WETLAND AND WATERWAY INVESTIGATION REPORT

I-95 ETL NORTHBOUND EXTENSION PHASE II

Harford County, MD

17-10674-001

Submitted to:
Maryland Transportation Authority

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

For Phase II of the I-95 Express Toll Lane (ETL) Northbound Extension project, the Maryland Transportation Authority (MDTA) will be extending the ETLs from just south of the MD 152 Interchange with I-95 to the Abingdon Road Overpass in Harford County, Maryland. Additional improvements will include extending the fourth general purpose lane on I-95 Northbound to the Bynum Run Bridge, improving the MD 24 and MD 152 Interchanges with I-95, constructing a Park and Ride facility at MD 24/MD 924, and relocating the MD 152 Park and Ride. To support this effort, multiple firms performed wetland and waterway investigations to identify environmental resources that could be impacted within the I-95 ETL Phase II Project Area (Project Area). These delineations were compiled by Johnson, Mirmiran & Thompson (JMT) to create this report, which covers the roadway improvements described above. Separate delineation reports will be provided for the Intelligent Transportation Systems (ITS) Study Areas and the proposed compensatory mitigation construction projects.

The Project Area is a narrow corridor extending approximately 6 miles along I-95 between Old Joppa Road and the Bynum Run Bridge; it totals 515 acres in size (**Appendix A, Figures 1A-1C**). The Project Area is neighbored by agricultural, residential, and commercial areas, but consists primarily of forested highway right-of-way and maintained road shoulder. In addition, one forested portion of the Project Area is not part of the I-95 corridor; it is located southwest of the intersection of Franklinville Road and MD 152 (**Appendix A, Figure 1A**).

The Project Area is within the Atlantic Coastal Plain and Piedmont Physiographic Provinces. It lies in the Maryland Department of the Environment (MDE) 8-digit Little Gunpowder Falls (#02130804), Lower Winters Run (#02130702), Bush River (#02130701), and Bynum Run (#02130704) Watersheds (MDE, 2005), and U.S. Geological Survey (USGS) Watershed Boundary Dataset 8-digit Gunpowder-Patapsco Watershed (#02060003; USGS, 2009). Portions of the Project Area are also located within a Tier II watershed, the Otter Point Creek 1 catchment (MDE, 2016).

Forest Stand Delineations and Specimen Tree Surveys were also completed for the Project Area. Details regarding forests and trees are available in the Forest Stand Delineation Report.

2.0 METHODOLOGY

2.1 PUBLISHED INFORMATION

The delineators reviewed several background data sources prior to completing the field work. These sources included United States Geological Survey (USGS) topographic maps, soil survey maps, National Wetland Inventory (NWI) and Maryland Department of Natural Resources (DNR) mapped wetlands, MDE mapped streams, Tier II watersheds, Federal Emergency Management Agency (FEMA) floodplain maps, and recent aerial photographs.

2.2 AGENCY COORDINATION

JMT coordinated with DNR, U.S. Fish and Wildlife Service (USFWS), and Maryland Historic Trust (MHT) to determine whether state-protected species, federal-protected species, and/or known historical or archaeological sites are present within the Project Area.

2.3 FIELD INVESTIGATIONS

Field investigations are conducted to delineate potentially jurisdictional waters of the United States, including wetlands and waterways, within the Project Area. Wetland delineations are performed according to the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain (Version 2.0)* (US Army Corps of Engineers [USACE], 2010), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region Version 2.0* (USACE, 2012). The *Corps of Engineers Wetland Delineation Manual* states three criteria (wetland vegetation, wetland soils, and wetland hydrology) must be present for an area to qualify as a wetland, unless the area is significantly disturbed (atypical situation) or is considered a problem area (e.g., seasonally ponded soils). If the area is significantly disturbed or a problem area, then only two parameters must be evident to classify an area as a wetland. All delineated wetlands are classified into system, subsystem, class and subclass according to the *Classification of Wetlands and Deep Water Habitats of the United States* (Cowardin *et al.*, 1979). In certain circumstances, sample plot sizes were modified based on site conditions.

Wetland (hydrophytic) vegetation is determined using the USACE National Wetland Plant List (NWPL), (Lichvar *et al.*, 2016). This document assigns a wetland indicator status to plants based on how frequently they occur in wetlands. The NWPL wetland indicator status and definitions are listed in **Table 1**.

Table 1: National Wetland Plant List Indicator Status Groups

Wetland Indicator Status	Definition
Obligate Wetland (OBL)	Almost always occur in wetlands
Facultative Wetland (FACW)	Usually occur in wetlands, but may occur in non-wetlands
Facultative (FAC)	Occur in wetlands or non-wetlands
Facultative Upland (FACU)	Usually occur in non-wetlands, but may occur in wetlands
Obligate Upland (UPL)	Almost never occur in wetlands

Source: Lichvar *et al.*, 2016

In order to delineate wetland boundaries, samples are taken periodically using an open-faced auger. Soil samples are collected at each wetland and upland sample point, and soil colors are recorded in the field using a Munsell soil color chart (Munsell Color, 2010).

Wetland and waterway boundaries are flagged in the field and documented using a Trimble® global positioning system (GPS) capable of sub-meter accuracy or by field survey. Waterway boundaries are delineated at top of bank.

In the state of Maryland, both USACE and MDE regulate wetlands and waterways. USACE and the Environmental Protection Agency published the Clean Water Rule in the Federal Register (FR) on June 29, 2015 (80 FR 37053) to clarify which wetlands and waterways are regulated by USACE. The Clean Water Rule went into effect in many states, including Maryland, in August 2018. The delineated resources described within this report have been categorized per the Clean Water Rule to aid USACE regulators in determining whether authorization is required. However, resources not requiring authorization by one agency may still be regulated by the other.

3.0 FINDINGS

3.1 PUBLISHED INFORMATION

The Edgewood Topographic 7.5' x 7.5' Quadrangle (USGS, 2016) depicts nine mapped waterways within the Project Area (**Appendix A, Figures 2A-2C**).

The NWI (USFWS, 2002) and DNR (2005) wetland datasets show three mapped wetlands within the Project Area (**Appendix A, Figures 3A-3C**).

The MDE Stream Designated Use Class Map (MDE, 2014) shows two Unnamed Tributaries to Little Gunpowder Falls (Use II), four Unnamed Tributaries to Winters Run (Use I-P), Winters Run (Use I-P), Haha Branch (Use I), an Unnamed Tributary to Bynum Run (Use III), and Bynum Run (Use III) within the Project Area (**Appendix A, Figures 3A-3C**).

The FEMA floodplain mapping for Harford County, Maryland (FEMA, 2014) depicts portions of the Project Area within the 100-year floodplain and floodway (FIRM Panel #s 24025C0253E, 24025C0254E, 24025C0258E, and 24025C0259E) (**Appendix A, Figures 3A-3C**).

The Web Soil Survey for Harford County, Maryland (USDA-NRCS, 2018) indicates that 40 soil survey units occur within the Study Area; of these, three units are hydric, and three units are predominantly hydric (**Appendix A, Figures 4A-4C**). A table of the soil mapping units can be found in **Appendix A**.

3.2 AGENCY COORDINATION

Rare, Threatened, and Endangered Species

On January 30, 2019, MDTA used the Maryland State Highway Administration/DNR Trilogy Letter Application to request any information concerning the presence of anadromous finfish or other fish, as well as the presence of known or potential occurrence of rare, threatened, or endangered species. When using this application, the Project Area was divided into three sections: MD 152 Park and Ride, MD 24/MD 924 Park and Ride, and I-95 Express Toll Lanes NB Extension Project Areas. A response was received on March 15, 2019 for the MD 152 Park and Ride and MD 24/MD 924 Park and Ride Project Areas, stating there are no official state records for RTE species within these areas. Additional information regarding non-RTE species commonly found and Best Management Practices (BMP) can be seen in the response letters in **Appendix B.** A response for the I-95 Express Toll Lanes NB Extension Project Area is still pending.

Through coordination with USFWS, no federally listed threatened or endangered species are known to exist in the within the MD 152 Park and Ride, MD 24/MD 924 Park and Ride, and I-95 Express Toll Lanes NB Extension Project Areas, other than occasional transient individuals. The USFWS Online Certification Letters documenting these results, dated April 8, 2019, can be found in **Appendix B.** It should be noted that while the Northern Long-Eared Bat (*Myotis septentrionalis*) was flagged by the USFWS system, per the USFWS Chesapeake Bay Field Office (CBFO) website, the only areas in Maryland with documented hibernacula are Allegany, Garrett, and Washington Counties, and the only areas with documented maternity roosts are in Garrett and Allegany Counties. This project is located in Harford County, Maryland and would therefore not be located within 150 feet of a known maternity roost tree or within 0.25 miles of a known hibernaculum. However, the project would result in more than 15 acres of clearing; therefore, coordination with CBFO is currently ongoing.

Historical Resources

JMT contacted MHT in a letter dated April 15, 2019 to determine if the proposed project may impact known historical or archeological sites. A response from MHT is pending. The submission to MHT is available in **Appendix B**.

3.3 FIELD INVESTIGATIONS

The I-95 ETL Northbound Extension project will be constructed as nine separate but overlapping contracts, consisting of the following:

A. KH-3019: MD 152 Interchange / I-95 NB ETL Two-Lane Extension / MD 152 Noise Wall
B. KH-3022: Clayton Road Overpass Reconstruction
C. KH-3021: MD 24 Interchange / Two-Lane ETL / Winters Run Bridge
D. KH-3029: Abingdon Road Overpass
E. KH-3027: MD 152 Park and Ride Facility Relocation
F. KH-3023: MD 24/MD 924 Park and Ride

G. KH-3020: I-95 NB Extension to Bynum Run/Noise Wall on NB I-95 North of Abingdon Road
H. KH-3031: Noise Wall on SB I-95 South of Calvary Road
I. KH-3030: Noise Wall on SB I-95 at MD 24/Woodsdale

Wetland delineations were conducted on a per-contract basis; the overall Project Area was subdivided into smaller contract Study Areas that do not overlap one another, to avoid duplication of efforts (**Appendix A, Figure 5**).

It should be noted that the contract Study Areas are merely a means of organizing the wetland delineation and may not match the limits of the ultimate proposed contract. Wetlands and streams delineated under one contract may ultimately fall within multiple, overlapping contracts.

The identified and delineated wetlands and waterways are discussed within the contract-specific subsections below. Locations of the delineated systems are shown, divided by contract, on the Delineated Resource Maps in **Appendix C**.

For newly delineated resources, at least one wetland sample plot was taken for each wetland, and one upland plot was taken for each wetland or shared between adjacent wetlands. Wetlands confirmed from previous delineations did not require new datasheets.

Stream data sheets as well as Wetland Determination Data Forms for the representative wetland and upland sample plots are presented in **Appendix D,** and photographic documentation is included in **Appendix E**. Delineated resources, including their Clean Water Rule designation, are summarized in **Appendix F**.

Pre-application meetings were held with USACE and MDE reviewers on March 11 and March 18, 2019. During these meetings, USACE and MDE reviewed a selection of the delineated resources and made determinations whether authorization would be required by either of the agencies for impacts to those resources. These decisions are summarized in the meeting minutes located in **Appendix G** as well as in the **Appendix F** summary table.

A. KH-3019: MD 152 Interchange / I-95 NB ETL Two-Lane Extension / MD 152 Noise Wall

RK&K conducted field investigations from October 30, 2018 to February 28, 2019 within the Study Area of Contract KH-3019. Twenty-one new non-tidal wetlands and 28 new waters of the U.S. (WUS) were delineated. Additionally, 24 previously delineated wetlands and 30 previously delineated WUS were confirmed within the Study Area for this contract.

Wetlands

Newly Delineated Wetlands

Wetland A-1 (WET A-1)

WET A-1 is a palustrine, emergent, persistent, temporarily flooded (PEM1A) wetland and is approximately 0.05 acres in size. It is located in the southern portion of the Study Area and has formed within a small depression on a disturbed access trail adjacent to Waters D (**Appendix C, Section A Map 5**). WET A-1 appears to receive hydrology from surrounding uplands. WET A-1 is hydrologically connected to Waters D. WET A-1 is a low-quality wetland due to high coverage by invasive species and disturbed soils. It provides groundwater recharge/discharge functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the herbaceous stratum included Japanese stiltgrass (*Microstegium vimineum,* FAC) and arrow-leaf tearthumb (*Persicaria sagittata,* OBL).

Primary hydrologic indicators observed included surface water, high water table, saturation, oxidized rhizospheres on living roots, and presence of reduced iron. Secondary hydrologic indicators observed included the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland A-2 (WET A-2)

WET A-2 is a palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E) wetland and is approximately 0.01 acres in size. It is located in the southern portion of the Study Area and has formed within a small depression adjacent to WUS A-1 (**Appendix C, Section A Map 7**). WET A-2 appears to receive hydrology from a groundwater seep. WET A-2 discharges into WUS A-1. WET A-2 is a moderate-quality wetland due to moderate coverage by invasive species and presence of groundwater seeps. It provides floodflow alteration and groundwater recharge/discharge functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included sweetgum (*Liquidambar styraciflua, FAC*). Dominant plant species in the sapling and shrub stratum also included sweetgum. Dominant plant species in the herbaceous stratum included Japanese stiltgrass and white grass (*Leersia virginica,* FACW).

Primary hydrologic indicators observed included surface water, high water table, saturation, oxidized rhizospheres on living roots, and presence of reduced iron. Secondary hydrologic indicators observed included the presence of a sparsely vegetated concave surface, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland A-3 (WET A-3)

WET A-3 is a palustrine, forested, broadleaf deciduous, seasonally flooded (PFO1C) wetland and is approximately 0.59 acres in size. It is located in the southern portion of the Study Area and has formed on a hillslope (**Appendix C, Section A Map 7**). WET A-3 appears to receive hydrology from WUS A-2, WUS A-24, and groundwater seeps. WET A-3 discharges to Waters F and WUS A-2. WET A-3 is a high-quality wetland due to low coverage by invasive species and extensive microtopography/habitat diversity. It provides floodflow alteration, sediment/toxicant retention, and nutrient removal functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included sweetgum, red maple (*Acer rubrum*, FAC), and willow oak (*Quercus phellos*, FAC). Dominant plant species in the sapling stratum included sweetgum and red maple. Dominant species in the shrub stratum also included red maple. In the herbaceous stratum, small-spike false nettle (*Boehmeria cylindrica,* FACW) was dominant.

Primary hydrologic indicators observed included surface water, water marks, water-stained leaves, and oxidized rhizospheres on living roots. Secondary hydrologic indicators observed included drainage patterns, microtopographic relief, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland A-4 (WET A-4)

WET A-4 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.01 acres in size. It is located in the southern portion of the Study Area and has formed within a small depression (**Appendix C, Section A Map 7**). WET A-4 appears to receive hydrology from surrounding uplands. WET A-4 discharges via overland sheet flow to Waters G. WET A-4 is a moderate-quality wetland due to low coverage by invasive species and small size. It provides floodflow alteration functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included sweetgum and red maple. Dominant plant species in the sapling stratum also included red maple. Dominant species in the shrub stratum included American holly (*Ilex opaca*, FACU) and highbush blueberry (*Vaccinium corymbosum,* FACW). In the herbaceous stratum, Alleghany blackberry (*Rubus allegheniensis,* FACU), roundleaf greenbrier (*Smilax rotundifolia*, FAC) and an unidentified *Carex* species were dominant.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. Secondary hydrologic indicators included drainage patterns and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland A-5 (WET A-5)

WET A-5 is a palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E) wetland and is approximately 0.16 acres in size. It is located in the southern portion of the Study Area and has formed within a farm field (**Appendix C, Section A Maps 7 and 8**). WET A-5 appears to receive hydrology from surrounding uplands. WET A-5 discharges to WUS A-4, WUS A-6, and WUS A-7. WET A-5 is a low-quality wetland due to high coverage by invasive species and active livestock grazing. It provides groundwater recharge/discharge functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the herbaceous stratum included soft rush (*Juncus effusus*, FACW), Japanese stiltgrass, and red fescue (*Festuca rubra*, FACU). Primary hydrologic indicators observed included surface water, high water table, saturation, inundation visible on aerial imagery, oxidized rhizospheres on living roots, and water-stained leaves. Secondary hydrologic indicators observed included the presence of a sparsely vegetated concave surface, saturation visible on aerial imagery, and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland A-6 (WET A-6)

WET A-6 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.03 acres in size. It is located in the eastern portion of the Study Area and has formed within two small depressions connected via surface drainage. (**Appendix C, Section A Map 10**). WET A-6 appears to receive hydrology from surrounding uplands. WET A-6 continues to the southeast outside of the Study Area and is hydrologically connected to a tributary of Winters Run. WET A-6 is a moderate-quality wetland due to moderate coverage by invasive species and moderate plant diversity. It provides nutrient removal functions and values.

The prevalence index for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple. Dominant plant species in the sapling stratum also included red maple. Dominant species in the shrub stratum included sweetgum and green ash (*Fraxinus pennsylvanica,* FACW). In the herbaceous stratum, Japanese stiltgrass and an unidentified *Carex* species were dominant.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. Secondary hydrologic indicators observed included drainage patterns, the presence of sparsely vegetated concave surface, and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland A-7 (WET A-7)

WET A-7 consists of two wetland cover types: palustrine, emergent, persistent, temporarily flooded (PEM1A) and palustrine, forested, broadleaf deciduous, temporarily flooded, (PFO1A). The PEM area is approximately 0.01 acres in size and the PFO portion is approximately 0.03 acres. One wetland sample plot was taken within each cover type.

WET A-7 is located in the northeastern portion of the Study Area and has formed at the toe of a hillslope (**Appendix C, Section A Map 10**). The source of hydrology for the wetland is runoff from the adjacent uplands. WET A-7 continues to the southeast outside of the Study Area and is hydrologically connected to a tributary to Winters Run. WET A-7 is a low-quality wetland due to high coverage by invasive species. It provides nutrient removal functions and values.

WET A-7 PEM

Within the PEM sample plot, the dominance test for hydrophytic vegetation was met. Dominant plant species in the herbaceous stratum included Japanese stiltgrass and reed canary grass (*Phalaris arundinacea,* FACW).

Primary hydrologic indicators observed included surface water, high water table, and saturation. Secondary hydrologic indicators included drainage patterns, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

WET A-7 PFO

Within the PFO sample plot, the dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included green ash and red maple. The dominant plant species in the shrub stratum included green ash. Japanese stilt grass was dominant in the herbaceous stratum.

Primary hydrologic indicators observed included high water table and saturation. Secondary hydrologic indicators observed included drainage patterns, microtopographic relief, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland A-8 (WET A-8)

WET A-8 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.02 acres in size. It is located in the eastern portion of the Study Area and has formed within a small depression on a disturbed access trail (**Appendix C, Section A Map 10**). WET A-8 appears to receive hydrology from surrounding uplands. WET A-8 does not have an observed hydrologic connection to waterways. WET A-8 is a moderate-quality wetland due to low coverage by invasive species and disturbed soils. It provides sediment/toxicant retention and nutrient removal functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included sweetgum. Dominant plant species in the shrub stratum included sweetgum and green ash. Dominant plant species in the herbaceous stratum included green ash, multiflora rose (*Rosa multiflora*, FACU), and an unidentified *Carex* species.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. Secondary hydrologic indicators observed included the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland A-9 (WET A-9)

WET A-9 is a palustrine, scrub-shrub, broadleaf deciduous, seasonally flooded/saturated (PSS1E) wetland and is approximately 0.02 acres in size. It is located in the northern portion of the Study Area and has formed within a small depression (**Appendix C, Section A Map 7**). WET A-9 appears to receive hydrology from groundwater and surrounding uplands. WET A-9 discharges to WUS A-11. WET A-9 is a moderate-quality wetland due to low coverage by invasive species and small size. It provides floodflow alteration functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the shrub stratum included sweetgum. Dominant plant species in the herbaceous stratum included skunk cabbage (*Symplocarpus foetidus,* OBL) and white grass.

Primary hydrologic indicators observed included high water table and oxidized rhizospheres on living roots. Secondary hydrologic indicators included drainage patterns, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland A-10 (WET A-10)

WET A-10 consists of two wetland cover types: palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A), and palustrine, scrub-shrub, broadleaf deciduous, seasonally flooded/saturated, (PSS1E). The PFO area of the wetland is approximately 0.04 acres in size. The PSS portion is approximately 0.18 acres and continues outside the Study Area to the south. One wetland sample plot was taken within each cover type.

WET A-10 is located in the southwestern portion of the Study Area and has formed within a partially cleared communication tower property (**Appendix C, Section A Map 2**). The source of hydrology for the wetland is runoff from the adjacent uplands. WET A-10 discharges into WUS A-12 and conveys via surface flow to WET A-11. WET A-10 is a moderate-quality wetland due to moderate coverage by invasive species and active vegetation clearing. It provides floodflow alteration and nutrient removal functions and values.

WET A-10 PFO

Within the PFO sample plot, the dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included sweetgum and black gum (*Nyssa sylvatica,* FAC). Japanese stiltgrass was dominant in the herbaceous stratum.

Primary hydrologic indicators observed included high water table and water-stained leaves. The soil profile met the depleted matrix (F3) indicator.

WET A-10 PSS

Within the PSS sample plot, the dominance test for hydrophytic vegetation was met. Dominant plant species in the shrub stratum included sweetgum and groundseltree (*Baccharis halimifolia,* FACW). Broom rosette grass (*Dichanthelium scoparium,* FACW) and soft rush were dominant in the herbaceous stratum.
Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. Secondary hydrologic indicators observed included the FAC-neutral test. The soil profile met the depleted matrix (F3) and the redox dark surface (F6) indicator.

Wetland A-11 (WET A-11)

WET A-11 is a palustrine, forested, broadleaf deciduous, seasonally flooded (PFO1C) wetland. It is approximately 0.33 acres in size. The wetland is located in the southwestern portion of the Study Area and continues outside the boundary to the south. The wetland was formed on a floodplain adjacent to WUS 23A (**Appendix C, Section A Map 2**). It is a large wetland composed of two nearby cells. WET A-11 appears to receive hydrology from WET A-10 and groundwater seeps. WET A-11 discharges to WUS 23A. WET A-11 is a high-quality wetland due to low coverage by invasive species and groundwater contribution to Use III streams. It provides floodflow alteration, sediment/toxicant retention, and nutrient removal functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included black gum. Dominant plant species in the shrub stratum included highbush blueberry. Dominant plant species in the herbaceous stratum included Japanese stiltgrass and roundleaf greenbrier.

Primary hydrologic indicators observed included surface water, high water table, saturation, drift deposits, and water-stained leaves. Secondary hydrologic indicators included drainage patterns, microtopographic relief, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland A-12 (WET A-12)

WET A-12 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.01 acres in size. It is located in the southwestern portion of the Study Area and has formed within a small depression adjacent to a mowed yard, partially atop a buried tarp (**Appendix C, Section A Map 4**). WET A-12 appears to receive hydrology from a groundwater seep or underdrain (reported by adjacent property owner). WET A-12 discharges to WUS A-13. WET A-12 is a low-quality wetland due to anthropogenic influences. It provides groundwater recharge/discharge and floodflow alteration functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple and sweetgum. Dominant plant species in the shrub stratum included arrowwood viburnum (*Viburnum dentatum,* FAC) and sweet-bay magnolia (*Magnolia virginiana,* FACW).

Primary hydrologic indicators observed included surface water, high water table, saturation, hydrogen sulfide odor, and water-stained leaves. Secondary hydrologic indicators included drainage patterns, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland A-13 (WET A-13)

WET A-13 is a palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E) wetland and is approximately 0.04 acres in size. It is located in the northern portion of the Study Area and continues outside the boundary to the northeast. The wetland has formed two adjacent cells which receive hydrology from a groundwater seep outside of the Study Area (**Appendix C, Section A Map 3**). WET A-13 discharges to WUS A-22 and WUS 25B. WET A-13 is a high-quality wetland due to low coverage by invasive species and groundwater contribution to adjacent streams. It provides groundwater recharge/discharge functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included American elm (*Ulmus americana*, FACW) and sweetgum. Dominant species in the sapling stratum included sweet-bay magnolia. Dominant plant species in the shrub stratum also included sweetgum. Dominant species in the herbaceous stratum included roundleaf greenbrier and an unidentified *Carex* species.

Primary hydrologic indicators observed included surface water, high water table, and saturation. Secondary hydrologic indicators included drainage patterns and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland A-14 (WET A-14)

WET A-14 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.21 acres in size. It is located in the northern portion of the Study Area in the floodplain adjacent to Waters G (**Appendix C, Section A Map 7**). WET A-14 appears to receive hydrology from out-of-bank flows from abutting Waters G. WET A-14 discharges to WUS A-15. WET A-14 is a moderate-quality wetland due to moderate coverage by invasive species and presence of litter and debris. It provides floodflow alteration, sediment/toxicant retention, and nutrient removal functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple. Dominant plant species in the shrub stratum included sweetgum. Dominant species in the herbaceous stratum included Japanese stiltgrass, and roundleaf greenbrier.

Primary hydrologic indicators observed included surface water, high water table, saturation, sediment deposits, drift deposits, and water-stained leaves. Secondary hydrologic indicators included drainage

patterns, stunted or stressed plants, geomorphic position, and microtopographic relief. The soil profile met the depleted matrix (F3) indicator.

Wetland A-15 (WET A-15)

WET A-15 is a palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E) wetland and is approximately 0.03 acres in size. It is located in the northern portion of the Study Area and has formed on the embankment of I-95 (**Appendix C, Section A Map 7**). WET A-15 appears to receive hydrology from a groundwater seep and roadway runoff. WET A-15 discharges via overland sheet flow to Waters G. WET A-15 is a moderate-quality wetland due to its low coverage by invasive species. It provides floodflow alteration and sediment/toxicant retention functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple, sweetgum, and American beech (*Fagus grandifolia*, FACU). Dominant plant species in the shrub stratum included American beech, American holly and sweetgum. Dominant species in the herbaceous stratum included roundleaf greenbrier.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. The soil profile met the depleted matrix (F3) indicator.

Wetland A-16 (WET A-16)

WET A-16 is a palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E) wetland and is approximately 0.92 acres in size. It is located in the southern portion of the Study Area and continues outside the Study Area boundary to the south. The wetland has formed on a gradual slope (**Appendix C, Section A Maps 2 and 4**). WET A-16 appears to receive hydrology from WUS A-17, WUS A-18, and runoff from surrounding uplands. WET A-16 discharges to WUS 26A, WUS A-10, WUS A-18, and WUS A-19. WET A-16 is a high-quality wetland due to groundwater contribution to Use III streams and large size. It provides floodflow alteration, sediment/toxicant retention, and nutrient removal functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple. Dominant plant species in the shrub stratum also included red maple and pin oak (*Quercus palustris,* FACW). Dominant species in the herbaceous stratum included roundleaf greenbrier, and rice cut grass (*Leersia oryzoides*, OBL).

Primary hydrologic indicators observed included surface water, high water table, saturation, drift deposits, iron deposits, presence of reduced iron, and water-stained leaves. Secondary hydrologic indicators observed included drainage patterns and the FAC-neutral test. The soil profile in the sample plot, which was close to I-95 and appears to have been disturbed in the past, did not meet hydric soil indicators but tested positive with an alpha-alpha-dipyridyl strip in the upper four inches of the profile. In other areas of the wetland, the soil profile met the depleted matrix (F3) indicator.

Wetland A-17 (WET A-17)

WET A-17 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.07 acres in size. It is located in the southwestern portion of the Study Area and has formed on an access trail (**Appendix C, Section A Map 2**). WET A-17 appears to receive hydrology from surrounding uplands. WET A-17 discharges via overland sheet flow to WET 13A and WET A-18. WET A-17 is a moderate-quality wetland due to limited functions and values. It provides nutrient removal functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple. Dominant plant species in the shrub stratum included arrowwood viburnum. Dominant species in the herbaceous stratum included broom rosette grass and roundleaf greenbrier.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. Secondary hydrologic indicators included geomorphic position and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland A-18 (WET A-18)

WET A-18 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.16 acres in size. It is located in the southwestern portion of the Study Area and has formed two adjacent cells at the toe of slope (**Appendix C, Section A Map 2**). WET A-18 appears to receive hydrology from WET A-17 and surrounding uplands. WET A-18 continues to the south outside of the Study Area and is hydrologically connected to a tributary to Little Gunpowder Falls. WET A-18 is a moderate-quality wetland due to low coverage by invasive species and limited functions and values. It provides nutrient removal functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple. Dominant plant species in the shrub stratum included arrowwood viburnum and highbush blueberry. Dominant species in the herbaceous stratum included sweetgum.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. Secondary hydrologic indicators observed included geomorphic position and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland A-19 (WET A-19)

WET A-19 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.12 acres in size. It is located in the northeastern portion of the Study Area and has formed three adjacent cells on a hillslope (**Appendix C, Section A Map 10**). WET A-19 appears to receive hydrology from surrounding uplands. WET A-7 continues to the southeast outside of the Study Area and is

hydrologically connected to a tributary to Winters Run. WET A-19 is a moderate-quality wetland due to moderate coverage by invasive species. It provides nutrient removal functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple and pin oak. Dominant plant species in the sapling stratum included red maple and black gum. Dominant plant species in the shrub stratum included spicebush (*Lindera benzoin,* FAC) and multiflora rose.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. The soil profile met the depleted matrix (F3) indicator.

Wetland A-20 (WET A-20)

WET A-20 is a palustrine, emergent, *Phragmites australis,* seasonally saturated (PEM5B) wetland and is approximately 0.04 acres in size. It is located in the southern portion of the Study Area and has formed at the toe of the MD 152 roadway embankment (**Appendix C, Section A Map 6**). WET A-20 appears to receive hydrology from roadway runoff. WET A-20 discharges via overland sheet flow to WUS A-25. WET A-20 is a low-quality wetland due to extensive coverage by invasive species and high levels of litter and pollution. It provides floodflow alteration functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the herbaceous stratum included common reed (FACW).

Primary hydrologic indicators observed included high water table and saturation. Secondary hydrologic indicators observed included drainage patterns, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland A-21 (WET A-21)

WET A-21 is a palustrine, forested, broadleaf deciduous, seasonally saturated (PFO1B) wetland and is approximately 0.05 acres in size. It is located in the western portion of the Study Area and has formed in a depression between a driveway embankment and the highway embankment (**Appendix C, Section A Map 1**). WET A-21 appears to receive hydrology from surrounding uplands. WET A-21 discharges via overland sheet flow to WUS 20A. WET A-21 is a moderate-quality wetland due to low coverage by invasive species. It provides nutrient removal functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple and sweetgum. Dominant plant species in the sapling stratum included slippery elm (*Ulmus rubra*, FAC). Dominant plant species in the herbaceous stratum included Japanese honeysuckle (*Lonicera japonica,* FACU).

Primary hydrologic indicators observed included high water table, saturation, and water-stained leaves. Secondary hydrologic indicators observed included the presence of a sparsely vegetated concave surface and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Previously Delineated Wetlands

Wetland 12A (WET 12A)

WET 12A is a palustrine, forested, broadleaf deciduous, seasonally flooded (PFO1C) wetland and is approximately 0.35 acres in size. It is located in the southwestern portion of the Study Area (**Appendix C, Section A Map 1**). WET 12A is a high-quality wetland due to low coverage by invasive species and high plant diversity. It provides groundwater recharge/discharge, floodflow alteration, and wildlife habitat functions and values. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Wetland 13A (WET 13A)

WET 13A is a palustrine, emergent, *Phragmites australis,* seasonally saturated (PEM5B) wetland and is approximately 0.42 acres in size. It is located in the southwestern portion of the Study Area (**Appendix C, Section A Map 2**). WET 13A is a low-quality wetland due to high coverage by invasive species and excessive roadway runoff. It provides sediment/toxicant retention and nutrient removal functions and values. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Wetland 17A (WET 17A)

WET 17A is a palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E) wetland and is approximately 0.28 acres in size. It is located in the northwestern portion of the Study Area (**Appendix C, Section A Maps 2-4**). WET 17A is a high-quality wetland due to low coverage by invasive species and groundwater contribution to Use III streams. It provides floodflow alteration and groundwater recharge/discharge functions and values. It was previously delineated by Wallace Montgomery in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Wetland 18A (WET 18A)

WET 18A was previously delineated by Wallace Montgomery in 2017. A portion of this wetland falls within the Study Area of the current project (**Appendix C, Section A Map 2**). RK&K felt that this portion of the wetland lacks the three wetland parameters and therefore does not meet the definition of a wetland. On March 18, 2019, USACE and MDE concurred. This portion of WET 18A was removed from the delineation. Impacts to this resource will not require authorization.

Wetland 35A (WET 35A)

WET 35A is a palustrine, forested, broadleaf deciduous, permanently flooded (PFO1H) wetland and is approximately 0.08 acres in size. It is located in the central portion of the Study Area (**Appendix C, Section A Map 4**). WET 35A is a low-quality wetland due to high coverage by invasive species and extensive highway runoff. It provides floodflow alteration and nutrient removal functions and values. It was previously delineated by JMT in 2008; more information can be found in the *Wetland Identification & Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22.*

Wetland 36A (WET 36A)

WET 36A is a palustrine, forested, broadleaf deciduous, intermittently flooded (PFO1J) wetland and is approximately 0.06 acres in size. It is located in the central portion of the Study Area (**Appendix C, Section A Map 4**). WET 36A is a low-quality wetland due to high coverage by invasive species and extensive highway runoff. It provides floodflow alteration and nutrient removal functions and values. It was previously delineated by JMT in 2008; more information can be found in *the Wetland Identification & Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22.*

Wetland 37A (WET 37A)

WET 37A is a palustrine, forested, broadleaf deciduous, intermittently flooded (PFO1J) wetland and is approximately 0.02 acres in size. It is located in the central portion of the Study Area (**Appendix C, Section A Map 4**). WET 37A is a low-quality wetland due to high coverage by invasive species and extensive highway runoff. It provides floodflow alteration and nutrient removal functions and values. It was previously delineated by JMT in 2008; more information can be found in the *Wetland Identification & Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22.*

Wetland 94A (WET 94A)

WET 94A is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.02 acres in size. It is located in the north-central portion of the Study Area (**Appendix C, Section A Map 3**). WET 94A is a low-quality wetland due to high coverage by invasive species and extensive highway runoff. It provides floodflow alteration functions and values. It was previously delineated by Wallace Montgomery in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Wetland A

Wetland A is a palustrine, emergent, persistent, temporarily flooded (PEM1A) wetland and is approximately 0.03 acres in size. It is located in the south-central portion of the Study Area (**Appendix C, Section A Map 5**). Wetland A is a low-quality wetland due to extensive roadside runoff and low species diversity. It provides

floodflow alteration functions and values. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

WET B

WET B is located in the southwestern portion of the Study Area and consists of two wetland cover types: palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E), and palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E). The PEM area is approximately 0.05 acres in size and the PFO portion is approximately 0.28 acres (**Appendix C, Section A Map 1**). One wetland sample plot was taken within each cover type.

WET B- PEM

WET B-PEM is a moderate-quality wetland due to moderate coverage by invasive species and high plant diversity. It provides nutrient removal and sediment/toxicant retention functions and values. It was previously delineated by JMT in 2017 as WET B2; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

WET B- PFO

WET B-PFO is a moderate-quality wetland due to moderate coverage by invasive species and high plant diversity. It provides nutrient removal and sediment/toxicant retention functions and values. It was previously delineated by JMT in 2017 as WET B1; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

WET C

WET C is located in the southwestern portion of the Study Area and consists of two wetland cover types: palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E), and palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E). The PEM area is approximately 0.01 acre in size and the PFO portion is approximately 0.01 acre (**Appendix C, Section A Map 1**). One wetland sample plot was taken within each cover type.

WET C-PEM

WET C-PEM is a low-quality wetland due to high coverage by invasive species and soil disturbance. It provides nutrient removal functions and values. It was previously delineated by JMT in 2017 as WET C; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

WET C-PFO

WET C-PFO is a low-quality wetland due to high coverage by invasive species and soil disturbance. It provides nutrient removal functions and values. It was previously delineated by JMT in 2017 as WET C; more information can be found in the I-*95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Wetland C

Wetland C is a palustrine, emergent, persistent, permanently flooded (PEM1H) wetland and is approximately 0.03 acres in size. It is located in the south-central portion of the Study Area (**Appendix C, Section A Map 5**). Wetland C is a low-quality wetland due to extensive roadside runoff and low species diversity. It provides floodflow alteration and nutrient removal functions and values. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Wetland H

Wetland H is a palustrine, forested, broadleaf deciduous / emergent, persistent, seasonally flooded/saturated (PFO/PEM1E) wetland and is approximately 0.15 acres in size. It is located in the eastern portion of the Study Area (**Appendix C, Section A Map 8**). Wetland H is a moderate-quality wetland due to moderate invasive species cover. It provides floodflow alteration and groundwater recharge/discharge functions and values. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

WET L1

WET L1 is a palustrine, forested, broadleaf deciduous, seasonally flooded (PFO1C) wetland and is approximately 0.03 acres in size. It is located in the southwestern portion of the Study Area (**Appendix C, Section A Map 2**). WET L1 is a low-quality wetland due to minimal function and value. It provides nutrient removal functions and values. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

WET L2

WET L2 is a palustrine, emergent, *Phragmites australis,* seasonally saturated (PEM5B) wetland and is approximately 0.03 acres in size. It is located in the southwestern portion of the Study Area (**Appendix C, Section A Map 1**). WET L2 is a low-quality wetland due to high coverage by invasive species and minimal function and value. It provides floodflow alteration functions and values. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Wetland L

Wetland L is a palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E) wetland and is approximately 0.02 acres in size. It is located in the eastern portion of the Study Area (**Appendix C, Appendix C, Section A Map 8**). Wetland L is a low-quality wetland because it provides minimal functions and values, specifically groundwater recharge/discharge functions and values. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

WET N

WET N is a palustrine, emergent, *Phragmites australis,* seasonally saturated (PEM5B) wetland and is approximately 0.03 acres in size. It is located in the southern portion of the Study Area (**Appendix C, Section A Map 2**). WET N is a low-quality wetland due to high coverage by invasive species and minimal function and value. It provides floodflow alteration functions and values. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

WET O

WET O is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.01 acres in size. It is located in the southwestern portion of the Study Area (**Appendix C, Section A Map 1**). WET O is a low-quality wetland due to high coverage by invasive species and soil disturbance. It provides nutrient removal functions and values. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Wetland KK

Wetland KK is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.05 acres in size. It is located in the eastern portion of the Study Area (**Appendix C, Section A Map 8**). Wetland KK is a low-quality wetland because it provides minimal functions and values, specifically nutrient removal. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Wetland LL

Wetland LL is a palustrine, emergent, persistent, seasonally saturated (PEM1B) wetland and is approximately 0.05 acres in size. It is located in the eastern portion of the Study Area (**Appendix C, Section A Maps 7-8**). Wetland LL is a moderate-quality wetland due to moderate species diversity. It provides floodflow alteration functions and values. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Wetland MM

Wetland MM is a palustrine, forested, broadleaf deciduous, seasonally saturated (PFO1B) wetland and is approximately 0.06 acres in size. It is located in the north-central portion of the Study Area (**Appendix C, Section A Map 7**). Wetland MM is a moderate-quality wetland due to moderate species diversity. It provides nutrient removal functions and values. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Wetland SS

Wetland SS is a palustrine, forested, broadleaf deciduous, continuously saturated (PFO1D) wetland and is approximately 0.01 acres in size. It is located in the north-central portion of the Study Area (**Appendix C, Section A Map 5**). Wetland SS is a moderate-quality wetland due to small size and minimal vegetation cover. It provides floodflow alteration and sediment/toxicant retention functions and values. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Wetland UU

Wetland UU is a palustrine, forested, broadleaf deciduous, continuously saturated (PFO1D) wetland and is approximately 0.10 acres in size. It is located in the north-central portion of the Study Area (**Appendix C, Appendix C, Section A Map 5**). Wetland UU is a high-quality wetland due to low coverage by invasive species and high plant diversity. It provides groundwater recharge/discharge, floodflow alteration, nutrient removal, and sediment/toxicant retention functions and values functions and values. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Wetland VV

Wetland VV is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.02 acres in size. It is located in the north-central portion of the Study Area (**Appendix C, Section A Map 7**). Wetland VV is a low-quality wetland due to highly disturbed soils. It provides floodflow alteration functions and values. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

WUS

Newly Delineated Waterways

Waters of the US A-1 (WUS A-1)

WUS A-1 is an intermittent stream located in the southern portion of the Study Area (**Appendix C, Section A Map 7**). The stream flows to the east, receiving hydrology from WET A-2, and discharges into Waters E. The stream channel is approximately 2 to 4 feet wide. At the time of the delineation, flow within the channel averaged 3 inches deep. The substrate consists of cobble, sand, gravel, and silt. The stream is moderate quality due to minor bank erosion.

Waters of the US A-2 (WUS A-2)

WUS A-2 is a perennial stream located in the southern portion of the Study Area (**Appendix C, Section A Map 7**). The stream flows to the northeast, abutting WET A-3, and discharges into Waters G. The stream channel is approximately 4 feet wide. At the time of the delineation, flow within the channel varied from 1 to 6 inches deep. The substrate consists of sand, gravel, and silt. The stream is moderate quality due to moderate bank erosion.

Waters of the US A-3 (WUS A-3)

WUS A-3 is a perennial stream located in the southern portion of the Study Area (**Appendix C, Section A Map 7**). The stream flows to the north and discharges into WUS A-2. The stream channel is approximately 3 feet wide. At the time of the delineation, flow within the channel averaged 6 inches deep. The substrate consists of cobble, sand, gravel, and silt. The stream is low quality due to major bank erosion.

Waters of the US A-4 (WUS A-4)

WUS A-4 is a perennial stream located in the southern portion of the Study Area (**Appendix C, Section A Map 7**). The stream flows to the north and discharges into Waters G. The stream channel is approximately 3 feet wide. At the time of the delineation, flow within the channel varied from 1 to 12 inches deep. The substrate consists of sand, gravel, and silt. The stream is moderate quality due to moderate bank erosion.

Waters of the US A-5 (WUS A-5)

WUS A-5 is an intermittent stream located in the southern portion of the Study Area (**Appendix C, Section A Map 8**). The stream flows to the north, and discharges into Waters G. The stream channel is approximately 1 to 3 feet wide. At the time of the delineation, flow within the channel varied from 1 to 6 inches deep. The substrate consists of sand and silt. The stream is low quality due to extensive agricultural pollution.

Waters of the US A-6 (WUS A-6)

WUS A-6 is an ephemeral stream located in the southern portion of the Study Area (**Appendix C, Section A Map 8**). The stream flows to the north from WET A-5, and discharges into Waters G. The stream channel is approximately 2 feet wide. At the time of the delineation, flow within the channel averaged 1 inch deep.

The substrate consists of sand, gravel, and silt. The stream is low quality due to extensive agricultural pollution.

Waters of the US A-7 (WUS A-7)

WUS A-7 is an ephemeral stream located in the southern portion of the Study Area (**Appendix C, Section A Map 8**). The stream flows to the east from WET A-5, and discharges into Waters G. The stream channel is approximately 3 feet wide. At the time of the delineation, flow within the channel averaged 1 inch deep. The substrate consists of sand, gravel, and silt. The stream is low quality due to extensive agricultural pollution.

Waters of the US A-8 (WUS A-8)

WUS A-8 is an intermittent stream located in the southern portion of the Study Area (**Appendix C, Section A Map 8**). The stream flows to the south from Wetland H, and discharges into Waters G. The stream channel is approximately 3 feet wide. At the time of the delineation, flow within the channel varied from 1 to 6 inches deep. The substrate consists of cobble, sand, and silt. The stream is high quality as a moderately stable conveyance of wetland hydrology to a perennial stream that does not provide fish habitat.

Waters of the US A-9 (WUS A-9)

WUS A-9 is an intermittent stream located in the southern portion of the Study Area (**Appendix C, Section A Map 8**). The stream flows to the southeast, from a waterline pressure vault, abutting Wetland H, and discharges into Waters G. The stream channel is approximately 4 feet wide. At the time of the delineation, flow within the channel averaged 3 inches deep. The substrate consists of sand, silt, and muck. The stream is moderate quality due to stable banks.

Waters of the US A-10 (WUS A-10)

WUS A-10 is an intermittent stream located in the southern portion of the Study Area (**Appendix C, Section A Map 2**). The stream flows to the southwest from WET A-16 and discharges into WUS 25A. The stream channel is approximately 4 feet wide. At the time of delineation, flow within the channel averaged 4 inches deep. The substrate consists of silts. The stream is low quality as a constructed ditch.

Waters of the US A-11 (WUS A-11)

WUS A-11 is an intermittent stream located in the northern portion of the Study Area (**Appendix C, Section A Map 7**). The stream flows to the north from a groundwater seep, abutting WET A-9, and discharges into Waters G. The stream channel is approximately 1 to 3 feet wide. At the time of the delineation, flow within the channel averaged 2 inches deep. The substrate consists of sand and silt. The stream is moderate quality due to moderate bank erosion.

Waters of the US A-12 (WUS A-12)

WUS A-12 is an ephemeral stream located in the southern portion of the Study Area (**Appendix C, Section A Map 2**). The stream flows to the northwest from WET A-10 and discharges into WUS 25A. The stream channel is approximately 1 foot wide. At the time of the delineation, flow within the channel averaged 2 inches deep. The substrate consists of gravel, sand, and silt. The stream is moderate quality due to moderate bank erosion.

Waters of the US A-13 (WUS A-13)

WUS A-13 is an intermittent stream located in the southern portion of the Study Area (**Appendix C, Section A Map 4**). The stream flows to the east from WET A-12 and discharges into a downstream culvert. The discharge point of this culvert is unknown. The stream channel is approximately 2 to 5 feet wide. At the time of the delineation, flow within the channel varied from 1 to 3 inches deep. The substrate consists of sand, concrete, and silt. The stream is low quality due to extensive pollution from the road.

Waters of the US A-14 (WUS A-14)

WUS A-14 is an intermittent stream located in the northern portion of the Study Area (**Appendix C, Section A Map 3**). The stream flows to the south from a groundwater seep and discharges into WUS 25B. The stream channel is approximately 3 feet wide. At the time of the delineation, flow within the channel averaged 1 inch deep. The substrate consists of sand and silt. The stream is moderate quality as a small stable conveyance of groundwater to a perennial channel that does not provide fish habitat.

Waters of the US A-15 (WUS A-15)

WUS A-15 is an intermittent stream located in the northern portion of the Study Area (**Appendix C, Section A Map 7**). The stream flows to the east from WET A-14, and discharges into Waters G. The stream channel is approximately 2 to 10 feet wide. At the time of the delineation, flow within the channel averaged 3 inches deep. The substrate consists of sand and silt. The stream is moderate quality due to minor erosion and presence of litter from storm flows.

Waters of the US A-16 (WUS A-16)

WUS A-16 is an ephemeral stream located in the northern portion of the Study Area (**Appendix C, Section A Map 7**). The stream flows to the southwest from outside of the Study Area, and discharges into Waters G. The stream channel is approximately 2 to 4 feet wide. At the time of the delineation, flow within the channel averaged 3 inches deep. The substrate consists of sand, gravel, and silt. The stream is low quality as an ephemeral channel draining uplands exhibiting minor bank erosion.

Waters of the US A-17 (WUS A-17)

WUS A-17 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section A Map 4**). The stream flows to the west and discharges into WET A-16. The stream channel is approximately 1 to 4 feet wide. At the time of the delineation, flow within the channel varied from 1 to 5 inches deep. The substrate consists of sand, gravel, and silt. The stream is low quality due to extensive pollution from the road.

Waters of the US A-18 (WUS A-18)

WUS A-18 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section A Maps 2 and 4**). The stream flows to the northwest, abutting WET A-16 and WUS A-19, and discharges into WET A-16. The stream channel is approximately 3 to 4 feet wide. At the time of the delineation, flow within the channel varied from 2 to 6 inches deep. The substrate consists of sand, gravel, and silt. The stream is moderate quality due to moderate bank erosion.

Waters of the US A-19 (WUS A-19)

WUS A-19 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section A Map 2**). The stream flows to the west from WET A-16 and discharges into WUS A-18. The stream channel is approximately 1 to 3 feet wide. At the time of the delineation, flow within the channel varied from 1 to 2 inches deep. The substrate consists of silt. The stream is moderate quality as a small stable conveyance of groundwater to a perennial Use III channel that does not provide fish habitat.

Waters of the US A-20 (WUS A-20)

WUS A-20 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section A Map 2**). The stream flows to the southwest and discharges into WUS 23A. The stream channel is approximately 1 to 3 feet wide. At the time of the delineation, flow within the channel varied from 1 to 3 inches deep. The substrate consists of muck and silt. The stream is moderate quality as a small stable conveyance of groundwater to a perennial Use III channel that does not provide fish habitat.

Waters of the US A-21 (WUS A-21)

WUS A-21 is an intermittent stream located in the center portion of the Study Area (**Appendix C, Section A Maps 3-4**). The stream flows to the south from a culvert, abutting Wetland 35A and Wetland 36A, and discharges via a culvert into Waters QQ. The stream channel is approximately 4 feet wide. At the time of the delineation, flow within the channel averaged 1 inch deep. The substrate consists of concrete and silt. The stream is low quality as a concrete lined channel receiving extensive pollution from the road.

Waters of the US A-22 (WUS A-22)

WUS A-22 is an intermittent stream located in the northern portion of the Study Area (**Appendix C, Section A Map 3**). The stream flows to the south from WET A-13, and discharges into WUS 25B. The stream channel is approximately 3 to 4 feet wide. At the time of the delineation, flow within the channel varied from 1 to 5 inches deep. The substrate consists of concrete, sand, and silt. The stream is moderate quality as a small stable conveyance of groundwater to a perennial channel that does not provide fish habitat.

Waters of the US A-23 (WUS A-23)

WUS A-23 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section A Map 1**). The stream flows to the southwest from WET B and continues outside the Study Area. The stream channel is approximately 1 to 4 feet wide. At the time of the delineation, flow within the channel varied from 1 to 4 inches deep. The substrate consists of silt. The stream is moderate quality as a small stable channel with mowed banks.

Waters of the US A-24 (WUS A-24)

WUS A-24 is an intermittent stream located in the southeastern portion of the Study Area (**Appendix C, Section A Map 7**). The stream flows to the north from a stormwater pond outside of the Study Area, and discharges into WET A-3. The stream channel is approximately 2 to 3 feet wide. At the time of the delineation, flow within the channel varied from 1 to 5 inches deep. The substrate consists of silt. The stream is moderate quality due to minor bank erosion.

Waters of the US A-25 (WUS A-25)

WUS A-25 is an intermittent stream located in the southern portion of the Study Area (**Appendix C, Section A Map 6**). The stream flows to the northwest from outside the Study Area, and discharges into a culvert under MD 152 and continues outside the Study Area to an unknown discharge point. The stream channel is approximately 2 to 3 feet wide. At the time of the delineation, flow within the channel averaged 3 inches deep. The substrate consists of silt, sand, cobble, gravel, and concrete. The stream is low quality due to extensive pollution from the road.

Waters of the US A-26 (WUS A-26)

WUS A-26 is an ephemeral stream located in the northeastern portion of the Study Area (**Appendix C, Section A Map 8**). The stream flows to the south from outside the Study Area, and discharges into a culvert with an unknown outfall. The stream channel is approximately 3 feet wide. At the time of the delineation, flow within the channel averaged 1.5 inches deep. The substrate consists of silt. The stream is low quality due to extensive pollution from the road.

Waters of the US A-27 (WUS A-27)

WUS A-27 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section A Map 8**). The stream flows to the south from outside the Study Area, and discharges into a culvert with an unknown outfall. The stream channel is approximately 1 foot wide. At the time of the delineation, flow within the channel averaged 1 inch deep. The substrate consists of silt. The stream is low quality due to extensive pollution from the road.

Waters of the US B-4 (WUS B-4)

WUS B-4 is an ephemeral stream located in the southeastern portion of the Study Area (**Appendix C, Section Map 8**). It was delineated by Straughan Environmental as part of the Clayton Road Overpass Study Area; see **Section 3.3.B** for more information

Previously Delineated Waterways

Waters of the US 13A-b (WUS 13A-b)

WUS 13A-b is an ephemeral stream located in the southwestern portion of the Study Area (**Appendix C, Section A Map 2**). The stream is low quality because it conveys only stormwater from the highway. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Waters of the US 20A (WUS 20A)

WUS 20A is a perennial stream located in the western portion of the Study Area (**Appendix C, Section A Map 1**). The stream is low quality because the banks are highly eroded. It was previously delineated by JMT/Wallace Montgomery in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Waters of the US 21A (WUS 21A)

WUS 21A is an intermittent stream located in the western portion of the Study Area (**Appendix C, Section A Map 1**). The stream is low quality because the banks are highly eroded. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Waters of the US 23A (WUS 23A)

WUS 23A is a perennial stream located in the western portion of the Study Area (**Appendix C, Section A Maps 2-3**). The stream is low quality because the banks are highly eroded. It was previously delineated by

JMT/Wallace Montgomery in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Waters of the US 24B (WUS 24B)

WUS 24B is an intermittent stream located in the north-central portion of the Study Area (**Appendix C, Section A Map 3**). The stream is low quality because the banks are highly eroded. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Waters of the US 25A (WUS 25A)

WUS 25A is a perennial stream located in the western portion of the Study Area (**Appendix C, Section A Map 2**). The stream is low quality because the banks are highly eroded. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Waters of the US 25B (WUS 25B)

WUS 25B is a perennial stream located in the northern portion of the Study Area (**Appendix C, Section A Maps 3-5**). It was delineated by JMT as a part of the MD 152 Park and Ride Facility Relocation; see **Section 3.3.E** for more information.

Waters of the US 26A (WUS 26A)

WUS 26A is an intermittent stream located in the western portion of the Study Area (**Appendix C, Section A Map 2**). The stream is low quality because it is a roadside ditch. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Waters of the US 29A (WUS 29A)

WUS 29A is an ephemeral stream located in the western portion of the Study Area (**Appendix C, Section A Maps 2 and 4**). The stream is low quality because it is a roadside ditch. It was previously delineated by Wallace Montgomery in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Waters of the US 30A (WUS 30A)

WUS 30A is an intermittent stream located in the northwestern portion of the Study Area (**Appendix C, Section A Map 2**). The stream is low quality because it is a roadside ditch. It was previously delineated by Wallace Montgomery in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Waters of the US B (Waters B)

Waters B is a perennial stream located in the central portion of the Study Area (**Appendix C, Section A Map 5**). The stream is low quality because it is mostly a roadside drainage ditch or piped. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US D (Waters D)

Waters D is an intermittent stream located in the central portion of the Study Area (**Appendix C, Section A Map 5**). The stream is low quality because it exhibits moderate bank erosion. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US E (Waters E)

Waters E is an intermittent stream located in the central portion of the Study Area (**Appendix C, Section A Map 7**). The stream is low quality because it is mostly concrete lined or piped. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US E (WUS E)

WUS E is an ephemeral stream located in the western portion of the Study Area (**Appendix C, Section A Map 1**). The stream is low quality because it is highly eroded and conveys only stormwater from the highway. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Waters of the US F (Waters F)

Waters F is a perennial stream located in the eastern portion of the Study Area (**Appendix C, Section A Map 7**). The stream is moderate quality because it becomes heavily incised at the confluence with Waters G. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US G (Waters G)

Waters G is a perennial stream located in the central portion of the Study Area (**Appendix C, Section A Maps 4-5 and 7-8**). The stream is low quality because it is highly eroded in most areas and largely disturbed. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US I (Waters I)

Waters I is an intermittent stream located in the eastern portion of the Study Area (**Appendix C, Section A Map 8**). The stream is low quality because it is a manmade drainage ditch. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US J (Waters J)

Waters J is a perennial stream located in the eastern portion of the Study Area (**Appendix C, Section A Map 8**). The stream is low quality because it is a deeply incised channel with unstable banks. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US K (Waters K)

Waters K is an intermittent stream located in the eastern portion of the Study Area (**Appendix C, Section A Map 8**). The stream is low quality because it is a moderately eroded drainage channel. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US M (Waters M)

Waters M is a perennial stream located in the eastern portion of the Study Area (**Appendix C, Section A Map 9**). The stream is moderate quality because it is partially concrete lined or piped. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US N (Waters N)

Waters N is an intermittent stream located in the eastern portion of the Study Area (**Appendix C, Section A Map 9**). The stream is moderate quality because it is partially lined with rip rap and exhibits minor erosion. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US Y (WUS Y)

WUS Y is an ephemeral stream located in the western portion of the Study Area (**Appendix C, Section A Map 1**). The stream is low quality because it is a roadside ditch. It was previously delineated by JMT in 2017; more information can be found in the *I-95 ETL Northbound Extension Wetland and Waters Delineation Report.*

Waters of the US HH (Waters HH)

Waters HH is an ephemeral stream located in the eastern portion of the Study Area (**Appendix C, Section A Map 9**). The stream is low quality because it is an eroded ephemeral channel. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US II (Waters II)

Waters II is an ephemeral stream located in the eastern portion of the Study Area (**Appendix C, Section A Map 8**). The stream is low quality because it is a deeply incised ephemeral channel with unstable banks. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory*.

Waters of the US JJ (Waters JJ)

Waters JJ is an ephemeral stream located in the eastern portion of the Study Area (**Appendix C, Section A Map 8**). The stream is low quality because it is a deeply incised ephemeral channel with unstable banks. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US NN (Waters NN)

Waters NN is an ephemeral stream located in the central portion of the Study Area (**Appendix C, Section A Map 7**). The stream is low quality because it is a rip rap lined ephemeral channel. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US QQ (Waters QQ)

Waters QQ is an intermittent stream located in the central portion of the Study Area (**Appendix C, Section A Maps 4-5**). The stream is low quality because it is a rip rap lined drainage ditch. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory*.

Waters of the US RR (Waters RR)

Waters RR is an ephemeral stream located in the central portion of the Study Area (**Appendix C, Section A Map 3**). The stream is low quality because it is a roadside drainage ditch. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US TT (Waters TT)

Waters TT is an ephemeral stream located in the central portion of the Study Area (**Appendix C, Section A Map 5**). The stream is moderate quality because it is a mostly stable conveyance to a perennial channel. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

Waters of the US WW (Waters WW)

Waters WW is an ephemeral stream located in the northeastern portion of the Study Area (**Appendix C, Section A Map 9**). The stream is low quality because it is moderately eroded. It was previously delineated by RK&K in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory.*

B. KH-3022: Clayton Road Overpass Reconstruction

Straughan Environmental conducted field investigations on November 2, 2018 within the Clayton Road Overpass Study Area. One new WUS was delineated, and one previously delineated WUS is culverted beneath the Study Area. No other previously delineated wetlands or WUS were confirmed within the Study Area for this contract.

WUS

Newly Delineated Waterways

Waters of the US B-4 (WUS B-4)

WUS B-4 is an ephemeral stream located in the southwestern portion of the Study Area (**Appendix C, Section B Map 1**). The stream flows to the north and discharges into Waters G, an unnamed tributary to Winters Run, in the MD 152 Interchange Study Area (**Appendix C, Section B Map 1).** The stream channel is approximately 4 feet wide with banks approximately 2 feet high. At the time of the delineation, the stream channel was dry. The substrate consists of cobble, gravel, and silt. The stream is low quality due to close proximity to the roadway and being fed by roadside runoff.

Previously Delineated Waterways

Waters G

Waters G is a perennial stream that is culverted beneath Clayton Road within the Study Area (**Appendix C, Section B Map 1**). It was delineated by RK&K as part of the MD 152 Interchange Study Area; see **Section 3.3.A** for more information.

C. KH-3021: MD 24 Interchange / Two-Lane ETL / Winters Run Bridge

CEM staff conducted field investigations from December 5, 2018 to January 29, 2019 within the Study Area for Contract KH-3021. Fourteen new non-tidal wetlands and 31 new WUS were delineated. Additionally, seven previously delineated wetlands and nine previously delineated WUS were confirmed within the Study Area for this contract.

Wetlands

Newly Delineated Wetlands

Wetland C-1 (WET C-1)

WET C-1 is a palustrine, emergent, persistent, temporarily flooded (PEM1A) wetland and is approximately 0.27 acre in size. It is located in the central portion of the Study Area and has formed along Waters Y (**Appendix C, Section C Maps 5-6**). WET C-1 appears to receive hydrology from Waters Y as well as runoff from adjacent uplands. WET C-1 is hydrologically connected to Winters Run. WET C-1 is a high-quality wetland due to low invasive species coverage and its large size. It provides the functions and values of floodflow alteration and sediment/toxicant retention.

The dominance test for hydrophytic vegetation was met. Dominant species in the sapling/shrub stratum included sweetgum (*Liquidambar styraciflua,* FAC), black willow (*Salix nigra*, OBL). In the herbaceous stratum a *Polygonum sp.* was dominant.

Primary hydrologic indicators included surface water, high water table, saturation, sediment deposits, water stained leaves, and hydrogen sulfide odor. Secondary hydrologic indicators included a sparsely vegetated concave surface, drainage patterns, saturation visible on aerial imagery, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) and hydrogen sulfide (A4) indicators.

Wetland C-2 (WET C-2)

WET C-2 is a palustrine, scrub shrub, broad-leaved deciduous, temporarily flooded (PSS1A) wetland and is approximately 0.11 acre in size. It is located in the central portion of the Study Area and has formed along Waters Y (**Appendix C, Section C Map 5**). WET C-2 appears to receive hydrology from Waters Y as well as runoff from adjacent uplands; it is hydrologically connected to Winters Run. WET C-2 is a high-quality wetland due to low invasive species coverage and its size. It provides the functions and values of floodflow alteration and sediment/toxicant retention.

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included sweetgum. Dominant species in the sapling/shrub stratum included sweetgum and groundsel tree (*Baccharis halimifolia,* FAC). No herbaceous layer was present.

Primary hydrologic indicators included surface water, high water table, saturation, sediment deposits, drift deposits, water stained leaves, and hydrogen sulfide odor. Secondary hydrologic indicators included drainage patterns, saturation visible on aerial imagery, and geomorphic position. The soil profile met the hydrogen sulfide (A4) and depleted matrix (F3) indicators.

Wetland C-3 (WET C-3)

WET C-3 is a palustrine, emergent, persistent, temporarily flooded (PEM1A) wetland and is approximately 0.17 acre in size. It is located in the northeastern portion of the Study Area and has formed at the end of WUS C-9 (**Appendix C, Section C Map 7**). WET C-3 appears to receive hydrology from WUS C-9 as well as runoff from adjacent uplands; it is adjacent to WUS C-7, WUS C-11, and WUS C-12, and is therefore hydrologically connected to Haha Branch. WET C-3 is a moderate-quality wetland due to low invasive species coverage and its small size. It provides the functions and values of floodflow alteration and sediment/toxicant retention.

The dominance test for hydrophytic vegetation was met. Dominant species in the sapling/shrub stratum included sweetgum and red maple (*Acer rubrum*, FAC). In the herbaceous stratum Japanese stiltgrass (*Microstegium vimineum*, FAC) was dominant, as well as an unidentified *Poa sp*.

Primary hydrologic indicators included saturation and drift deposits. The secondary hydrologic indicator was drainage patterns. The soil profile met the depleted matrix (F3) indicator.

Wetland C-4 (WET C-4)

WET C-4 is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is 0.01 acre in size. It is located in the northeastern portion of the Study Area (**Appendix C, Section C Map 9**). WET C-4 appears to receive hydrology from adjacent upland runoff and WUS C-31; it drains into WUS C-18 and is hydrologically connected to Haha Branch. WET C-4 is a moderate-quality wetland due to low invasive species coverage and the amount of water held by the wetland. It provides the functions and values of floodflow alteration and sediment/toxicant retention. A *Vitis* sp. was dominant in the woody vine stratum.

The dominance test for hydrophytic vegetation was met. The dominant species in the tree stratum was sweetgum. The dominant species in the sapling/shrub stratum was red maple. The herbaceous layer was dominated by American holly (*Ilex opaca*, FAC).

Primary hydrologic indicators included surface water, high water table, saturation, water stained leaves, and hydrogen sulfide odor. Secondary hydrologic indicators included sparsely vegetated concave surface, and geomorphic position. The soil profile met the depleted matrix (F3) and hydrogen sulfide (A4) indicator.

Wetland C-5 (WET C-5)

WET C-5 is a palustrine, forested, broad-leaved deciduous, saturated (PFO1B) wetland and is approximately 0.06 acre in size. It is located in the northeastern portion of the Study Area along WUS C-18 (**Appendix C,**

Section C Map 9). WET C-5 appears to receive hydrology from groundwater seeps and runoff from adjacent uplands; it discharges to WUS C-18. WET C-5 is a moderate-quality wetland due to the size of the wetland and its hydrologic connectivity to adjacent waterways. It provides the functions and values of floodflow alteration and sediment/toxicant retention.

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included sweetgum, red maple, and American sycamore (*Platanus occidentalis*, FACW). Dominant species in the sapling/shrub stratum included red maple and sweetgum. The herbaceous layer was dominated by Japanese stiltgrass.

Primary hydrologic indicators included surface water, saturation, and water stained leaves. Secondary hydrologic indicators included drainage patterns, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland C-6 (WET C-6)

WET C-6 is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.01 acre in size. It is located in the northeastern portion of the Study Area, south of WUS C-20, but continues outside the boundary to the south (**Appendix C, Section Map 9**). It appears to receive hydrology from adjacent upland runoff. WET C-6 drains into WUS C-20. WET C-6 is a moderate-quality wetland due to the size of the wetland and its hydrologic connectivity to adjacent waterways. It provides the function and value of floodflow alteration.

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included sweetgum and black cherry (*Prunus serotina*, FACU). Dominant species in the sapling/shrub stratum included highbush blueberry (*Vaccinium corymbosum*, FACW) and black cherry. The herbaceous layer was dominated by Japanese stiltgrass and highbush blueberry.

Primary hydrologic indicators included surface water, saturation, high water table, drift deposits, and water stained leaves. Secondary hydrologic indicators included sparsely vegetated concave surface, drainage patterns and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland C-7 (WET C-7)

WET C-7 is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.07 acre in size. It is located in the northeastern portion of the Study Area and continues outside the boundary to the south (**Appendix C, Section C Map 9**). WET C-7 appears to receive hydrology from WUS C-27 and runoff from adjacent uplands. WET C-7 drains into WUS C-24 and is a moderate-quality wetland due to the size of the wetland and its hydrologic connectivity to adjacent waterways. It provides the functions and values floodflow alteration and sediment/toxicant retention.

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included sweetgum, red maple, and black gum (*Nyssa sylvatica*, FAC). The dominant species in the sapling/shrub stratum was red maple. The herbaceous layer was dominated by Japanese stiltgrass.

Primary hydrologic indicators included surface water, saturation, high water table, drift deposits, and water stained leaves. Secondary hydrologic indicators included drainage patterns and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland C-8 (WET C-8)

WET C-8 is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.02 acre in size. It is located in the northeastern portion of the Study Area adjacent to WUS C-21 (**Appendix C, Section C Map 9**). WET C-8 appears to receive hydrology from adjacent upland runoff and a groundwater seep; it drains into WUS C-21 during high flow events. WET C-8 is a low-quality wetland due to the small size of the wetland and lack of vegetation. It provides the functions and values of floodflow alteration and sediment/toxicant retention.

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included American holly and sweetgum. There was no noticeable shrub or herbaceous layers within the wetland.

Primary hydrologic indicators included surface water, saturation, high water table, and water stained leaves. Secondary hydrologic indicators included sparsely vegetated concave surface, drainage patterns, and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland C-9 (WET C-9)

WET C-9 is a palustrine, forested, broad-leaved deciduous, saturated (PFO1B) wetland and is approximately 0.02 acre in size. It is located in the northeastern portion of the Study Area, west of WUS C-26 (**Appendix C, Section C Map 9**). WET C-9 appears to receive hydrology from adjacent upland runoff and groundwater seeps. WET C-9 drains into WUS C-26 and is a moderate-quality wetland due to the size of the wetland and its connection to groundwater. It provides the functions and values of floodflow alteration and sediment/toxicant retention.

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included sweetgum and red maple. Dominant species in the sapling/shrub stratum included sweetgum and red maple. The herbaceous layer was dominated by common reed (*Phragmites australis*, FACW) and Japanese stiltgrass.

Primary hydrologic indicators included surface water, high water table, saturation, and water stained leaves. Secondary hydrologic indicators included drainage patterns, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland C-10 (WET C-10)

WET C-10 is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is less than 0.01 acre in size. It is located in the central portion of the Study Area, adjacent to WUS C-28 (**Appendix C, Section C Map 6**). WET C-10 appears to receive hydrology from adjacent upland runoff and overflow from WUS C-28. WET C-10 drains into WUS C-28 and is a low-quality wetland due to the size of the wetland and lack of vegetation. It provides the functions and values of floodflow alteration and sediment/toxicant retention.

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included sweetgum and red maple. There was no sapling/shrub or herbaceous layer present.

Primary hydrologic indicators included surface water, high water table, saturation, and water stained leaves. Secondary hydrologic indicators included sparsely vegetated concave surface, drainage patterns, and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland C-11 (WET C-11)

WET C-11 is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is 0.13 acre in size. It is located in the southwestern portion of the Study Area and continues outside the boundary to the north. The wetland is adjacent to Waters W (**Appendix C, Section C Map 1**). WET C-11 appears to receive hydrology from adjacent upland runoff and groundwater. WET C-11 drains into Waters W and is a moderate-quality wetland due to the size of the wetland and abundance of vegetation. It provides the functions and values of floodflow alteration and sediment/toxicant retention.

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included green ash (*Fraxinus pennsylvanica*, FACW). The sapling/shrub layer was dominated by red maple, black gum, and spicebush (*Lindera benzoin*, FACW). The dominant species in the herbaceous layer was skunk cabbage (*Symplocarpus foetidus*, OBL).

Primary hydrologic indicators included surface water, high water table, saturation, drift deposits, and water stained leaves. Secondary hydrologic indicators included drainage patterns, geomorphic position and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland C-12 (WET C-12)

WET C-12 is a palustrine, forested, broad-leaved deciduous, saturated (PFO1B) wetland and is 0.07 acre in size. It is located in the southwestern portion of the Study Area, north of Waters FF (**Appendix C, Section C Map 1**). WET C-12 appears to receive hydrology from adjacent upland runoff and groundwater. WET C-12 drains into Waters FF and is a low-quality wetland due to the size of the wetland and lack of vegetation. It provides the functions and values of floodflow alteration and sediment/toxicant retention.

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included green ash and red maple. The sapling/shrub layer was dominated by red maple, and spicebush. The herbaceous layer was dominated by sweet woodreed (*Cinna arundinacea*, FACW) and poison ivy.

Primary hydrologic indicators included surface water, high water table, saturation, drift deposits, and water stained leaves. Secondary hydrologic indicators included drainage patterns and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland C-13 (WET C-13)

WET C-13 is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is 0.05 acre in size. It is located in the northeastern portion of the Study Area in between WUS C-23 and WUS C-17 (**Appendix C, Section C Map 9**). WET C-13 appears to receive hydrology from adjacent upland runoff and the adjacent streams. WET C-13 drains into WUS C-23 and WUS C-17 and is a low-quality wetland due to the size of the wetland and a lack of vegetation. It provides the functions and values of floodflow alteration.

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included sweetgum and red maple. The sapling/shrub layer was dominated by persimmon, sweetgum, and maleberry (*Lyonia ligustrina*, FACW). The herbaceous layer was dominated by Japanese stiltgrass.

Primary hydrologic indicators included surface water, high water table, saturation, drift deposits, and water stained leaves. The secondary hydrologic indicator was drainage patterns. The soil profile met the depleted matrix (F3) indicator.

Wetland D-1 (WET D-1)

WET D-1 is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is 0.17 acre in size within the Study Area. It is located in the northeastern portion of the Study Area, northeast of WUS C-17. It extends beyond the MD 24 Interchange Study Area (**Appendix C, Section C Map 9**) into the Abingdon Road Overpass Study Area (**Appendix C, Section D Map 1**). See **Section 3.3.D** for more information.

Previously Delineated Wetlands

Wetland P

Wetland P is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.05 acre in size. It is located in the central portion of the Study Area (**Appendix C, Section C Map 4**). Wetland P appears to receive hydrology from adjacent upland runoff but has no visible hydrologic connection to a waterway. Wetland P is a moderate-quality wetland due to its size and the low level of invasive species. It provides the function and value of floodflow alteration and sediment/toxicant retention. It was previously delineated by RKK in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included swamp white oak (*Quercus bicolor*, FACW) and black gum. The dominant species in the herbaceous layer was roundleaf greenbrier (*Smilax rotundifolia*, FAC).

Primary hydrologic indicators observed included surface water, water marks, water-stained leaves, and oxidized rhizospheres on living roots. Secondary hydrologic indicators included a sparsely vegetated concave surface and geomorphic position. The soil profile met the redox depressions (F8) indicator.

Wetland S

Wetland S is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.02 acre in size. It is located in the western portion of the Study Area, adjacent to Waters V (**Appendix C, Section C Map 2**). Wetland S appears to receive hydrology from adjacent upland runoff and a small stormwater pipe. Wetland S is hydrologically connected to Winters Run through Waters V. Wetland S is a moderate-quality wetland due to the low level of invasive species and a visible surface connection to an adjacent waterway. It provides the function and value of floodflow alteration and retention. It was previously delineated by RKK in 2017; more information can be found in *the I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included red maple and pin oak (*Quercus palustris*, FACW). The dominant species in the shrub stratum was broadleaf cattail (*Typha latifolia*, OBL).

The primary hydrologic indicator observed was water-stained leaves. Secondary hydrologic indicators included drainage patterns and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland T

Wetland T is a palustrine, emergent, persistent, temporarily flooded (PEM1A) wetland and is approximately 0.01 acre in size. It is located in the central portion of the Study Area, adjacent to I-95 northbound (**Appendix C, Section C Map 4**). Wetland T appears to receive hydrology from adjacent upland runoff, with no visible surface connection to other systems. Wetland T is a low-quality wetland due to low level of species diversity and its small size. It provides the function and value of floodflow alteration and retention. It was previously delineated by RKK in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

The dominance test for hydrophytic vegetation was met. The dominant species in the shrub stratum was groundsel tree. The dominant species in the herbaceous stratum was narrowleaf cattail (*Typha angustifolia*, OBL).

Primary hydrologic indicators observed included high water table and saturation. The secondary hydrologic indicators included the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland X

Wetland X is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.14 acre in size. It is located in the southwestern portion of the Study Area, adjacent to Waters V (**Appendix C, Section C Map 2**). Wetland X appears to receive hydrology from adjacent upland runoff and is hydrologically connected to Winters Run. Wetland X is a moderate-quality wetland due to the low level of invasive species and hydrologic connectivity to an adjacent waterway. It provides the functions and values of floodflow alteration and sediment/toxicant retention. It was previously delineated by RKK in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

The dominance test for hydrophytic vegetation was met. The dominant species in the tree stratum was green ash. The dominant species in the shrub stratum was multiflora rose and the dominant species in the herbaceous layer were black bent, poison ivy, and foxtail sedge (*Carex alopecoidea*, FACW).

Primary hydrologic indicators included water-stained leaves and oxidized rhizospheres on living roots. Secondary hydrologic indicators included drainage patterns and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland Z

Wetland Z is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is less than 0.01 acre in size. It is located in the central portion of the Study Area adjacent to Waters Y (**Appendix C, Section C Map 3**). Wetland Z appears to receive hydrology from adjacent upland runoff. Wetland Z appears to overflow into Waters Y during high precipitation events. Wetland Z is a low-quality wetland due its small size. It provides the function and value of floodflow alteration and retention. It was previously delineated by RKK in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

The dominance test for hydrophytic vegetation was met. The dominant species in the herbaceous layer was skunk cabbage. This wetland was categorized as PFO due to surrounding forest cover.

Primary hydrologic indicators included high water table, saturation, water-stained leaves, hydrogen sulfide odor, oxidized rhizospheres on living roots, and presence of reduced iron. There were no secondary indicators present. The soil profile met the hydrogen sulfide (A4) and depleted matrix (F3) indicators.

Wetland AA

Wetland AA is an approximately 0.01-acre palustrine, forested, broad-leaved deciduous, saturated (PFO1B) wetland located in the central portion of the Study Area, adjacent to Waters OO and Waters Y (**Appendix C, Section C Maps 3 & 5**). Wetland AA appears to receive hydrology from a seep as well as from runoff from adjacent uplands; it is hydrologically connected to Winters Run. Wetland AA is considered low-quality due to minimal vegetation and its small size. It provides the function and value of floodflow alteration and retention.

It was previously delineated by RKK in 2017; more information can be found in the I-*95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

The dominance test for hydrophytic vegetation was met. Dominant species in the herbaceous stratum included Japanese stiltgrass, quill sedge (*Carex tenera*, FAC), and multiflora rose.

Primary hydrologic indicators observed included high water table, saturation, hydrogen sulfide odor, and presence of reduced iron. The secondary hydrologic indicator was drainage patterns. The soil profile met the depleted matrix (F3) indicator along with the hydrogen sulfide indicator (A4).

Wetland BB

Wetland BB is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.05 acre in size. It is located in the central portion of the Study Area, adjacent to Waters Y (**Appendix C, Section C Map 3**). Wetland BB appears to receive hydrology from adjacent upland runoff, drains into Waters CC, and ultimately is hydrologically connected to Winters Run. Wetland BB is a moderate-quality wetland due the size of the wetland and its hydrologic connectivity. It provides the function and value of floodflow alteration and retention. It was previously delineated by RKK in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

The dominance test for hydrophytic vegetation was met. The dominant species in the tree stratum was red maple. The dominant species in the herbaceous stratum was roundleaf greenbrier.

The primary hydrologic indicator observed was water stained leaves. Secondary hydrologic indicators included sparsely vegetated concave surface and saturation visible on aerial imagery. The soil profile met the depleted matrix (F3) indicator.

WUS

Newly Delineated Waterways

Waters of the US C-1 (WUS C-1)

WUS C-1 is an ephemeral stream located in the central portion of the Study Area (**Appendix C, Section C Map 3**). WUS C-1 flows south and discharges into WUS C-2. The stream channel is approximately 1 to 3 feet wide with banks approximately 1 to 2 feet high. At the time of the delineation, flow within the channel varied between 0.5 and 2 inches deep. The substrate consisted of silt and sand. The stream is low quality due its size and that it drains from uplands.

Waters of the US C-2 (WUS C-2)

WUS C-2 is an intermittent stream located in the central portion of the Study Area (**Appendix C, Map 3**). WUS C-2 flows southwest and discharges into Waters Y. The stream channel is approximately 3 to 5 feet wide with banks about 18 inches high. At the time of the delineation, flow within the channel varied between 2 and 3 inches deep. The substrate consisted of silt, sand, and muck. The stream is low quality due its loosely defined bed and banks.

Waters of the US C-3 (WUS C-3)

WUS C-3 is an intermittent stream located in the central portion of the Study Area (**Appendix C, Section C Maps 5-6**). WUS C-3 flows south and discharges into Waters Y. The stream channel is approximately 3 to 8 feet wide with banks about 2 feet high. At the time of the delineation, flow within the channel varied between 0.5 and 4 inches deep. The substrate consisted of silt, sand, and muck. The stream is moderate quality due the drainage area and tributaries that discharge into it.

Waters of the US C-4 (WUS C-4)

WUS C-4 is an intermittent stream located in the central portion of the Study Area (**Appendix C, Section C Map 5**). WUS C-4 flows north and discharges into Waters Y. The stream channel is approximately 8 to 10 feet wide with banks about 10 feet high. At the time of the delineation, flow within the channel varied between 0.5 and 2 inches deep. The substrate consisted of cobble, gravel, sand, silt, riprap, and muck. The stream is low quality due to the small amount of flow present at the time of the site visit and the heavy erosion of the banks.

Waters of the US C-5 (WUS C-5)

WUS C-5 is an intermittent stream located in the central portion of the Study Area (**Appendix C, Section C Map 6**). WUS C-5 flows west and discharges into WUS C-3. The stream channel is approximately 2 to 3 feet wide with banks about 2 feet high. At the time of the delineation, flow within the channel varied between 0.5 and 2 inches deep. The substrate consisted of riprap, sand, silt, and muck. The stream is low quality due to the small amount of flow present at the time of the site visit.

Waters of the US C-6 (WUS C-6)

WUS C-6 is an intermittent stream located in the central portion of the Study Area (**Appendix C, Section C Maps 5-6**). WUS C-6 flows northeast and discharges into WUS C-3. The stream channel is approximately 3 to 4 feet wide with banks about 2 to 3 feet high. At the time of the delineation, flow within the channel varied between 1 and 2 inches deep. The substrate consisted of sand, silt, and muck. The stream is low quality due to the small amount of flow present at the time of the site visit.

Waters of the US C-7 (WUS C-7)

WUS C-7 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 7**). WUS C-7 flows south and discharges into WUS C-8. The stream channel is approximately 4 to 5 feet wide with banks about 3 to 4 feet high. At the time of the delineation, flow within the channel varied between 1 and 2 inches deep. The substrate consisted of sand, riprap and silt. The stream is moderate quality due to the consistent flow and connectivity to WUS C-8

Waters of the US C-8 (WUS C-8)

WUS C-8 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 7**). WUS C-8 flows southeast and discharges into Haha Branch outside of the Study Area. The stream channel is approximately 4 to 5 feet wide with banks about 5 to 6 feet high. At the time of the delineation, flow within the channel varied between 1 and 3 inches deep. The substrate consisted of cobble, gravel, sand, silt, and some riprap at the upstream extent. The stream is moderate quality due to the consistent flow resulting from the multiple tributaries that feed into it.

Waters of the US C-9 (WUS C-9)

WUS C-9 is an ephemeral stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 7**). WUS C-9 flows southwest out of an outfall and discharges into WET C-3. The stream channel is approximately 2 to 3 feet wide with banks about 1 to 2 feet high. At the time of the delineation, flow within the channel varied between 1 and 3 inches deep. The substrate consisted of cobble, gravel, sand, and silt. The stream is moderate quality.

Waters of the US C-10 (WUS C-10) – Haha Branch

WUS C-10 is a perennial stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 8**). WUS C-10 flows south and is Haha Branch. The stream channel is approximately 12 feet wide with banks about 3 to 4 feet high. At the time of the delineation, flow within the channel varied between 3 and 8 inches deep. The substrate consisted of cobble, sand, and silt, with some riprap at the upstream extent. The stream is moderate quality due to the size and flow amount.

Waters of the US C-11 (WUS C-11)

WUS C-11 is an ephemeral stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 7**). WUS C-11 flows west and discharges into WUS C-8. The stream channel is approximately 3 feet wide with banks about 5 feet high. At the time of the delineation there was no flow observed. The substrate consisted of gravel, sand, and silt. The stream is considered low quality due to its size and because no flow was observed during the site visit.

Waters of the US C-12 (WUS C-12)

WUS C-12 is an ephemeral stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 7**). WUS C-12 flows south and discharges into WUS C-8. The stream channel is approximately 3 to 5 feet wide with banks about 3 to 4 feet high. At the time of the delineation there was no flow observed. The substrate consists of sand and silt. The stream is low quality due to its size and that no flow was observed during the site visit.

Waters of the US C-13 (WUS C-13)

WUS C-13 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 8**). WUS C-13 flows south and discharges into an unnamed tributary to Haha Branch. The stream channel is approximately 6 to 8 feet wide with banks about 5 to 6 feet high. At the time of the delineation, flow within the channel varied between 1 and 2 inches deep. The substrate consisted of cobble, gravel, sand, and silt. The stream is moderate quality due to the size of the stream and the flow observed at the time of the site visit.

Waters of the US C-14 (WUS C-14)

WUS C-14 is an ephemeral stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 8**). WUS C-14 flows west and discharges into WUS C-13. The stream channel is approximately 3 to 6 feet wide with banks about 3 to 4 feet high. There was no flow observed at the time of the site visit. The substrate consisted of gravel, sand, and silt. The stream is considered low quality due to size and because no was flow observed at the time of the site visit.

Waters of the US C-15 (WUS C-15)

WUS C-15 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 8**). WUS C-15 flows west and discharges into WUS C-13. The stream channel is approximately 8 to 10 feet wide with banks about 2 to 7 feet high. At the time of the delineation, flow within the channel varied between 0.5 and 1 inch deep. The substrate consisted of gravel, sand, and silt. The stream is considered low quality due to its length and lack of contributing tributaries.

Waters of the US C-16 (WUS C-16)

WUS C-16 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 8).** WUS C-16 flows south and discharges into WUS C-13. The stream channel is approximately 2 to 5 feet wide with banks about 1 to 5 feet high. At the time of the delineation, flow within the channel varied between 0.5 and 1 inch deep. The substrate consisted of gravel, sand, and silt. The stream is considered low quality due to its length and lack of contributing tributaries.

Waters of the US C-17 (WUS C-17)

WUS C-17 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 9**). WUS C-17 drains WET D-1, flows southwest, and discharges into WUS C-18. The stream channel is approximately 4 to 5 feet wide with banks about 2 to 3 feet high. At the time of the delineation, flow within the channel varied between 1 and 2 inches deep. The substrate consisted of gravel, sand, muck, and silt. The stream is considered low quality.

Waters of the US C-18 (WUS C-18)

WUS C-18 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 9**). WUS C-18 flows southwest and discharges into WUS C-21. The stream channel is approximately 1 to 3 feet wide with banks about 1 to 3.5 feet high. At the time of the delineation, flow within the channel varied between 2 and 3 inches deep. The substrate consisted of cobble, gravel, sand, and silt. The stream is considered to be of moderate quality due to the contributing tributaries and because it drains multiple wetlands.

Waters of the US C-19 (WUS C-19)

WUS C-19 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 9**). WUS C-19 flows southwest and discharges into WUS C-18. The stream channel is approximately 2 to 3 feet wide with banks about 8 inches high. At the time of the delineation, flow within the channel varied between 1 and 2 inches deep. The substrate consisted of cobble, gravel, sand, and silt. The stream is considered to be of moderate quality due to the evidence of consistent flow.

Waters of the US C-20 (WUS C-20)

WUS C-20 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 9**). WUS C-20 flows northwest and discharges into WUS C-18. The stream channel is approximately 2 to 3 feet wide with banks about 8 inches high. At the time of the delineation, flow within the channel varied between 1 and 2 inches deep. The substrate consisted of cobble, gravel, sand, silt, and muck. The stream is moderate quality due the connection to wetland WET C-6.

Waters of the US C-21 (WUS C-21)

WUS C-21 is a perennial stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 9**). WUS C-21 flows south and discharges into Haha Branch outside of the Study Area. The stream channel is approximately 4 to 10 feet wide with banks about 4 to 6 feet high. At the time of the delineation, flow within the channel varied between 3 and 8 inches deep. The substrate consisted of cobble, gravel, sand, silt, and muck. The stream is considered to be of moderate quality due to the multiple tributaries and wetlands that discharge and drain into it.

Waters of the US C-22 (WUS C-22)

WUS C-22 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 9**). WUS C-22 flows south and discharges into WUS C-21. The stream channel is approximately 2 feet wide with banks about 1 to 3 feet high. At the time of the delineation, flow within the channel varied between 1 and 2 inches deep. The substrate consisted of sand, silt, and muck. The stream is considered to be low quality due to size and length of the stream.

Waters of the US C-23 (WUS C-23)

WUS C-23 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 9**). WUS C-23 flows southwest and discharges into WUS C-21. The stream channel is approximately 2 feet wide with banks about 6 inches high. At the time of the delineation, flow within the channel varied between 0.5 and 1 inch deep. The substrate consisted of gravel, sand, and silt. The stream is considered to be low quality due to size and length of the stream.

Waters of the US C-24 (WUS C-24)

WUS C-24 is a perennial stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 9**). WUS C-24 flows southeast and discharges into WUS C-21. The stream channel is approximately 3 to 4 feet wide with banks about 3 feet high. At the time of the delineation, flow within the channel varied between 1 and 3 inches deep. The substrate consisted of gravel, sand, and silt. The stream is moderate quality due to the tributaries and wetlands that discharge into the stream.

Waters of the US C-25 (WUS C-25)

WUS C-25 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 9**). WUS C-25 flows southeast and discharges into WUS C-24 outside of the Study Area. The stream channel is approximately 3 to 5 feet wide with banks about 3 to 5 feet high. At the time of the delineation, flow within the channel was about 1 inch deep. The substrate consisted of cobble, gravel, sand, and silt. The stream is low quality due to the lack of tributaries and the small amount of flow present during the field investigation.

Waters of the US C-26 (WUS C-26)

WUS C-26 is an intermittent stream located in the northeastern portion of the Study Area **Appendix C, Section C Map 9**). WUS C-26 flows south and discharges into WUS C-24. The stream channel is approximately 2 to 5 feet wide with banks about 2 to 5 feet high. At the time of the delineation, flow within the channel was about 1 inch deep. The substrate consisted of cobble, sand, and silt. The stream is low quality due to the lack of tributaries and the small amount of flow present during the field investigation.

Waters of the US C-27 (WUS C-27)

WUS C-27 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 9)** WUS C-27 flows south and discharges into WET C-7. The stream channel is approximately 2 to 5 feet wide with banks about 2 to 5 feet high. At the time of the delineation, flow within the channel was about 1 to 2 inches deep. The substrate consisted of cobble, sand, silt, and muck. The stream is moderate quality due to the size and amount of flow present during the field investigation.

Waters of the US C-28 (WUS C-28)

WUS C-28 is a perennial stream located in the central portion of the Study Area (**Appendix C, Section C Map 6**). WUS C-28 flows east through the Study Area, becomes Waters Y, and then flows southwest to discharge into Winters Run. The stream channel is approximately 1 to 3 feet wide with banks about 2 feet high. At the time of the delineation, flow within the channel was about 4 to 6 inches deep. The substrate consisted of cobble, sand, and silt. The stream is moderate quality due to the size and amount of flow present during the field investigation.

Waters of the US C-29 (WUS C-29)

WUS C-29 is a perennial stream located in the central portion of the Study Area (**Appendix C, Section C Map 6**). WUS C-29 flows west into WUS C-28. The stream channel is approximately 2 to 3 feet wide with banks about 1 to 2 feet high. At the time of the delineation, flow within the channel was about 2 to 3 inches deep. The substrate consisted of cobble, sand, and silt. The stream is low quality due to the lack of tributaries and the size and length of the stream.

Waters of the US C-30 (WUS C-30)

WUS C-30 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section C Map 1)** WUS C-30 flows southwest and discharges into Waters Y. The stream channel is approximately 5 to 7 feet wide with banks about 1 to 2 feet high. At the time of the delineation, flow within the channel was about 5 to 8 inches deep. The substrate consisted of cobble, gravel, sand, silt, and muck. The stream is low quality due to the channelized nature of the stream.

Waters of the US C-31 (WUS C-31)

WUS C-31 is an ephemeral stream located in the northeastern portion of the Study Area (**Appendix C, Section C Map 9**). WUS C-31 carries flow southwest from WET D-1 and discharges into WET C-4. The stream channel is approximately 2 feet wide with banks about 4 to 6 inches high. At the time of the delineation, shortly after a period of heavy rain, flow within the channel was about 0.5 inches deep. The substrate consisted of sand, silt, and muck. The stream is low quality due to the size and length of the stream.

Previously Delineated Waterways

Waters U – Winters Run

Waters U is a perennial stream located in the southwestern portion of the Study Area (**Appendix C, Section C Map 1**). Waters U flows north to south and receives hydrology from multiple tributaries. Winters Run eventually discharges into the Bush River. The stream channel is approximately 50 to 70 feet wide, with banks about 2 inches to 4 feet high. At the time of the delineation, flow within the channel was estimated to be 6 to 20 inches deep. The substrate consisted of cobble, gravel, sand, silt and concrete. The stream is considered high quality due its size and Tier II designation. It was previously delineated by RKK in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

Waters V

Waters V is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section C Maps 1-2**). Waters V flows southwest and discharges into Winters Run. The stream channel is approximately 2 to 5 feet wide with banks about 1 to 2 feet high. At the time of the delineation, flow within the channel varied between 0.5 and 2 inches deep. The substrate consisted of cobble, gravel, sand, and silt. The stream is considered moderate quality due its size and perennial flow. It was previously delineated by RKK in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

Waters W

Waters W is a perennial stream located in the southwestern portion of the Study Area (**Appendix C, Section C Map 1**). Waters W flows southeast and discharges into Winters Run. The stream channel is approximately 2 to 5 feet wide with banks about 1 to 2 feet high. At the time of the delineation, flow within the channel varied between 4 and 8 inches deep. The substrate consisted of gravel, sand, and silt. The stream is moderate quality due its size and perennial flow. It was previously delineated by RKK in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

Waters Y

Waters Y is a perennial stream located in the central and southwestern portions of the Study Area (**Appendix C, Section C Maps 1-3, 5-6**). Waters Y flows southwest and discharges into Winters Run. The stream channel is approximately 3 to 8 feet wide with banks about 1 to 4 feet high. At the time of the delineation, flow within the channel varied between 3 and 8 inches deep. The substrate consisted of cobble, gravel, sand, silt, and muck. The stream is moderate quality due its size and perennial flow. It was previously delineated by RKK in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

Waters CC

Waters CC is an intermittent stream located in the central portion of the Study Area (**Appendix C, Section C Map 3**). The stream discharges into Waters Y, and is approximately 1 to 2 feet wide, with banks about 6 to 8 inches high. At the time of the delineation, flow within the channel varied between 1 and 3 inches deep. The substrate of Waters CC consisted of gravel, sand, and muck; it is considered a moderate quality stream as it drains Wetland BB. It was previously delineated by RKK in 2017; more information can be found in *the I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

Waters DD

Waters DD is an intermittent stream located in the central portion of the Study Area (**Appendix C, Section C Map 3**). The stream discharges into Waters Y and is approximately 1 to 3 feet wide with banks about 4 to 6 inches high. At the time of the delineation, flow within the channel varied between 1 and 2 inches deep. The substrate consisted of gravel, sand, silt, and muck; it is considered moderate quality due its connection to groundwater. It was previously delineated by RKK in 2017; more information can be found in *the I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

Waters EE

Waters EE is a perennial stream located in the southwestern portion of the Study Area (**Appendix C, Section C Maps 2-3**). Waters EE flows south and discharges into Waters Y. The stream channel is approximately 4 to 8 feet wide with banks about 2 to 3 feet high. At the time of the delineation, flow within the channel varied between 2 and 6 inches deep. The substrate consisted of cobble, gravel, sand, and silt. The stream is moderate quality due its size and perennial flow. It was previously delineated by RKK in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

Waters FF

Waters FF is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section C Map 1**). Waters FF flows south and discharges into Winters Run. The stream channel is approximately 1 to 4 feet wide with banks about 6 to 12 inches high. At the time of the delineation, flow within the channel varied between 1 and 5 inches deep. The substrate consisted of sand, silt, muck, and some concrete. The stream is moderate quality due its size and concrete portion. It was previously delineated by RKK in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

Waters OO

Waters OO is an intermittent stream located in the central portion of the Study Area (**Appendix C, Section C Maps 3, 5**). Waters OO flows south and discharges into Waters Y. The stream channel is approximately 4 feet wide with banks about 1 foot high. At the time of the delineation, flow within the channel varied between

0.5 and 2 inches deep. The substrate consisted mostly of concrete, with an area of cobble and silt at the confluence with Waters Y. Because it is lined with concrete, the stream is considered low quality. It was previously delineated by RKK in 2017; more information can be found in the *I-95 5th Lane Widening from MD 152 to MD 24 – Natural Resource Inventory Report.*

D. KH-3029: Abingdon Road Overpass

Stantec conducted field investigations on February 26, 2019 within the Study Area for the Abingdon Road Overpass contract. One new non-tidal wetland was delineated. No other wetlands or WUS were identified within the Study Area for this contract.

Wetlands

Newly Delineated Wetlands

Wetland D-1 (WET D-1)

WET D-1 is a palustrine, forested, broadleaf deciduous, seasonally saturated (PFO1A) wetland and is approximately 0.06 acres in size within the Study Area. It is located in southwestern portion of the Study Area and extends beyond the Abingdon Road Overpass Study Area to the southwest (**Appendix C, Section D Map 1**) into the MD 24 Interchange Study Area (**Appendix C, Section C Map 9**). The wetland appears to be associated with a groundwater seep that forms the headwaters of a stream to the west of this Study Area; WET D-1 discharges to that stream, which is a tributary to Haha Branch. WET D-1 is a moderate-quality wetland, but the herbaceous stratum contains a minor amount of invasive species. It provides the function of floodflow alteration.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included sweetgum (*Liquidambar styraciflua*, FAC) and red maple (*Acer rubrum*, FAC). Vegetation in the sapling/shrub stratum was dominated by red maple. Japanese stilt grass (*Microstegium vimineum*, FAC), wool-grass (*Scirpus cyperinus*, OBL), and soft rush (*Juncus effusus*, OBL) were dominants in the herbaceous stratum.

Primary hydrologic indicators observed included high water table, saturation, and water-stained leaves. Secondary hydrologic indicators included drainage patterns and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

E. KH-3027: MD 152 Park and Ride Facility Relocation

JMT conducted field investigations between July 3, 2018 and January 4, 2019 within the Study Area of the MD 152 Park and Ride Facility Relocation contract. Ten new non-tidal wetlands and nine new WUS were delineated. Additionally, one previously delineated WUS was confirmed within the Study Area for this contract.

Wetlands

Newly Delineated Wetlands

Wetland E-1 (WET E-1)

WET E-1 is a palustrine, forested, broadleaf deciduous, temporarily flooded/seasonally flooded (PFO1A/C) wetland and is approximately 0.51 acres in size. It is located east of Jaycee Drive and southeast of Cornerstone Community Church (**Appendix C, Section E Map 1**). WET E-1 appears to receive hydrology from a groundwater seep, and discharges into WUS E-1. WET E-1 is a moderate-quality wetland due to low coverage by invasive species, inflow of stormwater runoff, and low to moderate plant diversity. It provides the function and value of groundwater recharge/discharge.

The dominance test for hydrophytic vegetation was met. Sweetgum (*Liquidambar styraciflua,* FAC) was dominant in the tree stratum. Dominant species in the sapling/shrub stratum included sugar maple (*Acer saccharum,* FACU) and highbush blueberry (*Vaccinium corymbosum,* FACW). In the herbaceous stratum, Japanese honeysuckle (*Lonicera japonica,* FACU), American holly (*Ilex opaca*, FAC), and highbush blueberry were dominant.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. Secondary hydrologic indicators included sparsely vegetated concave surface and drainage patterns. The soil profile met the depleted matrix (F3) indicator.

Wetland E-2 (WET E-2)

WET E-2 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.58 acres in size. It consists of two wetland polygons divided by a manmade berm and is located east of Jaycee Drive and southeast of Cornerstone Community Church (**Appendix C, Section E Map 1**). WET E-2 appears to receive hydrology from a stormwater management facility as well as groundwater, and discharges into WUS 25B. WET E-2 is a low-quality wetland due to disturbance such as fragmentation caused by the man-made berm. It provides the function and value of groundwater recharge/discharge.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included sweetgum and persimmon (*Diospyros virginiana,* FAC). Dominant species in the herbaceous stratum included deertongue (*Dichanthelium clandestinum,* FACW), sensitive fern (*Onoclea sensibilis*, FACW), and New York fern (*Thelypteris noveboracensis,* FAC).

Primary hydrologic indicators observed included water-stained leaves. Secondary hydrologic indicators included geomorphic position and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland E-3 (WET E-3)

WET E-3 consists of two wetland cover types: palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E), and palustrine, emergent, persistent, seasonally flooded (PEM1C). The PEM area is approximately 0.03 acres in size and is completely outside the Study Area to the east. The PFO portion is approximately 1.19 acres and continues outside the Study Area to the east. One wetland sample plot was taken within each cover type.

WET E-3 is located in a depression west of MD 152 and south of Franklinville Road (**Appendix C, Section E Map 3**). Sources of hydrology for the wetland include runoff from the surrounding hillslopes, unmanaged stormwater from MD 152, seeping groundwater, and rainfall. WET E-3 discharges into a channel located outside of the Study Area, which flows east underneath MD 152. The PFO portion of WET E-3 is high quality because it is a large, relatively undisturbed, mature forested wetland, with little presence of invasive species, and which may also be a vernal pool; the PEM portion is moderate quality, due to influence by unmanaged stormwater runoff and low presence of invasive species. The wetland provides groundwater recharge/discharge and wildlife habitat functions and values.

WET E-3 PFO

Within the PFO sample plot, the dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included black gum (*Nyssa sylvatica*, FAC), sweetgum, and red maple (*Acer rubrum*, FAC). Dominant species in the sapling/shrub stratum included highbush blueberry and black gum. In the herbaceous stratum, unidentified moss was dominant.

Primary hydrologic indicators observed included high water table, saturation, and water-stained leaves. Secondary hydrologic indicators included sparsely vegetated concave surface, drainage patterns, moss trim lines, saturation visible on aerial imagery, geomorphic position and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

WET E-3 PEM

Within the PEM sample plot, the dominance test for hydrophytic vegetation and the rapid test for hydrophytic vegetation were met. Dominant plant species in the herbaceous stratum included broadleaf cattail (*Typha latifolia*, OBL), soft rush (*Juncus effusus*, OBL) and an unidentified *Festuca* sp.

Primary hydrologic indicators observed included saturation. Secondary hydrologic indicators included drainage patterns, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland E-4 (WET E-4)

WET E-4 is a palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E) wetland and is approximately 1.25 acres in size. It is located south of Franklinville Road and southeast of WUS E-2, at the toe of a hillslope (**Appendix C, Section E Maps 2-3**). WET E-4 appears to receive hydrology from seeping groundwater and runoff from the adjacent hillslopes; it abuts and discharges into WUS E-2. WET E-4 is high quality because it is a large, relatively undisturbed, mature forested wetland. The wetland provides groundwater recharge/discharge, sediment/toxicant retention, and wildlife habitat functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included sweetgum, willow oak (*Quercus phellos,* FACW), red maple, and black gum. Dominant species in the sapling/shrub stratum included highbush blueberry and black gum. In the herbaceous stratum, Japanese stiltgrass (*Microstegium vimineum*, FAC), Jack in the pulpit (*Arisaema triphyllum*, FACW), and coastal sweetpepper bush (*Clethra alnifolia*, FACW) were dominant.

Primary hydrologic indicators observed included saturation, water marks, sediment deposits, and water-stained leaves. Secondary hydrologic indicators included drainage patterns, geomorphic position, and the FAC-neutral test. The soil profile met the loamy gleyed matrix (F2) and depleted matrix (F3) indicators.

Wetland E-5 (WET E-5)

WET E-5 is a palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E) wetland and is approximately 0.14 acres in size. It is located south of Franklinville Road, south of WET E-3, and west of MD 152 (**Appendix C, Section E Map 3**). WET E-5 is a groundwater seep that flows into WET E-3. WET E-5 is a moderate-quality wetland due to low coverage by invasive species, narrow width, and sparse vegetation. It provides groundwater recharge/discharge and wildlife habitat functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included silver maple (*Acer saccharinum,* FAC), sweetgum, and red maple. Dominant species in the sapling/shrub stratum included roundleaf greenbrier (*Smilax rotundifolia*, FAC), mountain laurel (*Kalmia latifolia*, FACU), and American holly. In the herbaceous stratum, Japanese stiltgrass was dominant.

Primary hydrologic indicators observed included surface water, high water table, saturation, and algal mat or crust. Secondary hydrologic indicators included sparsely vegetated concave surface, drainage patterns, and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland E-6 (WET E-6)

WET E-6 is a palustrine, forested, broadleaf deciduous, saturated to seasonally flooded/saturated (PFO1B/E) wetland and is approximately 0.20 acres in size. It consists of two wetland polygons located on a hillslope south of WUS E-2 (**Appendix C, Section E Map 2**). WET E-6 is fed by seeping groundwater and by WUS E-4, which dissipates into the wetland. The main portion of WET E-6 appears to have a subsurface

connection with WUS E-2, while WET E-6A discharges into WUS E-6. WET E-6 is a wetland mosaic estimated to consist of 70 percent wetland and 30 percent upland. The wetland is moderate quality due to low coverage by invasive species, narrow width, and sparse vegetation. It is also very marginal in some areas; it may appear smaller in the dry season. WET E-6 provides groundwater recharge/discharge functions and values.

The dominance test for hydrophytic vegetation was met. Dominant species in the tree stratum included red maple and American beech (*Fagus grandifolia,* FACU). Dominant species in the sapling/shrub stratum included sweetgum and roundleaf greenbrier.

Primary hydrologic indicators observed included surface water, high water table, saturation, water marks, and algal mat or crust. Secondary hydrologic indicators included sparsely vegetated concave surface and drainage patterns. The soil profile met the depleted matrix (F3) indicator.

Wetland E-7 (WET E-7)

WET E-7 is a palustrine, forested, broadleaf deciduous, seasonally flooded (PFO1C) wetland and is approximately 0.32 acres in size. It consists of two wetland polygons formed by WUS E-2 losing definition and frequently overflowing its banks (**Appendix C, Section E Maps 2-3**). WET E-7 discharges into WUS E-2. WET E-7 is a wetland mosaic estimated to consist of 80 percent wetland and 20 percent upland. WET E-7 is a moderate-quality wetland due to low coverage by invasive species, narrow width, and sparse vegetation. It provides groundwater recharge/discharge, floodflow alteration, and sediment/toxicant retention functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple, sweetgum, boxelder (*Acer negundo,* FAC), American holly, American beech, and black gum. Dominant species in the sapling/shrub stratum included spicebush (*Lindera benzoin,* FACW) and highbush blueberry. In the woody vine stratum, poison ivy (*Toxicodendron radicans,* FAC) was dominant.

Primary hydrologic indicators observed included surface water, high water table, saturation, drift deposits, and water-stained leaves. Secondary hydrologic indicators included drainage patterns, geomorphic position, and FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland E-8 (WET E-8)

WET E-8 consists of two wetland cover types: palustrine, forested, broadleaf deciduous, saturated to seasonally flooded/saturated (PFO1B/E), and palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E). The PEM area is approximately 0.01 acres in size and continues outside the Study Area to the north. The PFO portion is approximately 0.70 acres. One wetland sample plot was taken within each cover type.

WET E-8 consists of five wetland mosaic polygons located north of WUS E-2 and south of Franklinville Road, estimated to consist of 60 percent wetland and 40 percent upland (**Appendix C, Section E Maps 2-3**). These polygons are fed by rainwater, seeping groundwater, unmanaged stormwater runoff from the road, and a culvert under Franklinville Road. WET E-8A and WET E-D flow into WUS E-2, while the remaining wetland polygons are located within 100 feet of that stream; therefore, the wetland can be considered adjacent to WUS E-2. WET E-8 is a moderate-quality wetland due to low coverage by invasive species, spotty nature, and sparse vegetation. It provides groundwater recharge/discharge functions and values.

WET E-8 PFO

Within the PFO sample plot, the dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple, willow oak, and sweetgum. Dominant species in the sapling/shrub stratum included American beech and red maple. In the herbaceous stratum, woolgrass (*Scirpus cyperinus*, OBL) and roundleaf greenbrier were dominant.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. Secondary hydrologic indicators included sparsely vegetated concave surface and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

WET E-8 PEM

Within the PEM sample plot, the dominance test for hydrophytic vegetation was met. Dominant plant species in the herbaceous stratum included woolgrass, soft rush, deertongue, roundleaf greenbrier, and an unknown grass (*Festuca* sp., NA)

Primary hydrologic indicators observed included surface water, high water table, saturation, water-stained leaves, and oxidized rhizospheres on living roots. Secondary hydrologic indicators included drainage patterns, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland E-9 (WET E-9)

WET E-9 is a palustrine, forested, broadleaf deciduous, saturated (PFO1B) wetland and is approximately 0.13 acres in size. It is located south of Franklinville Road, east of WUS E-8 (**Appendix C, Section E Map 2**). WET E-9 consists of two wetland mosaic polygons, estimated to consist of 80 percent wetland and 20 percent upland. These polygons are fed by rainwater and seeping groundwater. They are located within 100 feet of WUS E-8, and therefore can be considered adjacent wetlands. WET E-9 is a moderate-quality wetland due to low coverage by invasive species and sparse vegetation. It provides groundwater recharge/discharge functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple. Dominant species in the sapling/shrub stratum included highbush blueberry and roundleaf

greenbrier. In the herbaceous stratum, deertongue, soft rush, roundleaf greenbrier, and sweet woodreed (*Cinna arundinacea*, FACW) were dominant.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. Secondary hydrologic indicators included drainage patterns, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland E-10 (WET E-10)

WET E-10 is a palustrine, emergent, persistent, saturated (PEM1B) wetland and is approximately 0.06 acres in size. It is located in a mowed meadow west of WUS E-8 and south of Franklinville Road (**Appendix C, Section E Map 2**). WET E-10 appears to receive hydrology from seeping groundwater (an old spring house is located nearby), occasional flooding from WUS E-8, and unmanaged stormwater from the adjacent road. WET E-10 is located within 100 feet of WUS E-8 and therefore can be considered an adjacent wetland. WET E-10 is a low-quality wetland due to disturbance caused by mowing, including low vegetation diversity and rutting. It provides groundwater recharge/discharge and floodflow alteration functions and values.

The dominance test for hydrophytic vegetation was met. Creeping jenny (*Lysimachia nummularia*, FACW) is dominant in the herbaceous stratum.

Primary hydrologic indicators observed included surface water, high water table, saturation, and algal mat or crust. Secondary hydrologic indicators included geomorphic position and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

WUS

Newly Delineated Waterways

Waters of the US E-1 (WUS E-1)

WUS E-1 is an intermittent stream located east of Jaycee Drive and southeast of Cornerstone Community Church (**Appendix C, Section E Map 1**). The stream flows south and discharges into WUS 25B. The stream channel is approximately 5 feet wide with banks between 4 and 6 feet high; at the time of the delineation, flow within the channel was approximately 3 inches deep. The substrate consists of sand and silt. The stream is moderate in quality due to its small size and stable channel and banks.

Waters of the US E-2 (WUS E-2)

WUS E-2 is a perennial stream that flows southwest from Franklinville Road to WUS E-8 (**Appendix C, Section E Maps 2-3**). The upper reaches of the stream had very low flow at the time of delineation, with subterranean flow in some areas, and several stagnant pools. Farther downstream, WUS E-2 becomes more unstable, in some places incised and in others losing definition and overflowing its banks to form wetlands,

with nascent alternate channels developing. The stream channel is approximately 2 to 4 feet wide with banks between 1 and 4 feet high; at the time of the delineation, flow within the channel was approximately 1 to 8 inches deep. The substrate consists of gravel, sand, and silt. The stream is low in quality within its incised and unstable reaches, and moderate in quality where it is well connected with its floodplain but has a stable, defined channel.

Waters of the US E-3 (WUS E-3)

WUS E-3 is an ephemeral stream and developing headcut channel that drains WET E-4 into WUS E-2 (**Appendix C, Section E Maps 2-3**). The stream flows southwest. The stream channel is approximately 3 to 5 feet wide with banks between 2 and 3 feet high; at the time of the delineation, flow within the channel was approximately 2 inches deep. The substrate consists of sand and gravel. WUS E-3 is low in quality due to bank instability.

Waters of the US E-4 (WUS E-4)

WUS E-4 is an intermittent stream located at the southern edge of the Franklinville Road portion of the Study Area (**Appendix C, Section E Map 2**). The stream flows northwest and loses definition, forming WET E-6. WET E-6 lacks a surface connection to any tributary; therefore, WUS E-4 lacks connection to a Traditionally Navigable Waterway. The stream channel is approximately 2 to 8 feet wide with banks between 0.5 and 2 feet high; at the time of the delineation, flow within the channel was approximately 2 to 6 inches deep. The substrate consists of muck and silt. The stream is low in quality, due to its lack of surface connection to downstream waters and poor definition.

Waters of the US E-5 (WUS E-5)

WUS E-5 is an intermittent stream that drains WET E-7 into WUS E-2 (**Appendix C, Section E Map 2**). WUS E-5 and WET E-7 serve as a high flow channel for WUS E-2. WUS E-5 flows west. The stream channel is approximately 3 to 4 feet wide with banks two feet high; at the time of the delineation, flow within the channel was approximately 1 to 4 inches deep. The substrate consists of gravel, sand, and silt. The stream is low in quality; it is rapidly downcutting, as evidenced by extensive tree roots crossing the channel.

Waters of the US E-6 (WUS E-6)

WUS E-6 is an intermittent stream that drains WET E-7 and WET E-6A into WUS E-2 (**Appendix C, Section E Map 2**). WUS E-6 and WET E-7 serve as a high flow channel for WUS E-2. WUS E-6 flows west. The stream channel is approximately 4 to 6 feet wide with banks between 2 and 3 feet high; at the time of the delineation, flow within the channel was approximately 2 to 6 inches deep. The substrate consists of gravel, sand, and silt. The stream is low in quality, due to its unstable banks.

Waters of the US E-7 (WUS E-7)

WUS E-7 is an intermittent stream that drains WET E-7A into WUS E-8 (**Appendix C, Section E Map 2**). WUS E-7 and WET E-7A serve as a high flow channel for WUS E-2. WUS E-7 flows west. The stream channel is approximately 8 to 10 feet wide with banks between 3 and 4 feet high; at the time of the delineation, flow within the channel was approximately 2 to 12 inches deep. The substrate consists of gravel, sand, and silt. The stream is low in quality, due to its unstable banks and actively developing headcut.

Waters of the US E-8 (WUS E-8)

WUS E-8 is a perennial tributary to Little Gunpowder Falls that flows into the Study Area from a culvert beneath Franklinville Road (**Appendix C, Section E Map 2**). The stream flows south and exits the Study Area at the southern edge of the property. The stream channel is approximately 5 to 12 feet wide with banks between 2 and 6 feet high; at the time of the delineation, flow within the channel was approximately 3 to 18 inches deep. The substrate consists of cobble, gravel, sand, and silt. The stream is low in quality due to its unstable, rapidly eroding banks and incised channel.

Waters of the US E-9 (WUS E-9)

WUS E-9 is an ephemeral stream located in the south-central portion of the Franklinville Road portion of the Study Area (**Appendix C, Section E Map 2**). The stream flows east into WUS E-8. The stream channel is approximately 2 to 6 feet wide with banks between 2 and 5 feet high; at the time of the delineation, there was no flow within the channel. The substrate consists of gravel, sand, and silt. The stream is low in quality because it is a developing headcut.

Previously Delineated Waterways

Waters of the US 25B (WUS 25B)

WUS 25B is a perennial stream fed by WET E-2 and WUS E-1. It is located south of the Cornerstone Community Church (**Appendix C, Section E Map 1**). The stream is moderate in quality because it has a moderately stable channel. It was previously delineated by JMT in 2008; more information can be found in the *Wetland Identification & Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22*. This stream was also delineated as Waters G by RKK in 2018 as part of the *I-95 5th Lane Widening from MD 152 to MD 24 Natural Resource Inventory.*

F. KH-3023: MD 24/MD 924 Park and Ride

Coastal Resources, Inc. conducted field investigations from November 12, 2018 to November 14, 2018 within the Study Area of Contract KH-3023. Eight new non-tidal wetlands and four new WUS were delineated within the Study Area for this contract.

Wetlands

Newly Delineated Wetlands

Wetland F-1 (WET F-1)

WET F-1 is a palustrine, forested, broadleaf deciduous, saturated (PFO1B) wetland and is approximately 0.10 acres in size. It is located in the southern portion of the Study Area and has formed within a swale abutting WUS F-1 (**Appendix C, Section F Map 2**). WET F-1 appears to receive hydrology from a high-water table as well as surface water runoff from the upslope gravel parking lot and the abandoned driveway bisecting the wetland. WET F-1 continues to the southeast outside of the Study Area and is hydrologically connected to WUS F-1. WET F-1 is a moderate-quality wetland due to low coverage by invasive species. It provides groundwater recharge/discharge and floodflow alteration functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included American hornbeam (*Carpinus caroliniana*, FAC), tuliptree (*Liriodendron tulipifera*, FACU), and white oak (*Quercus alba*, FACU). Dominant plant species in the sapling/shrub stratum included southern arrow-wood (*Viburnum dentatum*, FAC) and American hornbeam. The dominant species in the woody vine stratum is roundleaf greenbrier (*Smilax rotundifolia*, FAC). No species were observed in the herbaceous layer.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. The secondary hydrologic indicator is drainage patterns. The soil profile met the depleted matrix (F3) indicator.

Wetland F-2 (WET F-2)

WET F-2 is a palustrine, scrub-shrub, broadleaf deciduous, seasonally flooded/saturated (PSS1E) wetland and is approximately 0.01 acres in size. It is located in the central portion of the Study Area and has formed within a depression abutting the outfall of a stormwater management (SWM) pond (**Appendix C, Section F Map 1**). WET F-2 appears to receive hydrology from the SWM pond and discharges into WUS F-1. WET F-2 is considered a low-quality wetland due to the fact that is appears to have been formed by the creation of the SWM pond. It provides floodflow alteration functions and values.

Dominant plant species in the sapling/shrub stratum included multiflora rose (*Rosa multiflora*, FACU) and Chinese privet (*Ligustrum sinense*, FAC). Dominant species in the herbaceous stratum included leafy bulrush (*Scirpus polyphyllus*, OBL), multiflora rose, bristly lady's-thumb (*Persicaria longiseta*, FAC), Japanese stilt grass (*Microstegium vimineum*, FAC), small carpetgrass (*Arthraxon hispidus*, FAC), and an unknown aster species (*Symphotrichum* sp., NI). The dominant species in the woody vine stratum is roundleaf greenbrier.

Primary hydrologic indicators observed included surface water, saturation, and water-stained leaves. The secondary hydrologic indicator is drainage patterns. The soil profile met the depleted matrix (F3) indicator.

Wetland F-3 (WET F-3)

WET F-3 is a palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E) wetland and is approximately 0.01 acres in size. It is located in the northeastern portion of the Study Area and has formed within a depression at the outfall of a SWM pond (**Appendix C, Section F Map 1**). WET F-3 appears to receive hydrology from the SWM pond and discharges into WUS F-2. WET F-3 is a low-quality wetland due to a lack of diversity and presence of invasive species. It provides floodflow alteration functions and values.

The rapid test for hydrophytic vegetation and the dominance test were met. The dominant species in the herbaceous layer was reed canary grass (*Phalaris arundinacea*, OBL). Primary hydrologic indicators observed included surface water, high water table, saturation, and inundation visible on aerial imagery. The secondary hydrologic indicators are drainage pattern sand the FAC-Neutral test. The soil profile met the redox dark surface (F6) indicator.

Wetland F-4 (WET F-4)

WET F-4 is a palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E) wetland and is approximately 0.02 acres in size. It is located in the central portion of the Study Area and has formed within a depression abutting the outfall of a SWM pond (**Appendix C, Section F Map 1**). WET F-4 appears to receive hydrology from the SWM pond and is adjacent to, but lacks a surface connection to, WUS F-1. WET F-4 is a low-quality wetland due to the fact that is appears to have been formed by the creation of the SWM pond. It provides floodflow alteration functions and values.

The dominance test for hydrophytic vegetation was met. The dominant plant species in the tree stratum is red maple (*Acer rubrum*, FAC). Dominant species in the sapling/shrub stratum included sweetgum (*Liquidambar styraciflua*, FAC), groundseltree (*Baccharis halimifolia*, FAC), and multiflora rose. Dominant species in the herbaceous stratum included common reed (*Phragmites australis*, FACW) and Japanese stilt grass. The dominant species in the woody vine stratum is roundleaf greenbrier.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. The soil profile met the depleted matrix (F3) indicator.

Wetland F-5 (WET F-5)

WET F-5 is a palustrine, forested, broadleaf deciduous, seasonally flooded/saturated (PFO1E) wetland and is approximately 0.05 acres in size. It is located in the central portion of the Study Area and has formed within a depression abutting WUS F-2 (**Appendix C, Section F Map 1**). WET F-5 appears to discharge into WUS F-2. WET F-5 is a low-quality wetland due to the lack of native plant diversity and the presence of invasive species. It provides groundwater recharge/discharge functions and values.

The dominance test for hydrophytic vegetation was met. The dominant plant species in the tree stratum is red maple. Dominant species in the sapling/shrub stratum included multiflora rose and southern arrow-wood.

Dominant species in the herbaceous stratum included Japanese stilt grass and reed canary grass. The dominant species in the woody vine stratum is roundleaf greenbrier.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. The secondary hydrologic indicator observed is geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland F-6 (WET F-6)

WET F-6 is a palustrine, scrub-shrub, broadleaf deciduous, seasonally flooded/saturated (PSS1E) wetland and is approximately 0.05 acres in size. It is located in the north-central portion of the Study Area and occurs as a swale within a very disturbed landscape (**Appendix C, Section F Map 1**). WET F-6 appears to receive surface water runoff from the adjacent uplands in addition to a high water table, and discharges to WUS F-3. WET F-6 is a low-quality wetland due to the presence of invasive species and past disturbances to the wetland and surrounding area. It provides groundwater recharge/discharge functions and values.

The dominance test for hydrophytic vegetation was met. The dominant plant species in the sapling/shrub stratum included southern arrow-wood and sweetgum. Dominant species in the herbaceous layer included Japanese stilt grass and Japanese honeysuckle (*Lonicera japonica*, FACU).

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. The secondary hydrologic indicator observed is drainage patterns. The soils profile met the depleted matrix indicator.

Wetland F-7 (WET F-7)

WET F-7 is a palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E) wetland and is approximately 0.02 acres in size. On March 11, 2019, USACE and MDE determined that impacts to this resource do not require authorization. It is located in the north-central portion of the Study Area and has formed within a ditch paralleling a driveway (**Appendix C, Section F Map 1**). WET F-7 appears to receive surface water runoff from the adjacent driveway and uplands in addition to a high water table, and discharges to WUS F-1. WET F-7 is a low-quality wetland due to the presence of invasive species and past disturbance to the wetland and surrounding area. It provides groundwater recharge/discharge functions and values.

The dominance test for hydrophytic vegetation was met. The dominant plant species in the herbaceous stratum included Japanese stilt grass and deer-tongue rosette grass (*Dichanthelium clandestinum*, FACW).

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. The secondary hydrologic indicators are drainage patterns and the FAC-Neutral test. The soils profile met the depleted matrix indicator.

Wetland F-8 (WET F-8)

WET F-8 is a palustrine, scrub-shrub, broadleaf deciduous, seasonally flooded/saturated (PSS1E) wetland and is approximately 0.002 acres in size. It is located in the southern portion of the Study Area and has formed within a floodplain bench (**Appendix C, Section F Map 2**). WET F-8 appears to receive surface water runoff from upslope in addition to a high water table, and discharges into WUS F-1. WET F-8 is a low-quality wetland due to small size and the presence of invasive species. It provides groundwater recharge/discharge functions and values.

The dominance test for hydrophytic vegetation was met. The dominant plant species in the sapling/shrub stratum is northern spicebush (*Lindera benzoin*, FAC). The dominant species in the herbaceous stratum is small-spike false nettle (*Boehmeria cylindrica*, FACW), English ivy (Hedera helix, FACU), Indian strawberry (*Duchesnea indica*, FACU), American pokeweed (*Phytolacca americana*, FACU), and Japanese honeysuckle.

Primary hydrologic indicators observed included surface water, high water table, saturation, and water-stained leaves. Secondary hydrologic indicators observed included drainage patterns and geomorphic position. The soils profile met the depleted matrix (F3) and redox dark surface (F6) indicators.

WUS

Newly Delineated Waterways

Waters of the US F-1 (WUS F-1)

WUS F-1 is a perennial and intermittent stream located in the southern half of the Study Area (**Appendix C, Section F Maps 1-2**). The stream flows southeast and becomes perennial where it flows from the culvert under the Izaak Walton League driveway; it discharges into Haha Branch outside the Study Area. The stream channel is approximately 5 feet wide with banks between 3 and 4 feet high; at the time of the delineation, flow within the channel averaged 6 inches deep. The substrate consists of cobble, sand, and gravel. The stream is low-quality due to significant areas of moderate to severe erosion and approximately 75 linear feet of the perennial portion is buried under concrete rubble and roofing shingles.

Waters of the US F-2 (WUS F-2)

WUS F-2 is an intermittent stream located in the north-central portion of the Study Area (**Appendix C, Section F Map 1**). The stream flows southwest paralleling the driveway and receiving hydrology from one tributary and two wetlands; it discharges into WUS F-1. The channel is approximately 2 feet wide and 1 foot deep; at the time of the delineation, flow within the channel averaged 4 inches deep. The substrate consists of gravel, sand and silt. The stream is low-quality because it appears previously ditched as it parallels the driveway.

Waters of the US F-3 (WUS F-3)

WUS F-3 is an intermittent stream located in the north-central portion of the Study Area (**Appendix C, Section F Map 1**). The stream flows southeast, receiving hydrology from one wetland; it discharges into WUS F-2. The channel is approximately 3 feet wide and 2 feet deep; at the time of the delineation, flow within the channel averaged 2 inches deep. The substrate consists of sand and silt. The stream is low-quality because it is a very short reach that lacks stable, in-stream habitat.

Waters of the US F-4 (WUS F-4)

WUS F-4 is an ephemeral channel located in the south-central portion of the Study Area (**Appendix C, Section F Map 1**). On March 11, 2019, USACE and MDE determined that impacts to this resource do not require authorization. The stream flows southwest, receiving surface water runoff from the surrounding uplands; it discharges into WUS F-1. The channel is approximately 4 feet wide and 3 feet deep; at the time of the delineation, flow within the channel was between 0 and 6 inches deep. The substrate consists of gravel and sand. The stream is low-quality because it is subject to ephemeral flows and is actively head-cutting.

G. KH-3020: I-95 NB Extension to Bynum Run/Noise Wall on NB I-95 North of Abingdon Road

WSP conducted field investigations from February 22, 2019 to February 26, 2019 within the Study Area of the I-95 NB Extension to Bynum Run/Noise Wall on NB I-95 North of Abingdon Road contract. Eight new non-tidal wetlands and 22 new WUS were delineated. Additionally, two previously delineated WUS were confirmed within the Study Area for this contract.

Wetlands

Newly Delineated Wetlands

Wetland G-1 (WET G-1)

WET G-1 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.05 acres in size (**Appendix C, Section G Map 1**). It is located in the southwestern portion of the Study Area and has formed within a small depression along toe of slope. WET G-1 appears to receive hydrology overland flow from adjacent uplands and is hydrologically isolated. WET G-1 is a moderate-quality wetland due to low coverage by invasive species and medium plant diversity. It provides floodflow alteration and sediment/toxicant retention functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included Atlantic white cedar (*Chamaecyparis thyoides*, OBL). No species in the sapling/shrub stratum were observed. In the herbaceous stratum, roundleaf greenbrier (*Smilax rotundifolia,* FAC) and longstalk sedge (*Carex pedunculata*, OBL) were dominant.

Primary hydrologic indicators included surface water and saturation. Secondary hydrologic indicators included the geomorphic position and FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland G-2 (WET G-2)

WET G-2 is a palustrine, scrub-shrub, broadleaf deciduous, temporarily flooded (PSS1A) wetland and is less than 0.01 acres (170 SF) in size (**Appendix C, Section G Map 1**). On March 18th, USACE determined that impacts to this resource do not require authorization. However, MDE will require authorization of impacts. It is located in the southwestern portion of the Study Area and has formed within a small depression adjacent to I-95. WET G-2 appears to receive hydrology from overland flow from adjacent uplands and is hydrologically isolated. WET G-2 is a moderate-quality wetland due to low invasive species coverage and medium plant diversity. It provides groundwater recharge/discharge, nutrient removal, and sediment/toxicant retention functions and values.

The dominance test for hydrophytic vegetation was met. Dominant species in the sapling/shrub stratum were red maple (*Acer rubrum*, FAC) and roundleaf greenbrier. In the herbaceous stratum, longstalk sedge was dominant.

Primary hydrologic indicators included water-stained leaves and saturation. Secondary hydrologic indicators included the geomorphic position and FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland G-3 (WET G-3)

WET G-3 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.01 acres in size. It is located in the southern portion of the Study Area (**Appendix C, Section G Map 2**). WET G-3 appears to receive hydrology from WUS G-7 as well as overland flow from adjacent uplands. WET G-3 discharges to WUS G-7. WET G-3 is a moderate-quality wetland due to low coverage by invasive species and medium plant diversity. It provides groundwater recharge/discharge, floodflow alteration, nutrient removal, and sediment/toxicant retention functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum was red maple. No species in the sapling/shrub stratum were observed. In the herbaceous stratum, longstalk sedge was dominant.

Primary hydrologic indicators included surface water, water-stained leaves, and saturation. Secondary hydrologic indicators included geomorphic position and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland G-4 (WET G-4)

WET G-4 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.04 acres in size. It is located in the southern portion of the Study Area (**Appendix C, Section G Map 2**). WET G-4 appears to receive hydrology from WUS G-8 as well as overland flow from adjacent uplands, and discharges into WUS G-8. WET G-4 is a high-quality wetland due to low coverage by invasive species and high plant diversity. It provides groundwater recharge/discharge, floodflow alteration, nutrient removal, and sediment/toxicant retention functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum was red maple. Dominant species in the sapling/shrub stratum was silky dogwood (*Cornus amomum,* FACW). In the herbaceous stratum, longstalk sedge was dominant. The dominant species in the woody vine stratum was roundleaf greenbrier.

Primary hydrologic indicators included surface water, high water table, water-stained leaves, saturation, and oxidized rhizospheres on living roots. Secondary hydrologic indicators included drainage patterns. The soil profile met the depleted matrix (F3) indicator.

Wetland G-5 (WET G-5)

WET G-5 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.03 acres in size. It is located in the southern portion of the Study Area and continues outside the boundary to the south (**Appendix C, Section G Map 2**). WET G-5 appears to receive hydrology from overland flow from adjacent uplands. WET G-5 is a moderate-quality wetland due to low coverage by invasive species and medium plant diversity. It provides groundwater recharge/discharge, nutrient removal, and sediment/toxicant retention functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum was red maple. Dominant species in the sapling/shrub stratum was silky willow (*Salix sericea,* OBL). In the herbaceous stratum, longstalk sedge was dominant. In the woody vine stratum, common ivy (*Hedera helix*, FACU) and Japanese honeysuckle (*Lonicera japonica*, FACU) were dominant.

Primary hydrologic indicators included surface water, high water table, and saturation. Secondary hydrologic indicators included drainage patterns. The soil profile met the depleted matrix (F3) indicator.

Wetland G-6 (WET G-6A/B)

WET G-6 is located in the median of I-95 within the southern portion of the Study Area (**Appendix C, Section G Map 2).** The wetland consists of two wetland cover types: a palustrine, emergent, nonpersistent, temporarily flooded (PEM2A), and palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A). The PEM area is approximately 0.08 acres in size and the PFO portion is approximately 0.03 acres. One wetland sample plot was taken within each cover type.

WET G-6A (PEM)

WET G-6A appears to receive hydrology from overland flow from adjacent uplands, as well as from WUS G-20, WUS G-21, and WET G-6B. WET G-6A drains into culverted WUS G-5. WET G-6A is a low-quality wetland due to high coverage by invasive species and medium plant diversity. It provides groundwater recharge/discharge, nutrient removal, and sediment/toxicant retention functions and values.

The prevalence index for hydrophytic vegetation was met. The only dominant species within the wetland was an unidentified *Festuca* species.

Primary hydrologic indicators included surface water, high water table, saturation, and water-stained leaves. Secondary hydrologic indicators included drainage patterns, sparsely vegetated concave surface, saturation visible on aerial imagery, and geomorphic position. The soil profile met the redox dark surface (F6) indicator.

WET G-6B (PFO)

WET G-6B appears to receive hydrology from overland flow from adjacent uplands as well as WUS G-20 and WUS G-21. WET G-6B drains into WET G-6A, which discharges into culverted WUS G-5. WET G-6B is a low-quality wetland due to low coverage by invasive species and medium plant diversity. It provides groundwater recharge/discharge, floodflow alteration, nutrient removal, and sediment/toxicant retention functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum were groundseltree (*Baccharis halimifolia*, FAC) and sweetgum (*Liquidambar styraciflua*, FAC). Dominant species in the sapling/shrub stratum were sea myrtle and white dogwood (*Cornus alba*, FACW). In the herbaceous stratum, the dominant species was erect centella (*Centella erecta*, FACW).

Primary hydrologic indicators included surface water, saturation, high water table and water-stained leaves. Secondary hydrologic indicators included drainage patterns, sparsely vegetated concave surface, saturation visible on aerial imagery, and geomorphic position. The soil profile does not meet any of the hydric soil indicators; however, a problematic soil situation is present, due to the existence of a clay pan at 8 inches. This clay pan likely restricts full saturation within the lower portion of the profile, resulting in the formation of a depleted matrix right at the soil layer boundary that is too thin to meet the definition of F3.

Wetland G-7 (WET G-7)

WET G-7 is a palustrine, emergent, persistent, temporarily flooded (PEM1A) wetland and is approximately 0.26 acres in size. It is located in the median of I-95, in the middle portion of the Study Area (**Appendix C, Section G Maps 3-4**). On March 18, 2019, USACE and MDE determined that impacts to this resource do not require authorization.

Wetland G-8 (WET G-8)

WET G-8 is a palustrine, emergent, persistent, temporarily flooded (PEM1A) wetland and is approximately 0.05 acres in size. It is located in the median of I-95, in the middle portion of the Study Area (**Appendix C, Section G Map 3**). On March 18, 2019, USACE and MDE determined that impacts to this resource do not require authorization.

WUS

Newly Delineated Waterways

Waters of the US G-1 (WUS G-1)

WUS G-1 is an ephemeral stream located in the southwestern portion of the Study Area (**Appendix C, Section G Map 1**). The stream flows to the south and discharges into a WET G-1. The stream channel is approximately 3 feet wide with banks 1 feet high. The substrate consists of silt, muck, and vegetation. The stream is low quality due to extensive pollution from the roadway. Based on USACE and MDE review of similar channels on March 18, 2019, WSP has determined that impacts to this resource likely do not require authorization.

Waters of the US G-2 (WUS G-2)

WUS G-2 is an ephemeral stream located in the southwestern portion of the Study Area (**Appendix C, Section G Map 1**). The stream flows north, where it loses defined bed and banks, and dissipates into the forest. The channel is approximately 2 feet wide and less than 1 foot deep; at the time of the delineation, flow within the channel was between 0 and 1 inches deep. The substrate consists of silt, muck, and vegetation. The stream is low quality due to runoff from adjacent residential land. On March 18, 2019, USACE and MDE determined that impacts to this resource would not require authorization.

Waters of the US G-3 (WUS G-3)

WUS G-3 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section G Map 2**). The stream flows north and discharges into WUS 1D. The channel is approximately 2 to 5 feet wide and 1 to 6 feet deep; at the time of the delineation, flow within the channel was between 0 and 6 inches deep. The substrate consists of silt, muck, cobble, gravel, and sand. The stream is moderate quality due to sheet flow runoff from adjacent residential land.

Waters of the US G-5 (WUS G-5)

WUS G-5 is a perennial stream located in the southwestern portion of the Study Area (**Appendix C, Section G Map 2**). The stream flows north and discharges into a culvert under I-95. The channel is approximately 3 to 8 feet wide and 6 feet deep; at the time of the delineation, flow within the channel was between 3 and 6

inches deep. The substrate consists of silt, cobble, gravel, and sand. The stream is low quality due to poor bank stability and substantial erosion.

Waters of the US G-6 (WUS G-6)

WUS G-6 is an ephemeral stream located in the southwestern portion of the Study Area (**Appendix C, Section G Map 2**). The stream flows northeast and discharges into WUS G-5. The channel is approximately 2 feet wide and 1 to 2 feet deep; at the time of the delineation, flow within the channel was between 0 and 1 inches deep. The substrate consists of silt, muck, and vegetation. The stream is moderate quality due to poor bank stability and runoff from adjacent residential property.

Waters of the US G-7 (WUS G-7)

WUS G-7 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section G Map 2**). The stream flows north and discharges into WUS G-5. The channel is approximately 1 to 2 feet wide and 1 foot deep; at the time of the delineation, flow within the channel was 2 inches deep. The substrate consists of silt, muck, and vegetation. The stream is moderate quality due to poor bank stability and runoff from adjacent residential property and WET G-3.

Waters of the US G-8 (WUS G-8)

WUS G-8 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section G Map 2**). The stream flows southwest and discharges into WUS G-5. The channel is approximately 1 to 2 feet wide and 1 to 2 feet deep; at the time of the delineation, flow within the channel was 2 inches deep. The substrate consists of silt, muck, gravel, sand, and vegetation. The stream is moderate quality due to poor bank stability.

Waters of the US G-9 (WUS G-9)

WUS G-9 is an ephemeral stream located in the southwestern portion of the Study Area (**Appendix C, Section G Map 2**). The stream flows north, loses defined bed and bank, and dissipates into the forest. The channel is approximately 2 feet wide and 2 feet deep; at the time of the delineation, flow within the channel was between 0 and 1 inches deep. The substrate consists of silt and muck. The stream is moderate quality due to fair bank stability. On March 18, 2019, USACE and MDE determined that impacts to this resource would not require authorization.

Waters of the US G-10 (WUS G-10)

WUS G-10 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section G Maps 2-3**). The stream flows east and discharges into WUS 2D. The channel is approximately 18 inches wide and 2 feet deep; at the time of the delineation, flow within the channel was between 2 and 3

inches deep. The substrate consists of silt, muck, sand, and concrete. The stream is moderate quality due to fair bank stability.

Waters of the US G-11 (WUS G-11)

WUS G-11 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section G Maps 2-3**). The stream flows northeast and discharges into WUS 2D. The channel is approximately 12 to 18 inches wide and 6 inches deep; at the time of the delineation, flow within the channel was between 1 and 2 inches deep. The substrate consists of silt and muck. The stream is moderate quality due to fair bank stability.

Waters of the US G-13 (WUS G-13)

WUS G-13 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section G Maps 2-3**). The stream flows north and discharges into WUS 2D. The channel is approximately 18 inches wide and 18 inches deep; at the time of the delineation, flow within the channel was between 2 and 3 inches deep. The substrate consists of silt, concrete, and sand. The stream is moderate quality due to fair bank stability.

Waters of the US G-14 (WUS G-14)

WUS G-14 is an ephemeral stream located in the southwestern portion of the Study Area (**Appendix C, Section G Maps 2-3**). The stream flows west and discharges into WUS 2D. The channel is approximately 2 feet wide and 6 inches deep; at the time of the delineation, flow within the channel was 1 inch deep. The substrate consists of silt and muck. The stream is moderate quality due to fair bank stability.

Waters of the US G-15 (WUS G-15)

WUS G-15 is an ephemeral stream located in the central portion of the Study Area, within a ditch near the top of slope (**Appendix C, Section G Maps 3-4**). WUS G-15 was originally delineated as extending northeast until it dissipated. On March 18, 2019, USACE and MDE determined that impacts to this resource located to the east of an inlet identified within the ditch would not require authorization; this section of the channel has been labelled WUS G-15B. It was also determined that the grate carries WUS G-15's flow into a culvert beneath I-95 that outlets into a tributary to Bynum Run. The channel is approximately 2 to 3 feet wide and 1 to 2 feet deep; at the time of the delineation, flow within the channel was 0 inches deep. The substrate consists of silt, vegetation, and leaves. The stream is moderate quality due to a vegetated, mossy bank stability.

Waters of the US G-16 (WUS G-16)

WUS G-16 is an ephemeral stream located in the northeastern portion of the Study Area (**Appendix C, Section G Maps 3-4**). The stream flows northeast before dissipating. On March 18, 2019, USACE and MDE determined that impacts to this resource would not require authorization.

Waters of the US G-17 (WUS G-17)

WUS G-17 is an ephemeral stream located in the northeastern portion of the Study Area (**Appendix C, Section G Maps 3-4**). The stream flows northeast before dissipating. On March 18, 2019, USACE and MDE determined that impacts to this resource would not require authorization.

Waters of the US G-18A (WUS G-18A)

WUS G-18A is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section G Map 4**). The stream flows southwest and discharges into a culvert beneath I-95. The channel is approximately 2 to 3 feet wide and 6 to 12 inches deep; at the time of the delineation, flow within the channel was 1 to 2 inches deep. The substrate consists of silt, vegetation, and riprap. The stream is moderate quality due to a vegetated, stable bank stability.

Waters of the US G-18B (WUS G-18B)

WUS G-18B is an intermittent stream located in the northeastern portion of the Study Area. The stream flows northeast and discharges into a culvert beneath I-95. The channel is approximately 2 to 3 feet wide and 6 to 12 inches deep; at the time of the delineation, flow within the channel was 1 to 2 inches deep. The substrate consists of silt, vegetation, and riprap. The stream is moderate quality due to a vegetated, stable bank stability.

Waters of the US G-19 (WUS G-19)

WUS G-19 is an intermittent stream located in the northern portion of the Study Area (**Appendix C, Section G Map 5**). The stream flows northeast and discharges into Bynum Run via subsurface flow. The channel is approximately 1 to 2 feet wide and 6 to 12 inches deep; at the time of the delineation, flow within the channel was 1 to 2 inches deep. The substrate consists of cobble, gravel, vegetation, and concrete. The stream is moderate quality due to a vegetated bank stability.

Waters of the US G-20 (WUS G-20)

WUS G-20 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section G Map 2**). The stream flows northeast and discharges into WET G-6 and then to WUS G-5 via a storm drain. The channel is approximately 2 feet wide and 1 foot deep; at the time of the delineation, flow

within the channel was 1 to 3 inches deep. The substrate consists of gravel, vegetation, silt, and muck. The stream is moderate quality due to a fair bank stability.

Waters of the US G-21 (WUS G-21)

WUS G-21 is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section G Map 2**). The stream flows northeast and discharges into WET G-6 and then to WUS G-5 via a storm drain. The channel is approximately 1.5 feet wide, with no defined depth. At the time of the delineation, flow within the channel was approximately 1 inch deep. The substrate consists of vegetation, silt, and muck. The stream is moderate quality due to good bank stability.

Waters of the US G-22 (WUS G-22)

WUS G-22 is an intermittent stream located in the median of I-95, within the northern portion of the Study Area (**Appendix C, Section G Map 4**). The stream flows northeast and discharges into WUS G-18B via a storm drain/inlet. The channel is approximately 2 feet wide and has no defined depth. At the time of the delineation, flow within the channel was approximately 1 inch deep. The substrate consists of vegetation. The stream is moderate quality due to good bank stability.

Based on communications between JMT, MDE, and USACE on April 4, 2019, it was determined that WUS G-22 will not be regulated by either agency.

Previously Delineated Waterways

Waters of the US 1D (WUS 1D)

WUS 1D is an intermittent stream located in the southwestern portion of the Study Area (**Appendix C, Section G Map 2**). The stream flows northeast and discharges into WUS G-5. The channel is approximately 2 feet wide and 1 to 2 feet deep. At the time of the delineation, flow within the channel was 0 to 1 inch deep. The substrate consists of cobble, gravel, sand, concrete, silt, and muck. The stream is low quality due to a concrete trapezoidal channel. It was previously delineated by JMT in 2006; more information can be found in the *Wetland Identification & Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22.*

Waters of the US 2D (WUS 2D)

WUS 2D is a perennial stream located in the southwestern portion of the Study Area (**Appendix C, Section G Maps 2-3**). The stream flows north and discharges into a culvert under I-95. The channel is approximately 2 to 3 feet wide and 2 feet deep; at the time of the delineation, flow within the channel was 6 to 8 inches deep. The substrate consists of gravel, sand, and concrete. The stream is low quality due to a poor, eroded, and unstable banks. It was previously delineated by JMT in 2006; more information can be found in the *Wetland Identification & Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22.*

H. KH-3031: Noise Wall on SB I-95 South of Calvary Road

Stantec conducted field investigations from February 27, 2019 to March 5, 2019 within the Study Area of the Noise Wall on SB I-95 South of Calvary Road contract. Seven new non-tidal wetlands and two new WUS were delineated. Additionally, three previously delineated wetlands and six previously delineated WUS were confirmed within the Study Area for this contract.

Wetlands

Newly Delineated Wetlands

Wetland H-1 (WET H-1)

WET H-1 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.01 acre in size within the Study Area. It is located in the northern portion of the Study Area and continues outside the boundary to the north. The wetland has formed within a small depression adjacent to WUS 4D, an unnamed tributary to Bynum Run (**Appendix C, Section H Map 2**). WET H-1 discharges into WUS 4D and receives hydrology from WUS 4D and groundwater seeps from the hillside. WET H-1 lacks understory vegetation but is a moderate-quality wetland. It provides groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, and wildlife habitat functions.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple (*Acer rubrum*, FAC) and slippery elm (*Ulmus rubra*, FAC). Vegetation in the sapling/shrub, herbaceous, and woody vine strata were absent at the time of the investigation.

Primary hydrologic indicators included surface water, high water table, saturation, and water stained leaves. Secondary hydrologic indicators included sparsely vegetated concave surface. The soil profile met the depleted matrix (F3) indicator.

Wetland H-2 (WET H-2)

WET H-2 is a palustrine, forested, broadleaf deciduous/emergent, persistent, temporarily flooded (PFO/PEM1A) wetland and is approximately 109 square feet in size within the Study Area. It is located in the northern portion of the Study Area and continues outside the boundary to the north. The wetland has formed within a small depression adjacent to WUS 4D, an unnamed tributary to Bynum Run (**Appendix C, Section H Map 2**). The depression appears to be the remnant of a relic stream channel, which was confirmed by a review of the original wetland report that shows WUS 4D delineated at this location. Since the original delineation, the stream has cut a new channel to the west. WET H-2 discharges into WUS 4D and receives hydrology from WUS 4D, overland flow, and potentially from groundwater seeps from the hillside. WET H-2 is a moderate-quality wetland but the herbaceous stratum is dominated by invasive species. It provides groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions.

The dominance test for hydrophytic vegetation was met. The dominant plant species included spicebush (*Lindera benzoin*, FACW) in the shrub/sapling stratum and Japanese stilt grass (*Microstegium vimineum*, FAC) in the herbaceous stratum. Vegetation in the tree stratum was absent at the time of the investigation; however, tree canopy cover dominated by red maple was observed. Based on a request by the USACE, this wetland is classified as PFO/PEM because it includes a forest canopy dominated by hydrophytic species and an established herbaceous layer within the wetland boundary.

Primary hydrologic indicators included surface water, high water table, and saturation. Secondary hydrologic indicators included sparsely vegetated concave surface, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland H-3 (WET H-3)

WET H-3 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.03 acre in size. It is located in the southern portion of the Study Area and has formed within a small depression on an elevated terrace adjacent to WUS 4D, an unnamed tributary to Bynum Run (**Appendix C, Section H Map 1**). WET H-3 discharges into WUS 4D and receives hydrology from overland flow and potentially from groundwater seeps from the hillside. WET H-3 is sparsely vegetated and lacks understory vegetation but is a moderate-quality wetland. It provides groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple and sweetgum (*Liquidambar styraciflua*, FAC). Black gum (*Nyssa sylvatica*, FAC) was sparse but dominated the sapling/shrub stratum, and shallow sedge (*Carex lurida*, OBL), also sparse, dominated the herbaceous stratum. Vegetation was absent in the woody vine stratum at the time of the investigation.

Primary hydrologic indicators included surface water and water stained leaves. Secondary hydrologic indicators included sparsely vegetated concave surface, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland H-4 (WET H-4)

WET H-4 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.02 acre in size. It is located in the southern portion of the Study Area and has formed within a highly incised, relic stream channel that appears to have been a former outlet of WET 2D into WUS 4D (**Appendix C, Section H Map 1**). This observation was confirmed by a review of the original wetland report that shows WET H-4 delineated as WUS 4D-c at this location. Since the original delineation, discharge from WET 2D has relocated into a new channel (delineated as WUS H-2) to the southwest. WET H-4 discharges into WUS 4D and receives hydrology from WUS 4D, overland flow, and seepage from the side slopes of the relic channel. WET H-4 is sparsely vegetated and lacks understory vegetation but is a moderate-quality wetland. It provides groundwater recharge/discharge, floodflow alteration, and wildlife habitat functions.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple and sweetgum. Vegetation in the sapling/shrub, herbaceous, and woody vine strata was absent at the time of the investigation.

Primary hydrologic indicators included surface water and water stained leaves. Secondary hydrologic indicators included sparsely vegetated concave surface and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland H-5 (WET H-5)

WET H-5 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.01 acre in size within the Study Area. It is located in the southern portion of the Study Area and has formed along a hillslope southwest of where WUS 4D, WUS 11D, and WUS H-1 converge (**Appendix C, Section H Map 1**). WET H-5 continues to the southwest outside of the Study Area. WET H-5 receives hydrology from overland flow and potentially from groundwater seeps from the hillside. Though an obvious discharge point was not observed (i.e. no defined outlet or channel), WET H-5 likely discharges into WUS 4D by overland flow and potentially through groundwater infiltration. WET H-5 lacks understory vegetation but is a moderate-quality wetland. It provides groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple and black gum. Vegetation in the sapling/shrub, herbaceous, and woody vine strata was absent at the time of the investigation.

Primary hydrologic indicators included surface water and water stained leaves. A secondary hydrologic indicator included drainage patterns. The soil profile met the depleted matrix (F3) indicator.

Wetland H-6 (WET H-6)

WET H-6 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 186 square feet in size. It is located in the southern portion of the Study Area and has formed within a small depression on an elevated terrace adjacent to WUS 4D, an unnamed tributary to Bynum Run (**Appendix C, Section H Map 1**). WET H-6 receives hydrology from overland flow and potentially from groundwater seeps from the hillside. Though an obvious discharge point was not observed (i.e. no defined outlet or channel), WET H-6 likely discharges into WUS 4D by overland flow and potentially through groundwater infiltration. WET H-6 is sparsely vegetated but is a moderate-quality wetland. It provides groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple and sweetgum. Sweetgum was also observed sparsely in the sapling/shrub stratum, and shallow

sedge was sparsely occurring in the herbaceous stratum. Vegetation was absent in the woody vine stratum at the time of the investigation.

Primary hydrologic indicators included surface water and water stained leaves. Secondary hydrologic indicators included geomorphic position and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Wetland H-7 (WET H-7)

WET H-7 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.02 acre in size. It is located in the southern portion of the Study Area and has formed within a small depressional area that resembles a drainage or conveyance channel adjacent to WUS 4D, an unnamed tributary to Bynum Run (**Appendix C, Section H Map 1**). WET H-7 receives hydrology from groundwater and WUS 4D. WET H-7 is hydrologically connected to WUS 4D by the downstream portion of the channel and potentially through groundwater infiltration. WET H-7 lacks understory vegetation but is a moderate-quality wetland. It provides groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple and slippery elm. Shallow sedge was sparsely occurring in the herbaceous stratum. Vegetation was absent in the sapling/shrub and woody vine strata at the time of the investigation.

Primary hydrologic indicators included surface water, high water table, saturation, and water stained leaves. Secondary hydrologic indicators included drainage patterns, geomorphic position, and the FAC-neutral test. The soil profile met the depleted matrix (F3) indicator.

Previously Delineated Wetlands

Wetland 1D (WET 1D)

WET 1D is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.08 acre in size within the Study Area. It is located in the northern portion of the Study Area and continues outside the boundary to the northwest (**Appendix C, Section H Map 2**). WET 1D is a moderate-quality wetland but the herbaceous stratum is dominated by invasive species. It provides groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions. It was previously delineated by JMT in 2006; more information can be found in the *Wetland Identification & Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22.*

Wetland 2D (WET 2D)

WET 2D is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.58 acre in size within the Study Area. It is located in the southern portion of the Study Area. The wetland receives hydrology primarily from overland flow and groundwater seepage (**Appendix C, Section H Map 1**). WET 2D discharges into WUS H-2 and WUS 4D and continues to the northwest outside of the Study Area. WET 2D lacks understory vegetation but is a moderate-quality wetland. It provides groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions. WET 2D was previously delineated by JMT in 2006; however, the delineated wetland boundary was expanded to the southwest during the 2019 investigation. Therefore, a new wetland data plot was taken in an area previously determined to be upland. WET 2D is being threatened by erosion from headcuts within WUS H-2.

The dominance test for hydrophytic vegetation was met. Red maple was the dominant plant species in the tree stratum, while black gum was dominant in the sapling/shrub stratum. Vegetation in the herbaceous and woody vine strata was absent at the time of the investigation.

Primary hydrologic indicators included high water table, saturation, and water stained leaves. Secondary hydrologic indicators included drainage patterns and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland 4D (WET 4D)

WET 4D is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.04 acre in size. It is located in the southern portion of the Study Area (**Appendix C, Map 1**). WET 4D is a moderate-quality wetland but the herbaceous stratum is partially dominated by invasive species. It provides groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions. It was previously delineated by JMT in 2006; more information can be found in the *Wetland Identification & Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22.*

WUS

Newly Delineated Waterways

Waters of the US H-1 (WUS H-1)

WUS H-1 is an intermittent stream located in the southern portion of the Study Area. WUS H-1 flows in a northeast direction within a concrete-lined channel and discharges into WUS 4D just downstream from where WUS 4D leaves a culvert that conveys the stream under I-95 (**Appendix C, Section H Map 1**). WUS H-1 receives hydrology from groundwater seepage that was observed flowing up through a joint in the concrete channel at the time of the investigation. The channel is approximately 5 feet wide and 2 feet high. At the time

of the delineation, flow within the channel was approximately 0.5 inch deep. The stream is of low quality because it is within a concrete-lined channel.

Waters of the US H-2 (WUS H-2)

WUS H-2 is an intermittent stream located in the southern portion of the Study Area. WUS H-2 flows in a southeast direction and discharges into WUS 4D (**Appendix C, Section H Map 1**). It receives hydrology from WET 2D, a large wetland delineated within the Study Area. Since the original wetland delineation, WUS H-2 has replaced WUS 4D-c as the primary outlet for WET 2D. The channel is approximately 4 feet wide and ranges from 3 to 4 feet high. At the time of the delineation, flow within the channel was between 1 to 2 inches deep. The substrate consists of sand and gravel. The stream is of low quality based on its instability and due to the relatively substantial headcuts that are occurring at the upstream limits/the WET 2D boundary.

Previously Delineated Waterways

Waters of the US 2D (WUS 2D)

WUS 2D is an intermittent stream located in the southern portion of the Study Area (**Appendix C, Section H Map 1**). The stream is low quality due to its high gradient, undercut banks, lack of suitable substrate for habitat, and untreated roadway runoff. It was previously delineated by JMT in 2006; more information can be found in the *Wetland Identification & Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22.*

Waters of the US 3D (WUS 3D) – Bynum Run

WUS 3D is the perennial stream Bynum Run located in the northern portion of the Study Area (**Appendix C, Section H Maps 2-3**). The stream is of moderate quality based on its Use III designation; however, development within the watershed and untreated discharges of roadway runoff are likely causing degradation. It was previously delineated by JMT in 2006; more information can be found in the *Wetland Identification & Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22.*

Waters of the US 4D (WUS 4D)

WUS 4D is a perennial stream that flows through most of the Study Area except for the northernmost portion (**Appendix C, Section H Maps 1-2**). The stream is low quality because the downstream portion is concrete-lined, and the remaining upstream, natural portion is unstable, evident by severe streambank erosion and channel incision. It was previously delineated by JMT in 2006; more information can be found in the *Wetland Identification & Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22.*

Waters of the US 5D (WUS 5D)

WUS 5D is an intermittent stream located in the northern portion of the Study Area. The stream flows from a culvert under I-95 in a northwest direction. At the outfall along SB I-95, WUS 5D flows within a concrete-lined channel before dropping almost vertically downslope and discharging into Bynum Run (**Appendix C, Section H Maps 2-3**). The channel is approximately 5 feet wide with 2 to 3 feet high banks; at the time of the delineation, flow within the channel was approximately 1 inch deep. Most of the original soil material downstream of the concrete channel has eroded away, exposing bedrock. The stream is low quality because the upstream portion within the Study Area is concrete-lined, and the remaining downstream portion is unstable as evident by severe erosion, and due to untreated roadway runoff.

WUS 5D was previously delineated by JMT in 2006 but was determined to be non-jurisdictional at that time. However, due to consistent intermittent flow observed within the channel over several weeks during the recent investigation, and following an agency review on March 18, 2019, USACE and MDE have determined that impacts to WUS 5D will require authorization.

Waters of the US 6D (WUS 6D)

WUS 6D is an intermittent stream located in the southern portion of the Study Area. The stream flows from a culvert under I-95 in a northwest direction. At the outfall along SB I-95, WUS 6D flows down a steep, eroded embankment. At the bottom, the grade flattens and the stream meanders to where it ultimately discharges into WUS 4D, an unnamed tributary to Bynum Run (**Appendix C, Section H Map 2**). The channel is approximately 6 to 8 feet wide and 4 to 6 feet high. At the time of the delineation, flow within the channel was approximately 1 to 4 inches deep. The stream is low quality because the upstream portion within the Study Area is unstable as evident by erosion, and due to untreated roadway runoff.

WUS 6D was previously delineated by JMT in 2006 but was determined to be non-jurisdictional at that time. However, due to consistent intermittent flow observed within the channel over several weeks during the recent investigation, and following an agency review on March 18, 2019, USACE and MDE have determined that impacts to WUS 6D will require authorization.

Waters of the US 11D (WUS 11D)

WUS 11D is a perennial stream located in the southern portion of the Study Area (**Appendix C, Section H Map 1**). The stream is of moderate quality, but instability from streambank erosion and channel incision is evident. It was previously delineated by JMT in 2006; more information can be found in the *Wetland Identification & Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22.*

I. KH-3030: Noise Wall on SB I-95 at MD 24/Woodsdale

Century Engineering Inc. conducted field investigations from February 5, 2019 to February 6, 2019 within the Study Area of the Noise Wall on SB I-95 at MD 24/Woodsdale contract. Two new non-tidal wetlands and

three new waterways were delineated. Additionally, one previously delineated wetland and six previously delineated waterways were confirmed within the Study Area for this contract.

Wetlands

Newly Delineated Wetlands

Wetland I-1 (WET I-1)

WET I-1 is a palustrine, forested, persistent, temporarily flooded (PFO1A) wetland and is approximately 0.03 acres in size. It is located in the northeastern portion of the Study Area and has formed within a small depression on top of a sewer line adjacent to WUS 17C (**Appendix C, Section I Map 2**). WET I-1 appears to receive hydrology from overland flow. WET I-1 discharges to WUS 17C via subsurface drainage, which was visible when viewing the stream bank from the channel. WET I-1 is a moderate-quality wetland due moderate levels of invasive species and disturbance for the sanitary line access road and ATV vehicles. It provides groundwater recharge/discharge and floodflow alteration functions and values.

The dominance test for hydrophytic vegetation was met. Dominant plant species in the tree stratum included red maple (*Acer rubrum,* FAC), northern red oak (*Quercus rubra,* FACU), and tuliptree (*Liriodendron tulipifera*, FACU). Dominant plant species in the herbaceous stratum included eastern woodland sedge (*Carex blanda,* FAC) and Japanese stiltgrass (*Microstegium vimineum,* FAC). The wetland is considered PFO because it is located beneath a tree canopy and would be populated with trees if not for the sanitary access road.

Primary hydrologic indicators included surface water and water-stained leaves. Secondary hydrologic indicators observed included sparsely vegetated concave surface and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Wetland I-2 (WET I-2)

WET I-2 is a palustrine, forested, broadleaf deciduous, temporarily flooded (PFO1A) wetland and is approximately 0.04 acres in size. It is located in the northeastern portion of the Study Area and has formed within a small depression adjacent to WUS 17C (**Appendix C, Section I Map 2**). WET I-2 appears to receive hydrology from overland flow and groundwater. WET I-2 discharges into WUS 17C. WET I-2 is a moderate-quality wetland due to low levels of invasive species and location away from the roadway. Due to minor levels of disturbance (such as the nearby fence), this wetland was not considered to be high quality. It provides floodflow alteration, sediment/shoreline stabilization, and wildlife habitat functions and values.

The dominance test and prevalence index for hydrophytic vegetation were met. Dominant plant species in the tree stratum included red maple and sweetgum (*Liquidambar styraciflua*, FAC). Dominant plant species in the sapling stratum included red maple and sweetgum. Dominant plant species in the herbaceous stratum included eastern woodland sedge and Japanese stiltgrass.

Primary hydrologic indicators included highwater table. Secondary hydrologic indicators observed included drainage patterns and geomorphic position. The soil profile met the depleted matrix (F3) indicator.

Previously Delineated Wetlands

Wetland 7C

WET 7C is a palustrine, forested, broadleaf deciduous (PFO1) wetland and is approximately 0.25 acres in size. It is located in the northeastern portion of the Study Area (**Appendix C, Section I Map 2**). WET 7C is a moderate-quality wetland due to low levels of invasive species and size. Minor disturbance related to the roadway prevented this wetland from being characterized as high-quality. It provides floodflow alteration and wildlife habitat functions and values. It was previously delineated by JMT in 2006; more information can be found in the *Section 200: I-95, North of MD 43 to North of MD 22 Wetland Identification and Delineation Report.*

WUS

Newly Delineated Waterways

Waters of the US I-1 (WUS I-1)

WUS I-1 is an ephemeral channel located in the northeastern portion of the Study Area (**Appendix C, Section I Map 2**). The stream flows to the southwest until reaching WET I-2; it discharges into WET I-2, which discharges into WUS 17C. The stream channel is approximately 1 foot wide with banks approximately 2 feet high. At the time of the delineation, flow within the channel was approximately 1 inch deep. The substrate consists of cobble and silt. The stream is considered moderate quality, due to evidence of erosion.

Waters of the US I-2 (WUS I-2)

WUS I-2 is an ephemeral channel located in the northeastern portion of the Study Area (**Appendix C, Section I Map 2**). The stream flows to the west until reaching WET I-2; it discharges into WET I-2, which discharges into WUS 17C. The stream channel is approximately 1 foot wide with banks approximately 1 foot high. At the time of the delineation, flow within the channel was approximately 1 inch deep. The substrate consists of cobble and silt. The stream is moderate quality, due to evidence of erosion.

Waters of the US I-3 (WUS I-3)

WUS I-3 is an intermittent stream located in the northeastern portion of the Study Area (**Appendix C, Section I Map 2**). The stream originates at WET 7C and flows to the northwest before discharging into WUS 17C. The stream channel is approximately 2 feet wide with banks approximately 1 foot high. At the time of the delineation, flow within the channel was approximately 2 inches deep. The substrate consists of sand and

gravel. The stream is considered moderate quality, due to evidence of erosion and headcutting. Portions of this channel were previously delineated as WUS 16C by JMT in 2006; however, the path of WUS 16C has changed considerably since that time. It appears the outside meander of WUS 16C east of WUS 17C migrated and created a new connection with WUS 17C, disconnecting the downstream portion of WUS 16C.

Previously Delineated Waterways

Waters of the US 16C-a (WUS 16C-a)

WUS16C-a is an ephemeral channel located in the northeastern portion of the Study Area (**Appendix C, Section I Map 2**). The stream flows in a southwesterly direction along southbound I-95 into WET 7C where it loses bank definition. The channel is approximately 1 foot wide with banks approximately 6 inches high. At the time of the delineation, flow within the channel was approximately 1 inch deep. The substrate consists of sand and gravel. The stream is considered moderate quality. This channel was previously delineated as WUS 16C by JMT in 2006; however, since that time the path of the channel has changed considerably due to the aforementioned development of WUS I-3. More information on WUS 16C can be found in the *Section 200: I-95, North of MD 43 to North of MD 22 Wetland Identification and Delineation Report.*

Waters of the US 16-b (WUS16C-b)

WUS16C-b is an ephemeral channel located in the northeastern portion of the Study Area (**Appendix C, Section I Map 2**). The stream flows in a southwestern direction to its confluence with WUS 17C. The stream conveys overland flow from uplands. The channel is approximately 2 feet wide with banks approximately 3 feet high. At the time of the delineation, flow within the channel was approximately 1 inch deep. The substrate consists of cobble, gravel, and silt. The stream is considered moderate quality. It was previously delineated as WUS 16C by JMT in 2006; however, the path of WUS 16C has changed considerably since then and this segment is no longer part of the same stream due to the aforementioned development of WUS I-3. More information on WUS 16C can be found in the *Section 200: I-95, North of MD 43 to North of MD 22 Wetland Identification and Delineation Report.*

Waters of the US 17C (WUS 17C)

WUS 17C is a perennial stream located in the northeastern portion of the Study Area (**Appendix C, Section I Map 2**). The stream is considered moderate quality due to evidence of erosion. It was previously delineated by JMT in 2006; more information can be found in the *Section 200: I-95, North of MD 43 to North of MD 22 Wetland Identification and Delineation Report.*

Waters of the US 18C (WUS 18C) – Haha Branch

WUS 18C is a perennial stream located in the northeastern portion of the Study Area (**Appendix C, Section I Map 2**). The stream is considered moderate quality due to evidence of erosion. It was previously delineated

by JMT in 2006; more information can be found in the Section *200: I-95, North of MD 43 to North of MD 22 Wetland Identification and Delineation Report.*

Waters of the US 19C (WUS 19C)

WUS 19C is an intermittent channel located in the northwestern portion of the Study Area (**Appendix C, Section I Map 1**). The stream is considered moderate quality; although the channel appears man-made to assist with roadside drainage, the channel substrate is natural and field investigations indicate the channel conveys seasonal groundwater. It was previously delineated by JMT in 2006 and was determined to be non-jurisdictional drainage, but delineations performed in February 2019 indicate the channel is intermittent. More information can be found in the *Section 200: I-95, North of MD 43 to North of MD 22 Wetland Identification and Delineation Report.*

Waters of the US 20C (WUS 20C)

WUS 20C is an ephemeral channel located in the northwestern portion of the Study Area (**Appendix C, Section I Map 1**). The stream is considered moderate quality; although the channel substrate is natural, it is likely man-made to assist with roadside drainage. It was previously delineated by JMT in 2006. More information can be found in the *Section 200: I-95, North of MD 43 to North of MD 22 Wetland Identification and Delineation Report.*

4.0 CONCLUSIONS

Delineators conducted a review of published information and performed field investigations based on the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain (Version 2.0)* (USACE, 2010) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region Version 2.0* (USACE, 2012) to identify potentially jurisdictional wetlands and waterways within the Study Area.

Based on the results of the investigation, delineators identified 71 new non-tidal wetlands and 102 new waterways within the Project Area. Delineators also confirmed 35 previously delineated non-tidal wetlands and 55 previously delineated waterways in the Project Area. Newly and previously delineated resources are summarized by contract in **Appendix F.**

Environmental resources identified in this report may be subject to verification and regulation by USACE and MDE. Impacts to these resources may require authorization by USACE and MDE as well as mitigation.

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