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**Chesapeake Bay TMDL Action Plan for the James,
Potomac, Rappahannock, and York River Basins**

**Virginia Department of Transportation Small Municipal
Separate Storm Sewer System (MS4)**

In Compliance with:

General VPDES Permit for Discharges of Stormwater from MS4 (VAR040115)
Coverage from November 01, 2013 to June 30, 2018

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TABLE OF CONTENTS

Executive Summary..... ES-1

1.0 Current Program and Existing Legal Authority 1

 1.1 MS4 Program Plan 1

 1.2 Code of Virginia..... 2

 1.3 Virginia Administrative Code 6

 1.4 VDOT Policies, Guidance, and Instructional and Informational Memoranda 13

 1.5 VDOT Six-Year Improvement Program 13

2.0 New or Modified Legal Authorities..... 14

3.0 Means and Methods to Address Discharges from New Sources..... 15

4.0 Estimated Existing Source Loads and Pollutant of Concern Required Reductions 17

 4.1 Extent of VDOT MS4 Service Area 18

 4.2 Land Cover Breakdowns of MS4 Service Area 20

 4.2.1 James River Basin Land Cover Summary 21

 4.2.2 Potomac River Basin Land Cover Summary 22

 4.2.3 Rappahannock River Basin Land Cover Summary 22

 4.2.4 York River Basin Land Cover Summary 23

 4.3 Existing Source Load Estimates for River Basins..... 23

 4.3.1 James River Basin Existing Source Loads 24

 4.3.2 Potomac River Basin Existing Source Loads..... 24

 4.3.3 Rappahannock River Basin Existing Source Loads 25

 4.3.4 York River Basin Existing Source Loads..... 25

 4.4 Required Reduction Estimates for River Basins..... 25

 4.4.1 James River Basin Required Reductions 26

 4.4.2 Potomac River Basin Required Reductions..... 26

 4.4.3 Rappahannock River Basin Required Reductions 27

 4.4.4 York River Basin Required Reductions..... 27

 4.5 Overall Required Reduction Estimates for VDOT’s MS4 Area 28

5.0 Means and Methods to Meet the Required Reductions and Schedule 29

 5.1 BMP Types..... 29

 5.1.1 Historical BMPs 30

 5.1.2 Redevelopment..... 30

 5.1.3 Stream Restoration and Stabilization 31

 5.1.4 Outfall and Dry Channel Stabilization 32

 5.1.5 Shoreline Erosion Stabilization Control 33

 5.1.6 Land Cover Conversion 33

 5.1.7 Forest Buffers..... 34

 5.1.8 Street Sweeping and Other Annual Pollutant Removal Efforts..... 34

 5.1.9 Purchasing of Nutrient Credits..... 34

 5.1.10 Structural Enhancements and Retrofits..... 35

 5.1.11 Incidental Retrofits 36

 5.2 Summary of Proposed BMPs per River Basin 36

 5.2.1 James River Basin BMP Projections 36

5.2.2 Potomac River Basin BMP Projections..... 37
5.2.3 Rappahannock River Basin BMP Projections 37
5.2.4 York River Basin BMP Projections..... 38
5.3 Schedule and Annual Reporting 38
6.0 Means and Methods to Offset Increased Loads from New Sources Initiating Construction
between July 1, 2009 and June 30, 2014..... 39
7.0 Means and Methods to Offset Increased Loads from Grandfathered Projects 40
8.0 A List of Future Projects that Qualify as Grandfathered 41
9.0 Estimate of the Expected Cost to Implement the Action Plan 42
10.0 Public Comments on Draft Action Plan..... 44

DRAFT

LIST OF TABLES

Table ES-1. Summary of POC Existing Loads and Required Reductions ES-1
Table 1: VDOT MS4 Program BMPs 1
Table 3. River Basins and Associated Urbanized Areas 17
Table 4. VDOT MS4 Acreage relative to Census Urbanized Areas (CUA)¹ 19
Table 5. Land Cover Summary for VDOT MS4 Service Area in James River Basin..... 21
Table 6. Land Cover Summary for VDOT MS4 Service Area in Potomac River Basin 22
Table 7. Land Cover Summary for VDOT MS4 Service Area in Rappahannock River Basin..... 22
Table 8. Land Cover Summary for VDOT MS4 Service Area in York River Basin 23
Table 9. Existing Source Loads for VDOT Regulated Area in the James River Basin 24
Table 10. Existing Source Loads for VDOT Regulated Area in the Potomac River Basin 24
Table 11. Existing Source Loads for VDOT Regulated Area in the Rappahannock River Basin 25
Table 12. Existing Source Loads for VDOT Regulated Area in the York River Basin 25
Table 13. Required Reductions for VDOT Regulated Area in the James River Basin 26
Table 14. Required Reductions for VDOT Regulated Area in the Potomac River Basin 26
Table 15. Required Reductions for VDOT Regulated Area in the Rappahannock River Basin 27
Table 16. Required Reductions for VDOT Regulated Area in the York River Basin 27
Table 17. Required Reductions for VDOT’s Statewide Regulated Area..... 28
Table 18. Reductions Achieved by Historical BMPs in in VDOT’s MS4 Service Area 30
Table 19. Projected Reductions from Redevelopment in Each Basin 31
Table 20. Projected Reductions from Outfall and Dry Channel Stabilization in each Basin..... 32
Table 21. Ratios of TP Loading Rate to TN and TSS for VDOT MS4 ROW Land Cover 35
Table 22. Proposed BMPs to Achieve Required Reductions in the James River Basin..... 36
Table 23. Proposed BMPs to Achieve Required Reductions in the Potomac River Basin 37
Table 24. Proposed BMPs to Achieve Required Reductions in the Rappahannock River Basin .. 37
Table 25. Proposed BMPs to Achieve Required Reductions in the York River Basin 38
Table 26. Estimated Statewide Cost to Implement Proposed BMPs for TMDL Compliance..... 42
Table 27. Total Life-Cycle Costs for BMPs Implemented Watershed-Wide for TMDL Compliance 43
Table 28. Historical Meetings with Other MS4 Authorities..... 44

LIST OF FIGURES

Figure 1. Road centerlines before and after processing..... 19
Figure 2. VDOT ROW Schematic 21

APPENDICES

Appendix A - Maps of VDOT MS4 Regulated Area

Appendix B – Project Summary Spreadsheet

Appendix C - List of Historical BMPs

Appendix D - Screening Results of Stream Restoration Projects

Appendix E - Screening Results of Severely Eroded Outfalls

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ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
BMP	Best Management Practice
CGP	Construction General Permit
CTB	Commonwealth Transportation Board
CWA	Clean Water Act
DCR	Virginia Department of Conservation and Recreation
DEQ	Virginia Department of Environmental Quality
DOD	Department of Defense
EOS	Edge-of-Stream
EPA	Environmental Protection Agency
ESC	Erosion and Sediment Control
ESCCC	Erosion and Sediment Control Contractor Certification
FHWA	Federal Highway Administration
HB	House Bill
HUC	Hydrologic Unit Code
IDDE	Illicit Discharge Detection and Elimination
IIM	Instructional and Informational Memorandum
IP	Implementation Plan (as used by DEQ)
L2	Level 2
L&D	Location & Design
LAP	Locally Administered Projects
LB(S)	Pound or pounds
LID	Low Impact Development
LDA	Land-Disturbing Activity
LUP	Land Use Permit
MCM	Minimum Control Measure
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NLCD	National Land Cover Database
NMP	Nutrient Management Plan
O&M	Operations and Maintenance
ORI	Outfall Reconnaissance and Inventory
P2	Pollution Prevention
POC	Pollutant of Concern
POD	Point of Discharge
SSAR	Secondary Street Acceptance Requirements
SWM	Stormwater Management
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
VAC	Virginia Administrative Code
VDOT	Virginia Department of Transportation
VESC	Virginia Erosion and Sediment Control
VESCLR	Virginia Erosion and Sediment Control Law and Regulations
VGIN	Virginia Geographic Information Network
VRRM	Virginia Runoff Reduction Methodology
VSMP	Virginia Stormwater Management Program
VPDES	Virginia Pollutant Discharge Elimination System

WIP Watershed Implementation Plan
WLA Wasteload Allocation

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DEFINITIONS

The words and terms used in this Plan shall have the meanings defined in the State Water Control Law, the Virginia Stormwater Management Program (VSMP) regulations, and the General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4) General Permit, DEQ Guidance Memorandum #15-2005, unless the context clearly indicates otherwise in italics. The following definitions apply to this Plan.

"Best Management Practices" or "BMPs" or "management practices" means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices, including both structural and nonstructural practices, to prevent or reduce the pollution of surface waters and groundwater systems.

"Chesapeake Bay watershed" means all land areas draining to the following Virginia river basins: Potomac River Basin, James River Basin, Rappahannock River Basin, Chesapeake Bay and its small coastal basins, and York River Basin.

"Control measure" means any BMP, stormwater facility, or other method used to minimize the discharge of pollutants to state waters.

"Excluded lands" means any land cover of forest, water or wetland.

"Existing Sources" means for purposes of this Plan, impervious and pervious urban land cover, within the MS4 Service Area as of June 30, 2009.

"Historical BMPs" means, for purposes of this Plan, a stormwater management facility that is creditable under the Chesapeake Bay TMDL provided it was initially installed on or after January 1, 2006 and prior to July 1, 2009, and constructed to address water quality within the permittee's MS4 Service Area.

"Hydrologic Unit Code" or "HUC" means a watershed unit established in the most recent version of Virginia's 6th Order National Watershed Boundary Dataset unless specifically identified as another order.

"Impervious Cover" means a surface composed of material that significantly impedes or prevents natural infiltration of water into soil, and for purposes of this Plan, is a regulated land cover if within the MS4 Service Area.

"Locality" means a county, city, or town.

"Maximum extent practicable" or "MEP" means the technology-based discharge standard for municipal separate storm sewer systems established by CWA § 402(p). MEP is achieved, in part, by selecting and implementing effective structural and nonstructural best management practices (BMPs) and rejecting ineffective BMPs and replacing them with effective best management practices (BMPs). MEP is an iterative standard, which evolves over time as urban runoff management knowledge increases. As such, the operator's MS4 program must continually be assessed and modified to incorporate improved programs, control measures, BMPs, etc., to attain compliance with water quality standards.

"Means and Methods" means, for purposes of this Plan, an array of BMP types and retrofit programs that will be utilized to meet the required 5% reductions of the L2 scoping run.

"MS4 Service Area" or "VDOT MS4 Service Area" means, for purposes of this Plan, the acres of VDOT right-of-way (ROW) and VDOT property located within the 2000 U.S. Census Bureau delineated urbanized areas. VDOT Properties in VDOT's MS4 service area include district and headquarter offices, supporting storage facilities, and park and ride commuter lots. VDOT MS4 Service Area is synonymous with "VDOT MS4 Permit Area."

“Municipal Separate Storm Sewer System” or “MS4” means conveyance or system of conveyances otherwise known as a municipal separate storm sewer system, including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains:

1. Owned or operated by a federal state, city, town, county, district, association, or other public body, created by or pursuant to state law, having jurisdiction or delegated authority for erosion and sediment control and stormwater management, or a designated and approved management agency under § 208 of the Clean Water Act (CWA) that discharges to surface waters;
2. Designed or used for collecting or conveying stormwater;
3. That is not a combined sewer; and,
4. That is not part of a publicly owned treatment works.

“New Sources” means, for purposes of this Plan impervious and pervious urban land cover within the VDOT MS4 Service Area developed or redeveloped on or after July 1, 2009.

“National Pollutant Discharge Elimination System” or “NPDES” means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing state permits, and imposing and enforcing pretreatment requirements under §§ 307, 402, 318, and 405 of the CWA. The term includes an approved program.

“Nutrient credit” or “credit” means a nutrient reduction that is certified pursuant to the Chesapeake Bay Watershed Nutrient Credit Exchange Program and is expressed, for the purposes of this Plan, in pounds of phosphorus, nitrogen, and total suspended solids (i) delivered to tidal waters when the credit is generated within the Chesapeake Bay Watershed or (ii) as otherwise specified when generated in the Southern Rivers watersheds.

“Operator” means, for purposes of this Plan, the entity overseeing maintenance of a particular roadway segment and infrastructure within the MS4 Service Area. The term shall apply to VDOT, when VDOT’s sole role is, by agreement, to maintain a roadway owned by another party.

“Pervious Cover” means any surface other than impervious cover or excluded lands that is within VDOT’s MS4 Service Area, and for purposes of this Plan, is regulated land surface. Pervious surfaces might include: shoulders, medians, unimpacted gravel, embankments/side slopes, etc.

“Pollutants of Concern” or “POC” means Total nitrogen (“TN”), total phosphorous (“TP”), and total suspended solids (“TSS”).

“Prior Developed Lands” or “Redevelopment” means land that has been previously utilized for residential, commercial, industrial, institutional, recreational, transportation, or utility facilities or structures, and that will have the impervious areas associated with those uses altered during a land-disturbing activity.

“Regulated Land” means, for purposes of this Plan, those portions of the VDOT MS4 Service Area which is an urban impervious or pervious land surface.

“Regulated Land-Disturbing Activity” means any new development/redevelopment that disturbs greater than or equal to one acre or any new development/redevelopment disturb greater than or equal to 2,500 square feet in a Chesapeake Bay Preservation Area designated area.

“Residue parcel” or “residual property” means, for purposes of this Plan, a parcel or a portion of a parcel that was acquired by VDOT either through agreement or eminent domain, and was not immediately used for highway right-of-way. Residual properties typically result when the remainder of such property or part thereof can no longer be utilized for its original purpose.

"Right of way" means that property within the entire area of every way or place of whatever nature within the system of state highways under the ownership, control, or jurisdiction of the board or VDOT that is open or is to be opened within the future for the use of the public for purposes of travel in the Commonwealth. The area set out above includes not only the traveled portion but the entire area within and without the traveled portion, from boundary line to boundary line, and also all parking and recreation areas that are under the ownership, control, or jurisdiction of the board or VDOT.

"Transitional Land" or **"Transitional Sources"** means regulated land disturbing activities that are temporary in nature and discharge through the MS4.

"Sediment" means total suspended solids ("TSS") as in a POC of the Chesapeake Bay TMDL.

"Unregulated Land" means those acres that are not owned or operated by the MS4 permittee.

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MS4 GENERAL PERMIT CROSS REFERENCE TABLE

PERMIT REFERENCE	DESCRIPTION OF SPECIAL CONDITION	ACTION PLAN SECTION
Section I.C.2.a.(1)	Current Program and Existing Legal Authority	Section 1.0
Section I.C.2.a.(2)	New or Modified Legal Authority	Section 2.0
Section I.C.2.a.(3)	Means and Methods to Address Discharges from New Sources	Section 3.0
Section I.C.2.a.(4)	Estimated Existing Source Loads	Section 4.0
Section I.C.2.a.(5)	Calculated Total Pollutant of Concern (POC) Required Reductions	Section 4.0
Section I.C.2.a.(6)	Means and Methods to Meet the Required Reductions and Schedule	Section 5.0
Section I.C.2.a.(7)	Means and methods to offset increased loads from new sources initiating construction between July 1, 2009 and June 30, 2014	Section 6.0
Section I.C.2.a.(8)	Means and methods to offset increased loads from grandfathered projects that begin construction after July 1, 2014	Section 7.0
Section I.C.2.a.(10)	A list of future projects, and associated acreage that qualify as grandfathered	Section 8.0
Section I.C.2.a.(11)	An estimate of the expected cost to implement the necessary reductions	Section 9.0
Section I.C.2.a.(12)	Public Comments on Draft Action Plan	Section 10.0

EXECUTIVE SUMMARY

In the Phase I and Phase II Chesapeake Bay Total Maximum Daily Load (TMDL) Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL, the Commonwealth of Virginia (Commonwealth) committed to a phased approach (referred to as the Level 2 Scoping Run) to reducing nutrients and suspended solids discharging from municipal separate storm sewer systems (MS4s). This phased approach established the Commonwealth's schedule of reducing pollutant loads over 3 MS4 permit cycles, with 5% of the reductions achieved in the first permit cycle, an additional 35% in the second permit cycle and the remaining 60% in the third permit cycle. The current MS4 general permit cycle is from July 01, 2013 to June 30, 2018. The Department of Environmental Quality (DEQ) provided MS4 general permit coverage to the Virginia Department of Transportation (VDOT) on November 01, 2013. The Special Condition for the Chesapeake Bay TMDL (Special Condition) in the Phase II MS4 General Permit requires the Virginia Department of Transportation (VDOT) to develop a Chesapeake Bay TMDL Action Plan (Action Plan) by November 01, 2015 (24 months after permit coverage) and submit it to DEQ with the appropriate annual report.

This Action Plan provides a review of the current MS4 Program, which demonstrates VDOT's ability to ensure compliance with the Special Condition and includes the means and methods VDOT will use to meet 5.0% of the Level 2 (L2) scoping run reduction for existing development during the first permit cycle. VDOT will review and revise, as appropriate, this Action Plan as part of the reapplication process required by the MS4 Permit. The review will include evaluation of the loading and reduction estimates as they relate to newly available data and the most current Bay Model as well as the best management practices (BMPs) and other steps that will be implemented during the second and third permit terms to achieve the 35% and 60% reductions, respectively.

This Action Plan addresses all four major river basins within the Chesapeake Bay TMDL Watershed for which VDOT has regulated acres within its MS4 Service Area. Table ES-1 depicts the estimated load reductions for the pollutants of concern (POCs) for the first permit cycle for each river basin. The loads were developed by estimating the amount of impervious and pervious acres in each basin and multiplying by the edge-of-stream (EOS) loading rate for the respective pollutant of concern (POC).

In addition to the estimated load reductions, this Action Plan includes: a review of the current MS4 permit authority and implementation capabilities; existing, new, and modified legal authorities necessary to meet required reductions; an estimate of future grandfathered projects and their acreage; expected costs for implementing the Action Plan; and a public comment process and period.

Table ES-1. Summary of POC Existing Loads and Required Reductions

POC	River Basin	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)	Total Reduction Required First Permit Cycle (lbs/yr)
Nitrogen	James	221,917	896
	Potomac	578,518	2,395
	Rappahannock	28,141	116
	York	30,134	120
Phosphorus	James	33,700	249
	Potomac	47,876	359
	Rappahannock	3,674	27
	York	4,790	35
Sediment	James	12,072,625	115,185
	Potomac	32,948,533	315,811
	Rappahannock	1,028,377	9,870
	York	1,339,695	12,849

The Action Plan identifies several means and methods to achieve the required 5% reductions by the end of this permit cycle on June 30, 2018. VDOT estimates the potential costs to implement these means and methods to be approximately \$3,000,000 to \$5,000,000 in addition to the approximately \$1,500,000 that VDOT has already been spent on implementation.

This Action Plan was developed in accordance with the regulations of the MS4 General Permit and under the general intent of DEQ's Guidance Memo No. 14-2012, issued May 18, 2015, which provided background information and procedures to meet the Chesapeake Bay TMDL Special Condition Requirements. This Action Plan provides DEQ sufficient information to verify that VDOT will be able to meet the requirements for the Special Condition for the Chesapeake Bay by the end of the first permit cycle. This Plan provides sufficient supporting material to show that VDOT has calculated the full scope of offsets for existing development and new sources that are required to be made during the first permit cycle and determined the methods that will be used to meet the 5.0% reductions required by the end of the first permit cycle.

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1.0 CURRENT PROGRAM AND EXISTING LEGAL AUTHORITY

(GENERAL PERMIT SECTION I.C.2.A.(1)) *A review of the current MS4 program implemented as a requirement of this state permit including a review of the existing legal authorities and the operator’s ability to ensure compliance with this special condition*

The VDOT MS4 Program strives to improve environmental compliance, quality, and stewardship in VDOT’s MS4 Service Area through effective management and implementation of sound technical guidelines, criteria, and practices for stormwater management and erosion and sediment control. VDOT’s collective efforts under the MS4 Program result in significant reduction of all pollutants that may be discharged from its regulated MS4. In addition, VDOT has specifically developed its MS4 Program and other support programs such as local TMDL Action Plans to address specific pollutants, including the pollutants of concern (POCs) of the Chesapeake Bay TMDL (nitrogen, phosphorus, and suspended solids). Pollutant removal from the implementation of best management practices (BMPs) that address the six Minimum Control Measures (MCM) should be accounted for in evaluation of VDOT’s goal for meeting wasteload allocation (WLA) targets, including those reductions required by the Chesapeake Bay TMDL.

1.1 MS4 Program Plan

As specified in the Chesapeake Bay TMDL Special Condition of the MS4 General Permit (GP Section I.C.3), implementation of the following existing BMPs from VDOT’s MS4 Program Plan represents implementation to the maximum extent practicable and demonstrates adequate progress for this permit cycle and VDOT’s ability to meet the Special Condition of the MS4 General Permit:

- a. Implementation of Nutrient Management Plans (NMP) in accordance with the schedule identified in the minimum control measure in Section II [of the MS4 Permit] related to pollution prevention/good housekeeping for VDOT operations (**addressed in BMP 6(C) of the VDOT MS4 Program Plan**);
- b. Implementation of the minimum control measure in Section II [of the MS4 Permit] related to construction site stormwater runoff control in accordance with [the MS4 Permit] shall address discharges from transitional sources (**addressed in BMPs 4(A) through 4(C) of the VDOT MS4 Program Plan**); and
- c. Implementation of the means and methods to address discharges from new sources in accordance with the minimum control measure in Section II [of the MS4 Permit] related to post-construction stormwater management in new development and development of prior developed lands (**addressed in BMPs 5(A) and 5(B) of the VDOT MS4 Program Plan**).

In addition to these BMPs, VDOT’s robust program has BMPs that address the POCs of the Chesapeake Bay TMDL. The BMPs identified in Table 1 are those in VDOT’s MS4 Program Plan that are particularly effective in reducing sediment and nutrients. Though these MS4 Program BMPs are effective, VDOT has chosen not to claim credit for Chesapeake Bay TMDL pollutant reductions from the implementation of the MS4 Program Plan.

Table 1: VDOT MS4 Program BMPs

BMP #	BMP Description
1(A)	Continue to implement the Public Education and Outreach Plan to increase knowledge about high priority water quality issues
2(B)	Participate in stakeholder meetings and events, as applicable, to ensure that provisions for linear development projects are incorporated into local watershed planning
3(A)	Develop a storm sewer map and an information table that supports a successful Illicit Discharge Detection and Elimination (IDDE) Program that includes screening, investigation, and coordinating elimination of illicit discharges
3(B)	Increase awareness of interconnections with other MS4s
3(C)	Prohibit non-stormwater discharges into the storm sewer system
3(D)	Utilize written procedures to detect, identify, and address unauthorized non-stormwater discharges,

BMP #	BMP Description
	including illegal dumping, to VDOT's MS4
4(A)	VDOT will utilize its annual ESC and SWM Standards & Specifications to address discharges entering the MS4 from VDOT land-disturbing activities regulated by the VPDES and VSMP
4(B)	Prepare and implement Stormwater Pollution Prevention Plans (SWPPPs) including an ESC Plan and Pollution Prevention Plans for regulated land-disturbing activities
4(C)	Inspect and enforce compliance with the VPDES Construction General Permit and attending regulations on applicable projects
5(A)	VDOT will utilize its annual ESC and SWM Standards & Specifications to address post-construction stormwater runoff that enters the MS4 from regulated land-disturbing activities
5(B)	Prepare and implement post-construction stormwater management plans in accordance with VDOT's annual ESC and SWM Standards and Specifications for regulated land-disturbing activities
6(A)	Develop and refine written procedures designed to minimize or prevent pollutant discharge from daily operations, equipment maintenance, and the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers
6(B)	Develop and refine, as appropriate, procedures designed to minimize or prevent pollutant discharge from maintenance facilities, as applicable
6(C)	Develop and refine turf and landscape nutrient management plans (NMPs) that have been developed by a certified turf and landscape nutrient management planner
6(D)	Continue to implement VDOT's efforts to prevent and reduce stormwater pollution from VDOT-related activities
7(A)	Develop and implement applicable TMDL Action Plans for approved TMDLs that have assigned VDOT's MS4 a wasteload allocation

1.2 Code of Virginia

The MS4 Program Plan is built upon portions of the Code of Virginia that authorizes VDOT to develop and implement policies and procedures to comply with the MS4 General Permit. The following laws have applicability when satisfying the requirements of the Chesapeake Bay TMDL Special Condition for the MS4 General Permit:

Title 33.2. Highways and other Surface Transportation Systems

Chapter 2. Transportation Entities

Article 2. Commonwealth Transportation Board; Powers and Duties

Article 3. Commissioner of Highways

Chapter 3. Highway Systems

Article 1. Interstate System

Article 2. Primary State Highway System

Article 3. Secondary State Highway System.

Chapter 7. Local Authority Over Highways

Article 1. General Provisions

Chapter 10. Eminent Domain

Article 1. Eminent Domain and Damages

Below is a summary of citations from the various chapters and articles of the Code of Virginia.

§ 33.2-208. Location of routes.

A. The Board shall have the power and duty to locate and establish the routes to be followed by the highways comprising the systems of state highways between the points designated in the establishment of such systems, except that such routes shall not include highways or streets located within any local system of highways or streets, within the urban highway system, or those local highways in any county that has resumed full responsibility for all of the secondary state highway system within such county's boundaries pursuant to § [33.2-](#)

[342](#). Such routes to be located and established shall include corridors of statewide significance pursuant to § [33.2-353](#).

§ 33.2-214. Transportation; Six-Year Improvement Program.

A. The Board shall have the power and duty to monitor and, where necessary, approve actions taken by the Department of Rail and Public Transportation pursuant to Article 5 (§ [33.2-281](#) et seq.) in order to ensure the efficient and economical development of public transportation, the enhancement of rail transportation, and the coordination of such rail and public transportation plans with highway programs.

§ 33.2-222. Commissioner of Highways.

The Commissioner of Highways shall be the chief executive officer of the Department of Transportation. The Commissioner of Highways shall be an experienced administrator able to direct and guide the Department in the establishment and achievement of the Commonwealth's long-range highway and other transportation objectives.

§ 33.2-300. Power and authority of Commonwealth Transportation Board relating to the Interstate System, generally.

The Board may plan, designate, acquire, open, construct, reconstruct, improve, maintain, discontinue, abandon, and regulate the use of the Interstate System in the same manner in which it is now or may be authorized to plan, designate, acquire, open, construct, reconstruct, improve, maintain, discontinue, abandon, and regulate the use of the primary state highway system. The Board may vacate, close, or change the location of any highway or street in the manner in which it is now authorized by law to vacate, close, or change the location of a highway in the primary state highway system. The Board has any and all other authority and power relative to the Interstate System as is vested in it relative to highways in the primary state highway system, including the right to acquire by purchase, eminent domain, grant, or dedication title to lands or rights-of-way for such interstate highways whether within or without the limits of any city or town, and in addition thereto has such other power, control, and jurisdiction necessary to comply with the provisions of the Federal-Aid Highway Act of 1956 and all acts amendatory or supplementary thereto, all other provisions of law to the contrary notwithstanding.

§ 33.2-310. Primary state highway system.

The primary state highway system shall be constructed and maintained by the Commonwealth under the direction and supervision of the Board and the Commissioner of Highways.

§ 33.2-311. Certain highways in parks included in primary state highway system.

All highways in state parks that provide connections between highways, in either the primary or secondary state highway system, outside such parks and recreation centers within such parks shall continue to be portions of the primary state highway system.

§ 33.2-312. Maintenance of highways, bridges, and toll facilities within state parks.

The Commissioner of Highways may maintain all highways, bridges, and toll facilities within the boundaries of any state park established by and under the control of the Department of Conservation and Recreation. For the purpose of maintaining the highways in any such park, the Commissioner of Highways may expend funds under his control and available for expenditure upon the maintenance of highways in the secondary state highway system in the county or counties in which such state park is located. This section shall not affect the jurisdiction, control, and right to establish such highways, bridges, and toll facilities that are now vested in the Department of Conservation and Recreation.

All roads, bridges, and toll facilities constructed by way of revenue bonds issued by the Department of Conservation and Recreation shall operate under the terms of their establishment as a park facility, notwithstanding the right of the Commissioner of Highways to use highway funds to maintain them.

§ 33.2-313. Maintenance of highways at state institutions.

The Commissioner of Highways may, when requested by the governing body of a state institution, assume the maintenance of any highway within the grounds of such state institution that has been established and constructed by such institution to standards acceptable to the Commissioner of Highways. Any such highways accepted for maintenance by the Commissioner of Highways under the provisions of this section shall be a part of the primary state highway system, but the state institution shall continue to exercise police power over such highways.

§ 33.2-320. Incorporation into primary state highway system of connecting streets and highways in certain other cities and towns.

The Board may, by and with the consent of the Governor and the governing body of any city or town having a population of 3,500 or less, incorporate in the primary state highway system such streets and highways or portions thereof in such city or town as may in its judgment be best for the handling of traffic through such city or town from or to any highway in the primary state highway system and may eliminate any of such streets or highways or portions thereof from the primary state highway system. Every such action of the Board incorporating any such street or highway or portion thereof in the primary state highway system or eliminating it therefrom shall be recorded in its minutes.

Any such street or highway or portion thereof in any such city or town so incorporated in the primary state highway system shall be subject to the rules, regulations, and control of the state highway authorities as are other highways in the primary state highway system. But such city or town shall be obligated to pay the maintenance, construction, and reconstruction costs of such streets or highways or portions thereof so incorporated in the primary state highway system in excess of the amounts authorized to be spent by the Commissioner of Highways on such streets or highways.

Every provision in the charter of any such city or town insofar as it is in conflict with this section is hereby repealed.

The Commissioner of Highways may permit such city or town to maintain any such street or highway or portion thereof incorporated in the primary state highway system and may reimburse such city or town up to such amount as he is authorized to expend on the maintenance of such street or highway or portion thereof.

§ 33.2-322. Counties may perform certain maintenance.

Any county may enter into an agreement with the Department to permit the county to landscape and maintain any or all medians and other nontraveled portions of primary highways located in the county.

§ 33.2-324. Secondary state highway system; composition.

The secondary state highway system shall consist of all of the public highways, causeways, bridges, landings, and wharves in the counties of the Commonwealth not included in the primary state highway system. The secondary state highway system shall include such highways and community roads leading to and from public school buildings, streets, causeways, bridges, landings, and wharves in towns having a population of 3,500 or less according to the United States census of 1920, and in all towns having such a population incorporated since 1920, that constitute connecting links between highways in the secondary state highway system in the counties and between highways in the secondary state highway system and highways in the primary state highway system, not to exceed two miles in any one town. If in any such town that is partly surrounded by water less than two miles of the highways and streets therein constitute parts of the secondary state highway system, the Board shall, upon the

adoption of a resolution by the governing body of such town designating for inclusion in the secondary state highway system certain highways and streets in such town not to exceed a distance of two miles, less the length of such highways and streets in such town that constitute parts of the secondary state highway system, accept and place in the secondary state highway system such additional highways and streets.

§ 33.2-325. Certain school roads in secondary state highway system.

All roads leading from the state highways, either primary or secondary, to public schools in the counties of the Commonwealth to which school buses are operated shall continue to constitute portions of the secondary state highway system insofar as these roads lead to or are on school property and as such shall be improved and maintained.

§ 33.2-326. Control, supervision, and management of secondary state highway system components.

A. The control, supervision, management, and jurisdiction over the secondary state highway system shall be vested in the Department, and the maintenance and improvement, including construction and reconstruction, of such secondary state highway system shall be by the Commonwealth under the supervision of the Commissioner of Highways. The boards of supervisors or other governing bodies of the counties shall have no control, supervision, management, or jurisdiction over such public highways, causeways, bridges, landings, and wharves constituting the secondary state highway system. Except as otherwise provided in this article, the Board shall be vested with the same powers, control, and jurisdiction over the secondary state highway system in the counties and towns of the Commonwealth, and such additions as may be made, as were vested in the boards of supervisors or other governing bodies of the counties on June 21, 1932, and in addition thereto shall be vested with the same power, authority, and control as to the secondary state highway system as is vested in the Board in connection with the primary state highway system.

B. Nothing in this chapter shall be construed as requiring the Department, when undertaking improvements to any secondary state highway system component or any portion of any such component, to fully reconstruct such component or portion thereof to bring it into compliance with all design and engineering standards that would be applicable to such component or portion thereof if the project involved new construction.

§ 33.2-334. Requirements for taking new streets into secondary state highway system.

A. The governing body of any county that has not withdrawn from the secondary state highway system or any town within which the Department maintains the streets may, by resolution, request the Board to take any new street or highway into the secondary state highway system for maintenance if such street or highway has been developed and constructed in accordance with the Board's secondary street acceptance requirements. The Board shall adopt regulations establishing such secondary street acceptance requirements, which shall include such provisions as the Board deems necessary or appropriate to achieve the safe and efficient operation of the Commonwealth's transportation network.

B. In addition to such other provisions deemed necessary or appropriate by the Board, the regulations shall include (i) requirements to ensure the connectivity of highway and pedestrian networks with the existing and future transportation network, (ii) provisions to minimize stormwater runoff and impervious surface area, and (iii) provisions for performance bonding of new secondary highways and associated cost recovery fees.

§ 33.2-700. Transfer of highways, etc., from secondary state highway system to local authorities.

Whenever any town has a population of more than 3,500 inhabitants, all the streets, highways, causeways, bridges, landings, and wharves in such town that were incorporated within the secondary state highway system shall be eliminated from such system and the control and jurisdiction over them shall be vested in the local authorities. This section shall in no way affect the rights of such towns to receive the benefits provided elsewhere in this title.

§ 33.2-1009. Acquisition of residue parcels declared to be in public interest.

The acquisition of such residue parcels in addition to the lands necessary for the immediate use for highway rights-of-way or purposes incidental to the construction, reconstruction, or improvement of public highways is hereby declared to be in the public interest and constitutes a public use as the term public uses is used in Article I, Section 11 of the Constitution of Virginia.

§ 33.2-1010. Use and disposition of residue parcels of land.

The Commissioner of Highways may lease, sell, or exchange such residue parcels of land upon such terms and conditions as in the judgment of the Commissioner of Highways may be in the public interest, provided, however, that the Commissioner of Highways shall not use such parcels for any commercial purpose. The Commissioner of Highways may lease, sell, or exchange such residue parcels of land as may have been acquired under the provisions of the Transportation Development and Revenue Bond Act (§ [33.2-1700](#) et seq.), upon such terms and conditions as in the judgment of the Commissioner of Highways may be in the public interest. The Commissioner of Highways may lease such parcels of land as may have been acquired under the provisions of § [33.2-1005](#) in the event the former owner fails to make the request authorized under § [33.2-1005](#) to persons other than the former owner, upon such terms and conditions as in the judgment of the Commissioner of Highways may be in the public interest. The provisions of Articles 1 (§ [33.2-900](#) et seq.) and 2 (§ [33.2-908](#) et seq.) of Chapter 9 shall not be construed to apply to the disposition of land authorized in this section.

1.3 Virginia Administrative Code

The MS4 Program Plan is also built upon portions of the Virginia Administrative Code (VAC) that afford VDOT the ability to develop and implement policies and procedures to comply with the MS4 General Permit. The following regulations have applicability when satisfying the requirements of the Chesapeake Bay TMDL Special Condition for the MS4 General Permit:

24VAC30. Department of Transportation

- 21. General Rules and Regulations of the Commonwealth Transportation Board
 - 10. Definitions
 - 20. General Provisions Concerning Permits
 - 30. General Provisions Concerning Use of Right of Way
- 91. Subdivision Street Requirements
 - 10. Definitions
 - 20. Applicability, Effective Date, and Transition
 - 60. Administrative Procedure
 - 110. Design and Agreement Requirements
 - 150. Subdivision Street Development, Plan Review, and Acceptance
- 92. Secondary Street Acceptance Requirements
 - 70. Administrative Procedure
- 420. Operation and maintenance of roads in incorporated towns less than 3,500
- 430. Maintenance of roads crossing the interstate system
- 490. Roads in the grounds of state institutions
- 500. Roads in the grounds of state parks

Below is a summary of the relevant citations from the Virginia Administrative Code.

24VAC30. Department of Transportation – Agency Summary

The Virginia Department of Transportation (VDOT) is charged with implementing and enforcing the policies and regulations of the Commonwealth Transportation Board (board). VDOT operates under the overall supervision of

the Secretary of Transportation, who is designated as Chairman of the board. The Commissioner of Highways (commissioner) serves as Vice-Chairman of the board. Code of Virginia, Title 33.1 33.2, Chapter 2.

The board has general powers and duties, including, but not limited to, the following: to locate and name highways; let contracts for construction and maintenance; make decisions concerning the financing of transportation projects, including the administration of funds in the Transportation Trust Fund; oversee policy objectives of VDOT and the Department of Rail and Public Transportation (DRPT); comply with federal acts; and enter into contracts with other states. Code of Virginia, 33.1 33.2, Chapter 2.

The commissioner, either at his own discretion or acting as chief executive officer of VDOT, is authorized to perform all acts necessary for constructing, improving, and maintaining the roads comprising the state system of highways. The commissioner is also authorized to execute all orders and decisions of the board and may require that all employees and appointees perform their duties as required by statute. Code of Virginia, Title 33.1 33.2, Chapter 2.

The Code of Virginia authorizes the board, VDOT, or the commissioner to promulgate regulations, establish guidelines, administer programs, or take other actions related to transportation. This authority may be granted under general powers, or may be granted in connection with a specific subject. Code of Virginia, Title 33.133.2, Chapters 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 16, 17, and 18 and Title 46.2, Chapter 8.

Regulations of the board or VDOT generally deal with the following subjects:

1. Application of civil engineering concepts to the design, planning, and delivery of construction or maintenance projects (e.g., Secondary Street Acceptance Requirements) (Code of Virginia, Title 33.133.2, Chapters 2 and 3);
2. Use of traffic signs, signals and other devices on highways in the Commonwealth (e.g., Standards for Use Of Traffic Control Devices to Classify, Designate, Regulate, and Mark State Highways) (Code of Virginia, Title 33.2, Chapter 2 and Title 46.2, Chapter 8);
3. Use of highway right-of-way under the control of the board (e.g., Land Use Permit Regulations) (Code of Virginia, Title 33.133.2, Chapter 2); and
4. Activities associated with requirements of federal law, or in connection with an agreement with the federal government (e.g. Rules and Regulations Governing Relocation Assistance (Code of Virginia, Title 25, Chapter 4 and Title 33.133.2, Chapter 2) and Rules and Regulations Governing Outdoor Advertising and Directional and Other Signs and Notices) (Code of Virginia, Title 33.133.2, Chapters 2 and 12).

Guidance documents of the board or VDOT explain or interpret the following subjects:

1. Business operations of VDOT (e.g., VDOT Budget) (Code of Virginia, Title 33.133.2, Chapter 2);
2. Procedures related to administration of special-purpose funds; (e.g., Revenue Sharing Program Guidelines) (Code of Virginia, Title 33.133.2, Chapter 3);
3. Procurement of civil engineering contracts (e.g., Design-Build Procurement Manual) (Code of Virginia, Title 33.133.2, Chapter 2, Section [33.2-209](#)); and
4. Technical evaluation procedures related to highway studies (e.g., Highway Traffic Noise Impact Analysis Guidance Manual) (Code of Virginia, Title 33.133.2, Chapter 2, Section [33.2-215](#)).

24VAC30-21-10. Definitions

The following words and terms when used in this chapter shall have the following meanings unless the context clearly indicates otherwise:

"Board" means the Commonwealth Transportation Board.

"Commissioner" means the Commissioner of Highways, the individual who serves as the chief executive officer of the Virginia Department of Transportation (VDOT) or his designee.

"Commonwealth" means the Commonwealth of Virginia.

"Right of way" means that property within the entire area of every way or place of whatever nature within the system of state highways under the ownership, control, or jurisdiction of the board or VDOT that is open or is to be opened within the future for the use of the public for purposes of travel in the Commonwealth. The area set out above includes not only the traveled portion but the entire area within and without the traveled portion, from boundary line to boundary line, and also all parking and recreation areas that are under the ownership, control, or jurisdiction of the board or VDOT.

"System of state highways" means all highways and roads under the ownership, control, or jurisdiction of the board including, but not limited to, the primary, secondary, and interstate systems.

"VDOT" means the Virginia Department of Transportation, the Commissioner of Highways, or a designee.

24VAC30-21-20. General Provisions Concerning Permits

A. No work of any nature shall be performed on any real property under the ownership, control, or jurisdiction of the board or VDOT including, but not limited to, the right of way of any highway in the system of state highways until written permission is first obtained from VDOT. Written permission under this section is granted by way of permit. In addition, the letting of a contract by and between VDOT and any other party grants to that party automatically such permission for the area under contract, unless otherwise stated in the contract. VDOT is authorized to establish specific requirements for such permits including, but not limited to, permit authority, application procedure, and conditions under which a permit may be denied or revoked.

B. No land use permit shall be issued until the applicant has complied with the conditions set forth in and pursuant to applicable VDOT regulations filed as part of the Virginia Administrative Code.

C. Applicants to whom permits are issued shall at all times indemnify and save harmless the board, members of the board, the Commonwealth, and all Commonwealth employees, agents, and officers from responsibility, damage, or liability arising from the exercise of the privileges granted by these permits.

D. Any structure placed upon or within the right of way pursuant to a permit issued by VDOT shall be relocated or removed whenever ordered by VDOT. Such relocation or removal shall be accomplished at no expense to the Commonwealth unless VDOT agrees or has agreed otherwise.

24VAC30-21-30. General Provisions Concerning Use of Right of Way

A. No person, firm, or corporation shall use or occupy the right of way of any highway for any purpose except travel, except as may be authorized by VDOT, either pursuant to regulation or as provided by law.

B. Except as permitted by subdivision 2 of this subsection, the following restrictions apply to activities occurring on bridges forming a part of the system of state highways:

1. No person, firm, or corporation shall stand or park a vehicle of any description on any bridge unless authorized by VDOT.

2. No person shall fish or seine from any bridge except when facilities are provided for such purposes as set out in § [33.2-278](#) of the Code of Virginia.

3. No person, firm, or corporation shall use any bridge as a wharf from which to load or unload any vehicle, as a place of deposit for any property, or for any other purpose except crossing.

4. No master or owner of any vessel shall make it fast to or lay it alongside such bridge.

5. Provisions of this subsection shall not apply to highway maintenance vehicles or vessels.

C. No person, firm, or corporation shall, without the consent of VDOT, remove, injure, destroy, break, deface, or in any way tamper with any property, real or personal, that is growing or has been placed on the right of way of any highway within the system of state highways by or with the consent of VDOT.

D. No person, firm, or corporation may cause water to flow from any source upon the right of way of any highway within the system of state highways, nor shall any person, firm, or corporation cause any increase of the water, at present, lawfully on the right of way of any highway or concentrate the flow of water upon the right of way of any highway in the system of state highways without the written consent of VDOT.

E. No road, railroad, or tracks of any description shall be laid along, upon, or across any portion of a highway in the system of state highways without the written consent of VDOT.

24VAC30-21-40. Board Authority to Regulate Entrances from Adjacent Property to Right of Way of Highways Within the State Highway System.

The board, under § [33.2-210](#) of the Code of Virginia, reserves the power to regulate entrances from adjacent property upon the right of way of any highway within the system of state highways. No entrance of any nature shall be made, built, or constructed upon the right of way of any highway within the system of state highways until the location has been determined in the opinion of the commissioner or designee of VDOT to be acceptable from a public safety standpoint and, further, until approval has been granted by VDOT. The design and construction of

such entrances as approved by the commissioner pursuant to §§ [33.2-241](#) and [33.2-245](#) of the Code of Virginia must comply with VDOT's regulations where applicable.

24VAC30-91-10. Definitions

Part I. General Provisions

"Secondary system of state highways" means those public roads, streets, bridges, etc., established by a local governing body pursuant to § [33.2-705](#) of the Code of Virginia and subsequently accepted by the department for supervision and maintenance under the provisions of Article 3 (§ [33.2-324](#) et seq.) of Chapter 3 and Article 2 (§ [33.2-908](#) et seq.) of Chapter 9 of Title 33.2 of the Code of Virginia.

24VAC30-91-20. Applicability, Effective Date, and Transition

A. Applicability. This regulation is intended to govern subdivision street development and the criteria for acceptance of these streets by the department for subsequent maintenance. The Subdivision Street Design Guide ([24VAC30-91-160](#)) offers guidance on the design and construction features of subdivision street development and sets out design parameters deemed appropriate for most land development scenarios. However, the business of land development is fluid and the department, in consultation with local government officials, is prepared to consider innovative transportation approaches associated with land development proposals that are consistent with the geometric requirements of the Subdivision Street Design Guide ([24VAC30-91-160](#)). However, when not specifically addressed in one of these documents, the relevant requirements of the Road Design Manual ([24VAC30-91-160](#)), standards, specifications, Pavement Design Guide ([24VAC30-91-160](#)) and associated instructions shall govern.

These requirements apply to all subdivision streets designated to be maintained by the department as part of the secondary system of state highways. The department's review and approval shall apply only to streets proposed for addition to the secondary system of state highways maintained by the department. Any plans submitted for review that contain only streets proposed for maintenance by others may be reviewed for general guidance at the discretion of the resident engineer but will not be officially approved. However, any such review shall not represent the department's commitment to accept such streets for maintenance irrespective of the quality of the construction of the street or streets.

If a subdivision plan with streets proposed for VDOT acceptance includes any streets that are not initially intended to be accepted for maintenance by the department as part of the secondary system, the plan must include a notation identifying these streets. In the absence of this notation, the plans will not be approved. It is also recommended that any streets proposed to be privately maintained also have a notation on the plat and impacted deeds that clearly indicate that as a prerequisite for the streets future acceptance, the streets must be improved to the department's prevailing standards for acceptance at no cost to the department.

B. Effective date. All streets proposed for acceptance by the department after January 1, 2005, shall be accepted in accordance with these provisions, except as may be waived by the commissioner or his designee.

C. Transition. Prior to July 1, 2005, the department will allow the design of streets developed in accordance with either the former requirements (1996) or these requirements. Any street design initially submitted to the department for consideration after June 30, 2005, however, shall be in accordance with these requirements.

24VAC30-91-60. Administrative Procedure

E. Street acceptance. Upon the satisfactory completion of construction of the subdivision street, the department will advise the local governing body regarding the street's readiness for acceptance and the governing body, in consultation with the resident engineer, will initiate its acceptance into the secondary system of state highways maintained by the department provided:

1. The developer dedicates the prescribed right-of-way to public use.
2. The street has been constructed in accordance with the applicable specifications, standards and the plats or plans approved by the department.
3. The street renders a public service as prescribed in [24VAC30-91-50](#) (Service requirements) or as may otherwise be approved under those provisions.

4. The street has been properly maintained since its completion.
 5. The developer furnishes the surety and fees in accordance with [24VAC30-91-140](#) (Surety and fees).
 6. The governing body has executed all agreements prescribed by these requirements, unless specifically waived on an individual case basis by the appropriate Central Office Division Administrator, or other designee appointed by the commissioner.
 7. The governing body, by proper resolution, requests the department to accept the street or streets for maintenance as part of the secondary system of state highways under its jurisdiction. The resolution shall include the governing body's guarantee of an unrestricted and unencumbered right-of-way as dedicated, plus any necessary easements for fills, drainage, or sight distance.
- Upon the department's determination that the requested addition is in compliance with the applicable provisions of these requirements, the governing body will be officially advised of the street's acceptance into the secondary system of state highways and the effective date of such action. This notification serves as the resident engineer's authority to begin maintenance thereon.

24VAC30-91-110. Design and Agreement Requirements

Part II. Specific Provisions

L. Roadway drainage.

1. Policy and procedures. All drainage facilities shall be designed in accordance with the department's Drainage Manual ([24VAC30-91-160](#)) and supplemental directives. All drainage computations supporting a proposed drainage design shall be submitted to the department for review as part of the documents necessary for the approval of a construction plan.
2. Stormwater management. Whereas the department considers matters regarding stormwater management associated with the construction of new subdivision streets to be under the authority of the local governing body, decisions regarding stormwater management in the construction of subdivision streets are deferred to the locality. However, stormwater management, including the construction of detention or retention facilities, or both, is recognized as an available design alternative. Where the developer is required by regulations promulgated by an agency or governmental subdivision other than the department or the developer chooses to use stormwater management facilities in the design of a subdivision, the governing body shall, by formal agreement, and as a prerequisite for the transfer of jurisdiction over the street to the department, acknowledge that the department is not responsible for the operation, maintenance, or liability of the stormwater management facility or facilities associated with the subdivision. However, in the event the governing body has executed a comprehensive, countywide agreement with the department addressing these matters, a specific agreement addressing stormwater management controls in the subdivision will not be required as a condition for street acceptance. Stormwater management controls for VDOT projects are designed in accordance with the VDOT Erosion and Sediment Control and Stormwater Management Program Specifications Manual ([24VAC30-91-160](#)), the Erosion and Sediment Control Regulations, [9VAC25-840](#), and the Virginia Stormwater Management Program (VSMP) Regulation, [9VAC25-870](#). While these controls may be necessary whenever a street maintained by VDOT is widened or relocated, the department does not require them in the development of new subdivision streets, because such activity is regulated by the local governments. However, developers and counties may find these controls useful in managing land development activity. Devices and treatments intended to mitigate the impact of stormwater shall be placed off of the right-of-way and shall be designed to prevent the backup of water against the roadbed. Where development activity results in increased runoff to the extent that adjustment of an outfall facility is required, such adjustment shall be at the developer's expense and be contained within an appropriate easement.
3. Drainage easements.
 - a. An acceptable easement shall be provided from all drainage outfalls to a natural watercourse, as opposed to a swale. (See [24VAC30-91-10](#) for definitions.)
 - b. The department normally accepts and maintains only that portion of a drainage system that falls within the limits of the dedicated right-of-way for a street. The department's responsibility to enter drainage easements outside of the dedicated right-of-way shall be limited to undertaking corrective measures to alleviate problems that may adversely affect the safe operation or integrity of the roadway.

c. In the event drainage to a natural watercourse is not accomplished or is interrupted, an acceptable agreement from the governing body may be considered as an alternative to providing an easement to a natural watercourse, provided the agreement acknowledges that the department is neither responsible nor liable for drainage from the roadway.

24VAC30-91-150. Subdivision Street Development, Plan Review, and Acceptance.

Part III. Reference Section

A. The county-state partnership governing VDOT acceptance of new streets for maintenance. Section [33.2-705](#) of the Code of Virginia (a Byrd Act provision) creates the authority under which local governments establish new roads as part of the secondary system of state highways. Sections [15.2-2240](#) and [15.2-2241](#) of the Code of Virginia establish the authority of local subdivision ordinances and the authority of counties to set the standards for new streets within their territories.

VDOT's participation in the development and acceptance of subdivision streets for maintenance is a cooperative commitment of the Commonwealth Transportation Board.

VDOT's concurrence with or approval of a construction plan represents VDOT's commitment to accept the streets shown on the plan when satisfactorily constructed and all other requirements governing the department's acceptance of streets are satisfied, including the governing body's request for the acceptance of or transfer of the maintenance and operational jurisdiction over the street, as outlined in these requirements.

Pursuant to these principles:

1. Local government controls land development activity and establishes new streets, the relocation of existing streets, and the criteria governing the development of such streets.

2. VDOT establishes the minimum standards that must be satisfied for new subdivision streets to be considered for maintenance by the department as part of the secondary system of state highways under its jurisdiction.

Within each locality, VDOT is represented by a resident engineer or comparable designee.

B. Street development and acceptance of maintenance process.

1. Concept and construction plan approval phase. The proposed construction plan shall be considered incomplete in the absence of a preliminary pavement design based on the Pavement Design Guide ([24VAC30-91-160](#)) and the presumed values therein.

2. Construction phase. Upon approval of the construction plan and prior to construction, the resident engineer should advise the developer regarding inspection of the construction phases and the scheduling of those inspections. VDOT approval of each of the following phases of construction is recommended.

- a. Installation of any enclosed drainage system before it is covered.

- b. Installation of any enclosed utility placements within the right-of-way before being covered.

- c. Construction of the cuts and fills, including field density tests, before placement of roadbed base materials.

- d. A final pavement design, based on actual soil characteristics and certified tests, shall be completed and approved before the pavement structure is placed.

- e. Placement of base materials, including stone depths, consistent with the approved pavement design, prior to placement of the paving course or courses, followed by field density and moisture tests and the placement of a paving course as soon as possible.

- f. Construction of pavement, including depth and density, upon completion as part of the final inspection.

3. Street acceptance process. In the absence of any other formal acceptance, the governing body's resolution requesting the department to accept a street for maintenance as part of the secondary system of state highways completes the dedication and is deemed to constitute the governing body's acceptance of the street.

24VAC30-92-70. Administrative Procedure.

F. Street acceptance. Upon the satisfactory completion of construction of the street or streets in a network addition, the department will advise the local governing body regarding the street or network addition's readiness for acceptance and the local governing body, in consultation with the district administrator's designee, will initiate its acceptance into the secondary system of state highways maintained by the department provided:

1. The developer dedicates the prescribed right-of-way to public use.
2. The street or streets in the network addition have been constructed in accordance with the applicable specifications, standards and the plats or plans approved by the department.
 - a. Traffic control markings, signs, and devices have been installed in accordance with VDOT standards, specifications, and practices.
 - b. Speed limits have been set in accordance with Article 8 (§ [46.2-870](#) et seq.) of Chapter 8 of Title 46.2 of the Code of Virginia. For any streets with speed limits different from those set out in § [46.2-870](#) or §§ [46.2-873](#) through [46.2-875](#) of the Code of Virginia, traffic engineering investigations supporting such speed limits have been submitted to VDOT.
3. The developer furnishes all required information and data to the district administrator's designee and the local government official pertaining to the development's stormwater management system that are pertinent to the locality's, department's, or other entity's Municipal Separate Storm Sewer System (MS4) permit, if applicable.
4. The street or streets in a network addition provides sufficient public benefit as prescribed in [24VAC30-92-60](#) and meets the requirements of this chapter.
5. The street or streets in the network addition has been properly maintained since its completion.
6. The developer furnishes the surety and fees in accordance with [24VAC30-92-140](#).
7. The governing body or other responsible parties have executed all agreements prescribed by these requirements, unless specifically waived on an individual case basis by the department employee, or his successor or his designee, responsible for overseeing these requirements and the final acceptance of streets as part of the secondary system of state highways maintained by the department.
8. The governing body, by proper resolution, requests the department to accept the street or streets in the network addition for maintenance as part of the secondary system of state highways under its jurisdiction. The resolution shall include the governing body's guarantee of an unrestricted and unencumbered right-of-way as dedicated, plus any necessary easements for fills, drainage, or sight distance.

Upon the department's determination that the requested street or network addition is in compliance with the applicable provisions of these requirements, the governing body will be officially advised of the street or network addition's acceptance into the secondary system of state highways and the effective date of such action. This notification serves as the district administrator's designee's authority to begin maintenance thereon.

24VAC30-420-10. Operation and maintenance of roads in incorporated towns less than 3,500

The regulations governing operation and maintenance of roads in incorporated towns less than 3,500 cites state law establishing requirements for local governments to request the Commonwealth Transportation Board (CTB) to provide funds for road improvements from secondary funds, as well as CTB funding authority if no request is made.

24VAC30-430-10. Maintenance of roads crossing the interstate system

The regulations governing maintenance of roads crossing the interstate system discusses the responsibilities of municipalities and the Virginia Department of Transportation in maintaining interchanges and underpasses in cities and towns, roads in counties, and roads in Arlington and Henrico counties.

24VAC30-490-10. Roads in the grounds of state institutions

The regulations governing roads in the grounds of state institutions establish the criteria highways must meet to be considered for inclusion into the primary system. The criteria address design issues, such as road widths, drainage facilities, and pavement type. Also included is a table showing information on the source of funding for new road improvements.

24VAC30-500-10. Roads in the grounds of state parks

The regulations governing roads in the grounds of state parks establish the policy that all state secondary roads located completely within state parks, government parks, reservations and recreational areas may be closed or turned over for maintenance and construction to the various authorities in charge of such facilities, if they request. Boards of Supervisors of the county where the road is located must first give their approval before the action can be completed.

1.4 VDOT Policies, Guidance, and Instructional and Informational Memoranda

Internally, VDOT regularly updates its practices and programs to reflect changes to regulations and the agency's objectives. This includes VDOT's Instructional and Informational Memoranda (IIMs), Manuals, Standards and Specifications, etc. Significant internal guiding documents and policies that will be used to address the Chesapeake Bay TMDL may include the following:

- Department Policy Memoranda and Department Memoranda Manual (2015)
- BMP Design Manual (2013)
- Drainage Manual (2014)
- Stormwater BMP Standards & Specifications (2015)
- Plant Palette for Stormwater BMPs (2015)
- L&D Instructional and Informational Memoranda (2015)
 - IIM-LD-11.28 Stormwater Management Erosion and Sediment Control Program
 - IIM-LD-195.8 Post Development Stormwater Management
 - IIM-LD-233 Natural Channel Design
 - IIM-LD-242.5 Virginia Stormwater Management Program
 - IIM-LD-246.3 Stormwater Pollution Prevention Plan
 - IIM-LD-251.2 Stormwater Management (Nutrient Credits)
- 2008 Road and Bridge Standards
- 2005 Road Design Manual with revisions through 2015
- 2014 Structure and Bridge Manual Vol. 5
- 2007 Road and Bridge Specifications with revisions through 2014
- 2011 Secondary Street Acceptance Requirements
- 2009 Subdivision Street Design Guide Appendix B (1)

1.5 VDOT Six-Year Improvement Program

Section 33.2-361 of the Code of Virginia requires that a public hearing be held prior to the allocation of any transportation funds. The Six-Year Improvement Program (SYIP) is a document that outlines planned spending for transportation projects proposed for construction development or study for the next six years.

The SYIP is updated annually and is the means by which the CTB meets its statutory obligation under the Code of Virginia to allocate funds to interstate, primary, secondary and urban highway systems, public transit, ports and airports and other programs for the immediate fiscal year. The SYIP also identifies planned program funding for the succeeding five fiscal years. The CTB allocates funds for the first fiscal year of the SYIP, but the remaining five years are estimates of future allocations. Fiscal years start on July 1 and end on June 30.

The CTB updates the SYIP each year as revenue estimates are updated, priorities are revised, project schedules and costs change, and study results are known. Development of the SYIP begins in the fall and VDOT hosts a series of meetings seeking public comment with various other multi-modal transportation agencies. Each spring, a draft SYIP is presented to the CTB and made available for public comment.

2.0 NEW OR MODIFIED LEGAL AUTHORITIES

(GENERAL PERMIT SECTION I.C.2.a.(2)) – The identification of any new or modified legal authorities such as ordinances, state and other permits, orders, specific contract language, and interjurisdictional agreements implemented or needing to be implemented to meet the requirements of this special condition

As part of its MS4 Program, VDOT uses adaptive management to ensure it minimizes the discharge of pollutants through its MS4 to the maximum extent practicable (MEP). This adaptive management program, or iterative process, allows policies, practices, procedures, or other BMPs to be enhanced, revised, or created, as necessary. These enhancements may be made in response to self-identification, changes in regulations, and changes in technology.

Through its coverage under the MS4 General Permit, VDOT has modified several policies and procedures to better address its MS4 Program, including but not limited to:

- VDOT's ESC and Stormwater Management (SWM) Standards & Specifications;
- The Secondary Street Acceptance Regulations and Guidance Manual;
- The Land Use Permit (LUP) Regulations and Guidance Manual; and
- The Locally Administered Projects (LAP) Manual.

At the time of the Chesapeake Bay TMDL Action Plan development, VDOT did not identify the need for new or modified legal authorities to address the requirements of this Special Condition. However, VDOT will continue to employ its adaptive management for the MS4 Program, including efforts to address the Chesapeake Bay TMDL. For example, VDOT is pursuing opportunities to increase staffing with defined roles in the MS4 Program to facilitate implementation of the MS4 Program Plan and this Chesapeake Bay TMDL Action Plan. If new or modified authorities are identified and implemented, they will be reported in the MS4 Annual Report.

Throughout the Chesapeake Bay Watershed, VDOT actively coordinates with other MS4s that are potentially interconnected with its system. VDOT annually reports meeting with other MS4s to discuss approaches to TMDL Action Plans as well as potential coordination opportunities. At the time of the Plan development, VDOT initiated and met with all 11 large Phase I permittees and more than 30 small Phase II permittees, see Table 28. Through these meetings, VDOT discusses its MS4 Program and TMDL efforts, shares outfall and best management practice data, and identifies agency points-of-contact for the various MS4 Program elements, including IDDE.

3.0 MEANS AND METHODS TO ADDRESS DISCHARGES FROM NEW SOURCES

(GENERAL PERMIT SECTION I.C.2.a.(3)) – The means and methods that will be utilized to address discharges into the MS4 from new sources.

VDOT addresses its new source discharges through implementation of the VDOT ESC and SWM Standards and Specifications that are annually approved by DEQ. VDOT's ESC and SWM Standards and Specifications contain provisions to comply with applicable regulations, including provisions for new sources related to regulated land-disturbing activities (RLDA). A RLDA is any new development/redevelopment that disturbs greater than or equal to one acre or any new development/redevelopment that disturbs greater than or equal to 2,500 square feet in a Chesapeake Bay Preservation Area designated area. These Standards and Specifications are consistent with the requirements of the Virginia Stormwater Act, the Virginia Stormwater Management Program (VSMP) Regulations, the General Permit for Discharges of Stormwater from Construction Activities (9VAC25-880), and the Erosion and Sediment Control Law and Regulations. Additionally, the Standards and Specifications are updated to reflect new Stormwater BMPs and encourage the use of Low Impact Development (LID) practices and green technology BMPs in order to reduce the stormwater runoff impacts of development.

For each RLDA it undertakes, VDOT addresses new source discharges by developing and implementing post-construction stormwater management plans that are in accordance with its ESC and SWM Standards and Specifications. The applicable portions of the ESC and SWM Standards and Specifications for new sources include:

1. Provisions for the preparation of stormwater management plans for each construction project, when applicable. Each SWM Plan will adhere to the applicable technical criteria (Part IIB or IIC) to meet the requirements of the Stormwater Management Act and VSMP Regulations (Instances where Part IIC technical criteria may be utilized are discussed in Sections 7.0 and 8.0 of this Action Plan);
2. Provisions for stormwater management program administration, plan design, review, and approval;
3. Provisions for ensuring that responsible personnel and contractors obtain certifications or qualifications for stormwater management comparable to those required for VSMP Authorities;
4. Provisions for the long-term responsibility and maintenance of stormwater management control devices and other techniques specified to manage the quantity and quality of runoff, including an inspection and maintenance schedule;
5. Implementation of a system for project tracking and notification of the DEQ for all land disturbing activities covered under the Stormwater Management Act and VSMP; and
6. Requirements for documenting on-site changes as they occur to ensure compliance with the provisions of the Stormwater Management Act and VSMP.

There are projects that result in new sources that are undertaken by other parties, but will ultimately be under the maintenance purview of VDOT after construction is complete. VDOT has several programs and regulations in place to address the acceptance of these projects into the roadway system at project completion. Such programs include, but are not limited to, Secondary Street Acceptance Regulations (SSAR), Locally Administered Projects (LAP), and Land Use Permits (LUP). For these projects to be accepted into the state system for maintenance by VDOT, the improvements must meet the applicable standards and requirements of these programs.

Furthermore, new subdivision streets accepted into the VDOT secondary street system are required by the VSMP Authority (municipality or DEQ) to maintain compliance with stormwater quality (and quantity) requirements. These requirements are locally administered as cited in 24VAC30-91-110, "Whereas the department considers matters regarding stormwater management associated with the construction of new subdivision streets to be under the authority of the local governing body, decisions regarding stormwater management in the construction of subdivision streets are deferred to the locality." Where stormwater management facilities are required by the VSMP Authority or local governing body to provide treatment for the subdivision street, the oversight, design, construction and maintenance of these facilities is governed by agreements between the developer and local

governing body. 24VAC30-91-110 states further that, “Where the developer is required by regulations promulgated by an agency or governmental subdivision other than the department or the developer chooses to use stormwater management facilities in the design of a subdivision, the governing body shall, by formal agreement, and as a prerequisite for the transfer of jurisdiction over the street to the department, acknowledge that the department is not responsible for the operation, maintenance, or liability of the stormwater management facility or facilities associated with the subdivision.” These stormwater decisions, approvals and facilities serving new subdivision streets are administered through the local governing body and VSMP Authority. These new subdivision streets are considered by VDOT to be VSMP and Virginia Runoff Reduction Methodology (VRRM) compliant and subsequently requiring no additional actions by VDOT for Chesapeake Bay TMDL compliance.

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4.0 ESTIMATED EXISTING SOURCE LOADS AND POLLUTANT OF CONCERN REQUIRED REDUCTIONS

(GENERAL PERMIT SECTION I.C.2.A.(4) AND (GENERAL PERMIT SECTION I.C.2.A.(5)) – An estimate of the annual POC loads discharged from the existing sources as of June 30, 2009, based on the 2009 progress run. The operator shall utilize the applicable [Table/Tables] in this section based on the river basin to which the MS4 discharges by multiplying the total existing acres served by the MS4 on June 30, 2009, and the 2009 Edge of Stream (EOS) loading rate;

A determination of the total pollutant load reductions necessary to reduce the annual POC loads from existing sources utilizing the applicable [Table/Tables] in this section based on the river basin to which the MS4 discharges. This shall be calculated by multiplying the total existing acres served by the MS4 by the first permit cycle required reduction in loading rate. For the purposes of this determination, the operator shall utilize those existing acres identified by the 2000 U.S. Census Bureau urbanized area and served by the MS4.

Per the Special Condition, “the Commonwealth in its Phase I and Phase II Chesapeake Bay TMDL Watershed Implementation Plans (WIP) committed to a phased approach for MS4s, affording MS4 operators up to three full five-year permit cycles to implement necessary reductions”. This Special Condition meets “the Level 2 (L2) scoping run ... as it represents an implementation of 5% of L2”. L2 equates to an average reduction of 9% of nitrogen loads, 16% of phosphorus loads and 20% of sediment loads from impervious regulated acres and 6% of nitrogen loads, 7.25% of phosphorus loads and 8.75% of sediment loads from pervious regulated acres. The MS4 General Permit requires VDOT to estimate the loadings and the necessary 5.0% reductions from the L2 Scoping Run POC reductions for existing sources as of June 30, 2009 and provides in tabular format the specific equations per basin. In accordance with the permit, VDOT first estimated the size and extent of its regulated MS4, and the total regulated acres of urban pervious and urban impervious surface served by the MS4 as of June 30, 2009, using best professional judgment. This process is described in the following subsections.

Since VDOT’s regulated MS4 system serves all four major river basins of the Chesapeake Bay watershed identified in the MS4 General Permit, VDOT estimated the existing POC loads and required reductions for each basin. Table 3 identifies the urbanized areas associated with each basin, Note that some urbanized areas overlap multiple river basins.

Table 2. River Basins and Associated Urbanized Areas

River Basin	Urbanized Areas
James River Basin	Charlottesville
	Lynchburg
	Richmond
	Roanoke
	Virginia Beach
Potomac River Basin	Fredericksburg
	Harrisonburg
	Washington D.C.
	Winchester
Rappahannock River Basin	Fredericksburg
York River Basin	Fredericksburg
	Richmond
	Virginia Beach

4.1 Extent of VDOT MS4 Service Area

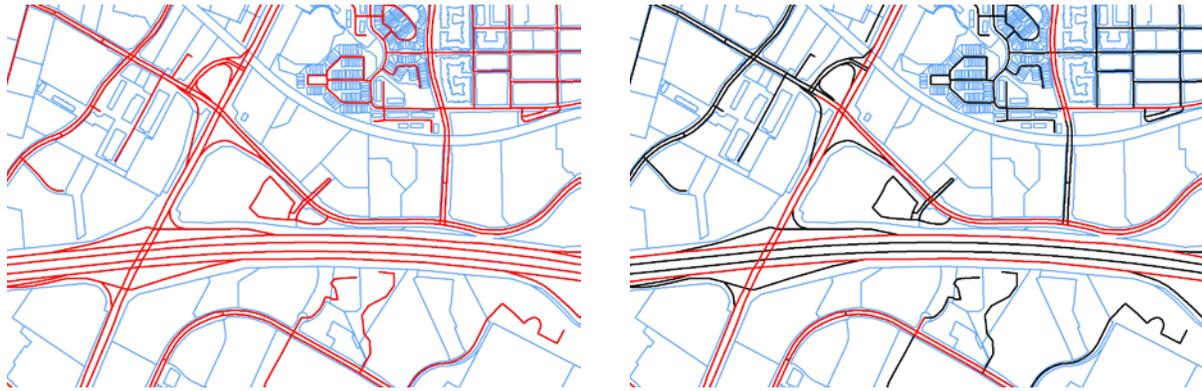
In order for VDOT to determine the annual POC loads discharged from its MS4 system and the required reductions from the existing sources, the extent of the VDOT MS4 Service Area was estimated. The VDOT MS4 Service Area includes VDOT right-of-way (ROW) and property that is located within 2000 US Census Bureau urbanized areas in each of the four major river basins of the Chesapeake Bay watershed. During the first permit cycle, VDOT is not required to account for the expanded urbanized areas that were identified as a result of the 2010 US Census. However, VDOT understands that 40% reductions (5% + 35%) will be required by the end of the second permit cycle for additional regulated lands resulting from the expanded urbanized areas.

The majority of VDOT's MS4 area is composed of ROW within urbanized areas that encompass roadways owned or operated (herein referred to as maintained) by VDOT. Other property in VDOT's regulated MS4 include areas such as district and headquarter offices, supporting storage facilities, and park and ride commuter lots, located in the urbanized areas.

VDOT ROW and associated acreage is constantly in a state of transition due to new roads being built, existing roads being redesigned, and acquisition of lands necessary for highway rights-of-way or purposes incidental to the construction, reconstruction, or improvement of public highways (including residual property). Given the dynamic nature of the VDOT ROW and the fact that detailed ROW and land cover mapping in 2009 does not exist statewide at this time, the spatial information is not readily available for use in a Geographic Information System (GIS) format. Therefore VDOT developed a methodology using available mapping tools to estimate the extent of the VDOT MS4 Service Area based on best data available and best professional judgment for use in this Action Plan.

The methodology utilized road centerline data as the basis for acreage estimation. This data was obtained from the Virginia Geographic Information Network (VGIN) and VDOT's Linear Referencing System (LRS, Quarterly Release 2009 Q4). Depending on the location, type of roadway, and agreements between VDOT and the locality, a roadway may either be owned by the locality or by VDOT. VDOT's Linear Referencing System (LRS) catalogs road ownership and maintenance and was used in this process to cull out all roads not owned or maintained by VDOT. Once the VDOT roadway centerlines have been screened and processed, the area surrounding the centerlines must be estimated to derive an overall acreage. Figure 1, below, simulates an example area where the roadway centerlines have been analyzed to determine which roads are owned or maintained by VDOT. On the left, a full roadway centerline dataset, including both VDOT and non-VDOT roadways, is shown in red. On the right, only the VDOT roadways remain red, with non-VDOT roadways shown in black. Note: even though the attribute data indicated the roadway was maintained by VDOT, it does not always mean it is owned by VDOT. This nuance can lead to instances where an adjacent MS4 may be claiming ownership and subsequently MS4/Chesapeake Bay TMDL responsibility for the same area. Furthermore, the adjacent MS4 likely oversees the maintenance of a BMP that treats these roadways. The main area where this nuance could occur is secondary streets, specifically roads under the purview of the Secondary Street Acceptance Regulations (SSAR). VDOT has acknowledged this possibility of double counting load contributions from these areas, and is moving forward with this determination as a conservative estimate of the VDOT MS4 Service Area, which is allowable under the DEQ Guidance Memorandum #15-2005, issued May 18, 2015. VDOT will continue its discussion and coordination with adjacent MS4 localities. VDOT will utilize and incorporate new information when appropriate to adjust VDOT's regulated area.

Figure 1. Road centerlines before and after processing



VDOT determined the most accurate and efficient method to estimate the area of ROW surrounding VDOT roads was through utilization of existing parcel datasets from local jurisdictions. Empty or unowned parcels surrounding VDOT roads were initially assigned to VDOT. VDOT developed a GIS tool and visual QA/QC process to evaluate the empty parcels and assign this void space as VDOT's ROW where appropriate. In instances of geospatial data conflict, where there was an existing VDOT road and an overlapping parcel, VDOT assumed a uniform ROW width surrounding the VDOT road to maintain a conservative estimate until further refinement. The parcel-driven ROW, combined with any other properties VDOT owns in the urbanized areas, define VDOT's MS4 Service Area. Maps of the VDOT MS4 Service Area are provided in Appendix A.

The method has excluded areas as allowed by DEQ Guidance Memorandum #15-2005 (e.g. forested lands and water) within VDOT's ROW, for purposes of determining existing loads and required reductions. However, these excluded areas have been summarized in this section to accurately depict VDOT's total MS4 Service Area (VDOT MS4 Permit Area). It is expected that this data will be refined as VDOT completes the mapping exercise required by the MS4 General Permit and continues coordination with adjacent MS4s. Furthermore, the method considers any upgradient run-on outside of VDOT's MS4 Service Area to be unregulated for the purposes of VDOT's MS4 Program. Table 4 shows the calculated VDOT MS4 Service Area in each urban area compared to the total urban area. The name of the urban area, as defined and used by the U.S. Census, is the central core jurisdiction that is presumed to be the driver for the urbanization. For example, the Washington D.C. urban area covers several jurisdictional boundaries in Virginia and Maryland. This is noteworthy as total CUA acreage is often times larger than the jurisdictional boundary named in the CUA.

Table 3. VDOT MS4 Acreage relative to Census Urbanized Areas (CUA)¹

Urban Area ²	Total CUA Acreage ³	VDOT Acreage ⁴	% of CUA
Charlottesville	24,919	1,290	5.18%
Fredericksburg	43,191	3,943	9.13%
Harrisonburg	18,813	948	5.04%
Lynchburg	39,844	1,164	2.92%
Richmond	283,716	19,078	6.72%
Roanoke	78 ⁵	11	14.10%
Virginia Beach	306,515	9,811	3.20%
Washington D.C.	407,491	37,876	9.29%
Winchester	24,827	2,191	8.83%

1) Based on 2000 CUA

2) Refers to surrounding urban area, which may include several localities

3) Includes Regulated, Unregulated Lands, and Excluded Lands (such as forest and surface water)

4) VDOT's ROW and properties

5) Chesapeake Bay Watershed only

4.2 Land Cover Breakdowns of MS4 Service Area

Following determination of the MS4 Service Area, the ROW was characterized to estimate the acreage of regulated impervious, regulated pervious, and excluded land cover types. VDOT evaluated several GIS datasets to accomplish this task. A statewide land cover dataset in a suitable resolution for a linear system such as VDOT's was not available during the development of this Action Plan; however VDOT anticipates improved data sources from the Virginia Geographic Information Network (VGIN) will be available in the Spring of 2016, as forecasted by VGIN.

VDOT considered utilizing GIS datasets and methodologies such as

- The National Land Cover Database (NLCD),
- LandSat data,
- VGIN Aerial Imagery, and
- Local High Resolution Land Cover.

For many of the GIS data sources available, significant geo-processing or digitization would be necessary to create a usable GIS land cover dataset (e.g. LandSat or VGIN's aerial imagery), which is impracticable at the statewide level. Local high resolution land cover data was only available in select locations and would need to be separately reviewed, then assimilated, and also supplemented in areas without such high resolution data. Rather than expend additional resources developing a refined dataset to reflect the 2009 land cover conditions, which would potentially extend beyond the submittal due date of this Action Plan, VDOT chose to utilize currently available GIS data until other high-resolution land cover data is developed. The Commonwealth through other agency efforts is currently developing such a dataset, and it is anticipated to be available in the middle of 2016. This further supports VDOT's decision to move forward with this methodology, while waiting for a consistent statewide dataset that will be available to all potential users. This dataset will be available statewide through VGIN, and will be used to support additional models of the Bay Program. Rather than develop a unique dataset that may or may not be consistent with this separate effort, VDOT decided to develop a methodology in the interim using the best data that is available consistently throughout VDOT's MS4 area. As new land cover data becomes available, VDOT will review data, when appropriate, to adjust the estimated regulated area, which is allowable under DEQ Guidance Memorandum #15-2005. VDOT will incorporate, as appropriate, newly available data as part of the reapplication process and updating the Action Plan.

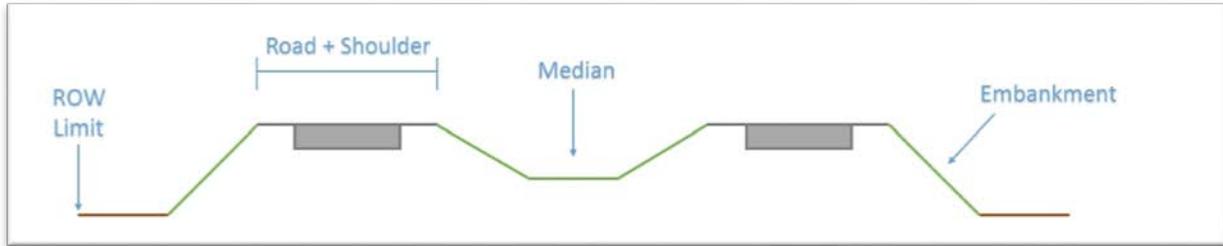
The NLCD is a statewide (also national), current, consistent, and public domain dataset that reflects land cover, including areas of development as well as forest, open water, and wetlands. NLCD is the product of the Multi-Resolution Land Characteristics (MRLC) Consortium, which is a group of 13 Federal programs in 10 agencies that partner to create this dataset. Datasets were developed for 1992, 2001, 2006, and 2011. VDOT used the 2011 dataset as the closest representative of the 2009 land cover conditions.

NLCD has a spatial resolution of 30 meters which may be sufficient for certain purposes at a large scale, but becomes more limiting when used at smaller and more refined scales. Roadways can be recognized with this dataset, however road widths and geometry definitions do not maintain consistency as the 30 meter cells are too coarse to accurately represent roadway surfaces (especially narrower roads). Many segments of VDOT ROW with narrow linear features are not reflected in NLCD, causing an under predicted account of impervious cover. Although these datasets are readily used by EPA and DEQ for modeling purposes, VDOT developed a methodology to increase the accuracy of estimating the imperviousness throughout its ROW as follows.

To adjust for these limitations, VDOT roadway centerlines were used to estimate the impervious area within VDOT ROW attributed to road lanes and compacted shoulders. These roadway components were characterized as 100% impervious. The remaining area of VDOT ROW (medians, ditches, curb and gutter, shoulders, embankments, etc.) has varying degrees of impervious, pervious, and forested conditions depending on the surrounding land cover. These areas were characterized by land use category using NLCD to estimate the impervious, pervious, and forested extent. A schematic of VDOT ROW components is shown in Figure 2. Tables 5 through 8 identify the

impervious, pervious, and forested areas and the land cover category that was used to derive the estimates for each river basin.

Figure 2. VDOT ROW Schematic



4.2.1 James River Basin Land Cover Summary

For the James River Basin, the VDOT MS4 Service Area is comprised of 27,318 acres, which is summarized in Table 4.

Table 4. Land Cover Summary for VDOT MS4 Service Area in James River Basin

Land Use Category	Impervious Acres ¹	Pervious Acres ¹	Excluded Acres
Roadway (derived from methodology)	14,151	0	0
Developed, High Intensity (80% Impervious)	188	47	0
Developed, Low Intensity (50% Impervious)	1,005	1,005	0
Developed, Medium Intensity (20% Impervious)	1,035	4,140	0
Developed, Open Space	0	4,310	0
Planted/Cultivated	0	128	0
Shrubland/Herbaceous/Barren	0	115	0
Forested ²	0	0	922
Water ²	0	0	16
Wetlands ²	0	0	256
Total	16,379	9,745	1,194

Note: 1 – Regulated Area based on the U.S. Census Bureau 2000 urbanized areas
 2 – Area excluded from permit-required loading and reduction estimations

4.2.2 Potomac River Basin Land Cover Summary

For the Potomac River Basin, the VDOT MS4 Service Area is comprised of 41,066 acres, which is summarized in Table 5.

Table 5. Land Cover Summary for VDOT MS4 Service Area in Potomac River Basin

Land Use Category	Impervious Acres ¹	Pervious Acres ¹	Excluded Acres
Roadway (derived from methodology)	21,998	0	0
Developed, High Intensity (80% Impervious)	351	88	0
Developed, Low Intensity (50% Impervious)	1,986	1,986	0
Developed, Medium Intensity (20% Impervious)	1,719	6,878	0
Developed, Open Space	0	4,653	0
Planted/Cultivated	0	176	0
Shrubland/Herbaceous/Barren	0	47	0
Forested ²	0	0	1,097
Water ²	0	0	13
Wetlands ²	0	0	74
Total	26,054	13,828	1,184

Note: 1 – Regulated Area based on the U.S. Census Bureau 2000 urbanized areas
 2 – Area excluded from permit-required loading and reduction estimations.

4.2.3 Rappahannock River Basin Land Cover Summary

For the Rappahannock River Basin, the VDOT MS4 Service Area is comprised of 3,640 acres, which is summarized in Table 6

Table 6. Land Cover Summary for VDOT MS4 Service Area in Rappahannock River Basin

Land Use Category	Impervious Acres ¹	Pervious Acres ¹	Excluded Acres
Roadway (derived from methodology)	1,930	0	0
Developed, High Intensity (80% Impervious)	33	8	0
Developed, Low Intensity (50% Impervious)	116	116	0
Developed, Medium Intensity (20% Impervious)	173	693	0
Developed, Open Space	0	459	0

Land Use Category	Impervious Acres ¹	Pervious Acres ¹	Excluded Acres
Planted/Cultivated	0	24	0
Shrubland/Herbaceous/Barren	0	14	0
Forested ²	0	0	69
Water ²	0	0	1
Wetlands ²	0	0	4
Total	2,252	1,314	74

Note: 1 – Regulated Area based on the U.S. Census Bureau 2000 urbanized areas
 2 – Area excluded from permit-required loading and reduction estimations

4.2.4 York River Basin Land Cover Summary

For the York River Basin, the VDOT MS4 Service Area is comprised of 4,288 acres, which is summarized in Table 7.

Table 7. Land Cover Summary for VDOT MS4 Service Area in York River Basin

Land Use Category	Impervious Acres ¹	Pervious Acres ¹	Excluded Acres
Roadway (derived from methodology)	2,462	0	0
Developed, High Intensity (80% Impervious)	22	6	0
Developed, Low Intensity (50% Impervious)	104	104	0
Developed, Medium Intensity (20% Impervious)	132	528	0
Developed, Open Space	0	654	0
Planted/Cultivated	0	22	0
Shrubland/Herbaceous/Barren	0	26	0
Forested ²	0	0	173
Water ²	0	0	4
Wetlands ²	0	0	51
Total	2,720	1,340	228

Note: 1 – Regulated Area based on the U.S. Census Bureau 2000 urbanized areas
 2 – Area excluded from permit-required loading and reduction estimations

4.3 Existing Source Load Estimates for River Basins

Using the estimated regulated urban pervious acres and regulated urban impervious acres for each basin, Tables 2a through 2d from the MS4 General Permit were utilized to estimate the existing source loads for the POCs based

on the EOS loading rate from the June 30, 2009 Progress Run. Table 9 through Table 12 show the estimated loads for the VDOT Regulated Area for each of the river basins.

Forested lands have been included as footnotes in the loading estimate tables in the event VDOT identifies opportunities to implement BMPs in these areas. Note: Inclusion of forested lands does not obligate VDOT to achieve a pollutant reduction in these areas per DEQ Guidance Memorandum #15-2005.

4.3.1 James River Basin Existing Source Loads

Table 8. Existing Source Loads for VDOT Regulated Area in the James River Basin

Subsource	Pollutant	Regulated Acres of MS4 Service Area as of 06/30/09	2009 EOS Loading Rate (lbs/acre/yr)	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr) ¹
Regulated Urban Impervious	Nitrogen	16,379	9.39	153,799
Regulated Urban Pervious		9,745	6.99	68,118
Regulated Urban Impervious	Phosphorus	16,379	1.76	28,827
Regulated Urban Pervious		9,745	0.50	4,873
Regulated Urban Impervious	Total Suspended Solids	16,379	676.94	11,087,600
Regulated Urban Pervious		9,745	101.08	985,025

1 – Loads from forested lands in James River Basin are estimated to be 2,176, 120 and 71,346 lbs/yr for TN, TP, and TSS, respectively.

4.3.2 Potomac River Basin Existing Source Loads

Table 9. Existing Source Loads for VDOT Regulated Area in the Potomac River Basin

Subsource	Pollutant	Regulated Acres of MS4 Service Area as of 06/30/09	2009 EOS Loading Rate (lbs/acre/yr)	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr) ¹
Regulated Urban Impervious	Nitrogen	26,054	16.86	439,270
Regulated Urban Pervious		13,828	10.07	139,248
Regulated Urban Impervious	Phosphorus	26,054	1.62	42,207
Regulated Urban Pervious		13,828	0.41	5,669
Regulated Urban Impervious	Total Suspended Solids	26,054	1,171.32	30,517,571
Regulated Urban Pervious		13,828	175.8	2,430,962

1 – Loads from forested lands in Potomac River Basin are estimated to be 5,806, 143 and 87,000 lbs/yr for TN, TP, and TSS, respectively.

4.3.3 Rappahannock River Basin Existing Source Loads

Table 10. Existing Source Loads for VDOT Regulated Area in the Rappahannock River Basin

Subsource	Pollutant	Regulated Acres of MS4 Service Area as of 06/30/09	2009 EOS Loading Rate (lbs/acre/yr)	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr) ¹
Regulated Urban Impervious	Nitrogen	2,252	9.38	21,124
Regulated Urban Pervious		1,314	5.34	7,017
Regulated Urban Impervious	Phosphorus	2,252	1.41	3,175
Regulated Urban Pervious		1,314	0.38	499
Regulated Urban Impervious	Total Suspended Solids	2,252	423.97	954,780
Regulated Urban Pervious		1,314	56.01	73,597

1 – Loads from forested lands in Rappahannock River Basin are estimated to be 278, 9 and 3,954 lbs/yr for TN, TP, and TSS, respectively.

4.3.4 York River Basin Existing Source Loads

Table 11. Existing Source Loads for VDOT Regulated Area in the York River Basin

Subsource	Pollutant	Regulated Acres of MS4 Service Area as of 06/30/09	2009 EOS Loading Rate (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr) ¹
Regulated Urban Impervious	Nitrogen	2,720	7.31	19,883
Regulated Urban Pervious		1,340	7.65	10,251
Regulated Urban Impervious	Phosphorus	2,720	1.51	4,107
Regulated Urban Pervious		1,340	0.51	683
Regulated Urban Impervious	Total Suspended Solids	2,720	456.68	1,242,170
Regulated Urban Pervious		1,340	72.78	97,525

1 – Loads from forested lands in York River Basin are estimated to be 368, 12 and 4,766 lbs/yr for TN, TP, and TSS, respectively.

4.4 Required Reduction Estimates for River Basins

Using the estimated regulated urban pervious acres and regulated urban impervious acres for each basin, Tables 3a through 3d provided in the MS4 General Permit were utilized to estimate the required reductions for the POCs based on the June 30, 2009 Progress Run. Table 13 through Table 16 show the required reductions for the VDOT

Regulated Area for each of the river basins. This is the 5.0% reduction for existing development that VDOT must meet within the first permit cycle.

4.4.1 James River Basin Required Reductions

Table 12. Required Reductions for VDOT Regulated Area in the James River Basin

Subsource	Pollutant	Regulated Acres of MS4 Service Area as of 06/30/09	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total Reduction Required First Permit Cycle (lbs/yr)
Regulated Urban Impervious	Nitrogen	16,379	0.042255	692
Regulated Urban Pervious		9,745	0.02097	204
Regulated Urban Impervious	Phosphorus	16,379	0.01408	231
Regulated Urban Pervious		9,745	0.0018125	18
Regulated Urban Impervious	Total Suspended Solids	16,379	6.67694	110,876
Regulated Urban Pervious		9,745	0.442225	4,309

4.4.2 Potomac River Basin Required Reductions

Table 13. Required Reductions for VDOT Regulated Area in the Potomac River Basin

Subsource	Pollutant	Regulated Acres of MS4 Service Area as of 06/30/09	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total Reduction Required First Permit Cycle (lbs/yr)
Regulated Urban Impervious	Nitrogen	26,054	0.07587	1,977
Regulated Urban Pervious		13,828	0.03021	418
Regulated Urban Impervious	Phosphorus	26,054	0.01296	338
Regulated Urban Pervious		13,828	0.00148625	21
Regulated Urban Impervious	Total Suspended Solids	26,054	11.7132	305,176
Regulated Urban Pervious		13,828	0.769125	10,635

4.4.3 Rappahannock River Basin Required Reductions

Table 14. Required Reductions for VDOT Regulated Area in the Rappahannock River Basin

Subsource	Pollutant	Regulated Acres of MS4 Service Area as of 06/30/09	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total Reduction Required First Permit Cycle (lbs/yr)
Regulated Urban Impervious	Nitrogen	2,252	0.04221	95
Regulated Urban Pervious		1,314	0.01602	21
Regulated Urban Impervious	Phosphorus	2,252	0.01128	25
Regulated Urban Pervious		1,314	0.0013775	2
Regulated Urban Impervious	Total Suspended Solids	2,252	4.2397	9,548
Regulated Urban Pervious		1,314	0.24504375	322

4.4.4 York River Basin Required Reductions

Table 15. Required Reductions for VDOT Regulated Area in the York River Basin

Subsource	Pollutant	Regulated Acres of MS4 Service Area as of 06/30/09	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total Reduction Required First Permit Cycle (lbs/yr)
Regulated Urban Impervious	Nitrogen	2,720	0.032895	89
Regulated Urban Pervious		1,340	0.02295	31
Regulated Urban Impervious	Phosphorus	2,720	0.01208	33
Regulated Urban Pervious		1,340	0.00184875	2
Regulated Urban Impervious	Total Suspended Solids	2,720	4.5668	12,422
Regulated Urban Pervious		1,340	0.3184125	427

4.5 Overall Required Reduction Estimates for VDOT's MS4 Area

Table 16. Required Reductions for VDOT's Statewide Regulated Area

POC	River Basin	Total Reduction Required First Permit Cycle (lbs/yr)	Total Reduction Required First Permit Cycle (lbs/yr)
Nitrogen	James	896	3,527
	Potomac	2,395	
	Rappahannock	116	
	York	120	
Phosphorus	James	249	670
	Potomac	359	
	Rappahannock	27	
	York	35	
Sediment	James	115,185	453,715
	Potomac	315,811	
	Rappahannock	9,870	
	York	12,849	

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5.0 MEANS AND METHODS TO MEET THE REQUIRED REDUCTIONS AND SCHEDULE

(GENERAL PERMIT SECTION I.C.2.A.(6)) The means and methods, such as management practices and retrofit programs that will be utilized to meet the required reductions included in subdivision 2 a (5) of this subsection, and a schedule to achieve those reductions. The schedule should include annual benchmarks to demonstrate the ongoing progress in meeting those reductions;

VDOT has identified several means and methods, such as an array of BMP types and retrofit programs, which may be utilized to meet the required reductions identified in Section 4.0. All management practices and programs that are identified in this Section are based on information that, at the time the Action Plan is developed, will meet the reductions required for this permit cycle. To date, VDOT expects to implement a combination of means and methods to achieve the required reductions for this permit cycle, which may include, but is not limited to:

- Historical BMPs
- Redevelopment
- Stream Restoration and Stabilization
- Outfall and Dry Channel Stabilization
- Shoreline Erosion Control
- Land Cover Conversion
- Forest Buffers
- Street Sweeping and Other Annual Pollutant Removal Efforts
- Purchase of Nutrient Credits
- Structural BMP Enhancements and Retrofits
- Incidental Retrofits

VDOT has developed a dynamic Action Plan that will allow adaptation to changing project and fiscal outlooks, as well as adoption of emerging technologies. While this Action Plan does not identify the exact number and combination of individual BMPs that will be implemented to meet the required 5% reduction, VDOT has taken great care to estimate the likely BMPs that will be implemented by the responsible Divisions and Districts within VDOT. VDOT has built flexibility into the Action Plan to allow for adjustments to the BMPs actually implemented in the event that new data or opportunities arise that result in pollutant reductions that have not been forecasted or in the event that VDOT cannot implement a planned BMP within this permit cycle. Where possible, this Action Plan has identified a list of potential projects for planning purposes. VDOT has developed a summary spreadsheet that will assist with VDOT's screening and selection process. An example spreadsheet for stream restoration projects is provided in Appendix B. Actual BMPs implemented, and associated credits, will be reported through the appropriate MS4 Annual Report. VDOT will annually report BMP information in accordance with Section I.C.4 of the MS4 General Permit to demonstrate annual progress is being made.

Implementation of the BMPs described below demonstrates compliance with the reduction requirements for this permit cycle with the understanding that any changes in established efficiencies will not be retroactively applied to projects approved to meet reductions for this permit cycle. The same credit guarantee will apply to any BMPs included in the Action Plan that are completed or under construction by the end of the 2013 MS4 General Permit term. Likewise, where the BMPs included in this Action Plan result in reductions beyond the required 5%, VDOT will apply those additional reductions at the established efficiencies to meet further reduction requirements necessary in the subsequent permit cycles. If adjustments to VDOT's regulated acreage estimates are made and it is determined additional reductions are achieved, those reductions will also be applied to future permit cycles.

5.1 BMP Types

The following subsections discuss the various BMPs that VDOT may utilize to meet the required reductions of the Chesapeake Bay TMDL. The discussion includes BMP appropriateness, scale of implementation, and crediting (if different from DEQ Guidance Memorandum #15-2005).

5.1.1 Historical BMPs

VDOT has taken great strides to organize and manage its stormwater management inventory and associated data. VDOT’s Location and Design (L&D) Division maintains a database of permanent post-construction stormwater BMPs installed over the years. VDOT uses this database to track BMPs that are currently operating and being maintained by VDOT. The database includes fields for BMP type, unique ID, 6th order Hydrologic Unit Code (HUC), location, treated impervious acres, total drainage area, date of installation, etc.

In accordance with DEQ Guidance Memorandum #15-2005, VDOT reviewed the BMPs that were installed on or after January 1, 2006 and before July 1, 2009, and determined which BMPs were treating regulated area in the Chesapeake Bay River Basins. Load reduction for each of the “historical BMPs” were determined using the impervious area treated (as determined by the VSMP requirements) and assuming the percent impervious to determine the pervious treatment based on the analysis of VDOT ROW using a methodology similar to that presented in Section 4.2. Note: VDOT did not treat for pervious acreage for purposes of VSMP compliance; however the Chesapeake Bay Program assigns credit for such treatment. A majority of the BMPs identified in the historical dataset were dry extended detention basins. Other BMPs included retention ponds, Bioretention, and MTDs. BMP removal efficiencies under the Bay Program for total nitrogen (TN), total phosphorus (TP), and total suspended sediments (TSS) were utilized to represent reductions. For dry extended basins, these are 20%, 20%, and 60%, respectively. A summary of the POC reductions is shown below in Table 18.

Table 17. Reductions Achieved by Historical BMPs in in VDOT’s MS4 Service Area

Basin	Total BMPs	Acres Treated (Impervious/Pervious)	TN Reductions (lbs/yr)	TP Reductions (lbs/yr)	TSS Reductions (lbs/yr)
James	3	(8/4.9)	22	3	3,538
Potomac	23	(127.7/78.3)	569	45	90,783
Rappahannock	0	(0/0)	0	0	0
York	3	(22.6/13.9)	55	9	2,631
Total	29	(158/97)	646	57	96,952

Note: Reductions are estimated using the applicable loading table of 2a – 2d, and then applying the removal efficiencies from the Chesapeake Bay Program.

Reductions for historical BMPs in relation to the required 5% reduction have been summarized by basin in tables 22 through 25 of Section 5.2.

On August 28, 2015, VDOT submitted historical data to DEQ for BMPs installed statewide prior to June 30, 2013. DEQ acknowledged receipt on the same day. This historical information included BMPs implemented throughout VDOT’s jurisdiction, not only those BMPs implemented in VDOT’s regulated MS4 area. A list of BMPs that VDOT has applied towards credit (i.e. within the MS4 regulated areas of the Chesapeake Bay TMDL watershed) is provided in Appendix C.

5.1.2 Redevelopment

VDOT undertakes many projects that qualify as “prior developed land (redevelopment).” Prior developed land is defined in the VSMP regulations as land that has been previously utilized for residential, commercial, industrial, institutional, recreational, transportation, or utility facilities or structures, and that will have the impervious areas associated with those uses altered during a land-disturbing activity. Whether a project is considered new development or redevelopment is determined during the project planning phase. The amount of redevelopment that has occurred or is projected to occur from July 1, 2009, through June 30, 2018, was investigated to determine

the additional nutrient and sediment loads removed that could be credited towards the TMDL reduction requirements. An estimate of future redevelopment was also calculated for planning purposes.

To quantify creditable POC reductions from redevelopment that has occurred, VDOT’s BMP database, maintained by the L&D Division, was researched in conjunction with a survey of the VDOT District Drainage Engineers (DDEs). The DDEs were asked to estimate 1) the portion of projects in their district that were considered redevelopment since 2009; and 2) how the post-construction stormwater BMPs were installed. By combining the DDE’s experience and data from the L&D BMP database, an estimate of POC reductions achieved through redevelopment was obtained. VDOT’s VSMP Permits Database was also researched alongside the Six Year Improvement Plan (SYIP) to develop projected reduction estimates.

Based on this analysis, approximately 1,184 lbs/yr of TN, 181 lbs/yr of TP and 205,623 lbs/yr of TSS annual removal credit is projected from BMPs associated with redevelopment. A breakdown of credits by Basin is shown in Table 19.

Table 18. Projected Reductions from Redevelopment in Each Basin

Basin	TN Removed due to Redevelopment (lbs/yr)	TP Removed due to Redevelopment (lbs/yr)	TSS Removed due to Redevelopment (lbs/yr)
James	25	3	3,288
Potomac	1,970	167	347,856
Rappahannock	10	1	747
York	69	10	7,950
Total	1,184	181	205,623

Reductions for redevelopment in relation to the required 5% reduction have been summarized by basin in tables 22 through 25 of Section 5.2.

5.1.3 Stream Restoration and Stabilization

Stream restoration projects have historically been used by multiple divisions at VDOT for various purposes. VDOT’s Environmental Division occasionally restores degraded streams in order to provide compensatory mitigation for other project-related impacts requiring Clean Water Act Section 404 permits or Virginia Water Protection Permits. VDOT’s L&D Division encounters degraded receiving streams located downstream from proposed project outfalls, inadequate for current or future conditions. In these instances the designers must provide for restoration or stabilization of the downstream receiving tributaries to recreate an adequate channel for discharge. VDOT’s Maintenance Division occasionally encounters degraded urban streams below existing stormwater outfalls which are experiencing significant erosion and head-cutting. These areas are often stabilized or restored through a variety of means including natural stream channel design.

Depending on the type of project and stream restoration approach, VDOT will seek credit when appropriate under one or more of the four protocols discussed in the EPA Chesapeake Bay Program Office (CBPO) “Expert Panel” guidance entitled, *“Final Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects.”* The primary protocol of use to VDOT is “Protocol 1: Credit for Prevented Sediment during Storm Flow,” which provides an annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that would otherwise be delivered downstream from an actively enlarging or incising urban stream.

Currently, there are at least two stream stabilization projects underway that satisfy the Chesapeake Bay TMDL requirements and others for which VDOT may seek credit. One stabilization project is occurring at VDOT’s Harrisonburg Residency in the Potomac River Basin, and the second is located within a drainage easement in Spotsylvania County in the Rappahannock River Basin. The Harrisonburg Residency project also includes land

cover conversion (pervious to forest) and forest buffers. The credits anticipated for both projects are discussed in Section 5.2.

An additional stream stabilization project is projected in the James River Basin to meet the TMDL requirement. VDOT is currently performing a preliminary review of candidate sites which is summarized in Appendix D. VDOT used the Expert Panel's interim rates for nutrient and sediment removal (provided in lbs per linear foot) to estimate the target stream length and ratio of removal. Assuming no coastal plain restoration, VDOT anticipates implementing one or more stream restoration projects for the James River Basin to meet reduction goals of 387 lbs/yr of TN, 350 lbs/yr of TP and 231,312 lbs/yr of TSS. Based on the interim rates, this equates to 5,150 linear feet of stream; however VDOT expects to identify appropriate restoration sites and plans to apply Protocol 1. By selecting highly degraded stream segments and applying protocol 1, VDOT anticipates a greater nutrient and sediment reduction in a shorter length of stream.

Reductions for stream restoration in relation to the required 5% reduction have been summarized by basin in tables 22 through 25 of Section 5.2.

5.1.4 Outfall and Dry Channel Stabilization

VDOT maintains stormwater and culvert outfalls throughout the state, some of which are experiencing erosion due to contributing factors such as increased imperviousness in upstream catchment area. These outfalls and eroding channels present an opportunity to reduce nutrients and sediments contributing to downstream waters through a directed maintenance program that will prioritize project locations to focus efforts where maximum nutrient and sediment reductions would be achieved.

Using notes from the outfall reconnaissance program, VDOT screened and identified several outfalls with eroding channels that have the opportunity to be stabilized. The screening results are provided in Appendix E. In the absence of guidance to credit outfall stabilization efforts, stream restoration methodologies were utilized to estimate the nutrients and sediment transport reduced by stabilizing the outfalls for this Action Plan. Outfall stabilization is similar in concept to Protocol 1 for stream restoration (prevented sediment) from the EPA CBPO's "Final Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects." This guidance was used to assess the nutrient and sediment reductions associated with stabilizing outfalls. The rates for nitrogen, phosphorous, and suspended sediment were 0.075, 0.068 and 44.88 (or 15.13 in the coastal plain) lbs per linear foot, respectively.

By implementing a subset of the identified outfalls, VDOT anticipates achieving approximately 42 lbs/yr of TN, 38 lbs/yr of TP and 25,536 lbs/yr of TSS annual removal credit from a mixture of outfall stabilization projects during this permit cycle. A breakdown per Basin is provided in Table 20. While this Action Plan estimates pollutant reductions for repaired outfalls because of the screening process used, the actual outfall that will be stabilized and creditable will vary based on field feasibility engineering assessment and findings. Actual outfalls with eroding channels that are stabilized, and associated credits, will be reported through the appropriate MS4 Annual Report.

Table 19. Projected Reductions from Outfall and Dry Channel Stabilization in each Basin

Basin	Number of Outfalls	Number of Linear feet	TN Reductions (lbs/yr)	TP Reductions (lbs/yr)	TSS Reductions (lbs/yr)
James	38	365	27	25	16,381
Potomac	3	33	2	2	1,481
Rappahannock	5	63	5	4	2,827
York	12	108	8	7	4,847

Basin	Number of Outfalls	Number of Linear feet	TN Reductions (lbs/yr)	TP Reductions (lbs/yr)	TSS Reductions (lbs/yr)
Total	58	568	43	39	25,492

Reductions for outfall stabilization in relation to the required 5% reduction have been summarized by basin in tables 22 through 25 of Section 5.2.

5.1.5 Shoreline Erosion Stabilization Control

Periodically, VDOT implements shoreline erosion controls to manage the impacts of large tributaries and their impacts on right-of-way operations. VDOT shoreline erosion control measures include such practices as vegetated shoreline stabilization, installation of shoreline structures and controls, revetments, and other preventive measures. These activities go through a formal permitting and approval process where the activities affect Water of the United States (WOUS) or tidal shorelines; however they have not been historically inventoried and tracked as a nutrient or sediment BMP.

Recent guidance from EPA’s Chesapeake Bay Program noted shoreline erosion as one of the greatest sources of sediment and turbidity in the Bay and its tributaries. The published guidance, entitled, “*Recommendation of the Expert Panel to Define Removal Rates for Shoreline Management Projects*,” April 15, 2014, provides four protocols for evaluating shoreline erosion control activities with regard to their function and design for TMDL crediting. Projects that implement shoreline erosion stabilization for credit will be consistent with any future guidance that is provided as final recommendations.

In consideration of this Expert Panel report, VDOT will further pursue crediting shoreline management activities where applicable. At this time, VDOT has only performed a cursory review of shoreline erosion control projects that have occurred since 2009 that have potential for TMDL credit in the four river basins. Once these projects have been completely evaluated for crediting, VDOT will report appropriate shoreline erosion control projects for nutrient and sediment load reductions in the appropriate MS4 Annual Report for Chesapeake Bay TMDL credit.

5.1.6 Land Cover Conversion

A portion of VDOT’s right-of-way area (shoulders, medians, and side slopes) is comprised of maintained vegetated areas that are classified as regulated pervious cover by the Chesapeake Bay model. While this managed pervious cover may appear to offer an opportunity for conversion to forested lands, upon further examination, VDOT notes that these pervious areas are critical to maintaining operational and safety features, such as clear zones and line of sight. Operating and maintaining a safe transportation system is a key component of VDOT’s mission, and as such, land cover conversion within VDOT’s ROW is likely a limited option as a BMP.

A small portion of VDOT’s MS4 Service Area is comprised of residual properties and facilities that also contain managed pervious cover. VDOT will consider land cover conversion on residual properties and facilities where it is appropriate and in no way interferes with public safety or VDOT operations. For example, VDOT anticipates the utilization of this BMP for credit at VDOT’s Harrisonburg Residency in the Potomac River Basin, where roughly 10 acres of pervious cover will be converted to forested land. The resulting pollutant loads reduced by the conversion will be 72 lbs/yr TN, 4 lbs/yr TP, and 1,330 lbs/yr TSS.

There may also be opportunities for land cover conversion credit when VDOT removes pavement for greenspace or safety purposes during the redesign of a developed area, such as an intersection, or the discontinuance of a road. VDOT will report the impervious to pervious land use conversions for credit that is not claimed for other purposes, such as VSMP compliance.

Reductions for land cover conversion in relation to the required 5% reduction have been summarized by basin in tables 22 through 25 of Section 5.2.

5.1.7 Forest Buffers

Forest Buffers can be credited as both a land cover conversion and efficiency BMP. Much like land cover conversion, VDOT will limit the use of this BMP to residual properties and facilities. VDOT will continue to explore forest buffer opportunities when exploring possible stream stabilization efforts throughout the VDOT MS4 regulated area.

VDOT estimates the Harrisonburg Residency stream enhancement project will provide approximately 15 lbs/yr of TN, 1 lbs/yr of TP and 506 lbs/yr of TSS of removal credit through forest buffer, where just under three acres of forest buffer will be planted along the stream and treat upland drainage areas.

Reductions for forest buffers in relation to the required 5% reduction have been summarized by basin in tables 22 through 25 of Section 5.2.

5.1.8 Street Sweeping and Other Annual Pollutant Removal Efforts

Street sweeping is an obvious choice for VDOT's linear properties and therefore, will likely be a substantial BMP in future reduction scenarios. VDOT practices street sweeping at varying degrees of frequency and location depending on the needs and abilities at the local level. The frequency of sweeping is based on safety, local agreements, and availability of equipment and personnel. Depending on the VDOT Residency, VDOT roads are swept by VDOT forces or by a contractor. VDOT also partners with local jurisdictions by sharing resources. These resources may be equipment, labor, VDOT roads, or funding.

VDOT is awaiting the pending findings of the Expert Panel Report on Urban Street Sweeping from the Chesapeake Bay Program's Urban Stormwater Workgroup. VDOT will use these findings to determine the viability of seeking credits for VDOT's street-sweeping efforts.

In addition to tracking street sweeping efforts, VDOT is exploring a mechanism to document efforts related to other activities, such as catch basin clean-out and ditch pulling, associated with the gross removal of POCs. These efforts are similar to street sweeping in that POCs are removed on an annual basis and can be tracked by a unit measure (e.g. number of miles) or by tonnage.

Currently, there are two local TMDLs in the Chesapeake Bay watershed in which VDOT utilizes or will utilize street sweeping to achieve local sediment waste load allocations. In the Rivanna River watershed (located in the James River Basin) and the Bull Run watershed (located in the Potomac River Basin), regular street sweeping programs will be implemented and tracked to the level necessary for meeting the qualifying conditions for Bay credit. The regular street sweeping that will occur in the Rivanna River watershed in response to the Rivanna River Sediment TMDL is anticipated to remove 369 lbs/yr of TN, 56 lbs/yr of TP, and 20,000 lbs/yr of TSS. The street sweeping that will occur in the Potomac River watershed to address the Bull Run Sediment TMDL is anticipated to remove 1,400 lbs/yr of TN, 116 lbs/yr of TP, and 80,000 lbs/yr of TSS.

VDOT is also reviewing the potential source reduction associated with different loading rates or percentage of abrasives applied to roadways during winter weather. VDOT will report appropriate street sweeping and other annual pollutant removal efforts for nutrient and sediment load reductions in the appropriate MS4 Annual Report for Chesapeake Bay TMDL credit.

5.1.9 Purchasing of Nutrient Credits

Until recently, VDOT had not historically utilized nutrient trading as a mechanism to achieve water quality compliance, however the practice is being used more frequently on new construction and redevelopment projects under certain circumstances. In 2014, VDOT issued an Instructional and Informational Memorandum (IIM), IIM-LD

251.1, titled “The Purchase of Nutrient Credits to Address Post-Construction Water Quality Reduction Requirements for Construction Activities”, outlining applicability, feasibility, the procurement process, recordkeeping, and reporting aspects for nutrient credit purchasing.

Internal research conducted by VDOT indicated the use of nutrient credits by the Department can be very cost effective compared to many structural BMP practices on a dollar per pound basis, with an average cost savings of 51%. For Chesapeake Bay TMDL purposes, VDOT will consider purchasing credits, as needed, to meet reductions, including achieving the 5% reduction in this permit cycle.

In terms of stormwater sources, the “currency” that is traded is normalized to Total Phosphorus, which is a keystone pollutant representative of an array of urban stormwater pollutants. The DEQ elects to utilize TP as a convenient single medium of exchange, rather than calculating required reductions and executing trades separately for TN, TP and TSS. The credits at the vast majority of nutrient banks utilized for stormwater offsets are derived from agricultural land conversion. When a bank sells a TP credit to a stormwater source, they are required to retire the appropriate amount of other pollutants (e.g. TN) in proportion to the amount of reductions of those pollutants. The state elected to simplify this because there is a reasonable presumption that there will be an equivalent or greater reduction in TN and TSS on the agricultural site than that generated by the stormwater source receiving the credit. As VDOT will be utilizing the purchase of nutrient credits to satisfy some portion of their overall Chesapeake Bay Special Condition requirements, some assessment of the equivalency of TP to TN and TSS is required.

Table 4 from the MS4 Phase II permit) provides ratios of TP loading rates to TN and TSS by basin. These numbers could be utilized to estimate the associated nitrogen and sediment loading rates for each basin achieved through the purchase of certified nutrient credits. However, it should be noted that the ratio of TP to other POCs is based on “All Land Uses” in the 2009 progress run. As an alternate to Table 4 from the Permit, if VDOT’s ROW acreages (regulated pervious and impervious) are assessed by basin, and those loads are used with the published tables for the EOS loading by basin, the following equivalencies in Table 21 can be drawn.

Table 20. Ratios of TP Loading Rate to TN and TSS for VDOT MS4 ROW Land Cover

Major River Basin	TP	TN	TSS
James	1.0	6.6	357.6
Potomac	1.0	12.1	687.5
Rappahannock	1.0	7.7	279.8
York	1.0	6.3	278.9

The difference in these ratios are due to the distinct differences in the composition of VDOT’s right-of-way, relative to the overall land use composition of the entire river basin used in the 2009 progress run.

VDOT will purchase 9 TP credits (and the associated TN and TSS equivalents noted in Table 21) in the York River Basin, if necessary, and has purchased 10 TP credits (and the associated TN and TSS equivalents noted in Table 21) in the James River Basin to assist in achieving nutrient reductions. Reductions for nutrient credits in relation to the required 5% reduction have been summarized by basin in tables 22 through 25 of Section 5.2.

5.1.10 Structural Enhancements and Retrofits

VDOT has a significant asset base of existing structural BMPs, mainly detention and extended detention facilities, commonly referred to in VDOT as “dry ponds.” There are opportunities at many of these dry ponds for functional enhancements or retrofits for which VDOT could increase the amount of nutrient and sediment removal achieved by the BMP. Examples which VDOT may consider include, but are not limited to: BMP conversions; BMP enhancements to improve design elements such as storage volume, residence time, or circuit pathway; and BMP rehabilitations such as sediment cleanouts greater than 10% of the storage volume; major vegetative harvesting; and filter media enhancements.

The costs of structural BMP retrofits and enhancements will vary widely depending on the complexity of the BMP and proposed modifications. Currently, VDOT is reviewing BMP retrofits on a screening level to identify suitable candidate sites for prioritization and cost effectiveness. VDOT will report any BMP retrofits as they occur in the appropriate MS4 Annual Report for TMDL Credit.

5.1.11 Incidental Retrofits

Typically when required to install stormwater management facilities, VDOT will primarily design for and consider drainage and land use only within the project right-of-way (ROW) and permanent easements for water quality compliance purposes. Although this is typical practice, VDOT stormwater facilities at times do accept runoff from adjacent upland areas not within the VDOT ROW (offsite areas). The treatment provided to these offsite areas is usually not accounted for or reported; however in light of the requirements of the Chesapeake Bay TMDL, VDOT intends to track these “incidental retrofits” and report them as a conservative reduction. Any projects that do report off-site treatment for VSMP compliance will not be reported for CB purposes.

VDOT will report any incidental retrofits that qualify for nutrient and sediment load reductions in the appropriate MS4 Annual Report for Chesapeake Bay TMDL credit.

5.2 Summary of Proposed BMPs per River Basin

Utilizing all the information collected and reviewed in Section 5.1, VDOT projected the implementation of each BMP type in the four River Basins, as shown in Tables 22 through 25. When implementation of the BMPs results in reductions beyond the required 5%, VDOT intends to apply the additional reductions in the subsequent permit cycles.

5.2.1 James River Basin BMP Projections

For the James River Basin, the BMPs in Table 22 are anticipated to meet the requirements of the 2013 MS4 General Permit Chesapeake Bay TMDL Special Condition.

Table 21. Proposed BMPs to Achieve Required Reductions in the James River Basin

BMP Type	Potential Nitrogen Removal (lbs/yr)	Potential Phosphorus Removal (lbs/yr)	Potential TSS Removal (lbs/yr)
<i>Reductions have been achieved at the time the Action Plan was developed. Credits will be reported to DEQ in the annual report.</i>			
Historical BMPs	22	3	3,538
<i>Reductions are a combination of existing and future BMPs</i>			
Redevelopment	25	3	3,288
<i>Future reductions are anticipated in subsequent years of this permit cycle</i>			
Stream Restoration and Stabilization	387	350	231,312
Outfall and Channel Stabilization	27	25	16,381
Street Sweeping and Catch Basin Clean-Out	369	56	20,000
<i>BMPs that may be implemented in subsequent years, but not currently projected to assist with required reductions.</i>			
Forest Buffers	0	0	0
Land Cover Conversion	0	0	0
Outfall and Channel Stabilization	0	0	0
Nutrient Credits	66	10	35,760
Incidental Retrofits	0	0	0
Structural Enhancements and Retrofits	0	0	0
Total	896 (100%)	447 (180%)	310,279 (269%)

5.2.2 Potomac River Basin BMP Projections

For the Potomac River Basin, the BMPs in Table 23 are anticipated to meet the requirements of the 2013 MS4 General Permit Chesapeake Bay TMDL Special Condition.

Table 22. Proposed BMPs to Achieve Required Reductions in the Potomac River Basin

BMP Type	Potential Nitrogen Removal (lbs/yr)	Potential Phosphorus Removal (lbs/yr)	Potential TSS Removal (lbs/yr)
<i>Reductions have been achieved at the time the Action Plan was developed. Credits will be reported to DEQ in the annual report.</i>			
Historical BMPs	569	45	90,783
<i>Reductions are a combination of existing and future BMPs</i>			
Redevelopment	1,970	167	347,856
<i>Future reductions are anticipated in subsequent years of this permit cycle</i>			
Stream Restoration and Stabilization	26	24	15,528
Forest Buffers	15	1	506
Land Cover Conversion	72	4	1,330
Outfall and Channel Stabilization	2	2	1,481
Street Sweeping and Catch Basin Clean-Out	1,400	116	80,000
<i>BMPs that may be implemented in subsequent years, but not currently projected to assist with required reductions.</i>			
Outfall and Channel Stabilization	0	0	0
Nutrient Credits	0	0	0
Incidental Retrofits	0	0	0
Structural Enhancements and Retrofits	0	0	0
Shoreline Erosion Control	0	0	0
Total	4,054 (169%)	359 (100%)	537,484 (170%)

5.2.3 Rappahannock River Basin BMP Projections

For the Rappahannock River Basin, the BMPs in Table 24 are anticipated to meet the requirements of the 2013 MS4 General Permit Chesapeake Bay TMDL Special Condition.

Table 23. Proposed BMPs to Achieve Required Reductions in the Rappahannock River Basin

BMP Type	Potential Nitrogen Removal (lbs/yr)	Potential Phosphorus Removal (lbs/yr)	Potential TSS Removal (lbs/yr)
<i>Reductions are a combination of existing and future BMPs</i>			
Redevelopment	10	1	747
<i>Future reductions are anticipated in subsequent years of this permit cycle</i>			
Stream Restoration and Stabilization	106	96	63,371
Outfall and Channel Stabilization	5	4	2,827
<i>BMPs that may be implemented in subsequent years, but not currently projected to assist with required reductions.</i>			
Historical BMPs	0	0	0
Forest Buffers	0	0	0
Land Cover Conversion	0	0	0
Street Sweeping and Catch Basin Clean-Out	0	0	0

Nutrient Credits	0	0	0
Incidental Retrofits	0	0	0
Structural Enhancements and Retrofits	0	0	0
Total	121 (104%)	101 (374%)	66,945 (678%)

5.2.4 York River Basin BMP Projections

For the York River Basin, the BMPs in Table 25 are anticipated to meet the requirements of the 2013 MS4 General Permit Chesapeake Bay TMDL Special Condition.

Table 24. Proposed BMPs to Achieve Required Reductions in the York River Basin

BMP Type	Potential Nitrogen Removal (lbs/yr)	Potential Phosphorus Removal (lbs/yr)	Potential TSS Removal (lbs/yr)
<i>Reductions have been achieved at the time the Action Plan was developed. Credits will be reported to DEQ in the annual report.</i>			
Historical BMPs	55	9	2,631
<i>Reductions are a combination of existing and future BMPs</i>			
Redevelopment	69	10	7,950
<i>Future reductions are anticipated in subsequent years of this permit cycle</i>			
Nutrient Credits	57	9	2,510
Outfall and Channel Stabilization	8	7	4,847
<i>BMPs that may be implemented in subsequent years, but not currently projected to assist with required reductions.</i>			
Stream Restoration and Stabilization	0	0	0
Forest Buffers	0	0	0
Land Cover Conversion	0	0	0
Street Sweeping and Catch Basin Clean-Out	0	0	0
Incidental Retrofits	0	0	0
Structural Enhancements and Retrofits	0	0	0
Total	189 (158%)	35 (100%)	17,938 (140%)

5.3 Schedule and Annual Reporting

VDOT will implement all BMPs necessary to achieve the 5% reduction by June 30, 2018. For all BMPs that are implemented to meet the Special Condition, VDOT will annually report the BMP information in accordance with Section I.C.4 of the MS4 General Permit to demonstrate adequate progress is being made. VDOT will identify which BMPs were implemented to meet the Special Condition to distinguish from those BMPs that were installed to satisfy the technical criteria of the VSMP regulations. VDOT intends to establish a standing quarterly meeting with DEQ personnel to discuss BMPs that have been recently implemented and/or are targeted for implementation during the applicable quarter.

VDOT will estimate the TMDL credit using the information presented in this Action Plan and within the intent of DEQ Guidance Memorandum #15-2005. VDOT will maintain the applicable calculations for the BMPs that are implemented and reported to DEQ.

6.0 MEANS AND METHODS TO OFFSET INCREASED LOADS FROM NEW SOURCES INITIATING CONSTRUCTION BETWEEN JULY 1, 2009 AND JUNE 30, 2014

(General Permit Section I.C.2.a.(7)) - The means and methods to offset the increased loads from new sources initiating construction between July 1, 2009, and June 30, 2014, that disturb one acre or greater as a result of the utilization of an average land cover condition greater than 16% impervious cover for the design of post-development stormwater management facilities.

In accordance with VDOT's ESC and SWM Standards and Specifications, construction projects that were initiated between July 1, 2009 and June 30, 2014, were required to utilize an average impervious land cover condition of 16% for the design of post-construction stormwater management plan.

As such, there are no new sources that would require load reductions according to this Special Condition requirement of the MS4 General Permit.

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7.0 MEANS AND METHODS TO OFFSET INCREASED LOADS FROM GRANDFATHERED PROJECTS

(General Permit Section I.C.2.a.(8)) – The means and methods to offset the increased loads from projects as grandfathered in accordance with 9VAC25-870-48, that disturb one acre or greater that begin construction after July 1, 2014, where the project utilizes an average land cover condition greater than 16% impervious cover in the design of post-development stormwater management facilities. The operator shall utilize Table 4 in this section to develop the equivalent pollutant load for nitrogen and total suspended solids.

In accordance with VDOT's ESC and SWM Standards and Specifications, construction projects that are grandfathered are required to utilize an average impervious land cover condition of 16% for the design of post-construction stormwater management plan.

As such, there are no new sources that would require load reductions according to this Special Condition requirement of the MS4 General Permit.

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8.0 A LIST OF FUTURE PROJECTS THAT QUALIFY AS GRANDFATHERED

(General Permit Section I.C.2.a.(10)) – A list of future projects and associated acreage that qualify as grandfathered in accordance with 9VAC25-870-48

VDOT established criteria to identify if a VDOT project would be considered grandfathered thus allowing the utilization of Part IIC technical criteria of the VSMP regulations. For a VDOT project or activity to be grandfathered it must fall into one of the following two categories:

1. Project specific bonds must have been issued prior to July 1, 2012.
 - Projects or activities meeting this requirement may be grandfathered indefinitely.
2. Funding (PE, RW or Construction) must have been allocated to the project or activity prior to July 1, 2012 (e.g., allocation in SYIP in FY13 or prior) and construction activity on the project must physically begin prior to July 1, 2019.

While the SYIP for FY13 is reviewable on VDOT's website, it is difficult to establish a list of projects that may qualify for grandfathering. There are several cases, where projects might meet one of the two criteria, but VDOT will opt to utilize the Part IIB technical criteria of the VSMP regulations. A few examples are presented below:

- Typically, for Design/Bid/Build (D/B/B) projects, the beginning of construction activity (as defined herein) typically occurs within five to six months after advertisement. Therefore, those projects with an advertisement date of January 1, 2019 or after should not be considered a candidate for grandfathering.
- Likewise, for Design/Build (D/B) projects, beginning of construction activity (as defined herein) typically occurs within 18 months following issuance of a Request for Proposal (RFP). Therefore, those projects with an RFP issuance date of January 1, 2018 or after should not be considered a candidate for grandfathering.

9.0 ESTIMATE OF THE EXPECTED COST TO IMPLEMENT THE ACTION PLAN

(General Permit Section I.C.2.a.(11)) - An estimate of the expected costs to implement the requirements of this special condition during the state permit cycle;

The purpose of this section is to provide an estimate of the expected costs to implement the requirements of this Special Condition during the current MS4 General Permit cycle. Cost estimates are derived herein based on published sources or VDOT’s experience implementing similar practices. The costs outlined are a starting point for VDOT to refine the costs based on actual cost data derived from implemented projects. Note: the refined costs will be what VDOT uses to develop budgetary needs, and it may not necessarily match what is identified in this section. Costs for this permit cycle include costs already realized by VDOT, costs associated with construction, and costs associated with long-term life cycles of the BMPs.

As discussed in previous sections of this Plan, VDOT has already achieved portions of the 5% reduction requirements. Many of the already realized costs were associated with project implementation, tracking, and maintenance operations (e.g. accounting for existing BMPs, reductions associated with Construction General Permit (CGP) compliance for redevelopment, and other such projects). While it is difficult to quantify all of these efforts, the magnitude of total cost to date is likely associated with implementation of historical BMPs, reductions due to redevelopment, and the purchase of nutrient credits. Using a \$15,000 average cost per pound for phosphorus, VDOT estimated the cost for the credits associated with historical BMPs (57 lbs of P), previous redevelopment (40 lbs of P), and nutrient credits (10 lbs of P) to be approximately \$1,605,000.

The remaining costs to implement the proposed BMPs were estimated using expected construction costs and typical unit costs of phosphorus for the various BMPs types. The future cost to construct or implement the proposed BMPs is estimated to be \$3,000,000 to \$5,000,000 based on ±25% of the costs summarized in Table 26.

Table 25. Estimated Statewide Cost to Implement Proposed BMPs for TMDL Compliance

BMP Category	Unit Cost	Number of Units	Projected Implementation Cost for 5% Reductions
Stream Restoration and Stabilization	\$700/LF	2,850	\$1,995,000
Land Cover Conversion	\$15,000/acre	10	\$150,000
Forest Buffers	\$15,000/acre	1	\$15,000
Nutrient Credit Purchase	\$15,000/lb of TP	9	\$135,000
Outfall Stabilization	\$20,000/each	58	\$1,160,000
Street Sweeping and Catch Basin Cleanout	\$1,200/acre/yr	172	\$412,800 ¹
Data Management	\$100,000/each	1	\$100,000
TOTAL			\$3,967,800

1: Assume cost to implement street sweeping is two years of implementation through June 30, 2018.

In addition to the cost to construct or implement the BMPs described in this Action Plan, which were derived using typical unit costs for construction, there will be additional direct and indirect costs to VDOT for operation, maintenance, design, permitting, inspection, validation, tracking, etc. Total life cycle cost estimates can be estimated by adjusting the unit construction or implementation costs for structural BMP practices (stream restoration, outfall stabilization, etc.) to account for other project related costs as appropriate. These other costs may include plantings, mobilization, erosion and sediment control, and other ancillary project elements.

The life cycle costs for the proposed BMPs are estimated to be \$7,500,000 to \$12,500,000 based on ±25% of the costs summarized in Table 27.

Table 26. Total Life-Cycle Costs for BMPs Implemented Watershed-Wide for TMDL Compliance

BMP Category	Unit Cost	Number of Units	Projected Life Cycle Cost for 5% Reductions
Stream Restoration and Stabilization	\$1,600/LF	2,850	\$4,560,000
Land Cover Conversion	\$17,250/acre	10	\$172,500
Forest Buffers	\$17,250/acre	1	\$172,500
Nutrient Credit Purchase	\$15,000/lb of TP	9	\$135,000
Outfall Stabilization	\$32,000/each	58	\$1,856,000
Street Sweeping and Catch Basin Cleanout	\$1,200/acre/yr	172	\$2,476,000 ¹
Data Management	\$1,000,000/each	1	\$1,000,000
TOTAL			\$10,372,000

1: Assume Cost to implement street sweeping is twelve years of implementation through June 30, 2028.

The estimates shown above represent the cost for implementing BMPs to meet the pollutant reductions required by July 1, 2018 and projected resources for the long-term impact of meeting the 5% pollutant reductions. The estimates do not capture the cost to implement the numerous other components of VDOT’s MS4 Program, nor do the estimates capture the cost for planning, implementing, or maintaining the BMPs to meet 35% and 60% pollutant reductions that will be required for the future Chesapeake Bay TMDL requirements. The cost for these elements will be significant; however, providing an estimate of the future permit cycle costs is not required as a part of this TMDL Action Plan.

There are already some immediate efforts VDOT is undertaking or envisions taking to approach the future Chesapeake Bay TMDL requirements. For example, as discussed in Section 4.2, the available GIS data to determine land cover characteristics of the VDOT MS4 Service Area was not ideal, but it was necessary to move forward with the data that was readily available. VDOT anticipates revisiting the land cover and pollutant estimates at the time of reapplication for the next permit cycle if improved data or methodologies are presented. The resources necessary to conduct this revision and developing the Implementation Plan for future permit cycles are not captured in the cost estimates above, but it is noteworthy for future planning purposes as the funding required to implement in future permit cycles will likely be significant.

10.0 PUBLIC COMMENTS ON DRAFT ACTION PLAN

An opportunity for receipt and consideration of public comment regarding the draft Chesapeake Bay TMDL Action Plan.

VDOT has participated on many fronts to communicate the intent and approach of its MS4 Program including the development of the Chesapeake Bay TMDL Action Plan. To date, VDOT has met with the MS4s identified in Table 28 and discussed VDOT's approach for the Action Plan.

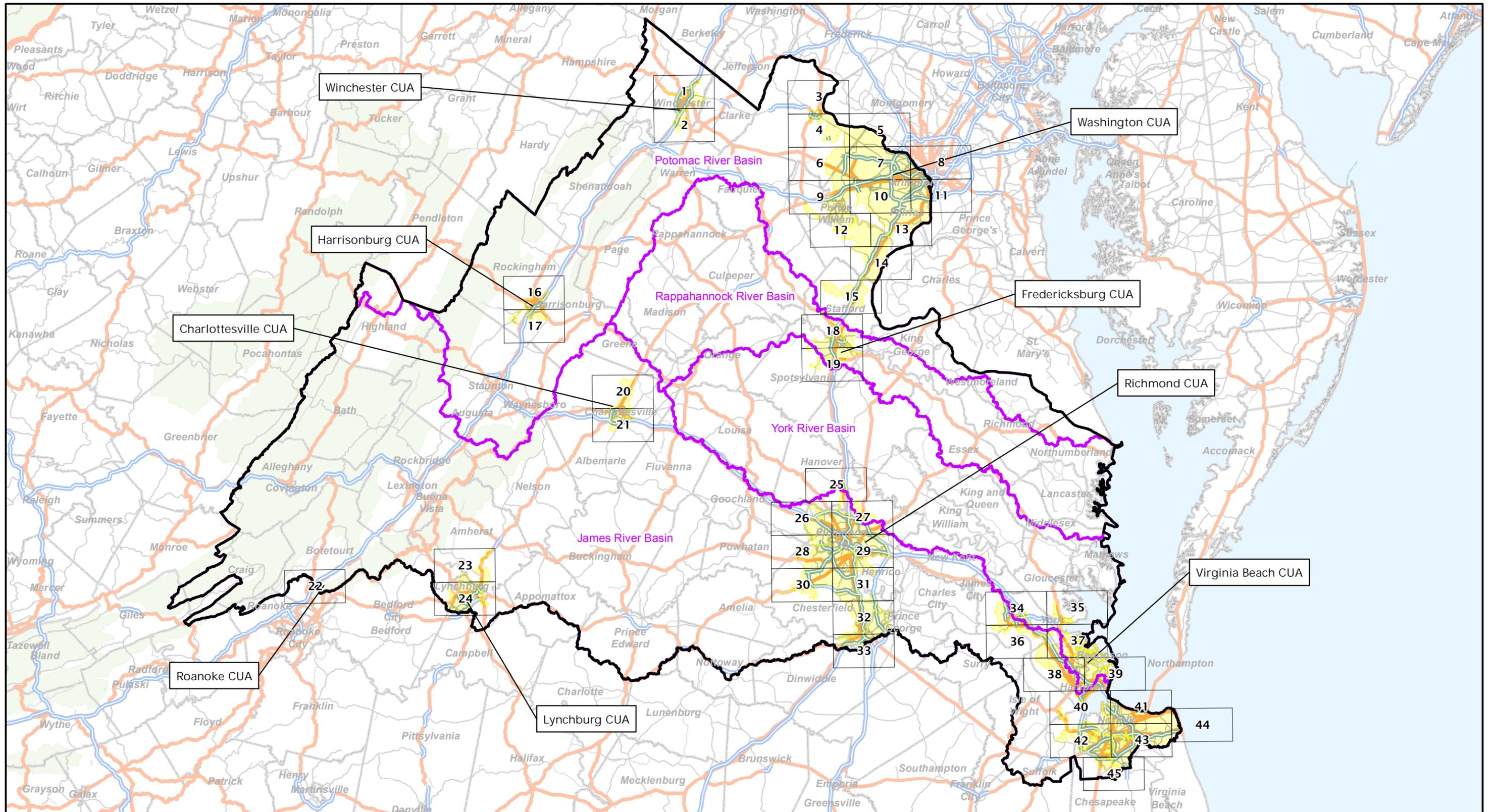
Table 27. Historical Meetings with Other MS4 Authorities

James City County	09/11/2015	Virginia Beach	1/7/2014
Staunton	5/6/2015	Chesterfield County	11/20/2013
Harrisonburg	5/6/2015	Fauquier County	11/19/2013
Ashland	3/18/2015	Loudoun	11/6/2013
Hanover	3/18/2015	Prince William	11/6/2013
Lynchburg	12/16/2014	Prince William Schools	9/20/2013
Central Virginia CC	12/16/2014	Leesburg	9/16/2013
Richmond	12/3/2014	Herndon	9/16/2013
JMU	10/3/2014	Manassas	9/13/2013
Chesapeake	4/15/2014	Arlington	7/22/2013
Hampton	4/15/2014	Fairfax (City)	7/22/2013
Williamsburg	2/28/2014	Vienna	7/16/2103
Newport News	2/14/2014	Alexandria	6/10/2013
Portsmouth	2/14/2014	GMU	5/29/2013
Albemarle County	2/7/2014	Fairfax County	5/29/2013
Henrico	1/13/2014	Stafford	5/20/2013
Norfolk	1/7/2014		

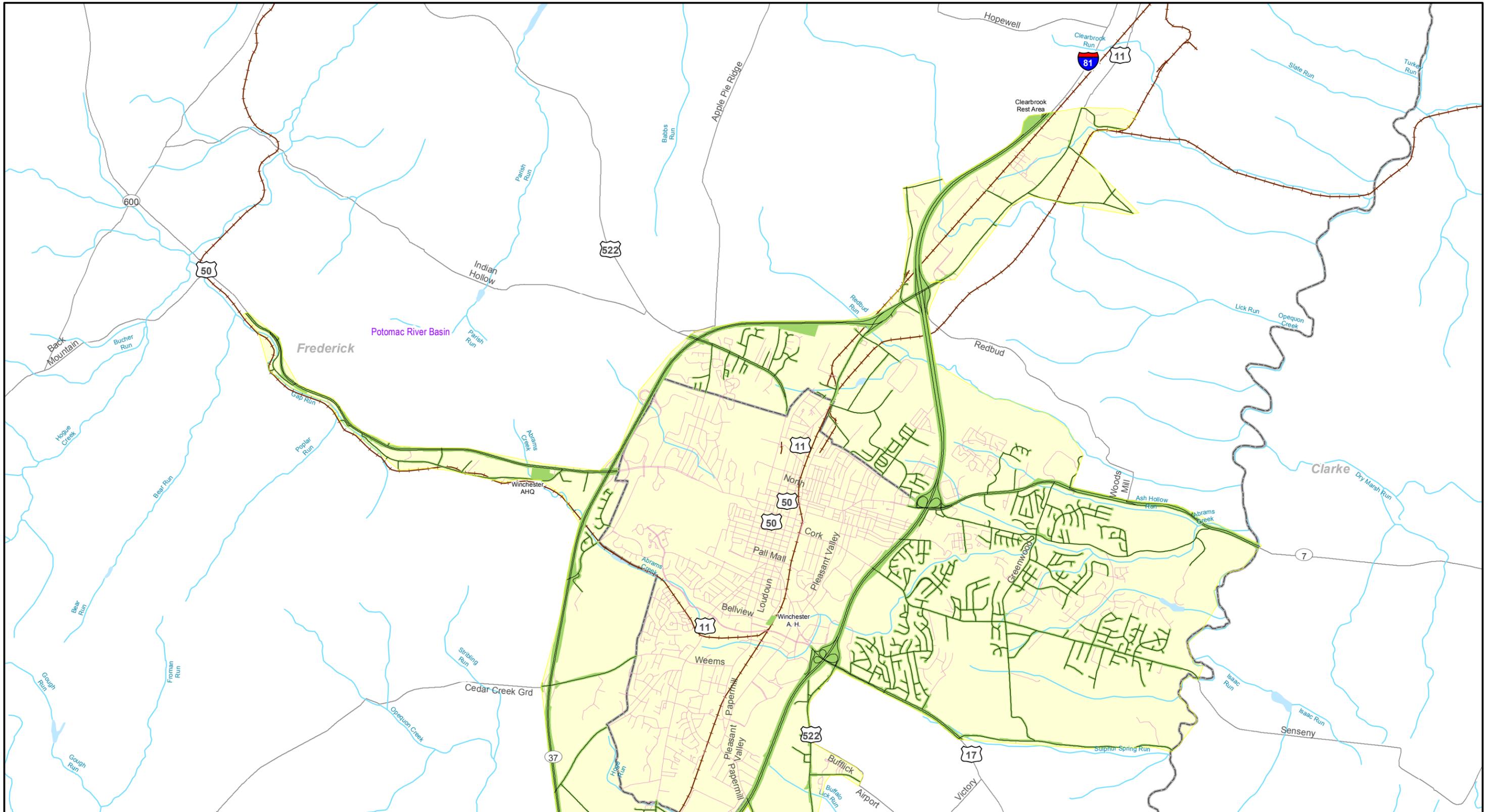
VDOT posted a copy of the draft Action Plan on its stormwater webpage from September 15 through September 30, 2015.

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Appendix A
Maps of VDOT MS4 Regulated Area



- Map Sheets
- 2000 Census Urbanized Area (CUA)
- Chesapeake Bay
- County/City Boundaries
- River Basins

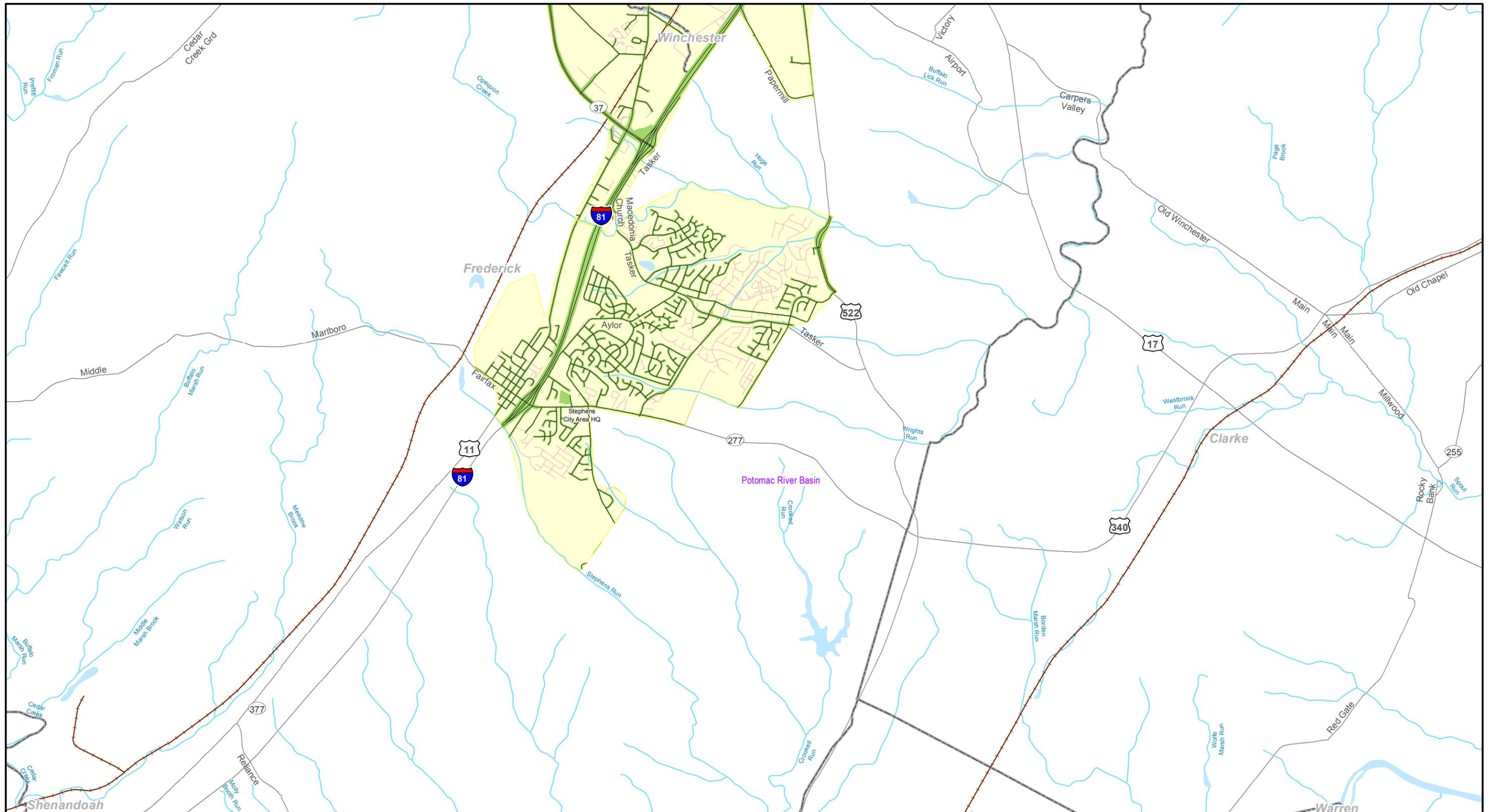


Projection: NAD 1983 Virginia Lambert

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| Chesapeake Bay | County/City Boundaries | Railroad Lines |
| River Basins | VDOT Maintained Roads within CUA | Rivers and Waterbodies |
| 2000 Census Urbanized Area (CUA) | Non-VDOT Maintained Roads within CUA | |
| VDOT Right of Way within CUA (VDOT's MS4 Regulated Area) | Roads Outside CUA | |

SHEET 1
WINCHESTER CUA
 CHESAPEAKE BAY TMDL ACTION PLAN

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 Sources: ESRI USA Basemap
 Prepared by Brian Brown, May 21, 2015

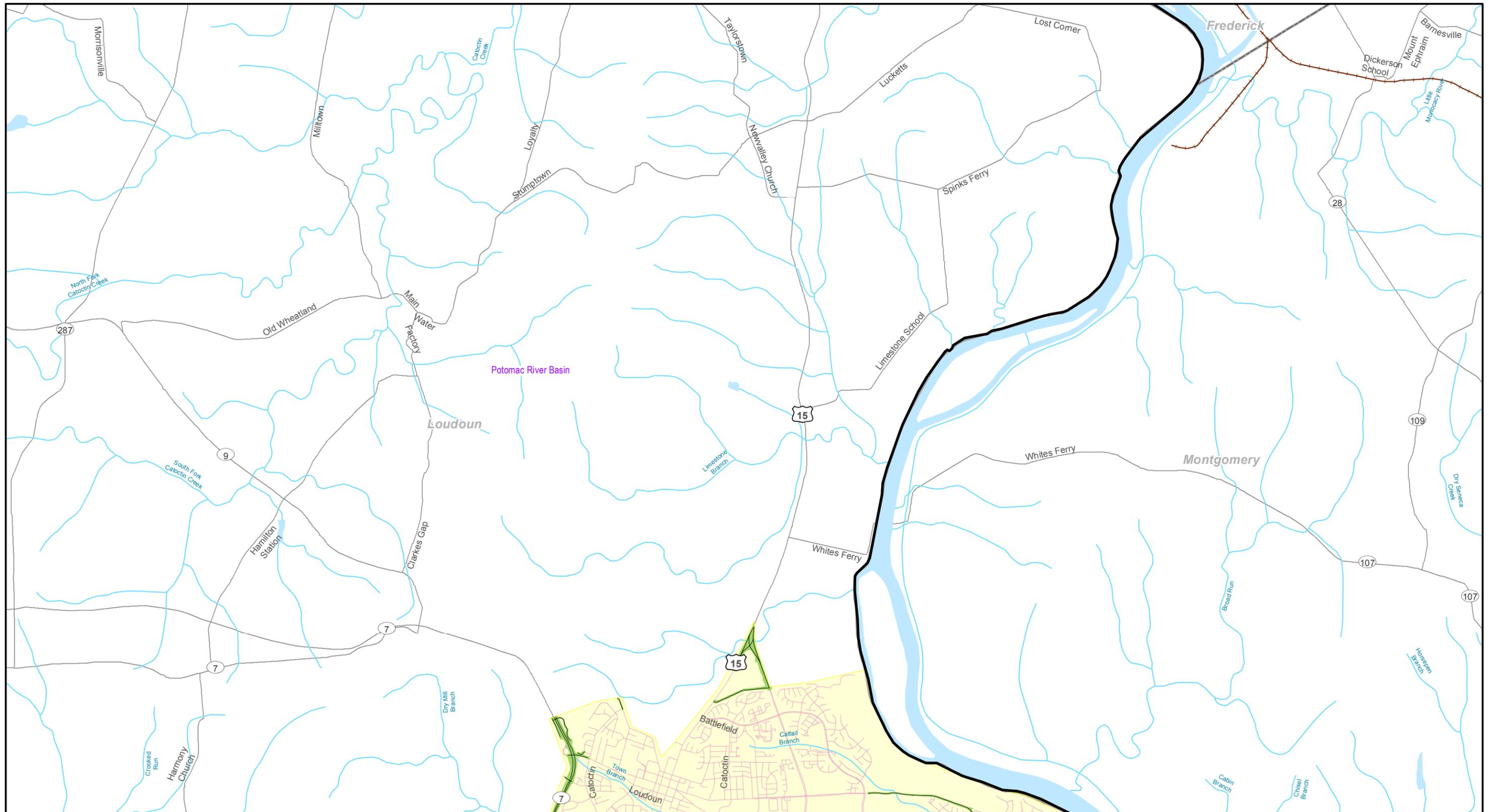


Projection: NAD 1983 Virginia Lambert

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 CHESAPEAKE BAY TMDL ACTION PLAN

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 Sources: ESRI USA Basemap
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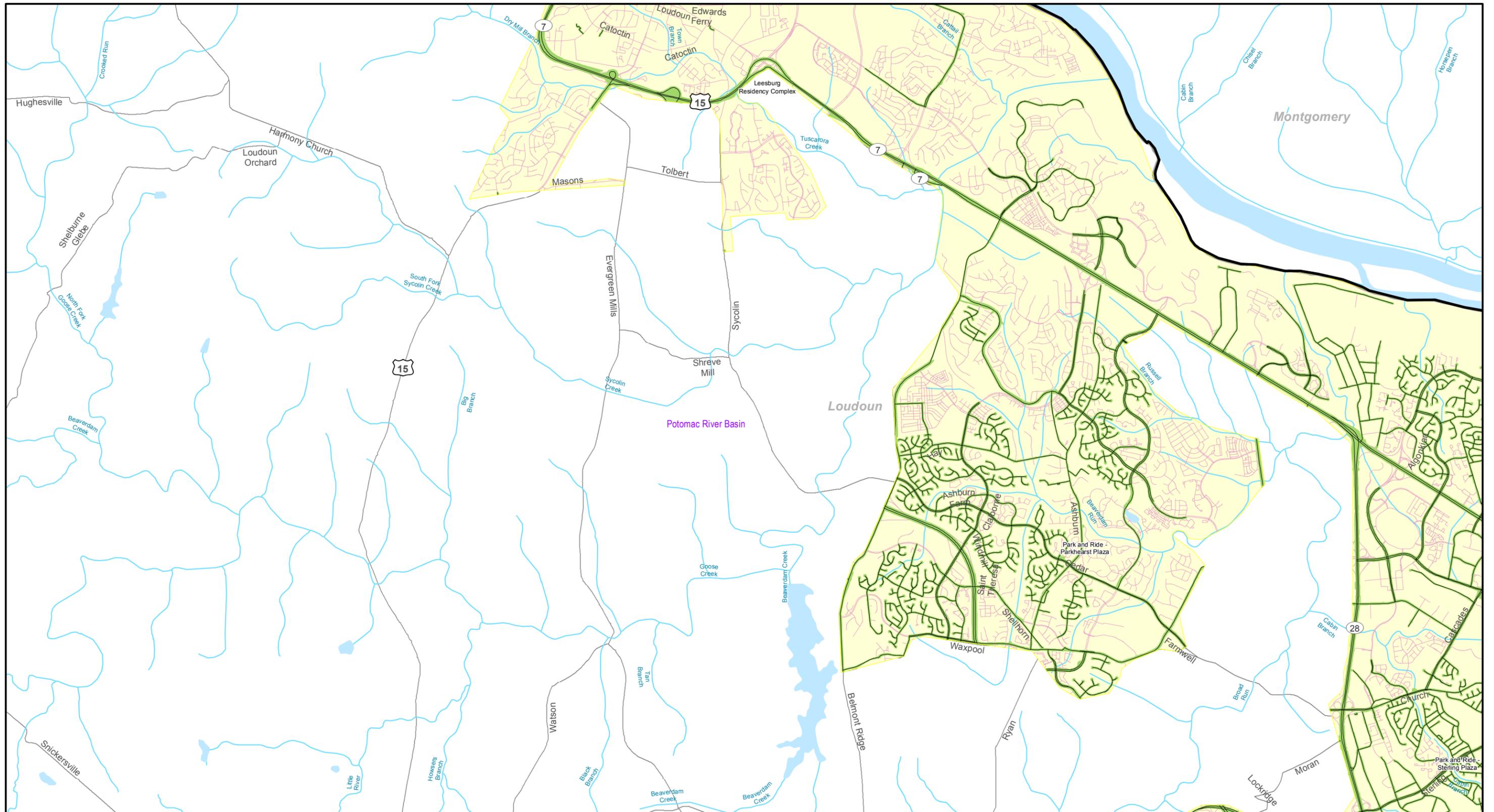


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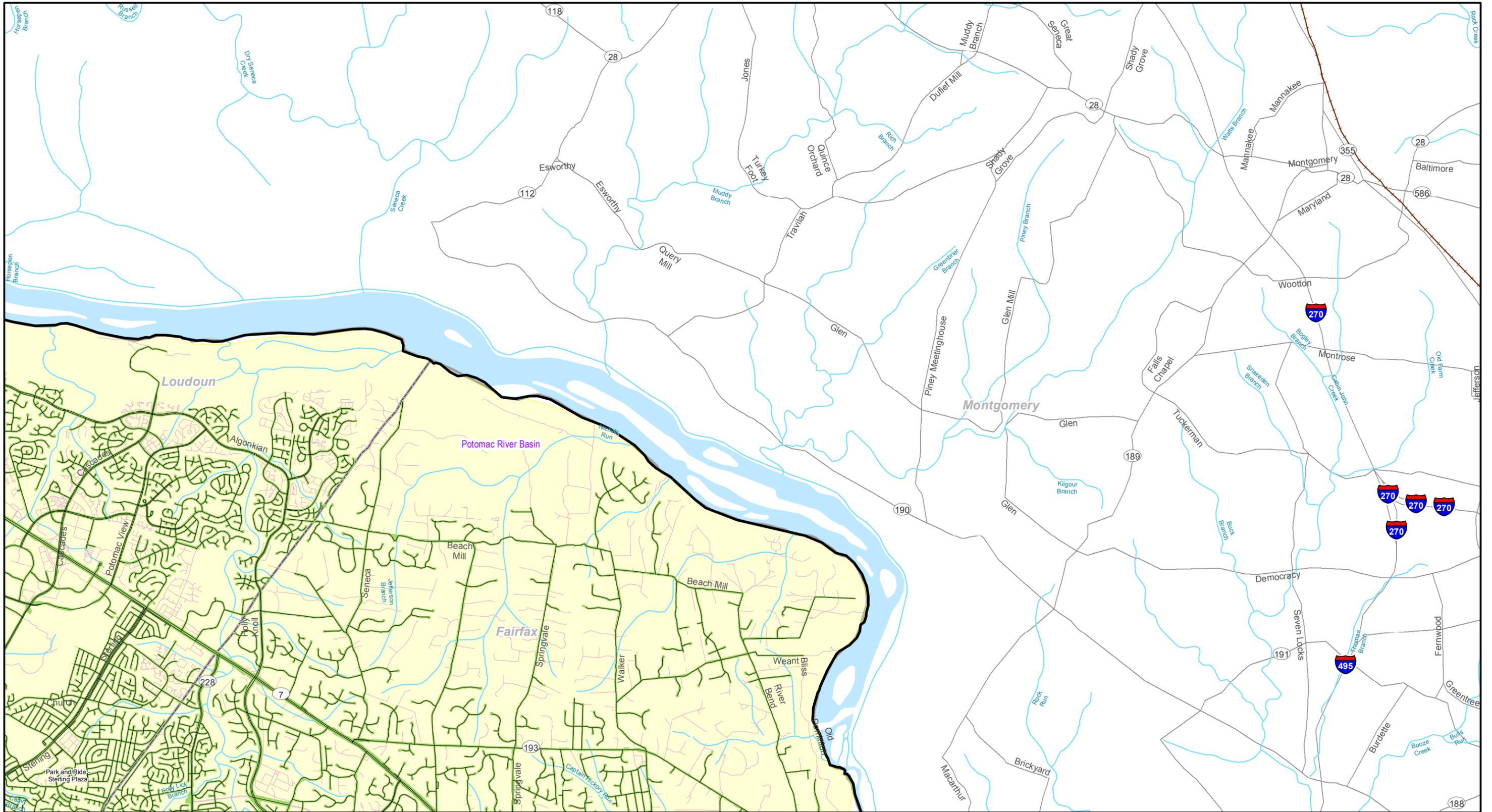
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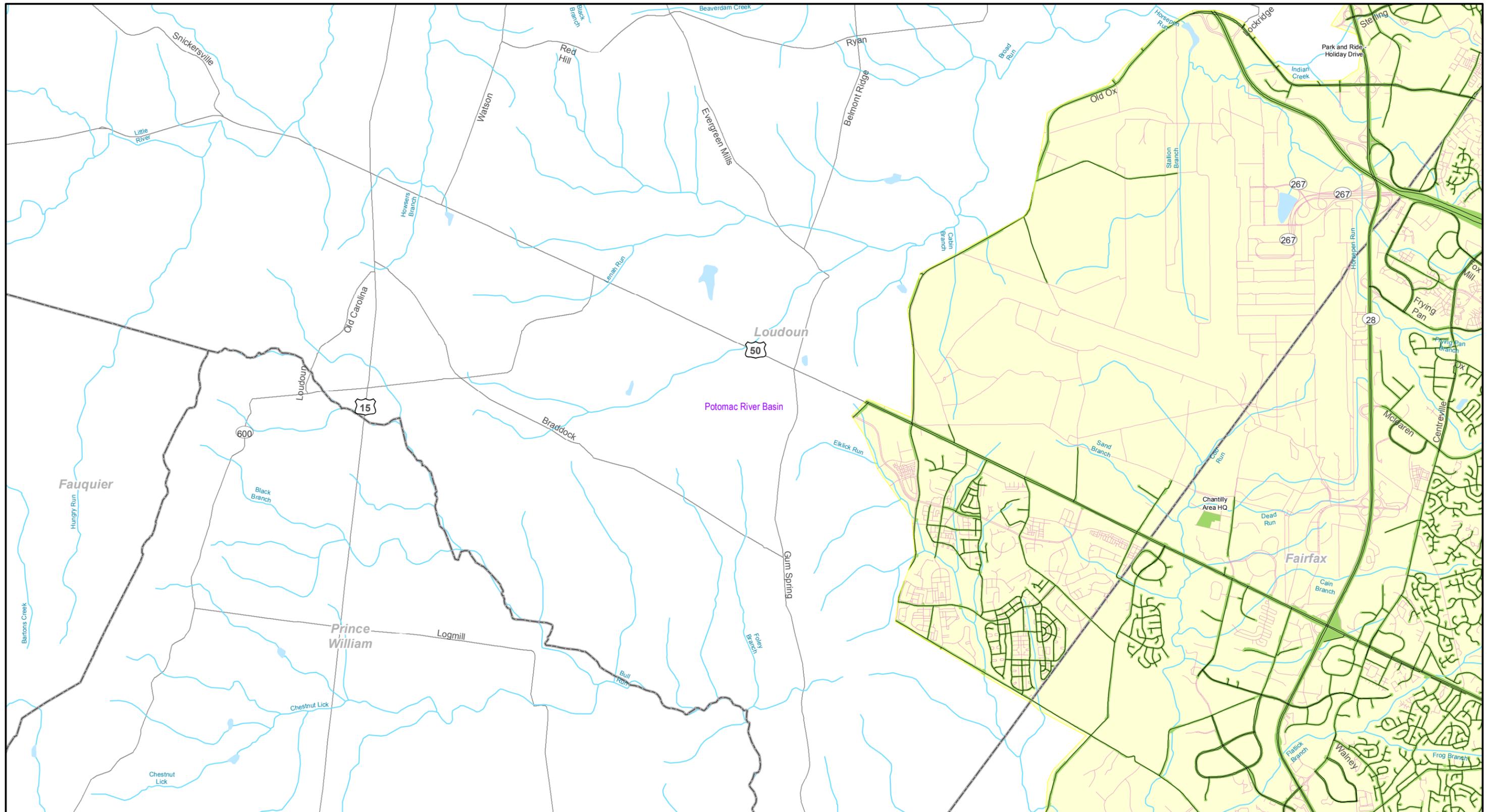
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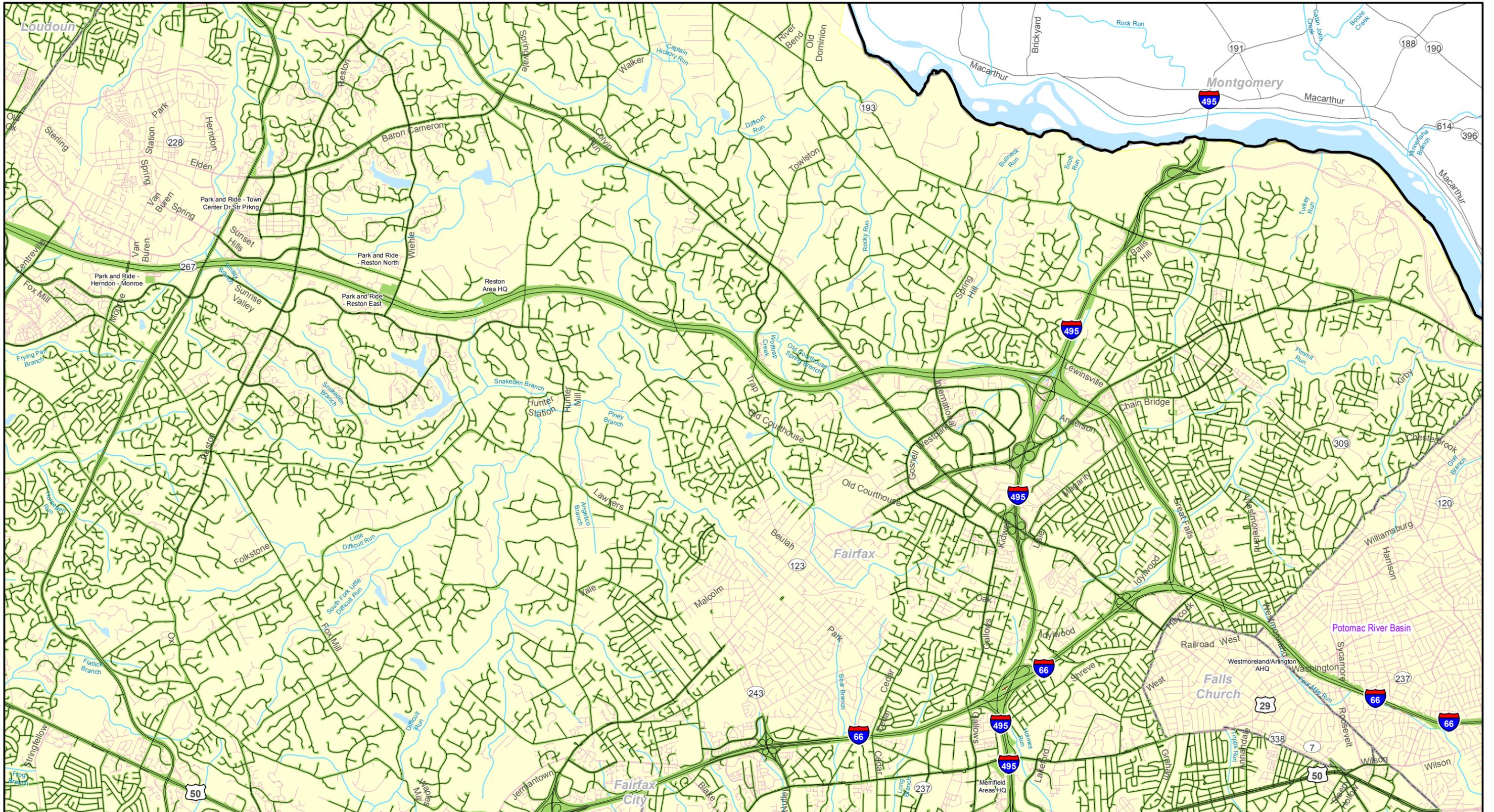
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 CHESAPEAKE BAY TMDL ACTION PLAN

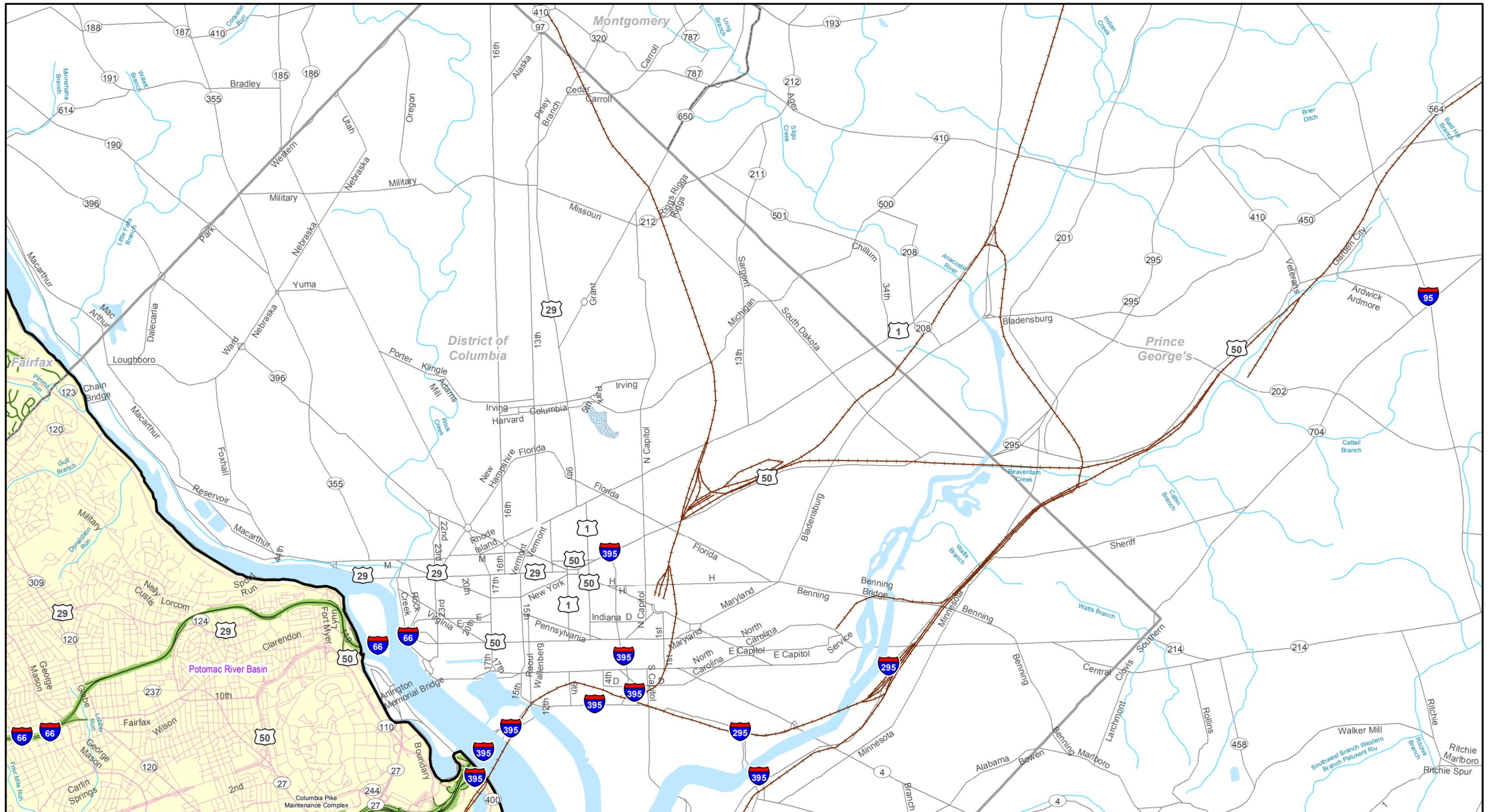
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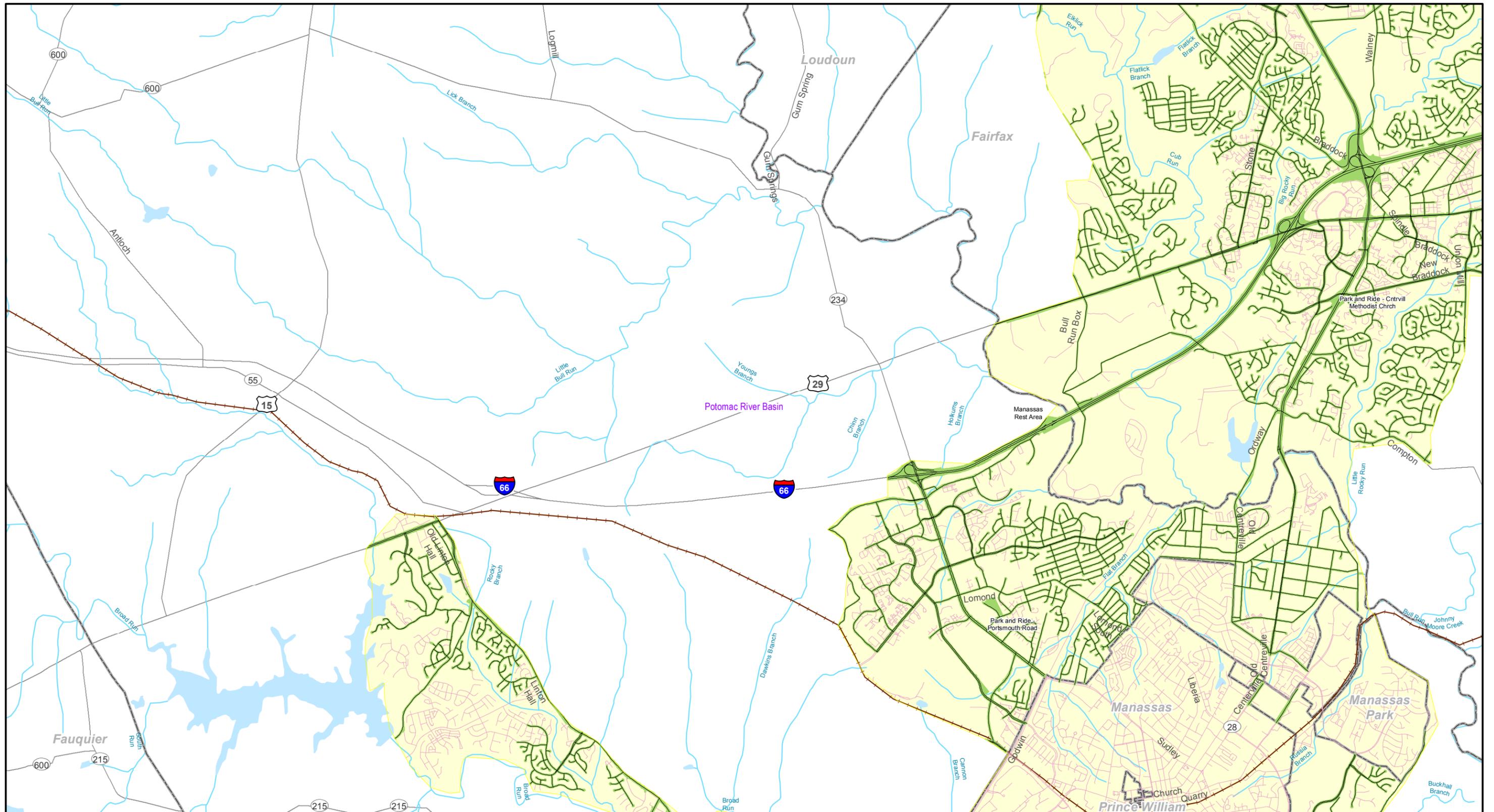
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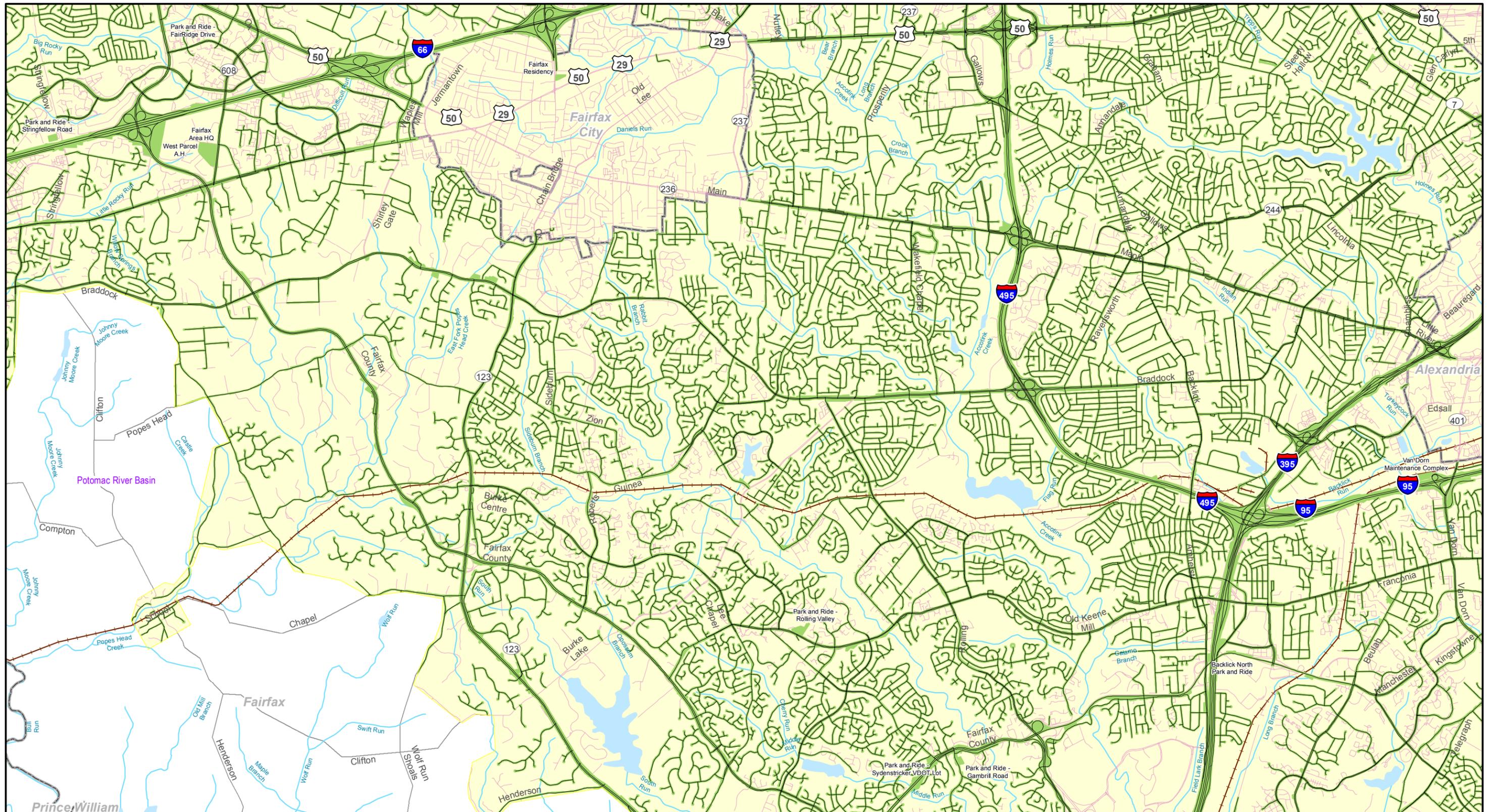
- Chesapeake Bay
- River Basins
- 2000 Census Urbanized Area (CUA)
- VDOT Right of Way within CUA (VDOT's MS4 Regulated Area)
- County/City Boundaries
- VDOT Maintained Roads within CUA
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- Roads Outside CUA
- Railroad Lines
- Rivers and Waterbodies

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 CHESAPEAKE BAY TMDL ACTION PLAN

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 Prepared by Brian Brown, May 21, 2015



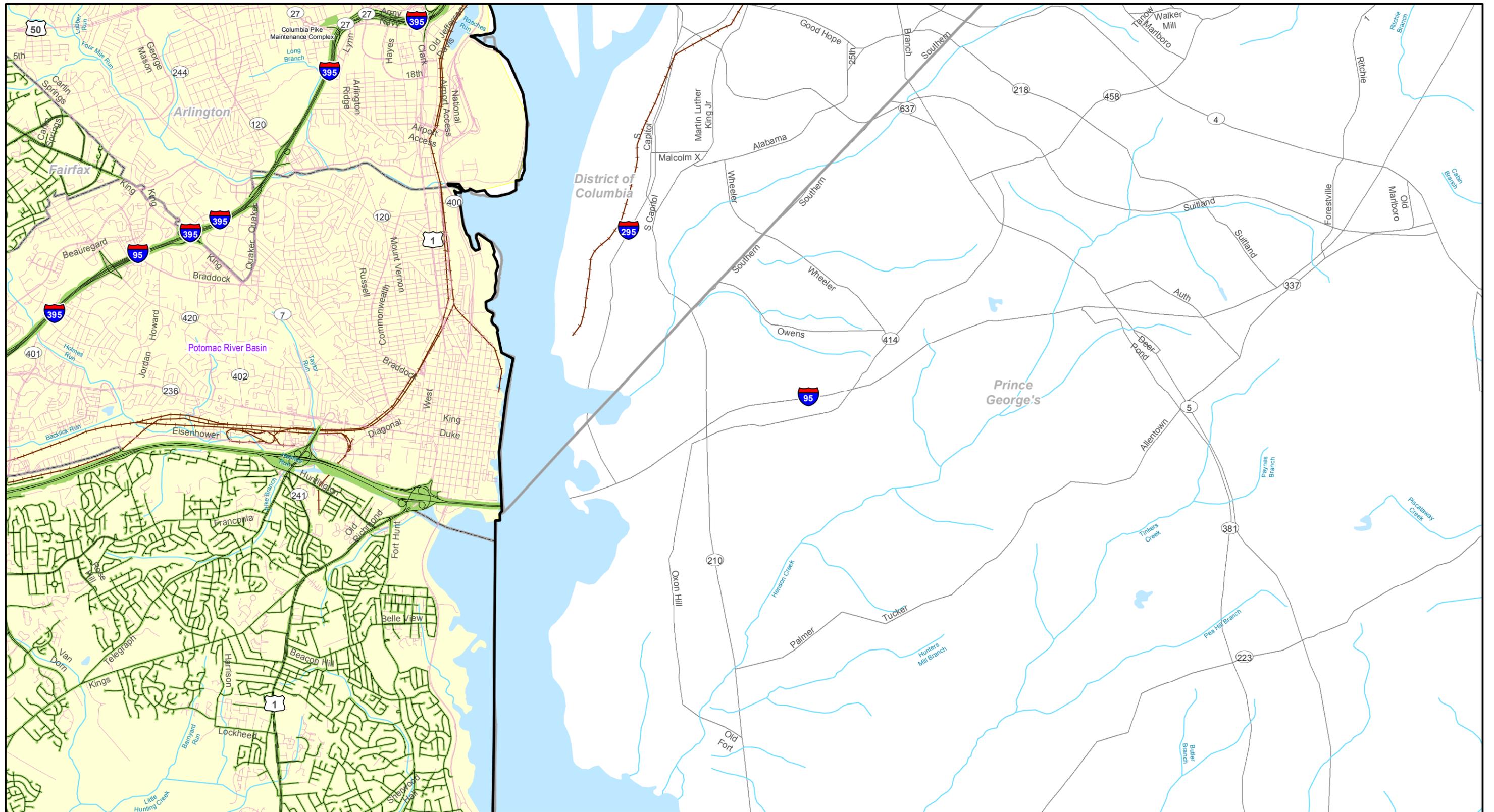
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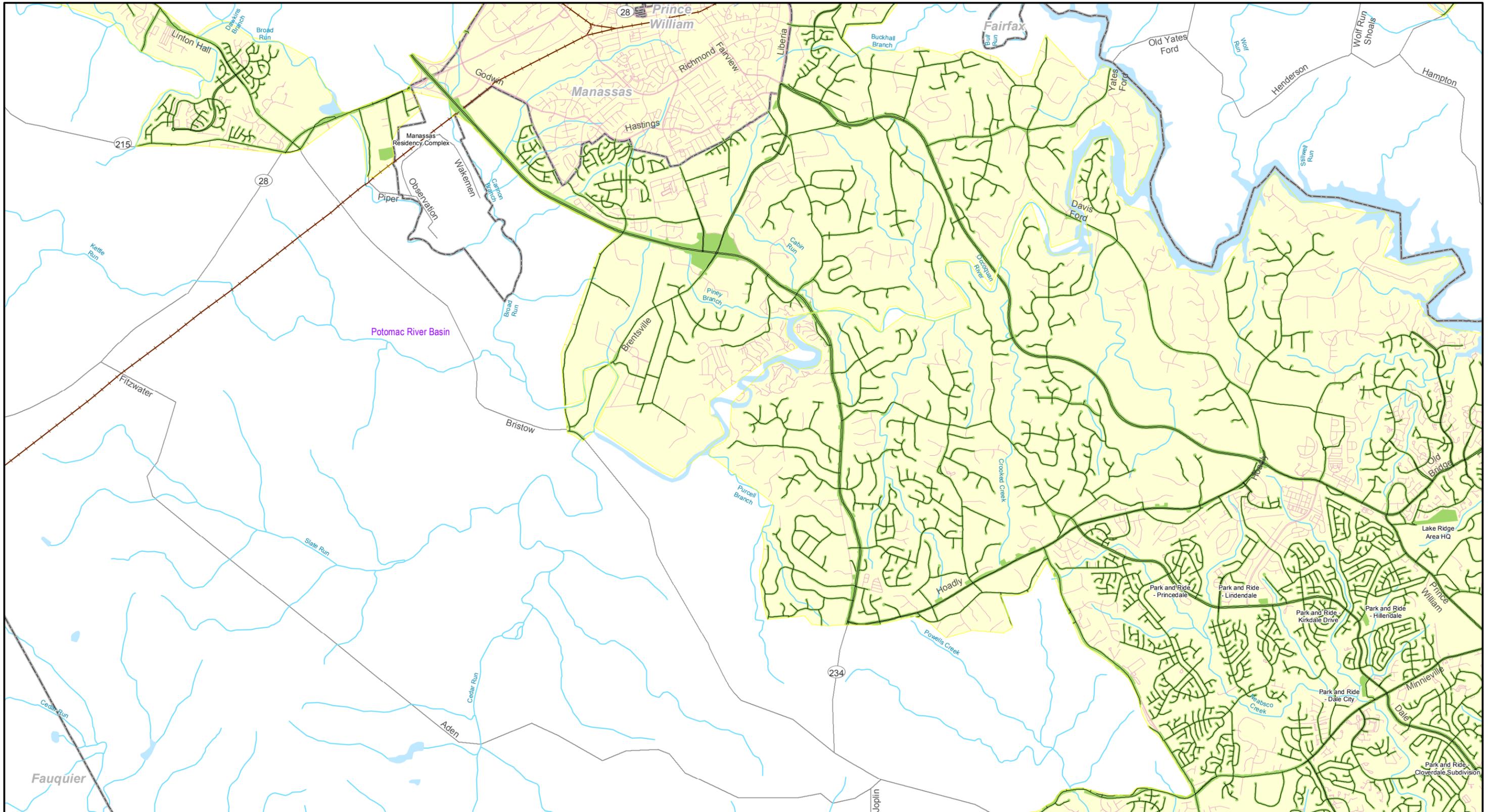
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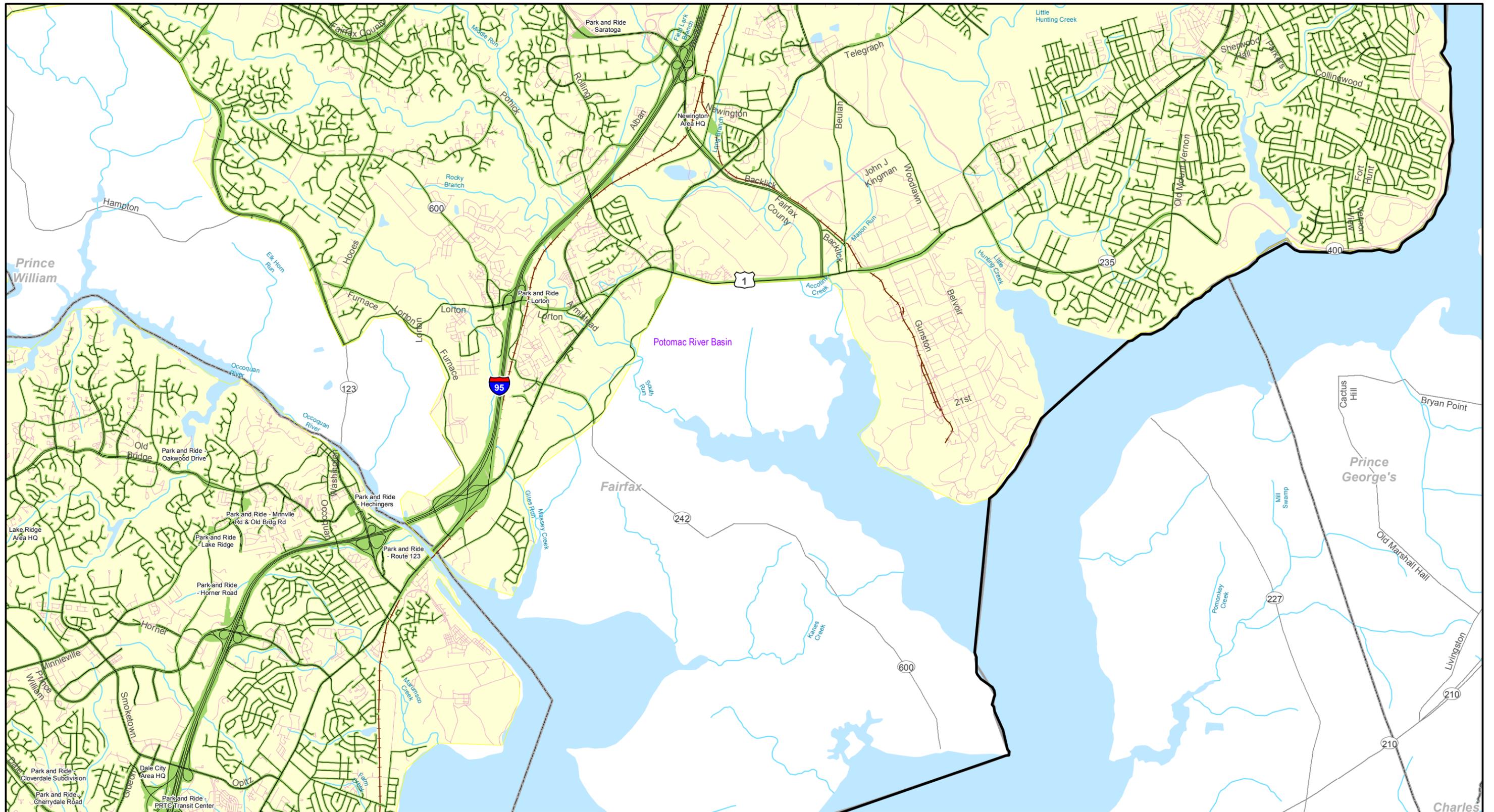
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Prepared by Brian Brown, May 21, 2015



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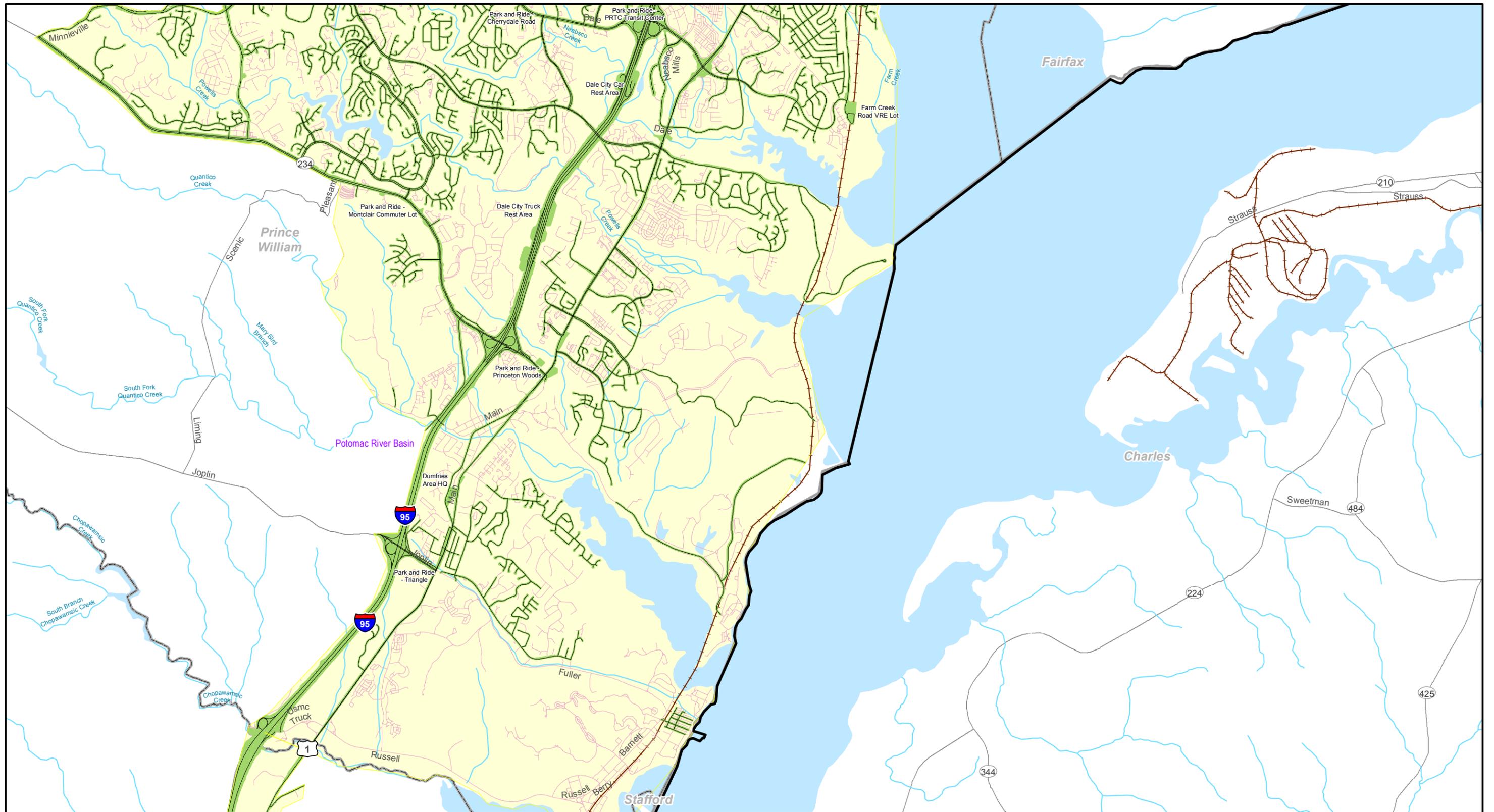
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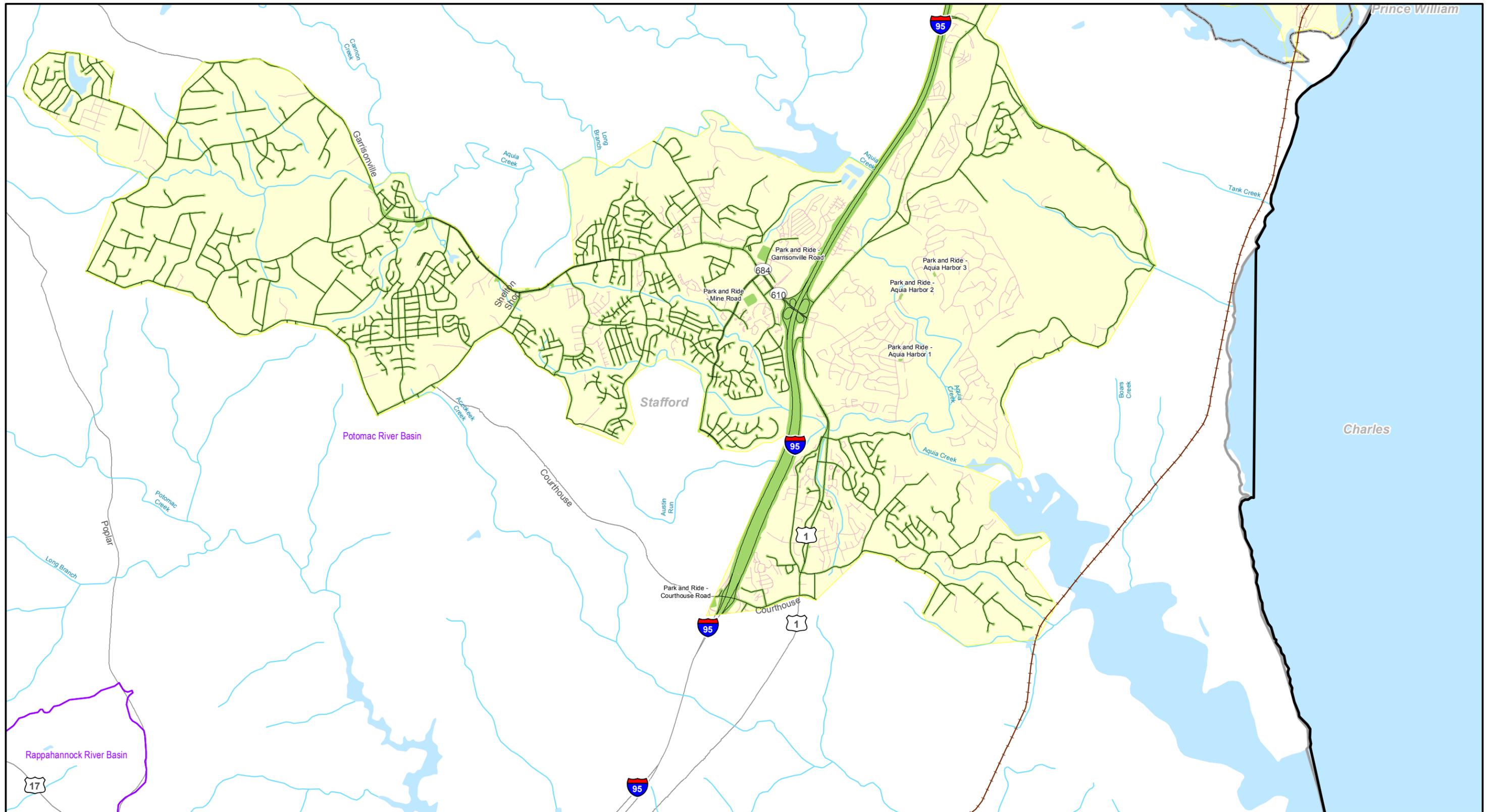
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SHEET 13
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 CHESAPEAKE BAY TMDL ACTION PLAN

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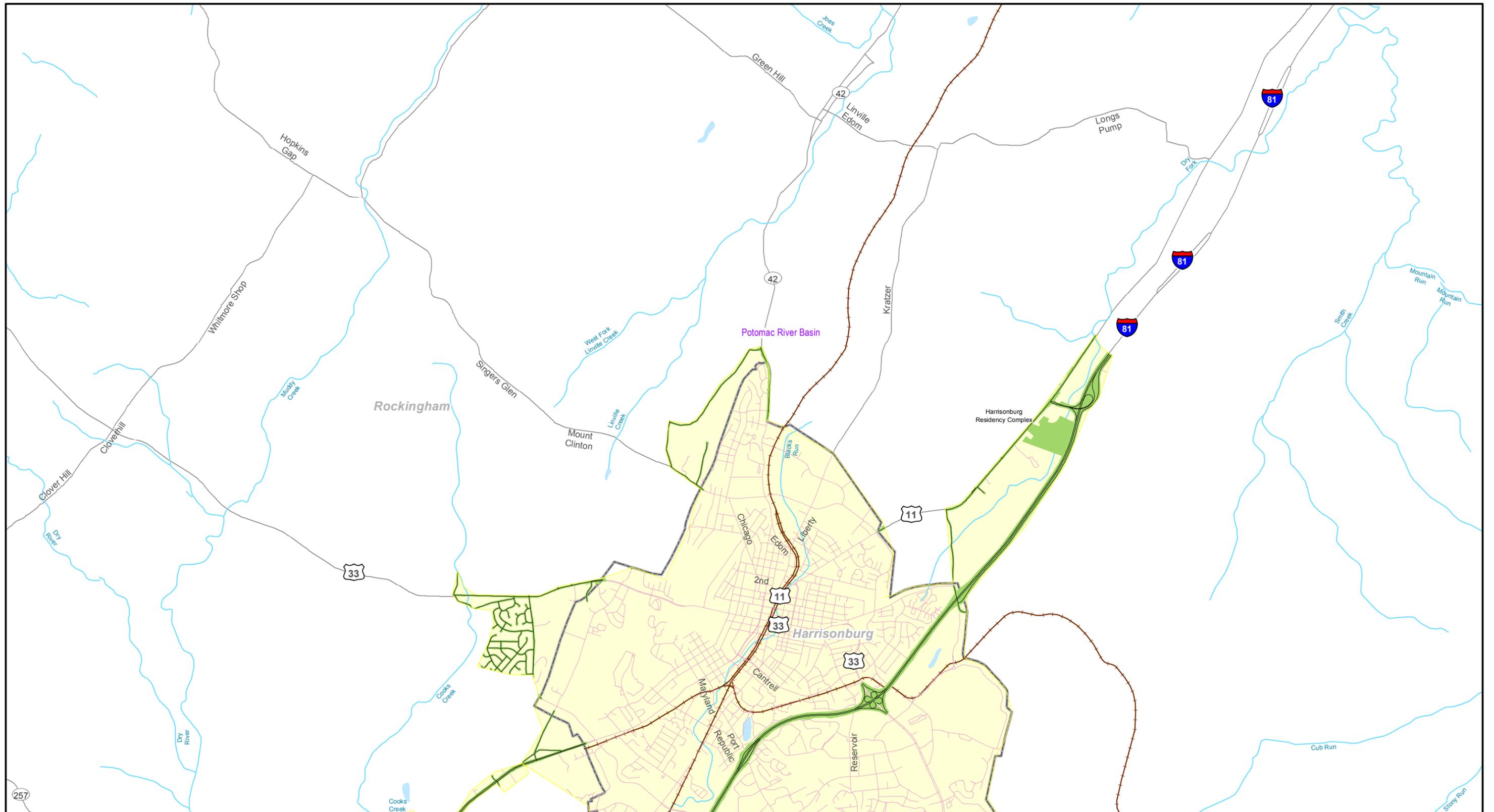


Projection: NAD 1983 Virginia Lambert

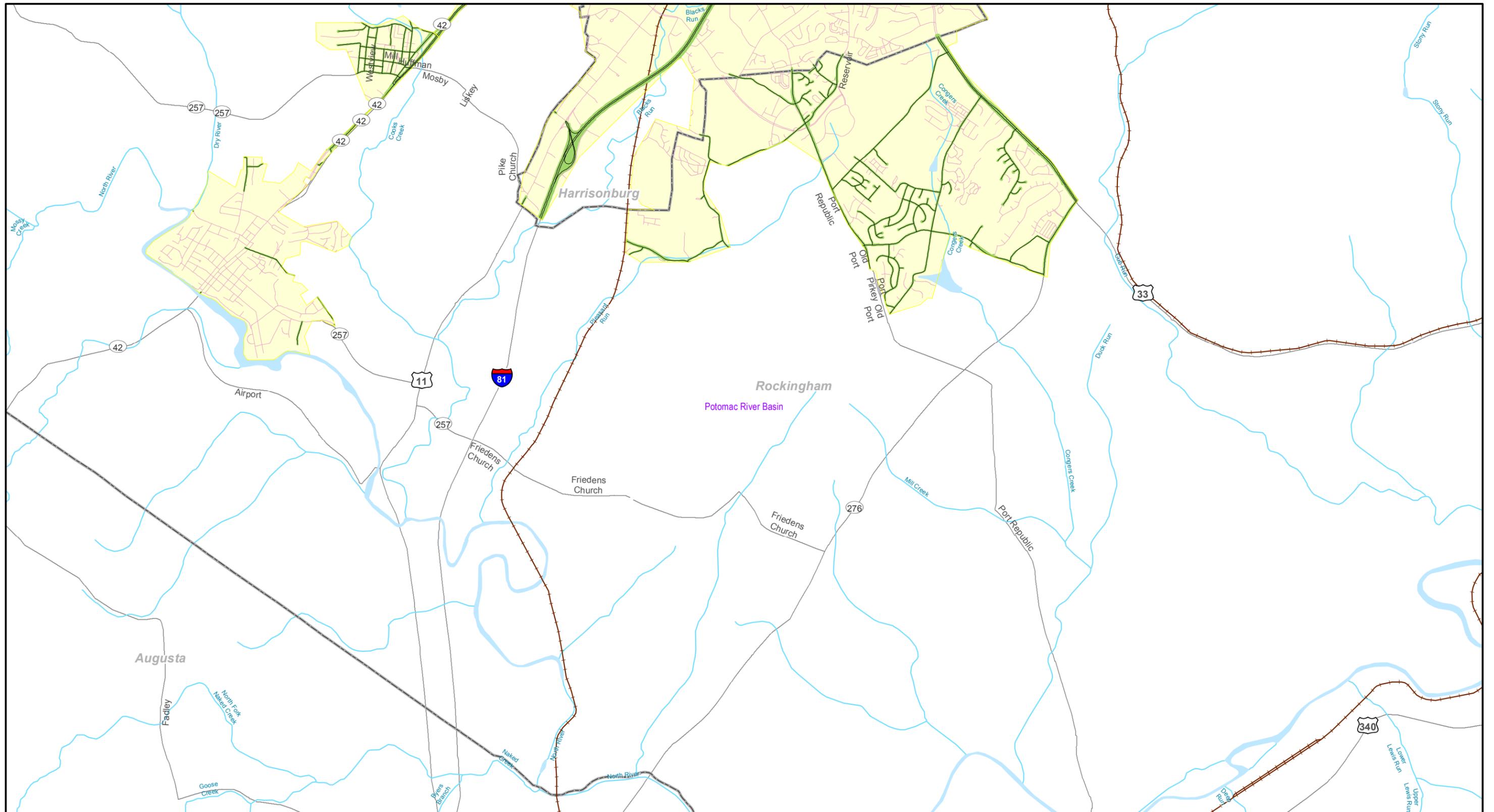
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SHEET 15
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 CHESAPEAKE BAY TMDL ACTION PLAN

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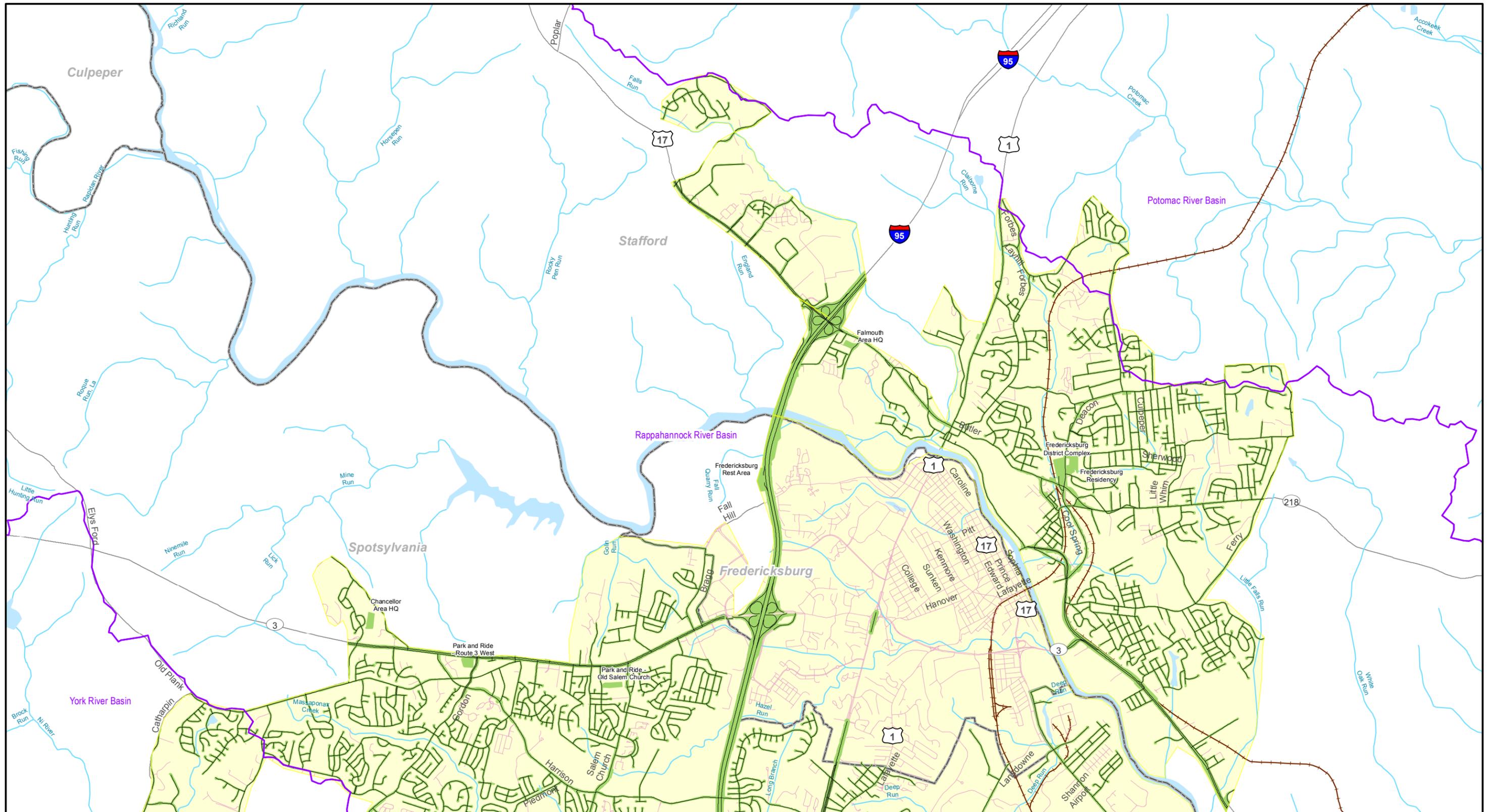


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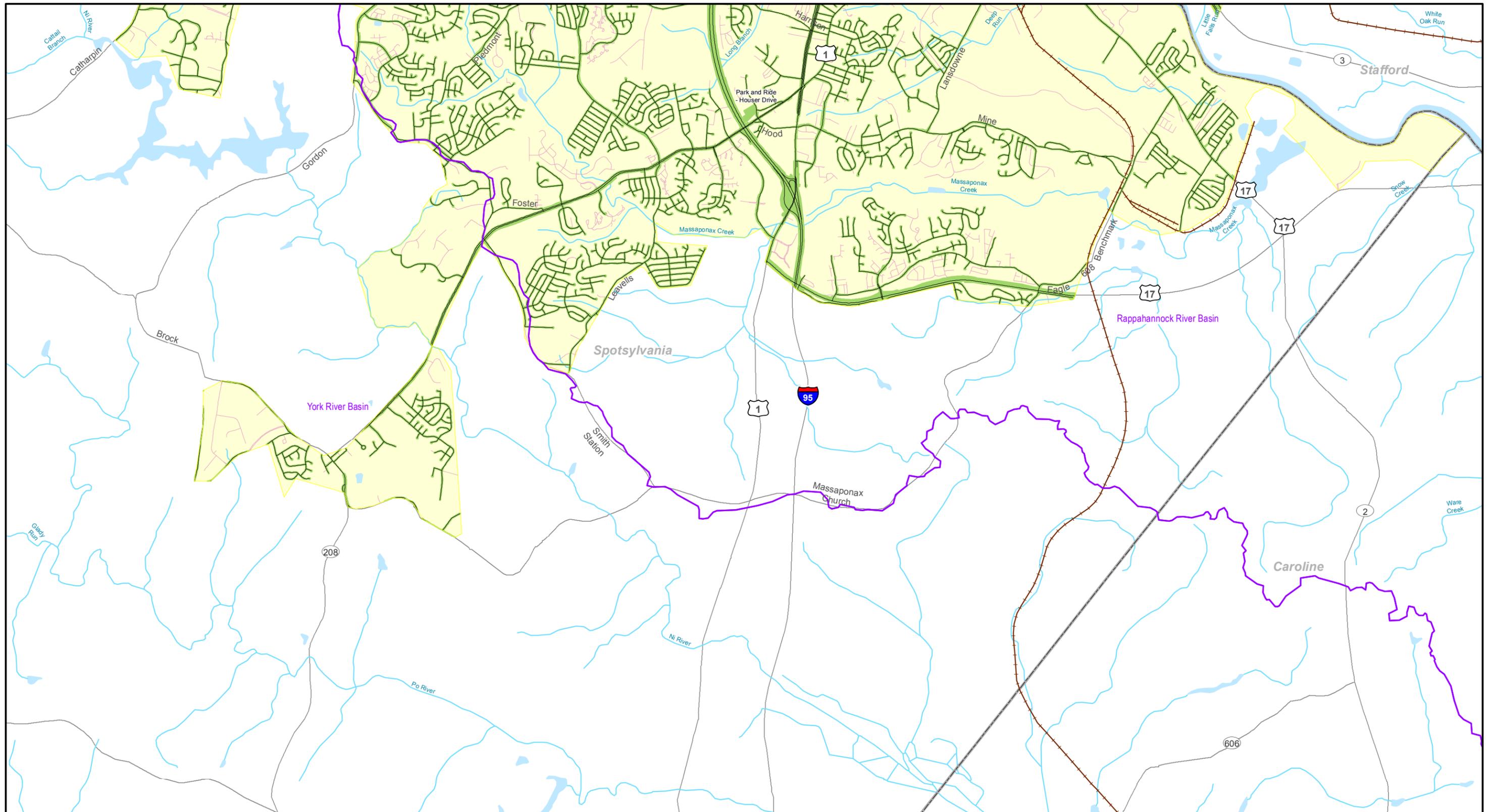
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SHEET 17
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 CHESAPEAKE BAY TMDL ACTION PLAN

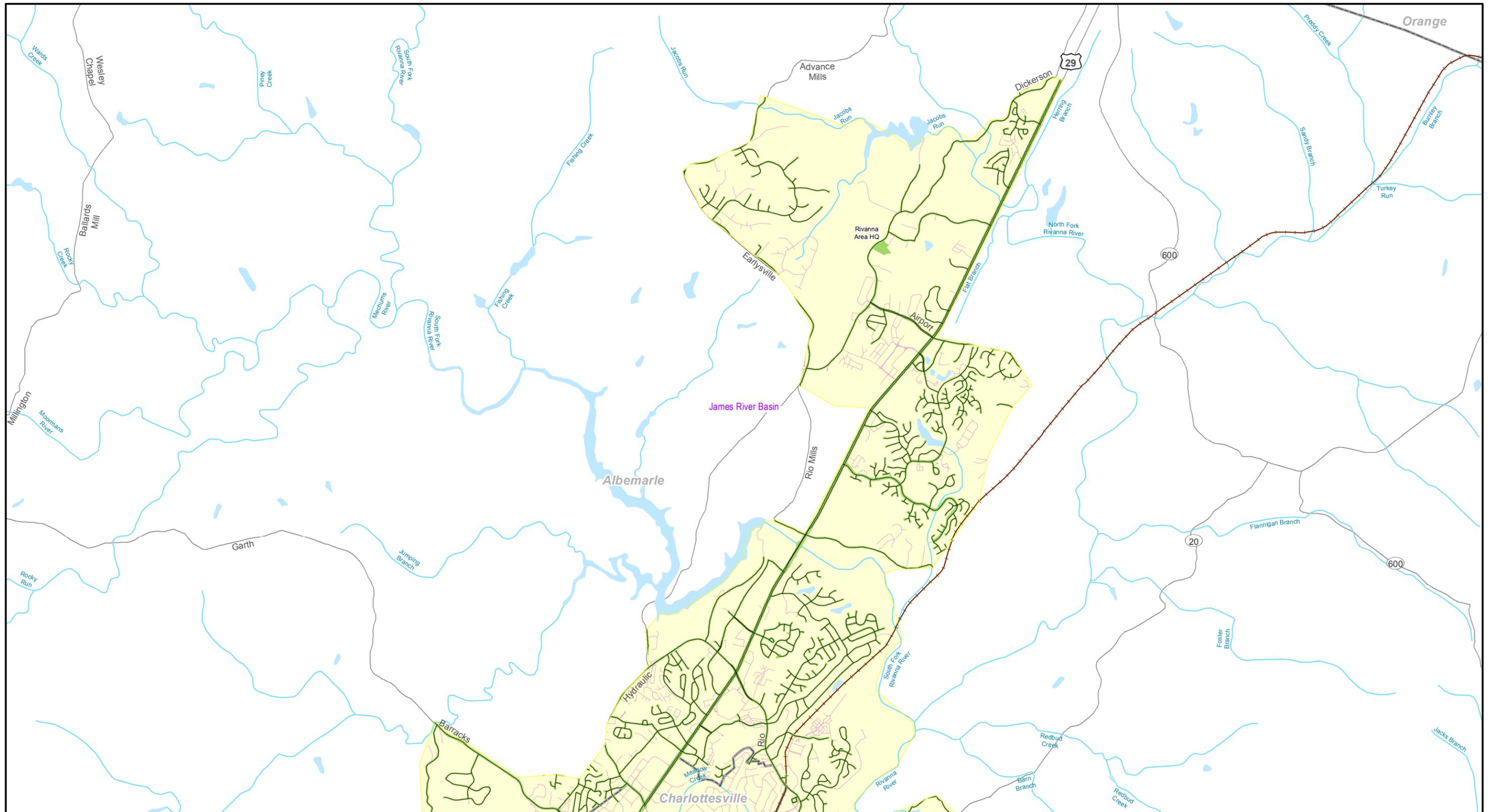
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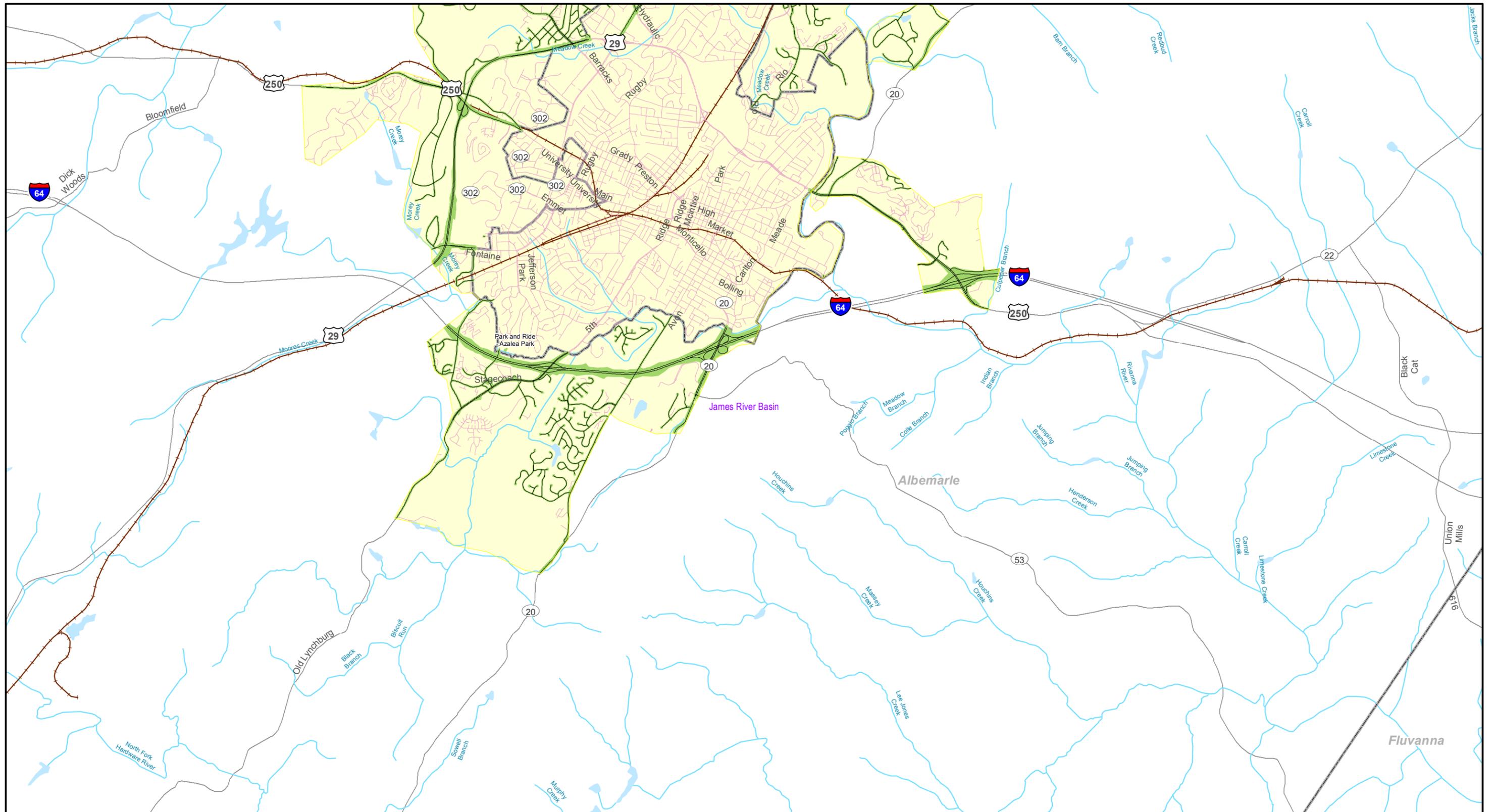
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| 2000 Census Urbanized Area (CUA) | Non-VDOT Maintained Roads within CUA | |
| VDOT Right of Way within CUA (VDOT's MS4 Regulated Area) | Roads Outside CUA | |



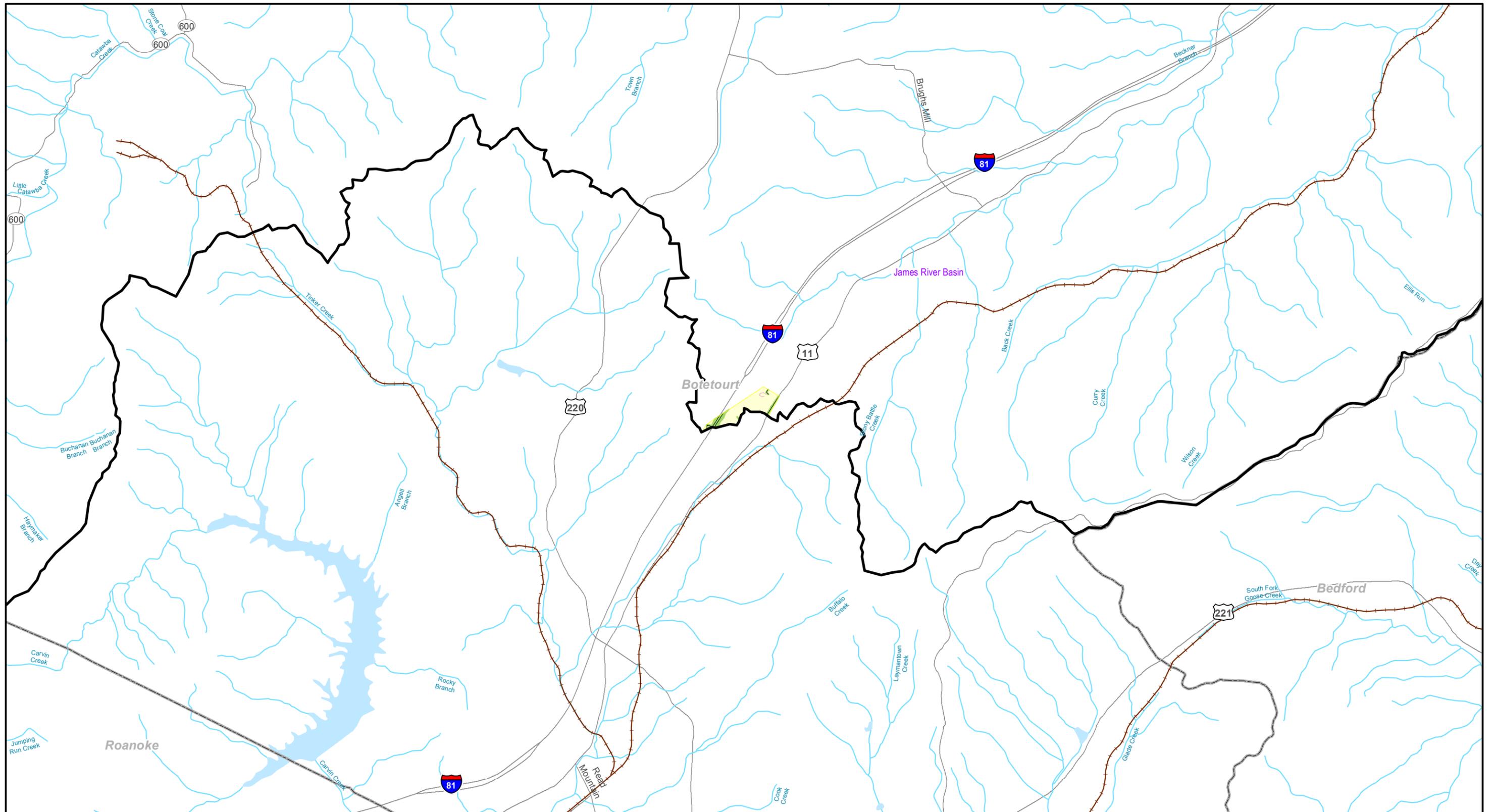
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| Chesapeake Bay | County/City Boundaries | Railroad Lines |
| River Basins | VDOT Maintained Roads within CUA | Rivers and Waterbodies |
| 2000 Census Urbanized Area (CUA) | Non-VDOT Maintained Roads within CUA | |
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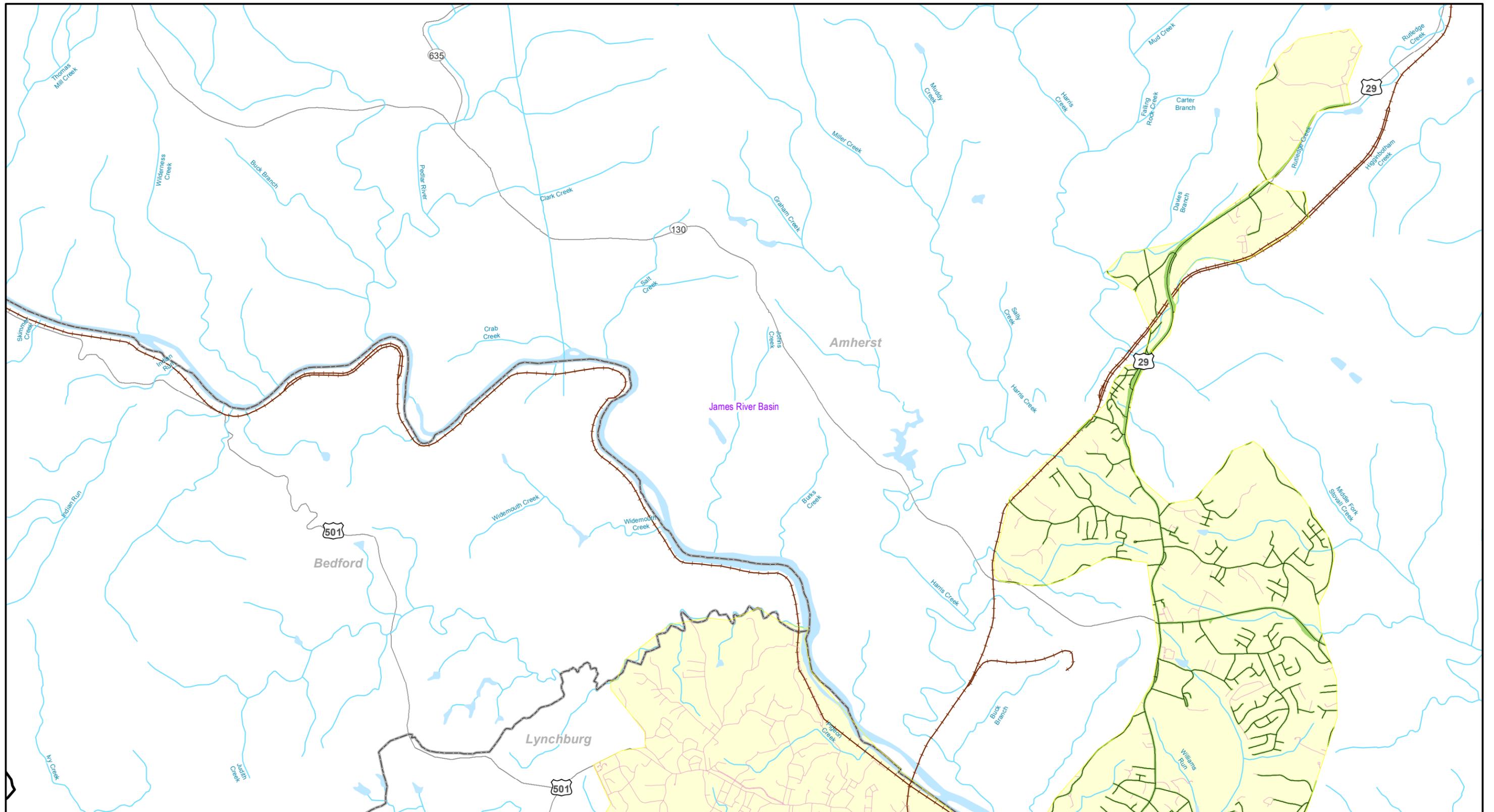


Projection: NAD 1983 Virginia Lambert

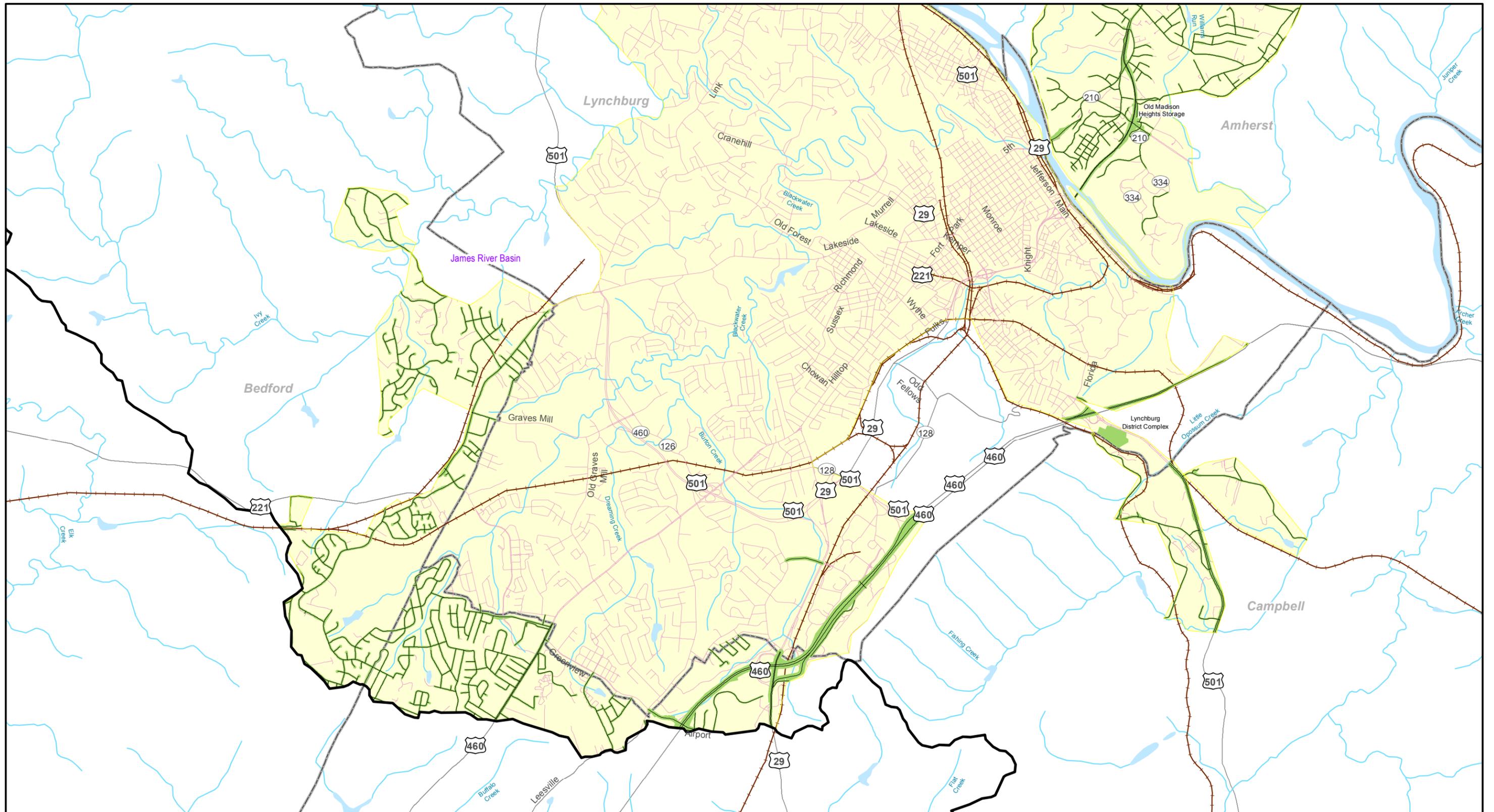
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| VDOT Right of Way within CUA (VDOT's MS4 Regulated Area) | Roads Outside CUA | |

SHEET 22
ROANOKE CUA
 CHESAPEAKE BAY TMDL ACTION PLAN

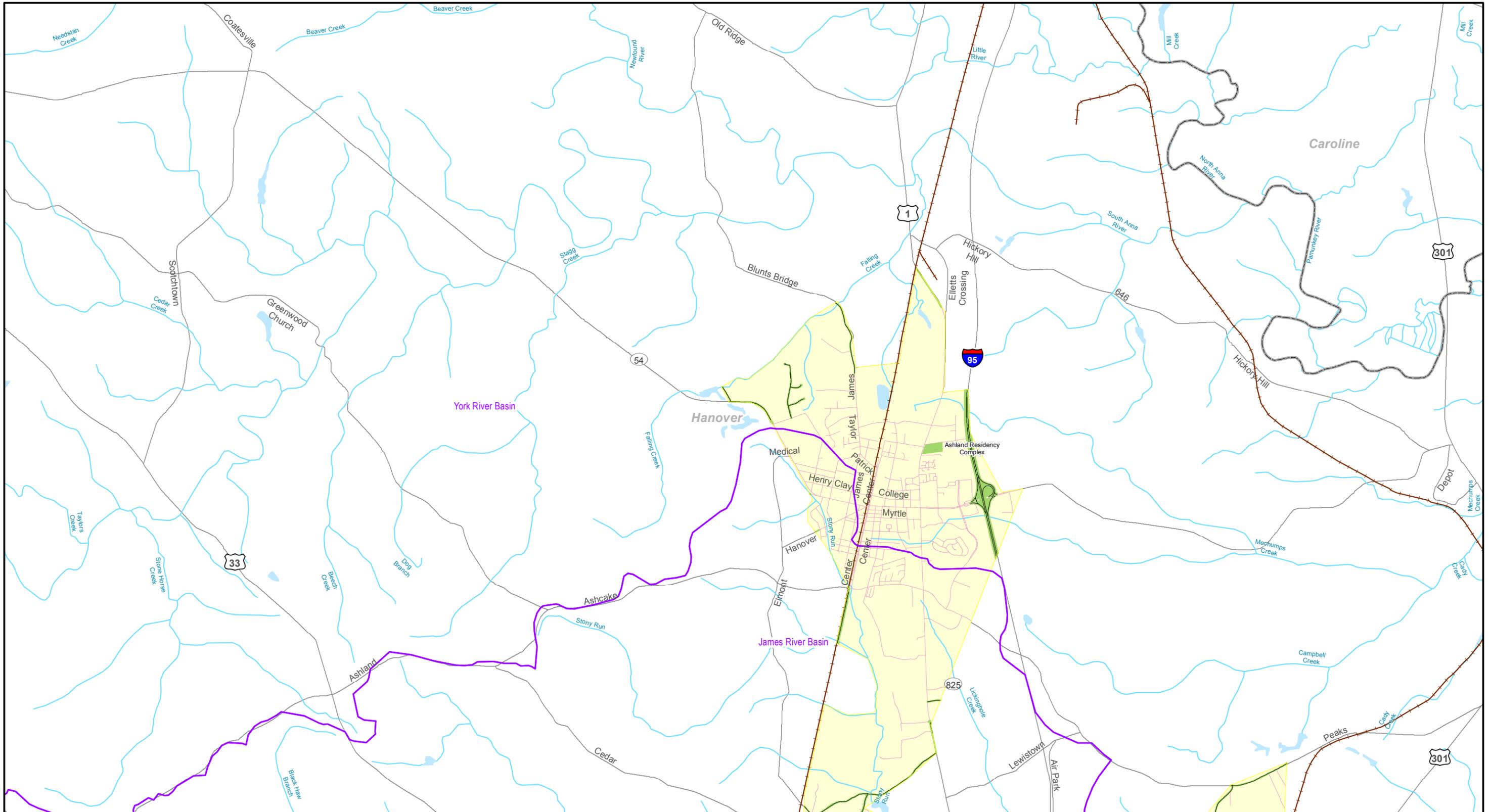
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 Sources: ESRI USA Basemap
 Prepared by Brian Brown, May 21, 2015



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| Chesapeake Bay | County/City Boundaries | Railroad Lines |
| River Basins | VDOT Maintained Roads within CUA | Rivers and Waterbodies |
| 2000 Census Urbanized Area (CUA) | Non-VDOT Maintained Roads within CUA | |
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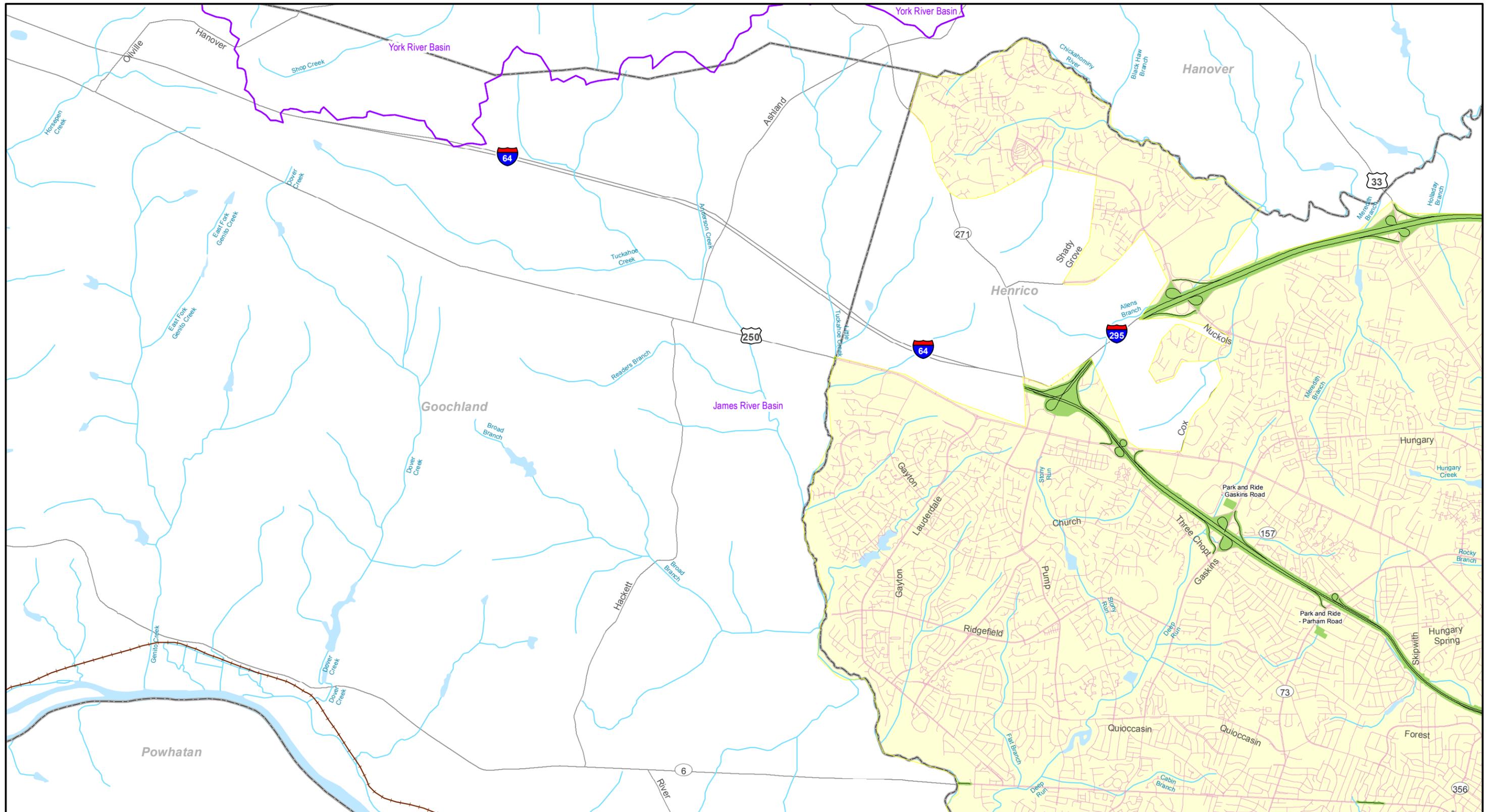
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| River Basins | VDOT Maintained Roads within CUA | Rivers and Waterbodies |
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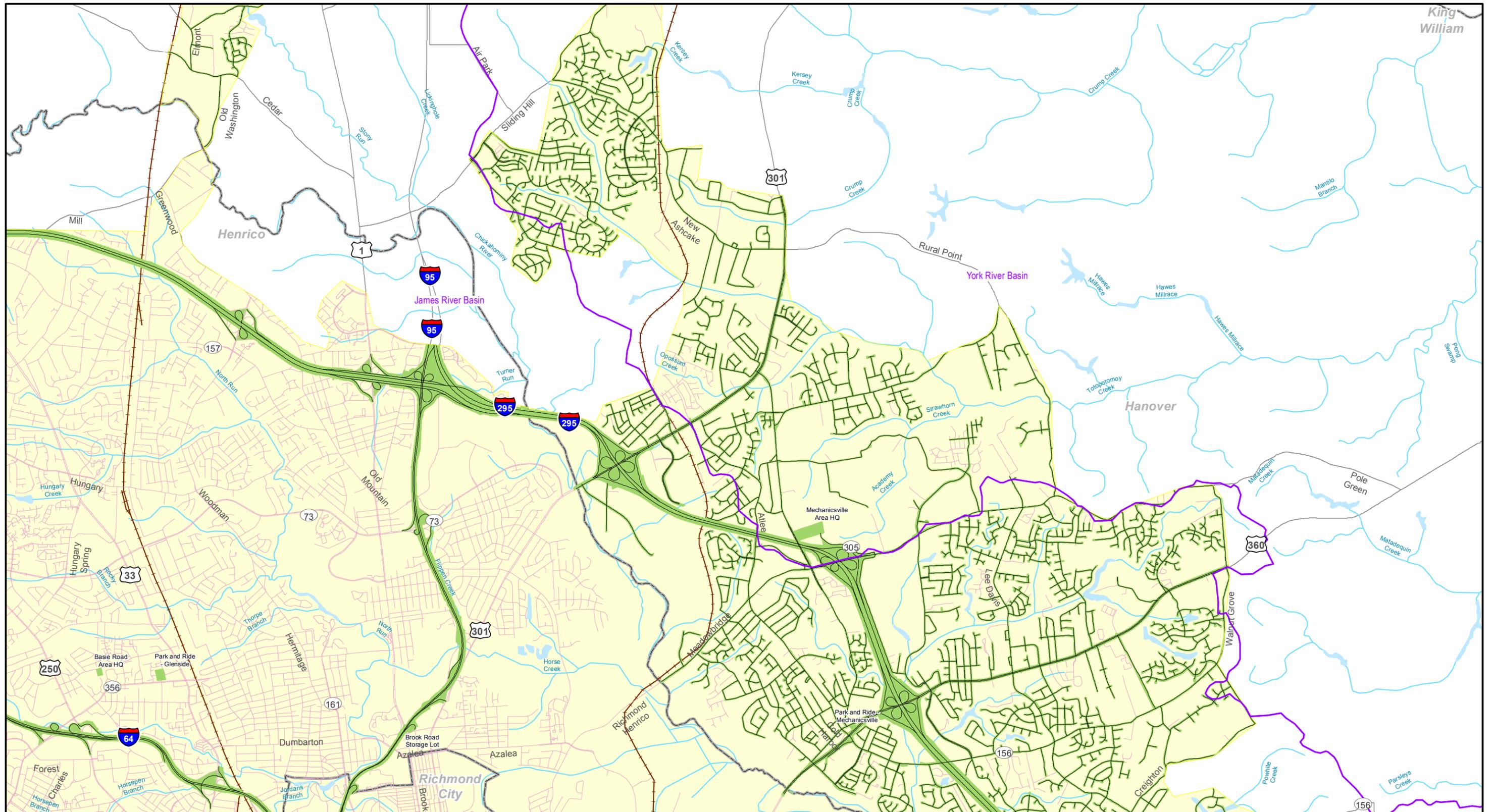
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| Chesapeake Bay | County/City Boundaries | Railroad Lines |
| River Basins | VDOT Maintained Roads within CUA | Rivers and Waterbodies |
| 2000 Census Urbanized Area (CUA) | Non-VDOT Maintained Roads within CUA | |
| VDOT Right of Way within CUA (VDOT's MS4 Regulated Area) | Roads Outside CUA | |

SHEET 25
RICHMOND CUA
 CHESAPEAKE BAY TMDL ACTION PLAN

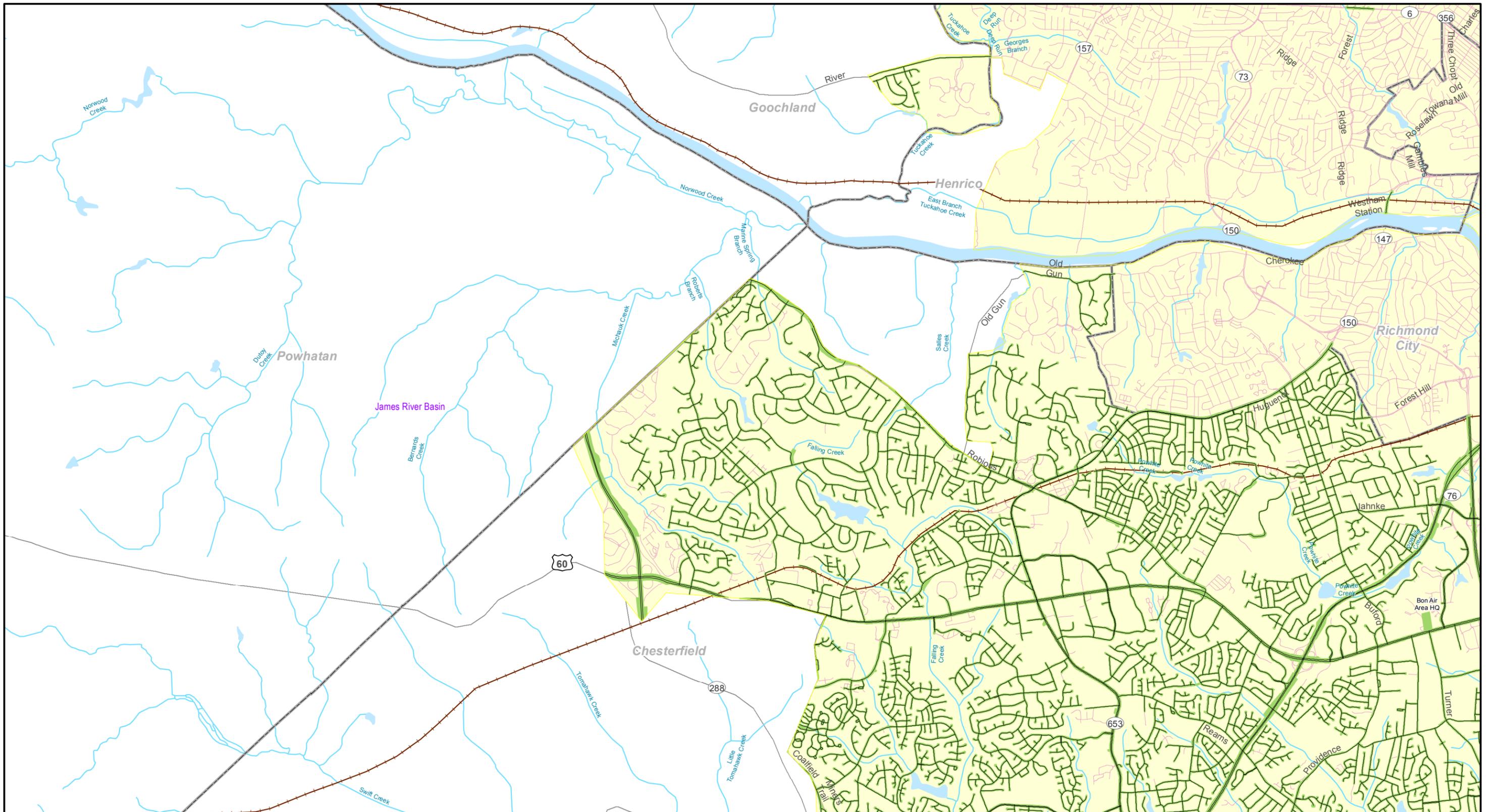
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 Sources: ESRI USA Basemap
 Prepared by Brian Brown, May 21, 2015



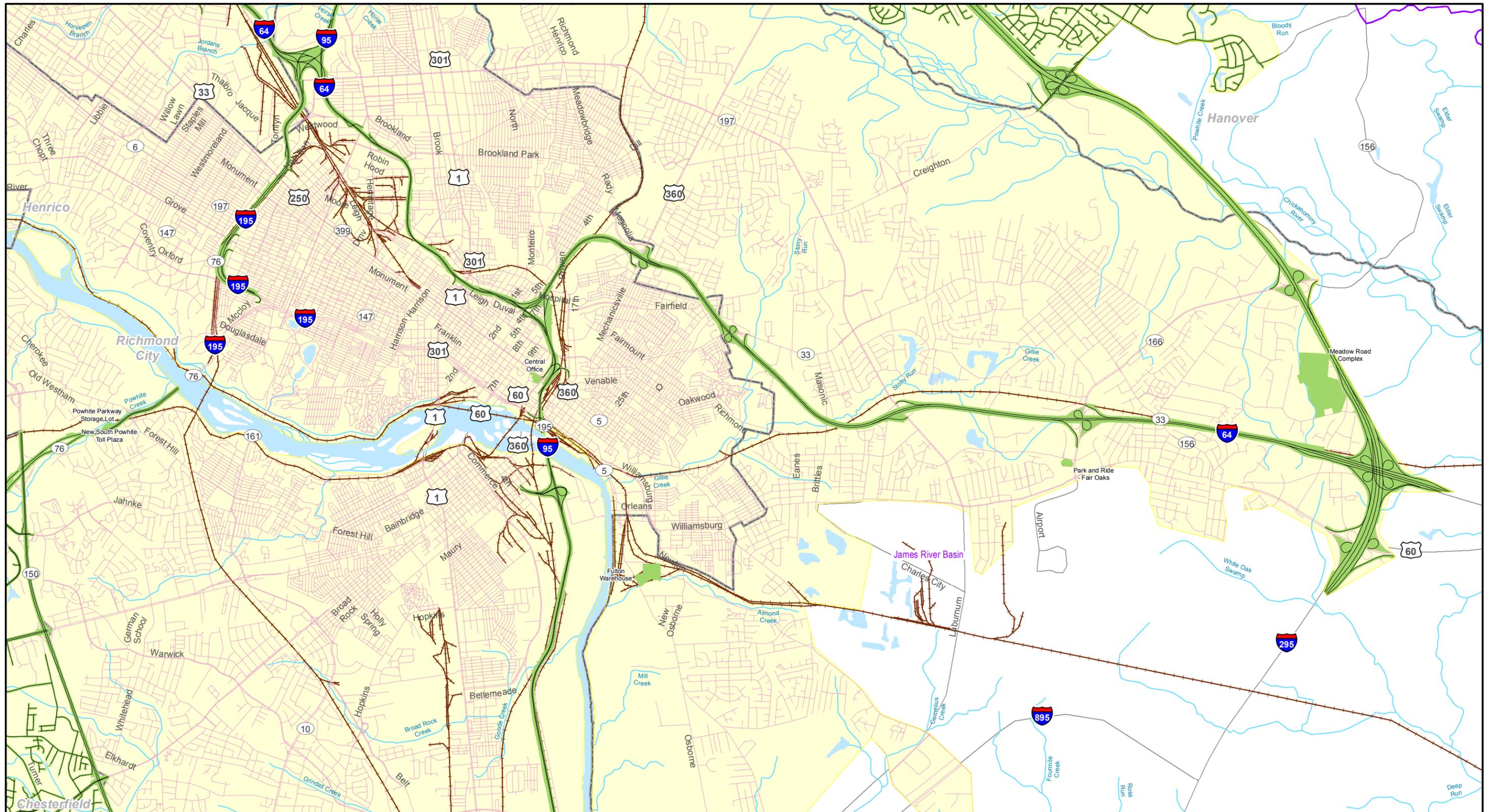
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| Chesapeake Bay | County/City Boundaries | Railroad Lines |
| River Basins | VDOT Maintained Roads within CUA | Rivers and Waterbodies |
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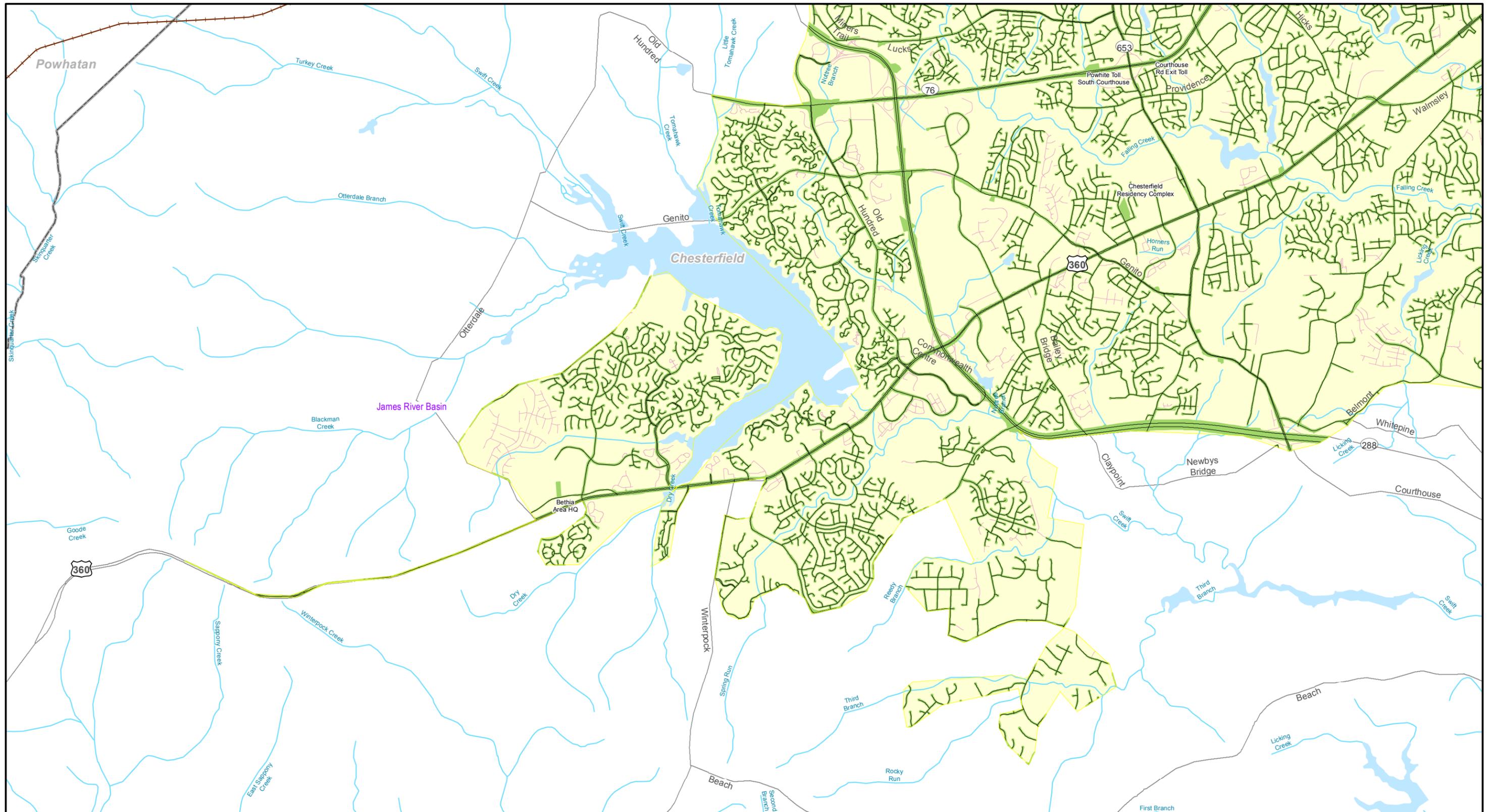


Projection: NAD 1983 Virginia Lambert

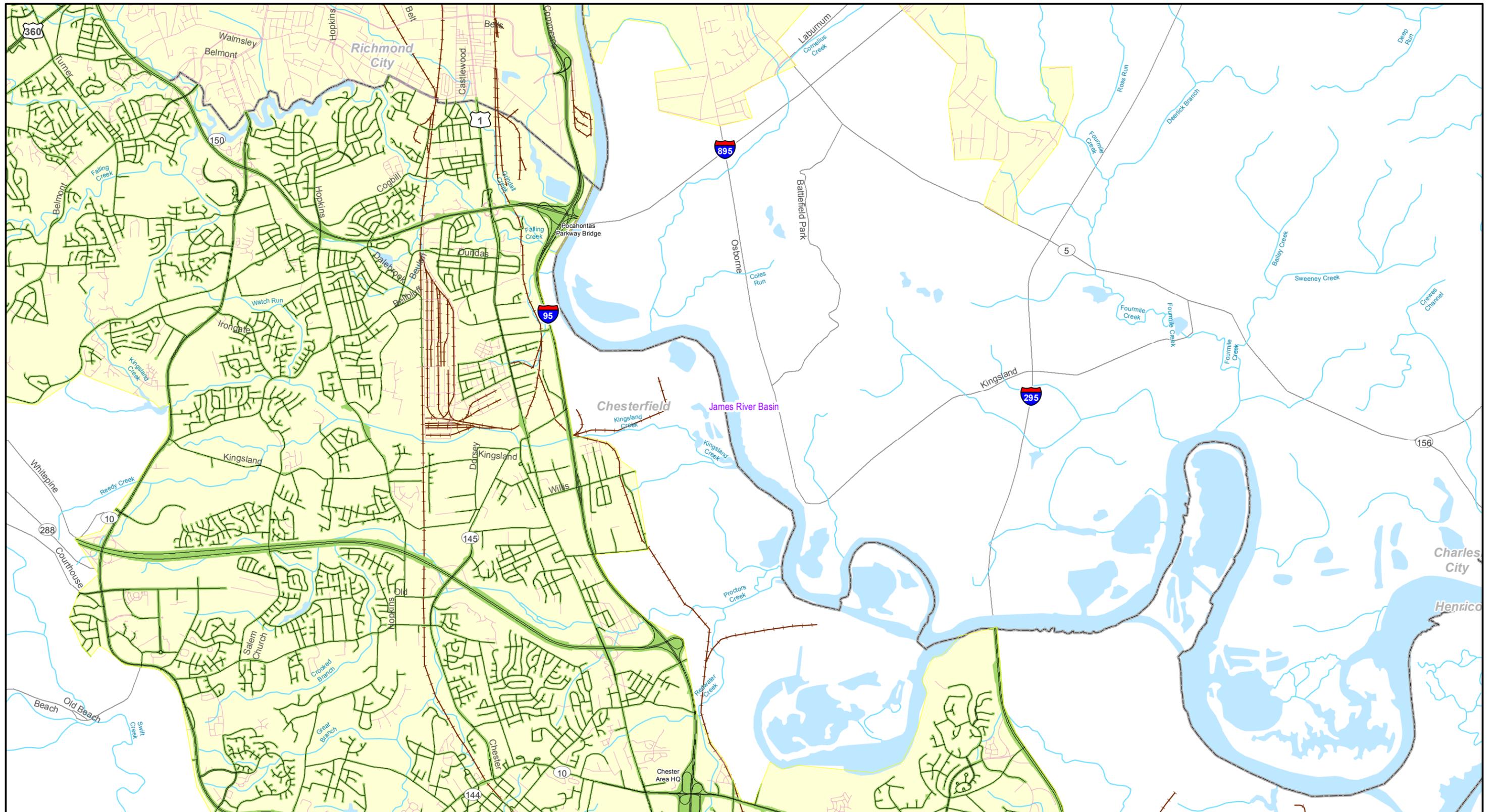
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| Chesapeake Bay | County/City Boundaries | Railroad Lines |
| River Basins | VDOT Maintained Roads within CUA | Rivers and Waterbodies |
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SHEET 29
RICHMOND CUA
 CHESAPEAKE BAY TMDL ACTION PLAN

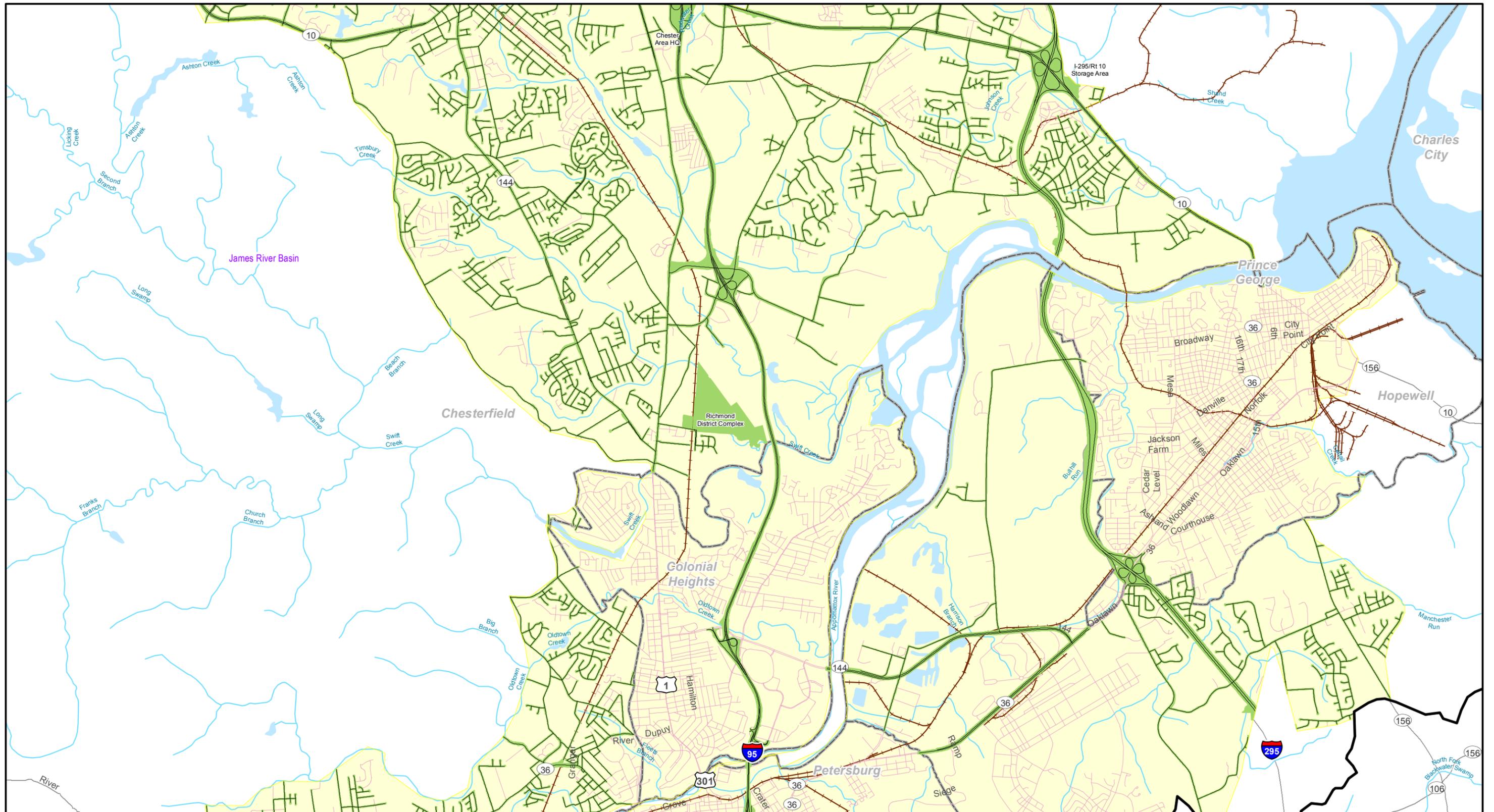
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 Virginia
 Sources: ESRI USA Basemap
 Prepared by Brian Brown, May 21, 2015



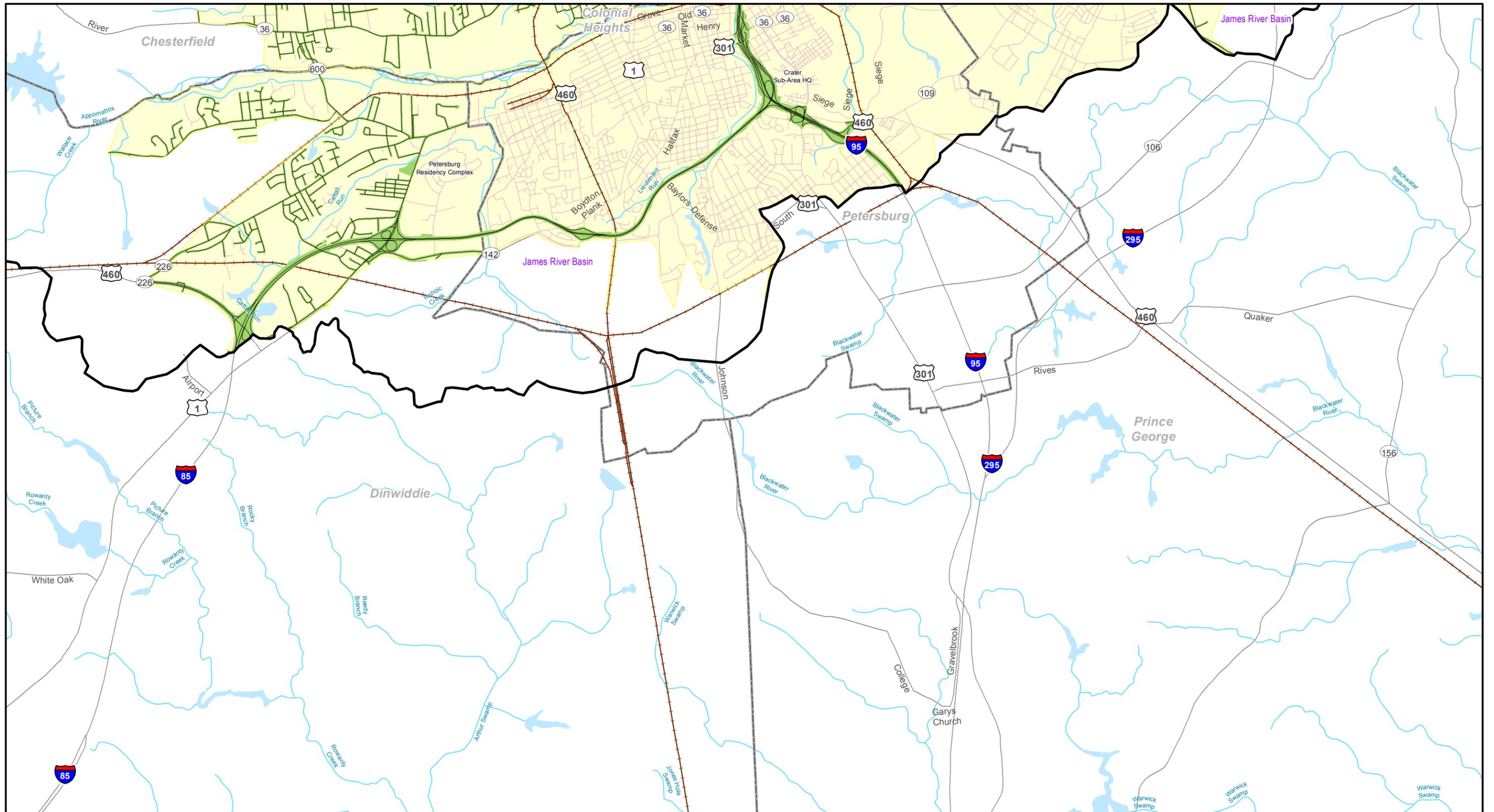
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| Chesapeake Bay | County/City Boundaries | Railroad Lines |
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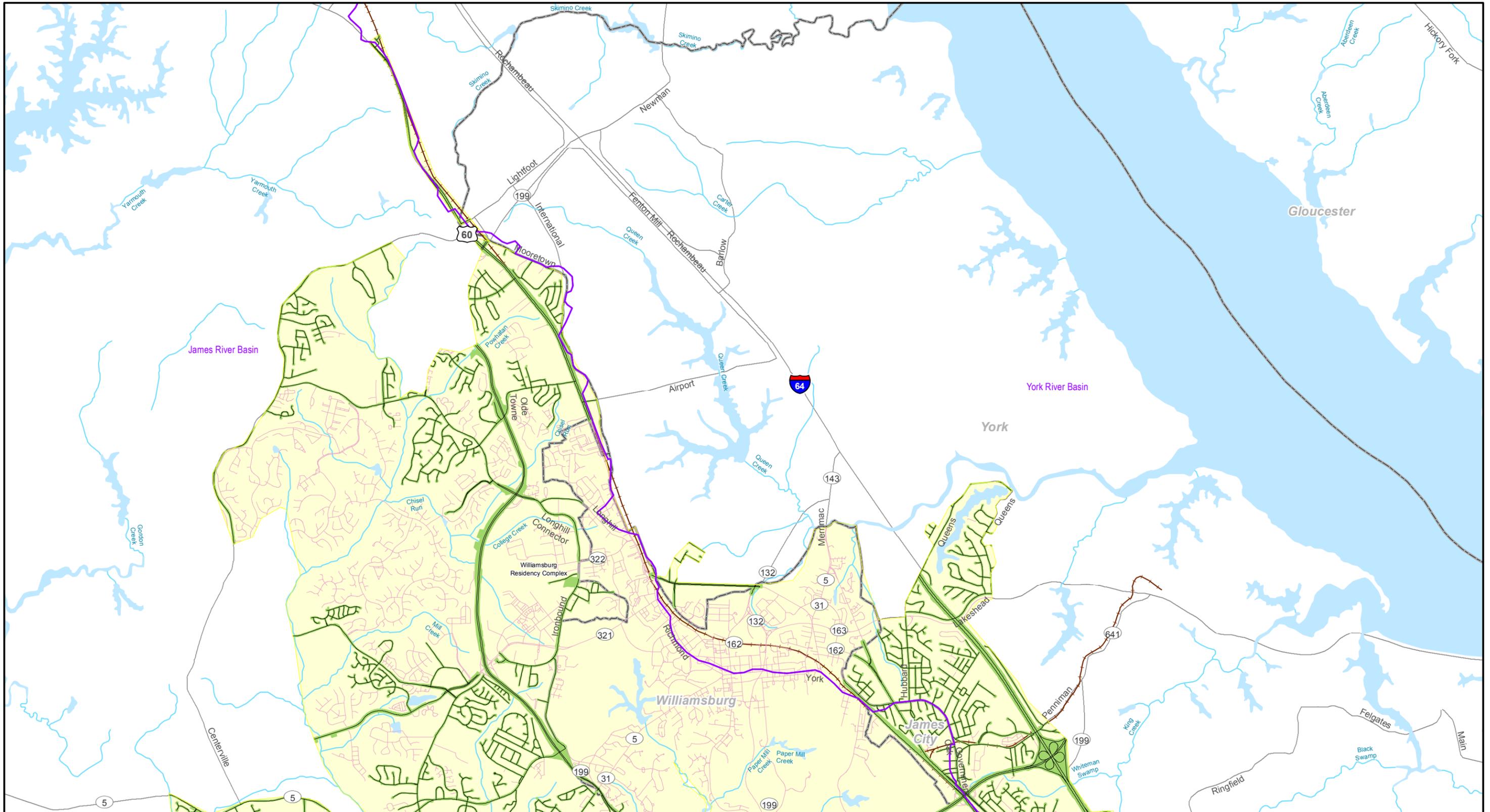
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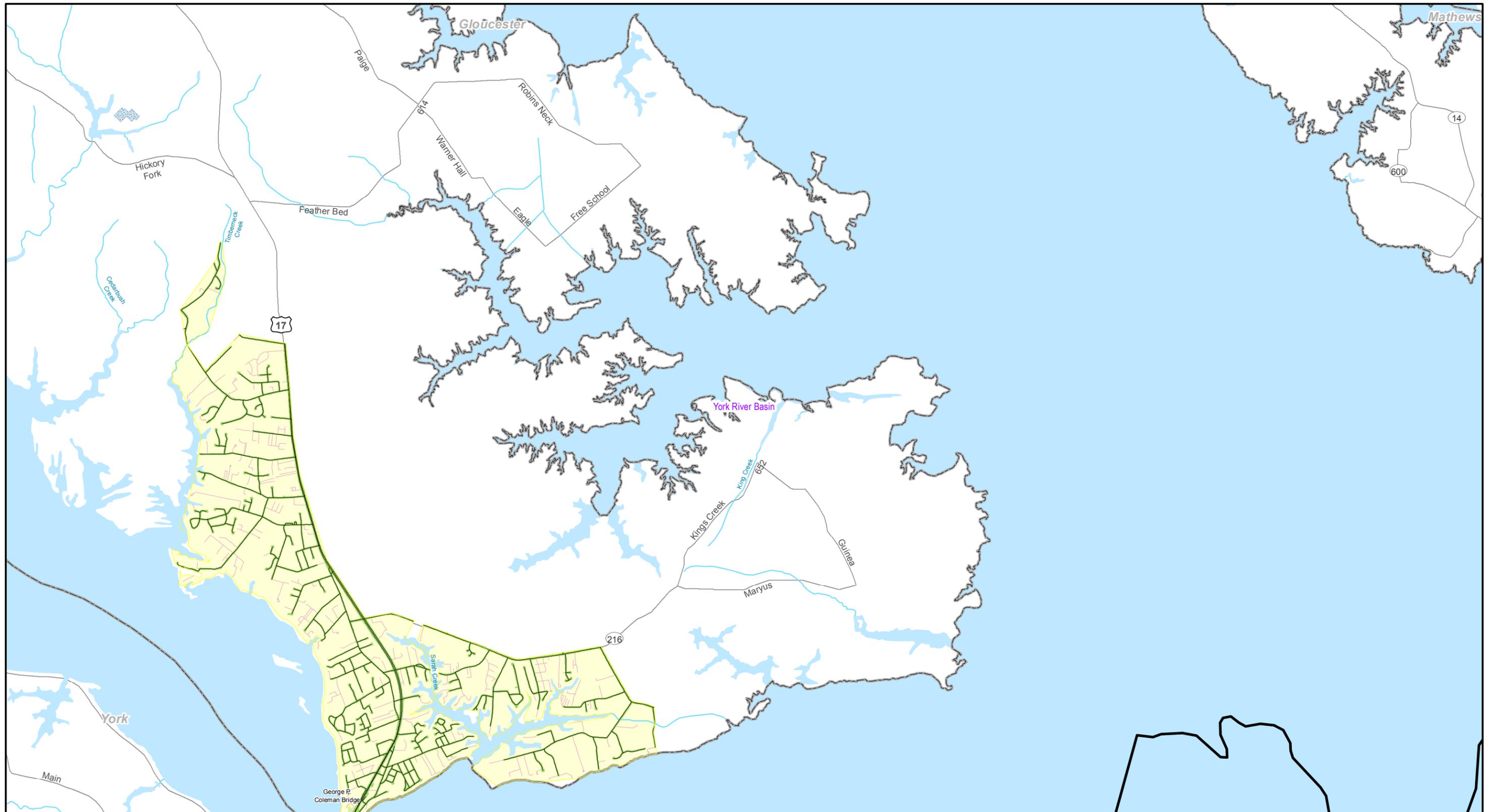
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SHEET 34
VIRGINIA BEACH CUA
 CHESAPEAKE BAY TMDL ACTION PLAN

0 5,000 10,000
 Feet
 Virginia
 Sources: ESRI USA Basemap
 Prepared by Brian Brown, May 21, 2015

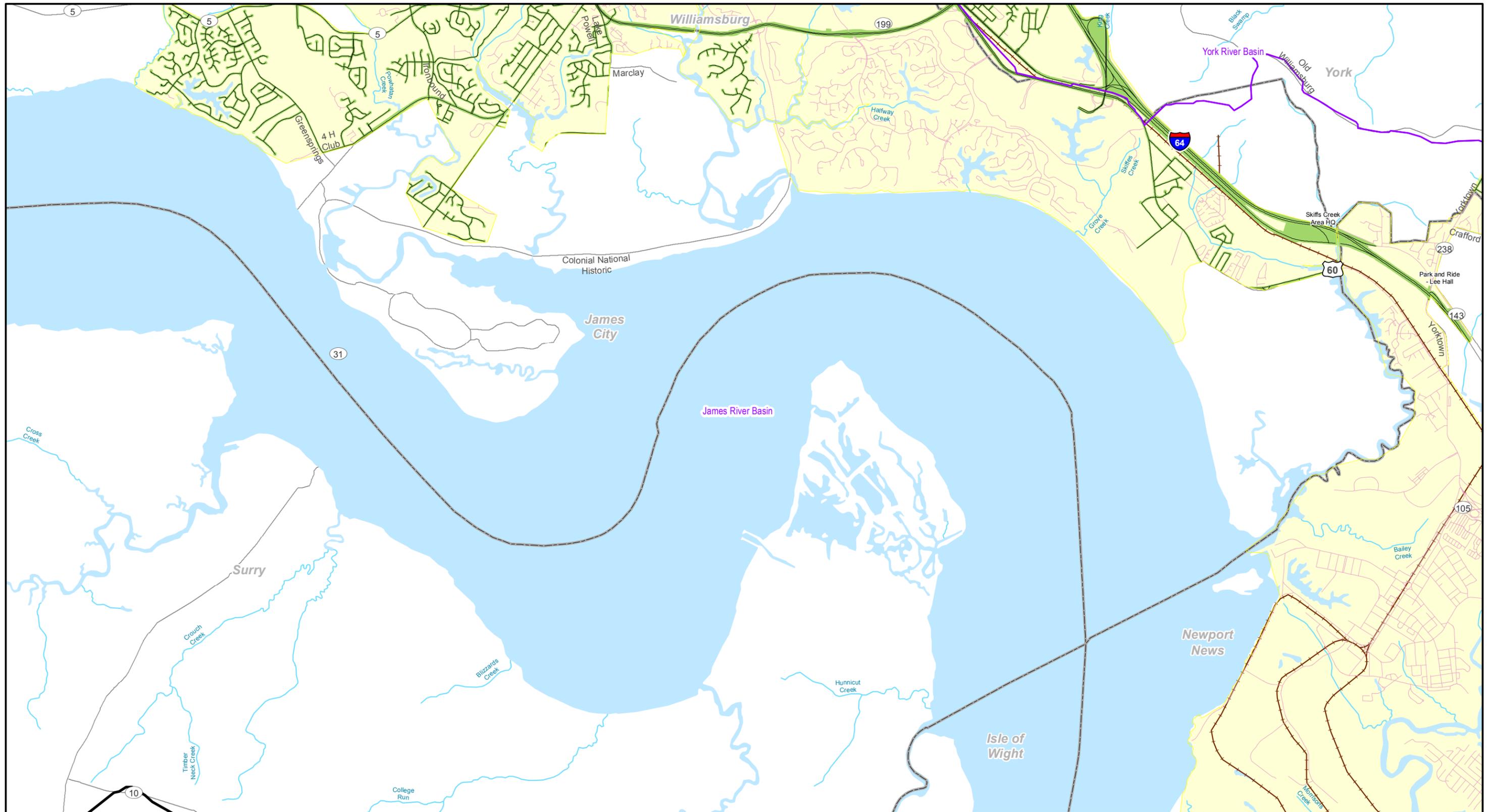


Projection: NAD 1983 Virginia Lambert

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| Chesapeake Bay | County/City Boundaries | Railroad Lines |
| River Basins | VDOT Maintained Roads within CUA | Rivers and Waterbodies |
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SHEET 35
VIRGINIA BEACH CUA
 CHESAPEAKE BAY TMDL ACTION PLAN

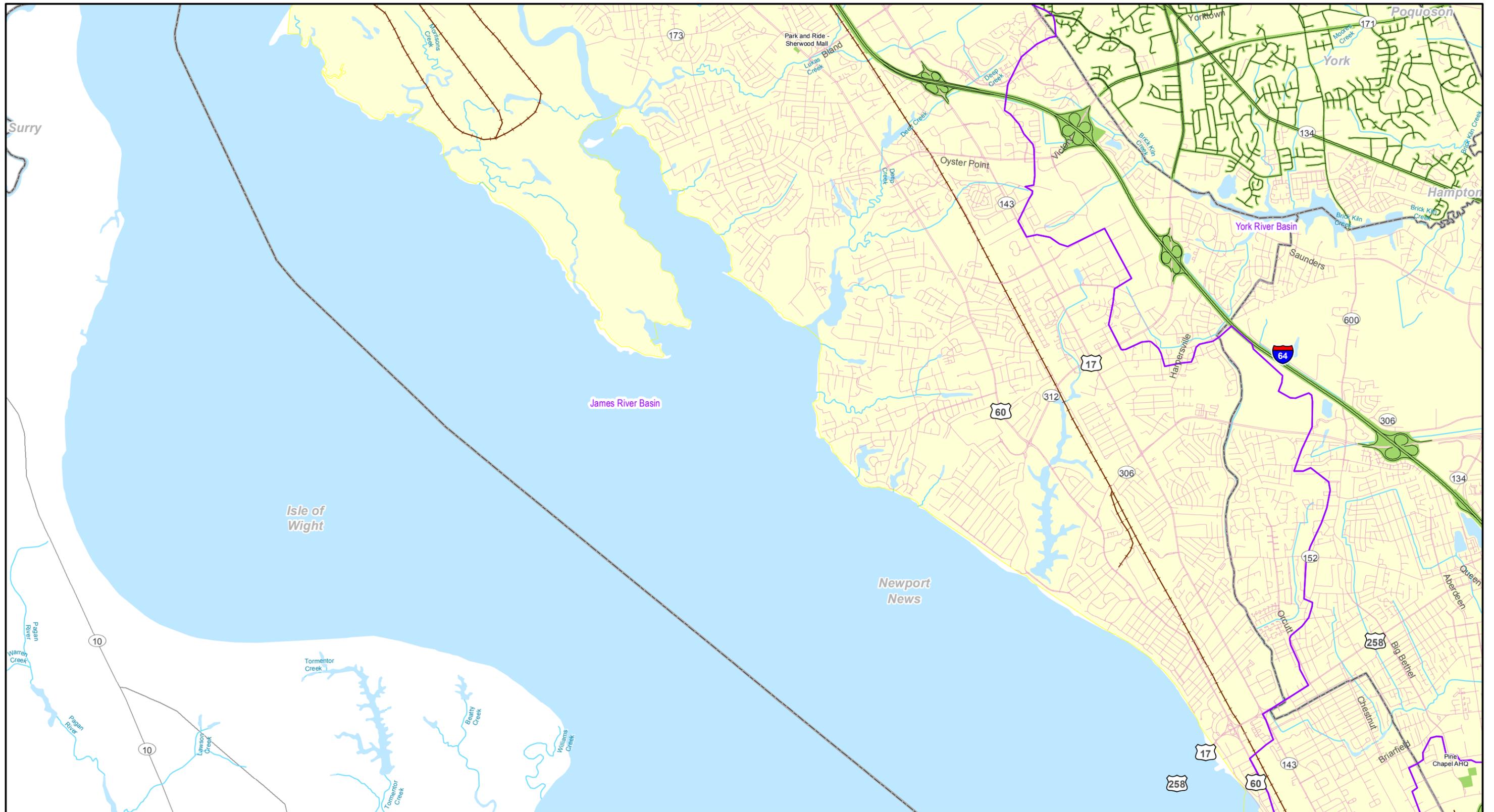
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 Sources: ESRI USA Basemap
 Prepared by Brian Brown, May 21, 2015



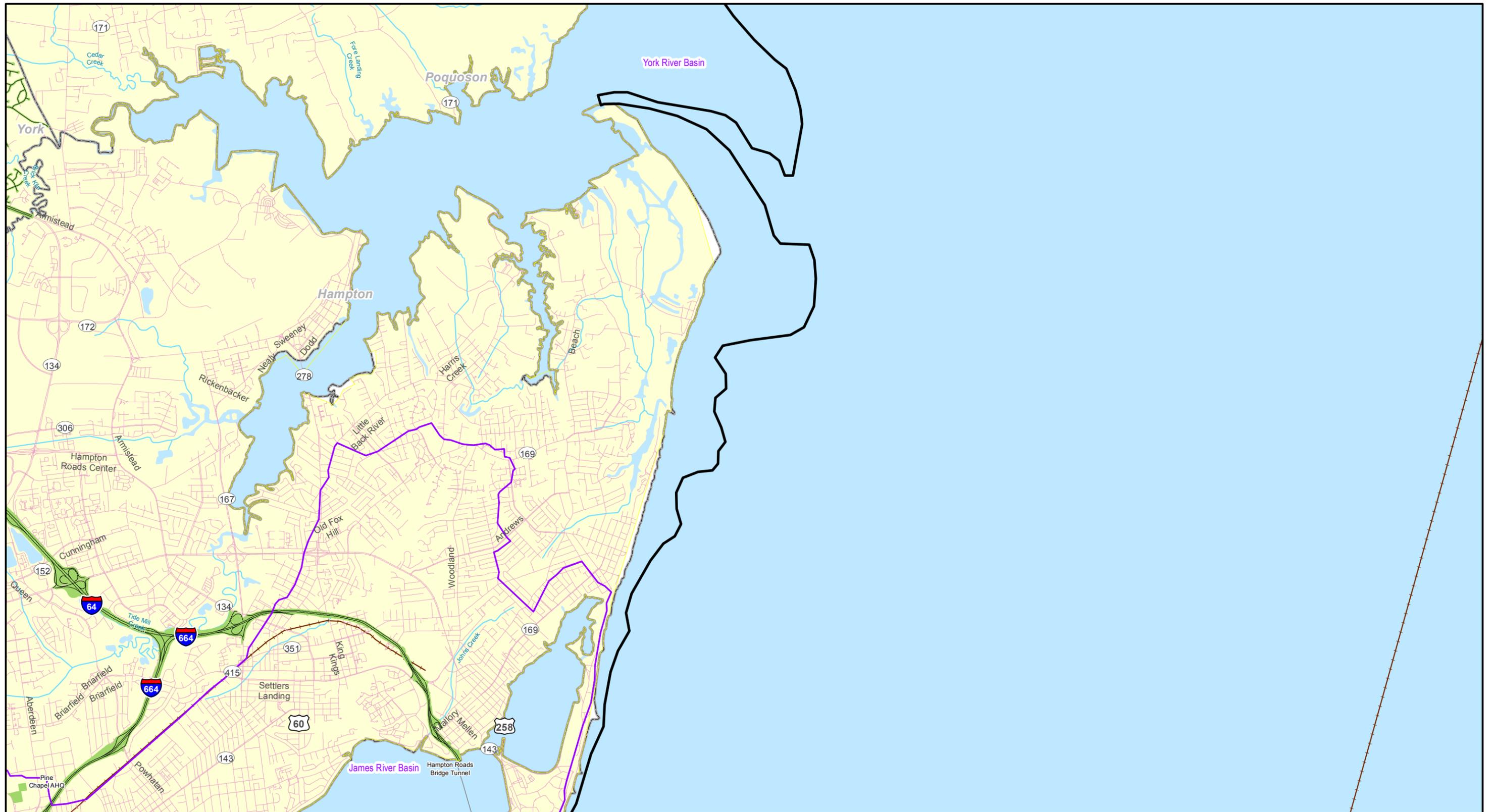
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| Chesapeake Bay | County/City Boundaries | Railroad Lines |
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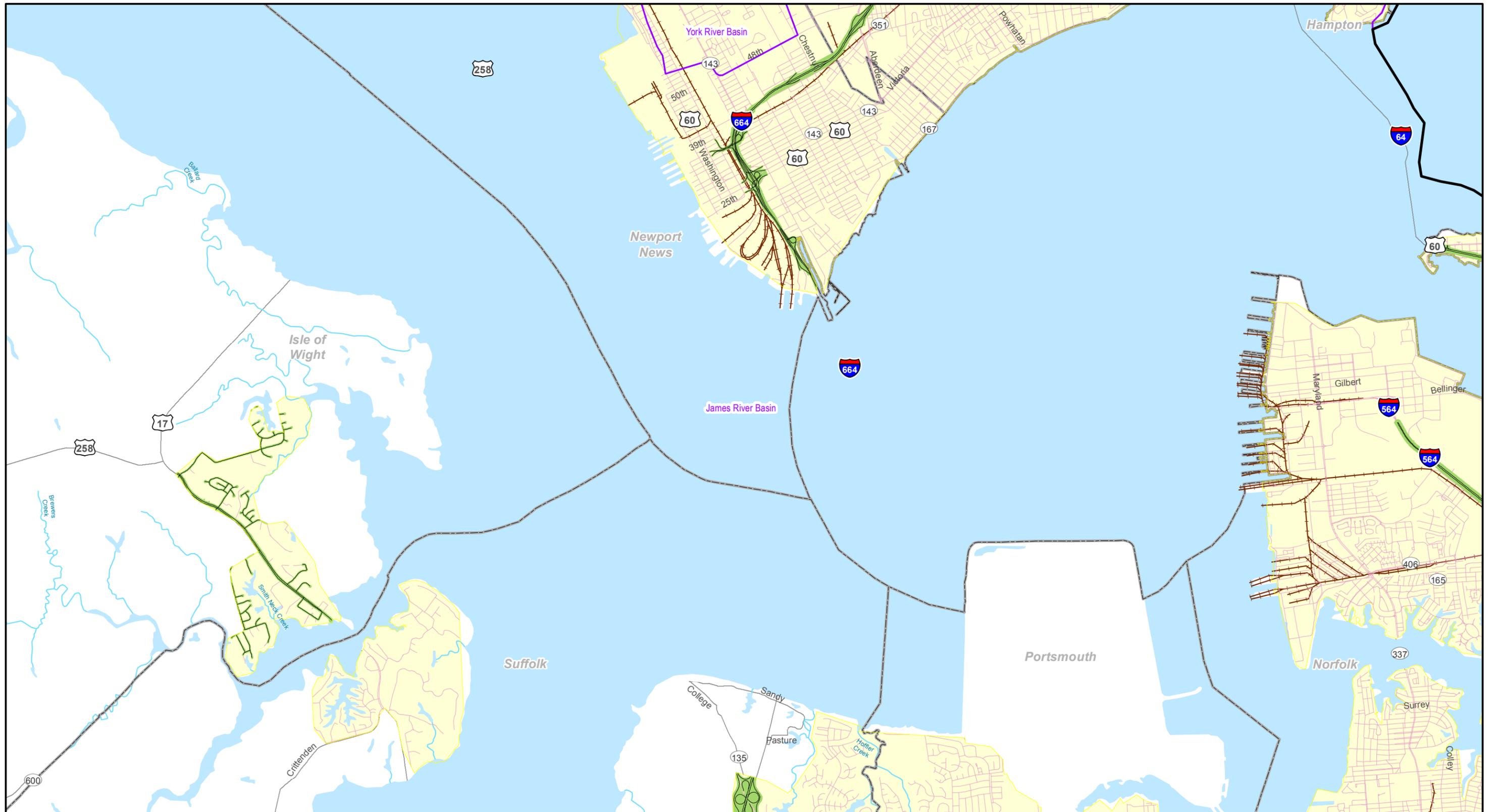


Projection: NAD 1983 Virginia Lambert

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| Chesapeake Bay | County/City Boundaries | Railroad Lines |
| River Basins | VDOT Maintained Roads within CUA | Rivers and Waterbodies |
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SHEET 39
VIRGINIA BEACH CUA
 CHESAPEAKE BAY TMDL ACTION PLAN

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 Feet
 Virginia
 Sources: ESRI USA Basemap
 Prepared by Brian Brown, May 21, 2015



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SHEET 40
VIRGINIA BEACH CUA
 CHESAPEAKE BAY TMDL ACTION PLAN

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 Feet
 Virginia
 Sources: ESRI USA Basemap
 Prepared by Brian Brown, May 21, 2015

Projection: NAD 1983 Virginia Lambert



Projection: NAD 1983 Virginia Lambert

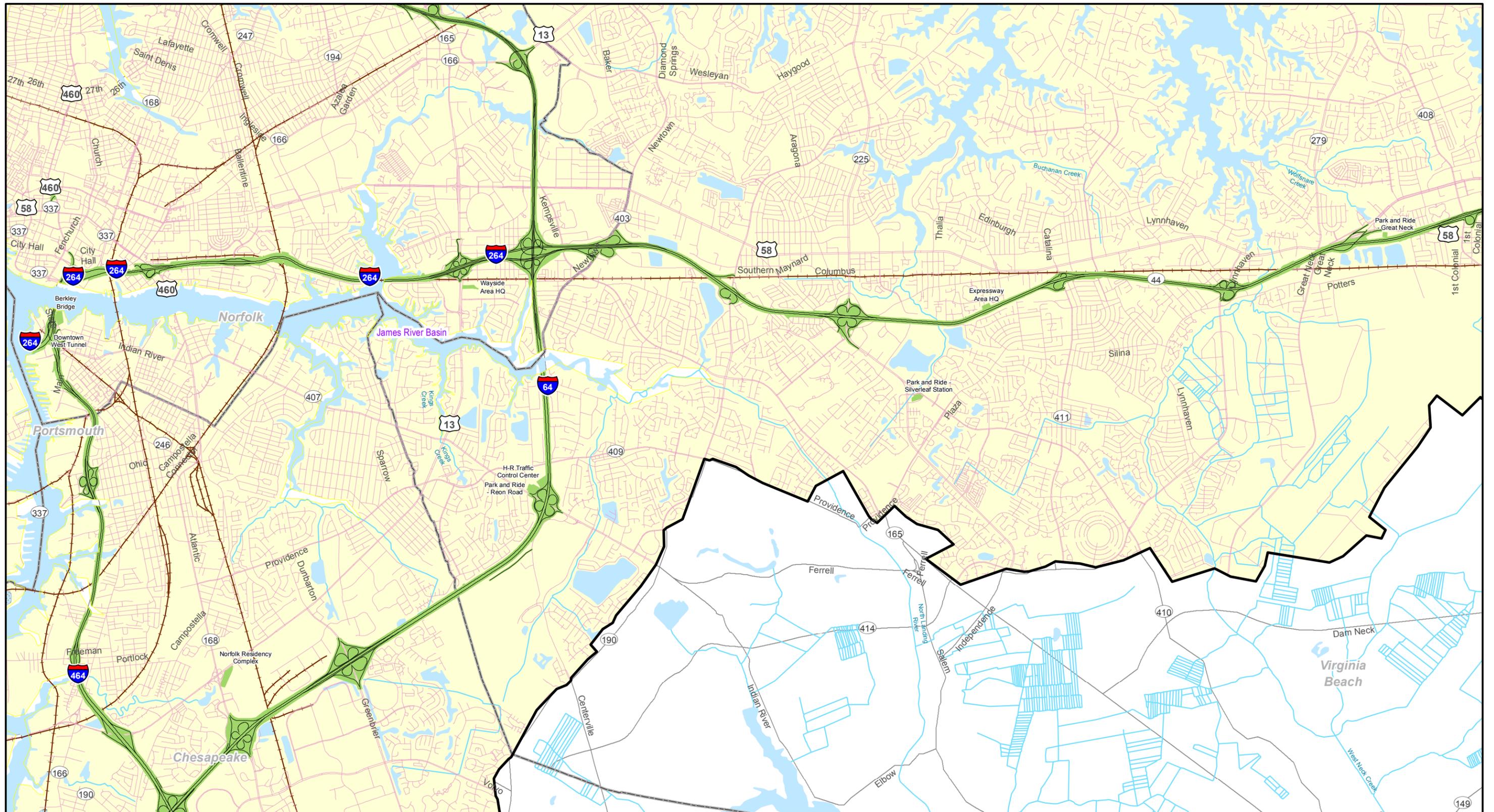
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| River Basins | VDOT Maintained Roads within CUA | Rivers and Waterbodies |
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| VDOT Right of Way within CUA (VDOT's MS4 Regulated Area) | Roads Outside CUA | |

SHEET 41
VIRGINIA BEACH CUA
 CHESAPEAKE BAY TMDL ACTION PLAN

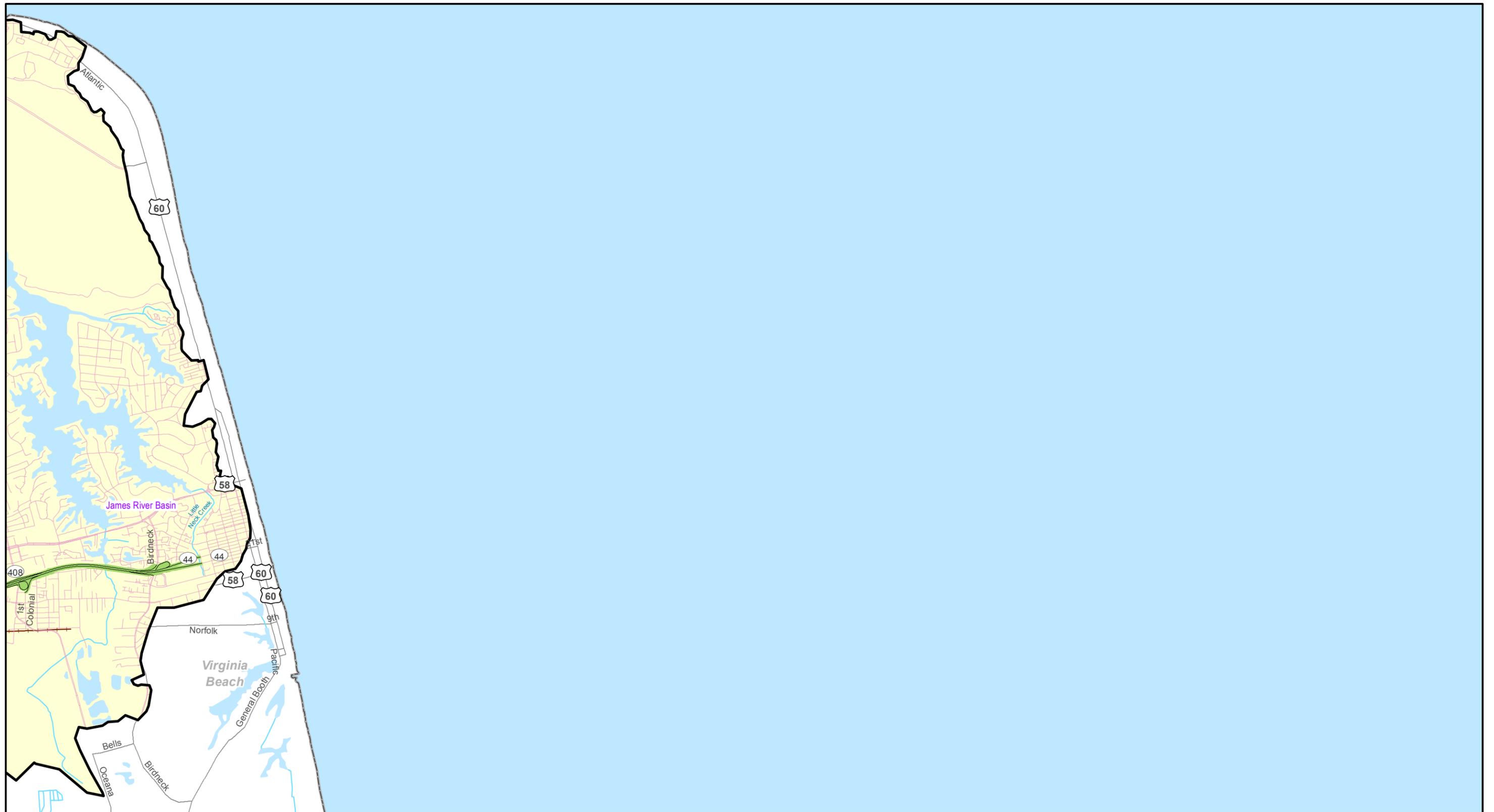
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 Sources: ESRI USA Basemap
 Prepared by Brian Brown, May 21, 2015



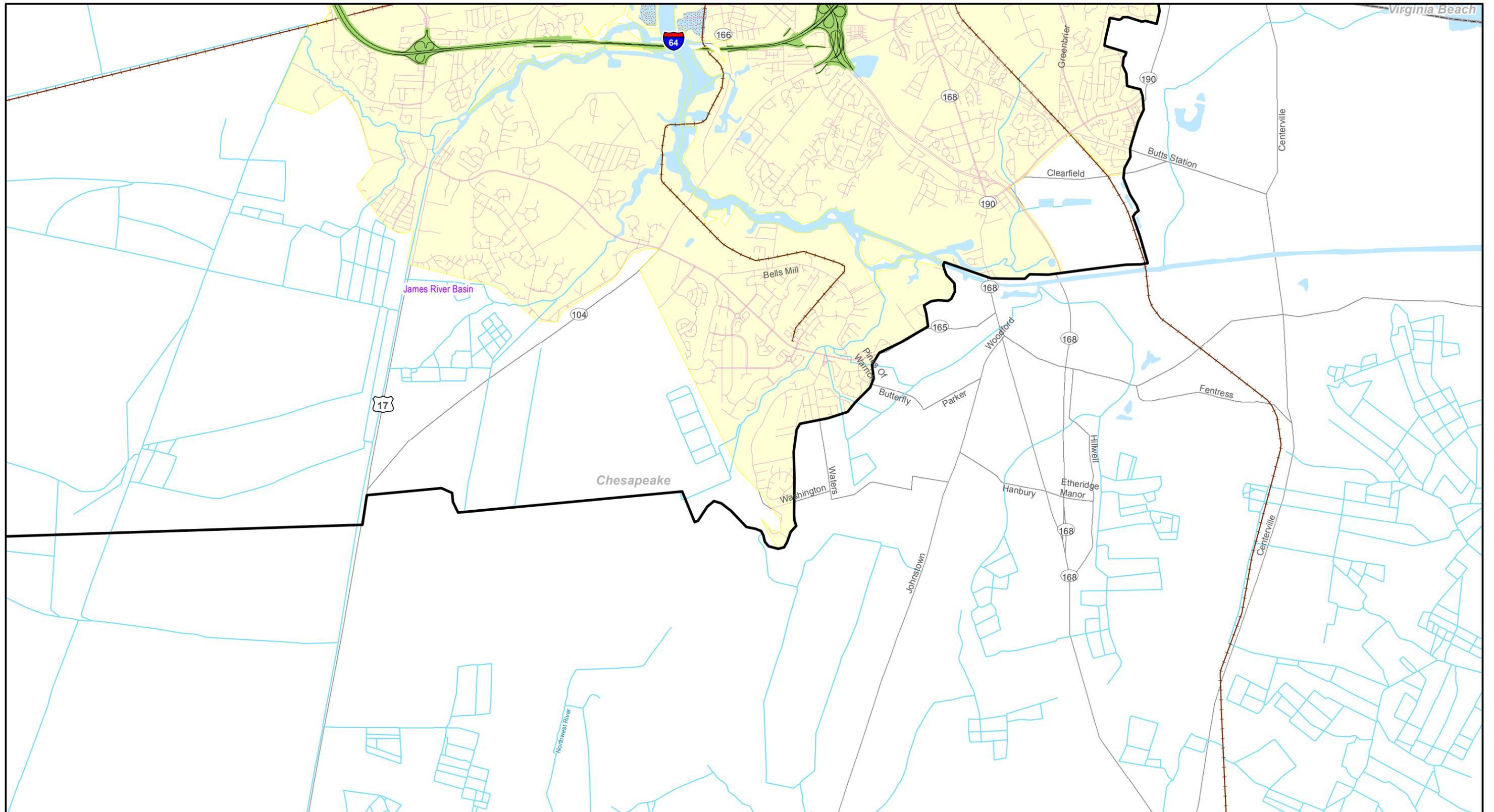
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| Chesapeake Bay | County/City Boundaries | Railroad Lines |
| River Basins | VDOT Maintained Roads within CUA | Rivers and Waterbodies |
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Virginia Beach



Projection: NAD 1983 Virginia Lambert

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| Chesapeake Bay | County/City Boundaries | Railroad Lines |
| River Basins | VDOT Maintained Roads within CUA | Rivers and Waterbodies |
| 2000 Census Urbanized Area (CUA) | Non-VDOT Maintained Roads within CUA | |
| VDOT Right of Way within CUA (VDOT's MS4 Regulated Area) | Roads Outside CUA | |

SHEET 45
VIRGINIA BEACH CUA
 CHESAPEAKE BAY TMDL ACTION PLAN

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 Feet
 Virginia
 Sources: ESRI USA Basemap
 Prepared by Brian Brown, May 21, 2015

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Appendix B
Project Summary Spreadsheet

Project Summary Spreadsheet

Project Summary Spreadsheet - Stream Restoration and Stabilization			
Project Name:	Industrial Drive Stream Restoration		UPC Code or BMP ID:
Project Description:	<p>The project consists of stream restoration to repair a deeply incised headcut. The project involves the use of natural stream channel design approaches within an existing VDOT drainage easement.</p>		
BMP Type:	Stream Restoration - Protocol 1		
Estimated Credit:	TN	TP	TSS
Discussion	<p>The overall project length is estimated at approximately 330 l.f. VDOT conducted pre-construction monitoring to estimate bank erosion rates. Erosion rates are severe (>2 ft.yr) and bank heights are excessive (15ft+) versus typical eroding urban streams. Conservative estimates of credit, based on Protocol 1, were prepared for the stream based on the field data gathered. The project is scheduled for implementation in late summer of 2015, and is to be funded using existing maintenance funds.</p>		
Estimated Implementation Date:	Summer 2015		
Project Completed:	No		



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Appendix C
List of Historical BMPs

Historical BMPs in Regulated Area

L&D ID	Maintenance ID	Installation Date	River Basin	Drainage Area (Acres)
55366	99021	22-May-09	James	6.66
55363	42006	22-Feb-08	James	2.63
55463	C12106	9-Aug-07	James	3.58
54060	29151	1-Jan-08	Potomac	2.06
54059	29150	1-Jan-08	Potomac	1.15
54061	29152	1-Jan-08	Potomac	5.18
54062	29153	1-Jan-08	Potomac	6.74
55375	53035	21-Jan-09	Potomac	2.86
54573	29149	9-Aug-07	Potomac	5.60
54903	291077	15-Jul-08	Potomac	27.03
54927	291107	23-Jul-07	Potomac	10.11
54929	291109	23-Jul-07	Potomac	5.08
54925	29166	23-Jul-07	Potomac	29.68
54926	291106	23-Jul-07	Potomac	5.53
54928	291108	23-Jul-07	Potomac	6.38
54924	29165	23-Jul-07	Potomac	4.18
54956	29117	2-Feb-13	Potomac	3
54070	76123	1-Jan-08	Potomac	6.77
54069	76122	1-Jan-08	Potomac	10.98
54999	76081	20-Mar-06	Potomac	4.14
54057	29146	1-Jan-08	Potomac	11.13
54058	29147	1-Jan-08	Potomac	7.34
53489	29124	1-Jan-06	Potomac	6.50
54583	29148	20-Aug-08	Potomac	14.24
54071	76131	1-Jan-09	Potomac	12.28
55022	34035	1-Feb-06	Potomac	17.77
53900	88024	1-Jan-06	York	3.16
53899	88023	1-Jan-06	York	1.31
54642	36009	29-May-08	York	32.00

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Appendix D
Screening Results of Stream Restoration Projects

Screened Stream Restoration Projects in James River Basin

Project Location	Number of Linear feet	TN Reductions (lbs/yr)	TP Reductions (lbs/yr)	TSS Reductions (lbs/yr)
Rivanna AHQ	178	13.4	0.91	41
Fulton Warehouse	796	59.7	4.06	182
Richmond District Complex	7807	585.5	39.82	1787
Chesterfield Residency Complex	719	53.9	3.67	165
I-295/Rt 10 Storage Area	1030	77.3	5.25	236
Powhite Toll South Courthouse	667	50.0	3.40	153
Meadow Road Complex	3195	239.6	16.29	731
Skiffs Creek	321	24.1	1.64	73

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Appendix E
Screening Results of Severely Eroded Outfalls

Screening Results of Severely Eroded Outfalls

Outfall ID	River Basin	Number of Linear Feet	TN Reductions (lbs/yr)	TP Reductions (lbs/yr)	TSS Reductions (lbs/yr)
CH-L3-06	James	15	1.125	1.02	673.2
DC-AD5-009	Potomac	15	1.125	1.02	673.2
DC-M15-G08	Potomac	8	0.5625	0.51	336.6
DC-O16-G01	Potomac	10	0.75	0.68	448.8
FR-C5-02	Rappahannock	13	0.9375	0.85	561
FR-E6-005	Rappahannock	8	0.5625	0.51	336.6
FR-G4-POD-06	Rappahannock	10	0.75	0.68	448.8
FR-I3-01	Rappahannock	15	1.125	1.02	673.2
FR-K2-01	York	13	1	0.906667	598.4
FR-K2-05	York	13	1	0.906667	598.4
FR-K5-09	Rappahannock	18	1.3125	1.19	785.4
LY-H8-EEE-02	James	10	0.75	0.68	448.8
LY-I8-EEE-01	James	10	0.75	0.68	448.8
LY-O3-EEE-01	James	8	0.625	0.566667	374
LY-P6-03	James	8	0.5625	0.51	336.6
RC-AB-5-008	James	10	0.75	0.68	448.8
RC-AC12-19	James	6	0.46875	0.425	280.5
RC-AC-68	James	8	0.5625	0.51	336.6
RC-AD7-12	James	10	0.75	0.68	448.8
RC-AG12-23	James	10	0.75	0.68	448.8
RC-AM18-01	James	15	1.125	1.02	673.2
RC-AM18-07	James	15	1.125	1.02	673.2
RC-J12-I95-87	James	5	0.375	0.34	224.4
RC-J12-I95-94	James	7	0.5	0.453333	299.2
RC-K12-I295-07	James	15	1.125	1.02	673.2
RC-K12-I295-10	James	11	0.8125	0.736667	486.2
RC-K12-I295-13	James	10	0.75	0.68	448.8
RC-K14-05	York	10	0.75	0.68	448.8
RC-K14-06	York	8	0.5625	0.51	336.6
RC-L12-I295-10	James	13	0.9375	0.85	561
RC-L15-05	York	8	0.5625	0.51	336.6
RC-O12-I95-17	James	8	0.5625	0.51	336.6
RC-O15-06	James	15	1.125	1.02	673.2
RC-O15-07	James	8	0.5625	0.51	336.6
RC-O15-09	James	8	0.5625	0.51	336.6
RC-P16-I295-13	James	15	1.125	1.02	673.2
RC-V10-10	James	8	0.5625	0.51	336.6
RC-Y11-18	James	7	0.5	0.453333	299.2

Outfall ID	River Basin	Number of Linear Feet	TN Reductions (lbs/yr)	TP Reductions (lbs/yr)	TSS Reductions (lbs/yr)
RC-Y9-06	James	6	0.46875	0.425	280.5
RC-Y9-34	James	8	0.5625	0.51	336.6
RC-Z7-17	James	10	0.75	0.68	448.8
Rich-ah18-001	James	8	0.5625	0.51	336.6
VB-AA14-10	York	7	0.5	0.453333	100.8667
VB-AA16-01	James	8	0.5625	0.51	113.475
VB-AA16-03	James	6	0.46875	0.425	94.5625
VB-AE13-19	James	7	0.5	0.453333	100.8667
VB-AK9-03	James	15	1.125	1.02	226.95
VB-AQ13-02	James	8	0.5625	0.51	113.475
VB-AT23-08	James	10	0.75	0.68	151.3
VB-F9-01	York	10	0.75	0.68	151.3
VB-N11-03	York	8	0.5625	0.51	113.475
VB-O11-07	York	7	0.5	0.453333	100.8667
VB-O12-38	York	8	0.59375	0.538333	119.7792
VB-R12-54	York	8	0.5625	0.51	113.475
WM-C4-02	James	10	0.75	0.68	151.3
WM-K5-005	James	10	0.75	0.68	151.3
WM-K9-002	York	10	0.75	0.68	151.3
WM-L8-EEE-02	James	10	0.75	0.68	151.3