COASTAL RESOURCES INC.

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MEMORANDUM

Date: July 30, 2019

Subject: I-95 ETL Northbound Extension – ITS and Sign Installation Study Areas

Introduction

Coastal Resources, Inc. (CRI), sub consultant to Gannett Fleming, Inc. (GF), has completed a natural resources inventory within 14 proposed locations for ITS and sign installation associated with Phases II of the I-95 Express Toll Lanes Northbound Extension Project. Within each study area, CRI completed a wetland delineation and forest stand characterization, and identified specimen trees. Field investigations were conducted on April 23, 2019 and May 14, 2019. The 14 study areas are situated around I-95 in Harford County from MD 152 to MD 543 (see Appendix A – Vicinity Map).

Methods

Wetland Delineation

In accordance with the guidance provided by the General Engineering Consultant (GEC), CRI delineated wetlands and waterways within the ITS and sign installation study areas. Since many of the study areas overlap, abut, or are adjacent to the study areas investigated during previous studies for the I-95 ETL Northbound Extension Project, CRI confirmed or updated the boundaries of previously delineated resources. All newly delineated wetland and waterway boundaries were flagged with pink wetland delineation survey ribbon and labeled consecutively with an alphanumeric designation. Each flag was surveyed using a handheld Trimble Global Positioning System (GPS) unit. If applicable, verified boundaries were noted as accurate, but not reflagged in the field.

Wetlands were identified and/or verified in accordance with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region, Version 2.0* (USACE 2010). Soils were sampled using three-inch diameter Dutch augers and Munsell Color charts were used to identify color (Munsell 1975). Wetland Determination Data Forms (USACE 2010) were completed for each newly delineated system. Stream characteristics were recorded for each waterway on a stream datasheet. Each resource was photographed, and a photo log was compiled (see Appendix C). A function and value assessment was completed for each newly delineated wetland within the study area using the New England Method.

Forest Characterization & Tree Survey

Following the guidance provided by the GEC, CRI conducted a forest stand delineation and specimen tree survey within the ITS and sign Installation study areas. CRI confirmed or updated the boundaries of

previously identified forests resources. A forest stand summary sheet was completed for each identified forest stand and stand boundaries were GPS-located and sketched on field mapping. Each stand was photographed, and a photo log was compiled (see Appendix E). All specimen trees (30" DBH or greater or within 75% of the current State Champion) within the study areas were identified, tagged, GPS-located, and their condition noted. Additionally, clusters of trees, that did not meet the State definition of a forest, were classified as hedgerows and the limits were GPS-located.

Results

Wetland Delineation
During the field investigations, two wetlands and six waterways were delineated and/or confirmed within the study areas. The locations of these resources are shown on the detailed maps provided in Appendix B. Wetland and stream datasheets are in Appendix D. The systems are described below.

Wetlands

Wetland E-3 (WET E-3)
WET E-3 is a palustrine forested and emergent wetland located along the southbound side of MD 152 (**Appendix B, Sheet 9**). It was previously delineated by Johnson, Mirmiran, and Thompson (JMT) in 2019; more information can be found in the KH-3027: MD 152 Park and Ride Relocation section of the *I-95 ETL Northbound Extension Phase II Wetland Delineation Report* (JMT 2019).

Wetland K-1 (WET K-1)
WET K-1 is a palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E) wetland and is approximately 0.03 acres in size. It originates at a culvert under I-95 and extends northeast as a ditch (**Appendix B, Sheet 2**). WET K-1 appears to receive hydrology from road runoff as well as a high water table. WET K-1 continues to the northeast where it drains into WUS 15D and is hydrologically connected to James Run. WET K-1 is a low-quality wetland due to it being a roadside ditch. It provides floodflow alteration and sediment/toxicant retention functions and values. The dominance test for hydrophytic vegetation was met. Dominant plant species in the herbaceous stratum included narrow-leaf cattail (*Typha angustifolia,* OBL). Primary hydrologic indicators observed included surface water, high water table, and saturation. Secondary hydrologic indicators included geomorphic position and the FAC-neutral test. The soil profile met the redox dark surface (F6) indicator. This wetland was previously delineated as part of WUS 15D and included in the *Wetland Identification and Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22* (JMT 2006). This system is currently classified as a wetland rather than a stream due to the presence of all three wetland parameters and a lack of channel characteristics and flowing water.

Waters
Waters of the US K-6 (WUS K-6)
WUS K-6 is an intermittent stream that originates as a roadside ditch north of I-95 (**Appendix B, Sheet 1**). The stream flows southwest and discharges into WUS 18D. The stream channel is approximately 3 feet wide with banks approximately 1 foot high; at the time of the delineation, flow within the channel varied between 1 and 3 inches deep. The substrate consists of gravel, sand, and silt. The stream is low quality within the study area because it is highly manipulated and receives extensive pollution from road runoff. WUS K-6 was previously delineated as a wetland (WET 18D) in 2006 and is included in the *Wetland Identification and Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22* (JMT 2006). This system is currently classified as a stream rather than a wetland due to the presence of channel characteristics, including disturbed vegetation, disturbed leaf litter, and sediment deposition, and flowing water during the

field visit.

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

WUS 3D is the perennial stream Bynum Run (**Appendix B, Sheet 3**). The stream flows south under I-95 and eventually discharges into Bush Creek at the confluence with James Run. The stream channel is approximately 50 feet wide with banks approximately 6 feet high; at the time of the delineation, flow within the channel varied between 1 and 3 feet deep. The substrate consists of cobble, gravel, sand, and rip-rap. The stream is moderate quality within the study area due to extensive pollution and disturbance from the roadway. WUS 13D was previously delineated and included in the *Wetland Identification and Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22* (JMT 2006).

Waters of the US 12D (WUS 12D)

WUS 12D is an intermittent stream that flows southwest from a culvert under I-95 (**Appendix B, Sheet 3**). The stream parallels I-95 and discharges into Bynum Run (WUS 3D) outside of the study area. The channel is approximately 4 feet wide and 1 foot deep; at the time of the delineation, flow within the channel was between 2 and 6 inches deep. The substrate consists of gravel, sand, and silt. The stream is low quality because it appears ditched and receives extensive pollution from road runoff. WUS 12D was previously delineated and included in the *Wetland Identification and Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22* (JMT 2006).

Waters of the US 14D (WUS 14D) – James Run

WUS 14D is the perennial stream James Run (**Appendix B, Sheet 2**). The stream flows south under I-95 and eventually discharges into Bush Creek at the confluence with Bynum Run. The stream channel is approximately 40 feet wide with banks approximately 10 feet high; at the time of the delineation, flow within the channel varied between 2 and 4 feet deep. The substrate consists of cobble, gravel, sand, and silt. The stream is moderate quality within the study area due to extensive pollution and disturbance from the roadway. WUS 14D was previously delineated and included in the *Wetland Identification and Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22* (JMT 2006).

Waters of the US 15D (WUS 15D)

WUS 15D is an intermittent stream that originates at wetland WET K-1 (**Appendix B, Sheet 2**). The stream flows northeast, paralleling I-95 and eventually discharges into James Run outside of the study area. The stream channel is approximately 4 feet wide with banks approximately 1 foot high; at the time of the delineation, flow within the channel varied between 2 and 6 inches deep. The substrate consists of sand and silt. The stream is low quality within the study area because it appears ditched and receives extensive pollution from road runoff. WUS 15D was previously delineated and included in the *Wetland Identification and Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22* (JMT 2006).

Waters of the US 18D (WUS 18D)

WUS 18D is an intermittent stream that flows from a culvert under I-95 (**Appendix B, Sheet 1**). The stream flows west and eventually discharges into James Run outside of the study area. The stream channel is approximately 2 feet wide with banks approximately 3 feet high; at the time of the delineation, flow within the channel varied between 1 and 2 inches deep. The substrate consists of gravel, sand, and rip-rap. The stream is low quality within the study area because it is highly manipulated and receives extensive pollution from road runoff. WUS 18D was previously delineated and included in the *Wetland Identification and Delineation Report for Section 200: I-95, North of MD 43 to North of MD 22* (JMT 2006).

Forest Stand Characterization & Specimen Tree Survey

During the field investigations, a total of 10 forest stands, 15 hedgerows, and three specimen trees were identified. Additionally, eight previously identified forest stands were confirmed within the study area. The locations of the forests, hedgerows, and specimen trees are shown on the detailed maps provided in Appendix B. Forest stand summary sheets are included in Appendix F and photographs are included in Appendix E. The forest stands are described below.

Forest Stands

Forest Stand A-1 (FS A-1)

Forest Stand A-1 is located along the northbound side of MD 152 (**Appendix B, Sheet 11**). It was previously delineated by RKK in 2019; more information can be found in the KH-3019: MD 152 Interchange / I-95 ETL Two-Lane Extension section of the *I-95 ETL Northbound Extension Phase II Forest Characterization Report* (JMT 2019).

Forest Stand A-7 (FS A-7)

Forest Stand A-7 is located along the southbound side of MD 24 (**Appendix B, Sheet 6**). It was previously delineated by RKK in 2019; more information can be found in the KH-3019: MD 152 Interchange / I-95 ETL Two-Lane Extension section of the *I-95 ETL Northbound Extension Phase II Forest Characterization Report* (JMT 2019).

Forest Stand E-3 (FS E-3)

Forest Stand E-3 is located along the southbound side of MD 152 (**Appendix B, Sheet 9**). It was previously delineated by CEM in 2019; more information can be found in the KH-3027: MD 152 Park and Ride Relocation section of the *I-95 ETL Northbound Extension Phase II Forest Characterization Report* (JMT 2019).

Forest Stand K-2 (FS K-2)

Forest Stand K-2 is located along the northbound side of I-95 around the James River crossing (**Appendix B, Sheet 2**). Forest Stand K-2 is a deciduous, mid-successional forest. Dominant canopy species in this stand include sawtooth oak (*Quercus acutissima*) and sweetgum. Dominant species are predominantly in the 12- to 20-inch DBH size class and 2- to 10-inch DBH size class, with a canopy closure estimated at approximately 80 percent. The co-dominant canopy species includes red maple. The area of the forest stand within the study area is approximately 0.09 acres. FS K-2 continues beyond the study area limits to the southeast.

Overall, Forest Stand K-2 is in fair health with moderate amounts of downed woody debris. The invasive species cover is high at 80 percent throughout the stand in the canopy, understory, and herbaceous layers. Invasive species include sawtooth oak, autumn olive (*Elaeagnus umbellata*), Japanese honeysuckle, rambler rose, Asian bittersweet (*Celastrus orbiculatus*), and common wormwood (*Artemisia vulgaris*). Within the study area FS K-2 is bisected by a perennial stream (WUS K-4) and contains no specimen trees. The stand is ranked as Priority 1 for retention due to the presence of a stream, 100-year floodplain, and steep slopes.

Forest Stand K-3 (FS K-3)

Forest Stand K-3 is located along I-95 near the MD 543 interchange (**Appendix B, Sheet 1**). FS K-3 is a deciduous/coniferous, early-successional forest. Dominant canopy species in this stand include sweetgum and Virginia pine (*Pinus virginiana*). Dominant species are predominantly in the 1- to 15-inch DBH size class and 3- to 9-inch DBH size class, with a canopy closure estimated at approximately 70 percent. The co-dominant canopy species include black locust (*Robinia pseudoacacia*). The area of the forest stand within the study area is approximately 1.01 acre. FS K-3 continues beyond the study area limits.

Forest Stand K-3 is in poor health and contains medium amounts of downed woody debris. The invasive species cover is high at 70 percent throughout the stand in the canopy, understory, and herbaceous layers. Invasive species include callery pear (*Pyrus calleryana*), rambler rose, Japanese honeysuckle, Asian bittersweet, and crow garlic. Forest Stand K-3 contains no specimen trees but is ranked as Priority 1 for retention due to the presence of streams (WUS K-5 and WUS K-6) and steep slopes.

Forest Stand K-4 (FS K-4)

Forest Stand K-4 is located along the exit ramp from I-95 northbound onto MD 543 (**Appendix B, Sheet 1**). FS K-4 is a deciduous/coniferous, early-mid successional forest. Dominant canopy species in this stand include sweetgum and eastern white pine (*Pinus strobus*). Dominant species are predominantly in the 5- to 14-inch DBH size class and 1- to 4-inch DBH size class, with a canopy closure estimated at approximately 95 percent. There are no co-dominant canopy species. The area of the forest stand within the study area is approximately 0.26 acre. FS K-4 continues east beyond the study area limits.

Forest Stand K-4 is in good health and contains little downed woody debris. The invasive species cover is low at 15 percent throughout the stand and only present in the canopy and understory. Invasive species include callery pear and Asian bittersweet. FS K-4 contains no specimen trees or environmentally sensitive areas, is not identified as a priority area by a local land use plan or forest conservation program and is therefore ranked as Priority 3 for retention.

Forest Stand K-5 (FS K-5)

Forest Stand K-5 is located north of the ramp from of I-95 northbound to MD 543 (**Appendix B, Sheet 1**). FS K-5 is a deciduous, mid-late successional forest. Dominant canopy species in this stand include northern red oak (*Quercus rubra*), white oak (*Quercus alba*), pin oak (*Quercus palustris*), and southern red oak (*Quercus falcata*). Dominant species are predominantly in the 2- to 26-inch DBH size class, 16- to 39-inch DBH class, 5- to 16-inch DBH class, and 12- to 26-inch DBH size class, with a canopy closure estimated at approximately 70 percent. The co-dominant canopy species include American beech (*Fagus grandifolia*), sweetgum, and black tupelo (*Nyssa sylvatica*). The area of the forest stand within the study area is approximately 0.86 acre. FS K-5 continues northeast beyond the study area limits.

Forest Stand K-5 is in good health and contains some downed woody debris. The invasive species cover is low at 10 percent throughout the stand and only present in the understory. Invasive species include Japanese honeysuckle and rambler rose. FS K-5 contains two specimen trees and is therefore ranked as Priority 1 for retention.

Forest Stand K-6 (FS K-6)

Forest Stand K-6 is located along MD 24 (**Appendix B, Sheet 5 and 6**). FS K-6 is a deciduous/coniferous, early-mid successional forest. Dominant canopy species in this stand include eastern white pine and black locust. Dominant species are predominantly in the 3- to 16-inch DBH size class and 2- to 7-inch DBH class, with a canopy closure estimated at approximately 70 percent. The co-dominant canopy species include big-tooth aspen (*Populus grandidentata*) and Virginia pine. The area of the forest stand within the study area is approximately 0.11 acre. FS K-6 continues west beyond the study area limits.

Forest Stand K-6 is in fair health and contains little downed woody debris. The invasive species cover is moderate at 35 percent throughout the stand and present in the understory and herbaceous layers. Invasive species include Japanese honeysuckle, Amur honeysuckle (*Lonicera maackii*) and crownvetch (*Securigera varia*). Forest Stand K-6 contains no specimen trees however it occurs along a steep slope and is therefore ranked as Priority 1 for retention.

Forest Stand K-7 (FS K-7)
Forest Stand K-7 is located along MD 24 (**Appendix B, Sheet 7**). FS K-7 is a deciduous early successional forest. Dominant canopy species in this stand include sweetgum and tuliptree (*Liriodendron tulipifera*). Dominant species are predominantly in the 2- to 6-inch DBH size class, with a canopy closure estimated at approximately 20 percent. The co-dominant canopy species includes black locust. The area of the forest stand within the study area is approximately 0.02 acre. FS K-7 continues east beyond the study area limits.

Forest Stand K-7 is in good health and contains little downed woody debris. The invasive species cover is low at 5 percent throughout the stand and present only the herbaceous layer. Invasive species include Canadian thistle (*Cirsium arvense*). FS K-7 contains no specimen trees however it is located along a steep slope and is therefore ranked as Priority 1 for retention.

Forest Stand K-8 (FS K-8)
Forest Stand K-8 is located along MD 24 (**Appendix B, Sheet 7**). FS K-8 is a deciduous, early-mid successional forest. Dominant canopy species in this stand include red maple and tuliptree. Dominant species are predominantly in the 3- to 18-inch DBH size class and 6- to 25-inch DBH class, with a canopy closure estimated at approximately 70 percent. The co-dominant canopy species include American beech, northern red oak, and white oak. The area of the stand within the study area is approximately 0.01 acre. FS K-8 continues east beyond the study area limits.

Forest Stand K-8 is in good health and contains moderate amounts of downed woody debris. Invasive species cover is low at 10 percent and is present in the understory and herbaceous layers. Invasive species include callery pear, common mugwort (*Artemisia vulgaris*), and Japanese honeysuckle. FS K-8 contains no specimen trees or environmentally sensitive areas, is not identified as a priority area by a local land use plan or forest conservation program and is therefore ranked as Priority 3 for retention.

Hedgerows
Hedgerows 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16 (H K-1 through H K-11 and H K-13 through H K-16)
A total of 15 hedgerows were identified throughout the study areas. Aside from H K-9, all hedgerows were classified as such because they were less than 10,000 SF in size and therefore did not meet the MD DNR requirements for a forest. These hedgerows ranged in size from approximately 150 SF to 2,000 SF. Hedgerow H K-9 was greater than 10,000 SF in size, however, it lacked the tree size and density requirement; 100 trees per acre with 50 percent being 2-inch DBH or greater.

Specimen Trees
During the field investigation, a total of three specimen trees were identified within the study areas (Table 1). The location of these trees can be found on the mapping provided in **Appendix B**. No state champion trees or trees having 75 percent or more of the DBH of the current state champion tree of that species were found within the study areas.

Table 1: Specimen Trees

Tree ID	DBH (In.)	CRZ (Ft.)	Common Name	Scientific Name	Condition	Forest Stand	Comments
TK-1	39	58.5	White Oak	*Quercus alba*	Good	FS K - 5	
TK-2	34	51	White Oak	*Quercus alba*	Good	FS K - 5	
TK-3	42.5	63.75	White Oak	*Quercus alba*	Fair	N/A	slightly reduced crown, evidence of trunk rot

Conclusions

During the field investigations, two wetlands and six waterways are located within or near the study areas. Disturbances to these systems will require a permit from the USACE and the Maryland Department of the Environment (MDE). All wetland boundaries are not considered final until a jurisdictional determination (JD) has been conducted by the USACE and MDE.

A total of 10 forest stands, 15 hedgerows, and three specimen trees were identified within the study areas. Impacts to these resources will require authorization from the Maryland Department of Natural Resources (DNR).

References

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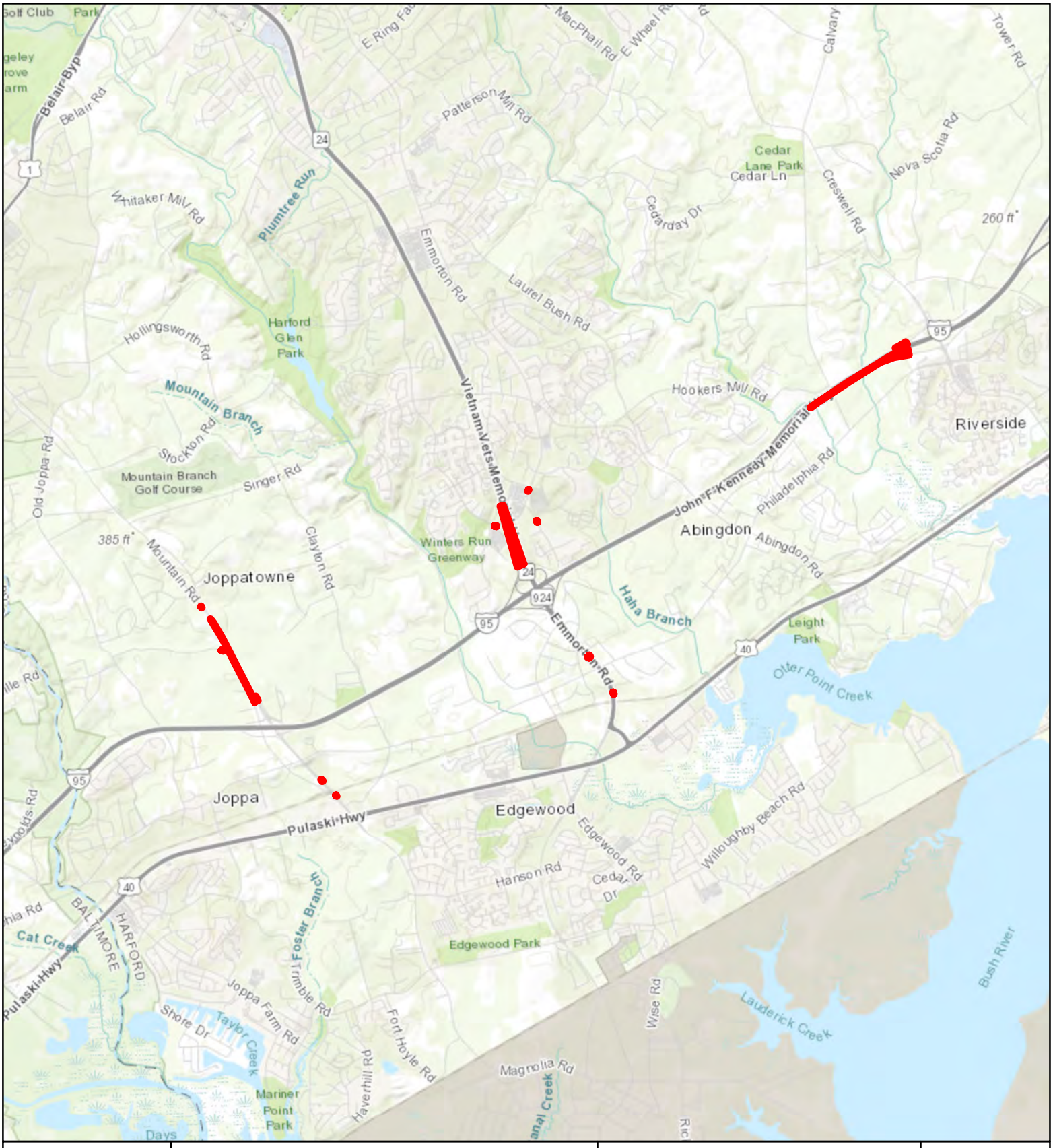
APPENDIX A – VICINITY MAP



COASTAL RESOURCES INC.

I-95 ETL NB Extension
ITS and Sign Installation

Vicinity Map

Harford County, MD
July 2019

Legend

Study Area

N
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1 inch = 1 mile

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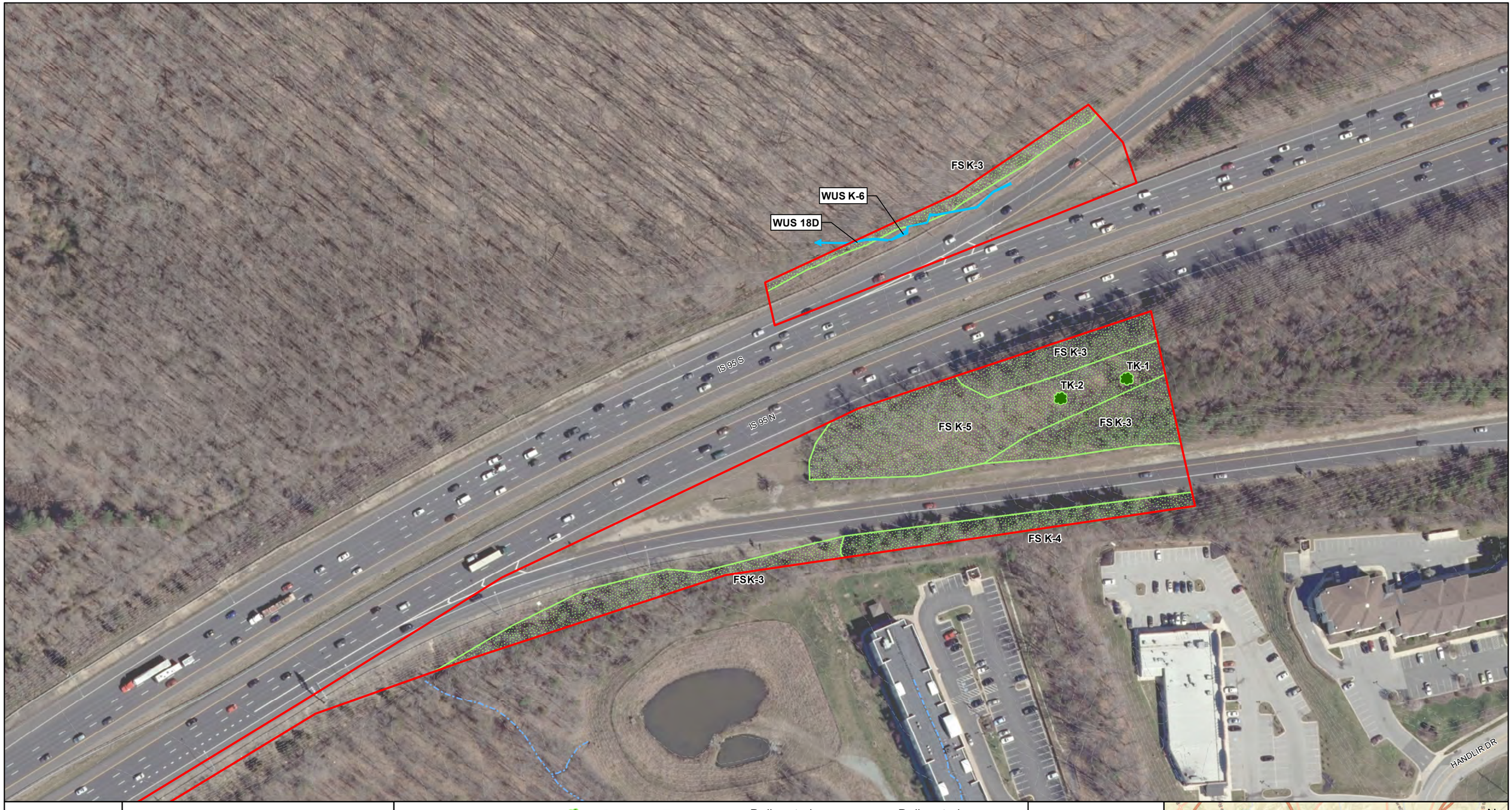
miles

APPENDIX B – WETLAND DELINEATION AND FOREST CHARACTERIZATION/TREE SURVEY MAPS



COASTAL RESOURCES INC.

I-95 ETL Northbound Extention ITS and Signal Installation

Wetland Delineation and Forest Characterization/Tree Survey Maps

SHEET 1 OF 11
Harford County, MD
July 2019

Legend

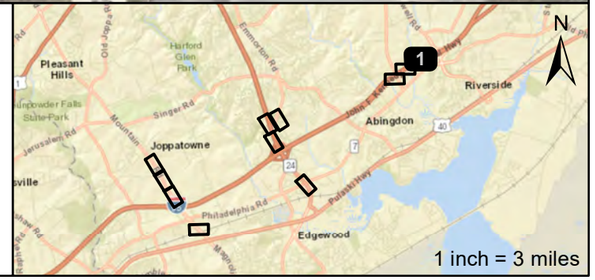
- Study Area
- Wetland Test Plot
- Upland Test Plot
- 2 ft Contours
- Specimen Tree
- Forest Stand*
- Hedgerow
- Mapped Streams
- 100-year Floodplain
- Delineated Ephemeral Channel
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated PEM Wetland
- Delineated PFO Wetland
- WB — 25 ft Wetland Buffer

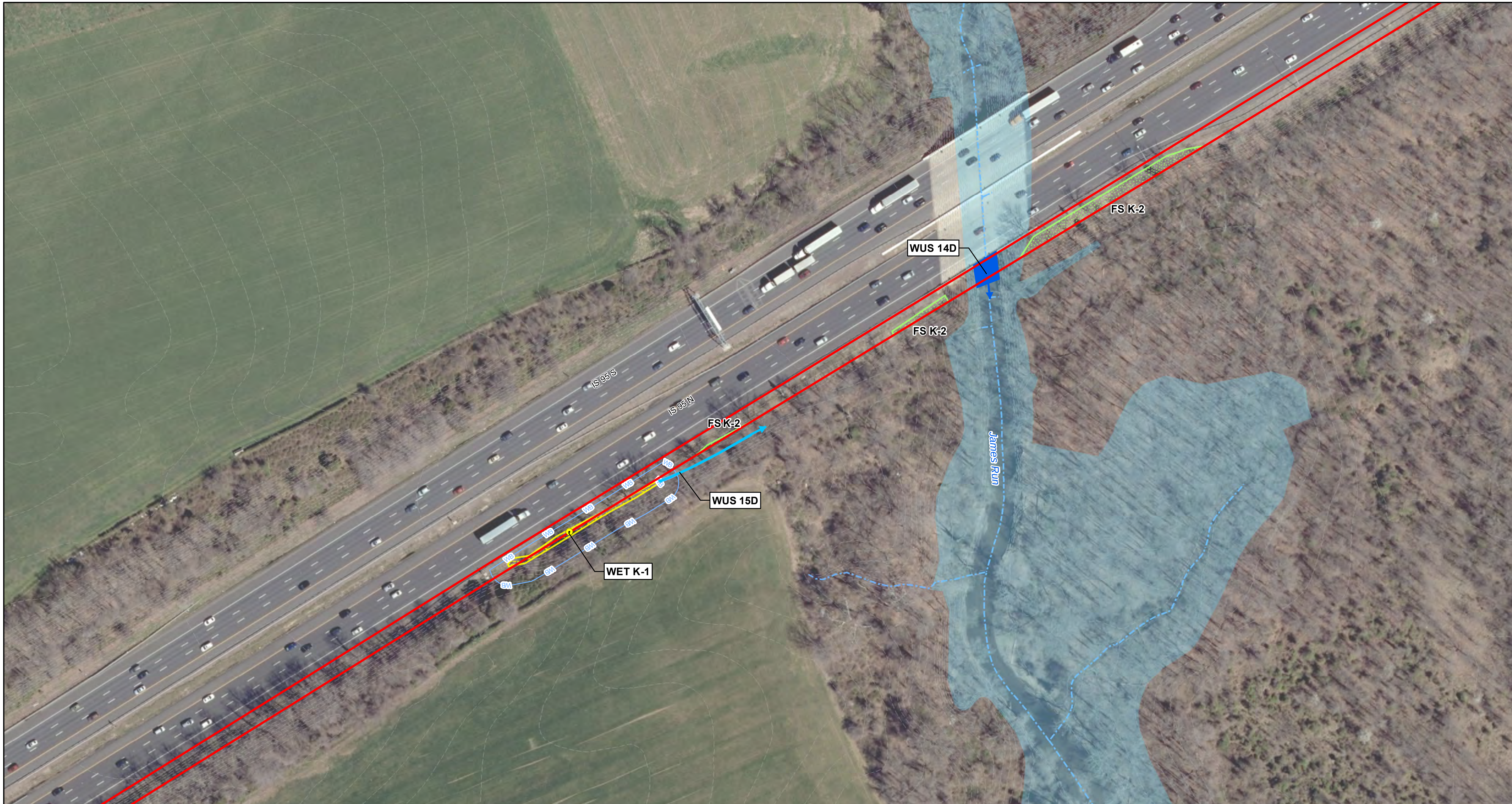
*Forest stand boundaries were clipped to the study area.

N
W E
S

1 inch = 120 feet

0 60 120
feet





I-95 ETL Northbound Extention
ITS and Signal Installation

Wetland Delineation and Forest Characterization/Tree Survey Maps

SHEET 2 OF 11
Harford County, MD
July 2019

COASTAL RESOURCES INC.

Legend

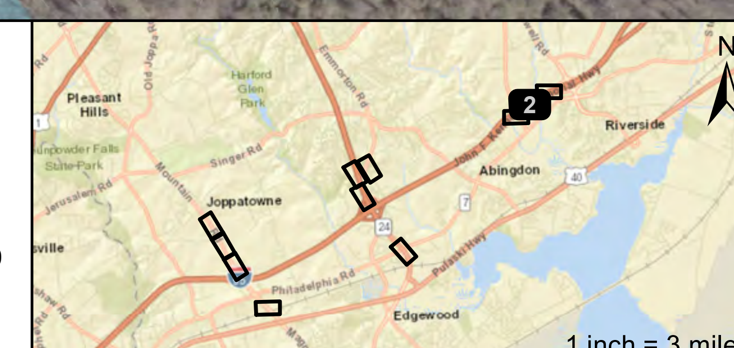
- Study Area
- Wetland Test Plot
- Upland Test Plot
- 2 ft Contours
- Specimen Tree
- Forest Stand*
- Hedgerow
- Mapped Streams
- 100-year Floodplain
- Delineated Ephemeral Channel
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated PEM Wetland
- Delineated PFO Wetland
- 25 ft Wetland Buffer

*Forest stand boundaries were clipped to the study area.

N W E S

1 inch = 120 feet

0 60 120
feet



COASTAL RESOURCES INC.

I-95 ETL Northbound Extention ITS and Signal Installation

Wetland Delineation and Forest Characterization/Tree Survey Maps

SHEET 3 OF 11
Harford County, MD
July 2019

Legend

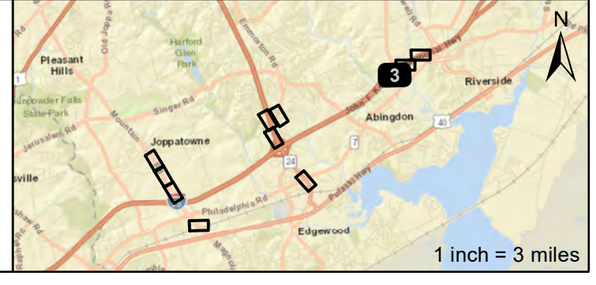
- Study Area
- Wetland Test Plot
- Upland Test Plot
- 2 ft Contours
- Specimen Tree
- Forest Stand*
- Hedgerow
- Mapped Streams
- 100-year Floodplain
- Delineated Ephemeral Channel
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated PEM Wetland
- Delineated PFO Wetland
- WB — 25 ft Wetland Buffer

*Forest stand boundaries were clipped to the study area.

N
W E
S

1 inch = 120 feet

0 60 120
feet



NOTE: NO RESOURCES WERE DELINEATED WITHIN THE STUDY AREA ON THIS SHEET.

COASTAL RESOURCES INC.

I-95 ETL Northbound Extention ITS and Signal Installation

Wetland Delineation and Forest Characterization/Tree Survey Maps

SHEET 4 OF 11
Harford County, MD
July 2019

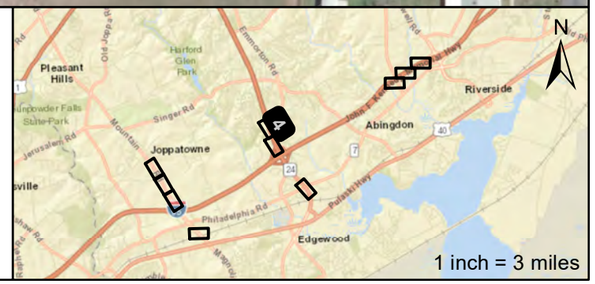
Legend

- Study Area
- Wetland Test Plot
- Upland Test Plot
- 2 ft Contours
- Specimen Tree
- Forest Stand*
- Hedgerow
- Mapped Streams
- 100-year Floodplain
- Delineated Ephemeral Channel
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated PEM Wetland
- Delineated PFO Wetland
- WB — 25 ft Wetland Buffer

*Forest stand boundaries were clipped to the study area.

1 inch = 120 feet

0 60 120
feet



NOTE: NO WETLANDS OR WATERS WERE DELINEATED WITHIN THE STUDY AREA ON THIS SHEET.

MD 24 - VIETNAM VETERANS MEMORIAL HWY

MD 924 - EMMORTON RD

S TOLLGATE RD

AIKEN TER

H K-11

FS K-6

COASTAL RESOURCES INC.

I-95 ETL Northbound Extention ITS and Signal Installation

Wetland Delineation and Forest Characterization/Tree Survey Maps

SHEET 5 OF 11
Harford County, MD
July 2019

Legend

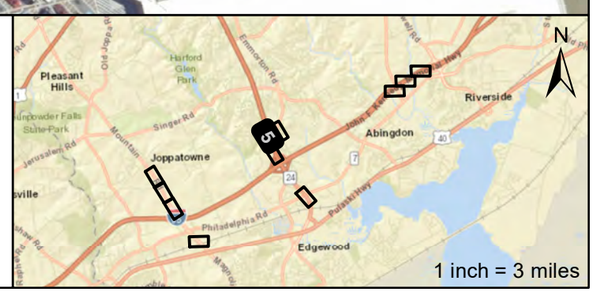
- Study Area
- Wetland Test Plot
- Upland Test Plot
- 2 ft Contours
- Specimen Tree
- Forest Stand*
- Hedgerow
- Mapped Streams
- 100-year Floodplain
- Delineated Ephemeral Channel
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated PEM Wetland
- Delineated PFO Wetland
- WB — 25 ft Wetland Buffer

*Forest stand boundaries were clipped to the study area.

1 inch = 120 feet

0 60 120

feet



NOTE: NO WETLANDS OR WATERS WERE DELINEATED WITHIN THE STUDY AREA ON THIS SHEET.

COASTAL RESOURCES INC.

I-95 ETL Northbound Extention ITS and Signal Installation

Wetland Delineation and Forest Characterization/Tree Survey Maps

SHEET 6 OF 11
Harford County, MD
July 2019

Legend

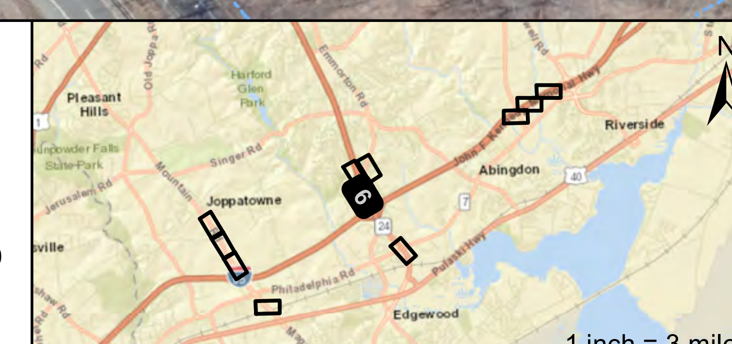
- Study Area
- Wetland Test Plot
- Upland Test Plot
- 2 ft Contours
- Specimen Tree
- Forest Stand*
- Hedgerow
- Mapped Streams
- 100-year Floodplain
- Delineated Ephemeral Channel
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated PEM Wetland
- Delineated PFO Wetland
- 25 ft Wetland Buffer (WB)

*Forest stand boundaries were clipped to the study area.

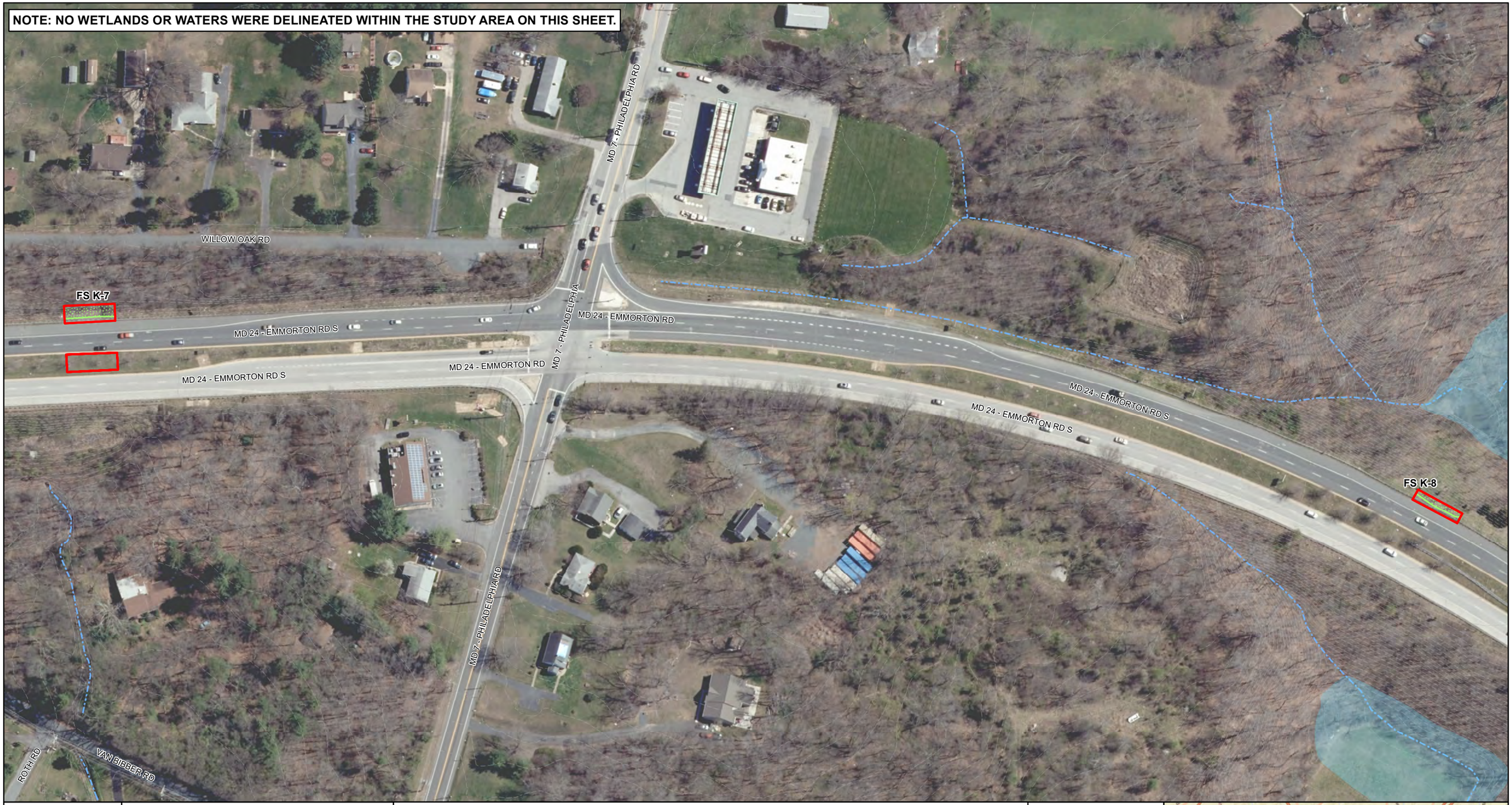
N E S W

1 inch = 120 feet

0 60 120
feet



NOTE: NO WETLANDS OR WATERS WERE DELINEATED WITHIN THE STUDY AREA ON THIS SHEET.



COASTAL RESOURCES INC.

I-95 ETL Northbound Extention ITS and Signal Installation

Wetland Delineation and Forest Characterization/Tree Survey Maps

SHEET 7 OF 11
Harford County, MD
July 2019

Legend

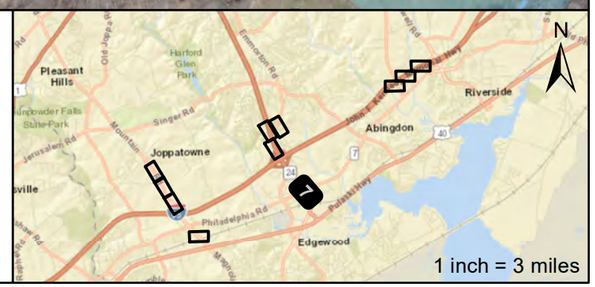
- Study Area
- Wetland Test Plot
- Upland Test Plot
- 2 ft Contours
- Specimen Tree
- Forest Stand*
- Hedgerow
- Mapped Streams
- 100-year Floodplain
- Delineated Ephemeral Channel
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated PEM Wetland
- Delineated PFO Wetland
- WB — 25 ft Wetland Buffer

*Forest stand boundaries were clipped to the study area.

1 inch = 120 feet

0 60 120

feet



1 inch = 3 miles

NOTE: NO WETLANDS OR WATERS WERE DELINEATED WITHIN THE STUDY AREA ON THIS SHEET.

MD 152 - MOUNTAIN RD

TK-3

HK-1

HK-2

HK-3

HK-4

HK-5

FRANKLINVILLE RD

COASTAL RESOURCES INC.

I-95 ETL Northbound Extention ITS and Signal Installation

Wetland Delineation and Forest Characterization/Tree Survey Maps

SHEET 8 OF 11
Harford County, MD
July 2019

Legend

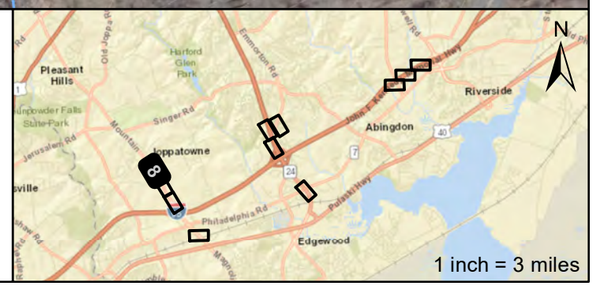
- Study Area
- Wetland Test Plot
- Upland Test Plot
- 2 ft Contours
- Specimen Tree
- Forest Stand*
- Hedgerow
- Mapped Streams
- 100-year Floodplain
- Delineated Ephemeral Channel
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated PEM Wetland
- Delineated PFO Wetland
- WB — 25 ft Wetland Buffer

*Forest stand boundaries were clipped to the study area.

1 inch = 120 feet

0 60 120

feet



COASTAL RESOURCES INC.

I-95 ETL Northbound Extention ITS and Signal Installation

Wetland Delineation and Forest Characterization/Tree Survey Maps

SHEET 9 OF 11
Harford County, MD
July 2019

Legend

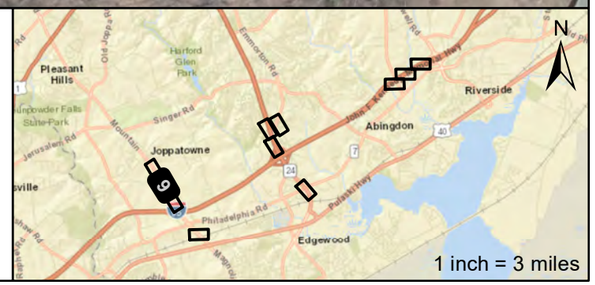
- Study Area
- Wetland Test Plot
- Upland Test Plot
- 2 ft Contours
- Specimen Tree
- Forest Stand*
- Hedgerow
- Mapped Streams
- 100-year Floodplain
- Delineated Ephemeral Channel
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated PEM Wetland
- Delineated PFO Wetland
- WB — 25 ft Wetland Buffer

*Forest stand boundaries were clipped to the study area.

1 inch = 120 feet

0 60 120

feet



NOTE: NO WETLANDS OR WATERS WERE DELINEATED WITHIN THE STUDY AREA ON THIS SHEET.

COASTAL RESOURCES INC.

I-95 ETL Northbound Extention ITS and Signal Installation

Wetland Delineation and Forest Characterization/Tree Survey Maps

SHEET 10 OF 11
Harford County, MD
July 2019

Legend

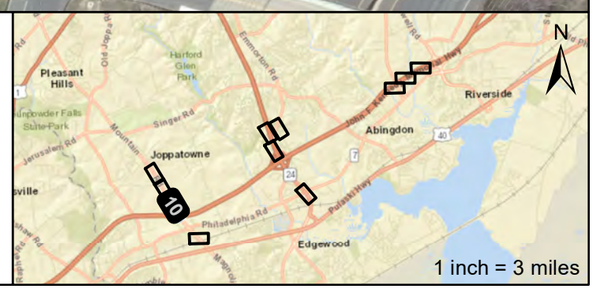
- Study Area
- Wetland Test Plot
- Upland Test Plot
- 2 ft Contours
- Specimen Tree
- Forest Stand*
- Hedgerow
- Mapped Streams
- 100-year Floodplain
- Delineated Ephemeral Channel
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated PEM Wetland
- Delineated PFO Wetland
- WB — 25 ft Wetland Buffer

*Forest stand boundaries were clipped to the study area.

1 inch = 120 feet

0 60 120

feet



1 inch = 3 miles

NOTE: NO WETLANDS OR WATERS WERE DELINEATED WITHIN THE STUDY AREA ON THIS SHEET.

COASTAL RESOURCES INC.

I-95 ETL Northbound Extention ITS and Signal Installation

Wetland Delineation and Forest Characterization/Tree Survey Maps

SHEET 11 OF 11
Harford County, MD
July 2019

Legend

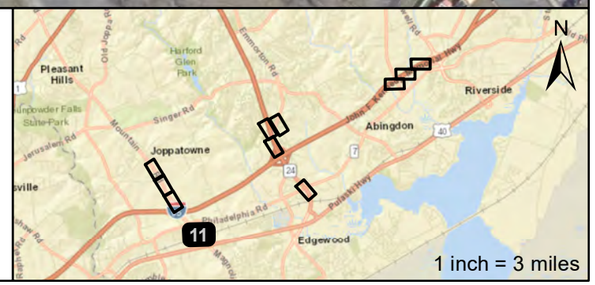
- Study Area
- Wetland Test Plot
- Upland Test Plot
- 2 ft Contours
- Specimen Tree
- Forest Stand*
- Hedgerow
- Mapped Streams
- 100-year Floodplain
- Delineated Ephemeral Channel
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated PEM Wetland
- Delineated PFO Wetland
- WB — 25 ft Wetland Buffer

*Forest stand boundaries were clipped to the study area.

N
W E
S

1 inch = 120 feet

0 60 120
feet



APPENDIX C – WETLAND DELINEATION PHOTO LOG

I-95 ETL Northbound Extension – ITS and Sign Installation Study Areas

Wetlands

Photo 1: WET E-3 PEM (Facing Northwest)

Photo 2: WET K-1 PEM (Facing Northeast)

Photo 3: UPL K-1 (Facing Southeast)

WUS

Photo 4: WUS K-6, downstream (Facing West)

Photo 5: WUS K-6, upstream (Facing East)

Photo 6: WUS 3D, downstream (Facing Southeast)

Photo 7: WUS 3D, upstream (Facing Northwest)

Photo 8: WUS 12D, downstream (Facing Northeast)

Photo 9: WUS 12D, upstream (Facing Southwest)

Photo 10: WUS 14D, downstream (Facing South)

Photo 11: WUS 14D, upstream (Facing North)

Photo 12: WUS 15D, downstream (Facing East)

Photo 13: WUS 15D, upstream (Facing West)

Photo 14: WUS 18D, downstream (Facing Northwest)

Photo 15: WUS 18D, upstream (Facing Southeast)

APPENDIX D – WETLAND DELINEATION DATASHEETS

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: ITS and Sign Installation | City/County: Harford County | Sampling Date: 4/23/2019

Applicant/Owner: MDTA | State: MD | Sampling Point: WET K-1

Investigator(s): HT, EB | Section, Township, Range:

Landform (hillslope, terrace, etc.): Ditch | Local relief (concave, convex, none): Concave | Slope (%): 5%

Subregion (LRR or MLRA): MLRA 149A | Lat: 39.479257 | Long: -76.263950 | Datum: NAD83 (2011)

Soil Map Unit Name: Loamy and Clayey Land, 5-15% slopes | NWI classification: PEM1E

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

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

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

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

Hydrophytic Vegetation Present?	Yes	☑	No	☐	
Hydric Soil Present?	Yes	☑	No	☐	**Is the Sampled Area Within a Wetland?** Yes ☑ No ☐
Wetland Hydrology Present?	Yes	☑	No	☐	

Remarks: Wetter than average past 6+ months. Plot represented by Photo 13 facing northeast. Upland plot was not completed due to the well-defined nature of the ditch's boundaries and steep slopes on either side.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes	☑	No	☐	Depth (inches):	1-6"
Water Table Present?	Yes	☑	No	☐	Depth (inches):	0"
Saturation Present? (includes capillary fringe)	Yes	☑	No	☐	Depth (inches):	0"

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks: Wetland originates at a culvert extending under I-95. Wetland appears to intercept groundwater in addition to receiving surface runoff from roadway. Wetland drains to intermittent stream WUS 15D which discharges to WUS 3D.

Sampling Point: WET K-1

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

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Sapling/Shrub Stratum (Plot size:)			
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Herb Stratum (Plot size: Approx. 10' x 50')			
1. *Typha angustifolia*	70	Y	OBL
2. *Phragmites australis*	5	N	FACW
3. *Celastrus orbiculatus*	5	N	FACU
4. *Lonicera japonica*	5	N	FACU
5. *Alliaria petiolata*	3	N	FACU
6. *Parthenocissus quinquefolia*	3	N	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	91 = Total Cover		
50% of total cover: 45.5	20% of total cover: 18.2		

Woody Vine Stratum (Plot size:)			
1. *None*			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

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

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ☑ No ☐

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

Plots size restricted by size/shape of wetland.

SOIL

Sampling Point: WET K-1

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	Organics							
1-6	2.5Y3/1	95	2.5Y3/3	5	C	M, PL	SL	With gravel and rootlets
6-10	2.5Y3/3	60					SCL	
	5Y5/1	40						

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

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

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

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: Gravel

Depth (inches): 10''

Hydric Soil Present? Yes ☑ No ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: ITS and Sign Installation | City/County: Harford County | Sampling Date: 5/1/2019

Applicant/Owner: MDTA | State: MD | Sampling Point: UPL K-1

Investigator(s): HT, SP, LN | Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale/Ditch | Local relief (concave, convex, none): Concave | Slope (%): 1-2%

Subregion (LRR or MLRA): MLRA 149A | Lat: 39.460781 | Long: -76.312654 | Datum: NAD83 (2011)

Soil Map Unit Name: Russett fine sandy loam, 5-15% slopes | NWI classification: N/A

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

Are Vegetation ☑ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

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

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

Hydrophytic Vegetation Present?	Yes	☑	No	☐	
Hydric Soil Present?	Yes	☐	No	☑	**Is the Sampled Area Within a Wetland?** Yes ☐ No ☑
Wetland Hydrology Present?	Yes	☑	No	☐	

Remarks: Wetter than average past 6+ months. Evidence of recent disturbance, tire ruts and soil stabilization material present. Possibly compaction by construction activity has altered hydrology within the area. Plot represented by Photo 5 facing southeast.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ☑ No ☐ Depth (inches): 0"

Water Table Present? Yes ☐ No ☑ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 3"

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks: Ditch located within recently disturbed area adjacent to roadway. Tire ruts and soils stabilization materials present. Saturation supported by recent precipitation rather than a high water table. Ditch lacks a direct surface connection to regulated resources.

Sampling Point: UPL K-1

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

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: 20% of total cover:

Sapling/Shrub Stratum (Plot size: 30')			
1. *Rosa multiflora*	10	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	10 = Total Cover		

50% of total cover: 5 20% of total cover: 2

Herb Stratum (Plot size: 30')			
1. *Juncus effuses*	20	Y	OBL
2. *Typha latifolia*	40	Y	OBL
3. *Ludwigia palustris*	3	N	OBL
4. *Poa palustris*	30	Y	FAC
5. *Carex sp.*	5	N	N/A
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	98 = Total Cover		

50% of total cover: 49 20% of total cover: 19.6

Woody Vine Stratum (Plot size:)			
1. *None*			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: 20% of total cover:

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1=	
FACW species		x2=	
FAC species		x3=	
FACU species		x4=	
UPL species		x5=	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

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

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ☑ No ☐

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

SOIL

Sampling Point: UPL K-1

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR5/4	50					SL	w/organics and rock fragments
	10YR4/3	50						
2-4	7.5YR4/4	60					SCL	w/gravel and rock fragments
	2.5Y5/3	40						
4-12+	7.5YR4/6	100					SCL	w/gravel and rock fragments and mica

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

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

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

Indicators for Problematic Hydric Soils [3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

Stream Datasheet

Project: ITS and Sign Installation **Date:** 5/01/19 **Stream ID:** WUS K-6

Staff: HT, SP, LN **Flow Type:** Perennial ☐ Intermittent ☒ Ephemeral ☐

Flow Direction: W **Drains Into:** WUS 18D

Fed By: Groundwater and road runoff.

Bank Height: 1' **Water Depth:** 1-3" **Width:** 3'

Channel Gradient (%): 8% **Bank Stability:** Moderately stable. The lower portion is filled with rip-rap.

Avg. Bank Slope: Vertical ☐ 2:1 ☒ 3:1 ☐ 4:1 or greater ☐

Mesohabitat: % Run: 40 % Riffle: 10 % Pool: 50

Substrate:

Cobble	☐	Gravel	☒	Sand	☒	Silt	☒
Veg	☐	Riprap	☐	Concrete	☐	Muck	☐

Channel Characteristics: Natural ☐ Artificial ☐ Man-altered ☒

OHWM:

Clear, natural line impressed on the bank	☐	Presence of litter and debris	☐
Changes in character of soil	☐	Destruction of terrestrial veg.	☐
Shelving	☐	Presence of wrack line	☐
Vegetation matted down, bent, or absent	☒	Sediment sorting	☐
Leaf litter disturbed or washed away	☒	Scour	☐
Sediment deposition	☒	Multiple observed/predicted flow events	☐
Water staining	☐	Abrupt change in plant community	☐

Photos? Upstream ☒ Downstream ☒

Connection to Traditional Navigable Waterway: Flow west to WUS 18D which discharges to James Run, which discharges to Bush Creek

Other Comments: Channel disturbed by recent placement of guardrail (tire ruts present and the channel banks were flattened). A pipe outlet contributes flow at lower portion of channel.

Stream Datasheet

Project: ITS and Sign Installation **Date:** 4/23/19 **Stream ID:** WUS 3D (Bynum Run)

Staff: HT, EB **Flow Type:** Perennial ☒ Intermittent ☐ Ephemeral ☐

Flow Direction: SE **Drains Into:** Bush Creek

Fed By: Farmandis Branch and Unnamed Tributaries (including WUS 12D) outside the study area

Bank Height: 6' **Water Depth:** 1-3' **Width:** 50'

Channel Gradient (%): 2% **Bank Stability:** Stable due to the placement of large boulders/rip-rap

Avg. Bank Slope: Vertical ☐ 2:1 ☒ 3:1 ☐ 4:1 or greater ☐

Mesohabitat: % Run: 50 % Riffle: 40 % Pool: 10

Substrate: Cobble ☒ Gravel ☒ Sand ☒ Silt ☐
Veg ☐ Riprap ☒ Concrete ☐ Muck ☐

Channel Characteristics: Natural ☐ Artificial ☐ Man-altered ☒

OHWM:

Clear, natural line impressed on the bank	☐	Presence of litter and debris	☐
Changes in character of soil	☐	Destruction of terrestrial veg.	☐
Shelving	☐	Presence of wrack line	☒
Vegetation matted down, bent, or absent	☒	Sediment sorting	☐
Leaf litter disturbed or washed away	☒	Scour	☐
Sediment deposition	☒	Multiple observed/predicted flow events	☐
Water staining	☒	Abrupt change in plant community	☐

Photos? Upstream ☒ Downstream ☒

Connection to Traditional Navigable Waterway: WUS 3D (Bynum Run) drains southeast to Bush Creek.

Other Comments: Flows southeast under I-95, large pipe (likely sewerline) crosses over channel where it flows under I-95.

Stream Datasheet

Project: ITS and Sign Installation **Date:** 4/23/19 **Stream ID:** WUS 12D

Staff: HT, EB **Flow Type:** Perennial ☐ Intermittent ☒ Ephemeral ☐

Flow Direction: SW **Drains Into:** WUS 3D (Bynum Run)

Fed By: Culvert, inlet location is unknown and is outside the study area

Bank Height: 1' **Water Depth:** 2-6" **Width:** 4'

Channel Gradient (%): 3% **Bank Stability:** Stable overall, banks are vegetated

Avg. Bank Slope: Vertical ☐ 2:1 ☐ 3:1 ☒ 4:1 or greater ☐

Mesohabitat: % Run: 35 % Riffle: 5 % Pool: 60

Substrate: Cobble ☐ Gravel ☒ Sand ☒ Silt ☒
Veg ☐ Riprap ☐ Concrete ☐ Muck ☐

Channel Characteristics: Natural ☐ Artificial ☐ Man-altered ☒

OHWM:

Clear, natural line impressed on the bank	☐	Presence of litter and debris	☒
Changes in character of soil	☐	Destruction of terrestrial veg.	☐
Shelving	☐	Presence of wrack line	☐
Vegetation matted down, bent, or absent	☒	Sediment sorting	☐
Leaf litter disturbed or washed away	☒	Scour	☐
Sediment deposition	☒	Multiple observed/predicted flow events	☐
Water staining	☐	Abrupt change in plant community	☐

Photos? Upstream ☒ Downstream ☒

Connection to Traditional Navigable Waterway: WUS 12D flows southwest to WUS 3D (Bynum Run). Bynum Run flows southeast to Bush Creek.

Other Comments: Appears to be a created roadside ditch. Stream flows from culvert under I-95. Areas of channel contain sediment deposits with cattails growing.

Stream Datasheet

Project: ITS and Sign Installation **Date:** 4/23/19 **Stream ID:** WUS 14D (James Run)

Staff: HT, EB **Flow Type:** Perennial ☒ Intermittent ☐ Ephemeral ☐

Flow Direction: W **Drains Into:** Bush Creek

Fed By: WUS 15D, WUS 18D, other Unnamed Tributaries and Broad Run outside the study area

Bank Height: 10' **Water Depth:** 2-4' **Width:** 40'

Channel Gradient (%): 2% **Bank Stability:** Stabilized by placement of large boulders/rip-rap

Avg. Bank Slope: Vertical ☐ 2:1 ☒ 3:1 ☐ 4:1 or greater ☐

Mesohabitat: % Run: 20 % Riffle: 0 % Pool: 80

Substrate: Cobble ☒ Gravel ☒ Sand ☒ Silt ☒
Veg ☐ Riprap ☐ Concrete ☐ Muck ☐

Channel Characteristics: Natural ☐ Artificial ☐ Man-altered ☒

OHWM:

Clear, natural line impressed on the bank	☐	Presence of litter and debris	☐
Changes in character of soil	☐	Destruction of terrestrial veg.	☐
Shelving	☐	Presence of wrack line	☒
Vegetation matted down, bent, or absent	☐	Sediment sorting	☐
Leaf litter disturbed or washed away	☒	Scour	☐
Sediment deposition	☐	Multiple observed/predicted flow events	☐
Water staining	☒	Abrupt change in plant community	☐

Photos? Upstream ☒ Downstream ☒

Connection to Traditional Navigable Waterway: WUS 14D (James Run) flows south to Bush Creek.

Other Comments: Stream flows south under I-95.

Stream Datasheet

Project: ITS and Sign Installation **Date:** 4/23/19 **Stream ID:** WUS 15D

Staff: HT, EB **Flow Type:** Perennial ☐ Intermittent ☒ Ephemeral ☐

Flow Direction: NE **Drains Into:** WUS 14D (James Run)

Fed By: Culvert and wetland (WET K-1), inlet location is unknown and is outside the study area

Bank Height: 1' **Water Depth:** 2-6" **Width:** 4'

Channel Gradient (%): 5-8% **Bank Stability:** Stable overall, banks are vegetated

Avg. Bank Slope: Vertical ☐ 2:1 ☒ 3:1 ☐ 4:1 or greater ☐

Mesohabitat: % Run: 25 % Riffle: 5 % Pool: 70

Substrate: Cobble ☐ Gravel ☐ Sand ☒ Silt ☒
Veg ☐ Riprap ☐ Concrete ☐ Muck ☐

Channel Characteristics: Natural ☐ Artificial ☐ Man-altered ☒

OHWM:

Clear, natural line impressed on the bank	☐	Presence of litter and debris	☐
Changes in character of soil	☐	Destruction of terrestrial veg.	☐
Shelving	☐	Presence of wrack line	☒
Vegetation matted down, bent, or absent	☒	Sediment sorting	☐
Leaf litter disturbed or washed away	☒	Scour	☐
Sediment deposition	☐	Multiple observed/predicted flow events	☐
Water staining	☒	Abrupt change in plant community	☐

Photos? Upstream ☒ Downstream ☒

Connection to Traditional Navigable Waterway: WUS 15D flows northeast to WUS 14D (James Run). James Run flows south to Bush Creek.

Other Comments: Stream originates at WET K-1 (PEM wetland ditch which begins at culvert) And flows northeast outside the study area. Channel is ditched but likely within natural drainage.

Stream Datasheet

Project: ITS and Sign Installation **Date:** 4/23/19 **Stream ID:** WUS 18D

Staff: HT, EB **Flow Type:** Perennial ☐ Intermittent ☒ Ephemeral ☐

Flow Direction: W **Drains Into:** WUS 14D (James Run)

Fed By: Culvert, inlet location is unknown but is likely receiving surface runoff only

Bank Height: 3' **Water Depth:** 1-2" **Width:** 2'

Channel Gradient (%): 5% **Bank Stability:** Top of reach stabilized with rip-rap; Downstream section is moderately unstable with eroding banks and signs of scour.

Avg. Bank Slope: Vertical ☐ 2:1 ☒ 3:1 ☐ 4:1 or greater ☐

Mesohabitat: % Run: 80 % Riffle: 5 % Pool: 15

Substrate:

Cobble	☐	Gravel	☒	Sand	☒	Silt	☐
Veg	☐	Riprap	☒	Concrete	☐	Muck	☐

Channel Characteristics: Natural ☐ Artificial ☐ Man-altered ☒

OHWM:

Clear, natural line impressed on the bank	☒	Presence of litter and debris	☐
Changes in character of soil	☐	Destruction of terrestrial veg.	☐
Shelving	☐	Presence of wrack line	☐
Vegetation matted down, bent, or absent	☒	Sediment sorting	☐
Leaf litter disturbed or washed away	☒	Scour	☒
Sediment deposition	☒	Multiple observed/predicted flow events	☐
Water staining	☐	Abrupt change in plant community	☐

Photos? Upstream ☒ Downstream ☒

Connection to Traditional Navigable Waterway: Flows west to WUS 14D (James Run). James Run flows south to Bush Creek.

Other Comments: Stream flows from culvert. Top of channel is filled with rip-rap. Stream continues beyond the study area.

APPENDIX E – FOREST PHOTO LOG

Photo 2: Forest Stand K-2 (Facing South)

Photo 3: Forest Stand K-3 (Facing East)

Photo 4: Forest Stand K-4 (Facing Southwest)

Photo 5: Forest Stand K-5 (Facing Northeast)

Photo 6: Forest Stand K-6 (Facing Northwest)

Photo 7: Forest Stand K-7 (Facing South)

Photo 8: Forest Stand K-8 (Facing North)

APPENDIX F – FOREST STAND SUMMARY SHEETS

Forest Stand Summary Sheet

Property: ITS and Sign Installation
Location: Harford County (Town, County ADC Map #, and Grid Coordinates)
Prepared By: AM, LN, EB Date: 4/24/2019

Stand Variable	Stand # FS K-2
1. Dominant species / Co-dominant species	*Quercus acutissima, Liquidambar styraciflua / Acer rubrum*
2. Successional stage	Mid
3. Size class of dominant species	12-20" DBH and 2-10" DBH
4. Percent of canopy coverage	80%
5. Common understory species 3' to 20' tall	*Acer rubrum, Elaeagnus umbellata, Lonicera japonica*
6. Percent of understory cover 3' to 20' tall	50%
7. Number of understory species 3' to 20' tall	6
8. Common herbaceous species 0' to 3' tall	*Festuca species*
9. Percent of herbaceous & woody plant cover 0' to 3' tall	65%
10. List of major invasive plant species and percent of cover	*Quercus acutissima (T), Eleagnus umbellata (V), Lonicera japonica (V), Rosa multiflora (S) Celastrus orbiculatus (V), Artemisia vulgaris (H) / 80%*
11. Comments	Stand K-2 is located along I-95. Forest is in fair condition overall, as it contains many invasives and the *Fraxinus pennsylvanica* trees are likely dead due to the emerald ash borer. Regenerating species include *Fraxinus pennsylvanica* and *Liquidambar styraciflua*. Other non-dominant species include *Diospyros virginiana* and *Robinia pseudoacacia*. Downed woody debris is a common feature within the stand.

Forest Stand Summary Sheet

Property: ITS and Sign Installation
Location: Harford County (Town, County ADC Map #, and Grid Coordinates)
Prepared By: AM, LN, EB Date: 4/24/2019

Stand Variable	Stand # FS K-3
1. Dominant species / Co-dominant species	*Liquidambar styraciflua, Pinus virginiana / Robinia pseudoacacia*
2. Successional stage	Early
3. Size class of dominant species	1-15" DBH and 3-9" DBH
4. Percent of canopy coverage	70%
5. Common understory species 3' to 20' tall	*Liquidambar styraciflua, Toxicodendron radicans, Lonicera japonica, Rosa multiflora*
6. Percent of understory cover 3' to 20' tall	90%
7. Number of understory species 3' to 20' tall	5
8. Common herbaceous species 0' to 3' tall	*Allium vineale*
9. Percent of herbaceous & woody plant cover 0' to 3' tall	10%
10. List of major invasive plant species and percent of cover	*Pyrus calleryana (T), Lonicera japonica (V), Rosa multiflora (S), Celastrus orbiculatus (V), Allium vineale (H) / 70%*
11. Comments	Stand K-3 is located near the MD-534 interchange. Forest is in poor condition overall, as it contains many invasives and the *Fraxinus pennsylvanica* trees are likely dead due to the emerald ash borer. Regenerating species include *Acer rubrum* and *Liquidambar styraciflua*. Other non-dominant species include *Platanus occidentalis*, *Liriodendron tulipifera*, and *Juniperus virginiana*. Downed woody debris is a common feature within the stand.

Forest Stand Summary Sheet

Property: ITS and Sign Installation
Location: Harford County (Town, County ADC Map #, and Grid Coordinates)
Prepared By: AM, LN, EB Date: 4/24/2019

Stand Variable	Stand # FS K-4
1. Dominant species / Co-dominant species	*Pinus strobus, Liquidambar styraciflua*
2. Successional stage	Early-Mid
3. Size class of dominant species	5-14" DBH and 1-4" DBH
4. Percent of canopy coverage	95%
5. Common understory species 3' to 20' tall	*Liquidambar styraciflua, Celastrus orbiculatus, Rubus species*
6. Percent of understory cover 3' to 20' tall	35%
7. Number of understory species 3' to 20' tall	3
8. Common herbaceous species 0' to 3' tall	Stand lacks herbaceous vegetation
9. Percent of herbaceous & woody plant cover 0' to 3' tall	N/A
10. List of major invasive plant species and percent of cover	*Pyrus calleryana (T), Celastrus orbiculatusv(V) / 15%*
11. Comments	Stand K-4 is located along the MD 543 ramp Forest is in good condition overall, as it contains little invasives. Regenerating species include *Acer rubrum* and *Liquidambar styraciflua* . Downed woody debris is a rare feature within the stand.

Forest Stand Summary Sheet

Property: ITS and Sign Installation
Location: Harford County (Town, County ADC Map #, and Grid Coordinates)
Prepared By: AM, LN Date: 4/24/2019

Stand Variable	Stand # FS K-5
1. Dominant species / Co-dominant species	*Quercus rubra, Quercus alba, Quercus palustris, Quercus falcata / Fagus grandifolia, Liquidambar styraciflua, Nyssa sylvatica*
2. Successional stage	Mid-Late
3. Size class of dominant species	2-26" DBH, 16-39" DBH, 5-16" DBH, and 12-26" DBH
4. Percent of canopy coverage	70%
5. Common understory species 3' to 20' tall	*Fagus grandifolia, Liquidambar styraciflua, Nyssa sylvatica, Kalmia latifolia, Smilax rotundifolia*
6. Percent of understory cover 3' to 20' tall	63%
7. Number of understory species 3' to 20' tall	7
8. Common herbaceous species 0' to 3' tall	None
9. Percent of herbaceous & woody plant cover 0' to 3' tall	N/A
10. List of major invasive plant species and percent of cover	*Lonicera japonica (V), Rosa multiflora (S) / 10%*
11. Comments	Stand K-5 is located within the MD-543 interchange. Forest is in good condition overall, as it contains little invasives and high species diversity. Two specimen trees are located within the stand. Regenerating species include *Quercus alba, Quercus rubra, Fagus grandifolia,* and *Liquidambar styraciflua* . Other non-dominant species include *Acer rubrum*. Downed woody debris is a common feature within the stand.

Forest Stand Summary Sheet

Property: ITS and Sign Installation
Location: Harford County (Town, County ADC Map #, and Grid Coordinates)
Prepared By: AM, LN Date: 4/24/2019

Stand Variable	Stand # FS K-6
1. Dominant species / Co-dominant species	*Pinus strobus, Robinia pseudoacacia / Populus grandidentata, Pinus virginiana*
2. Successional stage	Early-Mid
3. Size class of dominant species	3-16" DBH and 2-7" DBH
4. Percent of canopy coverage	70%
5. Common understory species 3' to 20' tall	*Robinia pseudoacacia, Lonicera japonica, Vitis species, Lonicera maackii*
6. Percent of understory cover 3' to 20' tall	60%
7. Number of understory species 3' to 20' tall	5
8. Common herbaceous species 0' to 3' tall	*Securigera varia*
9. Percent of herbaceous & woody plant cover 0' to 3' tall	5%
10. List of major invasive plant species and percent of cover	*Lonicera japonica (V), Lonicera maackii (V), Securigera varia (H) / 35%*
11. Comments	Stand K-6 is located along MD 24. Forest is in fair condition overall, as it contains many invasives. Regenerating species include *Pinus virginiana* and *Populus grandidentata*. Other non-dominant species include *Liquidambar styraciflua*. Downed woody debris is a rare feature within the stand.

Forest Stand Summary Sheet

Property: ITS and Sign Installation
Location: Harford County (Town, County ADC Map #, and Grid Coordinates)
Prepared By: HT, AM Date: 5/14/2019

Stand Variable	Stand # FS K-7
1. Dominant species / Co-dominant species	*Liquidambar styraciflua, Liriodendron tulipifera/ Robinia pseudoacacia*
2. Successional stage	Early (TMDL tree planting site)
3. Size class of dominant species	2-6" DBH
4. Percent of canopy coverage	20%
5. Common understory species 3' to 20' tall	*Juniperus virginiana, Liriodendron tulipifera, Robinia pseudoacacia, Liquidambar styraciflua*
6. Percent of understory cover 3' to 20' tall	30%
7. Number of understory species 3' to 20' tall	15
8. Common herbaceous species 0' to 3' tall	*Dactylis glomerata, Vicia sativa, Cirsium arvense*
9. Percent of herbaceous & woody plant cover 0' to 3' tall	95%
10. List of major invasive plant species and percent of cover	*Cirsium arvense* / 5%
11. Comments	Stand K-8 is located along Emmorton Road and appears to be a TMDL tree planting site. Forest is in good condition overall, as it contains little invasives. Regenerating species include *Robinia pseudoacacia, Liriodendron tulipifera,* and *Liquidambar styraciflua*. Downed woody debris is a rare feature within the stand.

Forest Stand Summary Sheet

Property: ITS and Sign Installation
Location: Harford County (Town, County ADC Map #, and Grid Coordinates)
Prepared By: AM, HT Date: 5/14/2019

Stand Variable	Stand # FS K-8
1. Dominant species / Co-dominant species	*Acer rubrum, Liriodendron tulipifera / Fagus grandifolia, Quercus rubra, Quercus alba*
2. Successional stage	Early-Mid
3. Size class of dominant species	3-18" DBH and 6-25" DBH
4. Percent of canopy coverage	70%
5. Common understory species 3' to 20' tall	*Acer rubrum, Fagus grandifolia, Viburnum dentatum*
6. Percent of understory cover 3' to 20' tall	50%
7. Number of understory species 3' to 20' tall	3
8. Common herbaceous species 0' to 3' tall	*Parthenocissus quinquefolia*
9. Percent of herbaceous & woody plant cover 0' to 3' tall	3%
10. List of major invasive plant species and percent of cover	*Pyrus calleryana* (U), *Artemisia vulgaris* (H), *Lonicera japonica* (H) / 10%
11. Comments	Stand K-8 is located along Emmorton Road. Forest is in good condition overall, as it contains few invasives. Regenerating species include *Fagus grandifolia* and *Quercus rubra*. Other non-dominant species include *Prunus serotina* and *Nyssa sylvatica*. Downed woody debris is a common feature within the stand.