George Mason University
Chesapeake Bay TMDL Action Plan

Phase 3 Permit Term 2023-2028
Permit Number VAR040106

Nov 1,2024
Amended Feb 2025

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Appendices

Executive Summary

George Mason University (Mason) is required to develop a Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan by the 2023-2028 General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 Permit third permit cycle) and in accordance with the Virginia Department of Environmental Quality (DEQ) Chesapeake Bay TMDL Action Plan Guidance Document (Guidance Document) dated May 18, 2015. This Action Plan details how Mason intends to provide the remaining 60% reduction in loading of the pollutants of concern (POCs) nitrogen, phosphorus and total suspended solids (TSS).

Mason's Phase 1 TMDL Action Plan, "George Mason University Chesapeake Bay TMDL Action Plan Permit Number VAR040106" by Timmons Group, dated October 2015, describes in detail the methodology used to determine the extent of the MS4 service area, including the estimated regulated impervious and pervious acres served by its MS4. No changes to Mason's MS4 service area or regulated impervious and pervious acres have been implemented since that time, therefore the information has been incorporated into the base information for the Phase 2 and Phase 3 TMDL Action Plan.

For compliance with the first permit cycle ending June 30, 2018, Mason utilized credit from existing oversized stormwater best management practices (BMPs) and implemented 320' of urban stream restoration on the Fairfax Campus. This provided reductions above and beyond the 5% requirement for the Phase 1 TMDL Action Plan. These additional reductions were credited toward the Phase 2 TMDL Action Plan reduction requirements.

For compliance with the second permit cycle ending Oct 30, 2023, Mason implemented 1,722' of urban stream restoration on the Fairfax Campus. This provided reductions above and beyond the 35% requirement for the Phase 2 TMDL Action Plan. These additional reductions were credited toward the Phase 3 TMDL Action Plan reduction requirements and have achieved the 60% Phase 3 TMDL reduction requirements as well.

Based on the stream restoration project completed in the second permit cycle, Mason has achieved and exceeded the Phase 3 TMDL Action Plan reduction requirements. Mason has fulfilled the Chesapeake Bay TMDL Special Condition for completion of 100% of required nitrogen, phosphorus, and sediment reductions.

Current MS4 Program and Existing Legal Authority

Stormwater discharges within George Mason University (Mason) are regulated under the terms of a Virginia Pollutant Discharge Elimination System (VPDES) General Permit for Discharges from Small Municipal Separate Storm Sewer System (General Permit No. VAR040106). This MS4 permit is issued to Mason by Virginia Department of Environmental Quality (DEQ), consistent with the provisions of Section 402 of the Clean Water Act and the Virginia Stormwater Management Act, which authorizes the Virginia Stormwater Management Program (VSMP) Regulations. A review of Mason's current MS4 Program Plan and existing legal authorities confirms that Mason has several relevant existing legal authorities and policies to comply with the Part II – TMDL Special Conditions. The relevant existing legal authorities and policies include the following:

- Mason's MS4 Program Plan
- Mason's Illicit Discharge Detection and Elimination Policy
- Mason's Nutrient Management Program
- Mason's Environmental Management and Sustainability System Policy
- Mason's Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management
- Mason's Stormwater Master Plan
- Mason's Design Manual

Mason is currently working to update their Stormwater Master Plan in conjunction with development of the TMDL Action Plan. No other significant changes have occurred to Mason's MS4 Program or existing legal authority since the Phase 1 TMDL Action Plan. Therefore, Mason is in compliance with the special condition.

Mason's Fairfax and Science and Technology campuses are bordered by several different jurisdictions, each with their own MS4 Programs. These potentially interconnected MS4s include the City of Fairfax, Fairfax County, VDOT and Prince William County. There are currently no memorandums of understanding (MOUs) between Mason and these entities. Mason reserves the right to coordinate and clarify MS4 service boundaries and interjurisdictional responsibilities for pollutant of concern (POC) loads and reductions through such means in the future.

Estimated Source Loads and POC Reduction Requirements

The Commonwealth of Virginia committed to a phased approach to address specific nutrient and sediment reductions being discharged from MS4s that drain to the Chesapeake Bay. The identified pollutants of concern include phosphorus, nitrogen, and total suspended solids (TSS). This phased approach requires MS4s to establish a baseline and develop approaches to achieve a 5% reduction of the POCs in the first permit cycle (2013-2018), an additional 35% reduction in the second permit cycle (2018-2023), and an additional 60% reduction in the third permit cycle (2023-2028) for a total of 100% reduction from the baseline to be achieved by the end of the third permit cycle in 2028. The plan should be in accordance with the DEQ Chesapeake Bay TMDL Action Plan Guidance Document (Guidance Document) dated May 18, 2015.

The 2013-2018 MS4 General Permit required an evaluation of the 2009 regulated land cover, calculation of POC loading, and identification of means and methods to achieve a 5% reduction to the POC loading. Mason's Phase 1 TMDL Action Plan, "George Mason University Chesapeake Bay TMDL Action Plan Permit Number VAR040106" by Timmons Group, dated October 2015, describes in detail the methodology used to determine the extent of the MS4 service area (including the estimated regulated impervious and pervious acres served by its MS4), as well as the calculations of the POCs and reduction requirements. The existing source loads and required reductions for the POCs are summarized in *Table 1*.

New Sources

Under Part II A.4. Mason is required to calculate offsets from new sources for the 2010 census urban area and the expanded 2020 census urban area, initiating construction between July 1, 2009 and June 30, 2019 designed in accordance with Part II C of the VSMP regulations if the activity disturbed one acre or greater and the resulting TP load was greater than 0.45 lb/acre/year, which is equivalent to an average land cover condition of 16% impervious cover.

Mason has been operating under Annual Standards and Specifications for Erosion and Sedimentation Control and Stormwater Management since 2009, which requires Mason land disturbing activities to follow Virginia stormwater management laws and regulations. Mason required projects design to meet an average land cover condition of 16% or less and doesn't have offsets from new resources.

Grandfathered Sources

Under Part II A.5. Mason is required to calculate offsets from grandfathered projects that began construction after July 1, 2014 that disturbed one acre or greater and the resulting TP load was greater than 0.45 lb/acre/year.

Mason did not have any grandfathered projects for which offset of the increased POC loads was required.

Phase 1 (2013-2018)

Mason's Phase 1 TMDL Action Plan required a reduction of 22.53 lbs/yr of nitrogen, 2.27 lbs/yr of phosphorus, and 2,586.43 lbs/yr of TSS. Mason met the reduction requirements through credit from oversized BMPs (Appendix D) and urban stream restoration. Additional credit from Phase 1 was credited toward the Phase 2 reduction requirements.

Phase 2 (2018-2023)

No changes to Mason's MS4 service area or regulated impervious and pervious acres have occurred since the Phase 1 TMDL Action Plan. Therefore, the same areas and reduction requirements have been incorporated into the base information for the Phase 2 TMDL Action Plan.

As presented in *Table 1*, the load reduction requirements for the Phase 2 TMDL Action Plan 35% reduction, inclusive of the credits from Phase 1, are 136.39 lbs of nitrogen, -0.67 lbs of phosphorus, and -14,394.89 lbs of total suspended solids (TSS). This means that no reductions of phosphorus or TSS are required to meet the Phase 2 reduction requirements.

Mason met the reduction requirements through the 1,722' urban stream restoration completed in 2022. With the updated design parameters, the stream restoration project was able to achieve a reduction of 477.8 lbs of Nitrogen, 58.0 lbs of Phosphorus, and 19,963.9 lbs of TSS. This met the reductions required by Phase 2 and also provided additional credits toward the Phase 3 reduction requirements, meeting all the Phase 3 reduction requirements.

Phase 3 (2023-2028)

No changes to Mason's MS4 service area or regulated impervious and pervious acres have occurred since the Phase 1 TMDL Action Plan. Therefore, the same areas and reduction requirements have been incorporated into the base information for this Phase 3 TMDL Action Plan.

As presented in *Table 1*, the load reduction requirements for the Phase 3 TMDL Action Plan 60% reduction, inclusive of the credits from Phase 2, are -80.84 lb of nitrogen, -22.82 lb of phosphorus, and -3,315.8 lb of total suspended solids (TSS). This means that no reductions of nitrogen, phosphorus or TSS are required to meet the Phase 3 TMDL requirements.

Mason has met the Phase 3 reduction requirements through the 1,722' urban stream restoration completed in 2022. Mason has fulfilled the Chesapeake Bay TMDL Special Condition for completion of 100% of required nitrogen, phosphorus, and sediment reductions.

George Mason University
Chesapeake Bay TMDL Action Plan

Permit Number VAR040106
Phase 3 Permit Cycle 2023-2028

Table 1: MS4 POC Loading and Reduction Calculations

Subsource	Campus	POC	Total Existing Acres Served by MS4 as of 6/30/2009 (acres)	Loading Rate (lbs/acre)	Estimated POC Load (lbs)	5% Total Reduction Required First permit Cycle (lbs)	5% Total Reduction Required First Permit Cycle (lbs)	Reduction Achieved First Permit Cycle (lbs)	Credit Toward Second Permit Cycle (lbs)*	35% Total Reduction Required Second Permit Cycle (lbs)	35% Total Reduction Required Second Permit Cycle (lbs)	Remaining Reduction Required Second Permit Cycle (lbs)	Reduction Achieved Second Permit Cycle (lbs)**	Credit Toward Third Permit Cycle (lbs)**	60% Total Reduction Required Third Permit Cycle (lbs)	60% Total Reduction Required Third Permit Cycle (lbs)	Remaining Reduction Required Third Permit Cycle (lbs)
Regulated Urban Impervious	Fairfax	N	185.01	16.86	3,119.27	14.80	22.53	43.87	21.34	103.61	157.73	136.39	477.8	341.41	189.33	260.57	-80.84
	PW		22.94		386.77	1.84				12.85							
Regulated Urban Pervious	Fairfax		161.80	10.07	1,629.33	4.85				33.98					71.25		
	PW		34.73		349.73	1.04				7.29							
Regulated Urban Impervious	Fairfax	P	185.01	1.62	299.72	1.85	2.28	18.88	16.60	12.95	15.93	-0.67	58.0	58.67	32.34	35.85	-22.82
	PW		22.94		37.16	0.23				1.61							
Regulated Urban Pervious	Fairfax		161.80	0.41	66.34	0.16				1.13					3.51		
	PW		34.73		14.24	0.03				0.24							
Regulated Urban Impervious	Fairfax	TSS	185.01	1,171.32	216,705.91	2,166.47	2,586.42	35,086.26	32,499.84	15,165.27	18,104.95	-14,394.89	19,963.9	34,358.79	29,229.12	31,042.99	-3,315.8
	PW		22.94		26,870.08	268.63				1,880.39							
Regulated Urban Pervious	Fairfax		161.80	175.80	28,444.44	124.59				872.10					1,813.87		
	PW		34.73		6,105.53	26.74				187.19							

*Reduction achieved first permit cycle and credit toward second permit cycle are based on the credit for the over designed BMPs*** and the BANCs assessment of the 320' stream restoration project performed by Mason

**Reduction achieved second permit cycle and credit toward third permit cycle are based on the credit from 1,722' stream restoration project performed by Mason

Oversized BMP***	N	P	TSS	Date Completed
Masonvale Site (lbs)	2.68	0.39	182.32	Oct 2010
Life Sciences Building (3) bioretention (lbs)	1.52	0.20	103.22	June 2011
Total (lbs)	4.20	0.61	285.54	

Conclusion

Mason developed this Phase 3 Chesapeake Bay TMDL Action Plan as required in the 2023-2028 third permit cycle of its MS4 Permit Number VAR040106 and in accordance with the DEQ Guidance Document dated May 18, 2015.

This TMDL Action Plan concludes that the phase 3 pollutant reduction requirements have been met by the stream restoration project completed in 2022. Mason has fulfilled the Chesapeake Bay TMDL Special Condition for completion of 100% of required nitrogen, phosphorus, and sediment reductions.

Mason reserves the right to modify this TMDL Action Plan as needed to maintain compliance with the third permit cycle of its MS4 Permit and to implement and take credit for additional creditable facilities or practices as provided for in the Chesapeake Bay TMDL Special Condition Guidance.

Appendix A

Mason MS4 Regulated Areas by Land Cover Type Fairfax Campus		
Land Cover Type	**Total Area (acres)**	**Regulated Area (acres)**
Impervious	185.01	185.01
Pervious	161.80	161.80
Forested*	298.82	298.82
Open Water*	5.28	0.00
Total	**650.91**	**645.63**

*Excluded from load calculations

Mason MS4 Regulated Areas by Land Cover Type Science and Technology Campus		
Land Cover Type	**Total Area (acres)**	**Regulated Area (acres)**
Impervious	22.94	22.94
Pervious	34.73	34.73
Forested*	75.53	75.53
Open Water*	1.32	0.00
Total	**134.52**	**133.20**

*Excluded from load calculations

Figures 1 and 2 provide maps of the Fairfax and Science and Technology campuses respectively that depict the MS4 service area boundaries, regulated lands, and lands that have been excluded in accordance with DEQ's Guidance Document.

Figure 1

Fairfax Campus

2009 Regulated Area Map

MS4 Service Area

Regulated Area

Regulated

Forest (Excluded)

Open Waters (Excluded)

N

0 500 1,000 1,500

Feet

GEORGE MASON UNIVERSITY

Figure 2

Science and Technology Campus

2009 MS4 Regulated Area Map

MS4 Service Area

Regulated Area

Regulated

Forest (Excluded)

Open Water (Excluded)

N

0 500 1,000

Feet

GEORGE MASON UNIVERSITY

Appendix B

References

Virginia Administrative Code 9VAC25-890-40 “General Permit for the Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems”.

“George Mason University MS4 Program Plan Permit Number VAR040106”.

“George Mason University Chesapeake Bay TMDL Action Plan Permit Number VAR040106” by Timmons Group, dated October 2015.

“Guidance Memo No. 15-2005” by DEQ, dated May 18, 2015.

Virginia Runoff Reduction Method Worksheets

Appendix C

Table 3b
Calculation Sheet for Estimating Existing Source Loads and Reduction Requirements for the Potomac River Basin

		A	B	C	D		E	F
Pollutant	Subsource	Loading rate (lbs/ac/yr)[1]	Existing developed lands as of 6/30/09 served by the MS4 within the 2010 CUA (acres)[2]	Load (lbs/yr)[3]	Percentage of MS4 required Chesapeake Bay total L2 loading reduction		100% cumulative reduction required by 10/31/2028 (lbs/yr)[4]	Sum of 100% cumulative reduction (lb/yr)[5]
Nitrogen	Regulated urban impervious	**16.86**	207.95	3506.04	**9%**		315.5	434.3
	Regulated urban pervious	**10.07**	196.53	1979.06	**6%**		118.7	
Phosphorus	Regulated Urban Impervious	**1.62**	207.95	336.88	**16%**		53.9	59.7
	Regulated urban pervious	**0.41**	196.53	80.58	**7.25%**		5.8	

[1]Edge of stream loading rate based on the Chesapeake Bay Watershed Model Progress Run 5.3.2

[2]To determine the existing developed acres required in Column B, permittees should first determine the extent of their regulated service area based on the 2010 Census urbanized area (CUA). Next, permittees will need to delineate the lands within the 2010 CUA served by the MS4 as pervious or impervious as of the baseline date of June 30, 2009.

[3]Column C = Column A x Column B.

[4]Column E = Column C x Column D.

[5]Column F = The sum of the subsource cumulative reduction required by 10/31/2028 (lbs/yr) as calculated in Column E.