA for the study was approved for public availability in April 2014.

The proposed Northstar Boulevard Extension represents a critical planned roadway for the Dulles Community in addition to its role as a new north-south corridor that would contribute to the greater region’s ultimate planned road network. Multiple public hearings were held to discuss the corridor between December 2012 and January 2013. Public comments gathered at these hearings were then incorporated into a Final CMP Report (completed in April of 2013), along with statewide goals and defined county transportation plans.

In April of 2017, a Request for Proposals (RFP) was issued by Loudoun County for roadway and civil design services related to the Northstar Boulevard Extension. A TIGER grant was subsequently awarded to the project in March 2018. Most recently, the Northstar Boulevard Extension has been listed in the State Transportation Improvement Program (STIP).

Table 2.1 Loudoun County CTP Meeting and Document History			
Year	Date	Document	Description/Action
2010	May 19 th	Corridor Master Planning Process (CMP)	Defined a five-step process for studying Corridors of Statewide Significance
2011	May 18 th	N/A	CTB designated the Northern Virginia North-South Corridor as a new Corridor of Statewide Significance
2011	October 19 th	N/A	CTB initiates CMP Study Process for Northern Virginia North-South Corridor of Statewide Significance
2012	May 2 nd	Loudoun County 2010 Countywide Transportation Plan	Plans for Northstar Boulevard were amended to reflect an ultimate condition of 6-lanes
2012	December	N/A	Public Participation in Ashburn and Manassas
2013	May 24 th	Dulles Air Cargo, Passenger, and Metro Access Highway Environmental Assessment	Environmental Assessment completed to address the growing transportation needs west of Dulles International Airport
2013	January 8 th	N/A	Public Participation in Manassas
2013	April	Final CMP Report	Consultants incorporated statewide goals, 2040 base line regional/local transportation plans, public comments into report
2014	April 4 th	Dulles Air Cargo, Passenger, and Metro Access Highway Revised Environmental Assessment	Environmental Assessment was revised to analyze a new alternative for the project
2017	April 7 th May 9 th	Request for Proposals	Roadway and Civil Design Services were solicited for the project
2018	March	N/A	TIGER Grant received to fund project
2018		State Transportation Improvement Program	Northstar is included in the 2018-2021 Virginia STIP; budget is allocated for project

2.2 Needs

2.2.1 Limited Travel Choices/Congestion Relief – Existing Conditions

The roads around Arcola, Virginia, currently experience high volumes of traffic due to the growth of Loudoun County. As noted in VDOT's Daily Traffic Volume Estimates Jurisdiction Report 53, completed in 2017, Loudoun County Parkway (Rt. 606) had an Average Daily Traffic (ADT) of 22,000 between Arcola Road and Evergreen Mills, and 37,000 further south from Evergreen Mills to Route 50. Evergreen Mills Road (Rt. 621), currently only a two-lane road, experienced ADT volumes of 11,000, 10,000, and 19,000 for the portions between Old Ox Road

and Belmont Ridge Road. Gum Spring Road (Rt. 659), also a smaller two-lane road, experienced ADT volumes of 10,000 between Evergreen Mills and Route 50. These traffic volumes are expected to increase substantially as Loudoun County continues to experience population and job growth.

Table 2.2.1 Existing and Future Levels of Service in Arcola		
Route	Segment	2012 LOS (VDOT)*
Route 50	Racefield Lane to Gum Spring Road	C or Above
	Gum Spring Road to Loudoun County Parkway	C or Above
Loudoun County Parkway	Old Ox Road to Evergreen Mills Road	D
	Evergreen Mills Road to Route 50	C or Above
Old Ox Road	Carters School Road to Loudoun County Parkway	D
Evergreen Mills Road	Belmont Ridge Road to Gum Spring Road	F
	Gum Spring Road to Loudoun County Parkway	C or Above
Gum Spring Road	Evergreen Mills Road to Route 50	C or Above

*These Level of Service (LOS) estimates are taken from a 2012 VDOT traffic analysis conducted in the study area for the Dulles Air Cargo, Passenger and Metro Access Highway. All of these routes would be expected to experience decreases in volume with the extension of Northstar Boulevard.

Table 2.2.1b Existing Intersection Levels of Service in Arcola			
Route	Intersection with	Existing LOS (2012)	
		AM	PM
US Route 50	Stone Springs Boulevard	C or Above	C or Above
	Gum Spring Road	F	F
	Hutchison Farm Drive	E	C or Above
	Pinebrook Road	D	C or Above
	Loudoun County Parkway	D	D
	South Riding Boulevard	C or Above	C or Above
Loudoun County Parkway	Evergreen Mills Road	D	C or Above
	Old Ox Road	-	-
Evergreen Mills Road	Belmont Ridge Road	F	F
	Gum Spring Road	F	D

2.2.1.1 Limited Travel Choices/Congestion Relief – Future

It is anticipated that 700,000 new jobs, 800,000 new individuals, and 300,000 new households will be added to the region between now and 2040 (Office of Intermodal Planning and Investment, 2012). The construction of the Northstar Boulevard Extension is anticipated to serve new demand associated with this projected development in the project area and to provide alternative travel choices to existing parallel north-south corridors. The Northstar Boulevard

Extension – Route 50 to Shreveport Drive Traffic Volume Projections Memorandum dated May 23, 2018 (Appendix A) studied the anticipated re-routing of existing traffic upon the construction and opening of Northstar Boulevard as part of the project’s traffic operations analysis.

High volumes of traffic are not only burdensome to commuters but can also be dangerous, often resulting in an increase in motor vehicle accidents. Between 2013 and 2018, 248 rear-end collisions occurred on Rt. 50 in the vicinity of the proposed intersection with Northstar Boulevard (between Kilkeran Drive to the west and Tanner Lane to the east), 90 of which were directly attributed in part to heavy traffic volumes (VDOT Virginia Crashes GIS Layer, 2018). The intersection of Route 50 and Loudoun County Parkway averages over 18 rear-end collisions a year alone.

Table 2.2.2 Future Levels of Service in Arcola Under No Build		
Route	Segment	Projected 2040 LOS (VDOT)*
Route 50	Racefield Lane to Gum Spring Road	F
	Gum Spring Road to Loudoun County Parkway	F
Loudoun County Parkway	Old Ox Road to Evergreen Mills Road	F
	Evergreen Mills Road to Route 50	F
Old Ox Road	Carters School Road to Loudoun County Parkway	F
Evergreen Mills Road	Belmont Ridge Road to Gum Spring Road	F
	Gum Spring Road to Loudoun County Parkway	F
Gum Spring Road	Evergreen Mills Road to Route 50	D

**These Level of Service (LOS) estimates are taken from a 2012 VDOT traffic analysis conducted in the study area for the Dulles Air Cargo, Passenger and Metro Access Highway. All of these routes would be expected to experience decreases in volume with the extension of Northstar Boulevard.*

Table 2.2.2b Future Intersection Levels of Service in Arcola Under No Build			
Route	Intersection with	No Build LOS (2040)	
		AM	PM
US Route 50	Stone Springs Boulevard	C or Above	E
	Gum Spring Road	E	F
	Hutchison Farm Drive	E	F
	Pinebrook Road	E	F
	Loudoun County Parkway	-	-
	South Riding Boulevard	C or Above	D
Loudoun County Parkway	Evergreen Mills Road	F	F
	Old Ox Road	F	F
Evergreen Mills Road	Belmont Ridge Road	F	F
	Gum Spring Road	F	F

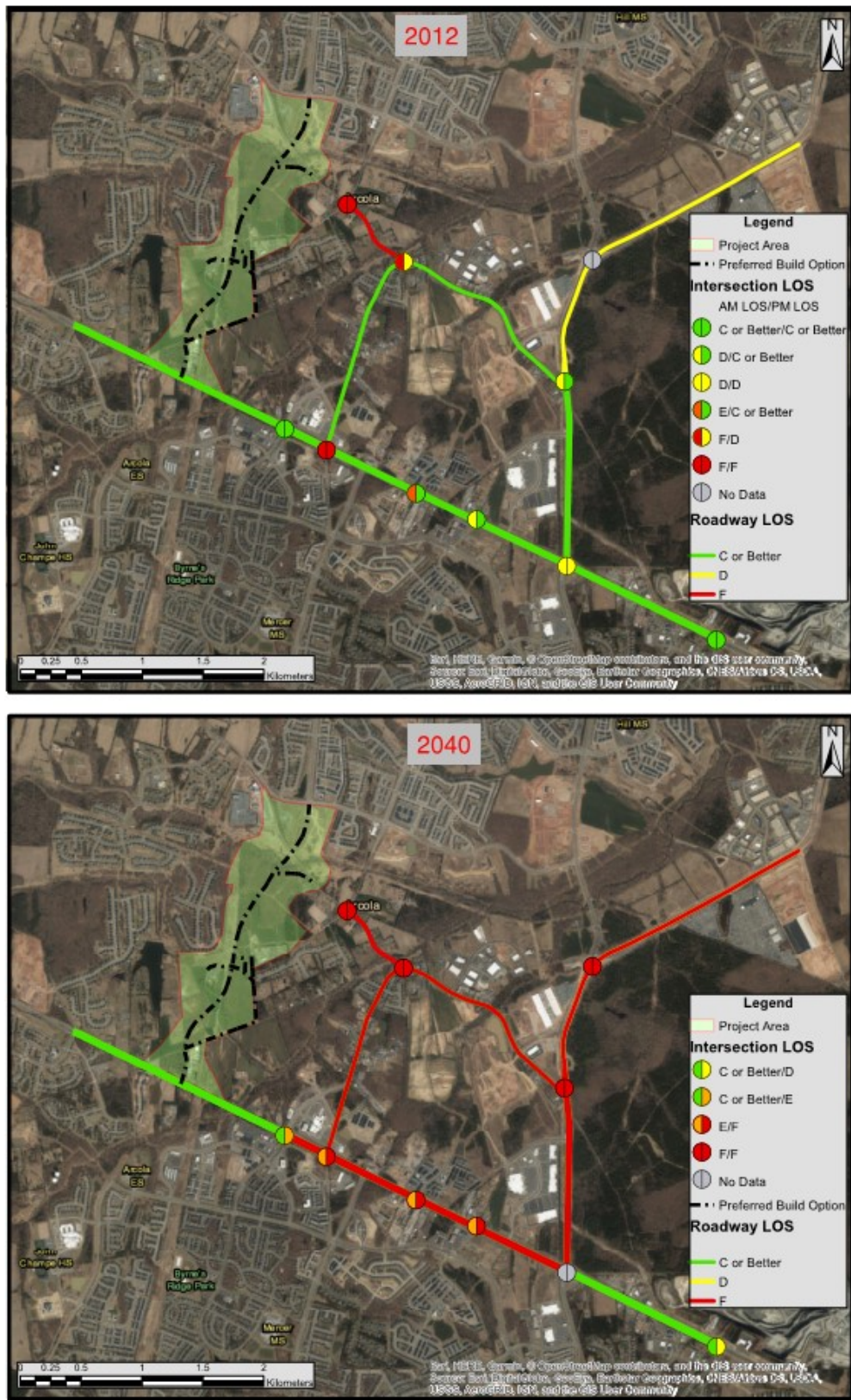


Figure 2.2.1 - Map of Level Of Service (LOS) traffic levels on Main Arteries in the Arcola, VA area under current conditions (2012 values) and future modeled conditions (2040)

2.2.2 School Access – Existing Conditions

Currently, residents in the Brambleton area do not have direct access to schools south of Route 50 in their service district, including a number of public schools (John Champe and Freedom High Schools, Mercer Middle School, Willard Intermediate School, Arcola Elementary, Hutchison Farm Elementary, Liberty Elementary), as well as several private schools (Stone Ridge Montessori, LePort Montessori Aldie, Minnieland Academy at Kirkpatrick).

2.2.2.1 School Access – Future Conditions

As the Loudoun County population continues to increase, the number of school aged children, and the need for additional schools, will also increase. In 2010, there were 73,500 school aged children (Ages 5-19) in Loudoun County; by 2040, that demographic is expected to grow by over 50% to more than 110,000 potential students (Loudoun County Dept. of Planning and Zoning, 2016).

2.2.3 Emergency & Maintenance Vehicle Access – Existing Conditions

The newly constructed Stone Springs Medical Center represents the largest proximate medical facility and hospital for the neighborhoods of Arcola, Brambleton and Watson. Presently these neighborhoods lack direct access to this medical facility. The closest rescue squad is located in Arcola, north of Route 50 (Arcola Volunteer Fire Department), and lacks a direct route to communities south of Route 50. The VDOT Arcola Area Headquarters, the largest VDOT maintenance facility in the state, is located on Rt. 50 just east of Racefield Lane. This facility is responsible for maintaining the most miles of roadway in the state. Currently, access to this facility is limited to an un-signalized entrance from Rt. 50 and a small outlet onto Racefield Lane.

2.2.3.1 Emergency & Maintenance Vehicle Access – Future Conditions

Future developments in the area would result in an increase of vehicle travel on smaller routes and hinder emergency vehicle routes and response time. VDOT Arcola Area Headquarters is the faster growing maintenance yard in the state and has the most lanes to maintain. Without proposed improvements to Youngwood Lane and Racefield Lane emergency response times, as well as ease of access for VDOT maintenance vehicles to major thoroughfares from the Arcola Area Headquarters, would continue to decrease.

2.3 Summary

The purpose of the project is to improve local roadway access connections through the surrounding area.

The needs for this project include:

- Improve emergency and state maintenance vehicle access and response time.

- Provide additional travel options and reduce local congestion.
- Improve community access to local schools.

3. ALTERNATIVES

3.1 Introduction

This section details the conceptual alignments reviewed and analyzed for the project, including a no build alternative. Conceptual alignments were similar due to existing constraints; the project is restricted to the same roadway corridor with the exception of a small portion of Evergreen Mills, where two options are discussed in further detail. The analysis focuses on alignment options within the defined project corridor that would meet the roadway classification criteria including design speed, avoidance of major utility corridors, minimization of right-of-way impacts and acquisitions, minimization of impacts on natural resources including Waters of the US (WOUS) and wetlands, and consistency with the Countywide Transportation Plan (CTP).

Constraints along the project corridor include many major utilities. These utilities include gas lines and substations, as well as power transmission and substations in both the north-to-south and east-to-west directions near the northern terminus of the corridor. A FEMA regulated floodplain associated with Broad Run crosses the project corridor in an east-to-west direction, and a number of streams and wetlands have been identified throughout the corridor (Figure 3.2.2). The following sections describe the use of the previously mentioned constraints as screening criteria for the alternatives.

3.2 Alternatives Development

The flowchart below (Figure 3.2.1) depicts the general approach used for screening the Northstar Boulevard Extension project and Evergreen Mills connection alternatives using the defined purpose and need of the proposed action along with the screening criteria listed in the previous section.

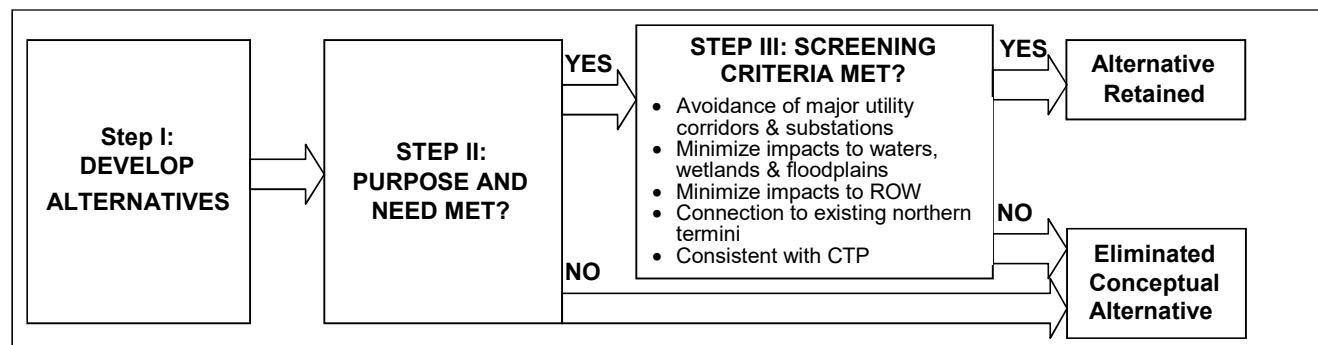


Figure 3.2.1 – Process for Evaluating Project Alternatives

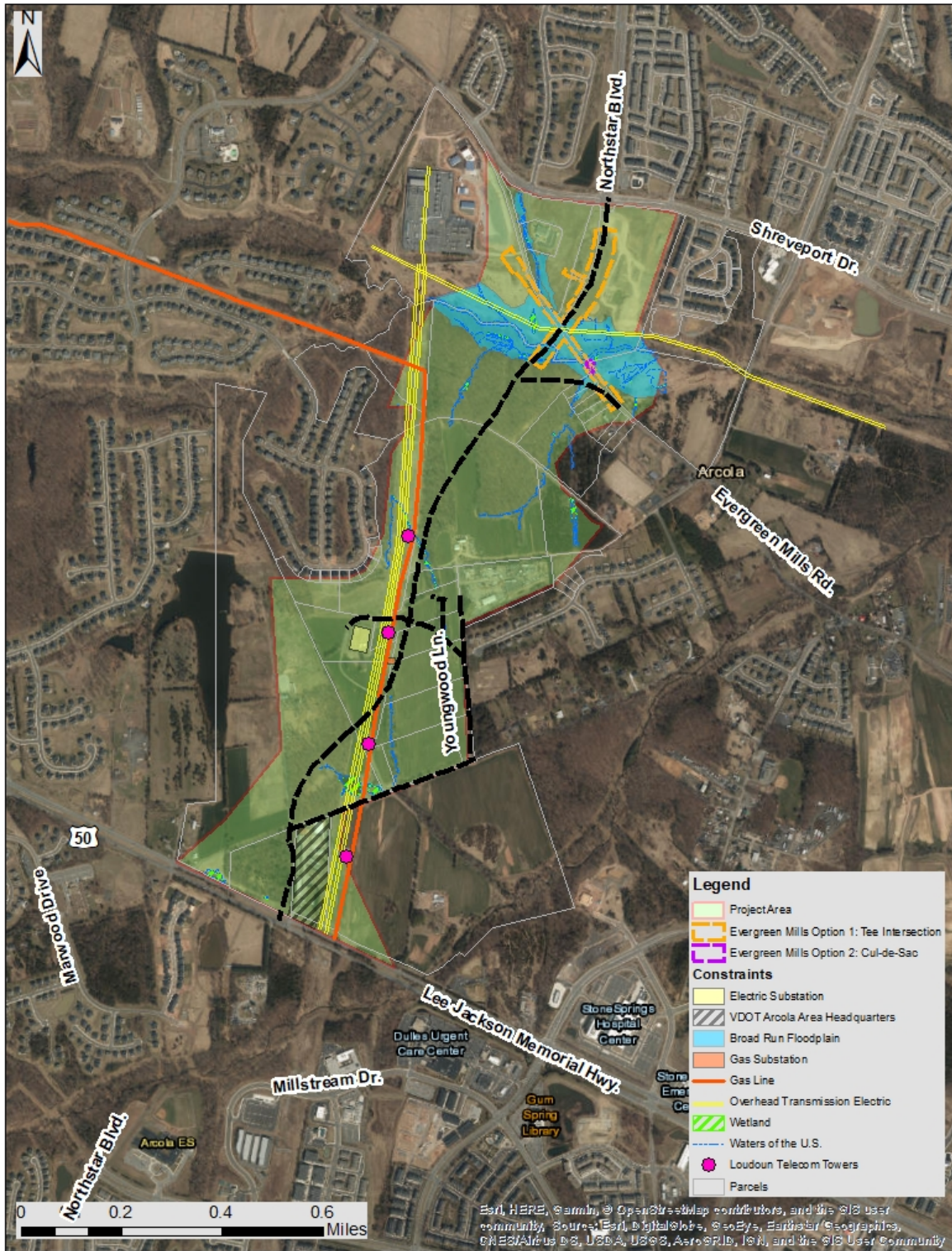


Figure 3.2.2 – Constraints Map for Northstar Boulevard Extension Alignments

3.3 No-Build Alternative

The No Build Alternative would not result in a new roadway connection. The No Build Alternative would not impact residential properties, minority and low income populations, natural resources including waters, wetlands, threatened and endangered species, floodplains, or forests. Additionally, the no build would have no effect on archaeological or architectural cultural resources. The No-Build Alternative has been carried forward as an alternative under consideration and as a baseline for comparison, despite failing to address the purpose and need identified in section 2.

3.4. Build Alternative

The Build Alternative (as shown in Figure 3.2.2) would extend Northstar Boulevard from its existing intersection with Shreveport Drive south to Route 50, adding approximately 8,800 feet of roadway. The Build Alternative also includes improvements to 1,700 feet along Youngwood Lane to its intersection with Racefield Lane, and 2,000 feet in length along Racefield Lane between its intersection with Youngwood Lane to the VDOT Arcola Area Headquarters. The Evergreen Mills Road crossing over Broad Run would be removed and Evergreen Mills Road would instead tie into Northstar Boulevard north of its crossing of Broad Run as detailed in Section 3.5. The Northstar Boulevard corridor would include a 400' bridge spanning Broad Run perpendicular to the waterway. Northstar Boulevard would be completed in accordance with Urban Minor Arterial Street (GS- 6) criteria with a design speed of 60 mph. The typical section would include curb and gutter on the outsides and a raised median to accommodate future widening from a 4-lane to 6-lane facility. Shared use paths and/or sidewalks would be incorporated on both sides of Northstar Boulevard. Stormwater management designs would be completed utilizing the Virginia Department of Environmental Quality IIB stormwater management criteria for water quality and quantity requirements. All stormwater management facilities would be designed using specifications from the Virginia BMP Clearinghouse. Locations of stormwater management basins would be identified to minimize right-of-way impacts.

3.4 Roadway Corridor Shift Options

Options which incorporated minor alignment shifts were considered wherever possible. However, given the existing roadway connections, future potential connections and numerous constraints, those options were limited to two locations.

One location is a section of the corridor approximately 3000' north of Route 50 and approximately 300' wide where minor shifts in the proposed alignment could potentially be accommodated. This area is located just southeast of the Power and Gas transmission substations. However, once project designs were reviewed for necessary treatment for stormwater management and drainage as well as potential elevation constraints presented by the existing gas transmission mains, it was determined that alternative options to the proposed alignment through this area were not practicable and therefore were not investigated further. The other location where options were considered is the area associated with Evergreen Mills Road connection as described below.

3.5 Evergreen Mills Road Connection – Proposed Build Option

In accordance with the Loudoun County Countywide Transportation Plan for the extension of Northstar Boulevard, Evergreen Mills Road would tie into Northstar Boulevard via a ‘T’ intersection. This intersection is proposed to be located just south of the bridge over Broad Run in an effort to minimize floodplain, environmental and utility impacts, and to ensure adequate sight-lines are provided at the intersection (accounting for bridge parapets and required guardrail installations). Based on coordination with Loudoun County and VDOT, the realignment of Evergreen Mills Road has been designed to achieve 40 mph design criteria. During early coordination, a design speed of 50 mph was analyzed. However, this resulted in increased impacts to additional (2 or more) properties. The 50 mph proposed design speed exceeded the existing posted speed limit on Evergreen Mills east of the proposed Northstar Boulevard connection and was not appropriate since Evergreen Mills Road would terminate at a ‘T’ intersection just west of the realignment. The use of a 40 mph design speed avoids impacts to additional residences further east of Evergreen Mills Road. Recognizing that one residential impact involving 3 parcels is necessary for the realignment of Evergreen Mills Road to provide the required connection to Northstar Boulevard south of the proposed bridge over Broad Run, options were considered in an effort to avoid the residential acquisition. These options are discussed below.

3.5.1 Evergreen Mills Road Connection – Option 1

Relocating the ‘T’ intersection onto the proposed bridge over Broad Run: This option would shift the realignment of Evergreen Mills Road to the north. This option met the screening criteria as outlined in Figure 3.2.1. However, connecting Evergreen Mills Road to Northstar Boulevard at an intersection on the bridge would require the Northstar Boulevard bridge to be widened by up to approximately 14 feet to provide adequate sightlines at the intersection. This option would also require an approximately 500-foot extension of the bridge along Evergreen Mills Road to avoid introducing an increase in water surface elevations and floodplain limits as well as associated flooding impacts to adjacent properties along Broad Run. This bridge extension and the associated profile adjustment needed to provide adequate clearance over the Broad Run floodplain would require a vertical profile adjustment on Evergreen Mills Road, which would impact the same residence as the Build Alternative described above. In addition to not eliminating impacts to the residence, this option resulted in inadequate intersection spacing to the adjacent intersection (to the north), which has already been approved for development and is under construction. It would also result in additional utility, wetland and stream impacts and would require the Northstar Boulevard Bridge over Broad Run to be lengthened in order to offset the additional bridge substructure elements for Evergreen Mills Road, which would be located within the floodplain. The additional estimated cost to realign Evergreen Mills Road to an intersection on the Northstar Boulevard Bridge over Broad Run, including the bridge extension along Evergreen Mills Road, is estimated at approximately \$10 million. Since residential impacts were not eliminated with this concept, and the design resulted in additional environmental and utility impacts, this option was not advanced.

3.5.2 Evergreen Mills Road Connection – Option 2

Construction of a Cul-de-Sac on Evergreen Mills Road: This concept consists of constructing a cul-de-sac on Evergreen Mills Road just west of the last residential property located to the east of the proposed Northstar Boulevard Bridge over Broad Run. The cul-de-sac would be located just outside of the Broad Run floodplain limits and would provide reductions in project costs (less than \$2 million) associated with eliminating the realignment of Evergreen Mills Road. However, this option is not consistent with the Loudoun County CTP, which details an intersection between Northstar Boulevard and Evergreen Mills Road. Therefore, in accordance with the process outlined in Figure 3.2.1, this option was not advanced.

4. EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES

The following section is a summary of environmental conditions present within the project area and anticipated environmental consequences resulting from the Build Alternative. Potential impacts enumerated in this document are estimations from the Build Alternative's proposed construction boundaries. Environmental impacts will continue to be evaluated when details of alignment, construction impacts and stormwater management are determined. Additional information regarding resources are provided in technical reports.

4.1 Summary of Environmental Issues

A summary of existing environmental conditions and potential impacts to each resource is provided in Table 4.1.

Table 4.1 - Summary of Environmental Issues	
Environmental Resource	Existing Conditions
Socioeconomics	The project is in a populous area of Virginia that has experienced increases in population and housing in recent years and is expected to increase into the future. Implementation of this project would help accommodate the sustained growth and support Loudoun County's <i>Revised Comprehensive Plan</i> (see Section 4.2).
Right of Way	Acquisitions of property and one residential displacement are required for the implementation of the Build Alternative. Right-of-way acquisitions are based off engineering judgements for the implementation of the project (see Section 4.2)
Land Use	The land use within the study area is transitional, consisting of planned commercial and residential developments. Within the study area, a Zoning Map Amendment was submitted on 2018.12.17 to rezone 71.5 acres from R-1, CR-1 and RC Zoning Districts to PD-IP for an Industrial Park for Office and Data Center Uses. The implementation of the project would provide a direct route to areas along Route 50, supporting Loudoun County's <i>Revised Comprehensive Plan</i> (see Section 4.2).

Environmental Justice (EJ)	This project has been evaluated in accordance with Title VI of the Civil Rights Act of 1964, as amended, and Executive Order (EO) 12898, <i>Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations</i> , and Department of Transportation (DOT) Order 6610.2(a). Minority and low income populations have been identified but are not expected to experience disproportionately high and adverse effects as a result of the project (see Section 4.3).
Community Facilities	There are no community facilities within the project area; however, the Arcola Volunteer Fire Department is located immediately adjacent to the project area. No impacts to community facilities are anticipated. Access to existing schools is anticipated to be improved, and the project would increase connectivity of the pedestrian and bicycle network through the construction of the shared use path associated with the roadway (see Section 4.2).
Historic Properties	Historic properties within the study area include the Manassas Gap Railroad bed site (DHR ID 44LD1280). Portions of this archaeological resource have previously been deemed eligible for listing under the NRHP (see Section 4.4).
Section 4(f) & Section 6(f)	<p>Section 4(f) of the U.S. Department of Transportation Act of 1966, as amended (49 USC 303 (C) , 23 CFR 774), protects publicly owned parks, recreation areas, wildlife or waterfowl refuges, and public or privately owned historic sites listed on or eligible for the National Register of Historic Places (NRHP). Potential historic properties are located in the project area; no adverse impacts to historic properties are anticipated (see Section 4.5)</p> <p>Section 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965, as amended (16 U.S.C. 4601, 36 CFR 59.3) protects lands purchased within LWCF funds. No impacts to Section 6(f) properties are anticipated and no Section 6(f) properties are located in the project area (see Section 4.5).</p>
Air Quality	The Northstar Boulevard Extension is anticipated to meet all applicable state and federal air quality requirements; construction of this road is not anticipated to impact Loudoun County's ability to remain in attainment for all applicable NAAQS (See Section 3.6 and Air Quality Technical Report: Northstar Boulevard Extension (Appendix D)).

Noise	The noise analysis did not identify sufficient impacts to warrant highway traffic noise abatement consideration (see Section 3.7 and The Preliminary Design Noise Impact Analysis Technical Report, Northstar Boulevard Extension (Appendix C)).
Wetlands and Streams	Broad Run crosses through the project area; all wetlands and streams are associated with the Broad Run-Lenah Run drainage area. A wetland and stream delineation was conducted in 2018 and the USACE issued a Preliminary Jurisdictional Determination (JD) NAO 2018-01132, dated November 14, 2018 and revised April 22, 2019. Wetlands within the study area include palustrine forested (PFO) wetlands, palustrine emergent (PEM) wetlands, and palustrine open waters (POW). Avoidance and minimization efforts were included in the preliminary design and will be refined during the final design and permitting phase of the project to reduce impacts (see Section 4.8 for wetlands and Section 4.9 for streams).
Floodplains	There are roughly 33.4 acres of FEMA-mapped floodplain of Broad Run. Two piers of the proposed bridge would be located within the floodplain, however, removal of the Evergreen Mill culvert crossing would off-set any adverse effect to floodplain. The bridge would result in a rise in the floodplain water surface elevation. No impacts to the floodplain are anticipated (see Section 4.10).
Prime, Unique, or Important Farmland	Farmland, as defined by the Farmland Protection Policy Act (FPPA) of 1981 (7 USC § 4201, et seq.), has not been defined in the study area. The proposed project area does not contain prime farmland. Though the soils are appropriate for prime farmland, the zoning and current land-use does not fit the USDA definition of prime farmland due to the built-up nature of the project area (consisting of numerous residences, utility structures and other buildings; the USDA states that prime farmland is “land that has the best combination of physical and chemical characteristics for producing food...and is available for these uses...but is not urban, built-up land or water areas.”) (see Section 4.2).

Wildlife and Wildlife Habitat	<p>The proposed project area contains forested lands, agricultural lands (fields/pasture), grasslands and scrub/shrub lands and is adjacent to residential and industrial areas.</p> <p>No Threatened & Endangered species waters occur within a 2 mile radius of the project area. There are no known eagle nests, roosts or concentration areas near the project area. No conservation easements exist within the project area (see Section 4.11).</p>
Threatened, Endangered, and Special Status Species	<p>A review of the U.S. Fish and Wildlife Service's (USFWS) Online Information, Planning, and Conservation (IPaC) system identified one federally listed threatened species potentially occurring in the project area: the Northern Long-eared Bat (NLEB). No critical habitat for this species was identified within the project area and no documented roost trees or hibernacula were identified in the vicinity of the proposed project area. A review of Virginia Department of Game and Inland Fisheries (DGIF) Fish and Wildlife Information Service (FWIS) identified one state threatened species potentially occurring in the project area: the Wood Turtle. Additional coordination will be conducted with federal and state wildlife agencies during project permitting, and any conditions or Time Of Year Restrictions (TOYR) will be incorporated into the construction of the project. The project will follow state and federal regulations in order to identify and conserve state and federally threatened and endangered species. Best management practices will be implemented to avoid impacts to state and federally threatened, endangered and rare species to the greatest extent feasible (see Section 4.12).</p>
Hazardous Materials	<p>A search of federal and state databases, including a search conducted through EDR, Inc. did not identify any recognized environmental concern (REC) within the study area. Phase I Environmental Site Assessments (ESA) per the American ASTM will be conducted on any properties to be acquired for this project (see Section 4.13).</p>

Table 4.1.1.1 - Inventory of Environmental Resources in the Study Area			
Category		Inventory	
Total Area (acres)		352.7	
Vacant Land tax parcels (no.)		29	
Residential tax parcels (no.)		19	
Business tax parcels (no.)		3	
Institutional tax parcels (no.)		3	
Community Facilities (no.)		0	
Minority Population (%)		52	
Population Below Poverty Level (%)		6.5	
Farmland or Farmland Soils (acres)		0	
Section 4(f) Property (acres)		0	
Historic Properties (no.)		1	
Noise Receptors (no.)		39	
Streams (linear feet)		15,187	
Wetlands (acres)		6.444	
Floodplains (acres)		33.4	
Forested and other vegetated Habitat (acres)		264	
Threatened and Endangered Species Identified (no.)		2	
Documented Hazardous Material Sites (no.)		4	
Table 4.1.1.2 - Summary of Planning-Level Design Impacts			
Category	Units of Impact	Anticipated Impacts	
		No-Build	Build-Alternative
Total Right-of-Way Area	acres	0	35
Right-of-Way Property Acquisitions	acres	0	19
Residential Displacements	no.	0	1
Business Displacements	no.	0	0
Institutional Displacements	no.	0	0
Community Facilities	no.	0	0
Section 4(f) Property Uses	acres	0	0
Farmland Converted	acres	0	0
Noise Receptors	no.	0	0
Streams	linear feet	0	1,850
Wetlands	acres	0	1.1
Floodplains	acres	0	0
Forested Habitat	acres	0	32
Hazardous Material Sites	no.	0	0

4.2 Socioeconomic and Right-of-Way

4.2.1 Existing Conditions

Socioeconomics

Population

The population of Loudoun County, Virginia has grown an average of 5.7% per year over the last 28 years and grew by a total of 184% from 2000 to 2010, making it the 5th fastest growing county in the nation over that span. Loudoun County is expected to expand another 26% by 2045 under a slowed annual rate of 0.9% a year. Loudoun County's 2011 per capita income was 67% higher than the national average, and the county's 2011 median household income was greater than twice the national average.

Table 4.2.1.1 – Population and Housing Unit Statistics and Projections for Loudoun County by Planning Sub-Area and Project Area

Planning Subarea	2000		2015		2030*		2045*		% Change^	
	POP	HU	POP	HU	POP	HU	POP	HU	POP	HU
Ashburn	33,581	12,007	105,912	37,529	129,918	48,358	136,986	52,206	29%	39%
Dulles	7,795	2,999	65,623	21,539	108,320	35,587	110,217	36,464	68%	69%
Leesburg	31,840	11,958	58,784	20,261	71,632	24,616	74,848	25,985	27%	28%
Northwest	6,499	2,430	10,601	3,878	14,564	5,114	18,801	6,429	77%	66%
Potomac	39,115	13,718	45,811	16,043	46,243	16,169	46,269	16,176	1%	1%
Route 15N	2,506	947	6,080	2,060	9,003	2,968	10,614	3,469	75%	68%
Route 15S	2,403	937	3,982	1,494	6,509	2,279	7,819	2,686	96%	80%
Route 7W	12,354	4,468	24,035	8,047	32,812	10,476	34,667	10,977	44%	36%
Southwest	6,056	2,706	7,275	3,237	8,522	3,646	10,564	4,280	45%	32%
Sterling	27,450	9,990	35,417	12,380	43,173	16,555	46,704	18,476	32%	49%
Project Area	-	-	355	102	686	190	696	192	96%	88%
County Total	169,599	62,160	349,672	113,432	328,533	141,753	426,242	172,914	22%	52%

*Population Totals and Housing Unit statistics taken from the Loudoun County Round 9.0 MWCOC Cooperative Forecasts created in March, 2016. T Project area totals were calculated by using population and housing estimates from the Loudoun County Traffic Analysis Zones and multiplying estimates by the percent of area for each zone that overlapped with the project area (Population/Housing Estimate * (Acres of TAZ in APE/Total Acres in TAZ)). ^% Change calculated between most recent estimates (2015) and 2045.

Demographic data for the study area was extracted from four Demographic Block groups as defined in the American Community Survey (ACS) 2011-2015 5-Year survey (see Table 4.2.1.2). Demographic block #511076118012 constitutes the majority of the project area. Most of the residents in the study area reside in the communities of Arcola and Stone Ridge.

Table 4.2.1.2 – Representative Demographic Data for the Northstar Boulevard Project Area				
Loudoun County Demographic Block	% of the Project Area within Block	Total Population (2016 ACS)	Community	Household Median Income (2016 ACS)
#511076118012	80.0%	2476	Arcola/Stone Ridge	\$107,750
#511076118061	0.8%	2308	Aldie/Ashburn	\$166,296
#511076110241	6.1%	2999		\$204,097
#511076110253	13.1%	3659	Ashburn	\$158,304

Table 4.2.1.2 – Source: <https://ejscreeen.epa.gov/mapper/>

In the communities surrounding the project area, median household income is high, topping \$100,000 for all demographic blocks overlapping with the project area.

Public Transportation

In the Arcola area, transportation is largely limited to cars due to a lack of public transportation options in the immediate area. A commuter bus stop and Kiss & Ride lot is located in Brambleton along Creighton Road, and a local bus route has stops at Stone Spring Hospital. The next nearest bus stops are located south of Rt. 50 and north of Rt. 267, and the closest metro stop is currently located in Reston. There are no light rail options in the area and the Brambleton commuter route is already known for being very crowded, which forced the county to add 2 long-haul trips to the 200 Dulles South-DC bus route in 2018 (Loudoun County Transit Development Plan, 2019).

Despite the lack of public transportation options, it is estimated that 7.2% of residents in the Arcola/Stone Ridge demographic block regularly use public transportation (2016 ACS statistics). In the surrounding demographic blocks representing portions of the Aldie and Ashburn communities, 6.0%, 2.4%, and 5.0% of residents (respective to the order of blocks in table 4.2.1.1) used public transportation regularly.

Community Facilities

Community facilities include schools, libraries, post offices, hospitals, government facilities, emergency service facilities (i.e. police and fire stations), places of worship, museums, and performing arts centers, and sports facilities. Only one community public facility exists within the project area itself (the VDOT Arcola Area Headquarters), though several others are located in the immediate vicinity (within 0.5 miles).

Table 4.2.1.3 - Summary of Community Areas		
Facility Name	Facility Location	Description
Within the Project Area		
VDOT Arcola Area Headquarters	41880 John Mosby Highway	Maintenance area headquarters
Adjacent to the Project Area		
Arcola Volunteer Fire Department	23675 Belmont Ridge Rd, Ashburn	Volunteer Emergency Response Facility
Stone Springs Hospital Center	24440 Stone Springs Blvd, Dulles	Medical Facilities
Montessori of Chantilly – Casa dei Bambini	42200 Glascock Field Dr, Dulles	Montessori School Pre-School & Kindergarten
Chesterbrook Academy Preschool	23651 Strickland Drive, Ashburn	Private Preschool
Virginia Fusion Park	42254 Briarfield Ln, Aldie	Sports Complex

Land Use and Right-of-Way

The Study Area is located within the Suburban Policy Area that is guided by the *Loudoun County Comprehensive Plan*, which includes the *General Plan* and *Countywide Transportation Plan*. The primary planned land uses within the project area mainly consist of commercial, transitional business, and residential. The project area resides within the Dulles sub-area of Loudoun County and is currently zoned for a mix of residential and industrial/commercial uses, including a number of areas designated for planned development (over 70% of the project area). The northern section of the project area consists of undeveloped land owned by the Brambleton community. Zoned for residential use as well as planned community/commercial centers, it would represent a continuation of the existent neighborhoods surrounding the existent portion of Northstar Boulevard. The majority of the project area is zoned for a Planned Development Industrial Park, and a recent application (#ZMAP-2018-0015) through the Loudoun Online Land Applications (LOLA) system has proposed rezoning over 70 acres of the project area from a mix of residential uses (R1, CR1) to additional industrial park area (PD-IP). Proposed uses for these Industrial Park areas include Office and Data Center businesses. Overall, development of the project area is guided by the ‘Suburban Policy Area’ policy and design guidelines (Loudoun County WebLogis Online Mapping System). For a more detailed breakdown of zoning and land use in the project area, refer to Figure 4.2.1.1 and Table 4.2.1.4 below.

The planned areas currently zoned for industrial use are intended to accommodate large data center complexes, and residential zoning will accommodate residential housing, and business zoning is intended to accommodate office and light industrial uses.

Property acquisitions and relocations would be required for the construction of the Northstar Boulevard Extension. The type of acquisition would be determined by existing tax parcel mapping and records obtained from Loudoun County. Necessary acquisitions for this project include the following types:

- Full Acquisition – purchase of the entire property which results in displacement of the

current land use.

- Partial Acquisition – partial purchase of a property. This does not impact or affect the ability for the parcel to support existing or planned future land uses. (If there is a need for a portion of the property that was determined to affect the ability of the parcel to support existing or planned future land uses, a full acquisition would be made of that property).
- Relocation – this results from full acquisitions and the conversion of land use to a transportation use. Relocations are measured by housing unit or business, not tax parcel (e.g. acquisition of an eight unit apartment building on one tax parcel would result in eight residential displacements, or relocations).

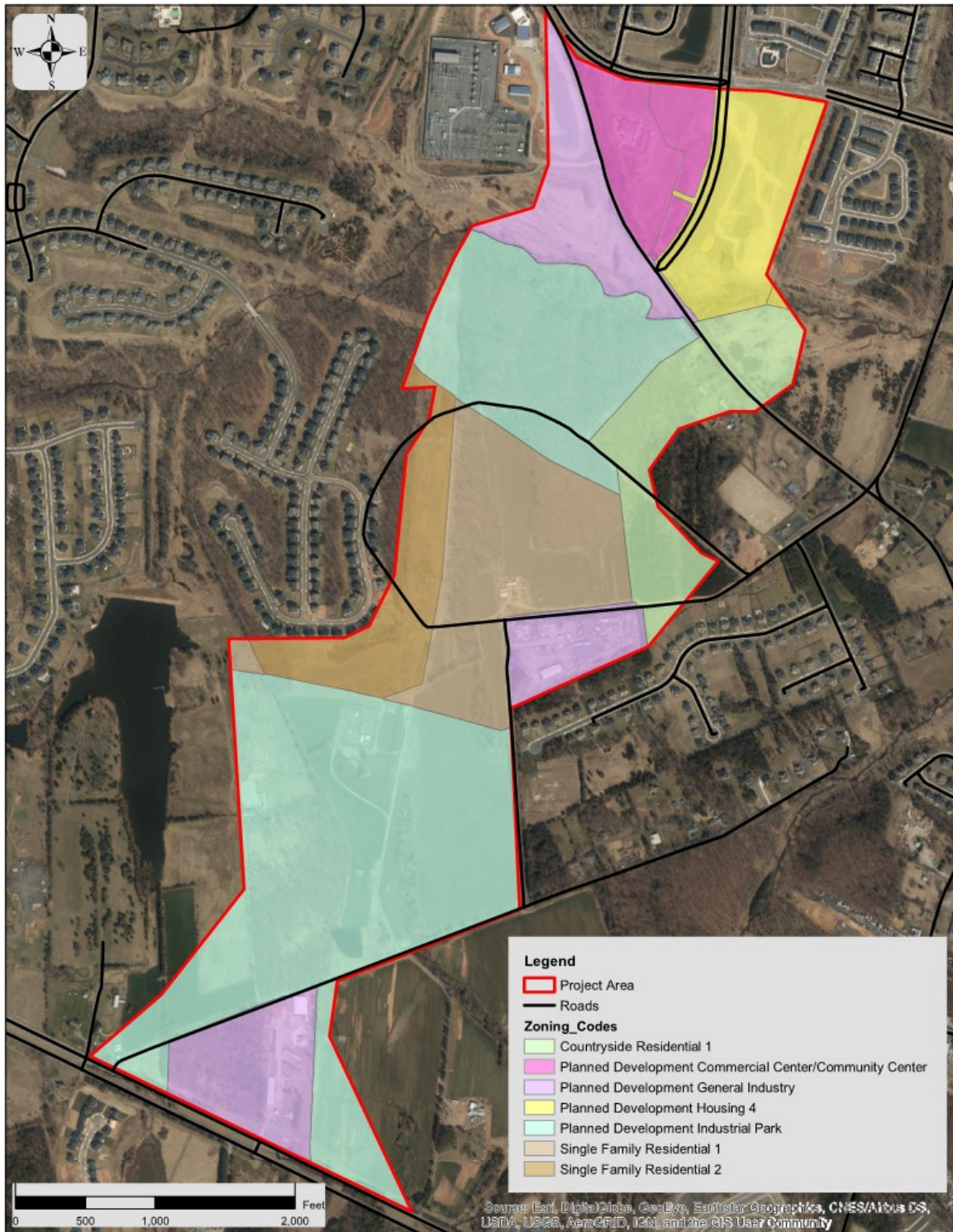


Figure 4.2.1.1 - Zoning within the Northstar Project Area

Table 4.2.1.4 – Zoned Land Use		
Zoned Land Use	Total Acreage within Study Area	Percent of Total Acreage within Study Area
Countryside Residential 1	30.3	8.6%
Planned Development – Commercial Center/Community Center	19.1	5.4%
Planned Development – General Industry	52.7	14.9%
Planned Development – Housing 4	27.1	7.7%
Planned Development – Industrial Park	154.0	43.7%
Single Family Residential 1	46.1	13.1%
Single Family Residential 2	23.4	6.6%
Total Planned Development	253.0	71.7%
Total Residential	99.7	28.3%
Planned Land Use	Total Acreage within Study Area	Percent of Total Acreage within Study Area
Business	32.8	9.3%
Industrial	319.8	90.6%
Transportation (Right-of-Way)	0.2	0.1%

Table 4.2.1. - The acquisition of property and the relocation of residents, businesses, farms, and non-profit organizations will be conducted in accordance with all applicable Federal laws, regulations and requirements, including but not limited to, 23 CFR Part 710, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended and its implementing regulations found in 49 CFR Part 24. All persons displaced on Federally-assisted projects will be treated fairly, consistently, and equitably so that they do not suffer disproportionate injuries as a result of projects that are designed for the benefit of the public as a whole. Relocation resources will be available to all residential and business relocates without discrimination.

4.2.2 Environmental Consequences

Socioeconomics

No-Build

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

Build Alternative

The Build Alternative would result in the acquisition of one residential property. The Build Alternative would likely improve traffic patterns and accessibility in the vicinity of the project area, which is anticipated to improve the local economy and employment by decreasing traffic congestion and increasing accessibility to local businesses and public facilities. In addition, the extension of Northstar to Rt. 50 provides an ideal corridor for future public transportation routes to and from the Arcola area; though no bus routes have been proposed for the Northstar Boulevard Extension, the new route would provide a much needed opportunity for expansion of public transportation into the area. The proposed project supports the planned land use set forth and

recommended in the *Loudoun County Revised Comprehensive Plan* and *Revised General Plan*. The project is not expected to alter the multiple types of zoning classifications present within the project area. The proposed project is not expected to generate substantial traffic through residential areas. Northstar Blvd is intended to provide improved connection in the area and support current and anticipated land use within the area.

Land Use and Right-of-Way

No-Build

The No-Build Alternative would not cause any project-related construction and, as a result, would not result in alterations or impacts to the existing land use in the project area. Land use is not anticipated to remain the same; several parcels are currently undergoing zoning changes and planned development.

Build Alternative

Right of way acquisitions required for the build alternative are summarized in Table 4.2.2.1. Outside of the limited roadway boundaries, this project is not expected to alter the existing land use designations and is not in conflict with policy and design guidelines for the encompassing Suburban Policy Area. Two zoned residential parcels would be full acquisitions and would require displacement resulting from the build alternative. Only one of the two parcels contains an occupied residential dwelling. No business or additional residential properties would be a complete take or substantially impacted during construction.

Table 4.2.1.5 – Build Alternative Right-of-Way Acquisition				
Alternative	Anticipated Right-of-Way Acquisition (Acres)	Full Acquisitions	Partial Acquisitions	Relocations
No Build	0	0	0	0
Build Alternative	35	2	24	1

Community Facilities

No-Build

The No-Build Alternative would not cause any project-related construction and, as a result, would not result in alterations or impacts to existing community facilities.

Build Alternative

No impacts to community facilities are anticipated as part of this project. Only limited portions of property along the edge of the VDOT facility would be affected. It is expected that the surrounding community would experience an overall beneficial impact from the improved movements along local road (due to eased traffic conditions) and subsequent improved access to community facilities. Improved traffic conditions would directly benefit rescue responders travelling to and

from the Arcola Volunteer Fire Department and Stone Springs Hospital Center.

4.3 Environmental Justice & Title VI

FHWA defines Environmental Justice (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 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.

As defined by Title VI of the Civil Rights Act of 1964 (Title VI) and in the guidance for implementing EO 12898, minority populations include citizens or lawful permanent residents of the U.S. who, as defined by FHWA Order 6640.23A, are:

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

The Council on Environmental Quality’s (CEQ) *Environmental Justice Guidance* (CEQ, 1997) defines the criteria for identifying minority populations as census tracts in which the minority population represents 50% or more of the total population. A census tract may also have a substantial minority population if the percentage of minorities is meaningfully greater than the minority population percentage in the “general population or other appropriate unit of geographic analysis” (10% via DOT guidelines; VDOT, 2018). In the sections below, existing vulnerable populations within the project area are identified, including population above the age of 64 and linguistically isolated households, and potential effects on each are defined. Data on minority and low-income populations was collected from 2010 U.S. Census Tract and 2016 American Community Survey (ACS) databases. Four census tracts intersected with the project area and are listed in tables 4.2.1.2 and 4.3.1.1 as well as Figure 4.3.1.1.

Populations with Limited English Proficiency (LEP)

Federal agencies are required to identify and provide services needed by those with Limited English Proficiency (LEP), as stated by Executive Order 13166 (“Improving Access to Services

for Persons with Limited English Proficiency”). It is further required that systems be developed and implemented that allow LEP populations to have meaningful access to these public services to avoid discrimination based on national origin and meet the requirements of Title VI and EO 13166. Loudoun County echoes these requirements in their own policy to “take reasonable steps to provide [LEP] people with timely and meaningful access to services and benefits” (Overview of Title VI and Loudoun County Government’s Limited English Proficiency (LEP) Plan, 2017). Data has been collected to determine the presence of LEP populations in the study area and public involvement efforts will include outreach specifically targeted towards LEP populations in the project area.

Individuals over the Age of 64

Individuals over the age of 64 do not necessarily belong to a population protected under EJ statutes; however, this population represents a key demographic group that is associated with increased susceptibility to environmental issues. In particular, elderly populations have shown elevated sensitivity to particulate matter exposure (U.S. EPA, 2009). Inclusion of this population in these analyses supports the EPA’s EJ goal of emphasizing potential effects on public health to “ensure the fair treatment and meaningful involvement of all people” (https://www.epa.gov/sites/production/files/2015-05/documents/ejscreen_technical_document_20150505.pdf).

4.3.1 Existing Conditions

The majority of the project area consists of large, unoccupied parcels associated with land bays for future development and the existent sod farm in the southern portion of the corridor. Though 19 occupied ‘Single Family’ parcels intersect with the project area, only 2 occupied residential parcels overlap with the proposed alignment. Due to the largely unoccupied nature of the project area, impacts to environmental justice populations are anticipated to be minimal and limited to indirect impacts to adjacent neighborhoods such as Arcola.

The neighborhoods adjacent to the proposed project area do have existent environmental justice populations per the 2010 census/2016 ACS data. Approximately 52% of the population in the study area is composed of minority populations. In addition, over 8% of the study area population is considered to have LEP, over 6% are considered low-income and over 7% of the population is over the age of 64 years. The overall demographic index value, which represents an average of the two primary EJ Population groups (minority and low-income), is 29% for the areas adjacent to the proposed Northstar project (the index value for Loudoun County is 17.5%).

Table 4.3.1.1 – Existing Socioeconomic Data					
Location	Total Minorities (%)	LEP Populations (%)	Total Low-income %	Persons Over 64 Years (%)	Demographic Index
Meaningfully Greater Threshold	33.8%	11.3%	4.7%	7.2%	19.3%
Loudoun County	30.7% ^	10.3% *	4.3% *	6.5% ^	17.5%
Study Area (weighted estimates)*	132 (51.9%)	21 (8.4%)	6.5%	11 (4.2 %)	29%
Block Group #511076118012*	1425 (58%)	267 (10.8%)	7%	96 (4%)	32%
Block Group #511276118061*	940 (41%)	34 (1.5%)	3%	258 (11%)	22%
Block Group #511076110241*	556 (19%)	44 (1.5%)	2%	418 (14%)	10%
Block Group #511076110253*	1476 (40%)	116 (3.2%)	6%	159 (4%)	23%

Table 4.3.1.1 - Socioeconomic Data obtained from: *EJ Screen ACS 2016 Data and ^EJScreen 2010 Census Data.

Demographic Index is calculated as the average of Percent Low-Income and Percent Minority

(<https://www.epa.gov/ejscreen/overview-demographic-indicators-ejscreen>). Totals for the 'Study Area' were calculated by weighting block group percentages of each demographic by the percentage of the project area represented by each block group.

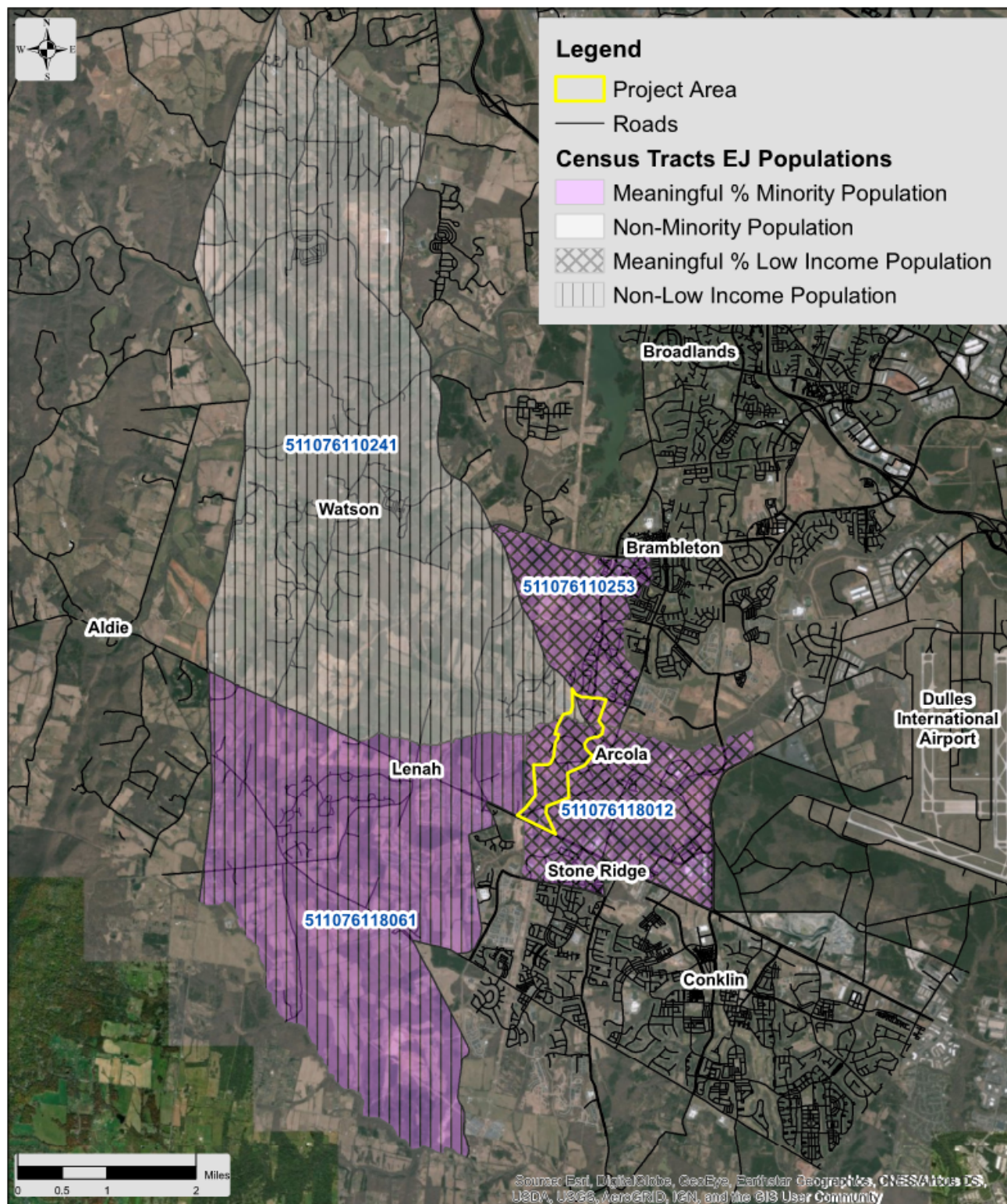


Figure 4.3.1.1 – Map of Minority and Low Income Population Groups in the Census Blocks intersecting the Project Area

Minority Populations

Minority Census Block groups were defined as having a meaningfully greater minority population if the percentage of minorities within the locality was 10% higher than that of the surrounding region (in this case, defined as Loudoun County). According to Loudoun County's *Overview of Title VI and Loudoun County Governments's Limited English Proficiency (LEP) Plan*, utilizing U.S. Census Bureau Population Estimates, Loudoun County had a minority population of 30.7 percent as of April 2016. Additionally, Loudoun County had a Hispanic population of 13.7 percent as of 2016, making Loudoun County the 3rd highest population and 11th highest concentration of Hispanic residents in Virginia. The majority of the proposed project area falls within Demographic Block group #511076118012, which is 58% minority, and the study area in whole had an average 52% minority population, which is meaningfully greater than that of Loudoun County.

Low English Proficiency Populations

An estimated 10.3% of Loudoun County's population speaks English "less than very well" (U.S. Census Bureau, 2016 American Community Survey 1-Year Estimates), or is defined as having 'Limited English Proficiency' (LEP). Within the study area, it is estimated that 8.4% of the population has LEP, which is not meaningfully greater than the county average. Of the 4 census block groups in the project area, none had greater than 2% linguistically isolated households, which are defined as a household where no one over the age of 14 speaks English 'very well' (EPA, 2018; Loudoun County Government, 2017).

Low-Income

According to *Loudoun County's Income Highlights American Community Survey*, utilizing U.S. Census Bureau and Office of Management and Budget's standards for income thresholds by family size and age, the 2019 poverty threshold for a family of four is defined as an income of \$25,750. As of 2013, Loudoun County concluded that 4.3% of the population was impoverished. The majority of the proposed project area falls within Demographic Block group #511076118012, which is comprised of 7% low income households. Small portions of the project area are within Demographic Block groups 511076118061, 511076110241 and 511076110253, with low income populations of 3%, 2% and 6% respectively. It is estimated that the percent of low-income households within the study area is 6.5%.

Table 4.3.1.2 – 2019 Poverty Guidelines for the 48 Contiguous States and the District of Columbia – Effective January 11, 2019 (USDHHS, 2019)	
Persons in Family/Household	Poverty Guidelines
1	\$12,490
2	\$16,910
3	\$21,330
4	\$25,750
5	\$30,170
6	\$34,590
7	\$39,010
8	\$43,430
For families with more than 8 persons, add \$4,420 for each person.	

Persons Over 64 Years of Age

An estimated 4% of the population in the project area is age 65 or older. Two of the representative block groups have meaningfully greater populations of people older than 64 (11% and 14%) in comparison to the county as a whole, but these block groups cumulatively compose only 6.9% of the project area.

4.3.2 Environmental Consequences

No-Build

The No-Build Alternative would not produce beneficial or adverse impacts to predominantly minority, linguistically isolated or low-income populations adjacent to the project area. Populations in the vicinity of the project area would continue to lack mobility to jobs and access to public transportation facilities. The nearest public transportation facilities would continue to be the Brambleton commuter bus stop/Park & Ride and the Local bus stop at Stone Spring Hospital (Loudoun County GeoHub Transit Information, 2019).

Build Alternative

The project is not expected to have disproportionately high and adverse impacts to minority and low-income populations within or adjacent to the study area in accordance with the provisions of the E. O. 12898 and FHWA Order 6640.23. No business acquisitions are proposed and one residential acquisition is necessary. The project is anticipated to provide improved mobility to jobs and public transportation facilities by connecting local roadways and reducing congestion, as outlined in Section 4.14.2. The Northstar Boulevard Extension would not significantly impact air quality around the project area (see Section 4.6 for further details). It is anticipated that Mobile Source Air Toxic (MSAT) levels would experience a net decrease while levels of Carbon Monoxide remain under attainment-level standards (see Air Quality Technical Report for further details; Appendix D). This project is anticipated to decrease emergency response times to the new Stone Springs Hospital and the community, and is anticipated to provide Arcola-area residents with improved ease-of-access to public schools south of Route 50. Improved emergency response

times and reduced MSAT levels are anticipated to benefit persons over 64 years of age, and improved access to community facilities and schools represent a beneficial impact for LEP populations. In summary, the Northstar Boulevard Extension is projected to be a net-benefit for the surrounding communities and any environmental justice populations within those communities.

4.4 Cultural Resources

Section 106 of the National Historic Preservation Act of 1966, as amended (54 USC 306108) and its regulations (36 CFR Part 800) require federal agencies to consider the effects on historic properties from their undertakings. Historic properties are defined as buildings, structures, sites, districts, and objects 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 (SHPO), federally-recognized tribes as appropriate, representatives of local governments, and other parties with an interest in an undertaking.

4.4.1 Existing Conditions

Two cultural resource surveys (titled “*Cultural Resources Survey of Unsurveyed Portion of the Northstar Boulevard Project, Loudoun County, Virginia*” and “*Phase I Cultural Resources Survey of ±1.76 Hectares (±4.20 Acres) for the Northstar Boulevard Project*”; VDHR File No. 2018-4115; see Appendix B) were prepared to support the Section 106 process for this study. The first survey encompassed a 30 hectare study area extending from the intersection between existing Northstar Boulevard and Shreveport Drive to just south of Broad Run (Figure 4.4.1.1). The second survey encompassed two smaller portions of the proposed alignment in the southern portion of the study area (Figure 4.4.1.1). Each survey identified the presence of archaeological and architectural resources within the study area.

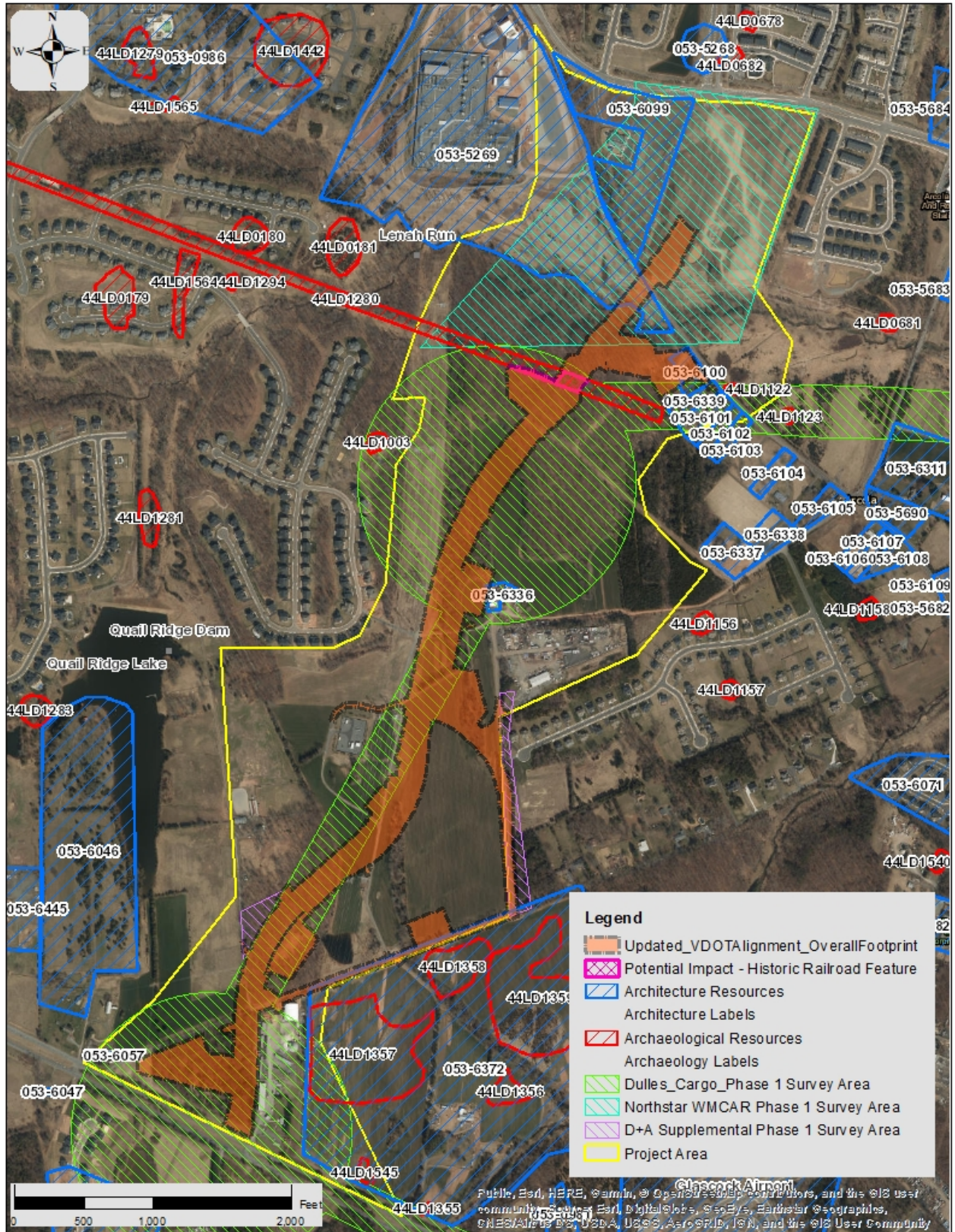


Figure 4.4.1.1 - Cultural Resources In and Around the Proposed Project Area

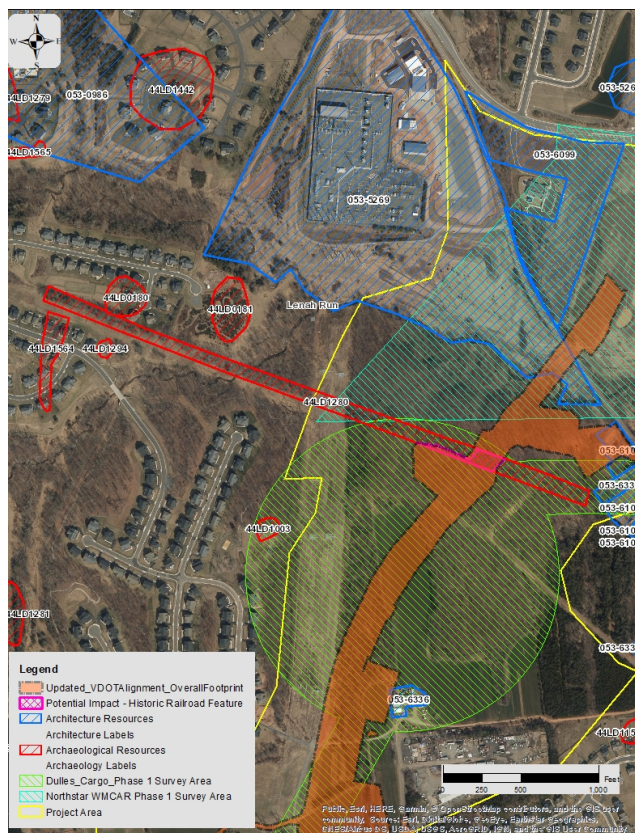


Figure 4.4.1.2 - Archaeological Resource 44LD1280 with Potential Impact Areas in the Proposed Northstar Boulevard Extension Alignment

The study area contains one archaeological site (Site 44LD1280) that is potentially eligible for the NRHP under Criteria A and D (Criteria B and C are not considered applicable). Site 44LD1280 consists of an incomplete segment of railroad grade from the 1850's. The SHPO was consulted with to determine the eligibility of site 44LD1280; SHPO determined an additional survey would likely be required to determine the NRHP eligibility of the site and the effects of the project. Also contained within the study area were two architectural resources (053-5269 and 053-6099) that were identified as demolished and are not eligible for listing under the NRHP. An archaeological location was also identified but is not eligible for NRHP by definition.

Cultural resources were previously identified in the southern portion of the project area in May 2013 and April 2014 during a Phase 1 survey for the Dulles Air Cargo, Passenger & Metro Access project (DACPMAH) including 8 architectural resources and 3 archaeological resources. 7 of the 8 additional architectural resources have

previously been determined ineligible for NRHP listing by VDHR; one resource has not been evaluated (053-6372; Chantilly Turf Farm). The remaining archaeological sites include an agricultural field and two single dwellings; none have been evaluated for NRHP listing. An additional Phase 1 survey (as mentioned previously) was conducted in the southern portion of the project area to assess unevaluated resources and previously unsurveyed areas as recommended by SHPO.

4.4.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in construction and subsequently would not impact any architectural or archaeological resources within the study area.

Build Alternative

This project is not anticipated to have any adverse effects on existent cultural resources. Architectural resources within the project area have been previously demolished and/or are not eligible for listing under the NRHP. Only one known archaeological resource in the area has been evaluated and is considered potentially eligible for listing. There will be no substantial cuts or grading in the vicinity of the resource. DHR determined that the resource (site 44LD1280) would be largely avoided and preserved in place and concurred in February of 2019 that the project would have ‘no adverse effect’ on the resource (see Appendix B for documentation).

4.5 Section 4(f) and 6(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 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965, as amended (16 U.S.C. 4601, 36 CFR 59.3) protects lands purchased within LWCF funds.

4.5.1 Existing Conditions

There are no publicly owned parks, recreation facilities or wildlife refuges within the study area. Historic properties within the study area include the URS Arcola A2 Railroad bed site (DHR ID 44LD1280). Portions of this archaeological resource have previously been deemed eligible for listing under the NRHP.

No 6(f) properties are located in the project area and no impacts to Section 6(f) properties are anticipated

4.5.1 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in construction and would therefore not result in impacts to Section 4(f) and 6(f) properties.

Build Alternative

This project is not anticipated to have any adverse impacts on Section 4(f) or 6(f) properties. There are no Section 6(f) properties within the project area. One Section 4(f) property, Manassas Gap

Rail Road site 44LD1280, has been identified within the proposed project area and is anticipated to overlap with the project corridor. However, there will be no substantial cuts or grading in the vicinity of the resource. DHR determined that the resource would be largely avoided and preserved in place and concurred in February of 2019 that the project would have ‘no adverse effect’ on the resource. Further coordination with DHR was initiated in March of 2019 in regards to a supplementary cultural resources survey conducted in a portion of the study area not addressed by previous surveys; DHR again determined the project would have ‘no adverse effect’ to historic resources in April of 2019 (see Appendix B for documentation).

4.6 Air Quality

In accordance with the Clean Air Act (CAA), as last amended in 1990, the EPA has established National Ambient Air Quality Standards (NAAQS; 40 CFR part 50) for pollutant that are considered harmful to people as well as the environment. NAAQS are categorized as primary standards, which provide for protection of public health (particularly for “sensitive” populations such as children, the elderly and asthmatics), while secondary standards address public welfare, which includes the protection of animals, crops, vegetation, buildings and general visibility from pollutant-associated damage. NAAQS are currently defined for six principle, or ‘criteria’, pollutants: carbon monoxide (CO), lead (Pb), ozone (O₃), nitrogen dioxide (NO₂), particulate matter (PM_{2.5} for particulate pollutants <2.5µm in diameter; PM₁₀ for particulate pollutants <10µm in diameter) and sulfur dioxide (SO₂). Standards are periodically reviewed and occasionally revised.

Table 4.6.1.1 - EPA National Ambient Air Quality Standards**				
Pollutant	Averaging Time	Standard	Standard Level	Form
Carbon Monoxide (CO)	8 HRs	9 ppm	Primary	Not to exceed more than once per year
	1 HR	35 ppm		
Lead (Pb)	3 Month Average (Rolling)	0.15 µg/m ³ ⁽¹⁾	Primary and Secondary	Not to exceed
Nitrogen Dioxide (NO ₂)	1 HR	100 ppb	Primary	98 th percentile of 1 HR Daily Max. concentrations, averaged over 3 years
	1 Year	53 ppb	Primary and Secondary	Annual Mean
Ozone (O ₃)	8 HRs	0.070 ppm ⁽²⁾	Primary and Secondary	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM _{2.5})	1 Year	12.0 µg/m ³	Primary	Annual mean, averaged over 3 years
	1 Year	15.0 µg/m ³	Secondary	
	24 HRs	35 µg/m ³	Primary and Secondary	98 th percentile, averaged over 3 years
Particle Pollution (PM ₁₀)	24 HRs	150 µg/m ³	Primary and Secondary	Not to exceed more than once a year on average over 3 years
Sulfur Dioxide (SO ₂)	1 HR	75 ppb ⁽³⁾	Primary	99 th percentile of 1 HR Daily Max. concentrations, averaged over 3 years
	3 HRs	0.5 ppm	Secondary	Not to exceed more than once per year

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m³ as a calendar quarter average) also remain in effect.

(2) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O₃ standards additionally remain in effect in some areas. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(3) The previous SO₂ standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO₂ standards or is not meeting the requirements of a SIP call under the previous SO₂ standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

**The information from this table references the EPA NAAQS Table available online at <https://www.epa.gov/criteria-air-pollutants/naaqs-table>.

Air quality may be influenced by a number of variables including weather, topography and the type and amount of the pollutants being emitted. The significance of a pollutant's concentration is determined by comparing the outdoor ambient air conditions of a locality to federal and state air quality standards, such as those listed above (Table 4.6.1.1). The EPA designates areas where air quality meets standards as being in 'attainment', while areas that do not meet standards are called 'non-attainment areas'. Non-attainment areas that improve air quality to meet NAAQS are redesignated by the EPA as 'maintenance' areas in accordance with redesignation requirements in the CAA (Section 107(d)(3)(E)).

Pursuant to the CAA Amendments (1990), states are required to define the status of all areas within their borders in accordance with their compliance to NAAQS. The attainment status was identified for the study area and is discussed in the sections below. A qualitative air quality analysis was performed for this EA in conformity with all applicable air quality regulations and requirements. Methods and assumptions applied during the study were defined to be consistent with standards defined in the VDOT Resource Document. The Northstar Boulevard Extension is listed in its preliminary engineering phase in the Loudoun County 2010 Revised Countywide Transportation Plan (as amended March 6, 2018) as well as the FY2018-2021 Statewide Transportation Improvement Program (July 2017), the Transportation Planning Board's Visualize 2045 report and the Constrained Long-Range Transportation Plan (October 17, 2018).

4.6.1 Existing Conditions

The Dulles area of Loudoun County is currently in attainment for all of the National Ambient Air Quality Standards (NAAQS). Due to the region's attainment status for CO, projects in the area are only subject to NEPA standards and not EPA project-level transportation conformity requirements. In addition, regional transportation projects do not require specific analysis related to Particulate Matter (PM) due to the region's PM attainment status.

4.6.2 Environmental Consequences

No-Build Alternative

The No-Build alternative would not result in construction and therefore no construction related activities would result in emissions. Emissions contributed by current traffic congestion would remain and likely worsen with continuing population growth and increasing congestion levels. However, as the region is currently in attainment for all NAAQS, it is unlikely a no-build scenario would result in future violation of NAAQS.

Build Alternative

Carbon Monoxide (CO)

To meet NEPA standards, the Federal Highway Administration (FHWA)-VDOT Programmatic Agreement for Project-Level Air Quality Analysis for Carbon Monoxide was applied to this project. The Northstar Boulevard Extension qualifies for this programmatic agreement because the build conditions for intersections meet the applicable criteria (see Appendix D, Northstar

Boulevard Extension Air Quality Technical Report for detailed descriptions of criteria) and the project is consistent with the project types and conditions listed in the agreement between FHWA and VDOT. Worst-case modeling parameters were used to determine that this project is of a type that would not significantly and negatively impact air quality and cause or contribute to a future violation of NAAQS for CO.

Mobile Source Air Toxics (MSATs)

The Northstar Boulevard Extension qualifies as a Tier 2 project, or a project with ‘Low Potential MSAT Effects’, under FHWA MSAT Guidance. Project of this tier are subject to qualitative analysis of potential differences for MSAT emissions for project alternatives. Due to considerable uncertainties associated with estimation of the potential health impacts of MSATs, and the lack of national consensus on dose-response relationships for MSAT compounds and acceptable levels of risk, predicted differences in impacts of alternatives are likely to be smaller than levels of uncertainty currently inherent in the predictions. For the purposes of evaluating this project, it is estimated that MSAT emissions might increase due to a localized increase in Vehicle Miles Travelled (VMT) resulting from the build alternative. However, national control programs implemented by the EPA are anticipated to reduce annual MSAT emissions by over 80 percent by the design year (2043), resulting in projected reductions in MSAT levels for all evaluated alternatives.

Construction Emissions & Conclusions

It is estimated that approximately 45,000 vehicles per day (VPD) would travel Northstar Boulevard in Design year 2043, subsequently reducing congestion on parallel north/south routes and local arterial roadways. A qualitative assessment of indirect and cumulative impacts concluded that the project is not expected to significantly impact the air quality designations for the region, which in part already reflect the accumulated mobile source emissions from past and present actions. Construction-related emissions are anticipated to occur and, though they would be temporary in nature, they would be restricted by standards defined by the VDOT Road and Bridge Specifications and additional VDEQ air pollution regulations (9 VAC 5-130 – Open Burning Restrictions; 9 VAC 5-45 – Article 7 – Cutback Asphalt Restrictions; 9 VAC 5-50 Article 1 – Fugitive Dust Precautions). Overall, the assessment concluded that the Northstar Boulevard Extension would meet all applicable state and federal air quality requirements.

4.7 Noise

A noise analysis was conducted to assess project impacts to the community. The proposed Build Alternative and No Build Alternative were assessed in accordance with Federal Highway Administration (FHWA) regulations set forth in 23 Codes of Federal regulations (CFR) Part 772 and the February 2018 Virginia Department of Transportation (VDOT) noise assessment guidelines. Design year traffic noise calculations were predicted using the FHWA’s Traffic Noise Model (TNM), version 2.5, the latest approved version. The TNM uses acoustic algorithms to predict noise levels at selected receptors using accepted sound propagation standards such as intervening ground barriers, building rows, and existing dense vegetation. Future TNM runs were developed by modifying existing conditions models, such as future terrain models, to account for the proposed roadway.

The study involved monitoring existing noise conditions and modeling existing (2018) and future design year (2043) noise conditions in the study area with the FHWA-approved computerized TNM. The worst-case noise hour was predicted to occur in the P.M. peak.

The noise report, *Preliminary Design Noise Impact Analysis Technical Report, Northstar Boulevard Extension (Route 50 to Shreveport Drive), UPC 106994, Loudoun County, VA*, can be found in Appendix C.

To determine the severity of traffic noise impacts on human activity, the FHWA established the Noise Abatement Criteria (NAC) to determine the degree of impact noise will have on human activities for different categories of land use (See Table 4.7.1.1). Noise levels that are predicted to approach or exceed the absolute FHWA/VDOT NAC design year build scenario at any receptor constitute an impact and warrant a noise abatement evaluation.

Table 4.7.1.1 – FHWA Noise Abatement Criteria: Hourly A-Weighted Sound Level Decibels [Leq(h) in dBA]			
Activity Category	Activity Category Leq(h)	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B*	67	Exterior	Residential
C*	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E*	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	-	-	Agricultural, airports, bus yards, emergency services, industrial, logging maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water re-sources, water treatment, electrical) and warehousing.
G			Undeveloped lands that are not permitted.
Source: CFR Part 772			
*Includes undeveloped lands permitted for this activity category.			

4.7.1 Existing Conditions

The study area, an approximately 500-foot wide corridor extending from the existing section of Northstar Boulevard south to Route 50, includes noise-sensitive land-uses consisting of single and multi-family residential properties, a community pool and daycare center. The majority of the area surrounding the study corridor is undeveloped and utilized as a sod farm. Within the study area corridor, seven noise-sensitive land uses were characterized that are considered similar in acoustic environment. Portions of the study area are bisected by the Washington Dulles International Airport 60 and 65 LDN noise contours. Departing aircraft from Dulles airport represent a substantial intermittent influence on sound levels within the Common Noise Environment (CNEs) in the project area. Evaluated CNEs are located within the Loudoun County noise overlay impact areas and are shown on Figure 2 through 4 of the Noise Report found in Appendix C.

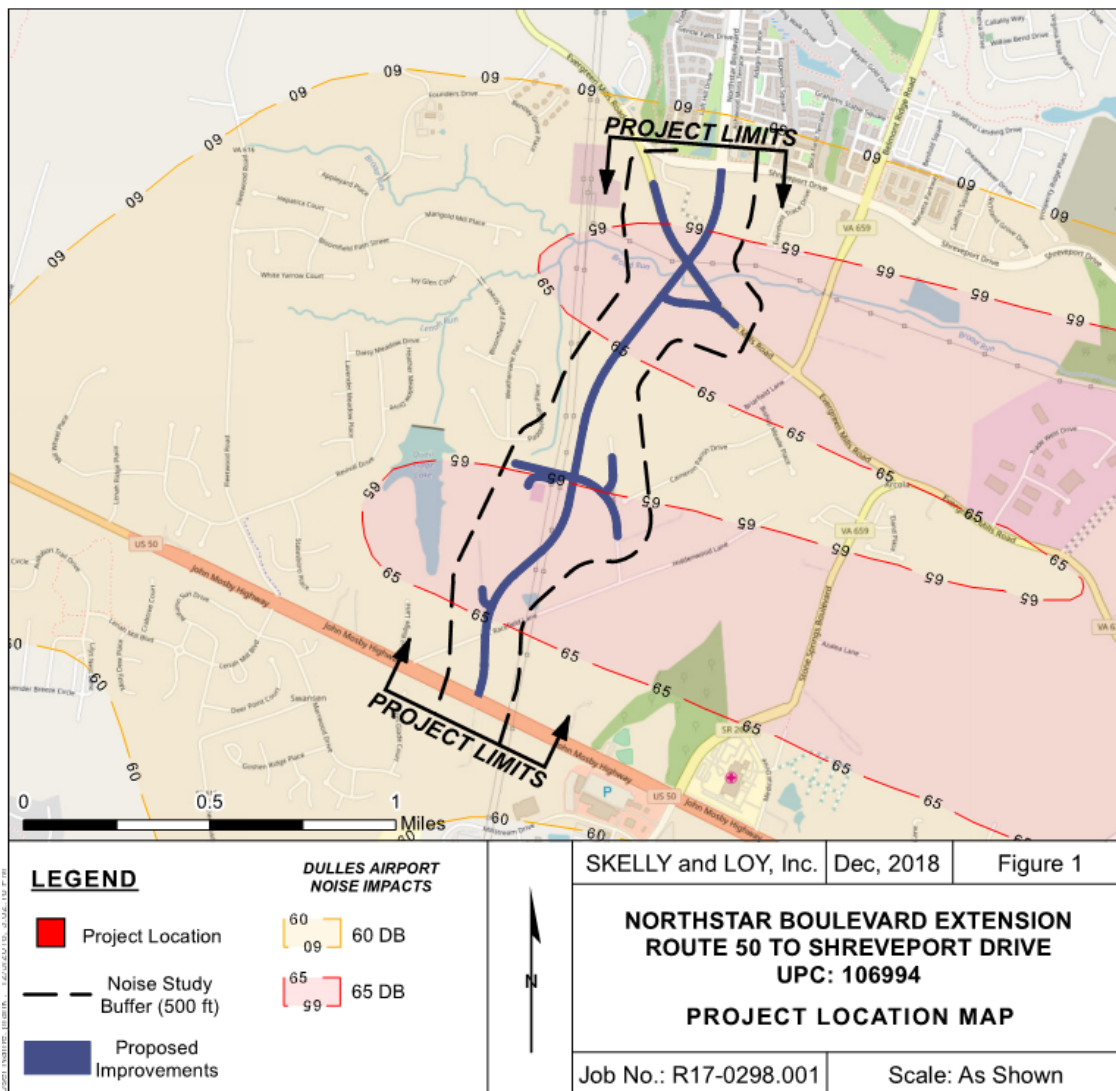


Figure 4.7.1.1 – Noise Study Project Area for Skelly and Loy, Inc. – Project limits overlap with existing Washington Dulles International Airport noise contours. Figure does not show Racefield Lane and Youngwood Lane.

Noise impacts were assessed for existing and future conditions in the study area for each CNE. The worst-case noise hour was determined to occur in the P.M. Table 4.7.2.1 summarizes the range of predicted noise levels by CNE. The tables includes a description of each CNE and its land use, the FHWA Activity Category, and the loudest-hour traffic.

4.7.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in construction and would not increase noise levels via construction-related activities or the subsequent traffic associated with the new road.

Build Alternative

As previously noted, table 4.7.2.1 provides a summary of existing and future noise levels and impacts for each CNE in the study area. Sound levels were projected to increase by 2 dBA over existing conditions throughout the study area. Table 5 in the Noise Report (Appendix C) offers a more detailed enumeration of all of the computed sounds levels at all the modeled receptors included in the noise assessment.

Table 4.7.2.1 – Summary of Predicted Exterior Noise Levels for the Worst Hour						
CNE	Land Use Description	Activity Category	Range of Predicted Exterior Noise Levels and Impacts for the Worst Hour			
			2018 Existing		2043 Build	
			Sound Level (dBA)	Number of Impacts	Sound Level (dBA)	Number of Impacts
A	Residential	B	58-59	0	59-60	0
B	Residential	B	59	0	60-61	0
C	Residential	B	58	0	60-62	0
D	Residential	B	58	0	58-62	0
E	Residential	B	58	0	60	0
F	Community Pool	C	59	0	64	0
G	Daycare Exterior	B	58	0	59	0
G	Daycare Interior	D	33	0	35	0
Total Impacted Receptor Units				0		0

There are no anticipated impacts associated with a “substantial increase above existing” noise level threshold or from an approach or exceedance of the NAC. There are no existing or future noise impacts predicted to occur within any CNE in the study area and highway traffic noise abatement consideration is not expected to be warranted. However, this noise evaluation is preliminary; a more detailed analysis will be performed during the final design stage.

Construction activity may cause intermittent fluctuations in noise levels from use of equipment such as dump trucks, graders, bulldozers, etc. During the construction phase of the project, all reasonable measures will be taken to minimize noise impacts from these activities. The contractor

would be required to be in compliance with applicable state (VDOT Road and Bridge Specifications Section 107.16(b) (3) and Loudoun County noise regulations and specifications to reduce the impact of construction noise on the surrounding community. These measures include, but are not limited to:

- Restricting work that may produce objectionable levels of noise between 10 PM and 6 AM
- Limiting exterior noise levels to no greater than 80 decibels during noise-sensitive activities; applying corrective actions if activities exceed this level
- Minimizing impacts from hauling activities by establishing haul routes that direct vehicles away from developed areas to the extent practicable.

4.8 Wetlands

Protection of wetlands is mandated by the federal government under the provisions of Executive

Order 11990, which specifies that all federal agencies must minimize the destruction, loss or degradation of wetlands in order to preserve the natural functions they provide. These functions may include sediment and toxin retention, nutrient removal, groundwater discharge and providing wildlife habitat. Wetlands are characterized as areas which are inundated or saturated for frequencies and/or durations sufficient to support a prevalence of vegetation adapted for life in saturated soils (40 CFR 230.41(a)(1)).

In April 2018 and February 2019, wetland delineations were performed within the proposed project corridor to identify non-tidal streams and wetlands. The boundaries,

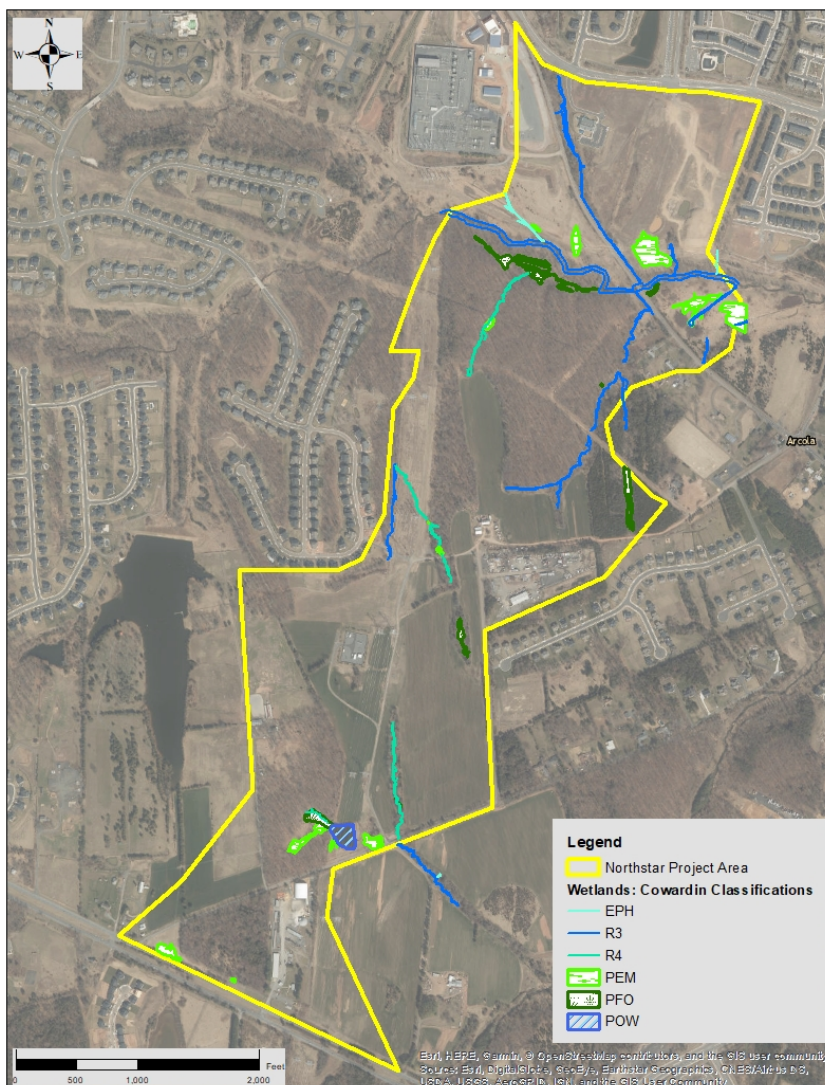


Figure 4.8.1.1 - Wetlands Delineated in the Northstar Boulevard Extension Project Area

classification and jurisdictional status of each wetland was verified by the US Army Corps of Engineers; results were reported in Revised Jurisdictional Determination NAO-2018-01132, dated November 14, 2018 and revised April 22, 2019.

4.8.1 Existing Conditions

The existing wetlands are shown above (Figure 4.8.1.1) and demarcated in further detail on the Wetlands Delineation Report found in Appendix E. Jurisdiction wetlands were classified via the Cowardin system as defined in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979). In total, 6.444 acres of wetlands were surveyed and verified as jurisdictional (see Table 4.8.1.1 for further details). All wetlands within the project area are located within the Middle Potomac Catocin watershed (eight-digit Hydrologic Unit Code (HUC) 02070008). Three types of palustrine wetlands were identified in the project corridor: Palustrine Forested (PFO) wetland, Palustrine Emergent (PEM) wetland, and Palustrine Open Water (POW; Table 4.8.1.1).

Table 4.8.1.1 - Estimated Wetland Acreage in the Project Study Area and Acreage of Anticipated Impacts				
Watershed	Cowardin Abbreviation	Cowardin Classification	Acreage within Study Area	Acreage of Anticipated Impacts
Middle Potomac Catocin (HUC 02070008)	PEM	Palustrine, Emergent	3.669	0.6
	PFO	Palustrine, Forested	2.091	0.5
	POW	Palustrine, Open Water	.684	0
	Total Wetlands		6.444	1.1
	Total Study Area		350	

4.8.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in construction and would not result in impacts to wetlands.

Build Alternative

The Build Alternative would result in approximately 1.1 acre of total wetland impacts, affecting both Palustrine Emergent and Palustrine Forested wetlands within the project area (Table 4.8.1.1). Direct impacts would result from grading, fill, conversation and hydrological isolations/loss of function. Hydrolic isolation/alteration and conversion of vegetative type is less impactful to system function than grading and filling. The majority of the wetlands are located in the northern portion of the project.

Wetland impacts are anticipated to occur during the construction of this roadway. As may be required, compensation for unavoidable wetland impacts associated with the construction of this project will be made in accordance state and federal regulations. The potential for avoiding impacts to wetlands is restricted by tie-in constraints to the existing Northstar Boulevard, design requirements, and location of wetlands. Efforts to minimize impacts will be explored in later stages of design and permitting. Wetland mitigation will be developed in concert with the designated State and Federal agencies during the permitting process for this project. VDOT will coordinate with USACE, DEQ and the Virginia Marine Resources Commission (VMRC) to obtain all required permits.

4.9 Streams and Water Quality

Surface waters draining the project area consist of the North Branch of Broad Run, which runs from west to east, as well as smaller tributaries of Broad Run and Lenah Run, which runs south to north until its confluence with Broad Run. Broad Run and Lenah Run are both perennial streams fed by a number of smaller intermittent tributaries. The entire inventory corridor lies within the Middle Potomac-Catoctin watershed (HUC 02070008).

In April 2018 and February 2019, wetland delineations were performed within the proposed project corridor to identify non-tidal streams and wetlands. In total, 15,187 linear feet of stream were mapped within the project corridor. Stream boundaries were verified and confirmed as jurisdictional by USACE Preliminary Jurisdictional Determination (JD) NAO-2018-01132, dated November 14, 2018 and revised April 22, 2019. The Delineation Report and JD can be found in Appendix E.

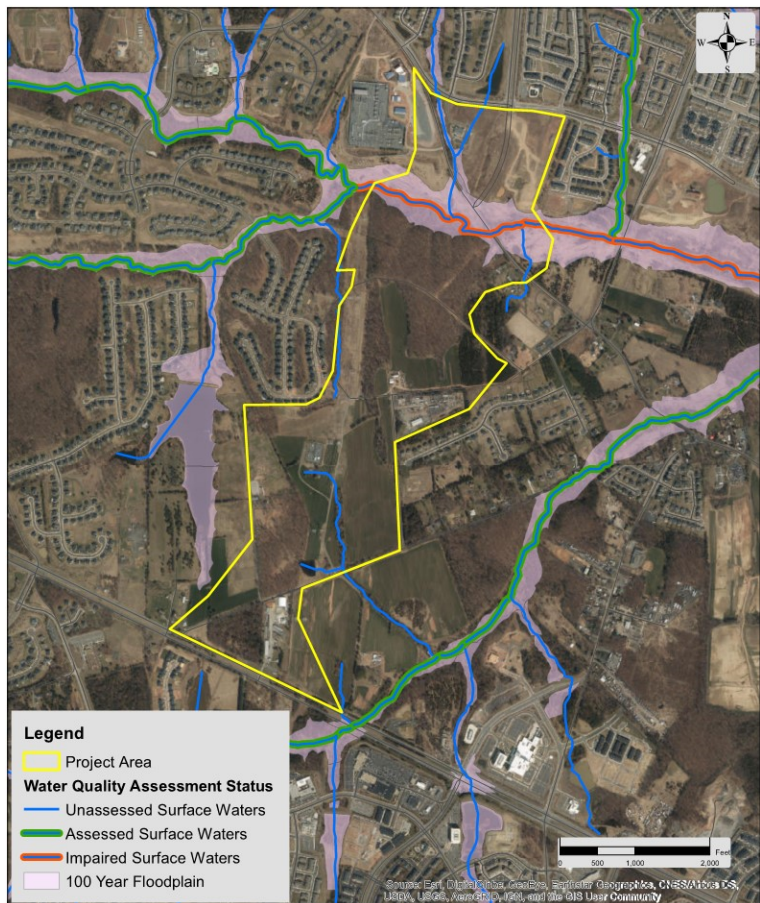


Figure 4.9.1.1 - Assessed and Impaired Stream Map - This map shows waterways in the vicinity of the project area that were assessed for water quality. The portion of Broad Run passing through the project area was classified as impaired.

The water quality of rivers, streams, and waterbodies contained within 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).

4.9.1 Existing Conditions

During the delineation survey, streams in the inventory corridor were classified as either ephemeral (RE), intermittent (R4) or perennial (R3). Ephemeral streams were generally located in areas with the smallest drainage areas, or areas that had drainage diverted away from them. Perennial streams have a much larger watershed. 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. All streams were found to have a significant nexus to offsite navigable waters and are therefore considered jurisdictional under the Clean Water Act. Table 4.9.1.1 shows the approximate total stream lengths within the study area for the watershed, categorized by flow persistence (as defined in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979)). The most substantial waterway in the project area, Broad Run, was designated impaired for biota (2010-2014; unknown causes) but has no recorded Total Maximum Daily Load (TMDL). No other impairment criteria were listed for surface waters within or immediately downstream of the project area.

Table 4.9.1.1 - Estimated Streams in the Project Area				
Watershed	Cowardin Abbreviation	Cowardin Classification	Linear Feet within Study Area	Linear Feet of Anticipated Impacts
Middle Potomac Catoctin (HUC 02070008)	R3	Perennial	10,754	975
	R4	Intermittent	3,543	875
	RE	Ephemeral	891	0
	Total Stream Impacts			1,850
	Total Streams within the Study Area		15,187	

4.9.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in construction and would not cause impacts to streams or water quality.

Build Alternative

The Build Alternative would result in approximately 1,850 linear feet of stream impacts (Table 4.9.2.1). Direct impacts would result from grading and the application of fill for the roadway and placement of structures such as culverts. In-stream culverts will be countersunk to maintain flow through the project area during low flow events. Due to tie-in constraints to the existing Northstar Boulevard, design requirements and location of streams, there is limited potential to minimize impacts to streams in the project area. Efforts to minimize impacts will be explored in later stages of design and permitting and all efforts will be coordinated with the appropriate regulatory agencies.

The Northstar Boulevard Extension would be bridged over Broad Run and the associated floodplain. The Broad Run floodplain currently provides a riparian buffer, which contributes to protecting water quality. Design methods will be implemented to minimize impacts to riparian buffers surrounding the non-impacted streams, thus maintaining a functioning water quality buffer.

During construction, non-point source pollutants have the potential to enter groundwater or surface water from stormwater runoff. Stormwater runoff from the roadway would be captured in stormwater management basins to address water quantity and treat water quality. These basins will be engineered and designed following the 2013 Virginia Stormwater Best Management Practice (BMP) Clearing House II B criteria. To minimize these impacts, appropriate erosion and sediment control practices, as outlined in the 1992 Virginia Erosion and Sediment Control Handbook as amended, would be utilized as well as best management practices in accordance with the VSMP permit Stormwater Pollution Prevention Plan and water quality permits. Should the contractor encounter potential hazardous materials during construction, they would be required to notify the proper authorities and address all hazards as directed.

4.10 Floodplains

In an effort to reduce losses and impacts associated with flooding and preserve the beneficial natural functions of floodplains, federal Floodplain Management mandates outlined in Executive Order 11988 require all federally-funded projects to assess the potential hazards of any action occurring within a floodplain. For the purposes of these mandates, a floodplain is defined as a relatively flat lowland adjacent to inland and coastal waters that are “subject to a one percent or greater chance of flooding in any given year” (E.O. 11988 Amended, 2015). The Federal Emergency Management Agency (FEMA) identifies and maps the nation’s flood-prone areas through the development of Flood Insurance Rate Maps (FIRM). Digital floodplain data from the National Flood Hazard Layer was obtained from the FEMA Flood Map Service Center and plotted to determine the location and extent of floodplain areas within the project area (FEMA, 2017).

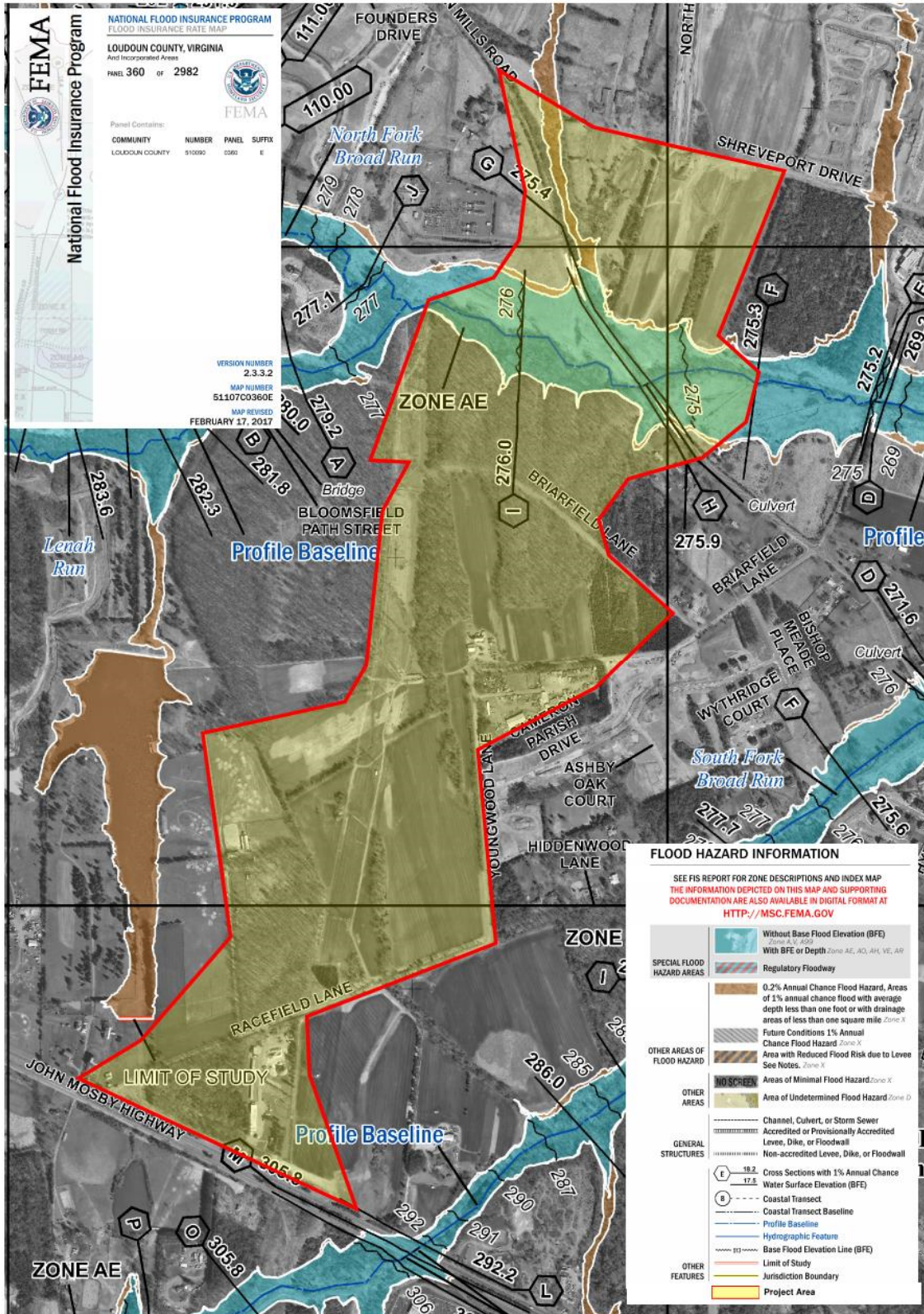


Figure 4.10.1.1 - Northstar Project Area Floodplains - This map, adapted from the FEMA National Floodplain Insurance Rate Map, shows the floodplains of waterways in the vicinity of the project area. Broad Run runs west to east along the northern section of the project area.

4.10.1 Existing Conditions

The study area includes approximately 33.4 acres of 100-year floodplain extending out from Broad Run and a small tributary flowing south along Evergreen Mills Road into Broad Run. The approximate locations of the 100-year floodplain limits in the study area are provided in Figure 4.10.1.1. Each locality in the study area is required to practice floodplain management and all development within the respective floodplains is restricted for certain activities, such as those associated with private and public utilities, SWM facilities, and road crossings.

4.10.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not involve construction activities and would not result in impacts to the existing floodplain function, values, or elevations. In addition, the periodic flooding of Evergreen Mill Road would not be addressed; Broad Run would continue to overtop Evergreen Mill Road during 25-year storm events.

Build Alternative

The Build Alternative would not result in impacts to the existing floodplain function, values, or rise in elevation. The Northstar Boulevard Extension would include a bridge over Broad Run and the adjacent floodplain to avoid impacts on the 100-year floodplain. In addition, the existing Evergreen Mills Road culverted crossing of Broad Run would be removed, resolving periodic flooding impacts on the road. Two piers of the proposed bridge would be located within the floodplain; however, removal of the Evergreen Mill culvert crossing would off-set any adverse affect to floodplain. The bridge would not result in a rise in the floodplain water surface elevation.

All applicable sections of VDOT's *Road and Bridge Specifications*, as well as relevant state and federal stormwater management regulations, will be complied with to address stormwater runoff and elevated downstream flood risk concerns. Overall, substantial floodplain encroachment (as defined by 23 CFR 650.150(c)) is not anticipated during construction associated with the Build Alternative and would not result in a rise to the floodplain elevation.

4.11 Wildlife and Wildlife Habitat

The study area encompasses areas that represent suitable aquatic and terrestrial habitats for wildlife. Descriptions of wildlife habitat present in the project area were developed through review of remote imaging resources including aerial imagery and forest cover data obtained from the Virginia Department of Forestry (VDOF) as well as field observations 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 a two mile buffer of the study area.

4.11.1 Existing Conditions

Terrestrial lands with natural cover, including forests, account for approximately 264 acres of the inventory corridor and are concentrated in the southern section. Roughly 80 acres of terrestrial land was recently utilized as a sod farm that contains minimal to no suitable wildlife habitat. Habitat adjacent to the study area has been fragmented by residential, commercial and industrial developments including Dulles Airport to the east. Habitat fragmentation in these developed areas has created an abundance of low-quality edge habitat. The proposed roadway poses little to no barrier to crossings by terrestrial species due to the lack of sound walls and fence lines that would otherwise separate the respective sides of the road and prevent wildlife from crossing once constructed. The edge habitat along the proposed roadway would see little degradation in quality of habitat once constructed.

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-Beech Forest or Oak-Hickory Woodlands and Savannas, represent potential habitat for many of the typical urban terrestrial wildlife species inhabiting this region. The wildlife species most capable of adapting to habitat fragmentation due to 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 migratory and non-migratory bird species (VDGIF, 2015).

Fish species recorded in area streams have included darters (*Percidea*), sculpins (*Cottoidea*) sunfish (*Centrarchidae*), and common carp (*Cyprinus carpio*). Game fish species observed include the channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), and smallmouth bass (*Micropterus dolomieu*) (VDGIF 2017). Minimal impacts to stream quality are anticipated (see Section 3.9) and, subsequently, impacts on local fish species are expected to be negligible.

4.11.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in construction and would not result in impacts to habitat or wildlife.

Build Alternative

The build alternative would result in the clearing and conversion of 48.1 acres of terrestrial habitat, of which 15.7 acres was recently utilized as a sod farm. Vegetation cleared for the project would result in the fragmentation of the existing contiguous forest stand located within the center of the study area. The road would result in minimal restriction of wildlife movement through the study area, though some reduction of movement is expected between the east and west portions of the study area due to traffic-related restrictions. The proposed bridging of the roadway over Broad Run would provide a corridor for wildlife movement between the east and west portions of the project area as well as access to the floodplain adjacent to Broad Run.

Some aquatic habitat would be lost due to roadway crossings and roadway fill. These losses would be minimized by utilizing design methods for roadway crossings, such as countersinking instream culverts, that would maintain continuity of aquatic habitat throughout the project area. Utilizing a bridge crossing over Broad Run reduces the loss of aquatic habitat and terrestrial habitat in the surrounding floodplain. Design methods to avoid altering natural streams bottoms and riparian areas would be implement to further reduce impacts. In addition, the bridge may provide habitat for bats and migratory birds protected under the Migratory Bird Treaty Act. Additional design methods to reduce impacts to habitat, aquatic and terrestrial resources would be implemented and explored during the design and permitting of the Build Alternative.

4.12 Threatened, Endangered, and Special Status Species

The Endangered Species Act (ESA), as enforced by the US Fish and Wildlife Service, prohibits the taking of endangered and threatened species except under Federal permit. Similarly, the Virginia Department of Agriculture and Consumer Services regulates the conservation of threatened and endangered species of plants and insects in Virginia, while the Department of Game and Inland Fisheries legally authorizes preservation of threatened and endangered vertebrate and non-insect invertebrate species in the state. To remain in compliance with species conservation and preservation plans adopted by these agencies, it is necessary to determine the presence of at-risk species in the project area. The information discussed below was obtained from a review of the U.S. Fish and Wildlife IPaC review process, VA Department of Game and Inland Fisheries databases, and Virginia Department of Conservation and Recreation databases and is summarized in Table 4.12.1.1. The table includes species currently listed as threatened or endangered that are known to occur, or have the potential to occur, within the vicinity of the study area in addition to each species' listed status and listing informational source.

Species (common name)	Scientific Name	Status*	Tier+	Source^
Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	FE, SE	Ia	VDGIF
Northern long-eared bat	<i>Myotis septentrionalis</i>	FT, ST	Ia	USFWS & VDGIF
Yellow lance	<i>Elliptio lanceolate</i>	FT	IIa	VDGIF
Little brown bat	<i>Myotis lucifugus</i>	SE	Ia	VDGIF
Tri-colored bat	<i>Perimyotis subflavus</i>	SE	Ia	VDGIF
Brook floater	<i>Alasmidonta varicosa</i>	SE	Ib	VDGIF
Wood turtle	<i>Glyptemys insculpta</i>	ST	Ia	VDGIF
Peregrine falcon	<i>Falco peregrinus</i>	ST	Ia	VDGIF
Loggerhead shrike	<i>Lanius ludovicianus</i>	ST	Ia	VDGIF
Henslow's sparrow	<i>Ammodramus henslowii</i>	ST	Ia	VDGIF
Green floater	<i>Lasmigona subviridis</i>	ST	IIa	VDGIF
Migrant loggerhead shrike	<i>Lanius ludovicianus migrans</i>	ST	-	VDGIF

*FE = Federally-Endangered; FT = Federally Threatened; SE = State-Endangered; ST = State Threatened

+Tier represents the conservation need as defined by the VA Wildlife Action Plan. Tier I – Critical Conservation Need; Tier II – Very High Conservation Need; a = On the ground management strategies/actions exist and can be feasibly implemented; b = On the ground actions or research needs have been identified but cannot feasibly be implemented at this time.

^VDGIF = Virginia Department of Game and Inland Fisheries, Fish and Wildlife Information Service; USFWS = U.S. Fish and Wildlife (USFWS) Online Information, Planning, and Conservation (IPaC)

4.12.1 Existing Conditions

According to a June 2018 review of the U.S. Fish & Wildlife Service's (USFWS) Online Information, Planning and Conservation (IPaC) system, only one federally-listed species was reported in the vicinity of the Northstar project area: the Northern Long-Eared Bat. An October 2018 review of the Virginia Department of Game and Inland Fisheries (VDGIF) online Virginia Fish and Wildlife Information Service (VaFWIS) database listed 12 threatened or endangered species as potentially occurring in or near the project area. None of the species listed in Table 4.12.1.1, including the Northern long-eared bat (NLEB), are listed as having confirmed records of presence within or in a two-mile radius of the project area. Additionally, the majority of the listed species have no known or suitable habitat within the project area. However, because the range of the NLEB overlaps with the project area, potential impacts to the species must be addressed in accordance with the programmatic agreement regarding the range-wide habitat for the Indiana Bat and NLEB (December 2016; discussed further below). In addition, impacts to potential wood turtle habitat within the study area require addressing as well. Supporting documentation can be found in Appendix F.

Northern Long-Eared Bat (NLEB; Federally Threatened)

As mentioned above, the USFWS IPaC conducted for this project lists the NLEB as having the potential be present within the project area as this project falls within the known range of the species. The project area contains approximately 115 acres of potentially suitable roosting habitat, mainly within the contiguous forested patch toward the center of the project corridor. However, a search conducted through the Virginia DGIF NLEB Winter Habitat and Roost Tree Application did not identify any confirmed roosts or hibernacula within 2 miles of the study area (maps in Appendix F).

Wood Turtle (State Threatened)

The Wood turtle (*Glyptemys insculpta*) is a Virginia State Threatened species occurring in 18 localities in Virginia, including Loudoun County. Wood turtles have been prioritized as a Tier 1a species in Virginia's original Wildlife Action Plan (WAP), which highlights a need to enforce collection laws and conserve/restore suitable habitat (riparian and upland) for the species (Virginia Department of Game and Inland Fisheries, 2015). According to the DGIF database, suitable Wood Turtle habitat has been predicted to be present within the project area, specifically along Broad Run, Lenah Run and the larger tributaries of each (Figure 4.12.1.1).

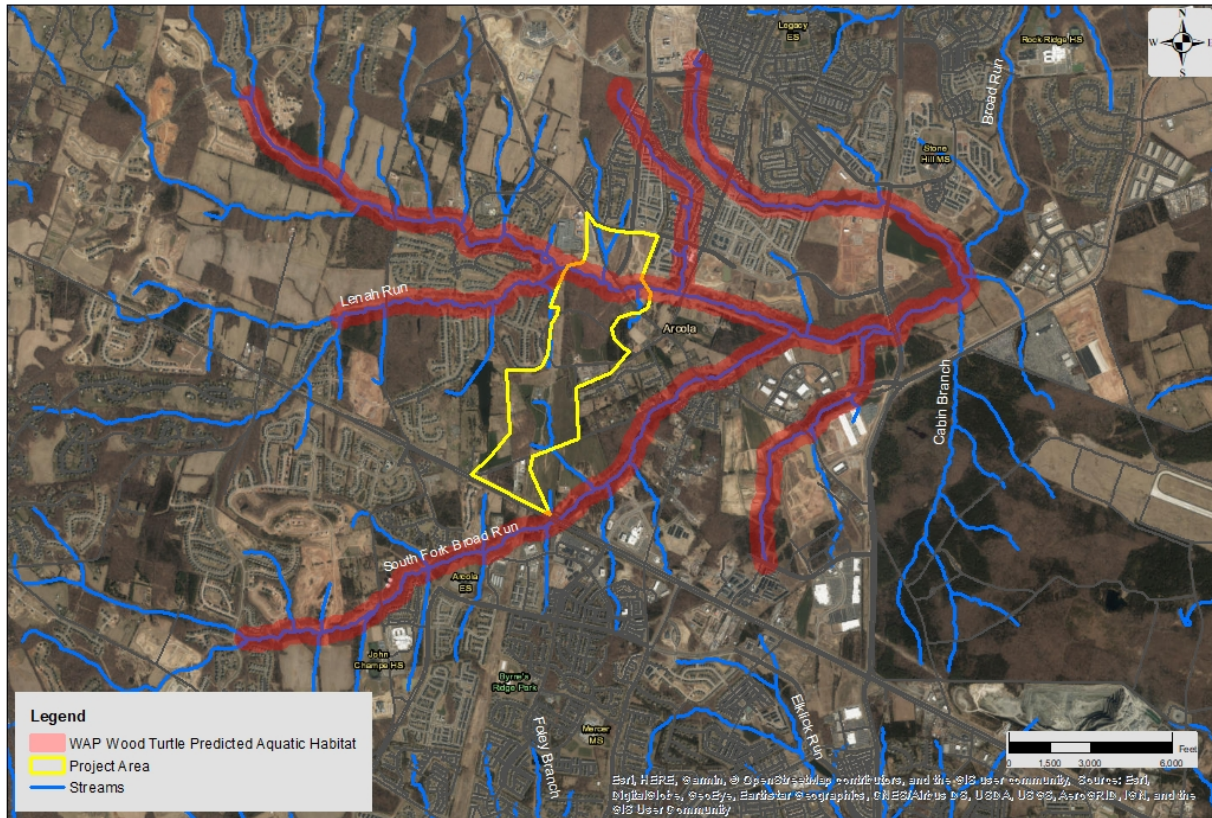


Figure 4.12.1.1 - Wood Turtle Wildlife Action Plan Predicted Aquatic Habitat Map – The areas highlighted above are predicted Wood Turtle aquatic habitat identified within 2 miles of the project area. Source: DGIF Virginia Fish and Wildlife Information System.

Bald Eagles

Bald Eagles are protected under the Bald and Golden Eagle Protection Act of 1940, making it necessary to account for the presence of eagles in and adjacent to the project area. Database searches were conducted in order to identify Bald eagle nests and concentration areas in the vicinity of the project area (CCB, 2018; USFWS, 2018). No documented Bald eagle nests or concentration areas have been recorded within one mile of the proposed project area (maps located in Appendix F).

Natural Heritage Resources

A project review of Natural Heritage resources within the Northstar Boulevard Extension project area was completed in September 2018 using the Virginia Department of Conservation & Resources (DCR) utilizing the online Natural Heritage Program database. A search of the project area as well as areas within 2 miles of the project site produced no records of natural heritage resources nor does the area intersect with the predictive models utilized by DCR to identify potential habitat for natural heritage resources (documentation is in Appendix F).

4.12.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in construction and would not result in impacts to wildlife or their habitat.

Build-Alternative

Northern Long Eared Bat

The project area consists of approximately 115 acres of potential NLEB summer roosting habitat. The majority of the habitat is located in the center of the corridor adjacent to the Broad Run floodplain. Approximately 32.5 acres is anticipated to be cleared for the build alternative.

The programmatic agreement reached between USFWS, FHWA, Federal Railroad Administration, and Federal Transit Administration regarding the range-wide habitat for the Indiana Bat and NLEB (December 2016) can be utilized for these species in lieu of formal Section 7 consultation provided the project adheres to the scope and criteria of the range-wide Biological Assessment (BA). In addition, the Intra-Service Programmatic Biological Opinion (BO) on the final 4(d) Rule for the NLEB may be used for projects with potential impacts to the NLEB as long as impacts to the Indiana Bat are not anticipated. 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;
- 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.

Wood Turtle

The project area consists of approximately 115 acres of hibernation habitat within the forested areas and summer habitat within Broad Run. Coordination with USFWS and DGIF would be conducted prior to the commencement of construction. Several preventative measures would be taken in order to avert potential impacts to the Wood turtle and its habitat. Pre-construction surveys to identify the presence of suitable habitat for the Wood Turtle would be conducted as well as updating VDGIF and USFWS database lists during the permitting process. Before work begins in the project area, silt fence borders would be installed in order to prevent Wood turtles from entering the project area. Turtles that are found would be relocated away from the project

area.

Bald Eagle

As no documented Bald eagle nests or concentration areas were identified within one mile of the proposed project area, it is not anticipated that the project would impact Bald Eagles or their habitat.

4.13 Hazardous Materials

A search of Federal and State regulatory agency databases was performed to identify the potential for encountering recognized environmental conditions (RECs) within the project area. An Environmental Data Resources, Inc. (EDR) query and report was completed on October 16th, 2018. Findings of the report are discussed below.

4.13.1 Existing Conditions

The EDR report compiled for this project (and located in Appendix G) detailed one (1) leaking tank (LTANK), four (4) Underground Storage Tanks (UST), one (1) Above-ground Storage Tank (AST), one (1) Financial Assurance (FA), two (2) Resource Conservation and Recovery Act - Conditionally Exempt Small Quantity Generators (RCRA-CESQG) and one (1) TIER 2 site (a facility that stores or manufactures hazardous materials) as present in the project area. Additionally, three (3) additional LTANKS were identified in the EDR Report as present within ½ mile of the project area.

Within the project area, the one (1) leaking tank (LTANK), four (4) USTs, one (1) AST, one (1) Financial Assurance, two (2) RCRA-CESQG are associated with the Virginia Department of Transportation property located at 41880 John Mosby Highway. The LTANK report was closed on 2/13/1998. Two of the four USTs (gasoline and diesel) are identified as “removed from the ground” while the other two USTs (gasoline and diesel) are “currently in use” by VDOT. VDOT has a registered VA Financial Assurance for the “currently in use” USTs. These USTs are federally registered and regulated. The one AST on the property is identified as “dismantled”. VDOT also has two conditionally exempt small quantity generator permits for waste code DOO1 Ignitable Hazardous Wastes. There are no violations found associated with the RCRA-CESQGs. This property is not to be disturbed during construction activities.

Additionally, one (1) TIER 2 site exists inside the project area, located on 24155 Evergreen Mills Road. This TIER 2 listing is for the storage of manufactured hazardous materials, specifically Sulfuric Acid.

Lastly, the incident reports for the three (3) LTANKS identified as present within ½ mile of the project area have been closed as of 10/6/2011, 5/25/2011 and 2/21/2014 respectively.

4.13.2 Environmental Consequences

No-Build Alternative

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

Build Alternative

Due to the proposed alignment of the roadway, minimal cut of the existing ground would be required. The majority of the project excavation would be for stormwater management basin construction.

A Phase I ESA will be performed in general accordance with the provisions of ASTM (American Society for Testing and Materials) E1527-13, *Standard Practice for Environmental Site Assessment Process*. The purpose of the Phase I ESA is to evaluate the subject property's history and existing conditions to help identify past or current environmental impacts onsite, which could have an impact on the proposed project.

Should the contractor encounter areas of potential contamination, the contractor would be required to notify the appropriate state and local authorities, and would be required to develop and implement appropriate procedures for the proper management and coordinated removal, disposal, and/or treatment of contaminated materials, as may be necessary. The project would meet compliance requirements of the VSMP by incorporating best management practices, as is required in the Stormwater Pollution Prevention Plan.

4.14 Indirect and Cumulative Effects

4.14.1 Indirect Effects

The Council for Environmental Quality (CEQ) defines indirect effects as effects caused by the action which are removed in distance or time but still reasonably foreseeable (40 CFR 1508.8(b)). Indirect effects may include effects, such as development-inducing effects, related to "induced changes in land-use patterns, population density or growth rate, and related effects on natural resources, including ecosystems" (40 CFR 1508.8(b)). A more detailed discussion of the methodology for the analysis of indirect effects can be found in the Indirect and Cumulative Effects Technical Report (VDOT, 2017g).

Table 4.14.1 – Summary of Potential Indirect Effects and Cumulative Impacts						
Resource Category	Potential Indirect Effects	Type of Potential Impact	Level of Impact	Potential Cumulative Impact	Type of Potential Impact	Level of Impact
<i>No Build Alternative</i>						
Land Use and Planned Development	Continued local development with alterations of current planned land uses and zoning	Negative	None	Overall alteration of local land use objectives	Negative/Positive	None
Right-of-Way and Property Acquisitions	Reduction in privately-owned land	Negative	Minimal	Increase in property values from additional development	Positive	Minimal
	Degradation of neighborhood cohesion	Negative	Minimal	Additional acquisitions and reductions in privately owned land	Negative	Minimal
Socioeconomics	Continued development without complimentary transportation improvements	Negative	Moderate	Increased development and job opportunities; decreased mobility to jobs, community facilities	Positive/Negative	None
Air Quality	Increase in local traffic congestion & delays	Negative	Slight	Increased production of pollutants associated with traffic congestion	Negative	Slight
Aquatic Resources	Increases in impermeable surfaces and downstream runoff	Negative	Slight	Continuation of development in Broad Run-Lenah Run watershed, leading to loss of wetlands, stream channels and impacts to water quality	Negative	Slight
Natural Resources	Induced development resulting in loss of natural vegetated habitat, including forested areas	Negative	Minimal	Continuation of activities resulting in fragmentation and degradation of natural wildlife habitat	Negative	Slight

<i>Build Alternative</i>						
Land Use and Planned Development	Induced development and alterations to current land use plans and zoning	Negative	None	Overall alteration of local land use objectives	Negative/Positive	None
Right-of-Way and Property Acquisitions	Reduction in privately-owned land	Negative	Minimal	Increase in property values from additional development	Positive	Minimal
	Degradation of neighborhood cohesion	Negative	Minimal	Additional acquisitions and reductions in privately owned land	Negative	Minimal
Socioeconomics	Improved road network conditions for commuters, shoppers, community	Positive	Moderate	Increased mobility, local development and job opportunities for community	Positive	Slight
Air Quality	Increase in overall traffic passing through the area/decrease in local traffic congestion	Positive/Negative	None	Lower net production of air pollutants due to less congestion/idling vehicles	Positive	Slight
Noise	-	-	-	Elevated noise impacts due to overall increases in local traffic	Negative	Slight
Aquatic Resources	Increases in impermeable surfaces and downstream runoff	Negative	Slight	Continuation of development in Broad Run-Lenah Run watershed, leading to loss of wetlands, stream channels and impacts to water quality	Negative	Slight
Natural Resources	Induced development resulting in loss of natural vegetated habitat, including forested areas	Negative	Minimal	Continuation of activities resulting in fragmentation and degradation of natural wildlife habitat	Negative	Slight

No-Build Alternative

It is anticipated that land development would continue to occur in the Arcola, VA area under the No-Build Alternative. The rapid population growth and increase in job opportunities in Loudoun County is expected to continue (as discussed in Section 4.2.1), and complementary development will continue to meet market demands. Land within the project area is zoned as Business and Residential by Loudoun County and several residential communities (e.g. Brambleton) would soon expand into the project area. The No-Build Alternative is not anticipated to spur development that is not already in process, planned, or previously zoned for.

Potential effects of development that would occur with a No-Build Alternative include parcel development, acquisitions and potentially displacements for existing and inevitable future projects. Property relocations and displacements are not anticipated to significantly degrade the cohesiveness or stability of the surrounding neighborhoods as the communities continue to adopt development and improvement projects.

The No-Build Alternative results in adverse indirect effects to local traffic, natural resources and safety that would be exacerbated over time. Traffic congestion along the surrounding roadway corridors would remain and, with further development in the area, traffic volumes would increase resulting in more substantial delays and greater levels of congestion. The culvert crossing of Evergreen Mills Road would remain in place and continue to flood during 25 year storm events. Periodic flooding of the roadway would continue to impede the ingress and egress of homes along Evergreen Mill Road and subsequently hazardous driving conditions would continue to affect the area.

Build Alternative

As with the No-Build alternative, development in the project area and the surrounding communities is expected to continue. Planned developments in the Arcola area do not require the implementation of the proposed roadway as they can be accessed by the existing roadway network. Implementation of the Northstar Boulevard Extension is intended to provide improved access to growth that is already planned. The Build Alternative would add another north-south connection to an increasingly developed area. This connection, providing an alternative route for local and regional traffic through the Dulles area, would decrease commute times, reduce que times at area intersections and improve overall accessibility of community features. Benefits from the alternative north-south route would be utilized by the surrounding community.

As this is a roadway on a new alignment, the acquisition of right-of-way would be required for the majority of the project with the exception of the proposed tie-ins at Route 50 and Shreveport Drive. Two complete parcel acquisitions would occur; however, there are no anticipated direct impacts to EJ populations. Indirect effects from increased noise levels and degraded visual aesthetics for the surrounding area are anticipated.

Indirect effects to wetlands, streams, water quality, wildlife habitat and threatened and endangered species could potential occur due to construction activities. Hydrologic patterns resulting from

increased run off could potentially effect downstream water quality. Stormwater management will be implemented to minimize impacts to water quality within the drainage basin. Proper measures implemented during construction in compliance with state and federal regulations would be strictly adhered to in efforts to minimize adverse impacts.

4.14.2 Cumulative Effects

The cumulative effects of a proposed project are defined by the CEQ as environmental impacts that result from “incremental impact of the action when added to other past, present, and reasonably foreseeable future actions” regardless of the party implementing the tangential actions. Cumulative effects may be the culmination of numerous individually minor actions which gain significance when viewed collectively (40 CFR § 1508.7). The cumulative effects analysis utilized here is defined as that outlined in FHWA’s Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process (FHWA, 2014). Based on the five-part evaluation process outlined in *Fritiofson v. Alexander*, 772 dF.2d 1225 (5th Cir. 1985), cumulative effects are evaluated using the following criteria:

- a. the geographic area affected by the proposed action
- b. the resources affected by the action
- c. past, present, and reasonably foreseeable actions that have impacted the identified resources
- d. specific impact to those resources
- e. overall impact on the identified resources by the accumulated actions?

No-Build Alternative

The No-Build Alternative would not contribute to the long-term efforts of Loudoun County to improve its transportation system with an additional arterial North-South roadway. Continued growth in the county and surrounding region would result in additional congestion along local roadways. The need for additional throughways would increase and result in the relocation of the proposed North-South corridor to another location, resulting in the widening and/or improvement of existing roadways.

The project area would be developed by encroaching residential and industrial uses in accordance with the zoning for the area. Neighborhoods in the Arcola area would continue to lack direct access to Route 50 and expansion of these neighborhoods would continue without sufficient ingress or egress, especially with the recent discontinuation of Evergreen Mills Road before its intersection with Shreveport Drive. Community facilities and businesses, including local schools in the area (i.e. John Champe and Freedom High Schools, Mercer Middle School, Willard Intermediate School, Arcola Elementary, Hutchison Farm Elementary, Liberty Elementary, Stone Ridge Montessori, LePort Montessori Aldie, Minnieland Academy at Kirkpatrick), would be increasingly inaccessible due to congestion on smaller local roads, necessitating the widening of roads such as Gum Spring Road.

Traffic Conditions & Considerations

The roads around Arcola currently experience high volumes of traffic due to the growth of

Loudoun County. As noted in VDOT's Daily Traffic Volume Estimates Jurisdiction Report 53, completed in 2017, Loudoun County Parkway (Rt. 606) had an Average Daily Traffic (ADT) of 22,000 between Arcola Road and Evergreen Mills, and 37,000 further south from Evergreen Mills to Route 50. Evergreen Mills Road (Rt. 621), currently only a two-lane road, experienced ADT volumes of 11,000, 10,000, and 19,000 for the portions between Old Ox Road and Belmont Ridge Road. Gum Spring Road (Rt. 659), also a smaller two-lane road, experienced ADT volumes of 10,000 between Evergreen Mills and Route 50. These traffic volumes are expected to increase substantially as Loudoun County continues to experience population and job growth.

Table 4.14.2.1 - Existing and Future Level of Service in Arcola Under No Build			
Route	Segment	2012 LOS (VDOT)*	Projected 2040 LOS (VDOT)*
Route 50	Racefield Lane to Gum Spring Road	C or Above	F
	Gum Spring Road to Loudoun County Parkway	C or Above	F
Loudoun County Parkway	Old Ox Road to Evergreen Mills Road	D	F
	Evergreen Mills Road to Route 50	C or Above	F
Old Ox Road	Carters School Road to Loudoun County Parkway	D	F
Evergreen Mills Road	Belmont Ridge Road to Gum Spring Road	F	F
	Gum Spring Road to Loudoun County Parkway	C or Above	F
Gum Spring Road	Evergreen Mills Road to Route 50	C or Above	D

*These Level of Service (LOS) estimates are taken from a 2012 VDOT traffic analysis conducted in the study area for the Dulles Air Cargo, Passenger and Metro Access Highway. All of these routes would be expected to experience decreases in volume with the extension of Northstar Boulevard.

Table 4.14.2.2 - Existing and Future Intersection Level of Service in Arcola					
Route	Intersection with	Existing LOS (2012)		No Build LOS (2040)	
		AM	PM	AM	PM
US Route 50	Stone Springs Boulevard	C or Above	C or Above	C or Above	E
	Gum Spring Road	F	F	E	F
	Hutchison Farm Drive	E	C or Above	E	F
	Pinebrook Road	D	C or Above	E	F
	Loudoun County Parkway	D	D	-	-
	South Riding Boulevard	C or Above	C or Above	C or Above	D
Loudoun County Parkway	Evergreen Mills Road	D	C or Above	F	F
	Old Ox Road	-	-	F	F
Evergreen Mills Road	Belmont Ridge Road	F	F	F	F
	Gum Spring Road	F	D	F	F

High volumes of traffic are not only burdensome to commuters but can also be dangerous, often resulting in an increase in motor vehicle accidents. Between 2013 and 2018, 248 rear-end collisions occurred on Rt. 50 in the vicinity of the proposed intersection with Northstar

Boulevard (between Kilkerran Drive to the west and Tanner Lane to the east), 90 of which were directly attributed in part to heavy traffic volumes (VDOT Virginia Crashes GIS Layer, 2018). The intersection of Route 50 and Loudoun County Parkway averages over 18 rear-end collisions a year alone.

Currently, residents in the Brambleton area do not have direct access to schools south of Route 50 in their service district, including a number of public schools (John Champe and Freedom High Schools, Mercer Middle School, Willard Intermediate School, Arcola Elementary, Hutchison Farm Elementary, Liberty Elementary), as well as several private schools (Stone Ridge Montessori, LePort Montessori Aldie, Minnieland Academy at Kirkpatrick).

The newly constructed Stone Springs Medical Center represents the largest proximate medical facility and hospital for the neighborhoods of Arcola, Brambleton and Watson. Presently these neighborhoods lack direct access to this medical facility. The closest rescue squad is located in Arcola, north of Route 50 (Arcola Volunteer Fire Department), and lacks a direct route to communities south of Route 50. The VDOT Arcola Area Headquarters, the largest VDOT maintenance facility in the state, is located on Rt. 50 just east of Racefield Lane. This facility is responsible for maintaining the most miles of roadway in the state. Currently, access to this facility is limited to an un-signalized entrance from Rt. 50 and a small outlet onto Racefield Lane.

Build Alternative

Historical and recent development has led to the fragmentation of natural resources and communities in the Arcola area. One consequence of this fragmentation is decreased accessibility of community facilities and businesses to the surrounding community. The Build Alternative would provide enhanced connectivity and improved access to local features, including the Arcola Volunteer Fire Department, Stone Springs Medical Center, numerous local schools (see above) and the Virginia Fusion Sports Complex. The Build Alternative neither explicitly hinders nor facilitates present or future planning and development in the project area.

The Build Alternative would contribute to cumulative impacts to wildlife habitat, wetlands, streams, threatened and endangered species, and historic resources that have occurred in the past within study area. These effects would be minimized through implementation of best management practices and avoidance and minimization during the final design of the alternative. The majority of the wetland and stream systems in the project area will be maintained up and downgradient of the project.

Traffic Conditions and Considerations

It is anticipated that 700,000 new jobs, 800,000 new individuals, and 300,000 new households will be added to the region between now and 2040 (Office of Intermodal Planning and Investment, 2012). The construction of the Northstar Boulevard Extension is anticipated to serve new demand associated with this projected development in the project area and to provide alternative travel choices to existing parallel north-south corridors. The Northstar Blvd Extension – Route 50 to Shreveport Drive Traffic Volume Projections Memorandum dated May 23, 2018 (Appendix A) studied the anticipated re-routing of existing traffic upon the construction and

opening of Northstar Boulevard as part of the project's traffic operations analysis. Based on regional modeling, traffic counts, and origin-destination studies, it is anticipated that twenty (20) percent of Route 607 (Loudoun County Parkway) traffic and five (5) percent of Route 15 (James Madison Highway) would re-route to Northstar Boulevard. For this re-routed traffic, the new Northstar Boulevard is anticipated to provide a shorter travel time between their origin and destination. The projected 20% volume reduction on Loudoun County Parkway and 5% volume reduction on James Madison Highway is anticipated to reduce existing congestion and improve travel times on both of these existing major north-south corridors as well as numerous local roadways (Table 4.14.2.3). The Northstar Boulevard Extension would divert traffic away from these arterials, reducing congestion, que lengths and the traffic incidences associated with existent conditions.

Table 4.14.2.3 - Estimated Percent Traffic Diverted by Northstar Boulevard Extension for Opening Year (2023)			
Origin Description	% of Traffic from Origin Diverted to Northstar Boulevard Extension		Origin Coding on Map (Figure 4.14.2.3)
	AM Peak	PM Peak	
*Evergreen Mills Rd, West of Shreveport Dr.	29.8%	17.56%	
Northstar Boulevard, North of Shreveport Dr.	27.8%	0.00%	
Belmont Ridge Rd., North of Shreveport Dr.	39.4%	20.57%	
Old Ox Rd., East of Loudoun County Pkwy	3.2%	4.75%	
Route 50, East of Loudoun County Pkwy	10.5%	4.28%	
Gun Spring Rd., South of Tall Cedars Pkwy	8.7%	14.65%	
Stone Springs Blvd., South of Rt. 50	9.6%	8.84%	
Route 50, West of Fleetwood Rd.	11.7%	11.48%	

Table 4.14.2.3 - These percentages, taken from the Traffic Volume Predictions generated in the 2018 Northstar Boulevard Extension analyses conducted by Gorove/Slade Associates, are graphically displayed in Figure 4.14.2.3. *The Evergreen Mills route is anticipated to be discontinued by the extension of Northstar Boulevard.

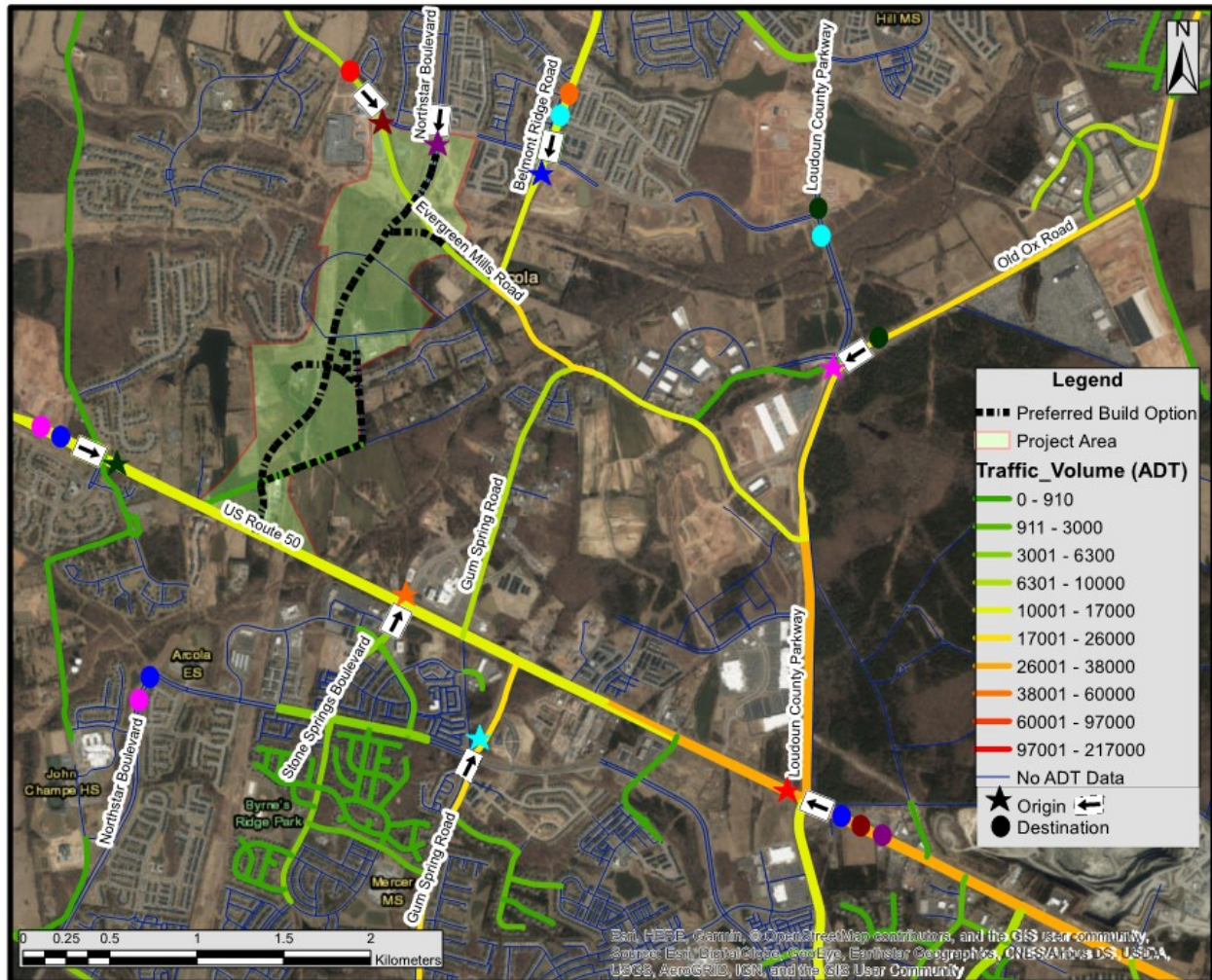


Figure 4.14.2.3 - This map shows the locations of Origins and Destinations listed in Table 4.14.2.3. Traffic between these points is expected to be diverted to the Northstar Boulevard Extension

As the Loudoun County population continues to increase, the number of school aged children, and the need for additional schools, will also increase. In 2010, there were 73,500 school aged children (Ages 5-19) in Loudoun County; by 2040, that demographic is expected to grow by over 50% to more than 110,000 potential students (Loudoun County Dept. of Planning and Zoning, 2016). In attempting to serve these student populations, the Northstar Boulevard Extension would allow schools in the adjacent areas to adapt their districts to shifting neighborhood demographics without substantially increasing commuting times for students. Likewise, students who attend private schools from the Arcola area would be able to reach their schools more efficiently with improved access to main arterial routes.

The Northstar Boulevard Extension would provide direct access from neighboring communities and improve emergency response and access to the newly constructed medical facilities. Providing alternative routes, as shown in table 4.14.2.3, would relieve congestion and divert traffic away from smaller routes, including Gum Spring Road and Evergreen Mills Road. Reducing congestion on smaller routes would also allow emergency vehicles to travel those routes unimpeded. Proposed improvements to Youngwood Lane and Racefield Lane would also

aid in reducing emergency response times as well as ease access for VDOT maintenance vehicles to major thoroughfares from the Arcola Area Headquarters. Improvements would facilitate faster VDOT response times to road maintenance and treatment needs for the large area covered by the facility.

Socioeconomics and Community Facilities

The implementation of the project would result in beneficial impacts within the study area by increasing mobility, relieving congestion and increasing mobility to local development. The increased mobility would also support the planned use and development of the area. Minority populations would benefit and equally experience the project benefits. This project would additionally further facilitate the population growth and mix demographics as well as a result of jobs and economic benefits associated with development.

Foreseeable transportation and development projects would continue to increase in the project area. This project would provide beneficial impacts, both directly and indirectly, to the surrounding communities, including minority populations, by providing improved access to neighborhoods, schools, business, and emergency facilities.

Land Use and Planned Development

Implementing the project would require acquisitions of right-of-way, resulting in displacement and relocation of one residential properties. Other present and reasonably foreseeable future actions of transportation and development would also require additional right of way; however, this is minimal and offset by the new developments planned for the area. It is anticipated that present and reasonably foreseeable future actions, including transportation projects, would also require displacements and right of way acquisitions. Planned developed in the reasonably foreseeable future will continue as recent re-zoning applications have been submitted to Loudoun County by private developers for portions of the study area to be re-designated as an Industrial Park for Office and Data Center Uses.

The newly constructed Stone Springs Medical Center represents the largest proximate medical facility and hospital for the neighborhoods of Arcola, Brambleton and Watson. Presently these neighborhoods lack direct access to this medical facility. The closest rescue squad is located in Arcola, north of Route 50 (Arcola Volunteer Fire Department), and lacks a direct route to communities south of Route 50. The VDOT Arcola Area Headquarters, the largest VDOT maintenance facility in the state, is located on Rt. 50 just east of Racefield Lane. This facility is responsible for maintaining the most miles of roadway in the state. Currently, access to this facility is limited to an un-signalized entrance from Rt. 50 and a small outlet onto Racefield Lane.

Aquatic Resources

Numerous wetlands have been identified in the project area, which is located within the Broad Run-Lenah Run subwatershed. Present and past development has degraded the Broad Run-Lenah Run watershed and will continue to impact wetlands. Wetland impacts will be subject to mitigation in accordance with state and federal regulations. This project is expected to have adverse impacts

to WOUS, wetlands and water quality and contribute to cumulative wetland impacts, though these impacts are anticipated to be comparable to those of other transportation projects in the area. Avoidance and minimization of wetland impacts will be implemented during final design stage.

Multiple unnamed tributaries to Broad Run and Lenah Run are located within the project area, and all are associated with the Broad Run-Lenah Run watershed. Present and reasonably foreseeable future actions would impact streams in the area. Resulting stream impacts would be avoided and minimized to the greatest extent feasible and mitigated where avoidance is not feasible. The 100 year floodplain associated with Broad Run is located within the project area; no significant impacts to the floodplain are anticipated.

Due to proposed development, water pollutants in this area are expected to transition from primarily agricultural-based pollutants associated with the sod farm to predominantly roadway run off and salts. Potential impacts to water quality will be addressed through the implementation of stormwater management BMPs.

Natural Resources

The proposed project, including present and future actions, are expected to continue to alter and convert natural wildlife habitat to other uses. Alteration of wildlife habitat would further result in fragmentation of habitat, thus, wildlife species and the quantity of species would change in the area. The majority of the subject area as already experienced fragmentation due farming activities and adjacent developments. Species within the study area are highly adaptable and are expected to remain as development continues.

Federally and state listed threatened and endangered species have the potential to be present within the project area. The proposed Northstar Boulevard project would implement all practicable efforts to protect and conserve listed species.

5.0 – AGENCY COORDINATION AND COMMENTS

5.1 Agency & Tribal Coordination

In September and October of 2018, scoping letters and questionnaires were mailed to state, federal, and local agencies and organizations to obtain pertinent information and data related to potential environmental impacts within the Northstar Boulevard Extension project area. Below is a list of agencies with which coordination has occurred/been attempted to this point in time for the proposed project.

- Blue Ridge District Supervisor
- Dulles District Supervisor
- Loudoun County Board of Supervisors
- Loudoun County Department of Family Services
- Loudoun County Department of Fire, Rescue, and Emergency Management
- Loudoun County Department of Parks, Recreation & Community Services (PRCS)
- Loudoun County Department of Planning and Zoning

- Loudoun County Department of Transportation and Capital Infrastructure
- Loudoun County Health Department
- Loudoun County Office of the County Administrator
- Loudoun County Preservation Society
- Loudoun County Public Schools
- Northern Virginia Regional Commission
- U.S Army Corps of Engineers Northern Virginia Field Office
- U.S. Department of Agriculture – Natural Resources Conservation Service
- U.S. Environmental Protection Agency, Region 3 (Mid-Atlantic)
- Virginia Department of Environmental Quality
- Virginia Department of Forestry
- Virginia Department of Game and Inland Fisheries
- Virginia Department of Health
- Virginia Department of Mines, Minerals and Energy
- Virginia Department of Transportation
- Virginia Marine Resource Commission
- Virginia Outdoors Foundation
- Delaware Nation
- Pamunkey Indian Tribe
- Rappahannock Tribe
- Mattaponi Tribe
- Upper Mattaponi Tribe
- Nansemond Indian Nation
- Chickahominy Indian Tribe
- Chickahominy Indians Eastern Division
- Monacan Indian Nation
- Patowomeck Indian Tribe
- Nottoway Indian Tribe of Virginia
- Cheroenhaka (Nottoway)
- Eastern Shawnee Tribe of Oklahoma
- United Keetoowah Band of Cherokee Indians in Oklahoma

5.1.1 Agency Scoping Responses

A number of responses to the scoping letters were received identifying transportation needs, environmental resources and other relevant factors to be analyzed as part of this environmental assessment. Table 5.1 below provides a summary of the responses received. Copies of the correspondence are provided in Appendix H.

Table 5.1 – Summary of Agency Responses to the Scoping Letter		
Agency	Scoping Response	Date Response Received
Loudoun County Parks, Recreation and Community Services (PRCS)	The response indicated that the Loudoun County PRCS reviewed the project and did not anticipate any environmental impacts, constraints or concerns related to PRCS facilities.	September 20, 2018
Virginia Department of Game and Inland Fisheries (VDGIF)	The response indicated that VDGIF would be unable to review and provide comments for this project due to staffing limitations. VDGIF recommended using the Virginia Fish and Wildlife Information System (VAFWIS) to determine what wildlife resources may be present at or near the project site (A search using the VAFWIS application was performed prior to distributing the scoping letters, and results of the search were provided to VDGIF with the scoping letter).	September 20, 2018
Virginia Department of Mines, Minerals and Energy (VA DMME)	The response indicated that DMME has no concerns or comments on the project at the time the letter was received. Two water wells identified through the DMME databases are under the purview of the VA Dept. of Health.	September 19, 2018
Virginia Outdoors Foundation (VOF)	The response indicated that as of September 19 th , 2018, there were no existing or proposed VOF open-space easements within or adjacent to the project area.	September 19, 2018

Loudoun County Health Department	The response indicated that four different properties within the project area had well or septic systems that would need to be addressed. A list of the features was provided, along with maps of the features, which included 8 total well features and 4 total septic systems. Further investigation into these features revealed that 3 of the well features and 2 of the septic features have been recorded as abandoned. The remaining 5 wells and 2 septic systems do not have abandonment records and should be assumed to still be active.	September 26, 2018
Virginia Department of Environmental Quality (DEQ)	The response did not address scoping concerns (the office responding does not participated in scoping efforts) but instead gave directions for how to submit NEPA documentation and solicited responses from other state and local agencies. In addition, the response listed numerous databases that might be utilized for preparing NEPA documents.	September 21, 2018
Loudoun County Department of Transportation and Capital Infrastructure (DTCI) (via Dept. of Family Services)	The response indicated two areas of concern: noise and business disruption. DTCI stated a concern that increased noise levels during and after road reconfiguration may impact the adjacent residential areas. Additionally, local businesses along Rte. 50 may encounter disturbances from the proposed roadway. Otherwise, DTCI suggested that Loudoun County PRCS may be best equipped to identify concerns associated with future community facilities in the area (DCTI has already responded with no anticipated effects).	October 12, 2018
Virginia Marine Resources Commission (VMRC)	The response indicated that if the project involves encroachments channelward of ordinary high water along Broad Run above the fall line, a subaqueous permit will be required from the Commission. Additionally, jurisdictional impacts will be reviewed by the commission during the JPA process.	October 16, 2018

Virginia Department of Health (VDH)	<p>The response indicated that the Office of Drinking Water has identified one public groundwater well within a 1-mile radius of the site (Arcola United Methodist Church; PWSID #6107026). Potential impacts to this well must be verified by the local utility. Otherwise, there are no surface water intakes within a 5-mile radius of the site, nor is the project in a watershed of any surface water intakes.</p> <p>Additionally, no comments were received from the Offices of Radiological Health, Environmental Health Service, Division of Shellfish Sanitation, Division of Onsite Sewage & Water Services or the Division of Environmental Epidemiology. VDH reminds that BMP should be employed.</p>	October 16, 2018
United States Army Corps of Engineering (USACE)	<p>USACE acknowledged the wetland delineation performed by Dewberry and requested involvement as a cooperating agency in further developing the study; they also requested information on who the lead federal agency is. USACE restated federal statutes regarding wetland and waters impacts/mitigation, stated that stormwater management facilities should not be in jurisdictional water bodies, and acknowledged that projects connecting existing roadways have constrained alternative options. USACE also mentioned that the project may impact numerous nearby historic resources and the federally listed Northern Long-eared Bat.</p>	October 16, 2018
Loudoun County Fire and Rescue	<p>The response indicated no specific concerns but requested further discussion regarding critical emergency response issues (road signage, adequate turning radii for emergency vehicles, anticipated temporary road closures, etc.). It was also requested that Loudoun County Fire and Rescue be included during formal review of the plans to verify relevant conditions for emergency response and public safety.</p>	October 16, 2018
Environmental Protection Agency (EPA)	<p>The response indicated numerous tips for constructing the scope of analysis for the project, including the composition of the justification and alternative analysis, description of potential impacts and aquatic resources, presence of hazardous sites, consideration of extreme weather events and resilience, and potential cumulative effects. No specific concerns were identified.</p>	October 17, 2018

Loudoun County Department of Planning and Zoning	The response indicated that several county plans pertain to the project area: the Revised General Plan (RGP), the 2010 Countywide Transportation Plan (2010 CTP), the Revised 1993 Zoning Ordinance and the Bicycle and Pedestrian Mobility Master Plan. The forthcoming Loudoun 2040 Comprehensive Plan does not anticipate any changes in the designated conditions for the proposed section of Northstar Blvd (the corridor is designated a Corridor of Statewide Significance). The project is located in the Dulles Community of the Suburban Policy Area and does not conflict with RGP designations for the area (Industrial/Business). The project is also anticipated to impact numerous cultural and natural resources, as were identified in the NEPA concurrence form. Design should adhere to standards of Loudoun County's Revised 1993 Zoning Ordinance/RGP/2010 CTP/SWMP BMPs in consideration of these resources.	October 19, 2018
Blue Ridge District Supervisor	No response to the scoping letter was received.	N/A
Dulles District Supervisor	No response to the scoping letter was received.	N/A
Loudoun County Board of Supervisors	No response to the scoping letter was received.	N/A
Loudoun County Office of the County Administrator	No response to the scoping letter was received.	N/A
Loudoun County Preservation Society	No response to the scoping letter was received.	N/A
Loudoun County Public Schools	No response to the scoping letter was received.	N/A
Northern Virginia Regional Commission	No response to the scoping letter was received.	N/A
U.S. Department of Agriculture – Natural Resources Conservation Service	No response to the scoping letter was received.	N/A
Virginia Department of Forestry	No response to the scoping letter was received.	N/A
Virginia Department of Transportation	No response to the scoping letter was received. Coordination is ongoing.	N/A
Delaware Nation	No response to the scoping letter was received.	N/A

Pamunkey Indian Tribe	No response to the scoping letter was received.	N/A
Rappahannock Tribe	No response to the scoping letter was received.	N/A
Mattaponi Tribe	No response to the scoping letter was received.	N/A
Upper Mattaponi Tribe	No response to the scoping letter was received.	N/A
Nansemond Indian Nation	No response to the scoping letter was received.	N/A
Chickahominy Indian Tribe	No response to the scoping letter was received.	N/A
Chickahominy Indian Eastern Division	No response to the scoping letter was received	N/A
Monacan Indian Nation	No response to the scoping letter was received.	N/A
Patowomeck Indian Tribe	No response to the scoping letter was received.	N/A
Nottoway Indian Tribe of Virginia	No response to the scoping letter was received.	N/A
Cheroenhaka (Nottoway)	No response to the scoping letter was received.	N/A
Eastern Shawnee Tribe of Oklahoma	No response to the scoping letter was received.	N/A
United Keetoowah Band of Cherokee Indians in Oklahoma	No response to the scoping letter was received.	N/A

5.2 Public Involvement

Providing meaningful opportunities for public participation is an essential part of the NEPA process for every publicly funded and permitted project. Involvement of the public in the decision-making process provides transparency and facilitates better and more informed decisions. For this proposed project, public involvement will involve a public hearing as well as an open comment period on this EA to solicit input from all potential stakeholders.

5.2.1 Public Information Meetings/ Location & Design Public Hearing

The Loudoun County Department of Transportation and Capital Infrastructure, in partnership with Dewberry Engineers Inc. and VDOT, will hold a Location and Design Public Hearing to provide a discussion forum between the public and project team, and obtain input and comments

from the community. Information provided at the Public Hearing will include: a preliminary project schedule, preliminary property impact information, right of way information and relocation assistance, and this EA for the proposed project. All presented information will be available for public review and comment. Comments received during the public hearing will become part of the public hearing record. This hearing will be publicly advertised in a local periodical twice prior to the meeting as well as through mailings to all previously-determined stakeholders.

5.2.2 Additional Coordination Efforts

All communications and public events will be designed to comply with Title VI and Title VII of the Civil Rights Act of 1964 to ensure nondiscrimination and equal employment. Special accommodations will be provided for persons with disabilities or limited English proficiency. Efforts will be made to accommodate those who cannot attend the public hearing and those who do not wish to speak at the hearing. Contact information will be provided for those who wish to email or mail comments and questions concerning this proposed project. In addition, public and agency comments received during the 30-day comment period that follows the release of the EA will be taken into consideration and incorporated, as appropriate, in revisions to this EA. All comments received during the public comment period will become part of the public hearing record.

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APPENDIX A

Northstar Boulevard Extension Traffic Volume Projections

APPENDIX B

**Northstar Boulevard Extension Cultural Resources Surveys, Loudoun
County, Virginia, VDHR File No. 2018-4115**

APPENDIX C

Northstar Boulevard Extension Preliminary Design Noise Impact Analysis Technical Report

APPENDIX D

Northstar Boulevard Extension Air Quality Technical Report

APPENDIX E

Northstar Bouvard Extension Wetland Delineation Report and Jurisdictional Determination

APPENDIX F

Northstar Boulevard Extension Natural Resources Reports and Maps

APPENDIX G

Northstar Boulevard Extension EDR Radius Map™ Report with GeoCheck®

APPENDIX H

Northstar Boulevard Extension Scoping Letter Responses