

CHESAPEAKE BAY TMDL ACTION PLAN

June 2025



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List of Abbreviations

Title	Abbreviation
Best Management Practice.....	BMP
Chesapeake Bay Local Assistance Department	CBLAD
Chesapeake Bay Preservation Act.....	CBPA
Capital Improvement Project.....	CIP
Virginia Department of Conservation and Recreation	DCR
Virginia Department of Environmental Quality	DEQ
Department of General Services.....	DGS
Edge of Stream	EOS
Environmental Protection Agency	EPA
Intensely Developed Area	IDA
Leadership in Energy and Environmental Design	LEED
Low Impact Design.....	LID
Minimum Control Measure	MCM
Minimum Standard	MS
Municipal Separate Storm Sewer Systems	MS4
National Pollution Discharge Elimination System.....	NPDES
Pollutant of Concern	POC
Resource Protection Area.....	RPA
Stormwater Improvement Project	SIP
Stormwater Management	SWM
Stormwater Management Masterplan.....	SWMP
Stormwater Pollution Prevention Plan	SWPPP
Total Maximum Daily Load.....	TMDL
Total Nitrogen	TN
Total Phosphorus.....	TP
Total Suspended Solids.....	TSS
Vanasse Hangen Brustlin.....	VHB
Virginia Institute of Marine Science	VIMS
Virginia Erosion and Sediment Control Program	VESCP
Virginia Pollution Discharge Elimination System.....	VPDES
Virginia Stormwater Management Handbook	VSMH
Virginia Stormwater Management Program	VSMP
Watershed Implementation Plan.....	WIP

1. Introduction

Purpose

This Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan was written to describe the means and methods by which Virginia Institute of Marine Science (VIMS) intends to meet the Special Condition for the Chesapeake Bay TMDL. This Special Condition is located in the General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems which was effective as of July 1, 2013, and states that Small Municipal Separate Storm Sewer Systems (MS4) must create a TMDL Action Plan and submit the plan to the Virginia Department of Environmental Quality (DEQ).

VIMS' MS4 permit (VAR040052) requires action plans to be implemented for the impaired bodies of water to which it discharges stormwater runoff. The ultimate discharge point for VIMS is the Chesapeake Bay. The entire campus drains to the York River. A TMDL is assigned to determine a waste load allocation to VIMS that establishes the maximum amount of pollutant that can enter an impaired water without violating water quality standards.

The TMDL for the Chesapeake Bay was established by the EPA in 2010 and targets specific Pollutants of Concern (POCs). POCs included in the TMDL are total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS). Virginia developed a Chesapeake Bay TMDL Watershed Implementation Plan (WIP) that implements an outline for meeting the Chesapeake Bay TMDL. The WIP requires a phased approach over three five-year permit cycles for meeting required POC reductions in order to meet the final TMDL target goal. The reductions include a 5% first permit cycle reduction, which will need to be accomplished by the end of the first permit cycle (June 30, 2018), a 35% second permit cycle reduction, which will need to be accomplished by the end of the second permit cycle (June 30, 2023), and a 60% third permit cycle reduction which will need to be accomplished by the end of the third permit cycle (June 30, 2028). The total reduction thus is 100% of the TMDL requirement.

Reductions are applied to 2009 Edge of Stream (EOS) loading rates for each POC as defined by the Chesapeake Bay Program Watershed Model Phase 5.3.2 for the York River Basin. A target reduction percent in the 2009 EOS loading rates must be met in order to meet the TMDL target goal at the end of the third permit cycle. The reduction target percent is defined for each POC by the Chesapeake Bay WIP. Target reduction percentages are further broken into two categories for impervious and pervious cover. Impervious areas must show a reduction of 9.0% for TN loads, 16% for TP loads, and 20% for TSS loads. Pervious areas must show a reduction of 6.0% for TN loads, 7.25% for TP loads, and 8.75% for TSS loads.

This plan will establish how VIMS intends to meet the 5%, 35%, and 60% reduction requirements by the end of the first, second, and third permit cycles to stay in compliance with their MS4 Permit and the Chesapeake Bay TMDL Special Condition Guidance developed by DEQ. This plan follows the order specified in Guidance Memo No. 15-2005 set forth by DEQ and dated May 18, 2015.

The following elements are included within this Action Plan:

1. Current Program and Existing Legal Authority
2. New or Modified Legal Authority
3. Means and Methods to Address Discharges from New Sources
4. Estimated Existing Source Loads and Calculated Total Pollutant of Concern Required Reductions
5. Means and Methods to Meet the Required Reductions and Schedule
6. Means and Methods to Offset Increased Loads From New Sources Initiating Construction Between July 1, 2009 and June 30, 2014
7. Means and Methods to Offset Increased Loads from Grandfathered Projects that Begin Construction After July 1, 2014
8. List of Future Projects and Associated Acreage that Qualify as Grandfathered
9. An Estimate of the Expected Cost to Implement the Necessary Reductions
10. Public Comments on Draft Action Plan

MS4 Permit Compliance

Table 1 of this plan provides the requirements of VIMS' MS4 permit and the specific section of this plan where the requirement is met by VIMS' MS4 Program Plan. Additionally, *Table 1* also describes actions VIMS has taken to meet the requirements specified by the MS4 permit.

Table 1: MS4 Permit Compliance

VIMS TDML Action Plan Section	Element from DEQ TMDL Special Condition Guidance	MS4 General Permit Section	MS4 Permit Requirement
2	Part VI.1 - Current Program and Existing Legal Authority	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
2	Part VI.2 - New or Modified Legal Authority	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

3	Part VI.3 - Means and Methods to Address Discharges from New Sources	I.C.2.a(3)	The means and methods that will be utilized to address discharges into the MS4 from new sources
4	Part VI.4 - Estimated Existing Source Loads and Calculated Total Pollutants of Concern (POC) Required Reductions	I.C.2.a(4) and 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 versions of Tables 2 a-d 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 versions of Tables 3 a-d 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 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
5	Part VI.5 - Means and Methods to Meet the Required Reductions and Schedule	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

6	Part VI.6 - Means and Methods to Offset Increased Loads from New Sources Initiating Construction between July 1, 2009 and June 30, 2014	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. The operator shall utilize Table 4 to develop the equivalent pollutant load for TN and TSS.
7	Part VI.7 - Means and Methods to Offset Increased Loads from Grandfathered Projects that Begin Construction after July 1, 2014	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 to develop the equivalent pollutant load for TN and TSS.
8	Part VI.8 - List of Future Projects and Associated Acreage that Qualify as Grandfathered	I.C.2.a(10)	A list of future projects and associated acreage that qualify as grandfathered in accordance with 9VAC25-870-48;
9	Part VI.9 - Estimated Expected Cost to Implement Necessary Reductions	I.C.2.a(11)	An estimate of the expected costs to implement the requirements of this special condition during the state permit cycle.
10	Part VI.10.a&b - Public Comments on Draft Action Plan	I.C.2.a(12)	An opportunity for receipt and consideration of public comment regarding the draft Chesapeake Bay TMDL Action Plan.

Summary

In accordance with the MS4 Permit, VIMS must calculate required permit cycle reductions and offsets for the following:

- Existing sources as of June 30, 2009
- Sources beginning construction between July 1, 2009 and June 30, 2014,
- Grandfathered sources beginning construction after July 1, 2014

Existing best management practices (BMPs) that were constructed simultaneously with pollutant sources will provide offset for the required first permit cycle reductions. BMPs that are outlined in the 2016 VIMS Stormwater Master Plan will provide pollutant offset for the required second and third permit cycle reductions. Total POC Load Reductions required by the permit cycles and associated offsets can be found in *Table 2A* through *Table 2B* of this plan. Calculations to determine load reductions can be found in *Table 3* of this plan. Offset calculations can be found in *Appendix B*.

Table 2A: Summary of Required and Achieved Reductions – Second Permit Cycle

Pollutant of Concern	2009 POC Load (lbs/yr)	MS4 Target POC Load (lbs/yr)	Second Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total POC Load Reduction Required by Second Permit Cycle (lbs/yr)	Second Permit Cycle POC Load Reduction Achieved (lbs/yr)
Total Nitrogen	311.31	288.91	0.391	7.84	19.05
Total Phosphorus	38.14	33.13	0.098	1.75	1.85
Total Suspended Solids	9530.81	7823.46	34.181	597.57	1545.87

Table 2B: Summary of Required and Achieved Reductions – Third Permit Cycle

Pollutant of Concern	2009 POC Load (lbs/yr)	MS4 Target POC Load (lbs/yr)	Third Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Third POC Load Reduction Required by First Permit Cycle (lbs/yr)	Third Permit Cycle POC Load Reduction Achieved (lbs/yr)
Total Nitrogen	311.31	288.91	0.670	13.44	58.70
Total Phosphorus	38.14	33.13	0.167	3.01	4.91
Total Suspended Solids	9530.81	7823.46	58.596	1024.41	4481.13

2. Current Program and Legal Authority

Current Program and Existing Legal Authority

As an operator of an MS4, the Virginia Institute of Marine Science must develop, implement, and enforce an [MS4 Program Plan](#) as stated in Phase II MS4 regulations. VIMS has created an MS4 Program Plan that is continually updated and monitored to ensure VIMS meets MS4 regulations. This MS4 Program Plan ensures the VIMS is acting in the most effective manner to reduce pollutant discharge, protect water quality, and ensure compliance with water quality standards. Additionally, the MS4 Program Plan ensures that VIMS is adhering to the Clean Water Act, the MS4 permit regulations, and other associated regulations.

The VIMS MS4 Program Plan is managed by the Office of Safety and Environmental Programs in addition to Facilities Management and includes updating the MS4 Program Plan and the MS4 General Permit Annual Report. Six Minimum Control Measures (MCMs) are outlined in the Phase II MS4 General Permit:

- Public Education and Outreach on Stormwater Impacts
- Public Involvement and Participation
- Illicit Discharge Detection and Elimination
- Construction Site Stormwater Runoff Control
- Post Construction Stormwater Management
- Pollution Prevention and Good Housekeeping for Municipal Operations

Best Management Practices have been integrated into these six MCMs to assist in protecting the water quality within the regulated acreage that ultimately discharges into the Chesapeake Bay. The VIMS' MS4 Program Plan lists each of the six MCMs and activities that VIMS is pursuing to meet them.

Stormwater policies that have been implemented by VIMS within the MS4 Program Plan to administer the Program and comply with the MCMs. These policies can be found on the [VIMS' Stormwater Management Webpage](#).

- [Stormwater Management Master Plan](#), November 2016
- [Illicit Discharge Detection and Elimination Program](#), September 2016
- Stormwater Pollution Prevention Plans, September 2016

New or Modified Legal Authority

New or modified legal authorities are not required for compliance with the Special Condition for the Chesapeake Bay TMDL. VIMS possesses the authorities necessary to meet pollution reduction goals.

VIMS and neighboring MS4 jurisdictions are responsible for the drainage area within their boundaries. In the event that an agreement is made with a neighboring MS4 operator that provides more easily managed compliance, this TMDL Action Plan will be updated.

3. Means and Methods to Address Discharges from New Sources

VIMS must introduce and implement means and methods to offset pollutant loads from new sources. To offset pollutant loads, provisions of the Virginia Stormwater Management Program (VSMP), as of the 2014 revisions, require that for a redevelopment project site of less than 1 acre, TP loadings from that site be reduced by 10%. For a redevelopment project site of greater than 1 acre, VSMP Regulations require TP loadings from that site be reduced by 20% as compared to the existing developed conditions. VSMP Regulations identify TP loading as the “keystone” indicator of runoff water quality. As TP is present in stormwater runoff in both particulate and soluble form, its concentration in stormwater runoff is considered indicative of the presence of other pollutants (TN, TSS) that exist in either form. VSMP regulations requires all new developments to remove 0.41 pounds of TP per acre per year. The Virginia Stormwater Management Handbook (VSMH) evaluates BMP pollutant removal performance in terms of percentage of TP removed. TP removal loads are used to determine TN and TSS removal loads through use of pollutant loading ratios found in *Table 4* of the MS4 General Permit regulations and *Appendix B* of this plan.

Since VIMS is a graduate school of the College of William and Mary, the ESC and SWM plan approval and application process is governed by the College of William and Mary Annual Standards and Specifications. Construction documents are developed by a design team hired by VIMS which includes surveyors, engineers, and landscape architects. Plans are designed to comply with the Virginia Standards and to comply with the MS4 General Permit regulations.

Following plan approval, general contractors are responsible for obtaining the necessary land disturbance permits and attending preconstruction meetings with VIMS officials. The purpose of the preconstruction meeting is to review all erosion and sediment controls once they are installed on site and to confirm they comply with the approved plans. The contractor is also responsible for maintaining the latest approved set of plans and the SWPPP on-site for each project during the extent of construction. A certified inspector is responsible for making sure each inspection is completed for the site.

A preconstruction meeting is also held prior to installation of any permanent water quality BMPs. Following construction, permanent stormwater facilities are inspected for conformance with plans, specifications, and standards. Annual inspection of stormwater facilities will be conducted with maintenance being performed as required by the contractor, or VIMS Facilities Management staff.

In addition to measures discussed within this TMDL Action Plan, VIMS has a previously completed Stormwater Master Plan previously provided to the Virginia DEQ. This Master Plan outlines several Stormwater Improvement and Capital Improvement projects that can be implemented on campus to meet future Permit Cycle pollutant reduction goals. Campus-wide Stormwater Pollution Prevention Plans

are to be submitted as part of the VIMS' MS4 Program Plan to assist in facilitating the measures for maintaining current and future best management practices.

4. Estimated Existing Source Loads and Calculated Total Pollutant of Concern (POC) Required Reductions

MS4 Area Delineation

In order to estimate the existing source loads within VIMS' regulated area, an MS4 boundary for the campus was outlined. The MS4 area delineation as well as areas of pervious and impervious regulated land are determined based on data from the 2016 Stormwater Master Plan (SWMP). Area delineation is calculated in the SWMP using GIS data and survey for the VIMS campus that was generated from an aerial flown in 2016. GIS data was supplemented by various record drawings of completed projects on the VIMS campus. A map of VIMS' MS4 boundary can be found in *Appendix A*.

In accordance with DEQ's Chesapeake Bay TMDL Special Guidance, VIMS may exclude from its MS4 service area land regulated under any general VPDES permit that addresses industrial stormwater or forested land one half contiguous acre or more that meets specific criteria. VIMS has not identified any property with a VPDES industrial stormwater permit or forested area within its MS4 boundary. If a property within the VIMS campus obtains an industrial stormwater permit, further analysis would be necessary to determine if this property meets specific criteria to be excluded from the MS4 service area delineation.

Existing Source Loads

Existing source loads for TP, TN, and TSS were calculated using 2009 Edge of Stream (EOS) loading rates specified in the MS4 General Permit. Since the VIMS campus is in the York River watershed, 2009 EOS rates were taken from *Table 2D* of the MS4 General Permit. Loading rates were applied to impervious and pervious cover and summed to determine total existing source loads. See *Table 3* of this plan for existing source load calculations.

Total POC Reduction Requirements

Total pollutant of concern (POC) reduction requirements were calculated using 2009 EOS loading rates that were reduced to meet the final TMDL target goals as required by the Chesapeake Bay Watershed Implementation Plan (WIP). Loading rates for the York River watershed can be found in *Table 3D* of the MS4 Permit. The loading rate reduction percentage is defined by the Chesapeake Bay WIP for each specific POC and land cover type. MS4 Impervious areas must show a reduction of 9.0% for TN loads, 16% for TP loads, and 20% for TSS loads. MS4 Pervious areas must show a reduction of 6.0% for TN loads, 7.25% for TP loads, and 8.75% for TSS loads. Reduced loading rates were then used to determine reduced final POC loads required at the end of the third permit cycle.

After determining the total net reduction required to meet TMDL target goals, the percent reduction for each POC for each permit cycle was calculated. Reduction required for pervious and impervious cover were summed to determine a total reduction required for each POC for each permit cycle. *Table 3* of this plan summarizes POC reduction requirements.

Table 3: TMDL Reduction Requirements

Table 3d
Calculation Sheet for Estimating Existing Source Loads and Reduction Requirements for the York River and Poquoson Coastal Basin

		A	B	C	D	E	F	G	H	I	J
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	Loads (lbs/yr) ³	Percentage of MS4 required Chesapeake Bay Total L2 loading	Percentage of L2 Required by 6/30/2023 (lbs/yr)	40% Cumulative reduction required by 6/30/2023 (lbs/yr) ⁴	Sum of 40% cumulative reduction (lbs/yr) ⁵	Percentage of L2 Required by 6/30/2028 (lbs/yr)	100% Cumulative reduction required by 6/30/2028 (lbs/yr) ⁶	Sum of 100% cumulative reduction (lbs/yr) ⁷
Nitrogen	Regulated Urban Impervious	7.31	17.00	124.27	9%	40%	4.47	8.96	100%	11.18	22.41
	Regulated Urban Pervious	7.65	24.45	187.04	6%	40%	4.49		100%	11.22	
Phosphorus	Regulated Urban Impervious	1.51	17.00	25.67	16%	40%	1.64	2.00	100%	4.11	5.01
	Regulated Urban Pervious	0.51	24.45	12.47	7.25%	40%	0.36		100%	0.90	
Sediment	Regulated Urban Impervious	456.68	17.00	7,763.56	20%	40%	621.08	683.37	100%	1552.71	1708.42
	Regulated Urban Pervious	72.78	24.45	1,779.47	8.75%	40%	62.28		100%	155.70	

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 existing 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 and impervious as of the baseline date of June 30, 2009.
3. Column C= Column A x Column B
4. Column F= Column C x Column D x Column E
5. Column G= The sum of subsource cumulative reduction required by 6/30/23 (lbs/yr) as calculated in Column F
6. Column I= Column C x Column D x Column H
7. Column J= The sum of subsource cumulative reduction required by 6/30/28 (lbs/yr) as calculated in Column I

5. Means and Methods to Meet the Required Reductions and Schedules

Best Management Practices

Best Management Practices (BMP) are used extensively by VIMS to offset sources of pollutant loads. It is a common VIMS practice to construct BMPs as part of Capital Improvement Projects (CIPs) and Stormwater Improvement Projects (SIPs) located on campus. These BMPs are intended to provide water quality treatment and to offset increases in pollutant loads that are associated with developments. Additionally, these BMPs provide surplus treatment that can be used to offset future increases in pollutant loads. The sum offset provided by existing condition BMPs provided enough credit to meet the 5% first permit cycle reduction requirements. BMPs that are planned to be constructed with future CIPs and SIPs will provide additional credit to meet the second and third permit cycle reduction requirements. Since TP is considered a “keystone” pollutant, reduction calculations were performed to target solely TP. Pollutant loading ratios found in *Table 4* of the MS4 General Permit regulations were used to calculate required TN and TSS reductions. See *Appendix B* of this plan for a summary of existing BMPs and associated pollutant offsets.

2016 Virginia Institute of Marine Science Master Plan

The 2016 VIMS Stormwater Master Plan (SWMP) has been previously submitted to DEQ in July 2017. The goal of the SWMP is to provide a “menu” of Capital Improvement Projects (CIPs), and Stormwater Improvement Projects (SIPs) that could be implemented to meet TMDL reduction goals using a variety of BMPs. CIPs are projects that have State funding allocated for their construction and typically include buildings, additions, or improvements to the VIMS campus. SIPs are stand-alone projects that improve the VIMS campus water quality performance and are not tied to any CIP budget. The Master Plan outlines the reduction potential for six CIPs and four SIPs on the VIMS campus. These projects provide enough pollutant offset to meet VIMS TMDL goals and will be used towards meeting permit cycle goals.

First Permit Cycle:

The first permit cycle reduction goals have been met with one existing BMP and two proposed BMPs associated with CIPs. Existing BMPs include an infiltration basin that was utilized with the Facilities Management Building project, called the Moat. Proposed BMPs include two bioretention basins that were constructed with the Consolidated Scientific Research Facility (Davis Hall) project.

Second Permit Cycle:

The second permit cycle goals have been met with a total of three proposed BMPs, one existing BMP, and a purchase of nutrient credits with the Acuff Center for Aquaculture and Boat Basin (Oyster Hatchery) CIP project. BMPs include permeable pavement and a hydrodynamic separator. In addition, the manufactured treatment

device at Andrews Hall will receive an increase in drainage area from the CIP project. These BMPs are located in the eastern portion of the VIMS campus.

Third Permit Cycle:

The third permit cycle goals can be met with a combination of seventeen proposed BMPs that are planned to be constructed with four CIPs and three SIPs and the purchase of offsite nutrient credits. BMPs associated with CIPs include permeable pavement and bioretention basins that will be constructed with the proposed Nunally Hall Addition, Watermen's Hall Addition and Amphitheater, and the Field Support Admin Building. An infiltration basin has been installed with the Chesapeake Bay Hall project completed after the 2023 permit cycle. BMPs associated with SIPs include permeable pavement that will be constructed near the Seawater Laboratory and the Boat Basin, and bioretention basins to be constructed near the Wilson House. These BMPs are located in both the western and eastern portions of the VIMS campus.

Calculations for pollutant removal can be found in *Appendix B. Table 3A* below summarizes the completed BMPs on campus completed with the first two permit cycles. *Table 3B* below summarizes the anticipated BMPs to be designed and constructed to meet the third permit cycle goals.

Table 3A: Summary of Completed BMPs on Campus

Completed Year	Name/Description	Reduction Means/Methods
2018	Facilities Management Building	Infiltration Basin (the Moat) (Existing)
2018	Consolidated Scientific Research Facility (Davis Hall)	Bioretention Basins
2022	Acuff Center for Aquaculture + Boat Basin (Oyster Hatchery)	Permeable Pavement
		MTD - Hydrodynamic
		MTD (Existing)
		Nutrient Credits

Table 3B: Summary of BMPs to be Completed

Fiscal Year to be installed	Name/Description	Reduction Means/Methods
2026	Boat Basin	Permeable Pavement
2027	Field Support (Marine Operations) Admin Building	Permeable Pavement
		Bioretention Basin
2027	Watermen's Hall Addition and Amphitheater	Permeable Pavement
		Bioretention Basins
2028	Nunnally Hall Addition	Permeable Pavement
		Bioretention Basin
2028	Seawater Laboratory	Permeable Pavement
2028	Wilson House	Bioretention Basins

Offsite Nutrient Credit Purchases

In addition to using nutrient credits to aid CIPs in meeting their development goals the "General VPDES Permit for Discharges or Stormwater from Small Municipal Separate Storm Sewer Systems" effective November 1, 2018 allows the use of nutrient credits to meet TMDL requirements. Refer to the VIMS MS4 permit (VAR040052) including nutrient credit requirements. If Stormwater Improvement Projects are not constructed to meet the requirements of the 2028 permit cycles, VIMS will need to purchase nutrient credits. The approximate rate of nutrient trading for the James River watershed is \$20,000 per pound phosphorus. This is a one-time fee.

6. Means and Methods to Offset Increase Loads from New Sources Initiating Construction between July 1, 2009 and June 30, 2014

No projects with BMPs have been constructed on the VIMS campus between July 1, 2009 and June 30, 2014. No increases in pollutant loads or load offsets were introduced during this time.

7. Means and Methods to Offset Increased Loads from Grandfathered Projects Beginning Construction after July 1, 2014

Grandfathered Projects Beginning Construction after July 1, 2014

VIMS does not have any projects that qualify for grandfathering under 9VAC25-875-490.

Future Projects Beginning Construction after July 1, 2014

VIMS is expecting to begin construction projects after July 1, 2014 as part of the Campus Master Plan.

8. List of Future Projects Qualifying as Grandfathered

VIMS has not identified any projects that qualify to be grandfathered under 9VAC25-875-490

9. Estimated Cost of Compliance

The estimated cost of compliance includes estimated stormwater construction costs in addition to operation and maintenance costs that are required to keep existing BMPs functioning. These costs are summarized in *Table 4* and 5 of this plan. Cost breakdowns can be found in *Appendix C*.

Table 4: Costs of Compliance (Operations and Maintenance)

				Existing 2025	
BMP Type	Typical Cycle (years)	Cycle Cost (\$)		Qty	Total Cost (\$/year)
Water Quality Inlet	1	1000	per structure	0	\$ -
Permeable Pavers	1	3000	per acre	0.26	\$ 780
Hydrodynamic Structure	1	1000	per structure	3	\$ 3,000
Bioretention Basin	1	2000	per basin	4	\$ 8,000
Infiltration Basin	1	2000	per basin	2	\$ 4,000
Wet Pond	1	1500	per pond	1	\$ 1,500
Total BMP's				11	
Yearly Cost					\$ 17,280

*Existing constructed facilities as per the date of this report.

Table 5: Costs of Compliance (New Projects)

Permit Cycle	Name/Description	Reduction Means/Methods	Estimated Total Cost (\$)	Phosphorus Removed (lbs)	Estimated Cost per Pound of Phosphorus Removed (\$/lb)
2028	Watermen's Hall Addition and Amphitheater	Permeable Pavement	\$524,683	1.04	\$504,503
		Bioretention Basins			
2028	Nunnally Hall Addition	Permeable Pavement	\$419,299	0.81	\$517,653
		Bioretention Basin			
2028	Field Support Admin Building	Permeable Pavement	\$263,642	0.72	\$366,169
		Bioretention Basin			
2028	Seawater Laboratory	Permeable Pavement	\$337,341	0.73	\$462,111
2028	Boat Basin	Permeable Pavement	\$1,943,592	2.84	\$684,363
2028	Wilson House	Bioretention Basins	\$302,807	0.86	\$352,101
		Permit Cycle Total:	\$3,791,364	7.00	\$541,623

*Costs are per the VIMS November 2016 Stormwater Masterplan

10. Public Comment

Part of the VIMS' MS4 program includes Public Education and Outreach to students, faculty and staff. As part of this program, this TMDL Action Plan will be available on VIMS' Stormwater Management webpage. A 15-day public comment period will take place which will provide an opportunity the VIMS community to provide feedback. Public comments and feedback will be considered and incorporated into this Action Plan before final completion.