CITY OF HARRISONBURG
PUBLIC WORKS
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April 29, 2024

Megan O'Gorek
Department of Environmental Quality
4411 Early Road
Harrisonburg, VA

Subject: City of Harrisonburg General VPDES Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (VAR040075)

Ms. O'Gorek

Please find the attached Chesapeake Bay TMDL Action Plan for the City of Harrisonburg. Please do not hesitate to contact Public Works should you have any questions at (540) 434-5928 or stormwater@harrisonburgva.gov

Sincerely,

Keith Thomas
Public Works Sustainability and Environmental Manager

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Responsible Official Signature — Date: 4/24/2024

VAR040075	City of Harrisonburg, VA
Permit Number	MS4 Name

Chesapeake Bay TMDL Action Plan

Reporting Period: November 1, 2023 – October 31, 2028
Permit Number: VAR040075

In compliance with the Virginia Stormwater Management Program (VSMP) and General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4)

Revised April 2024

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Chesapeake Bay TMDL Action Plan

Second TMDL Action Plan Requirements

Legal Authority

Requirements:

Any new or modified legal authorities, such as ordinances, permits, policy, specific contract language, orders, and interjurisdictional agreements, implemented or needing to be implemented to meet the requirements of Part II A 3, A 4, and A5.

Response:

This is the third Chesapeake Bay TMDL Action Plan submittal. All existing legal authorities are noted below. A review has been completed and existing legal authorities are sufficient, except the items noted below. Contract language has been established for future temporary and permanent credit purchases.

Legal Authorities Needing Updates

- Section 7-6 of the City Code; Illicit Discharges and Connections Ordinance
    - This ordinance will be updated to reflect the new language in 9VAC25-890-20
- Contract language prohibiting illicit discharges
    - Language is missing in our contract general terms and conditions

Existing Legal Authorities, http://www.harrisonburgva.gov/code

- Section 6-5 of the City Code; Stormwater Utility Fee Ordinance
- Section 7-6 of the City Code; Illicit Discharges and Connections Ordinance
- Section 10-4 of the City Code; Erosion and Sediment Control Ordinance
- Section 10-7 of the City Code; Stormwater Management Ordinance
- Section 10-2 of the City Code; Subdivision Ordinance
- Section 10-3 of the City Code; Zoning Ordinance
- Section 7-3-3.(e) of the City Code; Sewer System Ordinance
- Section 9-6 of the City Code; Public Tree Ordinance
- Design & Construction Standards Manual
- Some of the above ordinances and documents reference the Virginia Erosion and Sediment Control Regulations and the Virginia Erosion & Sediment Control Handbook

Load and Cumulative Reduction Calculations

Requirements:

An estimate of the annual POC loads discharged from the existing sources as of June 30, 2009, based on the Chesapeake Bay Watershed Model Progress Run 5.3.2. The existing developed acres were calculated by determining the extent of the MS4 regulated service area based on the 2010 Census Urbanized Area (CUA) and delineating the lands within the 2010 CUA served by the MS4 as pervious or impervious as of the baseline date of June 30, 2009. The loading was calculated by multiplying the loading rate by the MS4 regulated area.

Response:

Using the best data available at the time, Table 1 below shows the City's MS4 acreages and Table 2 shows the City's estimate of annual POC loads discharged. The acreages and loading used are the same as the first Chesapeake Bay TMDL Action Plan submittal. An explanation of how subsources were calculated is provided in *Appendix A: Explanation of Estimate Annual POC Loads 2009.*

Table 1: MS4 Acreages[1]	
	Total MS4 (ac)
Impervious	3,010
Pervious	3,547
Forest	281
Total	**6,839**

[1] Acreage methodology found in Appendix A: Explanation of Estimate of Annual POC Loads 2009

Table 2: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin[2]				
Pollutant	Subsource	Loading Rate (lbs/ac/yr)	Existing developed lands as of 6/30/09 served by the MS4 within the 2010 CUA (acres)	Loading (lbs/ac/yr)
Nitrogen	Regulated Urban Impervious	16.86	3,010	50,749.60
	Regulated Urban Pervious	10.07	3,547	35,718.29
Phosphorus	Regulated Urban Impervious	1.62	3,010	4,876.20
	Regulated Urban Pervious	0.41	3,547	1,454.27
Total Suspended Solids	Regulated Urban Impervious	1,171.32	3,010	3,525,673.20
	Regulated Urban Pervious	175.80	3,547	623,563.60

[2]Table 2 was taken from *Table 3b: Calculation for Estimating Existing Source Loads and Reduction Requirements for the Potomac River Basin* in the 2023-2028 General Permit.

Total Reductions Achieved as of July 1, 2023

Requirements:

The total reductions achieved as of July 1, 2023, for each pollutant of concern in each river basin. The determination of the total pollutant load reductions necessary was based on the 2023-2028 General Permit methodology, which required the pollutant reductions be determined by multiplying the total existing acres served by the MS4 by the first permit cycle required reduction in loading rate. These

required reductions are outlined in Table 3 below. The total reductions achieved are outlined in Table 4 below.

Response:

Using the best data available at the time, below is the City's estimate of Total POC Reductions required during 2023-2028 permit cycle, as well as a summary of the total reductions achieved as of July 1, 2023.

Table 3: Calculation Sheet for Determining Total POC Reductions Required During the 2023-2028 Cycle for the Potomac River Basin[3]

Pollutant	Subsource	Loading Rate (lbs/ac/yr)	Existing developed lands as of 6/30/09 served by the MS4 within the 2010 CUA (acres)	Load (lbs/yr)	Percentage of MS4 required Chesapeake Bay total L2 loading reduction	100% cumulative reduction required by 10/31/2028 (lbs/yr)	Sum of 100% cumulative reduction (lbs/yr)
Nitrogen	Regulated Urban Impervious	16.86	3,010	50,749	0.09	4567.41	6710
	Regulated Urban Pervious	10.07	3,547	35,718	0.06	2143.08	
Phosphorus	Regulated Urban Impervious	1.62	3,010	4,876	0.16	780.16	886
	Regulated Urban Pervious	0.41	3,547	1,454	0.07	105.42	
Total Suspended Solids	Regulated Urban Impervious		3,010	0		0.00	0
	Regulated Urban Pervious		3,547	0		0.00	

[3]Table 3 was taken from *Table 3b: Calculation Sheet for Determining Total POC Reductions Required During this Permit Cycle for the Potomac River Basin* in the 2023-2028 General Permit.

Table 4: Total Reductions achieved during the 2018-2023 Cycle for the Potomac River Basin

Pollutant	Total Reduction Required Second Permit Cycle (lbs)	Total Reduction Achieved
Nitrogen	2,684	3,262.98
Phosphorus	354	1,089.02

Total Suspended Solids	303,897	512,603.42

BMPs Implemented Prior to November 1, 2023

Requirements:

The list of BMPs implemented prior to November 1, 2023 to achieve reductions associated with the Chesapeake Bay TMDL, including: the date of implementation and the reductions achieved.

Response:

The following practices were implemented prior to November 1, 2023 by the City to meet required reductions. Calculation methodologies for each practices are outlined in the appendices (Appendix B through Appendix H).

Table 5: Summary of Completed BMPs						
Type of BMP	**Project Name**	**Date Implemented**	**Location**	**Reductions (lbs/yr)**		
				TP	**TN**	**TSS**
Permanent Water Quality Trading Credits	CBAY-VA LLC-Stone Bridge	2019	Nutrient Credit Market	8	59.44	571.44
Temporary Water Quality Trading Credits	As Needed (annual)	Annual	HRRSA	73	115	151,989
Stream Restoration	North End Greenway Stream Restoration	2020	North End Greenway	117.90	256.10	40,660.00
Stream Restoration	Mountain View Drive Stream Restoration	2023	Harrisonburg, VA	144.97	415.90	49,980
Stream Restoration	Blacks Run South Stream Restoration-Phase 1	2023	Harrisonburg, VA - PW	685.8	1489.19	236,438.53
Street Sweeping	Street Sweeping (annual)	Annual	Harrisonburg, VA	12.09	42.61	17,478.86
Storm Drain Cleaning	Storm Drain Cleaning (annual)	Annual	Harrisonburg, VA	29.41	132.34	14,704.20
Septic to Sanitary Sewer Connections	Septic to Sanitary Sewer Connections (since 2006)	Specific locations and dates available upon request	Harrisonburg, VA	0	584.66	0
Homeowner BMPs	Homeowner BMPs (annual)	Specific locations and dates available upon request	Harrisonburg, VA	10.61	134.98	0
BMP Retrofits	HCAP Program	Specific locations and dates available upon request	Harrisonburg, VA	0.26	1.21	258.20
Bioreactor	Bioreactor	2019	Purcell Park	0	Pending	0
Urban Tree Canopy Expansion	New Tree Planting	Specific locations and dates available upon request	Harrisonburg, VA	4.05	18.11	524.23
Land Conversion: Turf to Mixed Open	Pollinator Habitats (1.82 ac)	Specific locations and dates	Harrisonburg, VA	2.93	13.44	0

		available upon request				
	Total			**1061.48**	**3202.86**	**356,990.97**
	Amount Needed by 2023			**354**	**2,684**	**303,897**

BMPs to be Implemented During 2023- 2028 Permit Cycle

Requirements:

The list of BMPs to be implemented prior to November 1, 2028 (permit expiration), to meet the cumulative reductions calculated based on the permit methodology.

Response:

Table 6 lists a summary of BMPs that are proposed to be implemented to meet the required reductions outlined above in Table 3. Where available more in-depth information, including percent removal efficiencies for each pollutant of concern, is located in the appendix item for each BMP. In addition, the City will continue to use annual practices, such as street sweeping, storm drain cleaning, Homeowner BMPs, and temporary water quality trading credits. Annual practices are not shown in Table 6 due to variability in reduction amounts from year to year.

Additional BMPs necessary to meet the required reductions will be identified based on the Stormwater Improvement Plan which is currently being updated. This TMDL Action Plan will use the adaptive management approach so that if better practices are identified, the City may substitute alternative practices. The City of Harrisonburg reserves the right to make adjustments to this plan and to substitute any practices and projects that can achieve Pollutant of Concern (POC) reductions. Any substitutions or additions will be reported to DEQ in future annual reports and this TMDL Action Plan submittal.

Table 6: Summary of Planned BMPs					
Type of BMP	**Project Name**	**Anticipated Date Implemented**	**Location**	**Reductions (lbs/yr)**	
				TP	**TN**
Bioreactor	Bioreactor	2019	Purcell Park	0	300
Enhanced Extended Detention Basin	VMRC	2026	Harrisonburg, VA- VMRC	32.43	196.52
Stream Restoration	Blacks Run South Stream Restoration- Phase 2	2023	Harrisonburg, VA - PW	390.96	848.65
Land Use Conversion	Saufley Tree Farm	2026	Rockingham County, VA	123.3	1314
New Tree Planting (assuming 50 trees/yr)	Various tree plantings	2028	Harrisonburg, VA	1.31	0.30
Permanent Water Quality Trading Credits	As Needed	2026- if needed	Nutrient Credit Market	TBD	TBD
BMPs Identified in 2023 SWIP Update (*in progress*)				229	2600
			Total	**744.57**	**4762.95**
			Amount Needed for 2023-2028 Permit Cycle	**531**	**4,027**

Public Comment for TMDL Action Plan

Requirements:

Prior to submittal of the final action plan, the permittee shall provide an opportunity for public comment on the additional BMPs proposed to meet the reductions not previously approved in the first phase Chesapeake Bay TMDL action plan for no less than 15 days.

Response:

A 15 day public comment period was held September 21 – October 5, 2023.

Additional edits to the Action Plan will have a 15-day public comment period. Public comment periods will be noted in this section below as applicable. An opportunity for receipt and consideration of public comment regarding the draft Chesapeake Bay TMDL Action Plan will be provided through the following mediums:

- City Website; www.harrisonburgva.gov
- Harrisonburg Public Works Facebook Page; www.facebook.com/harrisonburgpublicworks
- Harrisonburg Public Works Instagram Page; hbgpublicworks
- Advertisements in Local Newspaper, Local Television Station, and Local Radio Station

Comments will be accepted through social media, hardcopy mediums and e-mail.

The following is a summary of comments received and responses.

Public Comment Period: September 21 – October 5, 2023.

Comment #1: Water pollution reduction. Not sure the city planning department goes along with your reduction proposals. Cutting down 89 acers of trees off Hillandale Drive for a new housing project. How many trees do you expect the city residents to plant to offset...

Response #1: This TMDL Action derived annual Pollutants of Concern (POC) loads discharged from the existing sources as of June 30, 2009, based on the Chesapeake Bay Watershed Model Progress Run 5.3.2. The existing developed acres were calculated by determining the extent of the MS4 regulated service area based on the 2010 Census Urbanized Area (CUA) and delineating the lands within the 2010 CUA served by the MS4 as pervious or impervious as of the baseline date of June 30, 2009. The loading was calculated by multiplying the loading rate by the MS4 regulated area. Development is regulated through other provisions and local ordinances to meet water quality and water quantity requirements. The City has an approved Virginia Stormwater Management Program (VSMP) and implements the VSMP consistent with the Virginia Stormwater Management Act (Sec 62.1-44.15:24 et seq. of the Code of Virginia) and the VSMP Regulations (9VAC25-870). The City also implements its Virginia Erosion and Sediment Control Program (VESCP) consistent with the Virginia Erosion and Sediment Control Law (Sec. 62.1-44.15:51 et seq. of the Code of Virginia) and Virginia Erosion and Sediment Control Regulations (9VAC25-840).

Comment #2: When were the BMPs in Table 5 completed?

Response #2: The BMPs listed in Table 5 were completed under the two previous permit cycles (2013-2018 and 2018-2023).

Comment #3: Table 6 does not include any annual practices from Table 5. Will those practices still be used or is the City getting rid of them?

Response #3: The City will continue to use the annual practices, such as street sweeping, storm drain cleaning, and Homeowner BMPs. Since annual practices produce variable rates of TP and TN reductions from year to year, the City intentionally excludes showing future compliance targets using annual practices in the summary of planned BMPs. The TMDL Action Plan was updated to include clarification on annual practices in the BMPs to be Implemented During 2023- 2028 Permit Cycle section.

Appendix A. Explanation of Estimate of Annual POC Loads 2009

The Chesapeake Bay TMDL pollutant removal estimates provided with the Chesapeake Bay TMDL Action Plan is based on the:

- **Impervious area delineation of parcels and railroad right-of-way.** This was completed using 2011 aerial photography and ArcGIS.
- **An estimate of the public right-of-way impervious area**. The estimate of public right-of-way impervious area within the MS4 boundary was calculated by subtracting an inward buffer of 5-feet from the ROW polygon's area.
- **A delineation of forested areas within the City's MS4 area.** This was completed by scanning 2011 aerial photography to delineate 'forested' areas based on the March, 2015 Chesapeake Bay TMDL draft guidance. In the final revised guidance released by VA DEQ in May 2015, the size threshold for forested areas has been reduced.
- **Delineation of MS4 Service Area.** This delineation was completed by mapping city-owned outfalls and the drainage areas entering them.

The Chesapeake Bay TMDL pollutant removal estimates do not include properties owned by VDOT or James Madison University which are covered by their own MS4 permits. Properties that have VPDES Industrial Stormwater permits have not been removed at this time, and will be considered in the future.

In future years, the City may update the estimate of annual POC loads when new aerial photography or other improved data sources are available.

Appendix B: Calculation of Annual Street Sweeping Pollutant Removal

Credit methodology taken from Guidance Memo No. 20-2003 – Chesapeake Bay TMDL Special Condition Guidance APPENDIX V.G – Street Cleaning and Storm Drain Cleaning.

SCP-1

Routes:

Table 2. Calculate Street Sweeping Loading Rate for the Potomac River Basin-SCP-1

Subsource	Pollutant	Curb Lane Miles Swept (1 curb lan mile swept = 1 acre)	2009 EOS Loading Rate (lbs/acre/yr) Potomac River Basin	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen	0.00	16.86	0.00
Regulated Urban Impervious	Phosphorus	0.00	1.62	0.00
Regulated Urban Impervious	Total Suspended Solids	0.00	1,171.32	0.00

Table 3. Street Sweeping Load Reductions -SCP-1

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	Removal Rate Percentage (lbs/acre/yr)	Total Reduction Credit (lbs/yr)
Regulated Urban Impervious	Nitrogen	0.00	0.04	**0.00**
Regulated Urban Impervious	Phosphorus	0.00	0.10	**0.00**
Regulated Urban Impervious	Total Suspended Solids	0.00	0.21	**0.00**

SCP-2

Routes: Downtown

Table 2. Calculate Street Sweeping Loading Rate for the Potomac River Basin -SCP-2

Subsource	Pollutant	Curb Lane Miles Swept (1 curb lan mile swept = 1 acre)	2009 EOS Loading Rate (lbs/acre/yr) Potomac River Basin	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen	12.00	16.86	202.39
Regulated Urban Impervious	Phosphorus	12.00	1.62	19.45
Regulated Urban Impervious	Total Suspended Solids	12.00	1,171.32	14,060.94

Table 3. Street Sweeping Load Reductions SCP-2

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	Removal Rate Percentage (lbs/acre/yr)	Total Reduction Credit (lbs/yr)
Regulated Urban Impervious	Nitrogen	202.39	0.03	**6.07**
Regulated Urban Impervious	Phosphorus	19.45	0.08	**1.56**
Regulated Urban Impervious	Total Suspended Solids	14,060.94	0.16	**2,249.75**

SCP-3

Routes:

Table 2. Calculate Street Sweeping Loading Rate for the Potomac River Basin -SCP-3

Subsource	Pollutant	Curb Lane Miles Swept (1 curb lan mile swept = 1 acre)	2009 EOS Loading Rate (lbs/acre/yr) Potomac River Basin	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen	0.00	16.86	0.00
Regulated Urban Impervious	Phosphorus	0.00	1.62	0.00

Regulated Urban Impervious	Total Suspended Solids	0.00	1,171.32	0.00

Table 3. Street Sweeping Load Reductions SCP-3

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	Removal Rate Percentage (lbs/acre/yr)	Total Reduction Credit (lbs/yr)
Regulated Urban Impervious	Nitrogen	0.00	0.02	**0.00**
Regulated Urban Impervious	Phosphorus	0.00	0.05	**0.00**
Regulated Urban Impervious	Total Suspended Solids	0.00	0.11	**0.00**

SCP-4

Routes: Areas 1-4 & Areas A-D

Table 2. Calculate Street Sweeping Loading Rate for the Potomac River Basin- SCP-4

Subsource	Pollutant	Curb Lane Miles Swept (1 curb lan mile swept = 1 acre)	2009 EOS Loading Rate (lbs/acre/yr) Potomac River Basin	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen	216.69	16.86	3,653.47
Regulated Urban Impervious	Phosphorus	216.69	1.62	351.04
Regulated Urban Impervious	Total Suspended Solids	216.69	1,171.32	253,818.44

Table 3. Street Sweeping Load Reductions- SCP-4

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	Removal Rate Percentage (lbs/acre/yr)	Total Reduction Credit (lbs/yr)
Regulated Urban Impervious	Nitrogen	3,653.47	0.01	**36.53**

Regulated Urban Impervious	Phosphorus	351.04	0.03	**10.53**
Regulated Urban Impervious	Total Suspended Solids	253,818.44	0.06	**15,229.11**

SCP-5

Routes: Parking lots

Table 2. Calculate Street Sweeping Loading Rate for the Potomac River Basin- SCP-5

Subsource	Pollutant	Curb Lane Miles Swept (1 curb lan mile swept = 1 acre)	2009 EOS Loading Rate (lbs/acre/yr) Potomac River Basin	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen	4.53	16.86	76.38
Regulated Urban Impervious	Phosphorus	4.53	1.62	7.34
Regulated Urban Impervious	Total Suspended Solids	4.53	1,171.32	5,306.08

Table 3. Street Sweeping Load Reductions- SCP-5

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	Removal Rate Percentage (lbs/acre/yr)	Total Reduction Credit (lbs/yr)
Regulated Urban Impervious	Nitrogen	76.38	0.07	**5.35**
Regulated Urban Impervious	Phosphorus	7.34	0.02	**0.15**
Regulated Urban Impervious	Total Suspended Solids	5,306.08	0.04	**212.24**

Street Sweeping Credits Based Upon 2020 Guidelines for Street Sweeping			
		Removal Rate (%)	Mass Removed (lbs)

Lane Miles/Acres	Street Cleaning Practice	TSS	TN	TP	TSS	TN	TP
0.00	SCP-1	21	4	10	0.00	0.00	0.00
12.00	SCP-2	16	3	8	2,249.75	6.07	1.56
0.00	SCP-3	11	2	5	0.00	0.00	0.00
216.69	SCP-4	6	1	3	15,229.11	36.53	10.53
4.53	SCP-5	4	0.7	2	212.24	5.35	0.15
228.6987141	**Total:**				**17,691.10**	**47.95**	**12.23**

Table 1. Street Cleaning Practices Available for Credit

	Practice #	**Description**	**Passes/yr (apx)[2]**	**%TSS Removal**	**%TN Removal**	**% TP Removal**
Advanced Sweeping Technology	SCP-1	2 passes per week	-100	21	4	10
	SCP-2	1 pss per week	-50	16	3	8
	SCP-3	1 pass every 2 weeks	-25	11	2	5
	SCP-4	1 pass every 4 weeks	-10	6	1	3
	SCP-5	1 pass every 8 weeks	-6	4	0.7	2
	SCP-6	1 pass every 12 weeks	-4	2	0	1
	SCP-7	Seasonal scenario 1 or 2	-15	7	1	4
	SCP-8	Seasonal scenario 3 or 4	-20	10	2	5
Mechanical Broom Tech	SCP-9	2 passes per week	-100	1		
	SCP-10	1 pass per week	-50	0.5		
	SCP-11	1 pass every 4 weeks	-10	0.1		

Appendix C: Calculation of Annual Storm Drain Cleaning Pollutant Removal and Storm Drain Cleaning Standard Operating Procedure

Credit methodology taken from Guidance Memo No. 20-2003 – Chesapeake Bay TMDL Special Condition Guidance APPENDIX V.G – Street Cleaning and Storm Drain Cleaning.

Storm Drain Cleaning Credit Estimates

Collection Totals

2022-2023

Month	Tons Collected
July	
August	
September	
October	
November	
December	
January	7.71
February	17.84
March	
April	9.46
May	
June	
Total	**35.01**

Pollutant Removal Calculation

Tons	35.01
lbs	70,020.00
lbs x .7 dry weight conversion	49,014.00

TN (lbs x .0027)	**132.34**
TP (lbs x .0006)	**29.41**
TSS (lbs x .3) **250 Micron Correction**	**14,704.20**

Appendix D: Calculation of Residential Credit Pollutant Reduction

Calculation methodology submitted in September 29, 2016 Annual Report submittal and was received by DEQ on December 8, 2016.

Homeowner BMPs Worksheet

Reporting Year*: **2022-2023** *Includes application years: 2016-2022

Site Calculations

	Total Area Draining to BMP		Pollutant Loads	
	Impervious Area (sf)	Pervious Area (sf)	TP Loading	TN Loading
Roof Drain Disconnection	475,128.30		17.67	183.90
Rain Barrel/ Cistern	63,002.98		2.34	24.39
Homeowner Nutrient Mgmt		4,710,289.14	44.33	1,088.90

Site Load Reductions

	Removal Rates		Nutrient Load Reduced	
	TP%	TN%	lbs TP/ yr	lbs TN/ yr
Roof Drain Disconnection	52%	45%	9.19	82.75
Rain Barrel/ Cistern	33%	28%	0.77	6.83
Homeowner Nutrient Mgmt	3%	6%	1.33	65.33
		TOTAL	**11.29**	**154.92**

Site Load Reductions with Compliance Factor

	Compliance Factor	Nutrient Load Reduced w/ Compliance Factor	
		lbs TP/ yr	lbs TN/ yr
Roof Drain Disconnection	100%	9.19	82.75
Rain Barrel/Cistern	90%	0.70	6.15
Homeowner Nutrient Mgmt	75%	1.00	49.00
	TOTAL	**10.88**	**137.90**

Due to new internal data management processes established in 2020, changes in how Homeowner BMP reductions are reported were made to reflect all current applications. This change reflects that every five years some applications are renewed and bumped into a new application year along with new applications for that year and some applications are removed due to expiration of credit.

Appendix E: Homeowner BMP Inspection Program & Non-Compliance Determination

Application Cycle 1

Year 1	**Annual Spot Check**	**Year 5**
Application Verification Process	On-Site Inspections	Re-Application Verification Process

Year 1

As a part of the application package, residential property owners take multiple steps to validate that their BMPs exist and function properly at the time of submittal. The application package is reviewed and verified by Public Works staff. Site visits and desktop analysis using Google Earth features are both utilized on an as-needed basis to ensure application information is accurate.

Validation Steps Taken by Applicants at the Time of Initial Application:

- Pictures must be taken of Rain Barrels and Downspout Disconnections no more than 60 days prior to application submittal.
- Application must be filled out and signed.
    - Signature of Agreement; *I hereby certify the above information to be true and correct to the best of my knowledge. I agree that pollutant credits approved by the City of Harrisonburg as Stormwater Utility Fee Credits will no longer be available for any other use, including Virginia Stormwater Management Program requirements.*
- Lawncare Agreement must be filled out and signed.
    - Signature of Agreement; *Upon signing this document, I agree to follow the selected responsible lawn care maintenance items for the extent of the Agreement and for the total land area listed in this Agreement.*
- Maintenance Agreement must be filled out and signed.
    - (Maintenance Agreement Language) Commitment to Operation and Maintenance of Facility; The Property Owner(s), including any homeowners association, shall adequately operate, inspect, and maintain the stormwater management BMP facilities in accordance with the specific operation, inspection, and maintenance requirements set forth in the attachment to the maintenance agreement.
    - Signature of Agreement; *Upon signing this document, The City and the Property Owner(s) agree to the terms and conditions as outlined above and as described in the appropriate Stormwater Utility Fee Credit Manual for Non-Residential or Residential effective on the date signed.*

Maintenance Schedule and Guidelines are available for all BMPs to property owners on the stormwater utility fee website. These fact sheets include a schedule of maintenance tasks associated with each

practice. A maintenance record is also available for the homeowner to log any maintenance activities. This maintenance record is required for submittal as part of the five year re-application.

Annual Spot Check

The City of Harrisonburg will spot-inspect 25% of the active residential properties annually with a maximum of 30 inspections. Letters will be sent to the pool of properties notifying property owners of their upcoming inspection (or phone calls/emails), as is required in the signed maintenance agreement. Staff will have a right to enter the property as is outlined in the maintenance agreement. An inspection report will be completed by staff and kept on file with the credit application information (see attachment). If inspection violations/issues are noted, a formal letter will be sent to the property owner. If violations are not corrected within 90 days after notification is sent, the approved credits for the insufficient BMP will be removed.

Applications are counted as active if their status is Approved (not denied, expired, or moved) and has not had an inspection in the last 5 years. Additionally, applications in final year or approved in the current year are not included as they are verified in the renewal or application.

Year 5

The Stormwater Utility Fee Credit Program allows applicants credit for five years from the date of application approval.

<u>Validation Steps Taken by Applicants at the Time of Re-Application:</u>

- Pictures must be taken of Rain Barrels and Downspout Disconnections within 60 days of re-application.
- Re-Application must be filled out and signed.
    - Signature of Agreement; *I hereby certify the above information to be true and correct to the best of my knowledge. I agree that the BMPs approved by the City of Harrisonburg as Stormwater Utility Fee Credits are maintained properly and functioning as designed.*
- *Maintenance Record filled out and submitted (in compliance with maintenance agreement)*
    - (Maintenance Agreement Language) Required Documentation; The Property Owner(s) shall document any maintenance, landscaping, and repairs performed to the on-site stormwater management BMP facilities on the City's Maintenance Record form and provide a copy of said Maintenance Record to the City or its representatives upon request. Regular inspection by the Property Owner(s) is encouraged, but submittal of inspection forms to the City is not required.

Non-Compliance Factor

The non-compliance factor will be calculated based on the current annual spot check inspection year. The percentage of compliant inspections for each reported practice (i.e. roof drain disconnection, rain

barrel/cistern, and homeowner nutrient management) will be applied to the total active practices for each respective practice. For example, if 10 rain barrel practices were inspected during the annual spot check and 1 was found to be non-compliant, the non-compliance factor would be calculated as follows and applied to the final site load reduction for all active rain barrel practices:

1 non-compliant inspection out of 10 = 90% compliance

Nutrient Load Reduced * compliance factor = Final Site Load Reduction

0.70 lbs TP/yr * 0.90 = 6.15 lbs TP/yr

Appendix F: Calculation of Septic System to Sanitary Sewer System Connection Credit

Credit methodology taken from Virginia Department of Environmental Quality – email from Jamie Bauer December 2016

Verified septic system to sanitary sewer system connections:
39 connections from 2006-2019
2012-2016 U.S. Census Bureau Persons per household:
2.7 Persons per household

The assumed average load of TN at the edge of the septic drain field is 9 lbs TN/year/person with an attenuation factor from edge of drain field to edge of stream resulting in a TN load of 3.6 lbs TN/year/person at the edge of stream.

Year	# Connections	Total Credits (lbs TN/yr)
2006	6	56.58
2007	6	56.58
2008	7	66.01
2009	1	9.43
2010	2	18.86
2011	4	37.72
2012	0	0
2013	3	28.29
2014	2	18.86
2015	1	9.43
2016	1	9.43
2017	3	28.29
2018	1	9.43
2019	12	113.16
2020	6	56.58
2021	3	28.29
2022	1	9.43
2023	3	28.29
Total credit (lbs TN/yr) amount from 2006 to present	**62**	**584.66**

Appendix G: Calculation of Tree Planting Pollutant Removal

Credit Methodology from Recommendations of the Expert Panel to Define BMP Effectiveness for Urban Tree Canopy Expansion (2016).

Methodology from *Recommendations of the Expert Panel to Define BMP Effectiveness for Urban Tree Canopy Expansion (2016).* Loading rates taken from average land use loading rates in the phase 6 watershed model, found on Table 2 (Page 5) of the *Good Recipes for the Bay Pollution Diet* "U-11 Urban Tree Planting Practices" document, shown below in Table 2.

Table 2. Average Land Use Loading Rates in the Phase 6 Watershed Model

Land Use	Total Nitrogen (lbs/acre/year)	Total Phosphorus (lbs/acre/year)	Total Suspended Solids (lbs/acre/year)*
Turf	11.19	0.86	760
Roads	22.87	0.86	1,880
Other Impervious	18.08	0.69	2,080
Forest	1.68	0.08	140

* Sediment loading rates based on MS4 average loading rates. Sediment loading rates for Non-Regulated and CSS acres are slightly different.

[1] Example is based upon average land use loading rates for the draft final Phase 6 Watershed Model. Average loading rates are subject to change.

Appendix H: Calculation of Stream Restoration/Ecological Restoration Pollutant Removal

Credit methodology taken from Guidance Memo No. 20-2003 – Chesapeake Bay TMDL Special Condition Guidance APPENDIX V.J – Urban Stream Restoration

Pollutant Reducrtion Reports completed by project engineers are available upon request for each completed stream restoration project.

Project	Year Completed	Protocols
Northend Greenway	2021	1 and 2
Mountain View Drive	2023	1 and 2
Blacks Run South	Expected 2024	1, 2 and 3