VDOT

SKIFFES CREEK

CONNECTOR STUDY

NATURAL RESOURCES

TECHNICAL REPORT

JUNE 2018

SKIFFES CREEK CONNECTOR STUDY

Natural Resources Technical Report

James City County
Project Number: 0060-047-627, P101; R201, C501; UPC: 100200

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List of Acronyms

BMP	Best Management Practice
C	Confirmed
CBPA	Chesapeake Bay Preservation Act
CCB	Center for Conservation Biology
CFR	Code of Federal Regulations
CLOMR	Conditional Letters of Map Revision
CMA	Coastal Management Area
COV	Code of Virginia
CSXT	CSX Transportation
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
DNH	Department of Natural Heritage
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
FE	Federally Endangered
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FPPA	Farmland Protection Policy Act
FT	Federally Threatened
FY	Fiscal Year
HUC	Hydrologic Unit Code
HRTPO	Hampton Roads Transportation Planning Organization
I-64	Interstate 64
IPaC	Information for Planning and Consultation
LOD	Limits of Disturbance
LOMR	Letters of Map Revision
LRTP	Long Range Transportation Plan
mph	Miles Per Hour
MS4	Municipal Separate Storm Sewer System
N	Not Prime Farmland
NLCD	National Land Cover Database
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NLEB	Northern Long-Eared Bat
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
PEM	Palustrine Emergent
PF	Prime Farmland

PFO	Palustrine Forested
PUB	Palustrine Unconsolidated Bottom
R2/R3	Perennial
R4	Intermittent
R6	Ephemeral
RCI	Reach Condition Index
RMA	Resource Management Area
RP-1	Regional Permit 1
RPA	Resource Protection Area
SCC	Skiffes Creek Connector
SE	State Endangered
SI	Farmland of Statewide Importance;
SPGP	State Programmatic General Permit
ST	State Threatened
SWPPP	Stormwater Pollution Prevention Plan
SYIP	Six Year Improvement Program
TMDL	Total Maximum Daily Load
US 60	US Route 60
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey
USM	Unified Stream Methodology
VA 143	State Route 143
VA 199	State Route 199
VA 238	State Route 238
VAC	Virginia Administrative Code
VaFWIS	Virginia Fish and Wildlife Information Service
VARTF	Virginia Aquatic Resources Trust Fund
V-CRIS	Virginia Cultural Resource Information System
VDACS	Virginia Department of Agriculture and Consumer Services
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDOT	Virginia Department of Transportation
VMRC	Virginia Marine Resources Commission
VPDES	Virginia Pollutant Discharge Elimination System
VSMP	Virginia Stormwater Management Program
VWPP	Virginia Water Protection Permit
WERMS	Wildlife Environmental Review Map Service
WetCAT	Wetland Condition Assessment Tool
WNS	White Nose Syndrome
WOUS	Waters of the United States
WP3	Water Protection General Permit

1. INTRODUCTION

The Virginia Department of Transportation (VDOT), in coordination with the Federal Highway Administration (FHWA) as the lead federal agency, has initiated an Environmental Assessment (EA) for the Skiffes Creek Connector (SCC) Study in James City County, Virginia. This study evaluates potential transportation improvements between Pocahontas Trail (U.S. Route 60 (US 60)) and Merrimac Trail (State Route 143 (VA 143)). The purpose of the SCC is to create efficient local connectivity between US 60 and VA 143, in the area between VA 199 and VA 238, in a manner that improves safety, emergency evacuation, and the movement of goods along the two primary roadways.

To support the analysis in the EA, this Natural Resources Technical Report has been prepared to document the following:

- **Section 1** provides an overview of the study, the Purpose and Need of the project, and the alternatives being evaluated in this study;
- **Section 2** describes Waters of the U.S. within the study area and evaluates the potential for impacts;
- **Section 3** describes the water quality within the study area and evaluates the potential for impacts;
- **Section 4** describes the floodplains within the study area and evaluates the potential for impacts;
- **Section 5** describes wildlife within the study area and anticipated impacts to habitat;
- **Section 6** describes aquatic biology protections within the study area and evaluates the potential for impacts;
- **Section 7** describes the threatened, endangered, and special status species and their habitats and evaluates the potential for impacts;
- **Section 8** describes types of soils, focusing on prime farmland and farmland of statewide importance, and evaluates the potential for impacts;
- **Section 9** describes the permits that would be required; and,
- **Section 10** includes a list of references that were used to complete this technical report.

The EA has been prepared in accordance with the National Environmental Policy Act of 1969, as amended, (NEPA) and in accordance with FHWA regulations[1]. The environmental review process as part of the EA was carried out following the *National Environmental Policy Act and Clean Water Act (Section 404) Merged Process for Highway Projects in Virginia* (merged process)[2] between VDOT, the FHWA, the U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency (USEPA), and the U.S. Fish and Wildlife Service (USFWS). In accordance with the merged process agreement, the environmental analysis methodologies were developed and concurred upon based on coordination and input from these agencies. The memorandum documenting these environmental analysis methodologies is included in **Appendix A**. Analyses were then carried out following the concurred upon methodologies and included in this Technical Report and summarized in the corresponding EA.

[1] NEPA and FHWA's regulations for Environmental Impact and Related Procedures can be found at 42 USC §4332(c), as amended, and 23 CFR §771, respectively.

[2] The process is intended to facilitate an environmental review process and development of documentation that comply with the requirements of NEPA and provide sufficient information to support FHWA approval or Federal regulatory decision-making, including permits issued by other Federal agencies.

1.1 STUDY AREA

The SCC study area is bordered to the north by the southern edge of the Interstate 64 (I-64) right-of-way and to the south by the southern edge of the US 60 right-of-way. The eastern border is Skiffes Creek Reservoir and the western border is just west of the intersection of the inactive rail spur that lines up with BASF Drive, as shown on **Figure 1-1** and **Figure 1-2**.

The SCC study area is comprised mainly of undeveloped, residential, institutional/public land, and industrial land. The southwest portion of the study area contains two residential areas bisected north to south by the inactive rail spur that lines up with BASF Drive, west of Green Mount Parkway. A second rail line, the CSX Transportation (CSXT) railroad, runs west to east, separating the northern third of the study area from the southern portion. This area contains three institutional properties – the Virginia Peninsula Regional Jail, Merrimac Juvenile Detention Center, and a VDOT maintenance center, as well as an industrial use, the asphalt processing plant.

1.2 PURPOSE AND NEED

The purpose of the SCC is to create efficient local connectivity between US 60 and VA 143, in the area between VA 199 and VA 238, in a manner that improves safety, emergency evacuation, and the movement of goods along the two primary roadways. The SCC would address the following needs:

- ***Improved local connectivity*** – there is inadequate and / or inefficient connectivity points between these two primary routes;
- ***Provide efficient connectivity for local truck movement*** – there are known truck destinations along the corridors; and
- ***Emergency evacuation capability*** – connectivity between identified evacuation routes should be enhanced to support connectivity and efficiency.

1.3 DESCRIPTION OF ALTERNATIVES

1.3.1 No Build Alternative

The No Build Alternative would retain the existing US 60 and VA 143 roadways and associated intersections/interchanges in their present configuration, and allow for routine maintenance and safety upgrades. This alternative assumes no major improvements to either corridor with the exception of previously committed projects, including projects currently programmed and funded in VDOT Fiscal Year (FY) 2018-2023 Six-Year Improvement Program (SYIP) and the Hampton Roads Transportation Planning Organization (HRTPO)'s 2040 Long-Range Transportation Plan (LRTP). As these other projects are independent of the proposed action, they are not evaluated in the EA.

Figure 1-1
Skiffes Creek Connector Initial Study Area

VDOT Virginia Department of Transportation
Skiffes Creek Connector Study
VDOT Project Number: 0060-047-627, P101, R201, C501; UPC: 100200

0 0.25 0.5 1 Mile

N W E S

Source: Esri OpenStreetMap

Study Area

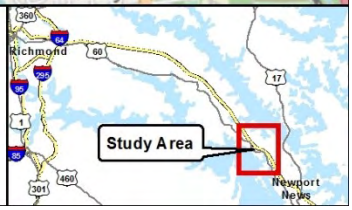


Figure 1-2
Skiffes Creek Connector Study Area

VDOT Virginia Department of Transportation
Skiffes Creek Connector Study
VDOT Project Number: 0060-047-627, P101, R201, C501; UPC: 100200

0 0.05 0.1 0.2 Miles

N W E S

Source: ESRI, NHD

Interstate Exit

Study Area

1.3.2 Build Alternative 1

Build Alternative 1 would provide an approximate one-mile two-lane roadway between US 60 and VA 143. Build Alternative 1 would tie into US 60 at the existing US 60/Green Mount Parkway signalized intersection, bridge[3] over Skiffes Creek, the CSXT railroad, and VA 143, then turn east to connect at a new intersection with VA 143. Potential environmental impacts of Build Alternative 1 were estimated based on the planning-level limits of disturbance (LOD), estimated to be 140 feet wide. This width includes sufficient area to accommodate the required right-of-way as well as any necessary utility or construction easements. It is anticipated that this planning-level LOD would be refined as the project advances through more detailed design and permitting following a FHWA NEPA decision. Additionally, resources within a larger 225-foot Inventory Corridor were identified to provide the ability for future shifts or refinements to be made within this corridor during the detailed design and permitting phases.

1.3.3 Build Alternative 2

Build Alternative 2 would provide an approximate one-mile two-lane roadway between US 60 and VA 143. Build Alternative 2 would begin at a new intersection with US 60, approximately 1,000 feet west of the existing US 60/Green Mount Parkway intersection. Build Alternative 2 would then bridge[3] over Skiffes Creek, the CSXT railroad, and VA 143, then turn east to connect at a new intersection with VA 143. Potential environmental impacts of Build Alternative 2 were estimated based on the planning-level LOD, estimated to be 140 feet wide. This width includes sufficient area to accommodate the required right-of-way as well as any necessary utility or construction easements. It is anticipated that this planning-level LOD would be refined as the project advances through more detailed design and permitting following a FHWA NEPA decision. Additionally, resources within a larger 225-foot Inventory Corridor were identified to provide the ability for future alignment shifts or refinements to be made within this corridor during the detailed design and permitting phases.

2. WATERS OF THE U.S.

2.1 REGULATORY CONTEXT

USACE exerts regulatory authority over activities involving the discharge of dredged or fill material into Waters of the U.S. (WOUS) pursuant to Section 404 of the Clean Water Act (CWA) of 1977, as amended (33 USC 1344). The Virginia Department of Environmental Quality (VDEQ) administers the Virginia Water Permit (VWP) Program for impacts to surface waters (9 VAC 25-210). The Virginia Marine Resources Commission (VMRC) regulates encroachment into state-owned submerged lands (4 VAC 20). These regulations are relevant for this analysis because the proposed project may result in impacts to WOUS.

2.2 METHODOLOGY

In order to identify potential WOUS that could be present within the study area, an in-office review of available resource information was conducted in January 2018. Data reviewed included U.S. Geological Survey (USGS) topographic mapping, National Wetland Inventory (NWI) mapping, the National Hydrography Dataset (NHD), U.S. Department of Agriculture (USDA) Natural Resources Conservation

[3] The type and length of bridge-like structure over Skiffes Creek would be determined during final design/permitting.

Service (NRCS) soils mapping and data, and aerial imagery (USGS, 2017; USFWS, 2017; and USDA-NRCS, 2018).

To provide a more refined estimate of potential wetland and stream impacts that may result from the project, field investigations were conducted in June 2013 and March 2018 within the 225-foot Inventory Corridor. Per the concurred methods with resource agencies, only the Inventory Corridor was studied in the field investigation; the rest of the study area was approximated with NWI and NHD. The field investigation was performed in accordance with the 2010 Regional *Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)*, the USACE 1987 *Wetland Delineation Manual*, and subsequent applicable regulatory guidance (USACE, 1987 and USACE, 2010).

Additionally, a qualitative assessment of wetland functions and values, consistent with the *Highway Methodology Workbook Supplement: Wetland Functions and Values – A Descriptive Approach*, referred to herein as "the Highway Methodology," was prepared using desktop resources and information gathered in the field. To determine the quality of Inventory Corridor streams, a qualitative approach to the USACE – Wilmington District's Stream Quality Assessment Worksheet was conducted. VDEQ's Wetland Condition Assessment Tool (WetCAT) was used to determine the condition of wetlands in the study area.

2.3 EXISTING CONDITIONS

The study area is located within the James River – Skiffes Creek subwatershed (Hydrologic Unit Code [HUC] 020802060802), as shown on **Figure 2-1** (USGS, 2017). One named perennial stream, Skiffes Creek, and several unnamed tributaries to Skiffes Creek and Blows Mill Run flow through the study area, as depicted on **Figure 2-2**. The streams within the study area ultimately flow to the James River.

2.3.1 Wetlands

Approximately 32.04 acres of wetlands (combined NWI and 2013/2018 wetland investigation data) are present within the study area, including 18.86 acres of palustrine forested (PFO) wetlands, 1.69 acres of palustrine emergent (PEM) wetlands, 1.76 acres of palustrine unconsolidated bottom (PUB) wetlands, 7.03 acres of lacustrine wetlands, and 2.70 acres of riverine wetlands. Within the Inventory Corridor, there are approximately 2.98 acres of wetlands (2013/2018 wetland investigation data), including 2.74 acres of PFO wetlands, 0.09 acres of PEM wetlands, and 0.15 acres of PUB wetlands. Field investigated and NWI wetlands are depicted on **Figure 2-2**. Representative wetland investigation data points are included as **Appendix B**.

Palustrine Forested Wetlands

Seasonally flooded/saturated, temporarily flooded, and seasonally flooded broad-leaved deciduous palustrine forested wetlands (PFO 1A/C/E) occur throughout the study area, including the Inventory Corridor (see **Figure 2-2**). These features mostly occur as riparian systems along Skiffes Creek and tributaries to Blows Mill Run. Dominant tree species encountered for these wetland areas include red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), and American sycamore (*Platanus occidentalis*). The understory primarily consists of smaller tree species, as well as spicebush (*Lindera benzoin*), pawpaw (*Asimina triloba*), marsh marigold (*Caltha palustris*), lizard's tail (*Saururus cernuus*), poison ivy (*Toxicodendron radicans*), Nepalese browntop (*Microstegium vimineum*), false nettle (*Boehmeria cylindrica*), and marsh blue violet (*Viola cucullata*).

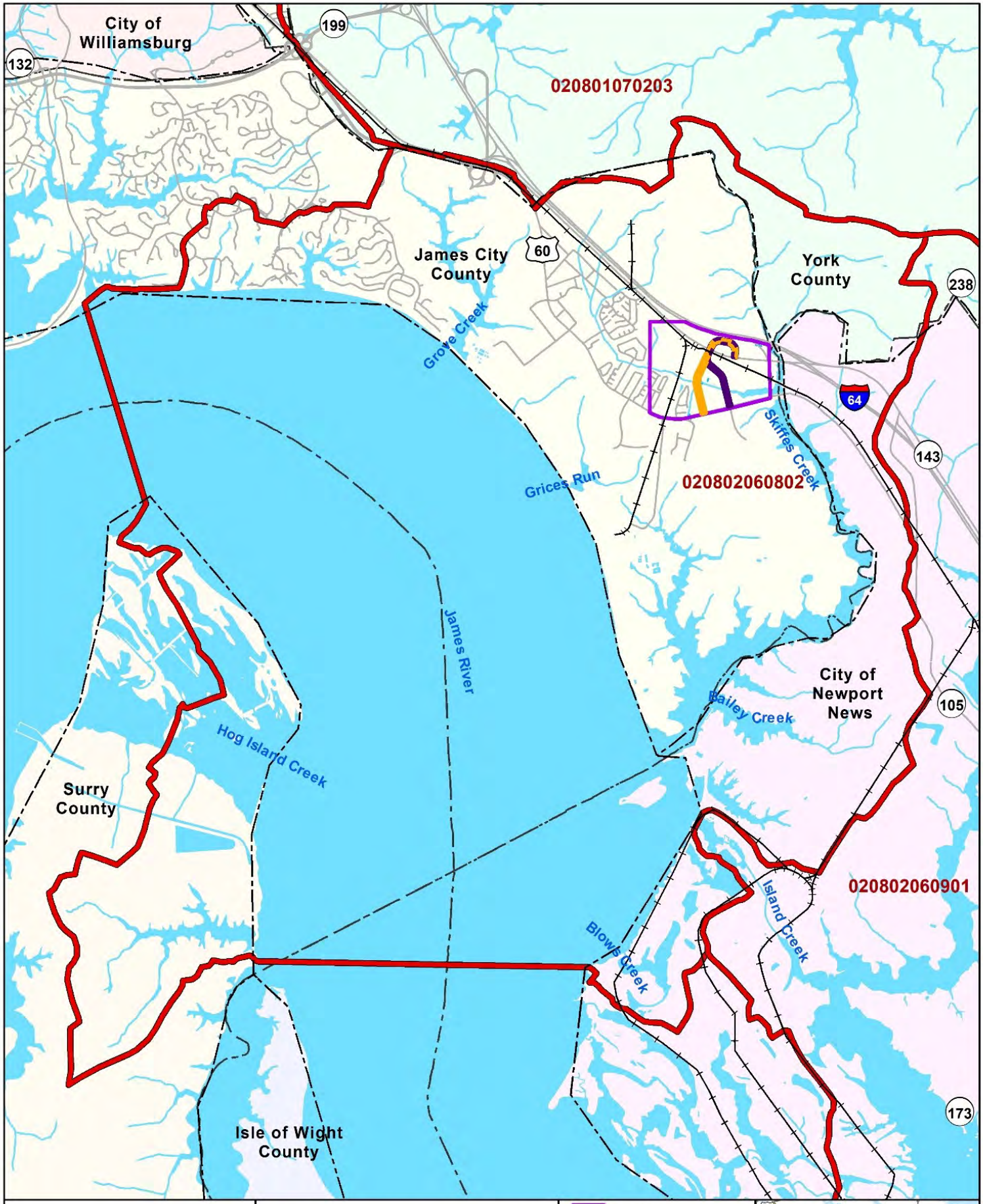


Figure 2-1
Sub-watersheds within the Study Area

VDOT Virginia Department of Transportation
Skiffes Creek Connector Study
VDOT Project Number: 0060-047-627, P101, R201, C501; UPC: 100200

0 0.375 0.75 1.5 Miles

N W E S

Source: ESRI, NHD, USGS

Study Area
Build Alternative 1
Build Alternative 2
Railroad
HUC 12 Boundary
County Boundary

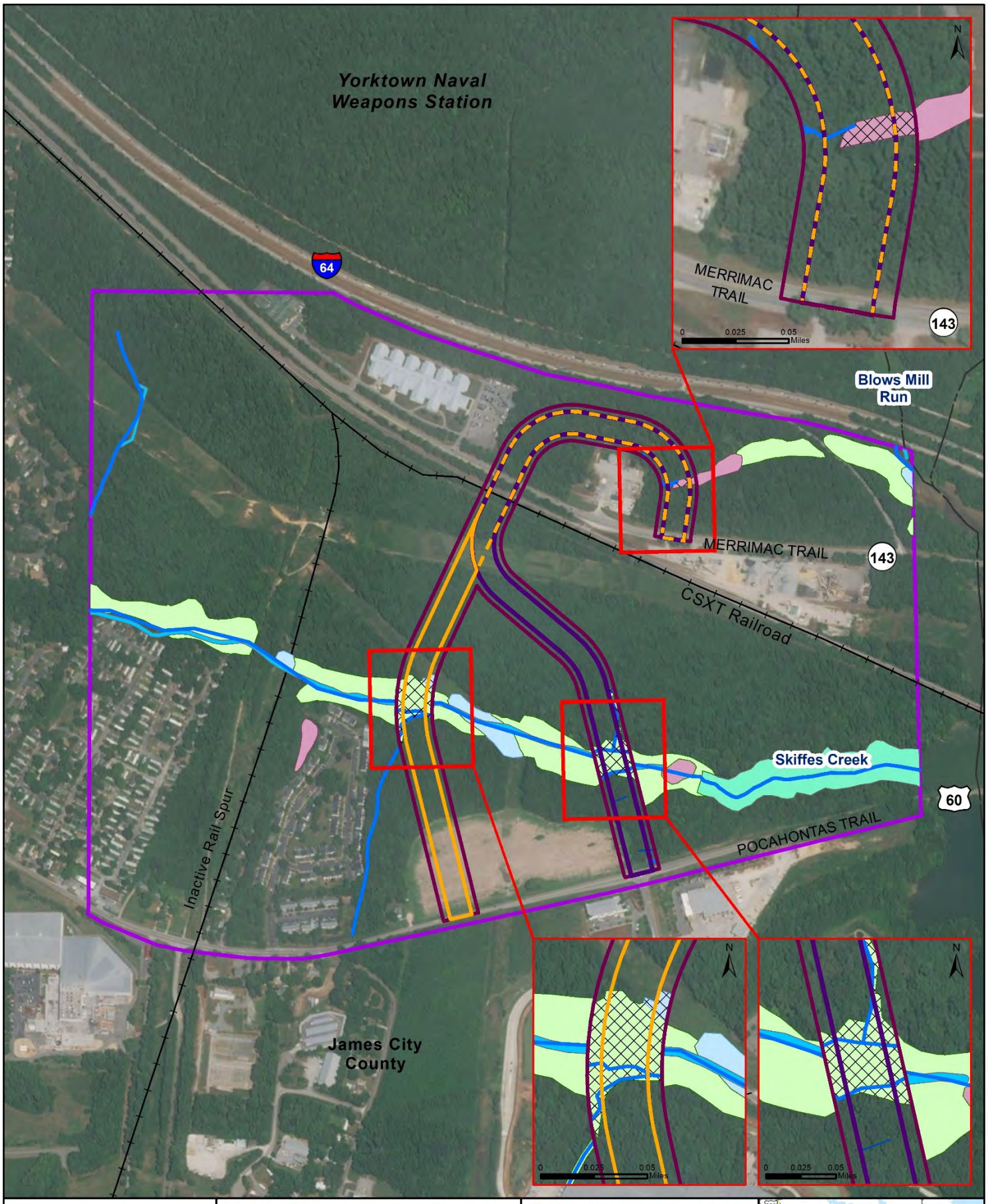


Figure 2-2 Wetlands and Streams within the Study Area

VDOT Virginia Department of Transportation
Skiffes Creek Connector Study
VDOT Project Number: 0060-047-627, P101, R201, C501; UPC: 100200

0 0.05 0.1 0.2 Miles

N W E S

Source: ESRI, NHD, NWI

Build Alternative 1
Build Alternative 2
Field Investigated Wetlands
Inventory Corridor
Lacustrine
Riverine
PEM
PFO
PUB
R2/R3/R4
R6
NHD Stream
Study Area

Richmond
Study Area
Newport News

Palustrine Emergent Wetlands

Persistent, seasonally flooded palustrine emergent wetlands (PEM1C) are present in the study area, including the Inventory Corridor (see **Figure 2-2**). These systems occur mostly as riparian systems along Skiffes Creek, and are typically kept in an emergent state due to utility easement maintenance. Common species found in these wetlands include common reed *(Phragmites australis*), common rush (*Juncus effusus*), and Japanese honeysuckle (*Lonicera japonica*).

Palustrine Unconsolidated Bottom Wetlands

Permanently flooded, diked/impounded or excavated palustrine unconsolidated bottom wetlands (PUBHh/x) occur in the study area, including the Inventory Corridor (see **Figure 2-2**). Most of these PUBs are associated with tributaries to Skiffes Creek and Blows Mill Run. These features typically consist of in-line best management practices (BMPs) or impoundments of jurisdictional waters with no vegetation present.

Lacustrine Wetlands

Lacustrine, limnetic, unconsolidated bottom, permanently flooded, diked/impounded wetlands (L1UBHh) are present in the study area, outside the Inventory Corridor (see **Figure 2-2**). These unvegetated wetlands consist of the Skiffes Creek Reservoir impoundment.

Riverine Wetlands

Unknown perennial, lower perennial, and intermittent streams, including those that are permanently flooded unconsolidated bottom and temporarily flooded streambed (R5UBH, R2UBH, R4SBA), are present in the study area (see **Figure 2-2**). These wetlands consist of Skiffes Creek and its adjacent wetlands.

Wetland Functions and Values

Wetland functions and values describe the services that a wetland performs that benefit the wetland, the wetland's watershed, and the surrounding ecosystem. Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society, and result from both living and non-living components of a specific wetland. These include all processes necessary for self-maintenance of the wetland ecosystem such as primary production and nutrient cycling. Values are the benefits that derive from either one or more functions and the physical characteristics associated with a wetland (USACE, 1999). A functions and values characterization is necessary to fulfill Virginia Water Protection Permit (VWPP) individual permit requirements (9VAC25-210-80).

The Highway Methodology was used to evaluate wetland functions and values within the Inventory Corridor, as specified in the Natural Resources Methodology Memorandum (**Appendix A**) (USACE, 1999). This descriptive approach uses qualitative characteristics to determine the functions and values of each wetland. A pre-established list of considerations or qualifying criteria based on those outlined in the Highway Methodology served as guidance in determining the suitability of each function and value. Functions and/or values may also be listed as principal if they are an important physical component of a wetland ecosystem and/or are considered of special value to society from a local, regional, and/or national perspective. Wetland functions and values within the Inventory Corridor were selected based on best professional judgement using existing literature and mapping including Federal Emergency Management

Agency (FEMA) floodplain, NWI, NRCS soil surveys, and threatened and endangered species mapping, as well as field data collected during the wetland investigation.

Wetland Functions and Values Methodology

The Highway Methodology evaluates 13 functions and values, including groundwater recharge/discharge, flood-flow alteration, fish and shellfish habitat, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, product export (nutrient), sediment/shoreline stabilization, wildlife habitat, recreation (consumptive and non-consumptive), educational/scientific, uniqueness/heritage, visual quality/aesthetics, and threatened or endangered species habitat (USACE, 1999).

A description of the functions and values that are considered in the Highway Methodology are provided below:

Groundwater Recharge/Discharge: This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. Recharge should relate to the potential for the wetland to contribute water to an aquifer. Discharge should relate to the potential for the wetland to serve as an area where groundwater can be discharged to the surface.

Flood-Flow Alteration: This function considers the effectiveness of the wetland in reducing flood damage by attenuation of floodwaters for prolonged periods following precipitation events.

Fish and Shellfish Habitat: This function considers the effectiveness of seasonal or permanent waterbodies associated with the wetland in question for fish and shellfish habitat.

Sediment/Toxicant/Pathogen Retention: This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens.

Nutrient Removal/Retention/Transformation: This function relates to the effectiveness of the wetland to prevent adverse effects of excess nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

Production Export (Nutrient): This function relates to the effectiveness of the wetland to produce food or usable products for humans or other living organisms.

Sediment/Shoreline Stabilization: This function relates to the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.

Wildlife Habitat: This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered. Species lists of observed and potential animals should be included in the wetland assessment report.

Recreation (Consumptive and Non-consumptive): This value considers the effectiveness of the wetland and associated watercourses to provide recreational opportunities such as canoeing, boating, fishing, hunting, and other active or passive recreational activities. Consumptive activities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland, whereas non-consumptive activities do not.

Educational/Scientific Value: This value considers the effectiveness of the wetland as a site for an "outdoor classroom" or as a location for scientific study or research.

Uniqueness/Heritage: This value relates to the effectiveness of the wetland or its associated waterbodies to produce certain special values. Special values may include such things as archaeological sites, unusual aesthetic quality, historical events, or unique plants, animals, or geologic features.

Visual Quality/Aesthetics: This value relates to the visual and aesthetic qualities of the wetland.

Threatened or Endangered Species Habitat: This value relates to the effectiveness of the wetland or associated waterbodies to support threatened and/or endangered species.

Functions and Values of Wetlands in the Inventory Corridor

Functions and values of wetlands are influenced by many factors including, but not limited to, size and proximity of wetlands to ongoing development activity, geologic setting, soil characteristics, presence and duration of hydrology, landscape position, vegetation cover type, and dominant ecological community type. The following sections discuss the functions and values of the wetlands within the Inventory Corridor as defined in the section above.

Groundwater Recharge/Discharge: Most wetlands serve a role in groundwater recharge/discharge due to the integral relationship between wetlands, aquifers, and water table fluctuations. Groundwater discharge within the Inventory Area may be found in muck, loam, and clay loam soils. Wetland and stream discharge typically occurs when the water table is high relative to the elevation of the waterbody. Groundwater recharge in the Inventory Corridor is driven by direct precipitation onto the land, seepage, and subsurface flow. Wetlands in the Inventory Corridor that contribute to groundwater discharge and recharge typically show signs of variable water table levels, including redoximorphic features in the soil, saturation, ponded water, and water stained leaves. Because most Inventory Corridor wetlands contain the features listed above, groundwater recharge/discharge is considered a principal function of Inventory Corridor wetlands.

Flood-flow Alteration: Wetlands connected to 100-year floodplains have the ability to affect downslope flood-flow through attenuation of stormwater flows. Since there are no 100-year floodplains within the Inventory Corridor, flood-flow alteration is not considered a principal function for wetlands in the Inventory Corridor.

Fish and Shellfish Habitat: The wetlands within the Inventory Corridor provide habitat, spawning/nursery areas, and refuge for non-migratory freshwater fish. Habitat is usually associated with wetlands adjacent to perennial streams which flood during large storm events. These flood flows allow fish to gain access to flooded wetland areas. The shallow water of forested floodplain wetlands provides good habitat for the majority of freshwater fish species to lay their eggs. It also offers refuge and protects young fish from predators. The floodplain can be used as a nursery and spawning ground for young fish. Additionally, fish species may rely on large woody debris and vegetation along stream banks to provide shelter from predators. Fish habitat should be considered a principal function of wetlands found in the floodplains of Skiffes Creek. For more information on aquatic biology, please see **Section 6.0**.

Sediment/Toxicant/Pathogen Retention: Wetlands within the Inventory Corridor retain excessive sediments, toxicants, and pathogens. Slowly-drained fine-grained soils hold pollutants. Dense vegetation commonly found in the PFO and PEM Inventory Corridor wetlands assists in trapping sediment. PUBs

retain sediment, toxicants, and pathogens. These wetland features prevent sediment, toxicants, and pathogens from downstream transport, and thus should be considered a principal function.

Nutrient Removal/Retention/Transformation: Wetlands within the Inventory Corridor are suitable for nutrient removal/retention/transformation. These wetlands share many characteristics that also assist in the function of sediment/toxicant/pathogen retention, including ponded water, slowly-drained fine-grained soils, and dense herbaceous vegetation. Vegetation allows for uptake, retention, and transformation of nutrients in wetland systems. Nutrient removal/retention/transformation is important in helping reduce the input of excess nutrients to downstream waterbodies. Excess nutrients in waterbodies are associated with increased productivity, eutrophication, and lower dissolved oxygen, all which have the potential to lower water quality, alter aquatic habitat, and adversely impact fish and other aquatic species. Consequently, nutrient removal/retention/transformation should be considered a principal function of the wetlands found in the Inventory Corridor.

Production Export: Wetlands typically have high productivity levels and are generally associated with providing food for wildlife and other living organisms. High trophic level wildlife consume and export vegetation, invertebrates, and/or other wildlife for use by lower trophic levels within the wetland. Wetlands within the Inventory Corridor are composed of relatively homogenous ecological systems. PFO wetlands generally contain green ash, American sycamore, red maple, pawpaw, and spicebush, which are food sources for wildlife. Emergent wetlands may serve this function because of the use of flowering plants by nectar and pollen-gathering insects. The ponded and seasonally inundated wetlands within the Inventory Corridor may serve as breeding grounds for insects that are consumed by bats, birds, and other insects. Production export is considered a principal function of the wetlands found within the Inventory Corridor.

Sediment/Shoreline Stabilization: Most wetlands that border perennial/intermittent streams function in sediment/shoreline stabilization. Nearly all wetlands associated with Inventory Corridor streams have an unmaintained buffer comprised of woody vegetation that absorbs energy during flood events. The unmaintained buffer stabilizes stream banks from erosive forces. Although some of the stream banks are vertical and lack vegetation, the root systems of mature trees near the streams serve to keep banks stable. Sediment/shoreline stabilization is considered a principal function of the wetlands located adjacent to, or upstream of, the streams within the Inventory Corridor. Maintained wetlands or wetlands not adjacent to streams do not have sediment/shoreline stabilization as a principal function.

Wildlife Habitat: Forested land within the Inventory Corridor contains habitat for a variety of wildlife species. Game species include wild turkey (*Meleagris gallopavo*), white-tailed deer (*Odocoileus virginianus*), gray squirrel (*Sciurus carolinensis*), raccoon (*Procyon lotor*), and gray fox (*Urocyon cinereoargenteus*). Small mammal species include mice, moles, and shrews. Forest bird species include a variety of warblers (*Muscicapidae*), vireos (*Viriondae*), and woodpeckers (*Picidae*). Amphibians inhabiting forests of the Inventory Corridor include eastern American toad (*Anaxyrus americanus americanus*), spotted salamander (*Ambystoma maculatum*), and three-lined salamander (*Eurycea guttolineata*). Reptiles inhabiting the forests include eastern box turtle (*Terrapene carolina*), eastern fence lizard (*Sceloporus undulatus*), northern black racer (*Coluber constrictor constrictor*), and eastern ratsnake (*Pantherophis alleghaniensis*). The seasonally flooded to semi-permanently flooded wetlands provide aquatic breeding habitat for amphibians, insects, and other invertebrates that provide food sources for higher tropic levels. Forested wetlands produce berries and acorns for birds and mammals to consume. Consequently, wildlife

habitat is considered a principal function of wetlands within the Inventory Corridor. For more information on wildlife habitat see **Section 5.0**.

Recreation: Wetlands can provide opportunities for enjoyment to the community. The wetlands within the Inventory Corridor do not have public access or parking. Because of this, recreation is not considered a principal value for Inventory Corridor wetlands.

Educational/Scientific Value: The wetlands within the Inventory Corridor are located on private property without public access or parking. Because the wetlands are not unique for the watershed, they would not be targeted by educational institutions for scientific research. In addition, the wetlands are not in close proximity to or easily accessed by schools or other educational institutions and would, therefore, offer little opportunity to serve as "outdoor classrooms." Therefore, the wetlands identified within the Inventory Corridor have little educational/scientific value.

Uniqueness/Heritage: Wetlands within the Inventory Corridor do not contain unique vegetation and don't contain threatened, endangered, and special status species habitat. According to Virginia Cultural Resource Information System (V-CRIS), there are no architecture or archaeology resources within Inventory Corridor wetlands. Therefore, uniqueness/heritage is not considered a principal value for the wetlands within the Inventory Corridor.

Visual Quality/Aesthetics: The wetlands within the Inventory Corridor lack publicly-accessible viewing locations, are not easily accessed, and are not dominated by plants that have vibrantly colored foliage or flowers. Therefore, visual/aesthetics is not considered a principal value for the wetlands within the Inventory Corridor.

Threatened or Endangered Species Habitat: In general, wetlands can provide habitat for numerous species, including state and federal threatened or endangered species. Threatened or endangered species database queries were conducted in January 2018. Based upon database findings, a habitat field investigation was conducted in March 2018. No suitable threatened or endangered species habitat was identified (for more information on threatened or endangered species, see **Section 7.0**). Due to the unlikely presence of threatened or endangered species, threatened or endangered species habitat is not a primary function of wetlands within the Inventory Corridor.

WetCAT

VDEQ's WetCAT was run on January 5, 2018 to provide additional documentation on the condition of wetlands in the study area. According to WetCAT, wetland habitat stress levels and water quality stress levels range from somewhat stressed to severely stressed (VDEQ, 2018b). These results indicate that all wetland habitats and water quality within the study area experience a degree of stress that is not consistent with pristine environments. The full WetCAT details and results are included in **Appendix C**.

2.3.2 Jurisdictional Streams and Ditches

Approximately 9,519 linear feet of regulated stream channels (combined NHD and 2013/2018 wetland investigation data) were identified within the study area, including 9,332 linear feet of perennial/intermittent channel (R2/R3/R4) and 187 linear feet of ephemeral channel (R6). Within the Inventory Corridor, there are approximately 1,627 linear feet of R2/R3/R4 and 187 linear feet of R6 (2013/2018 wetland investigation

data). Field investigated and NHD streams are depicted on **Figure 2-2**. No jurisdictional ditches were identified.

Stream Quality Assessment

High quality streams typically show evidence of groundwater discharge, have stable banks, contain a variety of aquatic habitats, and show evidence of wildlife use, to name a few. Conversely, lower quality streams often show evidence of past human alteration, are incised, have little canopy coverage, and do not support aquatic biology. To determine the quality of Inventory Corridor streams, the USACE – Wilmington District's Stream Quality Assessment Worksheet was recommended to be used by USACE, since Virginia does not have a similar tool. The use of the worksheet is intended to inform the qualitative NEPA discussion and is not meant to advance the project into the permitting phase.

USACE Wilmington District's Stream Quality Assessment Worksheet assesses stream quality based on four broad categories: physical, stability, habitat, and biology.

Physical: Physical components of streams are readily visible characteristics of streams. They include, but are not limited to, persistent baseflow, evidence of human alteration, riparian zone width, evidence of nutrient or chemical discharges, channel sinuosity, sediment input, and presence of groundwater discharge, floodplains, and/or adjacent wetlands. High quality streams typically have strong evidence of flow/groundwater discharge, no human alteration, large riparian buffer zones, and adjacent floodplains and wetlands.

Stability: Stability refers to a stream's ability to resist physical change. Undisturbed riparian buffers and vegetated banks help streams resist erosive forces and are thus characteristics of stable streams. Unstable streams often have incised channels, major bank failures, shallow root depth of vegetation on banks, and/or impacts from agriculture or livestock. There is a positive correlation between stream stability and stream quality.

Habitat: Habitat reflects the capacity of a stream ecosystem to provide essential life components for vertebrate and invertebrate wildlife communities, including food, shelter, light intensity, and oxygen. Diverse stream environments (*e.g.* riffle pool complexes, multiple substrates, varied water depths, leafpacks, root mats, undercut banks, canopy cover, and overhanging vegetation) provide a variety of habitat types for many species. There is a positive correlation between abundance of habitat and stream quality.

Biology: Biology includes the invertebrates, amphibians, fish, and other wildlife that utilize streams. Invertebrate species presence, abundance, and diversity can indicate flow regime and water quality. Amphibians, which require both aquatic and terrestrial habitats, can facilitate energy exchange between the two systems. They are also vulnerable to hydrologic alteration since many species require water for a specific amount of time for egg development and maturation of young. Fish are indicators of a perennial flow regime. Some species are sensitive to changes in channel morphology and water quality, and consequently can serve as stream quality indicator species.

USACE Wilmington District's Stream Quality Assessment Worksheet assesses these four broad categories with twenty-three parameters. **Table 2-1**, below, qualitatively assesses Inventory Corridor stream quality in accordance with these twenty-three parameters. A complete Stream Quality Assessment Worksheet for Inventory Corridor streams is included as **Appendix D**.

Table 2-1: Inventory Corridor Stream Quality Assessment

Category	No.	Parameter
Physical	1	**Presence of flow/persistent pools in stream:** About half of the streams in the Inventory Corridor are perennial and have persistent flow and/or pools. Inventory Corridor intermittent and ephemeral streams are usually located in headwaters or adjacent to roads and/or development.
	2	**Evidence of past human alteration:** The majority of Inventory Corridor streams do not display evidence of past human alteration. See **Section 6.3** for more information on Inventory Corridor channel alterations.
	3	**Riparian zone:** Most Inventory Corridor streams have a buffer consisting of trees with a non-maintained understory. Invasive species are often present in these buffer areas. Streams located close to roads and development typically have smaller riparian buffer zones. See **Section 6.3** for more information on Inventory Corridor stream buffers.
	4	**Evidence of nutrient or chemical discharges:** The Inventory Corridor is adjacent to industrial, institutional, residential, and agricultural lands that have the potential to discharge nutrients or chemicals into streams.
	5	**Groundwater discharge:** The majority of Inventory Corridor streams have evidence of groundwater discharge. Adjacent wetlands, seeps, springs, and reduced soils in channels are present in most Inventory Corridor streams. Streams that lack evidence of groundwater discharge are typically ephemeral features coming off farm fields.
	6	**Presence of adjacent floodplain:** Most Inventory Corridor streams have an adjacent floodplain. Exceptions to this include ditched streams adjacent to roads and ephemeral features coming off farm fields.
	7	**Entrenchment/floodplain access:** Skiffes Creek and its adjacent tributaries have evidence of floodplain access, including sediment deposits, wrack lines, and drainage patterns. Most streams adjacent to roads and farm fields either lack floodplains or lack evidence of floodplain access.
	8	**Presence of adjacent wetlands:** Most Inventory Corridor streams have adjacent wetlands. Exceptions to this include ditched streams adjacent to roads and ephemeral features coming off farm fields.
	9	**Channel sinuosity:** The majority of Inventory Corridor streams have natural meander. Exceptions to this include streams that have been ditched adjacent to roads.
	10	**Sediment input:** Few streams in the Inventory Corridor have extensive sediment deposition. These streams are located adjacent to roads and have significant bank erosion.
	11	**Size & diversity of channel bed substrate:** Not measured in the coastal plain.
Stability	12	**Evidence of channel incision or widening:** Most streams in the Inventory Corridor have stable banks. Incised channels are typically located adjacent to roads. See **Section 6.3** for more information on Inventory Corridor channel condition.
	13	**Presence of major bank failures:** Few streams within the Inventory Corridor have evidence of major bank failures. These streams are located adjacent to roads, and have banks falling into channels, exposed soil, and active zones of erosion.
	14	**Root depth and density on banks:** Streams in the Inventory Corridor with stable banks have significant root depth and density. Unstable banks typically have shallow root systems relative to the amount of exposed soil.
	15	**Impact by agriculture, livestock, or timber production:** The two ephemeral streams within the Inventory Corridor have been impacted by agriculture. Farm runoff has increased erosion and bank destabilization. Agricultural fields have also reduced riparian zone buffer width.

Category	No.	Parameter
Habitat	16	**Presence of riffle-pool/ripple-pool complexes:** Ripples are relatively infrequent in Inventory Corridor streams. Most streams consist of slow, flat water with fine sediment substrate.
	17	**Habitat complexity:** Most Inventory Corridor streams contain a variety of habitat elements including sticks, leafpacks, logs, undercut banks, overhanging vegetation, and varied water depths.
	18	**Canopy coverage over streambed:** The majority of Inventory Corridor streams have canopy coverage with some penetrating light. Exceptions include streams adjacent to roads and developments.
	19	**Substrate embeddedness:** Not measured in the coastal plain.
Biology	20	**Presence of stream invertebrates:** Invertebrates are present in Inventory Corridor streams. Crayfish were observed, which are somewhat pollution tolerant.
	21	**Presence of amphibians:** Amphibians are present in Inventory Corridor streams. A southern two-lined salamander (*Eurycea cirrigera*) was observed in a tributary to Skiffes Creek.
	22	**Presence of fish:** Non-migratory freshwater fish are present in Inventory Corridor streams. Anadromous fish are not present; the existing Skiffes Creek Reservoir and associated dam act as an impediment to fish passage.
	23	**Evidence of wildlife use:** Wildlife utilize Inventory Corridor streambeds and buffer zones. Tracks and droppings were observed within the Inventory Corridor.

2.4 ENVIRONMENTAL CONSEQUENCES

2.4.1 No Build Alternative

Because the alternatives are on new alignment, the No Build conditions are consistent with the existing pre-development conditions. Existing infrastructure has impacted WOUS (*e.g.* construction of roads, Skiffes Creek Reservoir and dam, the CSXT railroad, surrounding development, etc.). The current impacts to WOUS would be anticipated to continue under the No Build Alternative. Wetlands within the study area would continue to be somewhat stressed to severely stressed in terms of wetland habitats and water quality.

2.4.2 Build Alternative 1

Since the initiation of the SCC Study in 2012, VDOT has refined the design of Build Alternative 1 to reduce impacts to WOUS. The original four-lane divided freeway facility options were reduced to two-lane facility options, reducing the LOD from 225 feet to 140 feet. In addition, the design speed was reduced from 50 miles per hour (mph) to 35 mph. By reducing the design speed, the alignment for Build Alternative 1 could be shifted to cross Skiffes Creek at a perpendicular angle, which is generally the least impactful way to cross a wetland or stream and is preferred by the regulatory agencies with purview over these resources. The design refinements reduced impacts to streams and wetlands by 869 linear feet (lf) and 1.84 acres, respectively (see **Table 2-2**). The current alignment of Build Alternative 1 would result in impacts to an estimated 0.85 acres of wetlands and an estimated 673 linear feet of stream. An additional design element that would further reduce impacts to wetlands and streams is a bridge crossing over Skiffes Creek. The extent of impact reduction would depend upon the final configuration of the bridge which would be developed during final design and Section 404/401 permitting. The impact reductions from the bridge over Skiffes Creek were not included in this avoidance and minimization analysis.

Table 2-2: Avoidance and Minimization Impact Reductions

Alternative	Classification	2012 4-Lane LOD	2017 2-Lane 50 mph LOD	2-Lane 35 mph LOD (Current Alignment)
Build Alternative 1	PEM (acres)	-	-	-
	PFO (acres)	2.40	1.53	0.75
	PUB (acres)	0.29	0.21	0.10
	Total Wetland	**2.69**	**1.73**	**0.85**
	R6 (lf)	187	137	150
	R3/R4 (lf)	1,355	1,077	523
	Total Stream	**1,542**	**1,214**	**673**
Build Alternative 2	PEM (acres)	0.48	0.32	0.02
	PFO (acres)	0.82	0.51	0.83
	PUB (acres)	0.32	0.25	0.10
	Total Wetland	**1.62**	**1.07**	**0.95**
	R6 (lf)	-	-	-
	R3/R4 (lf)	318	188	365
	Total Stream	**318**	**188**	**365**

* In order to illustrate a worst-case scenario, impacts reported in Table 2-2 were estimated assuming the proposed roadway would cross Skiffes Creek on a fill causeway with culverts and would not be bridged. Through design and permitting, it is assumed bridging would be applied to avoid and minimize these impacts.

Primary impacts to streams and wetlands resulting from roadway construction would likely include discharges of fill material for culverted stream crossings, bridge approaches and abutments, and roadway cut/fill slopes.

Should Build Alternative 1 advance, impacts to wetlands and streams could be further avoided and minimized to the maximum extent practicable as part of the Section 404/401 permitting process. Compensatory mitigation for permanent impacts to streams and wetlands would be developed, as required, during the Section 404/401 permitting process in coordination with the appropriate state and federal agencies. For more information on permitting, see **Section 9.0: Anticipated Permits**.

2.4.3 Build Alternative 2

The same design refinements used to avoid and minimize impacts to streams and wetlands for Build Alternative 1 were used for Build Alternative 2, ultimately reducing impacts to wetlands by 0.67 acres but increasing impacts to streams by 47 linear feet (see **Table 2-2**). The current alignment of Build Alternative 2 would result in impacts to an estimated 0.95 acres of wetlands and an estimated 365 linear feet of stream. The primary impacts and mitigation described above for Build Alternative 1 would be the same for Build Alternative 2. For more information on permitting, please see **Section 9.0: Anticipated Permits**.

3. WATER QUALITY

3.1 REGULATORY CONTEXT

As directed by Section 305(b) of the CWA, VDEQ monitors water quality in the state's waters, identifying impairments and sources of impairments, and developing and implementing Total Maximum Daily Load (TMDL) reports for impaired waters (VAC § 62.1-44.19:5 and § 62.1-44.19:7). TMDLs are the allowable loadings or loading strategies for waterbodies classified as water quality limited. A TMDL Report is a study

to determine the amount of a pollutant that the impaired water can assimilate and still meet water quality standards.

When surface waters fail to meet water quality standards sufficient to support designated use categories, the waters are classified as "impaired waters" under Section 303(d) of the CWA. Freshwater rivers and surface waters in Virginia are evaluated biennially on the water's ability to support the following six designated use categories: Recreation, Aquatic Life, Fish Consumption, Shellfish Harvest, Public Water Supply, and Wildlife. These regulations are relevant for this analysis because the proposed project may result in impacts to water quality.

3.2 METHODOLOGY

To determine water quality within the study area, best available data sources were reviewed. These included VDEQ's Final 2014 305(b)/303(d) Water Quality Assessment Integrated Report and VDEQ's Draft 2016 305(b)/303(d) Water Quality Assessment Integrated Report (VDEQ, 2014; VDEQ, 2016). Additionally, James City County's website and VDEQ and Virginia Department of Health datasets were reviewed to determine the proximity of the proposed project to public drinking water supplies (Newport News, 2018; VDEQ, 2018a; VDOT, 2018). The findings are summarized below.

3.3 EXISTING CONDITIONS

According to VDEQ's 2014 305(b)/303(d) Water Quality Assessment Integrated Report, streams within the study area have insufficient data to determine if any designated uses are currently met, and are prioritized for future monitoring (VDEQ, 2014). VDEQ's Draft 2016 305(b)/303(d) Water Quality Assessment Integrated Report classifies these streams (totaling approximately 1.6 miles) as Category 5A impaired waters where a TMDL is required. Aquatic life is impaired due to dissolved oxygen deficiencies (VDEQ, 2016).

The study area is greater than two miles away from public drinking water wells (VDEQ, 2018a; VDOT, 2018). The study area crosses Skiffes Creek approximately 0.5 miles upstream from the City of Newport News' raw drinking water intake located on Skiffes Creek Reservoir. Drinking water is treated and stored elsewhere. Additionally, the study area is more than two miles from public drinking water wells (VDEQ, 2018a; VDOT, 2018).

3.4 ENVIRONMENTAL CONSEQUENCES

3.4.1 No Build Alternative

Because the alternatives are on new alignment, the No Build conditions are consistent with the existing conditions. Existing surface water impairments are expected to continue under the No Build Alternative.

3.4.2 Build Alternative 1

In accordance with Virginia's State Water Control Law (COV Title 62.1, Chapter 3.1) and implementing Virginia Stormwater Management Program (VSMP) regulations (9VAC25-870), Build Alternative 1 would maintain water quality and quantity post-development equal to or better than pre-development. Stormwater design would conform with VSMP regulations, which maintain, protect, or improve the physical, chemical,

biological, and hydrologic characteristics, as well as water quality and quantity, of the receiving state waters.

Implementation of Build Alternative 1 would not impact public surface water quality. Although the City of Newport News' Skiffes Creek Reservoir surface water intake is approximately 0.5 miles downstream of Build Alternative 1, the reservoir is only used to store raw water. Drinking water is treated and stored at the Newport News City Reservoir. Due to the off-site treatment of Skiffes Creek Reservoir water, contamination of public drinking water is not a major concern.

Implementation of Build Alternative 1 is not expected to impact public drinking water wells. Build Alternative 1 is over two miles away from public drinking water wells; therefore, the wellhead protection radius set forth in the Virginia Wellhead Protection Plan (VDEQ, 2005) and the 100-foot wellhead setback zone specified in Virginia Waterworks Regulations (VR 355-18-000) for public groundwater supply wells would not be impacted.

Build Alternative 1 would introduce impervious surface to an otherwise undeveloped area. Consequently, stormwater runoff would also increase. The stormwater associated with Build Alternative 1 has the potential to carry roadway pollutants that would impact water quality. However, permanent stormwater BMPs would be designed as the project progresses and implemented to minimize the negative impacts of various pollutants that can be carried by runoff into the groundwater and receiving waters in accordance with Virginia's State Water Control Law.

Build Alternative 1 could also result in temporary impacts to water quality during roadway construction through increased sedimentation from land disturbing activities and occurrences of fuel spills or hydraulic spills from construction equipment. During construction, the contractor would be required to adhere to strict erosion and sediment control and stormwater measures and the associated required monitoring protocols, as specified in the State Water Control Law. Temporary stormwater BMPs would be designed as the project progresses and implemented to minimize the negative impacts of various pollutants that can be carried by runoff into the groundwater and receiving waters in accordance with Virginia's State Water Control Law.

3.4.3 Build Alternative 2

Similar to Build Alternative 1, Build Alternative 2 would adhere to the State Water Control Law and VSMP regulations, would not impact public surface water quality or drinking water wells, and would result in the same temporary and permanent impacts to water quality.

4. FLOODPLAINS

4.1 REGULATORY CONTEXT

Federal policies, Executive Order (EO) 11988, as amended, EO 13690, and FHWA policy as set forth in 23 Code of Federal Regulations (CFR) §650, require avoidance of effects associated with the modification of and development in floodplains if a practicable alternative (such as shifting alignments to reduce or avoid the floodplains) exists for the proposed action. FEMA standards also limit increases in base flood levels to less than 1.0 foot above pre-development levels, provided that hazardous velocities are not produced (EO 11988).

The 100-year flood, or base flood, is the area covered by a flood that has a one percent chance of occurring in any given year; this is commonly referred to as the 100-year floodplain. The 100-year floodplain includes the floodway, which is the area that experiences the deepest water and the highest velocities. The floodplain also includes the flood fringe, which is located just outside the floodway. The 500-year floodplain is the area covered by a flood that has a 0.2 percent chance of occurring in any given year. These regulations and definitions are relevant for this analysis because the proposed project may result in impacts to floodplains.

4.2 METHODOLOGY

Locations of designated floodplains and floodways were determined using Flood Boundary and Floodway Maps published by FEMA (US Department of Homeland Security, 2017).

4.3 EXISTING CONDITIONS

Approximately 0.5 acres of the study area contain unmapped FEMA areas, where FEMA has not published a FEMA map. The portion of the study area mapped by FEMA contains approximately 11 acres of 100-year floodplain, 0 acres of 500-year floodplain, and 0 acres of floodway (see **Figure 4-1**).

These 100-year floodplains are associated with Skiffes Creek and Blows Mill Run. The remaining 399.2 acres within the study area are designated as Zone X (areas outside of the 500-year floodplain) (US Department of Homeland Security, 2017).

4.4 ENVIRONMENTAL CONSEQUENCES

4.4.1 No Build Alternative

Because the alternatives are on new alignment, the No Build conditions are consistent with the existing pre-development conditions. Existing infrastructure has impacted floodplains (*e.g.* construction of roads, Skiffes Creek Reservoir and dam, the CSXT railroad, surrounding development, etc.). The current level of impacts to floodplains would be anticipated to continue under the No Build Alternative.

4.4.2 Build Alternative 1

Build Alternative 1 would not encroach into and would not impact the 100-year floodplain. During final design, a hydrologic and hydraulic analysis would be conducted to ensure adequate design of the hydraulic openings of culverts allowing proper conveyance of floodwaters to minimize potential impacts to the floodplain and floodplain hazards. The design would ensure that no substantial increase in downstream flooding would occur and/or would document the need for any Letters of Map Revision (LOMR) or Conditional Letters of Map Revision (CLOMR) and that all encroachments would conform with all applicable state and local floodplain protection standards.

4.4.3 Build Alternative 2

Like Build Alternative 1, Build Alternative 2 would not encroach into and would not impact the 100-year floodplain. During final design, a hydrologic and hydraulic analysis would be conducted. The design would ensure that no substantial increase in downstream flooding would occur and/or would document the need for any LOMR or CLOMR and that all encroachments would conform with all applicable state and local floodplain protection standards.

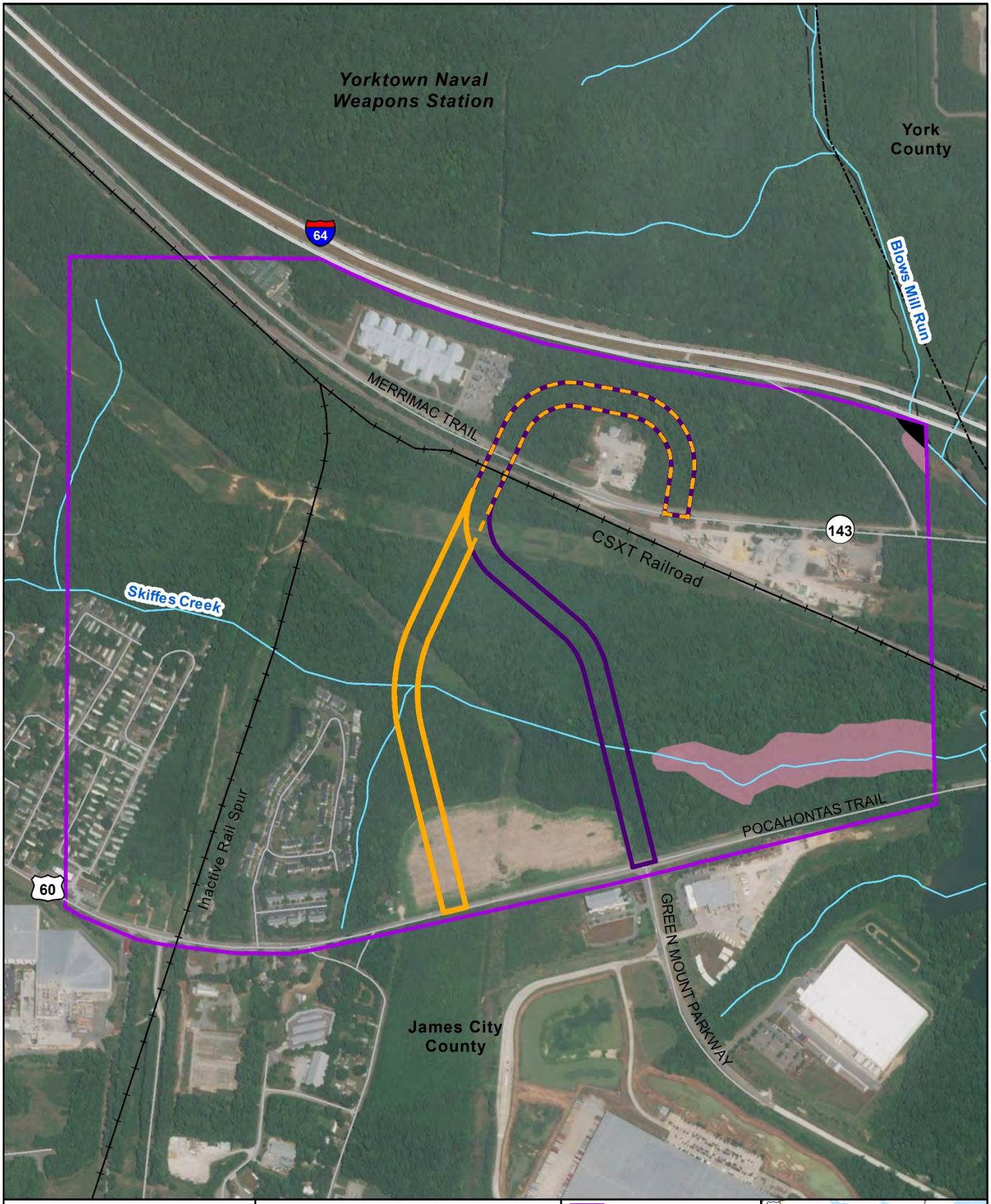


Figure 4-1
Floodplains within the Study Area

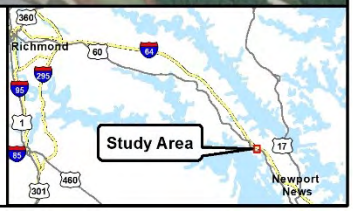
VDOT Virginia Department of Transportation
Skiffes Creek Connector Study
VDOT Project Number: 0060-047-627, P101, R201, C501; UPC: 100200

0 0.05 0.1 0.2 Miles

N W E S

Source: ESRI, NHD, FEMA

Study Area
Build Alternative 1
Build Alternative 2
100-Year Floodplain
Unmapped FEMA Area
Railroad



5. TERRESTRIAL WILDLIFE AND HABITAT

5.1 REGULATORY CONTEXT

Terrestrial wildlife and their habitats are managed through land conservation initiatives as well as hunting laws. These management strategies are relevant for this analysis because the proposed project may result in impacts to terrestrial wildlife and habitat.

5.2 METHODOLOGY

The 2011 National Land Cover Database (NLCD) was reviewed to determine the types of land cover within the study area. Wildlife corridors were identified using aerial imagery. Streams with contiguous forest cover generally greater than 0.25 mile in width were selected as wildlife corridors. Virginia Department of Game and Inland Fisheries' (VDGIF) Wildlife Environmental Review Map Service (WERMS) database was queried to identify documented occurrences of wildlife. Additional wildlife data was gathered from James City County electronic resources and field observations.

5.3 EXISTING CONDITIONS

The study area has experienced noticeable alterations over the past several hundred years, primarily due to human activity. Land development of the mid-late twentieth century, including housing, agriculture, retail, rail lines, reservoir construction, roadways, concrete plants, and correctional facilities, have encroached into and fragmented the various terrestrial wildlife habitats found within the study area (see **Table 5-1** and **Figure 5-1**). Most of these manmade impediments to wildlife movement (*i.e.* VA 143, US 60, and the CSXT railroad) are located in an east-west orientation, and thus inhibit wildlife movement north and south of the study area. The majority of remaining habitat is located in the study area's only wildlife corridor along Skiffes Creek. This corridor is intersected by utility easements, which fragment the corridor, but do not prevent continued use of the corridor.

Table 5-1: Land Cover within the Study Area

Land Cover Type	Acres
Forest; Deciduous, Evergreen, and Mixed	169.5
Developed; Open Space	79.4
Developed; Low, Medium, and High Intensity	71.4
Shrub/Scrub and Herbaceous/Grassland	40.3
Wetlands	22.3
Cultivated Crops	12.5
Barren Land	9.5
Open Water	5.8
TOTAL	**410.7**

Source: NLCD, 2011

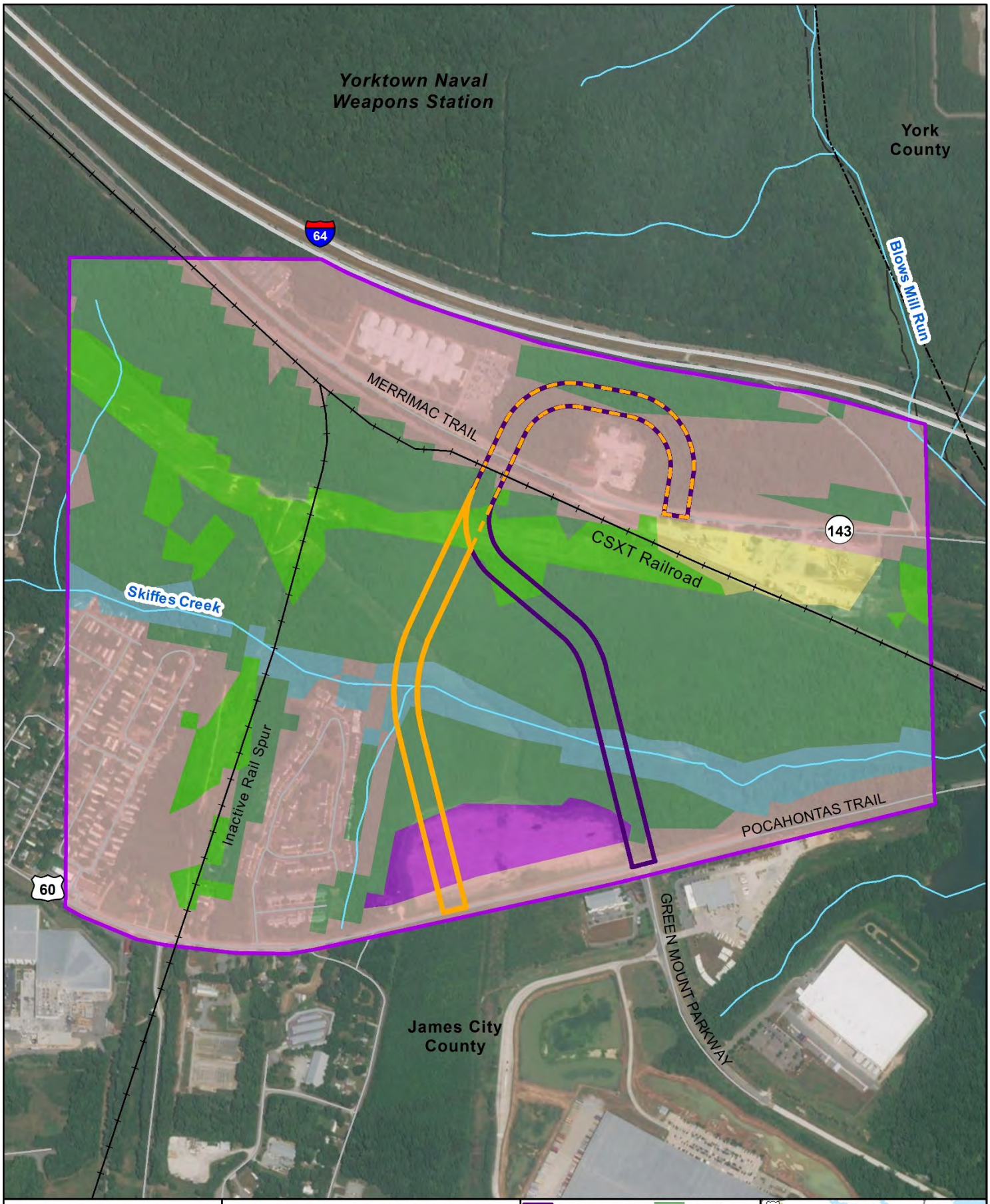


Figure 5-1
Land Cover within the Study Area

VDOT Virginia Department of Transportation
Skiffes Creek Connector Study
VDOT Project Number: 0060-047-627, P101, R201, C501; UPC: 100200

0 0.05 0.1 0.2 Miles

N W E S

Source: ESRI, NHD, NLCD

Build Alternative 1
Build Alternative 2
Study Area
Open Water
Developed
Barren Land
County Boundary
Forest
Shrub/Scrub & Herbaceous/ Grassland
Cultivated Crops
Wetlands
Railroad

Richmond
Study Area
Newport News

The wildlife in the study area primarily consists of species that are adapted to forest and developed lands. The forested riparian corridor along Skiffes Creek supports fauna more typically found in less disturbed floodplain forests, including neotropical migrant birds.

Species that may be present within the study area, including the wildlife corridor, include the following (VDGIF, 2018c; JCC, 2015, iNaturalist, 2018):

Common mammal species include:

- Foxes (*Canidae*)
- Beaver (*Castor canadensis*)
- Least shrew (*Cryptotis parva*)
- Wild turkey
- House mouse (*Mus musculus*)
- White-tailed deer
- Muskrat (*Ondatra zibethicus*)
- Racoon
- Eastern gray squirrel
- Eastern cottontail (*Sylvilagus floridanus*)
- Gray fox

Common amphibian and reptile species include:

- Copperhead (*Agkistrodon contortrix*)
- Spotted salamander
- American toad (*Anaxyrus americanus*)
- Fowler's toad (*Anaxyrus fowleri*)
- Eastern worm snake (*Carphophis amoenus*)
- Common snapping turtle (*Chelydra serpentina*)
- Painted turtle (*Chrysemys picta*)
- North American racer (*Coluber constrictor*)
- Three-lined salamander
- Eastern narrow-mouthed toad (*Gastrophryne carolinensis*)
- Squirrel tree frog (*Hyla squirella*)
- Eastern mud turtle (*Kinosternon subrubrum*)
- American bullfrog (*Lithobates catesbeianus*)
- Green frog (*Lithobates clamitans*)
- Southern leopard frog (*Lithobates sphenocephalus)*
- Northern watersnake (*Nerodia sipedon*)
- Eastern newt (*Notophthalmus viridescens*)
- Eastern rat snake
- Common five-lined skink (*Plestiodon fasciatus*)
- Broadhead skink (*Plestiodon laticeps*)
- Spring peeper (*Pseudacris crucifer*)
- River cooter (*Pseudemys concinna*)
- Eastern spadefoot (*Scaphiopus holbrookii*)
- Eastern fence lizard
- Little brown skink (*Scincella lateralis*)
- Common musk turtle (*Sternotherus odoratus*)
- DeKay's brownsnake (*Storeria dekayi*)
- Eastern box turtle
- Eastern ribbonsnake (*Thamnophis sauritus*)
- Common garter snake (*Thamnophis sirtalis*)
- Smooth earth snake (*Virginia valeriae*)

Common bird species include:

- Red-winged blackbird (*Agelaius phoeniceus*)
- Wood duck (*Aix sponsa*)
- Mallard (*Anas platyrhynchos*)
- American black duck (*Anas rubripes*)
- Great egret (*Ardea alba*)
- Great blue heron (*Ardea herodias*)
- Canvasback (*Aythya valisineria*)
- Tufted titmouse (*Baeolophus bicolor*)
- Cedar waxwing (*Bombycilla cedrorum*)

- Canada goose (*Branya canadensis*)
- Bufflehead (*Bucephala albeola*)
- Common goldeneye (*Bucephala clangula*)
- Red-tailed hawk (*Buteo jamaicensis*)
- Red-shouldered hawk (*Buteo lineatus*)
- Green heron (*Butorides virescens*)
- Hermit thrush (*Catharus guttatus*)
- Brown creeper (*Certhia americana*)
- Semipalmated plover (*Charadrius semipalmatus*)
- Killdeer (*Charadrius vociferous*)
- Northern cardinal (*Cardinalis cardinalis*)
- Turkey vulture (*Cathartes aura*)
- Bonaparte's gull (*Chroicocephalus philadelphia*)
- Yellow-billed cuckoo (*Coccyzus americanus*)
- Northern flicker (*Colaptes auratus*)
- Rock pigeon (*Columbia livia*)
- Eastern wood-pewee (*Contopus virens*)
- Black vulture (*Coragyps atratus*)
- Fish crow (*Corvus ossifragus*)
- Pileated woodpecker (*Dryocopus pileatus*)
- Gray catbird (*Bumetella carolinensis*)
- Little blue heron (*Egretta caerulea*)
- Peregrine falcon (*Falco peregrinus*)
- Common loon (*Gavia immer*)
- House finch (*Haemorhous mexicanus*)
- Bald eagle (*Haliaeetus leucocephalus*)
- Barn swallow (*Hirundo rustica*)
- Herring gull (*Larus argentatus*)
- Ring-billed gull (*Larus delawarensis*)
- Great black-backed gull (*Larus marinus*)
- Laughing gull (*Leucophaeus atricilla*)
- Belted kingfisher (*Megaceryle alcyon)*
- Red-bellied woodpecker (*Melanerpes carolinus*)
- Red-headed woodpecker (*Melanerpes erythrocephalus*)
- Wild turkey (*Meleagris gallopavo*)
- Song sparrow (*Melospiza melodia*)
- Red-breasted merganser (*Mergus serrator*)
- Northern mockingbird (*Mimus polyglottos*)
- Black-and-white warbler (*Mniotilta varia*)
- Great crested flycatcher (*Myiarchus crinitus*)
- Ruddy duck (*Oxyura jamaicensis*)
- Osprey (*Pandion haliaetus*)
- House sparrow (*Passer domesticus*)
- Blue grosbeak (*Passerina caerulea*)
- Brown pelican (*Pelecanus occidentalis*)
- Double-crested cormorant (*Phalacrocorax auritus*)
- Downy woodpecker (*Picoides pubescens*)
- Hairy woodpecker (*Picoides villosus*)
- Eastern towhee (*Pipilo erythrophthalmus*)
- Summer tanager (*Pranga rubra*)
- American avocet (*Recurvirostra americana)*
- Ruby-crowned kinglet (*Regulus calendula*)
- Golden-crowned kinglet (*Regulus satrapa*)
- Eastern phoebe (*Sayornis phoebe*)
- Ovenbird (*Seiurus aurocapilla*)
- Northern parula (*Setophaga americana*)
- Yellow-rumped warbler (*Setophaga coronata)*
- Black-throated gray warbler (*Steophaga nigrescens*)
- Palm warbler (*Setophaga palmarum*)
- Pine warbler (*Setophaga pinus*)
- American redstart (*Steophaga ruticilla*)
- Eastern bluebird (*Sialia sialis*)
- Red-breasted nuthatch (*Sitta canadensis*)
- White-breasted nuthatch (*Sitta carolinensis*)
- Brown-headed nuthatch (*Sitta pusilla*)
- Blue-winged teal (*Spatula discors*)
- Pine siskin (*Spinus pinus*)
- American goldfinch (*Spinus tristis*)
- Chipping sparrow (*Spizella passerina*)
- Yellow-bellied sapsucker (*Sphyrapicus varius*)
- Forster's tern (*Sterna forsteri*)
- Barred owl (*Strix varia*)
- European starling (*Sturnus vulgaris*)
- Royal tern (*Thalasseus maximus*)

- Carolina wren (*Thryothorus ludovicianus*)
- Brown thrasher (*Toxostoma rufum*)
- American robin (*Turdus migratorius*)
- Eastern kingbird (*Tyrannus tyrannus*)
- Vireos (*Viriondae*)
- White-throated sparrow (*Zonotrichia albicollis*)

Common fish species include:

- Largemouth bass (*Micropterus salmoides*)
- Perch (*Perca* sp.)
- Crappie *(Pomoxis* sp.)
- Rockfish (*Sebastidae*)
- Catfish (*Soluriformes*)

5.4 ENVIRONMENTAL CONSEQUENCES

5.4.1 No Build Alternative

Because the alternatives are on new alignment, the No Build conditions are consistent with the existing pre-development conditions. Existing infrastructure has impacted terrestrial wildlife and habitat (*e.g.* construction of roads, Skiffes Creek Reservoir and dam, the CSXT railroad, surrounding development, etc.). The current level of impacts and disruption to wildlife would be anticipated to continue under the No Build Alternative.

5.4.2 Build Alternative 1

Construction of Build Alternative 1 would result in some effects to the general ecology of the roadway's surroundings (see **Table 5-2**). Build Alternative 1 would affect wildlife communities and habitat through conversion of existing land cover to paved road surfaces and maintained right-of-way. An estimated 3.6 % (14.6 acres) of the existing land cover within the study area would be converted for transportation use. This conversion would result in loss of wildlife habitat and could affect existing wildlife migration patterns as a result of this new north-south road barrier, inhibiting wildlife movement east and west. The proposed bridges over the CSXT railroad and VA 143 would prevent full habitat fragmentation by providing wildlife passages. In addition, the bridge over Skiffes Creek that would be developed during final design and Section 404/401 permitting, would also provide a wildlife passage.

5.4.3 Build Alternative 2

Build Alternative 2 would impact approximately 0.3 more acres of land than Build Alternative 1, but would still convert an estimated 3.6% (14.9 acres) of the existing land cover within the study area to transportation use. Wildlife communities and habitat would be impacted in a similar manner as Build Alternative 1. Build Alternative 2 direct impacts to land cover are included in **Table 5-2**.

Table 5-2: Build Alternatives Land Cover Impacts

Land Cover Type	Total Acres within Study Area	Build Alternative 1 Impact (Acres)	Build Alternative 2 Impact (Acres)
Forest; Deciduous, Evergreen, and Mixed	169.5	6.4	6.4
Developed; Open Space	79.4	4.4	4.5
Developed; Low, Medium, and High Intensity	71.4	0.7	0.7
Shrub/Scrub and Herbaceous/Grassland	40.3	2.1	0.9
Wetlands	22.3	0.9	1.0
Cultivated Crops	12.5	0.1	1.4
Barren Land	9.5	0	0
Open Water	5.8	0	0
TOTAL	**410.7**	**14.6**	**14.9**

Source: NLCD, 2011

6. AQUATIC BIOLOGY

6.1 REGULATORY CONTEXT

Protection of streams in Virginia is mainly achieved through implementing regulations that stem from the CWA and the Virginia State Water Control Law. Both laws specifically mention protection of wildlife and aquatic life as stated goals. In addition, by generally protecting and improving water quality, both laws would result in protection of aquatic organisms.

6.2 METHODOLOGY

Laws and regulations that affect water quality were reviewed to determine if the regulations include measures that would be protective of aquatic biology. In addition, web-based research was conducted on the impact of stormwater on aquatic biology and the effectiveness of stormwater BMPs in reducing impacts to aquatic biology.

6.3 EXISTING CONDITIONS

During the field investigations conducted in June 2013 and March 2018, a qualitative approach to USACE – Wilmington District's Stream Quality Assessment Worksheet was conducted on Inventory Corridor streams. Most Inventory Corridor streams have evidence of groundwater discharge, stable banks, canopy coverage over streambed, and signs of wildlife use (see **Section 2.3.2**).

Additionally, stream reaches within the Inventory Corridor were assessed using the January 2007 Unified Stream Methodology (USM) for use in Virginia that was developed jointly by the USACE Norfolk District and the VDEQ. Streams were assessed using Form 1 (perennial/and intermittent streams) and Form 1a (ephemeral streams) of the USACE/VDEQ USM to assign a Reach Condition Index (RCI) to each stream reach. Parameters used to determine RCI include channel condition, riparian buffers, instream habitat/available cover, and channel alteration. The RCI scores for the stream reaches assessed are summarized in **Table 6-1**. Stream reaches are depicted in **Figure 6-1**. Inventory Corridor USM forms are included in **Appendix B**.

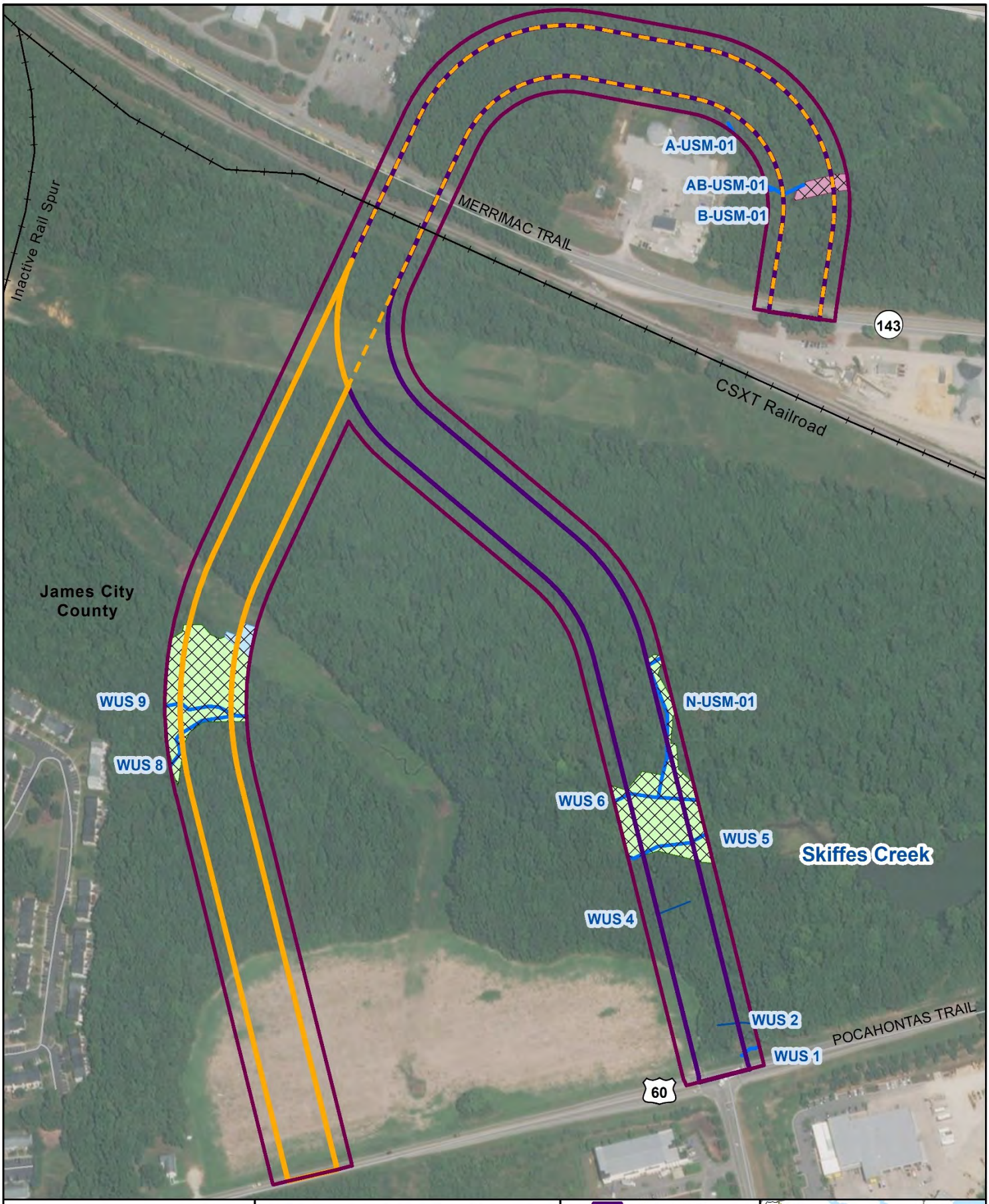


Figure 6-1
Stream Reaches within the Inventory Corridor

VDOT Virginia Department of Transportation
Skiffes Creek Connector Study
VDOT Project Number: 0060-047-627, P101, R201, C501; UPC: 100200

0 0.025 0.05 0.1 Miles

N W E S

Source: ESRI

Build Alternative 1
Build Alternative 2
Field Investigated Wetlands
Inventory Corridor
R2/R3/R4
R6
Railroad
PEM
PFO
PUB

Table 6-1: USM Scores for Streams Within the Inventory Corridor of the Build Alternatives

Stream Reach ID	Parameter Scores				RCI (0.5 – 1.5)
	Channel Condition (1.0 - 3.0)	Riparian Buffer (0.5 – 1.5)	Instream Habitat (0.5 – 1.5)	Channel Alteration (0.5 – 1.5)	
A-USM-01	3.00	1.01	0.90	0.50	1.08
AB-USM-01	2.60	1.50	1.20	1.50	1.36
B-USM-01	3.00	0.94	0.90	0.50	1.07
N-USM-01	3.00	1.50	1.50	1.50	1.50
WUS 1	1.60	1.08	0.90	1.10	0.94
WUS 2 (R6)	---	1.45	---	---	0.73
WUS 4 (R6)	---	1.50	---	---	0.75
WUS 5	3.00	1.50	1.50	1.50	1.50
WUS 6	3.00	1.50	1.50	1.50	1.50
WUS 8	3.00	1.50	1.20	1.50	1.44
WUS 9	3.00	1.50	1.20	1.50	1.44
Average	**2.80**	**1.36**	**1.20**	**1.23**	**1.21**

The average scores for channel condition, riparian buffer, and channel alteration are between optimal and suboptimal as is the average overall RCI, suggesting that the streams are in relatively good health. For instream habitat, three streams scored marginal, three scored suboptimal, and three scored optimal. This suggests that, overall, the streams would generally be able to support aquatic organisms; however, there may be localized disrupting influences that are damaging habitat. The parameter most indicative of damaging storm flows (both volume and velocity) is channel condition. The stream reach with the lowest channel condition score (WUS 1) is located adjacent to an existing road that currently does not have stormwater BMPs. Stream reach WUS 1 also has one of the lowest instream habitat scores, providing further evidence that uncontrolled storm flows from the adjacent roads negatively affect streams.

In addition to stormflows, stormwater pollutants consisting of nutrients, suspended solids, bacteria, hydrocarbons, trace metals, biological oxygen demand, and thermal impacts can also affect aquatic organisms (VDCR, 1999). These pollutants directly impact aquatic biology by increasing algae growth, blocking sunlight in the water column, reducing available dissolved oxygen, increasing water temperatures, and altering water chemistry (VDCR, 1999). Stormwater BMPs have been documented to improve stormwater quality and decrease stormwater quantity. Stormwater BMPs use filter media to remove pollutants. Stormwater ponds also detain water, allowing for groundwater recharge and management of runoff quantity. By slowly releasing water, downstream thermal pollution, erosion, and sedimentation are prevented (EPA, 2002). These BMPs are vital for aquatic biology health and habitat.

6.4 ENVIRONMENTAL CONSEQUENCES

6.4.1 No Build Alternative

Because the alternatives are on new alignment, the No Build conditions are consistent with the existing pre-development conditions. Existing infrastructure has impacted aquatic biology and habitat (*e.g.* construction of roads, Skiffes Creek Reservoir and dam, the CSXT railroad, and surrounding development, etc.). The

current level of impacts and disruption to aquatic biology and habitat would be anticipated to continue under the No Build Alternative.

6.4.2 Build Alternative 1

Build Alternative 1 would introduce impervious surface to an otherwise undeveloped area. Consequently, stormwater runoff would also increase. The stormwater runoff associated with Build Alternative 1 has the potential to carry roadway pollutants that impact aquatic biology and habitat. However, installation of stormwater BMPs would help mitigate the effect of roadway runoff pollutants on aquatic biology by treating stormwater. BMPs would also attenuate flows, reducing the potential for downstream erosion and impacts to hydrologic regime.

6.4.3 Build Alternative 2

Like Build Alternative 1, Build Alternative 2 would introduce impervious surface and increase stormwater runoff to an undeveloped area. Impacts to aquatic biology and habitat would be mitigated by the installation of stormwater BMPs.

7. THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

7.1 REGULATORY CONTEXT

Threatened, endangered, and special status species are protected primarily by the Endangered Species Act (ESA) of 1973, as amended (16 USC Sec. 1531-1543 et seq. / 50 CFR 17; 402). The United States Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) - National Marine Fisheries Service (NMFS) regulate and protect federally listed threatened, endangered, and special status species under the ESA with the primary goal of conserving and recovering listed species. The ESA, with few exceptions, prohibits activities affecting threatened, endangered, and special status species unless authorized by a permit. The legal federal status of a species is determined by USFWS and NMFS.

In addition to federal oversight, threatened, endangered, and special status species are also regulated at the state level by the Virginia Endangered Species Act (Code of Virginia [COV] §29.1-563 to -570), and the Virginia Endangered Plant and Insect Species Act (COV§3.2-1000 to 3.2-1011). State agencies have adopted the federal list as well as a state list of threatened, endangered, and special status species, with the primary focus of managing Virginia's wildlife to maintain optimum populations of all species and conserve biodiversity. The VDGIF is responsible for game, fish, and wildlife resources and habitats, and state-listed threatened, endangered, and special status animal species (exclusive of insects). The Virginia Department of Agriculture and Consumer Services (VDACS) is responsible for threatened, endangered, and special status species of plants and insects. The Virginia Department of Conservation and Recreation's Division of Natural Heritage (VDCR-DNH) maintains a statewide database for conservation planning and project review.

The bald eagle (*Haliaeetus leucocephalus*) was removed from the federal list of threatened and endangered species in 2007 and removed from the Virginia list of threatened and endangered species in 2013. However, the bald eagle still receives protection under the federal Bald and Golden Eagle Protection Act (16 USC § 668) and federal Migratory Bird Treaty Act (16 USC §§ 703–712).

These regulations are relevant for this analysis because the proposed project may result in impacts to threatened, endangered, and special status species.

7.2 METHODOLOGY

On January 4, 2018, the VDGIF Virginia Fish and Wildlife Information Service (VaFWIS) database (2-mile search radius), the VDGIF WERMS database, the USFWS Information for Planning and Consultation (IPaC) database, the VDCR-DNH online searchable database, the Center for Conservation Biology (CCB) Mapping Portal, and the USFWS Virginia Field Office's Bald Eagle Map Tool were queried to identify threatened, endangered, and special status species that may potentially be affected by the project within the study area. Additional background data was collected through aerial imagery, NRCS soils data, USGS topographic mapping, NWI mapping, NHD, and NLCD 2011. In March 2018, VDOT also conducted a field investigation within the Inventory Corridor to identify potential habitat for threatened, endangered, and special status species.

7.3 EXISTING CONDITIONS

7.3.1 Database Findings

The results of the threatened and endangered species database queries are included in **Appendix E**. Because of the variability in relevance of the various species "hits" returned from query results, an initial screening process was used to pare down the list of species returned from the database queries to a smaller list of species relevant to the project. This initial screening process was informed using a combination of site-specific knowledge, species life history requirements, and best professional judgement.

Twenty species were identified from the database query results. Of the twenty species included in the query results, 14 were listed only in the VaFWIS database and have not been confirmed as occurring within 2 miles of the study area. Therefore, these 14 species were eliminated from further consideration. Of the remaining 6 species, one (peregrine falcon) was listed as "potential" in the VaFWIS database but was not listed in other databases. "Potential" species are those that, through VDGIF modeling, have been identified as having potential habitat within the query radius. VDGIF's VaFWIS Coordination Recommendations indicate that no coordination is recommended if a species is only documented as "potential" by this dataset and no others; therefore, peregrine falcon was not considered further.

The remaining five species were either listed in the IPaC database, listed in multiple databases, or listed as "confirmed" on the VaFWIS database, and were, therefore, carried forward for further analysis (see **Table 7-1**).

No streams were identified as Threatened and Endangered Waters or Anadromous Fish Use Streams within the study area. The USFWS IPaC system indicates that no critical habitat occurs within the study area. Additionally, VAFWIS, WERMS, the CCB Mapping Portal, and the USFWS Virginia Field Office's Bald Eagle Map Tool indicate no bald eagle nests are present within the study area; the closest nest is over 0.8 miles away (CCB, 2018).

Table 7-1: Threatened and Endangered Species Carried Forward for Analysis

Common Name	Scientific Name	Status	Database		
			IPaC	VDCR-DNH	VaFWIS (2 Mile Buffer)
Atlantic sturgeon	*Acipenser oxyrinchus*	FE, SE		X	C
Little brown bat	*Myotis lucifugus lucifugus*	ST			C
Mabee's salamander	*Ambystoma mabeei*	ST			C
Northern long-eared bat	*Myotis septentrionalis*	FT, ST	X		C
Tri-colored bat	*Perimyotis subflavus*	SE			C

Source: USFWS IPaC, VDGIF-VaFWIS, VDCR-DNH, and WERMS
FE = federally endangered, FT= federally threatened, SE = state endangered, ST = state threatened, C = confirmed

Following is a description of each of the identified threatened, endangered, and special status species carried forward for further analysis.

Atlantic Sturgeon

The Atlantic sturgeon is an anadromous fish species that migrates from the ocean into coastal estuaries and rivers to spawn. In the Chesapeake Bay, Atlantic sturgeon historically spawned in all of its major tributaries. Presently, spawning populations have been reduced due to overfishing, pollution, dam construction, and habitat degradation (Bilkovic, et al., 2009). The James and York Rivers in Virginia are the two rivers comprising the Chesapeake Bay Distinct Population Segment where Atlantic sturgeon reproduction has been confirmed (Balazik, et al., 2012). Juveniles may spend several years in fresh water of some large rivers, or they may move downstream to brackish waters when the temperature drops in the fall. The Atlantic sturgeon was identified as a federal species of concern in 1988 and the Chesapeake Distinct Population Segment was federally listed as endangered in 2012. The Atlantic Sturgeon was last recorded within a two-mile buffer of the study area by VDGIF in 1998; however, the existing Skiffes Creek Reservoir and associated dam effectively act as an impediment to fish passage, which would make the Atlantic sturgeon's presence within the study area highly unlikely (VDGIF, 2018a).

Little Brown Bat

The little brown bat occupies a wide range in North America from the Alaska-Canada boreal forest south through most of the contiguous United States, though the species is generally absent from the southern Great Plains region (VDCR-DNH, 2018). The core of the range, based on historical abundance, appears to be the northeastern United States and boreal Canada, with smaller populations in the southern and western United States.

The little brown bat uses a wide range of habitats and often uses human-made structures, caves, and hollow trees for resting sites. Foraging habitat for the little brown bat is over water, along the margins of lakes and streams, or in woodlands near water. Winter hibernation sites (caves, tunnels, abandoned mines, and similar sites) generally have a relatively stable temperature of about 2 degrees to 12 degrees Celsius. Maternity colonies commonly are located in warm buildings (*e.g.*, attics) and other structures; also infrequently in hollow trees. Microclimate conditions suitable for raising young are relatively narrow, and availability of suitable maternity sites may limit the species' abundance and distribution. Most summer colonies range from 50 to 2,500 individuals (average 400). Declines in populations are largely due to the fungal disease

white-nose syndrome (WNS). The little brown bat was listed as state threatened on April 1, 2016. This species has been confirmed within a two-mile buffer of the study area (VDGIF, 2018a). VDGIF's tri-colored and little brown bat habitat mapper indicates the closest hibernaculum (overwintering shelter) is over 130 miles from the study area. There are no recorded roost trees in Virginia (VDGIF, 2018b).

Mabee's Salamander

Mabee's salamander is a small and rare terrestrial forest salamander that breeds in temporary pools. This species is found in savannas in burrows at the edges of bogs or ponds. They also occur in low wet woods and swamps. They are found in areas adjacent to water such as ditches and pools and have been found under pieces of paper or small logs in sandy areas adjacent to water. Breeding sites in Virginia consist of fish-free vernal ponds. These are typically Coastal Plain sinkhole ponds surrounded by mixed hardwood and pine forests (VDGIF, 2018a).

Mabee's salamanders have been recorded in 14 cities/counties in Virginia including James City County, York, Hampton, Newport News, and Williamsburg. Threats include habitat fragmentation, aquatic and terrestrial habitat loss, road mortality, and alteration of hydrology mostly due to urbanization (VDGIF, 2018a). Mabee's salamander was listed as state threatened on October 7, 1991.

Northern Long-Eared Bat

The northern long-eared bat (NLEB) was listed by the USFWS as threatened in April 2015. Home range for the northern long-eared bat is widely but patchily distributed in the eastern and north-central United States and adjacent southern Canada, and southward to southern Texas, Louisiana, Alabama, Georgia, and Florida, and westward in the United States generally to the eastern margin of the Great Plains region (VDCR-DNH, 2018). In the winter, they hibernate in caves, mines, and tunnels with relatively constant and cool temperatures, high humidity, and no air currents. In the summer, they roost in old-growth forests with uneven forest structure, single and multiple tree-fall gaps, standing snags, and woody debris. Major threats to the species existence include wind energy development, WNS, and habitat modification. This species was recorded within a two-mile buffer of the study area by VDGIF in 2014 (VDGIF, 2018a). VDGIF's northern long-eared bat winter habitat and roost trees mapper indicates that there are no known hibernacula (overwintering shelters) or roost trees within 40 miles away from the study area (VDGIF, 2018b).

Tri-Colored Bat

The tri-colored bat ranges throughout the eastern United States and Canada (VDCR-DNH, 2018). The tri-colored bat is associated with forested landscapes, where the species forages near trees (including forest perimeters) and along waterways. In many areas, most foraging occurs in riparian areas. Maternity and other summer roosts are mainly in dead or live tree foliage (including attached lichen clumps such as Usnea and "Spanish moss"); caves, mines, and rock crevices may be used as night roosts between foraging forays. Maternity colonies also utilize human-made structures (buildings, bridges), or tree cavities; sometimes the maternity colonies are in open sites that would not be tolerated by most other bats. Reproductive females roost alone or in groups of up to about 50 individuals. Hibernation sites often are in caves, mines, or cavelike tunnels, as well as box culverts under highways, especially those near forest. Hibernating individuals perch singly, infrequently in small groups. Declines in populations are largely due to WNS. The tri-colored bat was listed as state endangered on April 1, 2016. This species has been confirmed within a two-mile buffer of the study area (VDGIF, 2018a). VDGIF's tri-colored and little brown bat habitat mapper indicates the

closest hibernaculum (overwintering shelter) is over 130 miles away from the study area. There are no recorded roost trees in Virginia (VDGIF, 2018b).

7.3.2 Field Findings

In March 2018, a field investigation was conducted within the Inventory Corridor to identify potential habitat for Atlantic sturgeon, little brown bat, northern long-eared bat, Mabee's salamander, and tri-colored bat. No suitable habitat was identified for Mabee's salamander or Atlantic sturgeon. No ephemeral ponds that could be used by Mabee's salamander were identified. Skiffes Creek Reservoir and the associated dam act as an impediment to fish passage and would prevent the Atlantic sturgeon from migrating upstream to the Inventory Corridor. In addition, the largest stream within the Inventory Corridor, Skiffes Creek, is approximately 10 feet wide, 6-18 inches deep, has multiple roots, logs, and debris crossing the channel and would not provide suitable habitat for the Atlantic sturgeon (see **Photo 7-1**). The forested areas within the Inventory Corridor have suitable habitat for the listed bat species; however, the closest known hibernaculum/roost tree for any of the identified species is over 40 miles away.

Photo 7-1: Unsuitable Atlantic Sturgeon Habitat

7.4 ENVIRONMENTAL CONSEQUENCES

7.4.1 No Build Alternative

Because the alternatives are on new alignment, the No Build conditions are consistent with the existing pre-development conditions. Existing infrastructure has impacted threatened, endangered, or special status species (*e.g.*, construction of roads, Skiffes Creek Reservoir and dam, the CSXT railroad, surrounding development, etc.). The current level of impacts and disruption to threatened, endangered, or special status species would be anticipated to continue under the No Build Alternative.

7.4.2 Build Alternative 1

Based on the lack of habitat and/or distance to known occurrences, Build Alternative 1 is not anticipated to impact threatened, endangered, or special status species. Should Build Alternative 1 be selected for construction, further coordination and final Section 7 effect determinations would be conducted with resource agencies during the Section 404/401 permitting process.

Conservation and protection measures for the northern long-eared bat would be in accordance with the final 4(d) rule and the Programmatic Biological Assessment for Transportation Projects in the Range of the Indiana Bat and Northern Long-eared Bat. Additional conservation measures may be implemented depending upon the outcome of agency coordination.

In accordance with a memorandum of understanding between VDOT and FHWA, the results of any presence/absence surveys that may result from future Section 7 coordination would not influence the FHWA NEPA/location decision process. Therefore, if surveys are required from the resource agencies, the coordination requiring the surveys would occur during the permitting/design stage of the study. Following, or as part of the coordination, the surveys would be completed as required by the natural resource agencies.

7.4.3 Build Alternative 2

Based on the lack of habitat or distance to known occurrences, Build Alternative 2 is not anticipated to impact threatened, endangered, or special status species. The same coordination described above for Build Alternative 1 would be required should Build Alternative 2 be selected for construction.

As described for Build Alternative 1, if surveys are required from the resource agencies, the coordination requiring the surveys would occur during the permitting/design stage of the study.

8. FARMLANDS

8.1 REGULATORY CONTEXT

The Farmland Protection Policy Act of 1981 (FPPA) (7 USC 4201) is administered by USDA NRCS and is intended to minimize the impact of federal programs on unnecessary and irreversible conversion of farmland to nonagricultural uses. This regulation is relevant for this analysis because the proposed project may result in impacts to farmland.

Under the FPPA, "farmland" is defined as:

- *Prime farmland* - land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses;
- *Unique farmland* - land other than prime farmland that is used for production of specific high-value food and fiber crops; and
- *Farmland other than prime or unique* - farmland that is of statewide or local importance for the production of food, feed, fiber, forage, or oilseed crops.

8.2 METHODOLOGY

The FPPA Manual was reviewed to determine if lands covered by the Act are present within the study area. Additional resources, such as the 2010 US Census Bureau (Census) urbanized area maps, NRCS Web Soil Survey, and agricultural and forestal districts, were also reviewed. Web Soil Survey was developed to identify land that can be used for the production of the Nation's food supply. This database classifies soils based upon their properties, qualities, and suitability for farming. Urban areas, built up areas, water areas, as well as other areas that are not suitable for farming are classified as "not prime farmland". Areas with soils that are suitable and available for farming are classified as prime farmland or farmland of statewide importance. Areas with soils that could support farming if the areas were irrigated or drained are classified as "prime farmland if irrigated", and "prime farmland if drained", respectively. Additional coordination was conducted with USDA NRCS to determine impact ratings to prime farmland soil.

8.3 EXISTING CONDITIONS

Portions of the study area are located within the Census urbanized area; therefore, these areas are not subject to the FPPA (see **Figure 8-1**). Within the study area subject to the FPPA, there are several soil types designated as prime farmland and farmland of statewide importance. Soil types and designations are shown in **Table 8-1** and illustrated on **Figure 8-1**. The study area contains 133.4 acres of land classified as having prime farmland soils or soils of statewide importance that are subject to the FPPA. During field investigations, one portion of the study area was observed to be used for farming, as depicted on **Figure 8-2**. However, James City County's existing land use information does not identify any land uses designated as farmland (JCC, 2015). The closest agricultural and forestal district, Carter's Grove, is approximately 500 feet away from the study area (JCC, 2017).

8.4 ENVIRONMENTAL CONSEQUENCES

8.4.1 No Build Alternative

Because the alternatives are on new alignment, the No Build conditions are consistent with the existing pre-development conditions. Existing infrastructure has impacted farmlands (*e.g.* construction of roads, Skiffes Creek Reservoir and dam, the CSXT railroad, surrounding development, etc.) The current level of impacts to farmland would be anticipated to continue under the No Build Alternative.

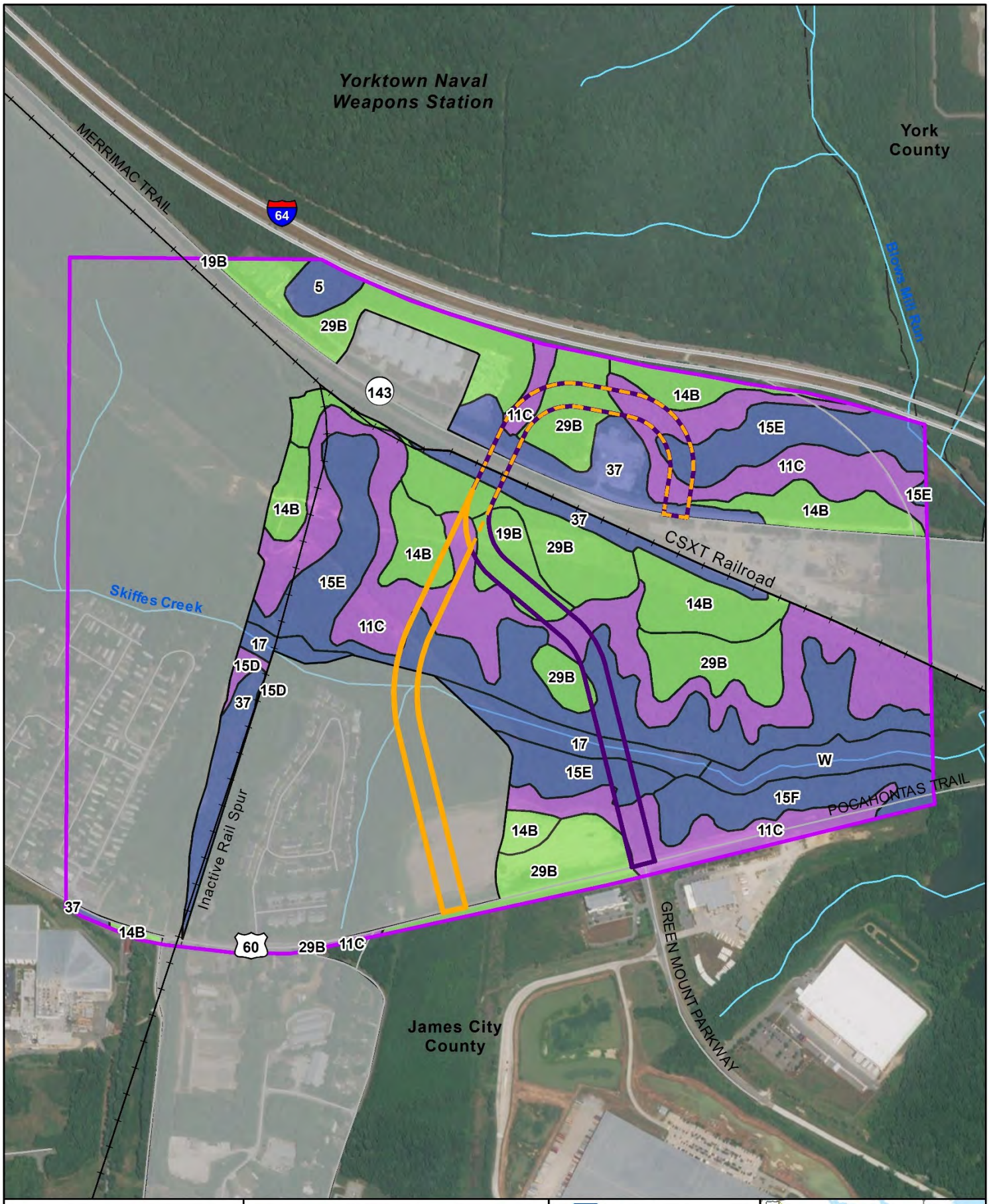


Figure 8-1
Soil Types within Portions of the Study Area Subject to the Farmland Protection Policy Act

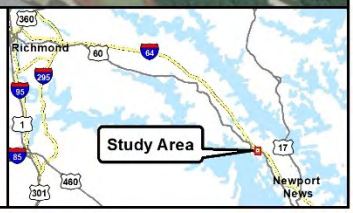
VDOT Virginia Department of Transportation
Skiffes Creek Connector Study
VDOT Project Number: 0060-047-627, P101, R201, C501; UPC: 100200

0 0.05 0.1 0.2 Miles

N W E S

Source: ESRI, NHD, USDA, Census

Build Alternative 1
Build Alternative 2
Prime Farmland
Farmland of Statewide Importance
Not Prime Farmland
USA Urban Areas
Study Area
County Boundary
Railroad



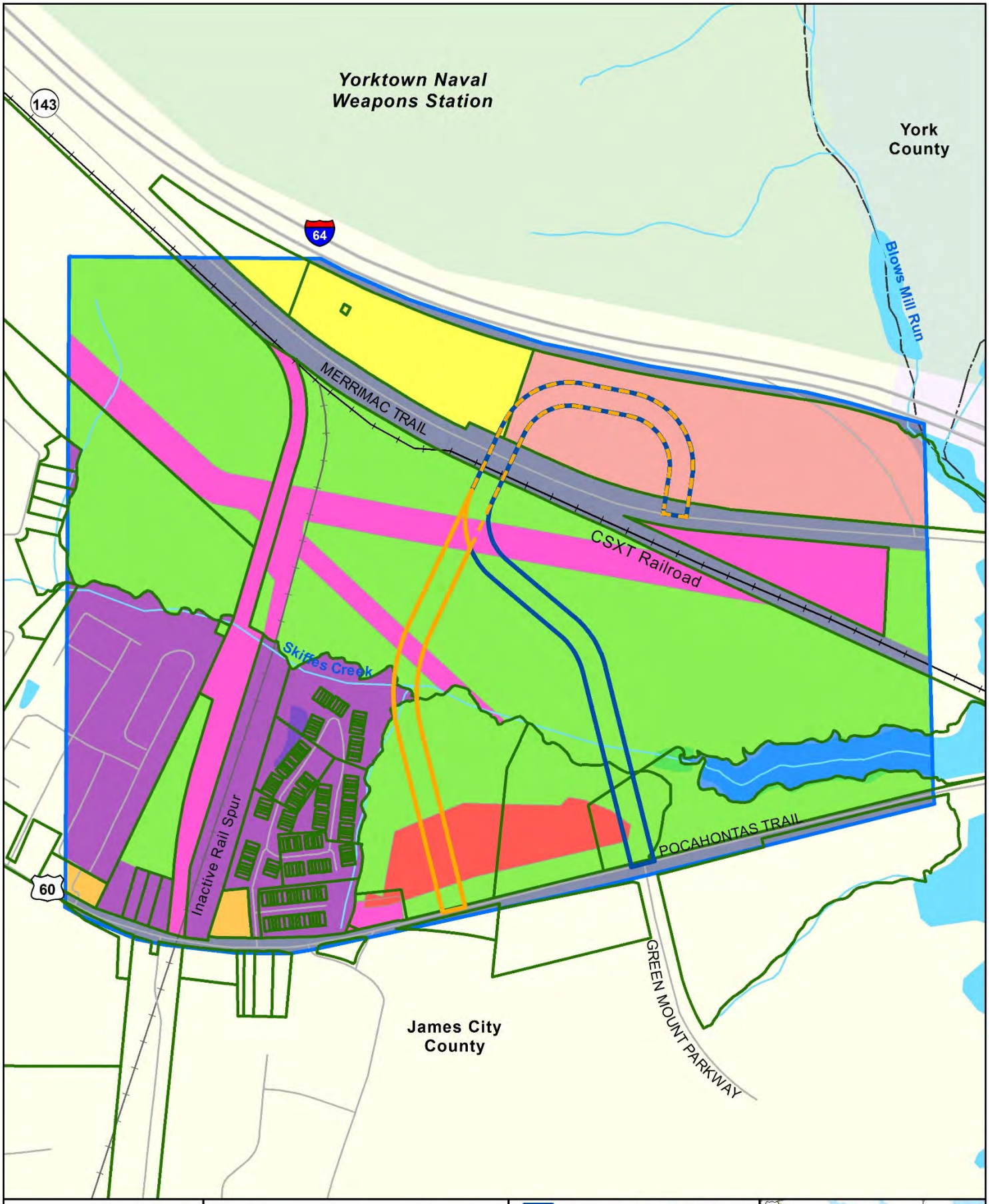


Figure 8-2 Existing Land Use within the Study Area

VDOT Virginia Department of Transportation
Skiffes Creek Connector Study
VDOT Project Number: 0060-047-627, P101, R201, C501; UPC: 100200

0 0.05 0.1 0.2 Miles

N W E S

Source: ESRI, NHD, James City County

Build Alternative 1
Build Alternative 2
Study Area
Parcel

Land Use Category

Business
Farmland
Industrial
Institutional
Public
Residential
Transportation
Undeveloped
Water

Richmond
Study Area
Newport News

Table 8-1: Soil Types within Portions of the Study Area Subject to the Farmland Protection Policy Act

Map Unit Symbol	Soil Type/Description	Prime Farmland Designation	Acres within Study Area	Percent Total
5	Bethera silt loam	N	2.4	1.1%
11C	Craven-Uchee complex, 6 to 10 percent slopes	SI	59.2	26.9%
14B	Emporia fine sandy loam, 2 to 6 percent slopes	PF	23.7	10.8%
15D	Emporia complex, 10 to 15 percent slopes	SI	0.8	0.4%
15E	Emporia complex, 15 to 25 percent slopes	N	45.0	20.5%
15F	Emporia complex, 25 to 50 percent slopes	N	8.8	4.0%
17	Johnson complex	N	6.9	3.1%
19B	Kempsville-Emporia fine sandy loams, 2 to 6 percent slopes	PF	5.0	2.3%
29B	Slagle fine sandy loam, 2 to 6 percent slopes	PF	44.7	20.3%
37	Urban land	N	17.5	8.0%
W	Water	N	5.9	2.7%
TOTAL			**219.9**	**100%**

N = Not Prime Farmland; SI = Farmland of Statewide Importance; PF = All Areas are Prime Farmland

8.4.2 Build Alternative 1

Build Alternative 1 would be located along the eastern edge of the land that is being used for farming and would impact approximately 9.7 acres of soils mapped by NRCS as prime farmland soil and/or soils of statewide importance that are subject to the FPPA (of the 133.4 acres within the study area), as depicted in **Table 8-2**. This is approximately seven percent of the overall amount of prime farmland soil and soils of statewide importance within the areas subject to the FPPA within the study area. Build Alternative 1 would not impact Carter's Grove Plantation.

A USDA NRCS Farmland Conversion Impact Rating Form has been completed and submitted to USDA NRCS to determine impact ratings to prime farmland soils and soils of statewide importance. The Farmland Conversion Impact Rating is based on an assessment of the suitability of the land in the corridor for the protection of farmland. The FPPA states that "increasingly higher levels of consideration for protection" be given to farmlands impacted by projects that have a Farmland Conversion Impact Rating exceeding a total score of 160, corridors receiving a total score less than 160 need not be given further consideration for protection. Build Alternative 1 scored below 160 because it is located in an urbanized area and there is a low percentage of farmland protected by FPPA within the study area; and thus no further action is recommended to mitigate farmland conversion.

Table 8-2: Soil Types within Portions of Build Alternative 1 and Build Alternative 2 Subject to the Farmland Protection Policy Act

Map Unit Symbol	Soil Type/Description	Prime Farmland Designation	Acres within LOD of Build Alternative 1	Percent Total	Acres within LOD of Build Alternative 2	Percent Total
11C	Craven-Uchee complex, 6 to 10 percent slopes	SI	4.9	34%	4.2	43%
14B	Emporia fine sandy loam, 2 to 6 percent slopes	PF	0.004	<1%	0.5	5%
15E	Emporia complex, 15 to 25 percent slopes	N	3.3	23%	1.9	19%
17	Johnson complex	N	0.4	3%	0	0%
19B	Kempsville-Emporia fine sandy loams, 2 to 6 percent slopes	PF	2.4	17%	0.1	1%
29B	Slagle fine sandy loam, 2 to 6 percent slopes	PF	2.4	17%	2.3	23%
37	Urban land	N	0.98	7%	0.9	9%
TOTAL			**14.46**	**100%**	**9.9**	**100%**

N = Not Prime Farmland; SI = Farmland of Statewide Importance; PF = All Areas are Prime Farmland

8.4.3 Build Alternative 2

Build Alternative 2 would impact 7.1 acres of soils mapped by NRCS as prime farmland soil and/or soils of statewide importance that are subject to the FPPA, as depicted in **Table 8-2**. This is approximately five percent of the overall amount of prime farmland soil and soils of statewide importance within the areas subject to the FPPA within the study area. Build Alternative 2 would not impact Carter's Grove Plantation.

A USDA NRCS Farmland Conversion Impact Rating Form was also completed for Build Alternative 2. This alternative also scored below 160 because it is also located in an urbanized area and there is a low percentage of farmland protected by FPPA within the SCC study area; and thus no further action is recommended to mitigate farmland conversion.

9. ANTICIPATED PERMITS

Following is a discussion of permits that could be required for each alternative. Given that this a planning level analysis, the required permits may change as the design of the project progresses.

9.1 NO BUILD ALTERNATIVE

The No Build Alternative is not anticipated to require any permits. The projects assumed under the No Build Alternative would be individually reviewed to determine the need for permits and the respective project sponsors would be responsible for avoidance, minimization, and compensation, as part of any necessary permitting processes.

9.2 BUILD ALTERNATIVE 1

9.2.1 Section 404/401

Impacts to WOUS are regulated through permits issued by USACE, VDEQ, and VMRC, as described in **Section 2.1**. Build Alternative 1 would require Section 404/401 permits from USACE and VDEQ. Because Build Alternative 1 is on new alignment, the entire project would be considered single and complete with independent utility. Therefore, impacts would be considered cumulatively for the entire project rather than for each crossing when applying permit thresholds. Under Build Alternative 1, project impacts are estimated to be 0.85 acre of wetlands and 673 linear feet of stream.

If VDOT were the applicant, the project could be authorized under a USACE Regional Permit 01 (RP-01), which authorizes impacts up to one acre of wetlands and 1,000 linear feet of stream per single and complete project. In order to qualify for an RP-01, VDOT must be the applicant and the permit may not be transferred to any other entity.

For all other applicants, the project impacts would exceed the impact thresholds allowed under the USACE State Programmatic General Permit (17-SPGP-01) which allows impacts up to 0.5 acre of wetlands and up to 1,000 linear feet of stream. Therefore, if the applicant is an entity other than VDOT, a USACE Individual Permit is anticipated. For either scenario, a VDEQ Virginia Water Protection General Permit for Linear Transportation Projects (WP3) is anticipated because impacts are below the WP3 threshold of 2 acres of wetlands and 1,500 linear feet of stream.

A VMRC subaqueous bottomland permit would not be required because there are no impacts to tidal waters and no impacts to non-tidal waters with a drainage area larger than five square miles.

A project specific Stormwater Pollution Prevention Plan (SWPPP) would be developed for Build Alternative 1, as required under the VDEQ General Permit for Discharges of Stormwater from Construction Activities. Mitigation for permanent wetland and stream impacts would be required and would be developed as described below.

The federal and state permit programs rely on the use of compensatory mitigation to offset unavoidable aquatic impacts by replacing lost functions with replicated functions elsewhere. Under Build Alternative 1, a conceptual mitigation plan would be developed in accordance with the 2008 Mitigation Rule (33CFR § 332). This rule established a national framework and hierarchy of preferences regarding how compensatory mitigation is addressed for project impacts to jurisdictional surface waters. The Mitigation Rule provides the following preference for compensatory mitigation options:

- Purchase of compensatory mitigation bank credits.
- Purchase of approved in-lieu fee fund credits.
- Watershed approach based mitigation by the permittee.
- On-site mitigation/in-kind mitigation by the permittee.
- Off-site mitigation/out-of-kind mitigation by the permittee.

The current typical compensatory mitigation impact ratios in Virginia for non-tidal forested, scrub-shrub, and emergent wetlands are 2:1, 1.5:1, and 1:1, respectively.

All compensatory mitigation bank credits would be purchased from the same or adjacent HUC within the same watershed and physiographic province as the impact. Mitigation banks within the same HUC are restoring and preserving similar systems with similar geomorphic setting, hydrology, hydrodynamics, and functions and values (as described in **Section 2.3.1**); therefore, it is reasonable to assume that these banks would provide suitable, "in-kind" compensation that would replace the lost functions of the wetlands being impacted by the project.

On May 1, 2018, the Regulatory In-lieu Fee and Bank Information Tracking System (RIBITS) was queried to identify mitigation bank credits available for purchase within the same or adjacent HUC, watershed, and physiographic province as the impact. Approximately 288.54 non-tidal wetland credits, 7999 tidal wetland credits, 11.09 wetland preservation credits, 3.72 upland preservation credits, and 353.6 stream credits were available for purchase. If, at the time of project permitting and construction, there are not enough compensatory mitigation credits available, the remaining credits would be purchased from an approved in-lieu fee fund (*i.e.* Virginia Aquatic Resources Trust Fund (VARTF)). All compensatory mitigation would be coordinated with resource agencies.

In accordance with the existing regulations and standard permit conditions, all areas with temporary impacts would be required to be restored to the areas' original contours and re-vegetated with the same or similar species. If Build Alternative 1 advances to the permitting stage, the specific limits of jurisdictional resources, applicable permits, and required mitigation would be confirmed in coordination with the appropriate regulatory agencies during such time.

9.2.2 Chesapeake Bay Preservation Act

The Chesapeake Bay Preservation Act (CBPA), administered by VDEQ, regulates development in the Chesapeake Bay watershed. The CPBA provides protections for riparian habitats that buffer wetlands and streams through the designation of Resource Protection Areas (RPA) and Resource Management Areas (RMA). In Virginia, administration and enforcement of the CPBA is carried out by the individual localities subject to the CPBA (9VAC25-870-51). In the study area, the CPBA is enforced by James City County; RPA in James City County includes any land characterized by one or more of the following features (JCC, 2018a):

- Tidal wetlands;
- Nontidal wetlands connected by surface flow and contiguous to tidal wetlands or water bodies with perennial flow;
- Tidal shores; and
- A buffer area not less than 100 feet in width located adjacent to and landward of the components listed in the bullets above, and along both sides of any water body with perennial flow.

RMAs include any area not designated by an RPA. Generally, development within the RPA is limited to water dependent activities or redevelopment of existing developed areas. Development within the RMA is generally less restrictive; however, coordination with the County is still required before development.

By managing land uses within these areas, local governments help reduce the water quality impacts of nonpoint source pollution and improve the health of the Chesapeake Bay. The Coastal Zone Management Act (CZMA) of 1972 and federal consistency regulations (15 CFR §Part 930, Subpart D, § 930.50 et seq.)

stipulate that activities in Virginia's Coastal Management Area (CMA) which have a federal component (*e.g.*, those requiring federal permits, licenses or approval) and can affect a Virginia coastal use or resource must be consistent with the enforceable policies of Virginia's Coastal Zone Management Program (CZMP).

The regulation of activities within RMAs and RPAs has been incorporated into the enforceable policies of Virginia's CZMP. Approximately 94 acres of RPA are located within the study area, 3.7 acres of which would be impacted by Build Alternative 1 (see **Figure 9-1**) (JCC 2018b).

Title 9 of the Virginia Administrative Code (VAC) (9VAC10-20-150B) allows public roads to be located within RPAs subject to certain conditions. Construction, installation, operation, and maintenance of public roads and the roads' appurtenant structures are exempt if:

- The roadway is constructed in accordance with an erosion and sediment control plan consistent with regulations promulgated pursuant to the Erosion and Sediment Control Law (§10.1-560 et seq. of the Code of Virginia).
- The roadway is constructed in compliance with the Stormwater Management Act (§10.1-603.1 et seq. of the Code of Virginia) and a stormwater management plan is approved by VDEQ.
- The road is designed and constructed to prevent or minimize otherwise minimal encroachment in the RPA and minimize water quality impacts.

9.2.3 Erosion and Sediment Control

Construction activities that may result in erosion and sediment discharge are regulated by the Virginia Erosion and Sediment Control Act. This Act is primarily administered by localities, which issue land disturbance permits for construction activities (9VAC25-840). VDEQ regulates water resources and water pollution through various programs including the Virginia Pollutant Discharge Elimination System (VPDES) Permits (9VAC25-260-186) and the VSMP (9VAC25-870-144).

VDEQ is responsible for regulating stormwater discharges from municipal separate storm sewer systems (MS4s) and construction activities. VDOT's MS4 permit program encompasses both operation and construction of the state's roadways. This program would monitor and control regulated pollutant discharges during construction. For any land-disturbing activities equal to one acre or more, registration with VDEQ for coverage under the VPDES General Permit for Discharges of Storm Water from Construction Activities would be required. This permit requires a site-specific SWPPP.

All regulated land-disturbing activities associated with Build Alternative 1, including on- and off-site access roads, staging areas, borrow areas, stockpiles, and soil intentionally transported from the project, would be covered by a project specific erosion and sediment control plan, developed in accordance with erosion and sediment control and stormwater regulations, as well as VDOT standards and specifications.

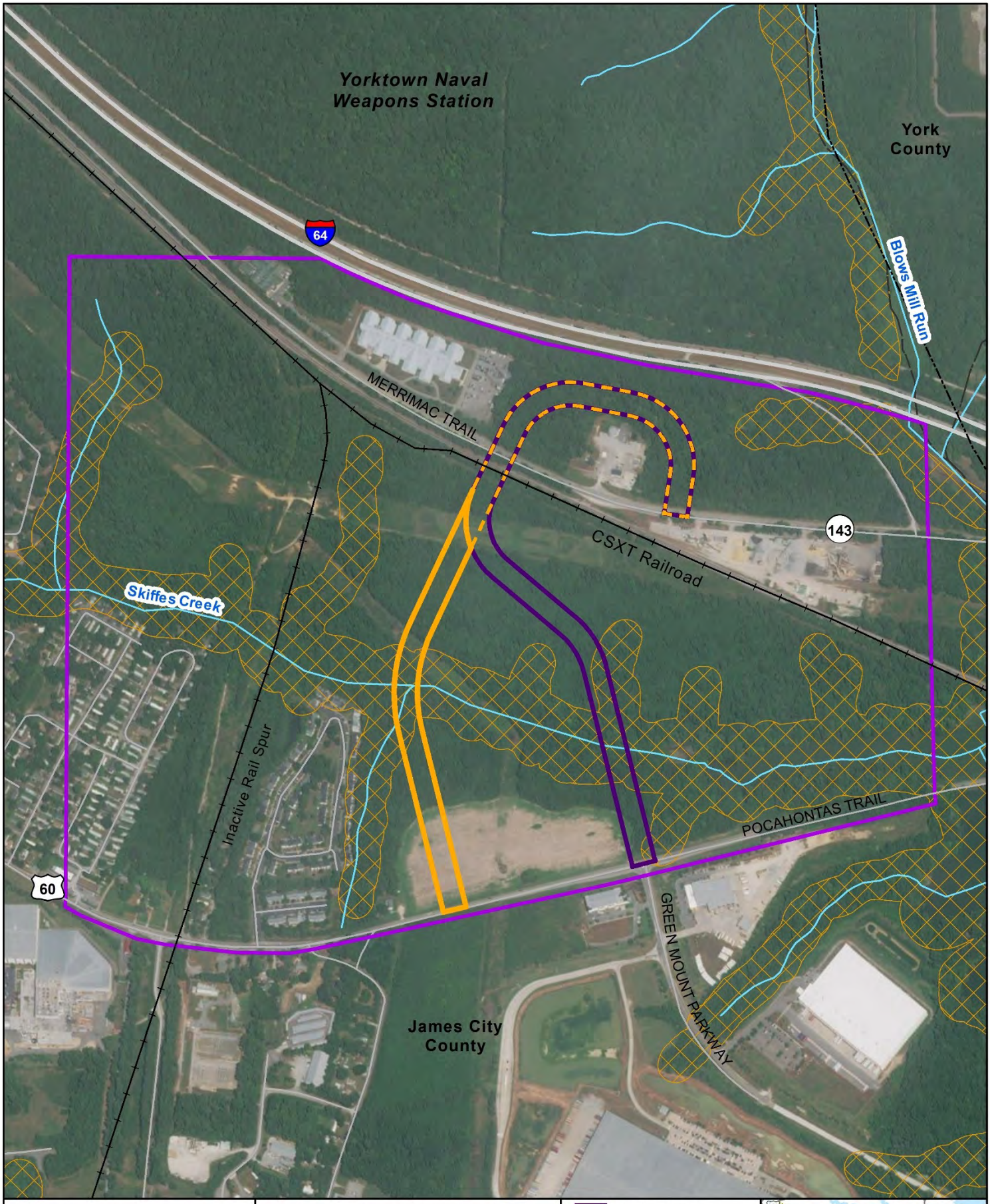


Figure 9-1
James City County
Mapped Resource Protection Areas

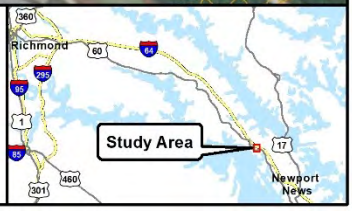
VDOT Virginia Department of Transportation
Skiffes Creek Connector Study
VDOT Project Number: 0060-047-627, P101, R201, C501; UPC: 100200

0 0.05 0.1 0.2 Miles

N W E S

Source: ESRI, NHD, James City County

Build Alternative 1
Build Alternative 2
Resource Protection Areas
Study Area
County Boundary
Railroad



9.3 BUILD ALTERNATIVE 2

Build Alternative 2 would require the same Section 404/401 permits from USACE and VDEQ as Build Alternative 1. Under Build Alternative 2, project impacts are estimated to be 0.95 acre of wetlands and 365 linear feet of stream. Therefore, the same Section 404/401 permitting scenarios described for Build Alternative 1 would apply to Build Alternative 2. The project could be authorized under a USACE RP-1 if VDOT is the applicant or a USACE Individual Permit for all other applicants. Regardless of the applicant, a VDEQ Virginia WP3 is anticipated. No VMRC permit would be required. Build Alternative 2 would impact approximately 1.7 acres of RPA, and would be held to the same CBPA provisions as Build Alternative 1. Build Alternative 2 would also comply with the same SWPPP, mitigation, and erosion and sediment control regulations as Build Alternative 1.

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Appendix A:
Natural Resources Methodology Memorandum

SKIFFES CREEK CONNECTOR STUDY

Natural Resources Methodology Memorandum

Revised 11/9/17

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LIST OF ACRONYMS

CCB	Center for Conservation Biology
CFR	Code of Federal Regulations
CMA	Coastal Management Area
CWA	Clean Water Act
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Area
CZMP	Coastal Zone Management Program
DNH	Department of Natural Heritage
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GIS	Geographic Information Systems
I-64	Interstate 64
IPaC	Information for Planning and Conservation
NCLD	National Land Cover Database
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NRTR	Natural Resources Technical Report
NWI	National Wetlands Inventory
PEM	Palustrine Emergent
PFO	Palustrine Forested
PUB	Palustrine Unconsolidated Bottom
RPA	Resource Protected Area
SCC	Skiffes Creek Connector
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers

USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey
VAC	Virginia Administrative Code
VAFWIS	Virginia Fish and Wildlife Information Service
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDOT	Virginia Department of Transportation
VMRC	Virginia Marine Resources Commission
VPDES	Virginia Pollutant Discharge Elimination System
VSMP	Virginia Stormwater Management Program
VWP	Virginia Water Permit
WERMS	Wildlife Environmental Review Map Service
WOUS	Waters of the United States

1. INTRODUCTION

The Virginia Department of Transportation (VDOT), in coordination with the Federal Highway Administration (FHWA), has initiated an Environmental Assessment (EA) for the Skiffes Creek Connector (SCC) Study located in James City County. The study corridor is positioned south of Interstate 64 (I-64) between Exits 243 and 247, between existing U.S. Route 60 (Pocahontas Trail) to State Route 143 (Merrimac Trail). The EA is being prepared in accordance with the National Environmental Policy Act of 1969 (NEPA).

This memorandum has been prepared to describe the regulatory context and methods for identifying natural resources and impacts considered in the EA and *Natural Resources Technical Report* (NRTR).

2. STRATEGY TO IDENTIFY NATURAL RESOURCES

The study area limits include the area in which the effects of evaluated alternatives would likely occur. The natural resources included in this analysis are a subset of those listed in the Natural Resources Decision Table of VDOT's February 29, 2016 Natural Resources Analysis Consultant Guidance that are known or have the potential to occur within the SCC study area. Natural Resources included in this analysis include Waters of the U.S. (WOUS); water quality; floodplains; threatened, endangered, and special status species; terrestrial wildlife and habitat; aquatic biology; farmlands, and anticipated permits.

3. REGULATORY CONTEXT

The following section details the regulations and guidance applicable to evaluation of the potential natural resources in the SCC study area.

3.1 WATERS OF THE U.S.

The USACE exerts regulatory authority over activities involving the discharge of dredged or fill material into WOUS pursuant to Section 404 of the CWA of 1977, as amended (33 USC 1344). The Virginia Department of Environmental Quality (VDEQ) administers the Virginia Water Permit (VWP) Program for impacts to surface waters (9 VAC 25-210). The Virginia Marine Resources Commission (VMRC) regulates encroachment into state-owned submerged lands (4 VAC 20).

3.2 WATER QUALITY

As directed by Section 305(b) of the CWA, VDEQ monitors water quality in the state's waters, identifying impairments and sources of impairments, and developing and implementing Total Maximum Daily Load (TMDL) reports for impaired waters (VAC § 62.1-44.19:5 and § 62.1-44.19:7).

3.3 FLOODPLAINS

Federal policies, Executive Order (EO) 11988, as amended, EO 13690, and FHWA policy as set forth in 23 CFR §650, require avoidance of effects associated with the modification of and development in floodplains if a practicable alternative (such as shifting alignments to reduce or avoid the floodplains) exists for the proposed action. Federal Emergency Management Agency (FEMA) standards also limit increases in base flood levels to less than 1.0 foot above pre-development levels, provided that hazardous velocities are not produced (EO 11988).

3.4 THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

Threatened, endangered, and special status species are protected primarily by the Endangered Species Act (ESA) of 1973, as amended (16 USC Sec. 1531-1543 et seq. / 50 CFR 17; 402), the Virginia Endangered Species Act (COV §29.1-563 to -570), and the Virginia Endangered Plant and Insect Species Act (COV§3.2-1000 to 3.2-1011). The bald eagle receives protection under the federal Bald and Golden Eagle Protection Act (16 USC § 668) and federal Migratory Bird Treaty Act (16 USC §§ 703–712).

3.5 TERRESTRIAL WILDLIFE AND HABITAT

Terrestrial wildlife and their habitats are managed through land conservation initiatives as well as hunting laws.

3.6 AQUATIC BIOLOGY

Aquatic species and their habitats are managed through conservation initiatives and fishing laws.

3.7 FARMLANDS

The Farmland Protection Policy Act of 1981 (7 USC 4201) is administered by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) and is intended to minimize the impact of federal programs on unnecessary and irreversible conversion of farmland to nonagricultural uses.

3.8 ANTICIPATED PERMITS

Impacts to WOUS are regulated through permits issued by USACE, VDEQ, and VMRC, as described in **Section 3.1** Waters of the U.S. The Chesapeake Bay Act is carried out by the individual localities subject to the Bay Act (9VAC25-870-51). Title 9 of the VAC (9VAC10-20-150B) allows public roads to be located within Resource Protection Areas (RPAs) consistent with certain conditions. The Coastal Zone Management Act (CZMA) of 1972 and federal consistency regulations (15 CFR §Part 930, Subpart D, § 930.50 et seq.) stipulate that activities in Virginia's Coastal Management Area (CMA) which have a federal component (e.g., those requiring federal permits, licenses or approval) and can affect a Virginia coastal use or resource must be consistent with the enforceable policies of Virginia's Coastal Zone Management Program (CZMP). Construction activities that may result in erosion and sediment discharge are regulated by the Virginia Erosion and Sediment Control Act. This Act is primarily administered by localities, which issue land disturbance permits for construction activities (9VAC25-840). VDEQ regulates water resources and water pollution through various programs including the Virginia Pollutant Discharge Elimination System (VPDES) Permits (9VAC25-260-186) and the Virginia Stormwater Management Program (VSMP) (9VAC25-870-144).

4. METHODOLOGY

Natural resources in the study area will be identified based on agency scoping letters; review of existing available databases; analysis of Geographic Information System (GIS) database information; 2013 wetland delineation information (see **Section 4.1**); any necessary supplemental wetland delineation information; and/or threatened, endangered, or special status species habitat field reconnaissance of the study area (see **Section 4.4**). Anticipated impacts will be assessed based upon a planning level Limits of Disturbance (LOD) that will include all impacts (both permanent and temporary) for each alternative.

4.1 WATERS OF THE U.S.

A qualitative approach to a functional assessment, consistent with the Highway Methodology, will be prepared using the 2012/2013 wetland delineation, field reconnaissance of the study area, knowledge of representative sites, as well as review of data from the following sources: U.S. Geological Survey (USGS) topographic mapping, National Wetland Inventory (NWI) mapping, National Hydrography Dataset (NHD) mapping; USDA NRCS soils mapping and data, and aerial imagery. Additionally, WetCAT will be used to determine the condition of wetlands in the study area. During the alternative development process, if additional alternatives are identified that fall outside the 2012-2013 delineation study area, additional wetland field work will be conducted. As discussed at the October 11, 2017 Agency Scoping Meeting, previously flagged wetlands are sufficient for this planning level study, and a Preliminary Jurisdictional Delineation or permit would not be required at this time. The accuracy of this pervious delineation will be field checked early in the study to determine if conditions have changed that would require these previous wetland lines to be revisited. Should additional alternatives be retained for study, the study area would be expanded accordingly and wetlands and streams would be delineated in a manner similar with the 2012/2013 data. Stereoscopic photointerpretation of collateral data sources will not be used to map Waters of the U.S. or to inform any functional assessment of these resources in this study.

4.2 WATER QUALITY

VDEQ's Final 2014 305(b)/303(d) Water Quality Assessment Integrated Report will be reviewed to determine if any impaired waters are located within the study area. Additional background data relating to drinking water supplies will be obtained from James City County's website and scoping letter responses.

4.3 FLOODPLAINS

Locations of designated floodplains and floodways will be determined using Flood Boundary and Floodway Maps published by FEMA.

4.4 THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

The VDGIF Virginia Fish and Wildlife Information Service (VAFWIS) database, the VDGIF Wildlife Environmental Review Map Service (WERMS), the USFWS Information for Planning and Conservation (IPaC) database, the Virginia Department of Conservation and Recreation (VDCR) Division of Natural Heritage (DNH) online searchable database, the Center for Conservation Biology (CCB) Mapping Portal, and the USFWS Virginia Field Office's Bald Eagle Map Tool will be queried to identify threatened, endangered, and special status species that may potentially be affected by the project. Additional background data will be collected through scoping letter responses, aerial imagery, NRCS soils data, USGS topographic mapping, NWI mapping, NHD, and National Land Cover Database (NLCD) 2011. Scientists experienced with conducting habitat assessments will also conduct a habitat field reconnaissance for threatened, endangered, and special status species.

4.5 TERRESTRIAL WILDLIFE AND HABITAT

NLCD 2011 will be reviewed to determine the types of land cover within the study area. Wildlife corridors will be qualitatively identified using aerial imagery. Streams with contiguous forest cover generally greater than 0.25 mile in width will be selected as wildlife corridors. VDGIF's WERMS database will be queried to identify documented occurrences of wildlife. Additional background data may be gathered from James

City County electronic resources, scoping letter responses, and field observations made during the threatened, endangered, and special status species habitat reconnaissance.

4.6 AQUATIC BIOLOGY

VDGIF's WERMS database will be queried to identify documented occurrences of aquatic species. Additional background data may be gathered from James City County electronic resources, scoping letter responses, and field observations made during the threatened, endangered, and special status species habitat reconnaissance.

4.7 FARMLANDS

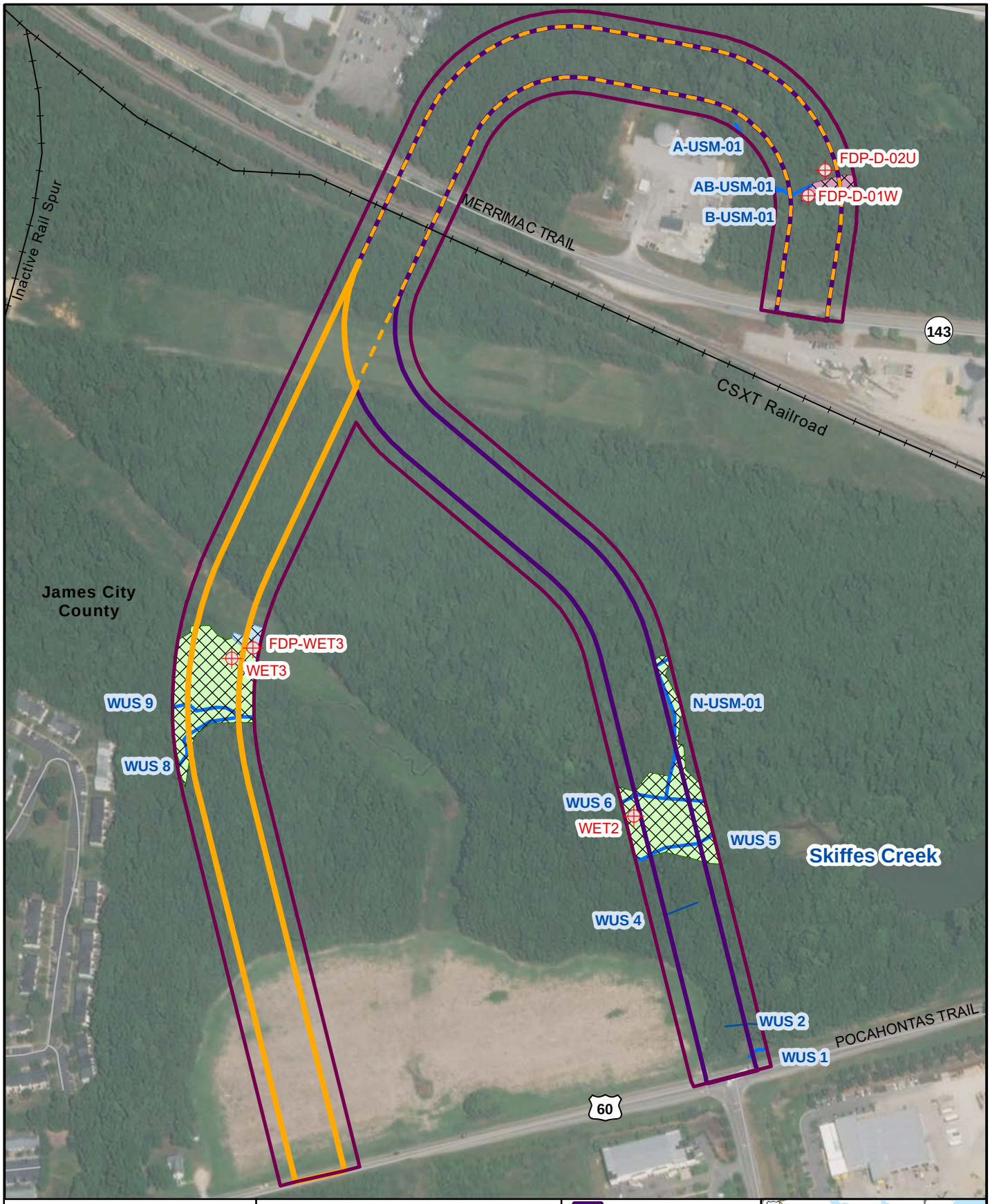
The Farmland Protection Policy Act Manual will be reviewed to determine if lands covered by the Act are present within the study area. Additional resources, such as the 2010 census urbanized area maps, NRCS Web Soil Survey, and agricultural and forestal districts, will also be reviewed.

4.8 ANTICIPATED PERMITS

Impacts to WOUS will be quantified in the study area as discussed above in **Section 4.1** Waters of the U.S. Permitting scenarios (USACE, VDEQ, and VMRC) and potential mitigation will be explained based on the expected WOUS impacts. Mitigation ratios typically applied by the USACE Norfolk District and VDEQ will be described. The ratios and specific mitigation will be reviewed and developed during the permitting process, which would begin after the FHWA NEPA decision.

To determine compliance with the Chesapeake Bay Preservation Act, James City County's Chesapeake Bay Preservation Ordinance will be reviewed. Impacts to RPAs will be calculated using James City County's mapped RPA. Public road RPA exemptions (Title 9 of the VAC (9VAC10-20-150B) will be reviewed and discussed. To comply with CZM regulations, information on CZM enforceable policies will be reviewed and obtained from VDEQ's Coastal Zone Management website. Information on erosion and sediment control enforceable policies will be obtained from VDEQ and James City County. VDOT erosion and sediment control standards and specifications will also be reviewed.

Appendix B:
Unified Stream Methodology (USM) Forms and Field Data Points



Data Points and USMs within the Inventory Corridor

VDOT Virginia Department of Transportation
Skiffes Creek Connector Study
VDOT Project Number: 0060-047-627, P101, R201, C501; UPC: 100200

0 0.025 0.05 0.1 Miles

N W E S

Source: ESRI

Build Alternative 1
Build Alternative 2
Field Investigated Wetlands
Inventory Corridor
Data Point
R2/R3/R4
PEM
R6
PFO
Railroad
PUB

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Skiffes Creek Connector Study City/County: James City County Sampling Date: 3/22/18

Applicant/Owner: VDOT State: VA Sampling Point: FDP-D-01W

Investigator(s): ECD, LW Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): LRR P; MLRA 133A Lat: 37.214631 Long: -76.598083 Datum: NAD83

Soil Map Unit Name: 15E NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔ No _____	**Is the Sampled Area within a Wetland?** **Yes** ✔ **No** _____
Hydric Soil Present?	Yes ✔ No _____	
Wetland Hydrology Present?	Yes ✔ No _____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes ✔	No _____	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 2

Wetland Hydrology Present? **Yes** ✔ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: FDP-D-01W

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Betula nigra*	20	Yes	FACW
2. *Salix nigra*	15	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
	35 = Total Cover		
50% of total cover: 17.5	20% of total cover: 7		

Sapling/Shrub Stratum (Plot size: 30 feet)			
1. *Liquidambar styraciflua*	20	Yes	FAC
2. *Betula nigra*	10	Yes	FACW
3. *Ligustrum sinense*	2	No	FAC
4. *Rubus argutus*	2	No	FAC
5.			
6.			
7.			
8.			
	34 = Total Cover		
50% of total cover: 17	20% of total cover: 6.8		

Herb Stratum (Plot size: 30 feet)			
1. *Microstegium vimineum*	10	Yes	FAC
2. *Rubus argutus*	5	Yes	FAC
3. *Juncus effusus*	2	No	OBL
4. *Lonicera japonica*	2	No	FACU
5. *Viola cucullata*	2	No	OBL
6. *Juniperus virginiana*	2	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	23 = Total Cover		
50% of total cover: 11.5	20% of total cover: 4.6		

Woody Vine Stratum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species		x 3 = 0
FACU species		x 4 = 0
UPL species		x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: FDP-D-01W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5Y 4/2	98	2.5Y 5/6	2	C	M	LS	
2-16	2.5Y 5/2	85	10YR 5/6	15	C	M	S	
16-20	2.5Y 6/2	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ✔ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Skiffes Creek Connector Study City/County: James City County Sampling Date: 3/22/18

Applicant/Owner: VDOT State: VA Sampling Point: FDP-D-02U

Investigator(s): ECD, LW Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 10

Subregion (LRR or MLRA): LRR P; MLRA 133A Lat: 37.214763 Long: -76.608093 Datum: NAD83

Soil Map Unit Name: 15E NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 17

Wetland Hydrology Present? **Yes** _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Saturation was observed at 17 inches. This does not meet indicator A3, which requires saturation within the upper 12 inches.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: FDP-D-02U

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	25	Yes	FAC
2. *Pinus taeda*	5	No	FAC
3. *Ulmus americana*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
	35 = Total Cover		
50% of total cover: 17.5	20% of total cover: 7		

Sapling/Shrub Stratum (Plot size: 30 feet)			
1. *Viburnum dentatum*	25	Yes	FAC
2. *Fagus grandifolia*	10	Yes	FACU
3. *Ulmus americana*	5	No	FAC
4. *Carpinus caroliniana*	5	No	FAC
5.			
6.			
7.			
8.			
	45 = Total Cover		
50% of total cover: 22.5	20% of total cover: 9		

Herb Stratum (Plot size: 30 feet)			
1. *Lonicera japonica*	5	Yes	FACU
2. *Polystichum acrostichoides*	5	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		

Woody Vine Stratum (Plot size: 30 feet)			
1. *Lonicera japonica*	5	Yes	FACU
2.			
3.			
4.			
5.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species		x 3 = 0
FACU species		x 4 = 0
UPL species		x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: FDP-D-02U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					SL	
2-15	2.5Y 4/2	100					SL	
15-18	2.5Y 5/4	100					LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Skiffes Creek Connector Study City/County: James City County Sampling Date: 3/23/18

Applicant/Owner: VDOT State: VA Sampling Point: FDP-WET3

Investigator(s): JEF, ECD Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR or MLRA): LRR P; MLRA 133A Lat: 37.211277 Long: -76.603212 Datum: NAD83

Soil Map Unit Name: 17; Johnston Complex NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** **Yes** ✔ **No** _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

Located within maintained powerline easement.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- __ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water-Stained Leaves (B9)
- __ Aquatic Fauna (B13)
- __ Marl Deposits (B15) **(LRR U)**
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- __ Surface Soil Cracks (B6)
- __ Sparsely Vegetated Concave Surface (B8)
- ✔ Drainage Patterns (B10)
- __ Moss Trim Lines (B16)
- __ Dry-Season Water Table (C2)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Geomorphic Position (D2)
- ✔ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)
- __ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes ✔	No _____	Depth (inches): 3
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✔ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: FDP-WET3

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Sapling/Shrub Stratum (Plot size: 30 feet)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Herb Stratum (Plot size: 30 feet)			
1. *Phragmites australis*	75	Yes	FACW
2. *Juncus effusus*	25	Yes	OBL
3. *Lonicera japonica*	15	No	FACU
4. *Viola cucullata*	8	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	123 = Total Cover		
50% of total cover: 61.5	20% of total cover: 24.6		

Woody Vine Stratum (Plot size: 30 feet)			
1. *Lonicera japonica*	5	Yes	FACU
2.			
3.			
4.			
5.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species		x 3 = 0
FACU species		x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: FDP-WET3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5Y 3/2	100					SL	
2-8	2.5Y 5/2	95	7.5YR 5/8	5	C	M	S	
8-12	10B 2.1/1	50					CL	Mixed Matrix
	10GY 4/1	50						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ✔ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ✔ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✔ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Skiffes Creek Connector City/County: James City County Sampling Date: Jun 13, 2013

Applicant/Owner: VDOT State: Virginia Sampling Point: WET2

Investigator(s): Scot Aitkenhead & Robin Cummings Section, Township, Range: _____

Landform (hillslope, terrace, etc.) _____ Local relief (concave, convex, none): none Slope (%): _____

Subregion (LRR or MLRA): LRR T (MLRA 153B) Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI Classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Photo 214 Large wetland within the NWI region. Goes from toe of slope to toe of slope.

VEGETATION (Four Strata) - Use scientific names of plants.

Sampling Point WET2

Tree Stratum (Plot size:_____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum (Maple,red)	30	Y	FAC
2. Fraxinus pennsylvanica (Ash,green)	30	Y	FACW
3. Platanus occidentalis (Sycamore,american)	30	Y	FACW
4.			
5.			
6.			
7.			
8.			
	90	= Total Cover	
50 % of total cover: 45	20 % of total cover: 18		

Sapling/Shrub Stratum (Plot size:_____)			
1. Lindera benzoin (Spicebush,northern)	50	Y	FACW
2. Asimina triloba (Pawpaw,common)	40	Y	FAC
3. Acer rubrum (Maple,red)	10		FAC
4.			
5.			
6.			
7.			
8.			
	100	= Total Cover	
50	20 % of total cover: 20		

Herb Stratum (Plot size:_____)			
1. Caltha palustris (Marsh-marigold,common)	25	Y	OBL
2. Lindera benzoin (Spicebush,northern)	20	Y	FACW

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		X 2 =	
FAC species		X 3 =	
FACU species		X 4 =	
UPL species		X 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 – Rapid Test for Hydrophytic Vegetation

X 2 – Dominance Test is > 50%

___ 3 – Prevalence Test is ≤ 3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or probl matic.

3.	Saururus cernuus (Tail,lizard's)	5		OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		50	= Total Cover	

50 % of total cover: 25 20 % of total cover: 10

Woody Vine Stratum (Plot size:_____)

1.	Toxicodendron radicans (Ivy,poison)	2	Y	FAC
2.				
3.				
4.				
5.				
		2	= Total Cover	

50 % of total cover: 1 20 % of total cover: 0.4

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WET2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR5/1	93	5YR4/6	7	CS	PL/M	Loamy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5)
___Organic Bodies (A6) **(LRR P, T, U)**
___5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___Muck Presence (A8) **(LRR U)**
___1 cm Muck (A9) **(LRR P, T)**
___Depleted Below Dark Surface (A11)
___Thick Dark Surface (A12)
___Coast Prairie Redox (A16) **(MLRA 150A)**
___Sandy Mucky Mineral (S1) **(LRR O, S)**
___Sandy Gleyed Matrix (S4)
X Sandy Redox (S5)
___Stripped Matrix (S6)
___Dark Surface (S7) **(LRR P, S, T, U)**

___Polyvalue Below Surface (S8) **(LRR S, T, U)**
___Thin Dark Suface (S9) **(LRR S, T, U)**
___Loamy Gleyed Matrix (F1) **(LRR O)**
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___Marl (F10) **(LRR U)**
___Depleted Ochric (F11) **(MLRA 151)**
___Iron Manganese Masses (F12) **(LRR O, P, T)**
___Umbric Surface (F13) **(LRR P, T, U)**
___Delta Ochric (F17) **(MLRA 151)**
___Reduced Vertic (F18) **(MLRA 150A, 150B)**
___Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) **(LRR O)**
___2 cm Muck (A10) **(LRR S)**
___Reduced Vertic (F18) **(outside MLRA 150A,B)**
___Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
___Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
___Red Parent Material (TF2)
___Very Shallow Dark Surface (TF12)
___Other (Explain in Remarks)

[3]Indicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:
Flags 1-6. 1&6 end a stream. Flags 7- . 7 starts at stream line and continues.

Additional Vegetation Samples

		Abs% Cover	Dom Spec?	Ind Status			Abs% Cover	Dom Spec?	Ind Status
Tree Stratum					20.				
9.					21.				
10.					22.				
11.					23.				
12.					24.				
13.					25.				
14.					26.				
15.					27.				
16.					28.				
17.					29.				
18.					30.				
19.					31.				
Sapling/Shrub Stratum					20.				
9.					21.				
10.					22.				
11.					23.				
12.					24.				
13.					25.				
14.					26.				
15.					27.				
16.					28.				
17.					29				
18.					30.				
19.					31.				
Herb Stratum					38.				
13.					39.				
14.					40.				
15					41.				
16.					42.				
17.					43.				
18.					44.				
19.					45.				
20.					46.				
21.					47.				
22.					48.				
23.					49.				
24.					50.				
25.					51.				
26.					52.				
27.					53.				
28.					54.				
29.					55.				
30.					56.				
31.					57.				
32.					58.				
33.					59.				
34.					60.				
35.					61.				
36.					62.				
37.					63.				
Vine Stratum					17.				
6.					18.				
7.					19.				
8.					20.				
9.					21.				
10.					22.				
11.					23.				
12.					24.				
13.					25.				
14.					26.				
15.					27.				
16.					28.				

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Skiffes Creek Connector City/County: James City County Sampling Date: Jun 14, 2013

Applicant/Owner: VDOT State: Virginia Sampling Point: WET3

Investigator(s): Scot Aitkenhead & Robin Cummings Section, Township, Range: _____

Landform (hillslope, terrace, etc.) FLOODPLAIN Local relief (concave, convex, none): none Slope (%): _____

Subregion (LRR or MLRA): LRR T (MLRA 153B) Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI Classification: PFO & PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Photo
224

VEGETATION (Four Strata) - Use scientific names of plants.

Sampling Point WET3

Tree Stratum (Plot size:_____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Platanus occidentalis (Sycamore,american)	40	Y	FACW
2. Acer rubrum (Maple,red)	30	Y	FAC
3. Fraxinus pennsylvanica (Ash,green)	20	Y	FACW
4.			
5.			
6.			
7.			
8.			
	90	= Total Cover	

50 % of total cover: 45 20 % of total cover: 18

Sapling/Shrub Stratum (Plot size:_____)			
1. Acer rubrum (Maple,red)	40	Y	FAC
2. Lindera benzoin (Spicebush,northern)	30	Y	FACW
3. Fraxinus pennsylvanica (Ash,green)	10		FACW
4. Platanus occidentalis (Sycamore,american)	10		FACW
5. Asimina triloba (Pawpaw,common)	2		FAC
6.			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		X 2 =	
FAC species		X 3 =	
FACU species		X 4 =	
UPL species		X 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

7.			
8.			

92 = Total Cover

46 20 % of total cover: 18.4

Herb Stratum (Plot size:_____)

1. Fleischmannia microstemon (Thorough-wort,tropical)	25	Y	
2. Saururus cernuus (Tail,lizard's)	20	Y	OBL
3. Boehmeria cylindrica (False-nettle,small-spike)	5		FACW
4. Caltha palustris (Marsh-marigold,common)	5		OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

55 = Total Cover

50 % of total cover: 27.5 20 % of total cover: 11

Woody Vine Stratum (Plot size:_____)

1. Toxicodendron radicans (Ivy,poison)	1	Y	FAC
2.			
3.			
4.			
5.			

1 = Total Cover

50 % of total cover: 0.5 20 % of total cover: 0.2

Hydrophytic Vegetation Indicators:

___ 1 – Rapid Test for Hydrophytic Vegetation

_X_ 2 – Dominance Test is > 50%

___ 3 – Prevalence Test is ≤ 3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or probl matic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** _X_ **No** ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WET3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR4/1	85	5YR4/6	15	RM	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5)
___Organic Bodies (A6) **(LRR P, T, U)**
___5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___Muck Presence (A8) **(LRR U)**
___1 cm Muck (A9) **(LRR P, T)**
___Depleted Below Dark Surface (A11)
___Thick Dark Surface (A12)
___Coast Prairie Redox (A16) **(MLRA 150A)**
___Sandy Mucky Mineral (S1) **(LRR O, S)**
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Stripped Matrix (S6)
___Dark Surface (S7) **(LRR P, S, T, U)**

___Polyvalue Below Surface (S8) **(LRR S, T, U)**
___Thin Dark Suface (S9) **(LRR S, T, U)**
___Loamy Gleyed Matrix (F1) **(LRR O)**
___Loamy Gleyed Matrix (F2)
_X_Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___Marl (F10) **(LRR U)**
___Depleted Ochric (F11) **(MLRA 151)**
___Iron Manganese Masses (F12) **(LRR O, P, T)**
___Umbric Surface (F13) **(LRR P, T, U)**
___Delta Ochric (F17) **(MLRA 151)**
___Reduced Vertic (F18) **(MLRA 150A, 150B)**
___Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) **(LRR O)**
___2 cm Muck (A10) **(LRR S)**
___Reduced Vertic (F18) **(outside MLRA 150A,B)**
___Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
___Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
___Red Parent Material (TF2)
___Very Shallow Dark Surface (TF12)
___Other (Explain in Remarks)

[3]Indicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** __X__ **No** _____

Remarks:

Additional Vegetation Samples

		Abs% Cover	Dom Spec?	Ind Status			Abs% Cover	Dom Spec?	Ind Status
Tree Stratum					20.				
9.					21.				
10.					22.				
11.					23.				
12.					24.				
13.					25.				
14.					26.				
15.					27.				
16.					28.				
17.					29.				
18.					30.				
19.					31.				
Sapling/Shrub Stratum					20.				
9.					21.				
10.					22.				
11.					23.				
12.					24.				
13.					25.				
14.					26.				
15.					27.				
16.					28.				
17.					29				
18.					30.				
19.					31.				
Herb Stratum					38.				
13.					39.				
14.					40.				
15					41.				
16.					42.				
17.					43.				
18.					44.				
19.					45.				
20.					46.				
21.					47.				
22.					48.				
23.					49.				
24.					50.				
25.					51.				
26.					52.				
27.					53.				
28.					54.				
29.					55.				
30.					56.				
31.					57.				
32.					58.				
33.					59.				
34.					60.				
35.					61.				
36.					62.				
37.					63.				
Vine Stratum					17.				
6.					18.				
7.					19.				
8.					20.				
9.					21.				
10.					22.				
11.					23.				
12.					24.				
13.					25.				
14.					26.				
15.					27.				
16.					28.				

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

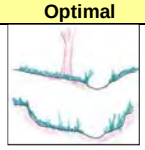
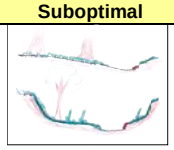
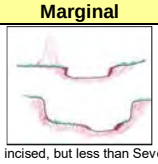
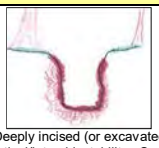
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
0060-047-627	Skiffes Creek Connector Study	James City Co.	R4	02080206	3/22/18	A-USM-01		

Name(s) of Evaluator(s)	Stream Name and Information
J. Felton, E. Drahos	Stream A; reach is a part of a restoration project E. of VDOT facility

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>	Channel has been stabilized with rock, debris, and matting. Very little sediment deposition.					

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor	
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
		High	Low	High	Low	High	Low
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

NOTES>>
Left Bank:
1.5=Tree stratum with non-maintained understory
0.6=Lawn

Right Bank:
0.6=Lawn
0.5=VDOT facility

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Left Bank	% Riparian Area>	95%	5%					100%		
	Score >	1.5	0.6							
									CI= (Sum % RA * Scores*0.01)/2	
Right Bank	% Riparian Area>	60%	40%					100%	Rt Bank CI >	1.46
	Score >	0.6	0.5						Lt Bank CI >	0.56

CI: 1.01

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

NOTES>>
Stream restoration project has significantly reduced habitat elements.

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
0060-047-627	VDOT	James City Co.	R4	02080206	3/22/18	A-USM-01	0	0

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>
Channel is 100% altered.

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.08**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

Downstream

Left Bank

Right Bank

DESCRIBE PROPOSED IMPACT:

To Be Determined

Stream Assessment Form (Form 1)

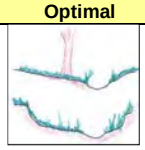
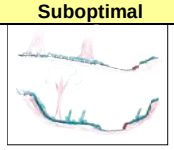
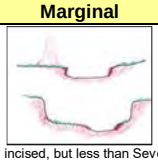
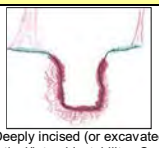
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
0060-047-627	Skiffes Creek Connector Study	James City Co.	R4	02080206	3/22/18	AB-USM-01		

Name(s) of Evaluator(s)	Stream Name and Information
E. Drahos, L. Williams	Stream AB

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
						
Channel Condition	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.6
NOTES>>	80% of banks are stable.					

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

NOTES>>
Both Banks:
1.5=Tree stratum with non-maintained understory

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Left Bank	% Riparian Area>	100%						100%		
	Score >	1.5								
									CI= (Sum % RA * Scores*0.01)/2	
Right Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.50	CI
	Score >	1.5							Lt Bank CI > 1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>
Unstable substrate is present.

	Conditional Category			
	Optimal	Suboptimal	Marginal	Poor
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.
Score	1.5	1.2	0.9	0.5

CI
1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
0060-047-627	VDOT	James City Co.	R4	02080206	3/22/18	AB-USM-01	0	0

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>
No channel alteration present.

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.36**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Photos not included due to poor lighting

DESCRIBE PROPOSED IMPACT:

To Be Determined

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

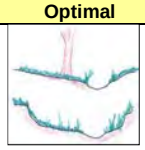
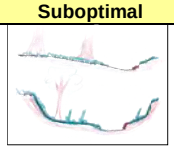
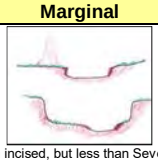
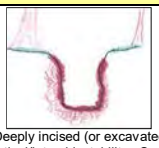
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
0060-047-627	Skiffes Creek Connector Study	James City Co.	R4	02080206	3/22/18	B-USM-01		

Name(s) of Evaluator(s)	Stream Name and Information
J. Felton, E. Drahos	Stream B; reach is a part of a restoration project E. of VDOT facility

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>	Channel has been stabilized with rock, debris, and matting. Very little sediment deposition.					

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor	
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
		High	Low	High	Low	High	Low
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

NOTES>>
Left Bank:
0.6=Lawn
0.5=VDOT facility

Right Bank:
1.5=Tree stratum with non-maintained understory
0.6=Lawn

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Left Bank	% Riparian Area>	60%	40%					100%		
	Score >	0.6	0.5							
									CI= (Sum % RA * Scores*0.01)/2	
Right Bank	% Riparian Area>	20%	80%					100%	Rt Bank CI >	0.56
	Score >	0.6	1.5						Lt Bank CI >	1.32

CI: 0.94

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.
Score	1.5	1.2	0.9	0.5

NOTES>>
Stream restoration project has significantly reduced habitat elements.

CI: 0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
0060-047-627	VDOT	James City Co.	R4	02080206	3/22/18	B-USM-01	0	0

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>
Channel is 100% altered.

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.07**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

Downstream

Left Bank

Right Bank

DESCRIBE PROPOSED IMPACT:

To Be Determined

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

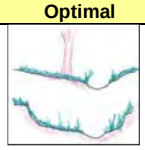
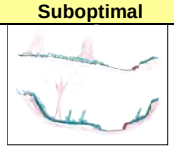
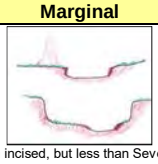
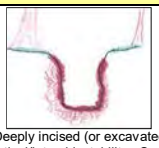
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
0060-047-627	Skiffes Creek Connector Study	James City Co.	R4	02080206	3/23/18	N-USM-01		

Name(s) of Evaluator(s)	Stream Name and Information
J. Felton, E. Drahos	Stream N; north tributary to Skiffes Creek

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>	Very little incision or active erosion present.					

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor	
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
		High	Low	High	Low	High	Low
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

NOTES>>
Both Banks:
1.5=Tree stratum with non-maintained understory

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Left Bank	% Riparian Area>	100%						100%		
	Score >	1.5								
									CI= (Sum % RA * Scores*0.01)/2	
Right Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.50	CI
	Score >	1.5							Lt Bank CI > 1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

NOTES>>
Varied substrate, water veloocity, debris, shade, and stable features present throughout reach.

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
0060-047-627	VDOT	James City Co.	R4	02080206	3/23/18	N-USM-01	0	0

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>
No channel alteration present.

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**

RCI= (Sum of all CI's)/5

COMPENSATION REQUIREMENT (CR) >>	**0**

CR = RCI X LF X IF

INSERT PHOTOS:

Upstream

Downstream

Left Bank

Right Bank

DESCRIBE PROPOSED IMPACT:

To Be Determined

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

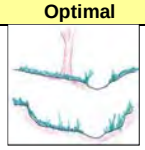
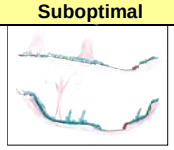
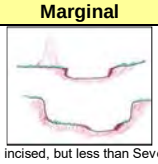
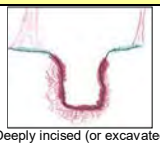
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
0060-047-627	Skiffes Creek Connector Study	James City Co.	R3	02080206	3/22/18	WUS 1		

Name(s) of Evaluator(s)	Stream Name and Information
J. Felton, E. Drahos	WUS 1; adjacent to Rt. 60

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>	Stream is incised with banks near vertical.					

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor	
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
		High	Low	High	Low	High	Low
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

NOTES>>
Left Bank:
1.5=Tree stratum with non-maintained understory

Right Bank:
1.5=Tree stratum with non-maintained understory
0.6=Mowed
0.5=Road

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Left Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Right Bank	% Riparian Area>	10%	60%	30%				100%	Rt Bank CI >	1.50	CI
	Score >	1.5	0.6	0.5					Lt Bank CI >	0.66	1.08

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>
Heavy incision and siltation contribute to unsuitable habitat.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
0060-047-627	VDOT	James City Co.	R3	02080206	3/22/18	WUS 1	0	0

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>> Culvert/riprap on upstream end.

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.94**

RCI= (Sum of all CI's)/5

COMPENSATION REQUIREMENT (CR) >>	**0**

CR = RCI X LF X IF

INSERT PHOTOS:

Upstream

Downstream

Left Bank

Right Bank

DESCRIBE PROPOSED IMPACT:

To Be Determined

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
0060-047-627	Skiffes Creek Connector Study	James City Co.	R6	02080206	3/22/18	WUS 2		1

Name(s) of Evaluator(s)	Stream Name and Information
J. Felton, E. Drahos	WUS 2; E. of farmfield

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category							
	Optimal	Suboptimal		Marginal		Poor	
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
		High	Low	High	Low	High	Low
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

NOTES>>
Right Bank:
1.5=Tree stratum with non-maintained understory
0.5 = Road

Left Bank:
1.5=Tree stratum with non-maintained understory

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	90%	10%					100%			
	Score >	1.5	0.5								
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.40	CI
	Score >	1.5							Lt Bank CI >	1.50	1.45

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	0.73

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >>	0

CR = RCI X LF X IF

INSERT PHOTOS:

Upstream

Downstream

Left Bank

Right Bank

DESCRIBE PROPOSED IMPACT:

To Be Determined

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5505-01	Skiffes Creek Connector	James City County	Ephemeral	02080206	6-13-13			1

Name(s) of Evaluator(s)	Stream Name and Information
Scot Aitkenhead & Robin Cummings	WUS 4

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	0.75

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >>	0

CR = RCI X LF X IF

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

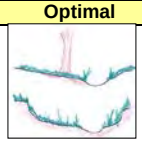
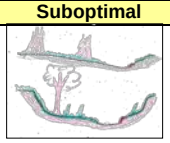
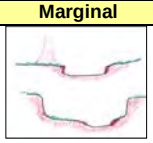
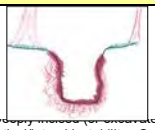
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5505-01	Skiffes Creek Connector	James City County	R2UB2	02080206	6-13-13			

Name(s) of Evaluator(s)	Stream Name and Information
Scot Aitkenhead & Robin Cummings	WUS 5

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor	
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
		High	Low	High	Low	High	Low
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

NOTES>>

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
									CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.50 — CI
	Score >	1.5							Lt Bank CI > 1.50 — 1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Average 8' wide within study area GPS'd Right Bank

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
5505-01	Skiffes Creek Connector	James City County	R2UB2	02080206	6-13-13			

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

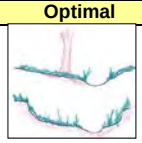
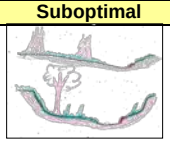
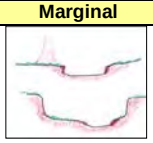
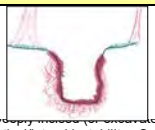
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5505-01	Skiffes Creek Connector	James City County	R2UB2	02080206	6-13-13			

Name(s) of Evaluator(s)	Stream Name and Information
Scot Aitkenhead & Robin Cummings	WUS 6

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor	
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
		High	Low	High	Low	High	Low
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

NOTES>>

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%	
	Score >	1.5							
									CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.50 — CI
	Score >	1.5							Lt Bank CI > 1.50 — 1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Average 4' wide

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
5505-01	Skiffes Creek Connector	James City County	R2UB2	02080206	6-13-13			

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

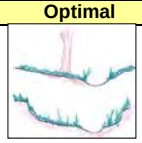
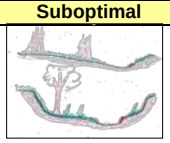
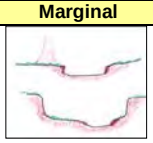
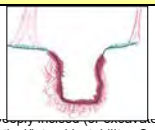
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5505-01	Skiffes Creek Connector	James City County	R2UB2	02080206	6-13-13			

Name(s) of Evaluator(s)	Stream Name and Information
Scot Aitkenhead & Robin Cummings	WUS 8

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor	
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
		High	Low	High	Low	High	Low
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

NOTES>>

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.5								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.50	CI
	Score >	1.5							Lt Bank CI > 1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> All sand substrate, no gravel

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
5505-01	Skiffes Creek Connector	James City County	R2UB2	02080206	6-13-13			

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.44**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

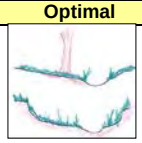
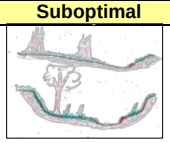
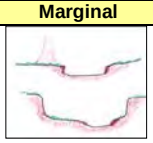
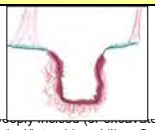
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5505-01	Skiffes Creek Connector	James City County	R2UB2	02080206	6-13-13			

Name(s) of Evaluator(s)	Stream Name and Information
Scot Aitkenhead & Robin Cummings	WUS 9

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor	
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Ensure the sums of % Riparian Blocks equal 100

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	Score >	1.5								
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Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.50	CI
	Score >	1.5							Lt Bank CI > 1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> All sand bottom with woody debris

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
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Stream Impact Assessment Form Page 2

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SCORE	1.5	1.3	1.1	0.9	0.7	0.5	1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.44**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Appendix C:
WetCAT Details and Results

WetCAT Cumulative Results summarizing data within user defined boundary (center point longitude: latitude:)

Located in the following jurisdiction(s): JAMES CITY and YORK

10 Digit Hydrologic Unit(s): 0208020608 (Lawnes Creek-James River)

NWI List:

The number of NWI nontidal wetlands within this buffer is 8.

Unique ID	Attribute	Acres	Habitat Score	Habitat Stress Level	Habitat Restoration Potential(%)	WQ Score	WQ Stress Level	WQ Restoration Potential(%)
Oct2014_84816	PEM1C	1.45	0.7	Somewhat Stressed	19	0.4	Somewhat Severely Stressed	0
Oct2014_84817	PEM1C	0.29	0.49	Somewhat Severely Stressed	0	0.4	Somewhat Severely Stressed	0
Oct2014_84826	PEM1C	0.77	0.42	Somewhat Severely Stressed	17	0.1	Severely Stressed	300
Oct2014_89241	PFO1A	1.28	0.29	Severely Stressed	24	0.1	Severely Stressed	300
Oct2014_90405	PFO1C	5.51	0.62	Somewhat Stressed	0	0.7	Somewhat Stressed	0
Oct2014_90408	PFO1C	7.45	0.43	Somewhat Severely Stressed	14	0.4	Somewhat Severely Stressed	75
Oct2014_92005	PFO1E	2.94	0.42	Somewhat Severely Stressed	17	0.4	Somewhat Severely Stressed	75
Oct2014_177430	PFO1C	6.71	0.47	Somewhat Severely Stressed	26	0.7	Somewhat Stressed	0

NWI Summary:

The number of NWI nontidal wetlands within this buffer is 8.

Score Type	Score	Minimum	Maximum

Score Type	Score	Minimum	Maximum
Habitat (average)	0.479999996722	0.289999991655	0.699999988079
Habitat Restoration Potential (average %)	14.625	0	26
Water Quality Restoration Potential (mode %)	0	0	300
Water Quality (mode)	0.4	0.10000000149	0.699999988079

Stress Level	# Wetlands (Habitat)	# Wetlands (WQ)
Slightly Stressed	0	0
Somewhat Stressed	2	2
Somewhat Severely Stressed	5	4
Severely Stressed	1	2

Wetland Class	Acres	# Wetlands	Ave Habitat Score	Min Habitat Score	Max Habitat Score	Ave Habitat Restoration Potential(%)	Mode WQ Score	Min WQ Score	Max WQ Score	Mode WQ Restoration Potential(%)
PEM	2.50606659962	3	0.536666661501	0.419999986887	0.699999988079	12	0.4	0.10000000149	0.40000000596	0
PFO	23.8972652976	5	0.445999997854	0.289999991655	0.620000004768	16.2	0.4	0.10000000149	0.699999988079	0

WetCAT Cumulative Results summarizing data within user defined boundary (center point longitude: latitude:)
Located in the following jurisdiction(s): JAMES CITY and YORK

10 Digit Hydrologic Unit(s): 0208020608 (Lawnes Creek-James River)

Soils:

Soils within user buffer: 12

Soil Name	Drainage Class	Hydric Class	Soil Order	Percent of Buffer
Bethera silt loam	Poorly drained	All hydric	Ultisols	0.582911316813
Craven-Uchee complex, 6 to 10 percent slopes	Moderately well drained	Not hydric	Ultisols	22.6160371074
Emporia complex, 10 to 15 percent slopes	Well drained	Partially hydric	Ultisols	0.809168801824
Emporia complex, 15 to 25 percent slopes	Well drained	Partially hydric	Ultisols	19.207984083
Emporia complex, 25 to 50 percent slopes	Well drained	Partially hydric	Ultisols	2.14063003966
Emporia fine sandy loam, 2 to 6 percent slopes	Well drained	Not hydric	Ultisols	11.7182324175
Johnston complex	Very poorly drained	All hydric	Inceptisols	3.82096785872
Kempsville-Emporia fine sandy loams, 2 to 6 percent slopes	Well drained	Not hydric	Ultisols	3.22814070474
Not Complete		Unknown		0.00189470029396
Slagle fine sandy loam, 2 to 6 percent slopes	Moderately well drained	Not hydric	Ultisols	19.5569397489
Urban land		Unknown		14.8805821355
Water	n/a (water)	n/a (water)	n/a (water)	1.43651038345

Soils Summary:

Soils within user buffer: 12

Soil Name	Drainage Class	Hydric Class	Soil Order	Percent of Buffer
Craven-Uchee complex, 6 to 10 percent slopes	Moderately well drained	Not hydric	Ultisols	22.6160371074

Soil Order	# Soils	Percent of Buffer
	4	14.8824768358

Soil Order	# Soils	Percent of Buffer
Inceptisols	1	3.82096785872
n/a (water)	1	1.43651038345
Ultisols	24	79.8600442197

Drainage Class	# Soils	Percent of Buffer
	4	14.8824768358
Moderately well drained	10	42.1729768564
n/a (water)	1	1.43651038345
Poorly drained	1	0.582911316813
Very poorly drained	1	3.82096785872
Well drained	13	37.1041560466

Hydric Class	# Soils	Percent of Buffer
All hydric	2	4.40387917553
n/a (water)	1	1.43651038345
Not hydric	19	57.1193499786
Partially hydric	4	22.1577829244
Unknown	4	14.8824768358

WetCAT Cumulative Results summarizing data within user defined boundary (center point longitude: latitude:)
Located in the following jurisdiction(s): JAMES CITY and YORK

10 Digit Hydrologic Unit(s): 0208020608 (Lawnes Creek-James River)

Permits:

There are no DEQ Permit Points present within this 1km buffer.

Permit Name	MultiRecord	Action	Activity Type	Facility Name	Date Effective

DEQ Permitted Preservation Site(s):

There are no DEQ Permitted Preservation Sites represented within this 1km buffer.

Permit Name	Region	Type of Preservation Site	Preservation Definition

Mitigation Bank(s):

There are no Mitigation Banks represented within this 1km buffer.

Mitigation Bank Name	Bank Type	Bank Status	Service Area	Bank Credit Classification	Permit Number

WetCAT Cumulative Results summarizing data within user defined boundary (center point longitude: latitude:)
Located in the following jurisdiction(s): JAMES CITY and YORK

10 Digit Hydrologic Unit(s): 0208020608 (Lawnes Creek-James River)

Conservation Lands:

There are no Conservation Lands represented within this 1km buffer.

Managed Area Type	Management Agency	Management Level	Percent of Buffer

WetCAT Cumulative Results summarizing data within user defined boundary (center point longitude: latitude:)
Located in the following jurisdiction(s): JAMES CITY and YORK

10 Digit Hydrologic Unit(s): 0208020608 (Lawnes Creek-James River)

NPDES Facilities:

There are no NPDES Facilities represented within this 1km buffer.

VPDES	Facility Name	Stream Name	Type	Category

Water Quality Monitoring Stations:

There are no Water Quality Monitoring Stations represented within this 1km buffer.

Monitoring Station ID	Assessment Unit Code	Station Type	Assessed	# Temp Vio (1)	# DO Vio	# pH Vio	# E. coli Vio	# ENT Vio (2)	# Water Col Metals Vio	# Water Col Toxics Vio	# Sediment Metals Vio	# Sediment Toxics Vio	# Fish Tissue Metals Vio	# Fish Tissue Toxics Vio	# Total PHP EXCD (3)	# CHL A EXCD (4)	Comments

1:Violations; 2:Enterococci; 3:Phosphorus Exceedances; 4:Chlophyll A Exceedances

WetCAT Cumulative Results summarizing data within user defined boundary (center point longitude: latitude:)
Located in the following jurisdiction(s): JAMES CITY and YORK

10 Digit Hydrologic Unit(s): 0208020608 (Lawnes Creek-James River)

Impaired Water:

There are no Impaired Waters represented within this 1km buffer.

Assessment Unit Code	Assessment Year	Water Name	Type of Impaired Water	Cat. ID	Category Definition	Impairment Cause	Source

WetCAT Cumulative Results summarizing data within user defined boundary (center point longitude: latitude:)
Located in the following jurisdiction(s): JAMES CITY and YORK

10 Digit Hydrologic Unit(s): 0208020608 (Lawnes Creek-James River)

Class VII Water:

There are no Class VII Waters represented within this 1km buffer.

Assessment Unit Code	Water Name	Comments

WetCAT Cumulative Results summarizing data within user defined boundary (center point longitude: latitude:)

Map showing user defined boundary:

Study Area

Appendix D:
Stream Quality Assessment Worksheet

STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	3
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	4
	3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	5
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	4
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	2
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 2	3
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 2	4
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 2	4
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 3	4
	10	**Sediment input** (extensive deposition= 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	4
	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	—
STABILITY	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	4
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	4
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	2
	15	**Impact by agriculture, livestock, or timber production** (substantial impact =0; no evidence = max points)	0 – 5	0 – 4	0 – 5	4
HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	1
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	5
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	4
	19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	—
BIOLOGY	20	**Presence of stream invertebrates** (see page 4) (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	2
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	2
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	2
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	5
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on first page)				72

* These characteristics are not assessed in coastal streams.

Appendix E:
Threatened and Endangered Species Database Query Results

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Virginia Ecological Services Field Office
6669 Short Lane
Gloucester, VA 23061-4410
Phone: (804) 693-6694 Fax: (804) 693-9032
http://www.fws.gov/northeast/virginiafield/

In Reply Refer To: January 04, 2018
Consultation Code: 05E2VA00-2018-SLI-1184
Event Code: 05E2VA00-2018-E-02775
Project Name: Skiffes Creek NRTR

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to

utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Virginia Ecological Services Field Office
6669 Short Lane
Gloucester, VA 23061-4410
(804) 693-6694

Project Summary

Consultation Code: 05E2VA00-2018-SLI-1184

Event Code: 05E2VA00-2018-E-02775

Project Name: Skiffes Creek NRTR

Project Type: TRANSPORTATION

Project Description: Skiffes Creek NRTR

Project Location:

Approximate location of the project can be viewed in Google Maps:
https://www.google.com/maps/place/37.21248582315975N76.60190043772604W

Counties: James City, VA

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

REFUGE INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

Natural Heritage Resources

Your Criteria

Taxonomic Group: Select All

Federal Legal Status: LE - Listed endangered,LT - Listed threatened,PE - Proposed endangered,PT - Proposed threatened,C - Candidate

State Legal Status: Select All

County: James City

Watershed (8 digit HUC): 02080206 - Lower James River

Subwatershed (12 digit HUC): JL35 - James River-Skiffes Creek

Search Run: 1/4/2018 10:55:28 AM

Result Summary

Total Species returned: 1

Total Communities returned: 0

Click scientific names below to go to NatureServe report.

Click column headings for an explanation of species and community ranks.

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
James City							
Lower James							
James River-Skiffes Creek							
FISH							
Atlantic Sturgeon	Acipenser oxyrinchus	G3	S2	LE	LE	2	Y

Note: On-line queries provide basic information from DCR's databases at the time of the request. They are NOT to be substituted for a project review or for on-site surveys required for environmental assessments of specific project areas.

For Additional Information on locations of Natural Heritage Resources please submit an information request.

To Contribute information on locations of natural heritage resources, please fill out and submit a rare species sighting form.

VaFWIS Search Report Compiled on 1/4/2018, 11:11:36 AM

Help

Known or likely to occur within a 2 mile buffer ar ound polygon; center 37.2133000 -76.5929899 in 095 James City County , 199 York County , 700 Newport News City , VA

View Map of Site Location

589 Known or Likely Species ordered by Status Concern for Conservation (displaying first 39) (39 species with Status* or Tier I** or Tier II**)

BOVA Code	Status *	Tier **	Common Name	Scientific Name	Confirmed	Database(s)
030074	FESE	Ia	Turtle, Kemp's ridley sea	Lepidochelys kempii		BOVA
010032	FESE	Ib	Sturgeon, Atlantic	Acipenser oxyrinchus	Yes	BOVA,SppObs,HU6
030075	FESE	Ic	Turtle, leatherback sea	Dermochelys coriacea		BOVA
040183	FESE		Tern, roseate	Sterna dougallii dougallii		BOVA
030071	FTST	Ia	Turtle, loggerhead sea	Caretta caretta		BOVA
040144	FTST	Ia	Knot, red	Calidris canutus rufa		BOVA,HU6
050022	FTST	Ia	Bat, northern long-eared	Myotis septentrionalis	Yes	BOVA,SppObs
040120	FTST	IIa	Plover, piping	Charadrius melodus		BOVA
040110	SE	Ia	Rail, black	Laterallus jamaicensis		BOVA,HU6
050020	SE	Ia	Bat, little brown	Myotis lucifugus	Yes	BOVA,SppObs,HU6
050034	SE	Ia	Bat, Rafinesque's eastern big-eared	Corynorhinus rafinesquii macrotis		HU6
050027	SE	Ia	Bat, tri-colored	Perimyotis subflavus	Yes	BOVA,SppObs,HU6
020052	SE	IIa	Salamander, eastern tiger	Ambystoma tigrinum		BOVA,HU6
030013	SE	IIa	Rattlesnake, canebrake	Crotalus horridus		BOVA,HU6
040096	ST	Ia	Falcon, peregrine	Falco peregrinus	Potential	BOVA,BBA,HU6
040293	ST	Ia	Shrike, loggerhead	Lanius ludovicianus		BOVA
040379	ST	Ia	Sparrow, Henslow's	Ammodramus henslowii		HU6
020044	ST	IIa	Salamander, Mabee's	Ambystoma mabeei	Yes	BOVA,Habitat,SppObs,HU6

020002	ST	IIa	Treefrog, barking	Hyla gratiosa		BOVA,HU6
040292	ST		Shrike, migrant loggerhead	Lanius ludovicianus migrans		BOVA
030067	CC	IIa	Terrapin, northern diamond-backed	Malaclemys terrapin terrapin	Potential	BOVA,Habitat,HU6
030063	CC	IIIa	Turtle, spotted	Clemmys guttata		BOVA,HU6
010077		Ia	Shiner, bridle	Notropis bifrenatus		BOVA
040040		Ia	Ibis, glossy	Plegadis falcinellus		BOVA,HU6
040306		Ia	Warbler, golden-winged	Vermivora chrysoptera		BOVA
020063		IIa	Toad, oak	Anaxyrus quercicus		HU6
040052		IIa	Duck, American black	Anas rubripes	Potential	BOVA,BBA,HU6
040033		IIa	Egret, snowy	Egretta thula	Potential	BOVA,BBA,HU6
040029		IIa	Heron, little blue	Egretta caerulea caerulea		BOVA
040036		IIa	Night-heron, yellow-crowned	Nyctanassa violacea violacea		BOVA
040114		IIa	Oystercatcher, American	Haematopus palliatus		BOVA
040192		IIa	Skimmer, black	Rynchops niger		BOVA
040181		IIa	Tern, common	Sterna hirundo	Potential	BOVA,BBA,HU6
040320		IIa	Warbler, cerulean	Setophaga cerulea		BOVA,HU6
040140		IIa	Woodcock, American	Scolopax minor		BOVA,HU6
040203		IIb	Cuckoo, black-billed	Coccyzus erythropthalmus	Potential	BOVA,BBA
040105		IIb	Rail, king	Rallus elegans		BOVA
040304		IIc	Warbler, Swainson's	Limnothlypis swainsonii		HU6
100003		IIc	Skipper, rare	Problema bulenta		HU6

To view All 589 species View 589

*FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; CC=Collection Concern

**I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II - Very High Conservation Need; III=VA Wildlife Action Plan - Tier III - High Conservation Need;
IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need
Virginia Widlife Action Plan Conservation Opportunity Ranking:
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.;
c - No on the ground actions or research needs have been identified or all identified conservation opportunities have been exhausted.

View Map of All Query Results from All Observation Tables

Bat Colonies or Hibernacula: Not Known

Anadr omous Fish Use Str eams (2 records)

View Map of All Anadromous Fish Use Streams

Str eam ID	Str eam Name	Reach Status	Anadr omous Fish Species			View Map
			Differ ent Species	Highest TE *	Highest T ier **	
C92	James River 1	Confirmed	6		IV	Yes
P145	Skiffes creek	Potential	0			Yes

Impediments to Fish Passage (2 records)

View Map of All Fish Impediments

ID	Name	River	View Map
411	BREWERY ROAD DAM	GROVE CREEK	Yes
766	SKIFFS CREEK DAM	SKIFFS CREEK	Yes

Colonial W ater Bird Survey (1 records)

View Map of All Query Results Colonial Water Bird Survey

Colony_Name	N Obs	Latest Date	N Species			View Map
			Differ ent Species	Highest TE *	Highest Tier **	
Western Shore, Yorktown, Newport News	1	May 4 2013	1			Yes

Displayed 1 Colonial Water Bird Survey

Thr eatened and Endanger ed W aters

N/A

Managed T r out Str eams

N/A

Bald Eagle Concentration Ar eas and Roosts

ar e pr esent. View Map of Bald Eagle Concentration Areas and Roosts

(5 records)

BECAR ID	Observation Year	Authority	Type	Comments	View Map
10		Bryan Watts (Center for Conservation Biology)	Roost	Count 15	Yes
24	2009	Jeannette Parker (VDGIF)	Roost	Count 8	Yes

47	2006 - 2007	Center for Conservation Biology at the College of William and Mary/Virginia Commonwealth University	Summer Concentration Area	Eagle_use High	Yes
49	2006 - 2007	Center for Conservation Biology at the College of William and Mary/Virginia Commonwealth University	Summer Concentration Area	Eagle_use Moderate	Yes
52	2006 - 2007	Center for Conservation Biology at the College of William and Mary/Virginia Commonwealth University	Winter Concentration Area	Eagle_use Moderate	Yes

Bald Eagle Nests (9 records)

View Map of All Query Results
Bald Eagle Nests

Nest	N Obs	Latest Date	DGIF Nest Status	View Map
JC0106	3	Jan 1 2002	HISTORIC	Yes
JC0304	7	Apr 26 2007	HISTORIC	Yes
JC0305	2	May 1 2003	HISTORIC	Yes
JC0401	15	Apr 18 2011	Unknown	Yes
JC0503	14	Apr 18 2011	Unknown	Yes
JC0703	10	Apr 18 2011	Unknown	Yes
JC1108	2	Apr 18 2011	UNKNOWN	Yes
JC8703	20	May 10 1999	HISTORIC	Yes
JC9802	9	Jan 1 2002	HISTORIC	Yes

Displayed 9 Bald Eagle Nests

Species Observations (49 records - displaying first 20 , 13 Observations with Threatened or Endangered species)

View Map of All Query Results
Species Observations

obsID	class	Date Observed	Observer	N Species			View Map
				Different Species	Highest TE *	Highest Tier **	
63204	SppObs	Feb 10 1998	USFWS	1	FESE	I	Yes
624285	SppObs	Aug 3 2014	Carl; Anderson| David; Yates| Dustin; Meattey| Lauren; Gilpatrick| Robby; Lambert| Tim; Divoll| Chelsea; Vosburgh	1	FTST	I	Yes
622969	SppObs	Aug 3 2014	Carl; Anderson| David; Yates| Dustin; Meattey| Lauren; Gilpatrick| Robby; Lambert| Tim; Divoll| Chelsea; Vosburgh	4	SE	I	Yes
301778	SppObs	Jul 11 2003	RUSS BENEDICT (PRINCIPLE PERMITTEE)	6	SE	I	Yes
301777	SppObs	Jun 10 2003	RUSS BENEDICT (PRINCIPLE PERMITTEE)	5	SE	I	Yes
65926	SppObs	Aug 24 2001	RUSS BENEDICT (PRINCIPLE PERMITTEE)	2	SE	I	Yes

619179	SppObs	Apr 29 2013	Joseph; Mitchell| Lindsay; Eiser Quillen	1	ST	II	Yes
615438	SppObs	Mar 13 2013	Joseph; Mitchell	1	ST	II	Yes
615437	SppObs	Mar 12 2013	Lindsay ; Eiser| Joseph; Mitchell	1	ST	II	Yes
3528	SppObs	Jun 5 1990	Div. Natural Heritage	1	ST	II	Yes
4216	SppObs	Jun 5 1990	K. A. Buhlmann, DCR/DNH	1	ST	II	Yes
3527	SppObs	Feb 13 1990	Div. Natural Heritage	1	ST	II	Yes
60008	SppObs	Feb 13 1990	PAGUE, C A AND BUHLMANN, K	1	ST	II	Yes
339147	SppObs	May 15 2000	D. FOWLER, B. MEHL	6		III	Yes
339180	SppObs	Apr 27 1995	D. DOWLING, E. STEPHENS	23		III	Yes
624286	SppObs	Aug 4 2014	Carl; Anderson| David; Yates| Dustin; Meattey| Lauren; Gilpatrick| Robby; Lambert| Tim; Divoll| Chelsea; Vosburgh	1		IV	Yes
622449	SppObs	May 21 2014	Vitek; Jirinec	1		IV	Yes
623555	SppObs	May 20 2014	Vitek; Jirinec	1		IV	Yes
320958	SppObs	Mar 10 2008	John Kleopfer	1		IV	Yes
301776	SppObs	May 9 2003	RUSS BENEDICT (PRINCIPLE PERMITTEE)	1		IV	Yes

Displayed 20 Species Observations

Selected 49 Observations View all 49 Species Observations

Habitat Pr edicted for Aquatic W AP T ier I & II Species

N/A

Habitat Pr edicted for T err estrial W AP T ier I & II Species (2 Species)

View Map of Combined Terrestrial Habitat Predicted for 2 WAP Tier I & II Species Listed Below

ordered by Status Concern for Conservation

BOVA Code	Status *	Tier **	Common Name	Scientific Name	View Map
020044	ST	IIa	Salamander, Mabee's	Ambystoma mabeei	Yes
030067	CC	IIa	Terrapin, northern diamond-backed	Malaclemys terrapin terrapin	Yes

Virginia Br eeding Bird Atlas Blocks (5 records)

View Map of All Query Results
Virginia Breeding Bird Atlas Blocks

BBA ID	Atlas Quadrangle Block Name	Breeding Bird Atlas Species			View Map
		Differ ent Species	Highest TE *	Highest T ier **	
57064	Hog Island, CE	56		II	Yes
57062	Hog Island, NE	105		II	Yes
58064	Yorktown, CE	65		II	Yes
58063	Yorktown, CW	1			Yes
58062	Yorktown, NE	68	ST	I	Yes

Public Holdings: (1 names)

Name	Agency	Level
Yorktown Naval Weapons Station	U.S. Dept. of Navy	Federal

Summary of BOV A Species Associated with Cities and Counties of the Commonwealth of V irginia:

FIPS Code	City and County Name	Differ ent Species	Highest TE	Highest T ier
095	James City	420	FESE	I
199	York	431	FESE	I
700	Newport News City	416	FESE	I

USGS 7.5' Quadrangles:
Hog Island
Yorktown

USGS NRCS W atersheds in V irginia:

N/A

USGS National 6th Order W atersheds Summary of W ildlife Action Plan T ier I, II, III, and IV Species:

HU6 Code	USGS 6th Order Hydr ologic Unit	Differ ent Species	Highest TE	Highest T ier
JL35	James River-Skiffes Creek	98	FESE	I
JL38	Warwick River	86	FTSE	I
YO68	York River-Carter Creek	81	FESE	I

Compiled on 1/4/2018, 11:11:37 AM I878720.0 report=all searchType= P dist= 3218 poi= 37.2133000 -76.5929899 siteDD= 37.2133000 -76.5929998;37.2133000 -76.5929998;37.2133000 -76.5928998;37.2132000 -76.5928998;37.2132000 -76.5928998;37.2131000 -76.5929998;37.2130000 -76.5929998;37.2130000 -76.5929998;37.2120000 -76.5929998;37.2091000 -76.5929998;37.2089000 -76.5928998;37.2079000 -76.5988998;37.2077000 -76.5996998;37.2070000 -76.6039998;37.2067000 -76.6058998;37.2067000 -76.6063998;37.2067000 -76.6074998;37.2069000 -76.6088998;37.2070000 -76.6094998;37.2074000 -76.6105998;37.2075000 -76.6109998;37.2077000 -76.6109998;37.2183000 -76.6105998;37.2182000 -76.6053998;37.2179000 -76.6048998;37.2175000 -76.6035998;37.2172000 -76.6027998;37.2170000 -76.6018998;37.2167000 -76.6008998;37.2165000 -76.5996998;37.2163000 -76.5986998;37.2161000 -76.5976998;37.2160000 -76.5965998;37.2158000 -76.5953998;37.2156000 -76.5945998;37.2152000 -76.5929998;37.2143000 -76.5929998;

PixelSize=64; Anadromous=0.032071; BBA=0.068962; BECAR=0.040945; Bats=0.014191; Buffer=0.14691; County=0.116538; HU6=0.121724; Impediments=0.037268; Init=0.255693; PublicLands=0.033801; Quad=0.072194; SppObs=0.479821; TEWaters=0.027531; TierReaches=0.046179; TierTerrestrial=0.091397; Total=1.689681; Tracking_BOVA=0.167511; Trout=0.018538; huva=0.054213

1 Species Observations where Bat, little brown (050020) observed

37,12,47.8 -76,35,34.7 is the Sear ch Point

Show Position Rings
Yes No
1 mile and 1/4 mile at the Search Point

Show Sear ch Ar ea
Yes No
2 Search distance miles buffer

Display at center	Search Point is not at map center

Base Map Choices
Topography

Map Overlay Choices
Current List: Position, Search, SppObs

Map Overlay Legend

Position Rings 1 mile and 1/4 mile at the Search Point

2 mile radius Search Area

Data Observation Site

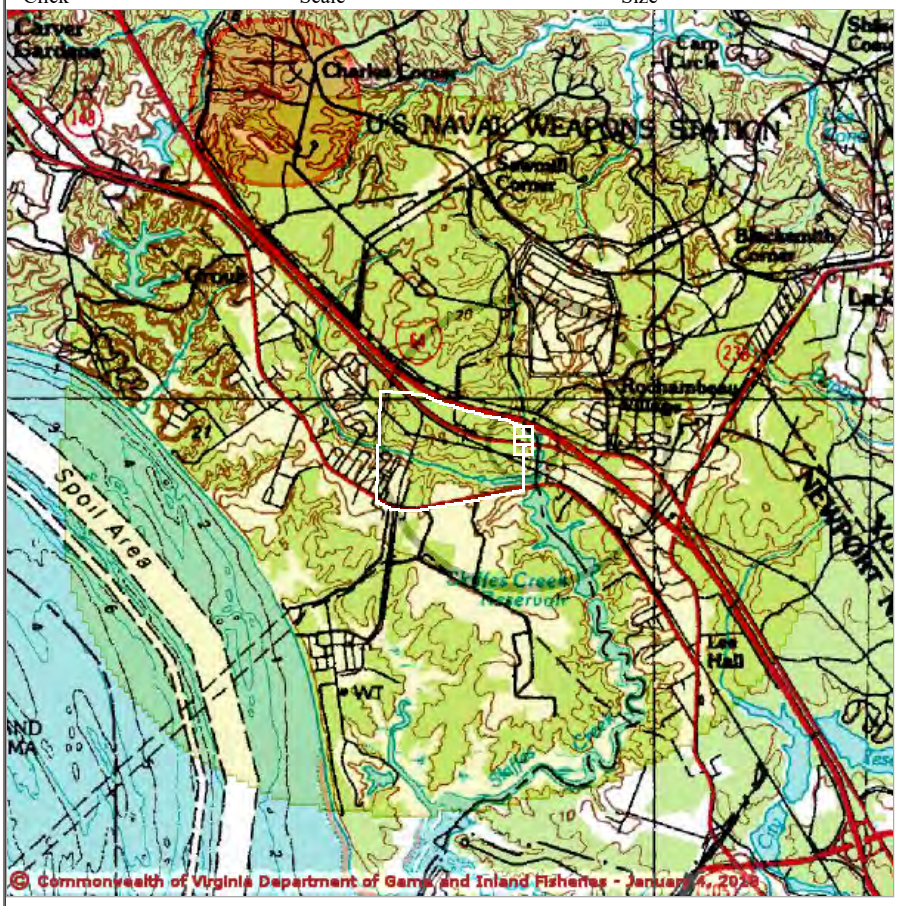
Refresh Browser Page

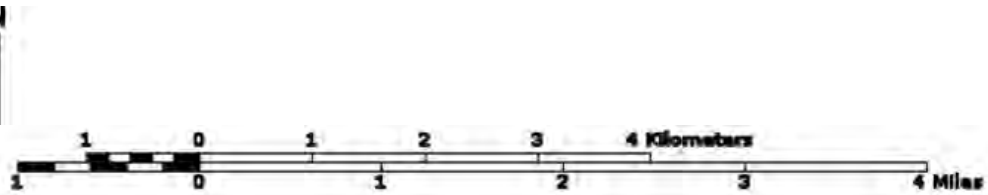
Map Click Pan Id M

Map Scale In Zoom Out

Screen Size Small Size Big

Help





Point of Search 37,12,47.8 -76,35,34.7
Map Location 37,12,44.2 -76,36,06.5

Select Coordinate System:
- Degrees,Minutes,Seconds Latitude - Longitude
- Decimal Degrees Latitude - Longitude
- Meters UTM NAD83 East North Zone
- Meters UTM NAD27 East North Zone

Base Map source: USGS 1:100,000 topographic maps (see Microsoft terraserver-usa.com for details)

Map projection is UTM Zone 18 NAD 1983 with left 353071 and top 4124423. Pixel size is 13. . Coordinates displayed are Degrees, Minutes, Seconds North and West. Map is currently displayed as 600 columns by 600 rows for a total of 360000 pixles. The map display represents 9600 meters east to west by 9600 meters north to south for a total of 92.1 square kilometers. The map display represents 31501 feet east to west by 31501 feet north to south for a total of 35.5 square miles.

Topographic maps and Black and white aerial photography for year 1990+- are from the United States Department of the Interior, United States Geological Survey.
Color aerial photography aquired 2002 is from Virginia Base Mapping Program, Virginia Geographic Information Network.
Shaded topographic maps are from TOPO! ©2006 National Geographic
http://www.national.geographic.com/topo

All other map products are from the Commonwealth of Virginia Department of Game and Inland Fisheries.

map assembled 2018-01-04 11:15:25 (qa/qc March 21, 2016 12:20 - tn=878720.1 dist=3218 I)
$poi=37.2133000 -76.5929899

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Virginia Department of Game and Inland Fisheries

1/4/2018 11:14:59 AM

Fish and Wildlife Information Service

VaFWIS Search Report Compiled on 1/4/2018, 11:14:59 AM

Help

Known or likely to occur within a 2 mile buffer ar ound polygon; center 37.2133000 -76.5929899
in 095 James City County , 199 York County , 700 Newport News City , VA
where (050020) Bat, little br own observed.

View Map of
Site Location

Species Observations where Bat, little br own (050020) observed (1 records , 1 Observation with Threatened or Endangered species)

View Map of All Query Results
Species Observations where Bat, little brown (050020) observed

obsID	class	Date Observed	Observer	N Species			View Map
				Different Species	Highest TE *	Highest Tier **	
622969	SppObs	Aug 3 2014	Carl; Anderson| David; Yates| Dustin; Meattey| Lauren; Gilpatrick| Robby; Lambert| Tim; Divoll| Chelsea; Vosburgh	4	SE	I	Yes

Displayed 1 Species Observations where Bat, little brown (050020) observed

*FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; CC=Collection Concern

**I=VA Wildlife Action Plan - Tier I - Critical Conservation Need;
II=VA Wildlife Action Plan - Tier II - Very High Conservation Need;
III=VA Wildlife Action Plan - Tier III - High Conservation Need;
IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need
Virginia Widlife Action Plan Conservation Opportunity Ranking:
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.;
c - No on the ground actions or research needs have been identified or all identified conservation opportunities have been exhausted.

USGS National 6th Order W atersheds Summary of W ildlife Action Plan T ier I, II, III, and IV Species:

HU6 Code	USGS 6th Order Hydr ologic Unit	Different Species	Highest TE	Highest T ier
JL38	Warwick River	86	FTSE	I

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7 Species Observations where Salamander, Mabee s (020044) observed

37,12,47.8 -76,35,34.7 is the Sear ch Point

Show Position Rings
Yes No
1 mile and 1/4 mile at the Search Point

Show Sear ch Ar ea
Yes No
2 Search distance miles buffer

Display at center	Search Point is not at map center

Base Map Choices
Topography

Map Overlay Choices
Current List: Position, Search, SppObs

Map Overlay Legend

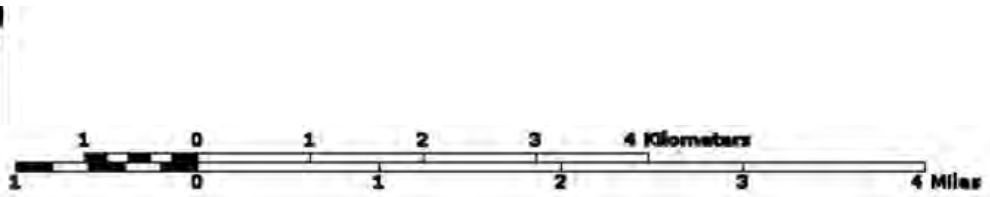
Position Rings 1 mile and 1/4 mile at the Search Point

2 mile radius Search Area

Data Observation Site

Refresh Browser Page

Map Click Pan Id M | Map Scale In Zoom Out | Screen Size Small Size Big | Help



Point of Search 37,12,47.8 -76,35,34.7
Map Location 37,12,44.2 -76,36,06.5

Select Coordinate System:
- Degrees,Minutes,Seconds Latitude - Longitude
- Decimal Degrees Latitude - Longitude
- Meters UTM NAD83 East North Zone
- Meters UTM NAD27 East North Zone

Base Map source: USGS 1:100,000 topographic maps (see Microsoft terraserver-usa.com for details)

Map projection is UTM Zone 18 NAD 1983 with left 353071 and top 4124423. Pixel size is 13. . Coordinates displayed are Degrees, Minutes, Seconds North and West. Map is currently displayed as 600 columns by 600 rows for a total of 360000 pixles. The map display represents 9600 meters east to west by 9600 meters north to south for a total of 92.1 square kilometers. The map display represents 31501 feet east to west by 31501 feet north to south for a total of 35.5 square miles.

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map assembled 2018-01-04 11:17:40 (qa/qc March 21, 2016 12:20 - tn=878720.1 dist=3218 I)
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Virginia Department of Game and Inland Fisheries

1/4/2018 11:17:22 AM

Fish and Wildlife Information Service

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Help

Known or likely to occur within a 2 mile buffer ar ound polygon; center 37.2133000 -76.5929899
in 095 James City County , 199 York County , 700 Newport News City , VA
where (020044) Salamander , Mabee s observed.

View Map of
Site Location

Species Observations where Salamander , Mabee s (020044) observed

(7 records , 7 Observations with Threatened or Endangered species)

View Map of All Query Results
Species Observations where Salamander, Mabee s (020044) observed

obsID	class	Date Observed	Observer	N Species			View Map
				Different Species	Highest TE *	Highest Tier **	
619179	SppObs	Apr 29 2013	Joseph; Mitchell| Lindsay; Eiser Quillen	1	ST	II	Yes
615438	SppObs	Mar 13 2013	Joseph; Mitchell	1	ST	II	Yes
615437	SppObs	Mar 12 2013	Lindsay ; Eiser| Joseph; Mitchell	1	ST	II	Yes
3528	SppObs	Jun 5 1990	Div. Natural Heritage	1	ST	II	Yes
4216	SppObs	Jun 5 1990	K. A. Buhlmann, DCR/DNH	1	ST	II	Yes
60008	SppObs	Feb 13 1990	PAGUE, C A AND BUHLMANN, K	1	ST	II	Yes
3527	SppObs	Feb 13 1990	Div. Natural Heritage	1	ST	II	Yes

Displayed 7 Species Observations where Salamander, Mabee s (020044) observed

*FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; CC=Collection Concern

**I=VA Wildlife Action Plan - Tier I - Critical Conservation Need;
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III=VA Wildlife Action Plan - Tier III - High Conservation Need;
IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need
Virginia Widlife Action Plan Conservation Opportunity Ranking:
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c - No on the ground actions or research needs have been identified or all identified conservation opportunities have been exhausted.

Habitat Predicted for Aquatic WAP Tier I & II Species where Salamander, Mabees (020044) observed

N/A

Habitat Predicted for Terrestrial WAP Tier I & II Species where Salamander, Mabees (020044) observed

BOVA Code	Status *	Tier **	Common Name	Scientific Name	View Map
020044	ST	IIa	Salamander, Mabee's	Ambystoma mabeei	Yes

USGS National 6th Order Watersheds Summary of Wildlife Action Plan Tier I, II, III, and IV Species:

HU6 Code	USGS 6th Order Hydrologic Unit	Different Species	Highest TE	Highest Tier
JL35	James River-Skiffes Creek	98	FESE	I
JL38	Warwick River	86	FTSE	I
YO68	York River-Carter Creek	81	FESE	I

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audit no. 878720 1/4/2018 11:17:22 AM Virginia Fish and Wildlife Information Service

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1 Species Observations where Bat, northern long-eared (050022) observed

37,12,47.8 -76,35,34.7 is the Sear ch Point

Show Position Rings
Yes No
1 mile and 1/4 mile at the Search Point

Show Sear ch Ar ea
Yes No
2 Search distance miles buffer

Display at center	Search Point is not at map center

Base Map Choices
Topography

Map Overlay Choices
Current List: Position, Search, SppObs

Map Overlay Legend

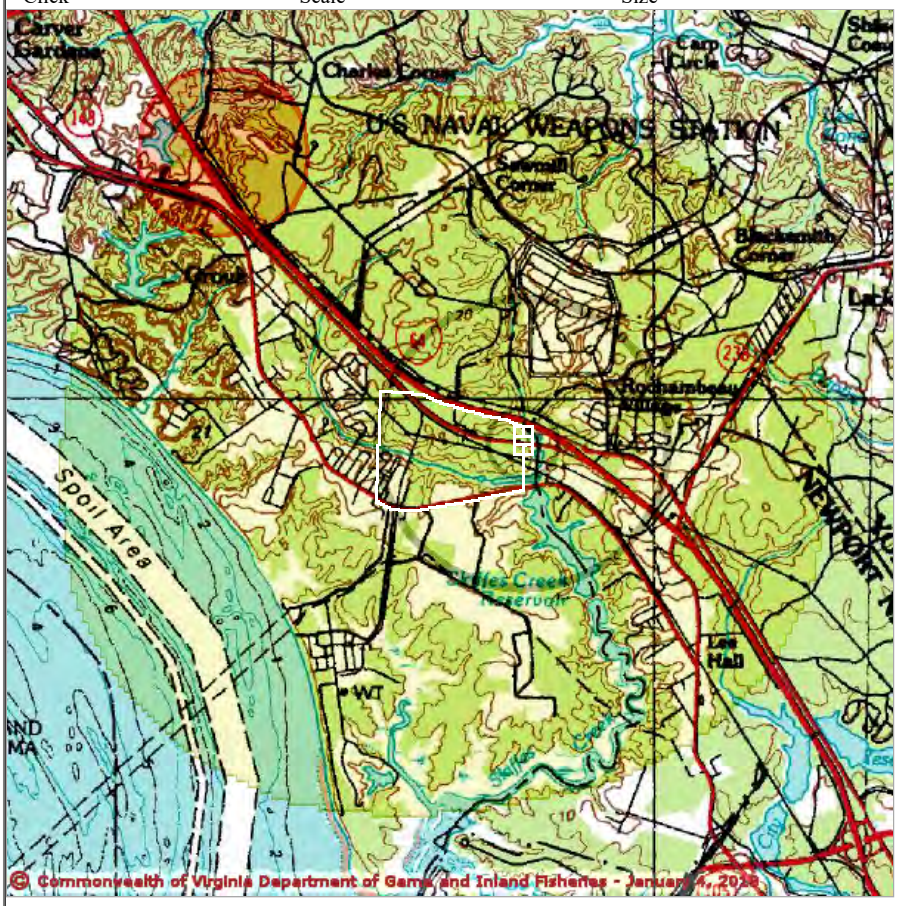
Position Rings 1 mile and 1/4 mile at the Search Point

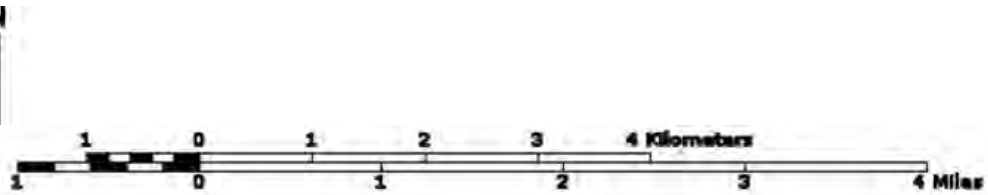
2 mile radius Search Area

Data Observation Site

Refresh Browser Page

Map Click Pan Id M | Map Scale In Zoom Out | Screen Size Small Size Big | Help





Point of Search 37,12,47.8 -76,35,34.7
Map Location 37,12,44.2 -76,36,06.5

Select Coordinate System:
- Degrees,Minutes,Seconds Latitude - Longitude
- Decimal Degrees Latitude - Longitude
- Meters UTM NAD83 East North Zone
- Meters UTM NAD27 East North Zone

Base Map source: USGS 1:100,000 topographic maps (see Microsoft terraserver-usa.com for details)

Map projection is UTM Zone 18 NAD 1983 with left 353071 and top 4124423. Pixel size is 13. . Coordinates displayed are Degrees, Minutes, Seconds North and West. Map is currently displayed as 600 columns by 600 rows for a total of 360000 pixles. The map display represents 9600 meters east to west by 9600 meters north to south for a total of 92.1 square kilometers. The map display represents 31501 feet east to west by 31501 feet north to south for a total of 35.5 square miles.

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1/4/2018 11:13:17 AM

Fish and Wildlife Information Service

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Help

Known or likely to occur within a 2 mile buffer ar ound polygon; center 37.2133000 -76.5929899
in 095 James City County , 199 York County , 700 Newport News City , VA
where (050022) Bat, northern long-ear ed observed.

View Map of
Site Location

Species Observations where Bat, northern long-ear ed (050022) observed

(1 records , 1 Observation with Threatened or Endangered species)

View Map of All Query Results
Species Observations where Bat, northern long-eared (050022) observed

obsID	class	Date Observed	Observer	N Species			View Map
				Different Species	Highest TE *	Highest Tier **	
624285	SppObs	Aug 3 2014	Carl; Anderson| David; Yates| Dustin; Meattey| Lauren; Gilpatrick| Robby; Lambert| Tim; Divoll| Chelsea; Vosburgh	1	FTST	I	Yes

Displayed 1 Species Observations where Bat, northern long-eared (050022) observed

*FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; CC=Collection Concern

**I=VA Wildlife Action Plan - Tier I - Critical Conservation Need;
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III=VA Wildlife Action Plan - Tier III - High Conservation Need;
IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need
Virginia Widlife Action Plan Conservation Opportunity Ranking:
a - On the ground management strategies/actions exist and can be feasibly implemented.;
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c - No on the ground actions or research needs have been identified or all identified conservation opportunities have been exhausted.

Compiled on 1/4/2018, 11:13:17 AM I878720.1 report=BOVA searchType= P dist= 3218 poi= 37.2133000 -76.5929899

audit no. 878720 1/4/2018 11:13:17 AM Virginia Fish and Wildlife Information Service

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1 Species Observations where Sturgeon, Atlantic (010032) observed

37,12,47.8 -76,35,34.7
is the Sear ch Point

Show Position Rings
Yes No
1 mile and 1/4 mile at the Search Point

Show Sear ch Ar ea
Yes No
2 Search distance miles buffer

Display at center	Search Point is not at map center

Base Map Choices
Topography

Map Overlay Choices
Current List: Position, Search, SppObs

Map Overlay Legend

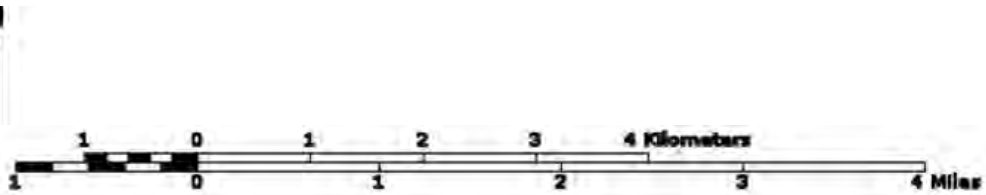
Position Rings 1 mile and 1/4 mile at the Search Point

2 mile radius Search Area

Data Observation Site

Refresh Browser Page

Map Click Pan Id M | Map Scale In Zoom Out | Screen Size Small Size Big | Help



Point of Search 37,12,47.8 -76,35,34.7
Map Location 37,12,44.2 -76,36,06.5

Select Coordinate System:
- Degrees,Minutes,Seconds Latitude - Longitude
- Decimal Degrees Latitude - Longitude
- Meters UTM NAD83 East North Zone
- Meters UTM NAD27 East North Zone

Base Map source: USGS 1:100,000 topographic maps (see Microsoft terraserver-usa.com for details)

Map projection is UTM Zone 18 NAD 1983 with left 353071 and top 4124423. Pixel size is 13. . Coordinates displayed are Degrees, Minutes, Seconds North and West. Map is currently displayed as 600 columns by 600 rows for a total of 360000 pixles. The map display represents 9600 meters east to west by 9600 meters north to south for a total of 92.1 square kilometers. The map display represents 31501 feet east to west by 31501 feet north to south for a total of 35.5 square miles.

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Fish and Wildlife Information Service

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Help

Known or likely to occur within a 2 mile buffer ar ound polygon; center 37.2133000 -76.5929899
in 095 James City County , 199 York County , 700 Newport News City , VA
where (010032) Sturgeon, Atlantic observed.

View Map of
Site Location

Species Observations where Sturgeon, Atlantic (010032) observed

(1 records , 1 Observation with Threatened or Endangered species)

View Map of All Query Results
Species Observations where Sturgeon, Atlantic (010032) observed

obsID	class	Date Observed	Observer	N Species			View Map
				Different Species	Highest TE *	Highest Tier **	
63204	SppObs	Feb 10 1998	USFWS	1	FESE	I	Yes

Displayed 1 Species Observations where Sturgeon, Atlantic (010032) observed

*FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; CC=Collection Concern

**I=VA Wildlife Action Plan - Tier I - Critical Conservation Need;
II=VA Wildlife Action Plan - Tier II - Very High Conservation Need;
III=VA Wildlife Action Plan - Tier III - High Conservation Need;
IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need
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USGS National 6th Order W atersheds Summary of W ildlife Action Plan T ier I, II, III, and IV Species:

HU6 Code	USGS 6th Order Hydr ologic Unit	Different Species	Highest TE	Highest T ier
JL35	James River-Skiffes Creek	98	FESE	I
YO68	York River-Carter Creek	81	FESE	I

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3 Species Observations where Bat, tri-colored (050027) observed

37,12,47.8 -76,35,34.7 is the Sear ch Point

Show Position Rings
Yes No
1 mile and 1/4 mile at the Search Point

Show Sear ch Ar ea
Yes No
2 Search distance miles buffer

Display at center	Search Point is not at map center

Base Map Choices
Topography

Map Overlay Choices
Current List: Position, Search, SppObs

Map Overlay Legend

Position Rings 1 mile and 1/4 mile at the Search Point

2 mile radius Search Area

Data Observation Site

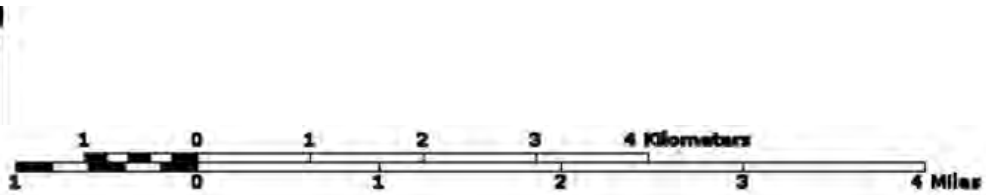
Refresh Browser Page

Map Click Pan Id M

Map Scale In Zoom Out

Screen Size Small Size Big

Help



Point of Search 37,12,47.8 -76,35,34.7
Map Location 37,12,44.2 -76,36,06.5

Select Coordinate System:
- Degrees,Minutes,Seconds Latitude - Longitude
- Decimal Degrees Latitude - Longitude
- Meters UTM NAD83 East North Zone
- Meters UTM NAD27 East North Zone

Base Map source: USGS 1:100,000 topographic maps (see Microsoft terraserver-usa.com for details)

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Fish and Wildlife Information Service

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Help

Known or likely to occur within a 2 mile buffer ar ound polygon; center 37.2133000 -76.5929899
in 095 James City County , 199 York County , 700 Newport News City , VA
where (050027) Bat, tri-color ed observed.

View Map of
Site Location

Species Observations where Bat, tri-color ed (050027) observed (3 records , 3 Observations with Threatened or Endangered species)

View Map of All Query Results
Species Observations where Bat, tri-colored (050027) observed

obsID	class	Date Observed	Observer	N Species			View Map
				Different Species	Highest TE*	Highest Tier**	
301778	SppObs	Jul 11 2003	RUSS BENEDICT (PRINCIPLE PERMITTEE)	6	SE	I	Yes
301777	SppObs	Jun 10 2003	RUSS BENEDICT (PRINCIPLE PERMITTEE)	5	SE	I	Yes
65926	SppObs	Aug 24 2001	RUSS BENEDICT (PRINCIPLE PERMITTEE)	2	SE	I	Yes

Displayed 3 Species Observations where Bat, tri-colored (050027) observed

*FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; CC=Collection Concern

**I=VA Wildlife Action Plan - Tier I - Critical Conservation Need;
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USGS National 6th Order W atersheds Summary of W ildlife Action Plan T ier I, II, III, and IV Species:

HU6 Code	USGS 6th Order Hydr ologic Unit	Different Species	Highest TE	Highest T ier
JL38	Warwick River	86	FTSE	I

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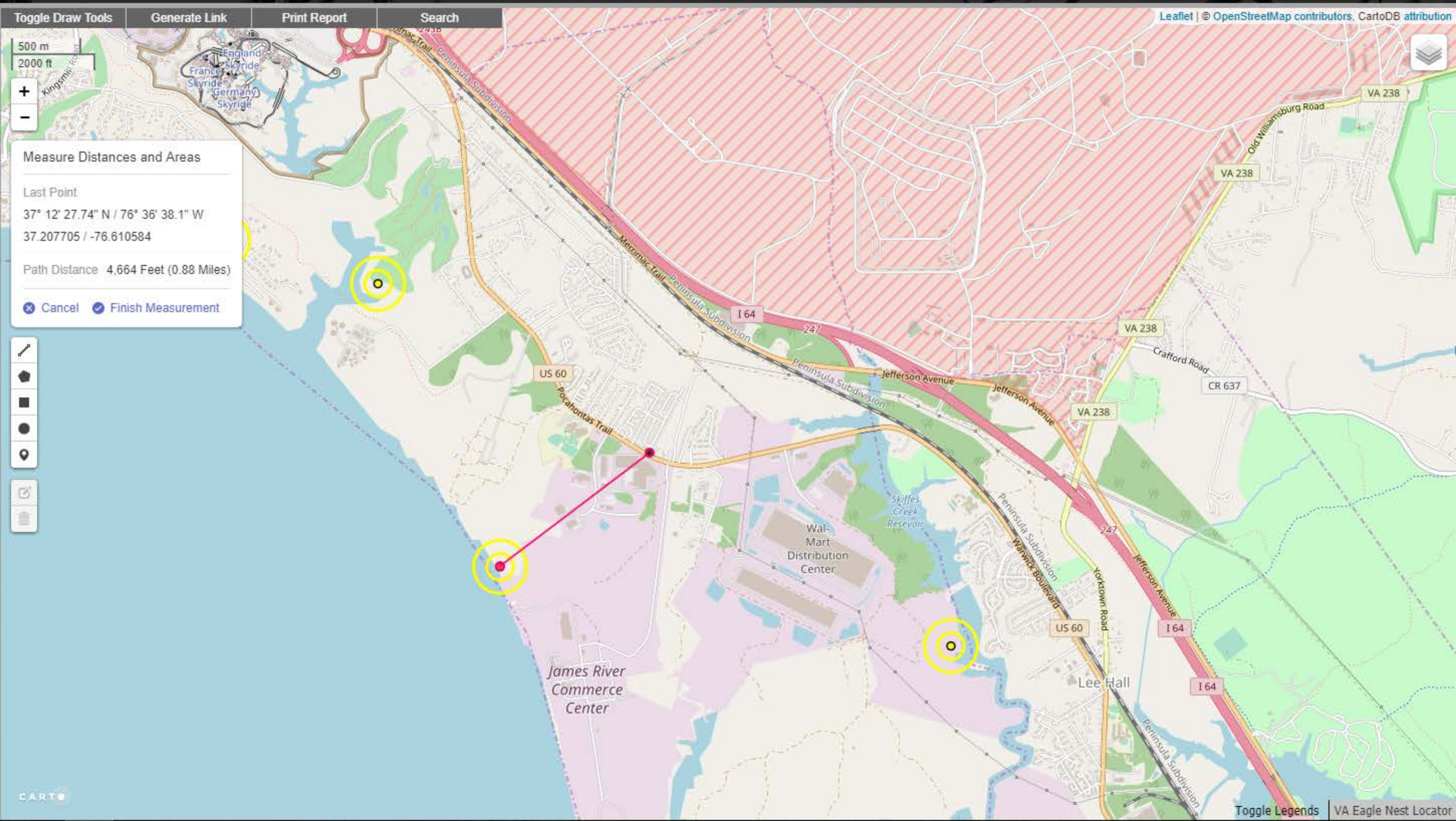
Toggle Draw Tools
Generate Link
Print Report
Search
Leaflet | © OpenStreetMap contributors, CartoDB attribution
500 m
2000 ft
Measure Distances and Areas
Last Point
37° 12' 27.74" N / 76° 36' 38.1" W
37.207705 / -76.610584
Path Distance 4,664 Feet (0.88 Miles)
Cancel
Finish Measurement
England Skyride
France Skyride
Germany Skyride
Kingsmill Road
Merrimac Trail
Peninsula Subdivision
I 64
247
US 60
Pocahontas Trail
Jefferson Avenue
VA 238
Old Williamsburg Road
Crafford Road
CR 637
Skiffes Creek Reservoir
Wal-Mart Distribution Center
James River Commerce Center
Warwick Boulevard
Yorktown Road
Lee Hall
Toggle Legends
VA Eagle Nest Locator