Table of Contents

Background ................................................................................................................................................... 1

1. Current Program and Existing Legal Authority (General Permit Section I.C.2.a.(1)) ......................... 2
2. New or Modified Legal Authority (General Permit Section I.C.2.a.(2)) .............................................. 3
3. Means and Methods to Address Discharges from New Sources
   (General Permit Section I.C.2.a.(3)) ..................................................................................................... 3
4. Estimated Existing Source Loads and Calculated Total Pollutant of Concern Required Reductions
   (General Permit Section I.C.2.a.(5)) ..................................................................................................... 4
5. Means and Methods to Meet the Required Reductions and Schedule
   (General Permit Section I.C.2.a.(6)) ..................................................................................................... 7
6. 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)) ......................... 10
7. Means and Methods to Offset Increased Loads from Grandfathered projects that Begin Construction After July 1, 2014 (General Permit Section I.C.2.a.(8)) ............................................. 11
8. A List of Future Projects, and Associated Acreage that Qualify as Grandfathered
   (General Permit Section I.C.2.a.(10)) ................................................................................................. 11
9. An Estimate of the Expected Cost to Implement the Necessary Reductions
   (General Permit Section I.C.2.a.(11)) ................................................................................................. 11
10. Public Comments on Draft Action Plan (General Permit Section I.C.2.a.(12)) ................................. 12
List of Appendices

Appendix A - MS4 Pervious/Impervious Areas Map
Appendix B - BMP Tracking List and Calculation Methodologies
**Background**
The University of Virginia (UVA) is composed of approximately 1,100 acres and is located within the borders of both the City of Charlottesville and Albemarle County. The University is also situated in the headwaters of the Meadow Creek and Moores Creek watersheds which drain to the Rivanna River on the eastern boundary of the City of Charlottesville. The Rivanna River flows to the James River, and ultimately discharges to the lower Chesapeake Bay.

As a predominately urbanized state entity, the University is classified as a Small Municipal Separate Storm Sewer System (MS4) and is mandated to follow the regulations of the Environmental Protection Agency as outlined in the Clean Water Act, the Virginia Stormwater Act and the MS4 General Permit granted by the Department of Environmental Quality (DEQ). The MS4 service area consists of 782 acres.

In compliance with Section I.C of the General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (Permit No.: VAR040073), and the Special Condition described therein, the University of Virginia, an MS4 Operator, has developed a Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan.

The TMDL for the Chesapeake Bay sets limits on the amount of pollutants of concern (POCs), including total nitrogen (TN), total phosphorus (TP) and total suspended solids (TSS), that can be discharged to the Bay without detrimentally impacting water quality. The MS4 Permit Special Condition for the Chesapeake Bay TMDL requires all MS4 operators to reduce existing levels of these POCs to a level that will be protective of Bay water quality. This process typically requires that the MS4 operator install best management practices (BMPs) that will, through various means, lower the contaminant levels in or erosive velocities of stormwater discharged to local streams and water bodies.

The Virginia Phase II Watershed Implementation Plan, in regards to the Chesapeake Bay, dictates compliance under the TMDL and requires applicable MS4 operators or permit holders to meet 5.0% of the Level 2 scoping run reductions (to reduce the POCs in urban areas) by the end of the first permit cycle (2013-2018). The permit also indicates that permit holders will be required to reduce the POCs an additional 35% for the second permit cycle and the final 60% of the Level 2 scoping run reductions in the third permit cycle.

This TMDL action plan has been prepared in accordance with the Virginia General Permit and the DEQ’s TMDL Guidance Memo No. 12-2005, dated May 18, 2015.
1. **Current Program and Existing Legal Authority**  
   *(General Permit Section I.C.2.a.(1))*

The University of Virginia owns, operates and maintains its own small MS4. The entirety of UVA’s MS4 is located on UVA owned property. The Facilities Management Department at the University has developed a comprehensive stormwater program and is responsible for enforcement and compliance with the standards of the Clean Water Act under the General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems. The requirements stipulated in the University’s Annual Standards & Specifications for Stormwater Management and Erosion and Sediment Control (SWM/E&SC) along with their MS4 program plan provide the authority to enforce the Special Condition of the Chesapeake Bay TMDL. In addition, Facilities Management applies a stormwater utility fee to all supported departments, the medical center, and auxiliary entities in order to establish a renewable funding source to maintain the stormwater program.

All projects on UVA property involving land-disturbing activity subject to Virginia SWM/E&SC Laws and Regulations are bound by the UVA Annual Standards and Specifications for SWM/E&SC. UVA’s Annual Standards and Specifications (AS&S) has been developed to ensure that all land-disturbing activities undertaken by UVA will proceed in accordance with all applicable laws and regulations as related to municipal separate storm sewer systems and construction activities. UVA’s AS&S for SWM/E&SC are approved by DEQ and are composed of general specifications. The general specifications that apply to the land-disturbing activities include the following:

1. Virginia Stormwater Management Act (§62.1-44.15:24-50)
2. Virginia Stormwater Management Program (VSMP) Regulations (9VAC25-870)
3. General Permit for Discharges of Stormwater from Construction Activities (9VAC25-880)
4. General Permit for Discharges of Stormwater from Small MS4s (9VAC25-890)
7. Virginia Erosion and Sediment Control Regulations (9VAC25-840)
8. Virginia Erosion and Sediment Control Certification Regulations (9VAC25-850)
10. E&SC Technical Bulletins, as amended *(http://www.deq.state.va.us/Programs/Water/StormwaterManagement/Publications.aspx)*
Additionally, in order for the University to discharge its stormwater into state surface waters, the University is required to have a General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4). The MS4 permit requires the University to implement pollution control measures addressing the following six program areas in order to minimize the amount of pollution entering state waterways:

1. Public Education and Outreach
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management
6. Pollution Prevention/Good Housekeeping

Refer to [http://www.fm.virginia.edu/docs/operations/UVaMS4ProgramPlan.pdf](http://www.fm.virginia.edu/docs/operations/UVaMS4ProgramPlan.pdf) for the current MS4 Program Plan.

UVA has also recently completed a Stormwater Master Plan which reviews the existing regulatory requirements that will shape University strategy for implementation and compliance in the future. This Master Plan addressed the TMDL compliance issues within each cycle of the General Permit and outlined planning considerations and potential projects for various situations and the associated pollutant removal methods. Some of these potential projects are further described in Section 9.

2. **New or Modified Legal Authority**
   (General Permit Section I.C.2.a.(2))

The legal authorities noted in Section 1 are adequate for the University to adhere to the Special Condition for the Chesapeake TMDL; therefore, no new legal authorities are needed. Although no official contracts have been drafted, the University may coordinate with the City of Charlottesville and Albemarle County to draft a memorandum of understanding in order to meet the Special Condition as planning and requirements evolve.

3. **Means and Methods to Address Discharges from New Sources**
   (General Permit Section I.C.2.a.(3))

All projects at the University involving land-disturbing activity subject to Virginia Stormwater Management (SWM) and Erosion and Sediment and Control (E&SC) Laws and Regulations shall be bound by the DEQ-approved UVA Annual Standards and Specifications for SWM/E&SC. Additionally, they shall follow the guidelines of the Energy & Utilities Master Plan – Stormwater section – or appropriate watershed master plan for Meadow Creek or Moore’s Creek. The University ensures that projects are located, designed, and constructed to protect the water quality and living resources of local streams, rivers and the Chesapeake Bay. The University is in
a unique position in that it oversees all development on its property and can regulate projects accordingly.

Site-specific SWM plans shall be prepared for all projects involving a regulated land-disturbing activity that requires:

1. A Virginia Stormwater Management Program (VSMP) General Permit for Discharges of Stormwater from Construction Activities;
2. Land-disturbing activity within a watershed of a regional water quality SWM facility; or
3. Incorporates the use of LID practices and/or a constructed BMP; or
4. Land-disturbing activity exceeding 6,000 square feet within the City of Charlottesville’s portion of campus, to the maximum extent practical.

Projects are encouraged to oversize BMPs to help address the TMDL requirements or to build up a “bank” of credits to be used on future projects. Continued long term maintenance on all installed BMPs is performed by the Facilities Management Department. Specific procedures for maintaining these stormwater management facilities have been developed as part of the MS4 program noted in Section 1.

4. Estimated Existing Source Loads and Calculated Total Pollutant of Concern Required Reductions
   (General Permit Section I.C.2.a.(5))

In order to calculate the total POC loads and required reductions from existing sources as of June 30 2009, the University first delineated all of the impervious and pervious areas within the MS4 watershed service area. Figure 1 (attached as Appendix A) shows the regulated University lands and their designations as pervious and impervious. These areas were determined using UVA Geographic Information System data. Regulated impervious and pervious areas were determined in the following manner:

1. A 2009 UVA parcel data was generated by creating a layer with the 2009 parcels within the 2000 Urbanized area layers.
   a. 2009 Parcel data based on City of Charlottesville and Albemarle County Tax Parcel GIS Data.

2. A layer for exemptions from the regulated urban land cover data set was created. This layer has two categories: Industrial & Forested.
   a. The Parking & Transportation facility parcel is exempt. This site is covered by industrial stormwater permit VAR051372.
b. The forested areas marked as exempt were created from aerial imagery. Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, 1:4,623.

3. Another layer was created for impervious data using impervious layers from a 2009 GIS dataset that identifies UVA buildings, parking areas, roads, sidewalks and other hardscape features.

4. The 2009 MS4 area was created by clipping the exemptions layer (step 2) from the 2009 parcels layer (step 1).

5. UVA’s regulated urban impervious and pervious areas were derived by overlaying the impervious layer (step 3) and the 2009 MS4 layer (step 4).

6. The University shares jurisdictional boundaries with three other MS4 permittees; the County of Albemarle (County), the City of Charlottesville (City) and the Department of Transportation (VDOT). To address slight differences between digital maps, the County, University, and the City have agreed to use the City’s jurisdictional boundary as a common delineation between the permittees’ regulated areas. Each permittee has agreed to take responsibility for the POC loads generated within their regulated area boundary regardless of sheetflow draining to or from another jurisdiction. POC reduction credit for BMPs installed on any lands with inter-jurisdictional sheetflow will be received by the permittee that installs and maintains the BMP. The University agreed to include within its regulated area, all lands solely owned and operated by the University that lie within the jurisdictional extent of the County and the City. Correspondingly, the County and the City have agreed to include within their respective regulated areas, lands which they solely own and operate; as such, these lands were excluded from the University’s regulated area. GIS files were shared between the County, the City, and UVA to ensure all lands were included in the TMDL process.

Virginia’s Phase II Watershed Implementation Plan defines the Level 2 scoping and POC reductions for the Chesapeake Bay. As noted in the DEQ Guidance Memo No. 15-2005, “Level 2 implementation equates to an average reduction [from existing sources] of 9.0% of nitrogen loads, 16% of phosphorus loads, and 20% of sediment loads from impervious regulated acres and 6.0% of nitrogen loads, 7.25% of phosphorus loads and 8.75% sediment loads from pervious regulated acres”. For the first permit cycle (2013-2018) the Phase II MS4 permit requires each MS4 to achieve 5% of the POC reductions required.

Tables 1 and 2 below provide a summary of the University land that is subject to the MS4 permit and the determination of Chesapeake Bay TMDL loading and reduction requirements. All of the watersheds within the University’s service area drain to the James River; therefore Table 2a and Table 3a in the MS4 Permit were used in these calculations. This submittal incorporated the 5% POC required reduction values that were revised for Table 3a found on page 7 of the Guidance Memo.
### Table 1

**MS4 General Permit - Table 2a: Calculation Sheet for Estimating Existing Source Loads for the James River Basin**

*Based on Chesapeake Bay Program Watershed Model Phase 5.3.2*

<table>
<thead>
<tr>
<th>Subsource</th>
<th>Pollutant</th>
<th>Total Existing Acres Served by MS4 (06/30/09)</th>
<th>2009 EOS Loading Rate (lbs/ac/yr)</th>
<th>Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulated Urban Impervious</td>
<td>Nitrogen</td>
<td>313</td>
<td>9.39</td>
<td>2,939.07</td>
</tr>
<tr>
<td>Regulated Urban Pervious</td>
<td></td>
<td>469</td>
<td>6.99</td>
<td>3,278.31</td>
</tr>
<tr>
<td>Regulated Urban Impervious</td>
<td></td>
<td>313</td>
<td>1.76</td>
<td>550.88</td>
</tr>
<tr>
<td>Regulated Urban Pervious</td>
<td>Phosphorus</td>
<td>469</td>
<td>0.5</td>
<td>234.50</td>
</tr>
<tr>
<td>Regulated Urban Pervious</td>
<td>Total Suspended Solids</td>
<td>313</td>
<td>676.94</td>
<td>211,882.22</td>
</tr>
<tr>
<td>Regulated Urban Pervious</td>
<td></td>
<td>469</td>
<td>101.08</td>
<td>47,406.52</td>
</tr>
</tbody>
</table>

### Table 2

**MS4 General Permit - Table 3a: Calculation Sheet for Determining Total POC Reductions Required During this Permit Cycle for the James River Basin**

*Based on Chesapeake Bay Program Watershed Model Phase 5.3.2*

<table>
<thead>
<tr>
<th>Subsource</th>
<th>Pollutant</th>
<th>Total Existing Acres Served by MS4 (06/30/09)</th>
<th>First Permit Cycle Required Reduction in Loading Rate (lbs/ac/yr)</th>
<th>Total Reduction Required for First Permit Cycle, 5% (lbs/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulated Urban Impervious</td>
<td>Nitrogen</td>
<td>313</td>
<td>0.042255</td>
<td>13.23</td>
</tr>
<tr>
<td>Regulated Urban Pervious</td>
<td></td>
<td>469</td>
<td>0.02097</td>
<td>9.83</td>
</tr>
<tr>
<td>Regulated Urban Impervious</td>
<td></td>
<td>313</td>
<td>0.01408</td>
<td>4.41</td>
</tr>
<tr>
<td>Regulated Urban Pervious</td>
<td>Phosphorus</td>
<td>469</td>
<td>0.0018125</td>
<td>0.85</td>
</tr>
<tr>
<td>Regulated Urban Impervious</td>
<td></td>
<td>313</td>
<td>6.7694</td>
<td>2,118.82</td>
</tr>
<tr>
<td>Regulated Urban Pervious</td>
<td>Total Suspended Solids</td>
<td>469</td>
<td>0.442225</td>
<td>207.40</td>
</tr>
</tbody>
</table>
5. Means and Methods to Meet the Required Reductions and Schedule
(General Permit Section I.C.2.a.(6))

The University has achieved and exceeded the 5% POC reductions for the first permit cycle outlined in the Special Condition. These reductions were achieved as a result of implementing structural BMPs and installing rainwater harvesting practices since 2009, completing stream restoration projects since 2006, and accounting for “historical” BMPs installed and maintained on projects since 2006 and before July 1, 2009 (See Table 4 below).

These reductions have been verified using the calculation methods defined in the Guidance Memo and the established efficiencies therein. Appendix B provides a listing of these BMPs and the associated methodologies. Pollutant reduction credits achieved in this permit cycle that exceed the 5% requirement of the first permit cycle will be applied against future permit submittals.

**Structural BMPs Installed Since 2009**

POC credits for BMPs that have been installed on sites less than one acre since 2009 were calculated using the Guidance Memo (Example V.B.1, V.C.1) and utilize the Virginia Stormwater Clearinghouse, the Chesapeake Bay Program Retrofit Curves/Equations, or the Chesapeake Bay Program Established Efficiencies (See Appendix B for further details). Similarly, any BMPs that were installed in addition to the VSMP requirements or on a project that reduced the pollutants on site used the same calculation methodologies.

Example V.E.1 in the Guidance memo was used to calculate credits for any oversized BMPs installed since 2009 on a site that disturbed greater than one acre. These calculations are also further detailed in Appendix B. Per correspondence with the DEQ, for redevelopment projects completed prior to January 1, 2014, permittees need to reduce the post-redevelopment pollutant load to the pre-redevelopment pollutant load level prior to taking credit for any additional reductions produced by a BMP.

**Table 3a**

<table>
<thead>
<tr>
<th>Pollutant of Concern</th>
<th>Reduction Credits for Structural BMP Projects Since 2009 - Implemented / To Be Implemented For First Permit Cycle (To Date)</th>
<th>Percentage of Total Permit Reductions Achieved by 2018 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>39.81</td>
<td>21.94</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>7.07</td>
<td>3.51</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>2,674.53</td>
<td>1,298.22</td>
</tr>
</tbody>
</table>
Rainwater Harvesting BMPs

Credits for POCs were also calculated from installed supplemental cisterns and underground detention systems using the Chesapeake Bay Program Retrofit Curves/Equations (Guidance Memo Example V.B.1) and as defined in the Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects, dated October 9, 2012. These BMPs were installed in addition to the VSMP requirements and considered enhancements, since water quality for the associated sites was handled through other, and separate practices on site.

Table 3b
Reduction Credits for Rainwater Harvesting BMPs

<table>
<thead>
<tr>
<th>Pollutant of Concern</th>
<th>Cisterns/Underground Detention Systems (lbs/yr)</th>
<th>Percentage of Total Permit Reductions Achieved by 2018 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>131.27</td>
<td>28%</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>23.33</td>
<td>22%</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>9,284.91</td>
<td>20%</td>
</tr>
</tbody>
</table>

Stream Restorations

The University has completed three stream restoration projects in the Meadow Creek watershed (on regulated urban area) since 2006. Table 3c below details the stream restoration projects and the associated reductions. The efficiencies calculated follow the revised default rates, non-coastal plane streams, in Table 3 in the Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects, dated September 8, 2014. All of the stream restoration projects listed in Table 3 were submitted to the Army Corps of Engineers and found to meet the criteria as described in the Corps Nationwide Permit Number 27.

Table 3c
Reduction Credits for Stream Restoration Projects

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Year Built</th>
<th>Length (LF)</th>
<th>Location</th>
<th>POC Reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TN @ 0.075 lbs/ft/yr</td>
</tr>
<tr>
<td>JPP Arena – Sec.1</td>
<td>2006</td>
<td>165</td>
<td>Meadow Creek</td>
<td>12.38</td>
</tr>
<tr>
<td>JPP Arena – Sec. 2</td>
<td>2006</td>
<td>455</td>
<td>Distillery Branch</td>
<td>34.13</td>
</tr>
<tr>
<td>Lambeth – Phase 1</td>
<td>2011</td>
<td>130</td>
<td>Meadow Creek</td>
<td>9.75</td>
</tr>
<tr>
<td>Lambeth – Phase 2</td>
<td>2012</td>
<td>84.5</td>
<td>Meadow Creek</td>
<td>6.34</td>
</tr>
<tr>
<td>Carr’s Hill Field Park</td>
<td>2013</td>
<td>230</td>
<td>Tributary to Meadow Creek</td>
<td>17.25</td>
</tr>
<tr>
<td>Totals (lbs/yr)</td>
<td></td>
<td></td>
<td></td>
<td>79.84</td>
</tr>
<tr>
<td>Percent of Final Permit Cycle (2028) Reductions Achieved</td>
<td>17%</td>
<td>69%</td>
<td>103%</td>
<td></td>
</tr>
</tbody>
</table>
Historical BMPs

Part IV.2 of the Guidance Memo allows full credit to be provided for BMPs installed on or after January 1, 2006 and prior to July 1, 2009 and that were constructed to address water quality. All BMPs included in this submittal were provided to DEQ in the “Historical Data Clean-Up” submittal. The credits that were calculated for these BMPs followed the James River Edge of Stream loading rates and the Chesapeake Bay Program Retrofit Curves/Equations, or the Chesapeake Bay Program Established Efficiencies (Guidance Memo Example V.B.1 and V.C.1 respectively). Projects that used conversions followed Appendix V.D in the Guidance Memo. Removal efficiencies listed in the Bay Retrofit Performance Curves section for Dry Extended Detention ponds used the efficiencies listed in Table A-4 of Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects, revised January 20, 2015. These efficiencies are 15% for TP and 10% for TN.

Table 3d

<table>
<thead>
<tr>
<th>Pollutant of Concern</th>
<th>Reduction Credits for Historical BMPs</th>
<th>Percentage of Total Permit Reductions Achieved by 2018 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>147.12</td>
<td>32%</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>26.25</td>
<td>25%</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>13,030.79</td>
<td>28%</td>
</tr>
</tbody>
</table>

Long before the mandates of the most recent Permit, the University of Virginia has made an aggressive effort to reduce POCs within the watershed. In order to protect the local watersheds, and ultimately the Chesapeake Bay, the University has constructed three oversized regional stormwater management facilities (two constructed wetlands and one retention pond). These BMPs were partly constructed in an effort to create a “bank” of POC credits for projected future development. Projects completed within the jurisdiction of the University that could not implement BMP methods due to physical or other constraints could use these “bank” credits to satisfy water quality regulations. The DEQ has confirmed, verbally and via email, that this unclaimed excess capacity (calculated using the Guidance Memo) could be utilized to account for POC reductions required through 2028 or as available. No credits from the regional facilities have been included with this submission or are reflected in Table 4 below. Should the University’s POC reduction requirements change during future permit cycles or as the MS4 boundary expands, UVA may wish to permanently retire some banked capacity to meet TMDL requirements. In that event, UVA will provide supporting calculations of the remaining bank capacity.
<table>
<thead>
<tr>
<th>Pollutant of Concern</th>
<th>Total Reduction Required for First Permit Cycle (2018), 5% (lbs/yr)</th>
<th>Total Reduction Required for Final Permit Cycle (2028), 100% (lbs/yr)</th>
<th>Total Reduction Practices Implemented/ To Be Implemented For First Permit Cycle (To Date) (lbs/yr)</th>
<th>Percentage of Final Permit Cycle (2028) Reductions Achieved (To Date) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>23.06</td>
<td>461.21</td>
<td>446.08</td>
<td>97%</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>5.26</td>
<td>105.14</td>
<td>138.22</td>
<td>131%</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>2,326.23</td>
<td>46,524.51</td>
<td>77,449.24</td>
<td>166%</td>
</tr>
</tbody>
</table>

As can be seen in Table 4 above, the University has exceeded the required reductions for Phosphorus and Suspended Solids for the final permit cycle (2028).

Implementation of potential projects to further reduce POCs required by 2028 will depend on planning, funding and areas in need. These factors are subject to change over time and will be planned as the permit cycles progress. Diligent planning to meet pollutant TMDL reduction requirements, maintenance of the drainage system, and mitigation of the effects of redevelopment will be required to provide a sustainable and functional stormwater system.

If planning efforts at the University should change and affect this Action Plan, updates or modifications will be submitted to the Department of Environmental Quality to ensure that the University has continued to comply with the General Permit.

6. 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 University has never used an average land cover condition of greater than 16% impervious cover for the design of post-development stormwater management facilities and thus has no increased loads to offset under this permit requirement.
7. Means and Methods to Offset Increased Loads from Grandfathered projects that Begin Construction After July 1, 2014 (General Permit Section I.C.2.a.(8))

As was stated in section 6, the University has never used an average land cover condition of greater than 16% impervious cover for the design of post-development stormwater management facilities. Additionally, there are no grandfathered projects and thus there are no increased loads to offset under this permit requirement.

8. A List of Future Projects, and Associated Acreage that Qualify as Grandfathered (General Permit Section I.C.2.a.(10))

This section of the permit does not apply as the University has no grandfathered projects that qualify in accordance with 9VAC25-870-48.

9. An Estimate of the Expected Cost to Implement the Necessary Reductions (General Permit Section I.C.2.a.(11))

There are no additional costs associated with achieving the necessary 5% reduction of POCs for this permit cycle. The University has accomplished the required POC reductions for the first permit cycle (2018) as a result of BMPs that have been installed and stream restorations that have been completed since 2006. A listing of these BMPs is located in Appendix B.

As shown in the most recent master plan, the University strives to continue to improve and reduce the POC loading on the James River and ultimately the Chesapeake Bay. The following lists are examples of potential projects currently under consideration to continue this effort:

<table>
<thead>
<tr>
<th>Stream Location</th>
<th>Adjacent Redevelopment Zone</th>
<th>Estimated Restoration Length (ft)</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distillery Branch</td>
<td>Copeley Housing</td>
<td>700</td>
<td>$574,000</td>
</tr>
<tr>
<td>Nameless Field – Stream Daylighting</td>
<td>N/A</td>
<td>1,000</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Stream through Ivy Mountain Area</td>
<td>Ivy Mountain / KCRC</td>
<td>700</td>
<td>$574,000</td>
</tr>
</tbody>
</table>

Total: $2,148,000
Table 6 - Stormwater Basin Retrofit Opportunities

<table>
<thead>
<tr>
<th>Stormwater Facility Name</th>
<th>Existing BMP Type</th>
<th>Proposed BMP Type</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darden #1 Basin (North)</td>
<td>Dry Extended Detention</td>
<td>Wet Pond</td>
<td>$820,635</td>
</tr>
<tr>
<td>Darden #2 Basin (South)</td>
<td>Dry Extended Detention</td>
<td>Wet Pond</td>
<td>$227,503</td>
</tr>
<tr>
<td>The Park Basin</td>
<td>Dry Detention</td>
<td>Wet Pond</td>
<td>$1,048,140</td>
</tr>
<tr>
<td>FM Basin</td>
<td>Dry Detention</td>
<td>Wet Pond</td>
<td>$1,324,390</td>
</tr>
<tr>
<td>Gooch Dillard Basin</td>
<td>Dry Detention</td>
<td>Bioretention or Wetland</td>
<td>$154,377</td>
</tr>
<tr>
<td>Gilmer Basin</td>
<td>Dry Detention</td>
<td>Extended Det. &amp; Add Forebay</td>
<td>$300,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Total</strong></td>
</tr>
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</table>

Table 7 - Potential Septic System Replacement Opportunities

<table>
<thead>
<tr>
<th>Building</th>
<th>Design Flow (gal/day)</th>
<th>Proposed Treatment</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duke House/ Sunnyside</td>
<td>1,366</td>
<td>Connect to Centralized</td>
<td>$148,100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Treatment</td>
<td></td>
</tr>
<tr>
<td>KCRC</td>
<td>767</td>
<td>Connect to Centralized</td>
<td>$233,800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Treatment</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td><strong>$381,900</strong></td>
</tr>
</tbody>
</table>

10. Public Comments on Draft Action Plan  
(General Permit Section I.C.2.a.(12))

The planned public comment period for this action plan was advertised from August 26, 2015 to September 9, 2015. This Action Plan and all future action plan updates will be advertised for a minimum of two weeks prior to finalizing the documents. These updates will be posted on the University of Virginia’s Facilities Management web page which is accessible to all interested parties. The webpage will provide an opportunity for public comment and directions to contact the Environmental Resources Division. No comments were received during the public comment period, however, any comments on future updates will be documented as part of the submittal and considered for revision to the update.
Appendix A

MS4 Pervious/ Impervious Areas Map
UVA Watersheds and MS4 Permit Areas

Figure 1

- Subwatershed
- Streams
- MS4 Impervious Areas (2009)
- MS4 Exempt Areas (2009)
- MS4 Non-Exempt Pervious Areas (2009)
Appendix B

BMP Tracking List and Calculation Methodologies
## Rainwater Harvesting BMPs

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Amphitheater</th>
<th>Garrett Hall</th>
<th>Student Garden</th>
<th>New Cabell Courtyard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date BMP Installed</td>
<td>2010</td>
<td>2011</td>
<td>2011</td>
<td>2013</td>
</tr>
<tr>
<td>Conversion or Enhancement</td>
<td>Enhancement</td>
<td>Enhancement</td>
<td>Enhancement</td>
<td>Enhancement</td>
</tr>
<tr>
<td>Total Drainage Area (acres)</td>
<td>0.09</td>
<td>0.07</td>
<td>0.09</td>
<td>0.10</td>
</tr>
<tr>
<td>BMP Type (UVA Description)</td>
<td>Cistern</td>
<td>Cistern</td>
<td>Cistern</td>
<td>Cistern</td>
</tr>
<tr>
<td>SWMF ID#</td>
<td>MOS58-0062-01</td>
<td>MOS58-0055-01</td>
<td>ME03-0252-01</td>
<td>MOS58-0060-03</td>
</tr>
<tr>
<td>Storage Volume (CF)</td>
<td>5,425.9</td>
<td>668.4</td>
<td>73.5</td>
<td>561.5</td>
</tr>
</tbody>
</table>

### PERFORMANCE BASED CRITERIA

| Drainage Area to BMP-Impervious (Ac) | 0.09 | 0.07 | 0.09 | 0.10 |
| Drainage Area to BMP-Pervious (Ac)  | 0.00 | 0.00 | 0.00 | 0.00 |

### JAMES RIVER POC RATES

| Phosphorus (P) Loads (lbs/yr) | 0.16 | 0.12 | 0.16 | 0.18 |
| Nitrogen (N) Loads (lbs/yr)  | 0.85  | 0.66  | 0.85  | 0.94  |
| Total Suspended Solids (TSS) Loads (lbs/yr) | 60.92 | 47.39 | 60.92 | 67.69 |

### VA STORMWATER MANAGEMENT HANDBOOK (1999)

| BMP Type | N/A | N/A | N/A | N/A |
| P Removal Efficiency | 0% | 0% | 0% | 0% |
| P Reduction per VA Stormwater Management Handbook (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 |

### VA STORMWATER BMP CLEARINGHOUSE

| BMP Type | N/A | N/A | N/A | N/A |
| P Removal Efficiency | 0% | 0% | 0% | 0% |
| N Removal Efficiency | 0% | 0% | 0% | 0% |
| P Reduction per Clearinghouse (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 |
| N Reduction per Clearinghouse (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 |

### BAY PROGRAM RETROFIT PERFORMANCE CURVES

| Type (ST or RR) | RR | RR | RR | RR |
| Runoff Depth Treated (Inches) | 16.61 | 2.63 | 0.23 | 1.55 |
| P Removal Efficiency | 78.8% | 78.8% | 30.0% | 76.3% |
| N Removal Efficiency | 66.7% | 66.7% | 25.7% | 65.3% |
| TSS Removal Efficiency | 84.9% | 84.9% | 32.1% | 81.9% |
| P Reduction per Retrofit Curves (lbs/yr) | 0.12 | 0.10 | 0.05 | 0.13 |
| N Reduction per Retrofit Curves (lbs/yr) | 0.56 | 0.44 | 0.22 | 0.61 |
| TSS Reduction per Retrofit Curves (lbs/yr) | 51.72 | 40.23 | 19.56 | 55.42 |

### BAY PROGRAM BMP EFFICIENCY

| CBP BMP Type | N/A | N/A | N/A | N/A |
| P Removal Efficiency | 0% | 0% | 0% | 0% |
| N Removal Efficiency | 0% | 0% | 0% | 0% |
| TSS Removal Efficiency | 0% | 0% | 0% | 0% |
| P Reduction per CBP Efficiency Table (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 |
| N Reduction per CBP Efficiency Table (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 |
| TSS Reduction per CBP Efficiency Table (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 |

### Maximum Phosphorus Credit per Site (lbs/yr)

| 0.12 | 0.10 | 0.05 | 0.13 |
| Maximum Nitrogen Credit per Site (lbs/yr)
| 0.56 | 0.44 | 0.22 | 0.61 |
| Maximum Suspended Solids Credit per Site (lbs/yr)
| 51.72 | 40.23 | 19.56 | 55.42 |

**Notes:**

1. All rainwater harvesting systems were installed above and beyond the VSMP requirements and should count as full credit towards the TMDL.
<table>
<thead>
<tr>
<th>Site Name</th>
<th>O-Hill Dining Hall</th>
<th>Med Ed</th>
<th>Newcomb Hall</th>
<th>South Lawn</th>
<th>Varsity Hall Drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date BMP Installed</td>
<td>2013</td>
<td>2010</td>
<td>2010</td>
<td>2010</td>
<td>2010</td>
</tr>
<tr>
<td>Conversion or Enhancement</td>
<td>Enhancement</td>
<td>Enhancement</td>
<td>Enhancement</td>
<td>Enhancement</td>
<td>Enhancement</td>
</tr>
<tr>
<td>Total Drainage Area (acres)</td>
<td>14.35</td>
<td>1.09</td>
<td>0.25</td>
<td>22.03</td>
<td>0.5</td>
</tr>
<tr>
<td>BMP Type (UVA Description)</td>
<td>Cistern</td>
<td>Underground Detention</td>
<td>Underground Detention</td>
<td>Underground Detention</td>
<td>Underground Detention</td>
</tr>
<tr>
<td>SWMF ID#</td>
<td>MO3A-0201-02</td>
<td>MO6A-1147-01</td>
<td>ME06-0122-01</td>
<td>MO5B-0070-05</td>
<td>MO6A-0056-01</td>
</tr>
<tr>
<td>Storage Volume (CF)</td>
<td>43,500.0</td>
<td>8,478.0</td>
<td>847.8</td>
<td>13,341.0</td>
<td>81.0</td>
</tr>
</tbody>
</table>

**PERFORMANCE BASED CRITERIA**

| Drainage Area to BMP-Impervious (Ac) | 5.65 | 0.29 | 0.25 | 9.957 | 0.23 |
| Drainage Area to BMP-Pervious (Ac)  | 8.70 | 0.80 | 0.00 | 12.07 | 0.27 |

**JAMES RIVER POC RATES**

| Phosphorus (P) Loads (lbs/yr) | 14.29 | 0.91 | 0.44 | 23.56 | 0.54 |
| Nitrogen (N) Loads (lbs/yr)   | 113.87 | 8.32 | 2.35 | 177.89 | 4.05 |
| Total Suspended Solids (TSS) Loads (lbs/yr) | 4704.11 | 277.18 | 169.24 | 7960.63 | 182.99 |

**VA STORMWATER MANAGEMENT HANDBOOK (1999)**

| BMP Type | N/A | N/A | N/A | N/A | N/A |
| P Removal Efficiency | 0% | 0% | 0% | 0% | 0% |
| P Reduction per VA Stormwater Management Handbook (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**VA STORMWATER BMP CLEARINGHOUSE**

| BMP Type | P Removal Efficiency | N Removal Efficiency | P Reduction per Clearinghouse (lbs/yr) | N Reduction per Clearinghouse (lbs/yr) |
| RR | 2.12 | 0.56 | 0.10 |
| ST | 8.05 | 0.24 | 76.27 |
| ST | 0.93 | 0.80 | 38.51 |
| ST | 0.37 | 0.81 | 25.89 |
| RR | 0.10 | 3.91 | 11.20 |
| ST | 11.1% | 14.1% | 0.00 |
| ST | 71.1% | 14.1% | 0.00 |
| ST | 10.0% | 14.1% | 0.00 |

**BAY PROGRAM RETROFIT PERFORMANCE CURVES**

| Type (ST or RR) | 3558.51 | 218.42 | 113.87 | 3447.49 | 25.89 |
| Runoff Depth Treated (Inches) | 2.12 | 0.56 | 0.10 |
| P Removal Efficiency | 78.3% | 34.0% | 11.1% |
| N Removal Efficiency | 67.0% | 21.6% | 71.1% |
| TSS Removal Efficiency | 84.2% | 43.3% | 14.1% |
| P Reduction per Retrofit Curves (lbs/yr) | 0.10 | 0.06 | 0.29 |
| N Reduction per Retrofit Curves (lbs/yr) | 38.51 | 25.89 |
| TSS Reduction per Retrofit Curves (lbs/yr) | 3958.51 | 218.42 | 115.99 | 3447.49 |

**BAY PROGRAM BMP EFFICIENCY**

| CBP BMP Type | N/A | N/A | N/A | N/A | N/A |
| P Removal Efficiency | 0% | 0% | 0% | 0% | 0% |
| N Removal Efficiency | 0% | 0% | 0% | 0% | 0% |
| TSS Removal Efficiency | 0% | 0% | 0% | 0% | 0% |
| P Reduction per CBP Efficiency Table (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| N Reduction per CBP Efficiency Table (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| TSS Reduction per CBP Efficiency Table (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Maximum Phosphorus Credit per Site (lbs/yr)** | 11.20 | 0.56 | 0.24 | 8.02 | 0.06 |
| Maximum Nitrogen Credit per Site (lbs/yr) | 76.27 | 2.93 | 0.80 | 38.51 | 0.29 |
| Maximum Suspended Solids Credit per Site (lbs/yr) | 3958.51 | 218.42 | 115.99 | 3447.49 | 25.89 |

Notes:
## Rainwater Harvesting BMPs

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Rehearsal Hall</th>
<th>Hospital Ellipse</th>
<th>Thrust Theatre</th>
<th>North Grounds Mechanical Plant</th>
<th>Rugby Admin (O'Neil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversion or Enhancement</td>
<td>Enhancement</td>
<td>Enhancement</td>
<td>Enhancement</td>
<td>Enhancement</td>
<td>Enhancement</td>
</tr>
<tr>
<td>Total Drainage Area (acres)</td>
<td>0.21</td>
<td>1</td>
<td>2.87</td>
<td>0.17</td>
<td>0.2</td>
</tr>
<tr>
<td>BMP Type (UVA Description)</td>
<td>Underground Detention</td>
<td>Underground Detention</td>
<td>Underground Detention</td>
<td>Underground Detention</td>
<td>Underground Detention</td>
</tr>
<tr>
<td>SWMF ID#</td>
<td>ME06-0448-01</td>
<td>MO6A-1150-01</td>
<td>ME06-0449-01</td>
<td>ME11-7533-01</td>
<td>ME13-2422-02</td>
</tr>
<tr>
<td>Storage Volume (CF)</td>
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<td>841.0</td>
<td>2,571.7</td>
<td>628.0</td>
<td>992.2</td>
</tr>
</tbody>
</table>

### PERFORMANCE BASED CRITERIA

| Drainage Area to BMP-Impervious (Ac) | 0.21 | 0.92 | 1.92 | 0.17 | 0.17 |
| Drainage Area to BMP-Pervious (Ac)  | 0.00 | 0.08 | 0.95 | 0.00 | 0.03 |

### JAMES RIVER POC RATES

| Phosphorus (P) Loads (lbs/yr) | 0.37 | 1.66 | 3.85 | 0.30 | 0.31 |
| Nitrogen (N) Loads (lbs/yr)   | 1.97 | 9.20 | 24.67 | 1.60 | 1.81 |
| Total Suspended Solids (TSS) Loads (lbs/yr) | 142.16 | 630.87 | 1395.75 | 115.08 | 118.11 |

### VA STORMWATER MANAGEMENT HANDBOOK (1999)

| BMP Type | N/A | N/A | N/A | N/A | N/A |
| Removal Efficiency | 0% | 0% | 0% | 0% | 0% |
| Reduction per VA Stormwater Management Handbook (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

### VA STORMWATER BMP CLEARINGHOUSE

| BMP Type | N/A | N/A | N/A | N/A | N/A |
| Removal Efficiency | 0% | 0% | 0% | 0% | 0% |
| Reduction per Clearinghouse (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

### BAY PROGRAM RETROFIT PERFORMANCE CURVES

| Type (ST or RR) | ST | ST | ST | ST | ST |
| Runoff Depth Treated (Inches) | 3.34 | 0.25 | 0.37 | 1.02 | 1.61 |
| P Removal Efficiency | 62.0% | 25.7% | 34.0% | 55.2% | 60.3% |
| Reduction per Retrofit Curves (lbs/yr) | 0.23 | 0.43 | 1.31 | 0.17 | 0.19 |
| N Reduction per Retrofit Curves (lbs/yr) | 0.69 | 1.51 | 5.34 | 0.56 | 0.69 |
| TSS Reduction per Retrofit Curves (lbs/yr) | 112.02 | 206.71 | 604.32 | 80.82 | 90.63 |

### BAY PROGRAM BMP EFFICIENCY

| CBP BMP Type | N/A | N/A | N/A | N/A | N/A |
| Removal Efficiency | 0% | 0% | 0% | 0% | 0% |
| Reduction per CBP Efficiency Table (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| N Reduction per CBP Efficiency Table (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| TSS Reduction per CBP Efficiency Table (lbs/yr) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum Phosphorus Credit per Site (lbs/yr) | 0.23 | 0.43 | 1.31 | 0.17 | 0.19 |
| Maximum Nitrogen Credit per Site (lbs/yr) | 0.69 | 1.51 | 5.34 | 0.56 | 0.69 |
| Maximum Suspended Solids Credit per Site (lbs/yr) | 112.02 | 206.71 | 604.32 | 80.82 | 90.63 |

Notes:
## Rainwater Harvesting BMPs

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Education Resource Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date BMP Installed</td>
<td>2017</td>
</tr>
<tr>
<td>Conversion or Enhancement</td>
<td>Enhancement</td>
</tr>
<tr>
<td>Total Drainage Area (acres)</td>
<td>0.56</td>
</tr>
<tr>
<td>BMP Type (UVA Description)</td>
<td>Underground Detention</td>
</tr>
<tr>
<td>SWMF ID#</td>
<td>TBD</td>
</tr>
<tr>
<td>Storage Volume (CF)</td>
<td>2,050.0</td>
</tr>
</tbody>
</table>

### PERFORMANCE BASED CRITERIA

| Drainage Area to BMP-Impervious (Ac) | 0.53 |
| Drainage Area to BMP-Pervious (Ac) | 0.03 |

### JAMES RIVER POC RATES

| Phosphorus (P) Loads (lbs/yr) | 0.95 |
| Nitrogen (N) Loads (lbs/yr) | 5.19 |
| Total Suspended Solids (TSS) Loads (lbs/yr) | 361.81 |

### VA STORMWATER MANAGEMENT HANDBOOK (1999)

<table>
<thead>
<tr>
<th>BMP Type</th>
<th>P Removal Efficiency</th>
<th>P Reduction per VA Stormwater Management Handbook (lbs/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### VA STORMWATER BMP CLEARINGHOUSE

<table>
<thead>
<tr>
<th>BMP Type</th>
<th>P Removal Efficiency</th>
<th>N Removal Efficiency</th>
<th>P Reduction per Clearinghouse (lbs/yr)</th>
<th>N Reduction per Clearinghouse (lbs/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
<td>0%</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### BAY PROGRAM RETROFIT PERFORMANCE CURVES

<table>
<thead>
<tr>
<th>Type (ST or RR)</th>
<th>Runoff Depth Treated (Inches)</th>
<th>P Removal Efficiency</th>
<th>N Removal Efficiency</th>
<th>TSS Removal Efficiency</th>
<th>P Reduction per Retrofit Curves (lbs/yr)</th>
<th>N Reduction per Retrofit Curves (lbs/yr)</th>
<th>TSS Reduction per Retrofit Curves (lbs/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST</td>
<td>1.07</td>
<td>55.8%</td>
<td>35.5%</td>
<td>71.1%</td>
<td>0.53</td>
<td>1.84</td>
<td>257.17</td>
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</tbody>
</table>

### BAY PROGRAM BMP EFFICIENCY

<table>
<thead>
<tr>
<th>CBP BMP Type</th>
<th>P Removal Efficiency</th>
<th>N Removal Efficiency</th>
<th>TSS Removal Efficiency</th>
<th>P Reduction per CBP Efficiency Table (lbs/yr)</th>
<th>N Reduction per CBP Efficiency Table (lbs/yr)</th>
<th>TSS Reduction per CBP Efficiency Table (lbs/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Credit Totals

- Maximum Phosphorus Credit per Site (lbs/yr): 0.53
- Maximum Nitrogen Credit per Site (lbs/yr): 1.84
- Maximum Suspended Solids Credit per Site (lbs/yr): 257.17

### Notes:

- Education Resource Center
- 2017
- Enhancement
- Underground Detention
- TBD
- 2,050.0
- 0.53
- 0.03
- 0.95
- 5.19
- 361.81
- N/A
- 0%
- 0%
- 0%
- 0.00
- 0.00
- 0.00
- 23.33
- 131.27
- 9,284.91
### Historical BMPs

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Date BMP Installed</th>
<th>Conversion or Enhancement</th>
<th>Site Area (Ac)</th>
<th>BMP Type (UVA Description)</th>
<th>SWMF ID#</th>
<th>WQV (CF)</th>
<th>PERFORMANCE BASED CRITERIA</th>
<th>JAMES RIVER POC RATES</th>
<th>VA STORMWATER MANAGEMENT HANDBOOK (1999)</th>
<th>VA STORMWATER BMP CLEARINGHOUSE</th>
<th>BAY PROGRAM RETROFIT PERFORMANCE CURVES</th>
<th>BAY PROGRAM BMP EFFICIENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPI Arena</td>
<td>2006</td>
<td>Enhancement</td>
<td>2.10</td>
<td>Oil-Water Separator</td>
<td>ME10-5575-01</td>
<td>2,673.6</td>
<td>Drainage Area to BMP-Impervious (Ac)</td>
<td>Phosphorus (P) Loads (lbs/yr)</td>
<td>3.65</td>
<td>Separation System</td>
<td>P Removal Efficiency</td>
<td>ST</td>
</tr>
<tr>
<td>JPI Arena</td>
<td>2006</td>
<td>Enhancement</td>
<td>3.62</td>
<td>Grass Swale</td>
<td>ME10-5574-02</td>
<td>5,429.1</td>
<td>Drainage Area to BMP-Pervious (Ac)</td>
<td>Nitrogen (N) Loads (lbs/yr)</td>
<td>19.63</td>
<td>Grassed Swale</td>
<td>P Reduction per VA Stormwater Management Handbook (lbs/yr)</td>
<td>RR</td>
</tr>
<tr>
<td>JPI Arena</td>
<td>2006</td>
<td>Enhancement</td>
<td>1.35</td>
<td>Bioretention</td>
<td>ME10-5574-03</td>
<td>1,362.8</td>
<td>Phosphorus (P) Loads (lbs/yr)</td>
<td>Nitrogen (N) Loads (lbs/yr)</td>
<td>32.46</td>
<td>Bioretention I</td>
<td>N Reduction per Retrofit Curves (lbs/yr)</td>
<td>RR</td>
</tr>
<tr>
<td>JPI Arena</td>
<td>2006</td>
<td>Enhancement</td>
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<td>Total Suspended Solids (TSS) Loads (lbs/yr)</td>
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<td>Water Quality Swale</td>
<td>N Reduction per Retrofit Curves (lbs/yr)</td>
<td>RR</td>
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#### Notes:
### Historical BMPs

#### Site Name
- **Historical BMPs**

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Date BMP Installed</th>
<th>Conversion or Enhancement</th>
<th>Site Area (Ac)</th>
<th>BMP Type (UVA Description)</th>
<th>SWMF ID#</th>
<th>WQV (CF)</th>
<th>PERFORMANCE BASED CRITERIA</th>
<th>JAMES RIVER POC RATES</th>
<th>VA STORMWATER MANAGEMENT HANDBOOK (1999)</th>
<th>VA STORMWATER BMP CLEARINGHOUSE</th>
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<tr>
<td>Reactor Bldg Basin</td>
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<td>0.13</td>
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#### PERFORMANCE BASED CRITERIA
- **Drainage Area to BMP-Impervious (Ac):** 2.08, 2.12, 0.00
- **Drainage Area to BMP-Pervious (Ac):** 2.08, 2.12, 0.00

#### JAMES RIVER POC RATES
- **Phosphorus (P) Loads (lbs/yr):** 14.72, 174.14, 3642.39
- **Nitrogen (N) Loads (lbs/yr):** 300.0, 11.31, 364.24
- **Total Suspended Solids (TSS) Loads (lbs/yr):** 815.50, 330.15, 364.24

#### VA STORMWATER MANAGEMENT HANDBOOK (1999)
- **BMP Type:** Extended Detention, Baysaver, Bioretention I
- **P Removal Efficiency:** N/A, 0%, 0%
- **N Removal Efficiency:** N/A, 35%, 35%
- **P Reduction per VA Stormwater Management Handbook (lbs/yr):** 0.00, 5.15, 0.00

#### VA STORMWATER BMP CLEARINGHOUSE
- **BMP Type:** Separation System
- **P Removal Efficiency:** 0%
- **N Removal Efficiency:** 5.15
- **P Reduction per Clearinghouse (lbs/yr):** 0.00
- **N Reduction per Clearinghouse (lbs/yr):** 0.32

#### BAY PROGRAM RETROFIT PERFORMANCE CURVES
- **Type (ST or RR):** ST, RR
- **Runoff Depth Treated (Inches):** 0.00, 0.00, 0.77
- **P Removal Efficiency:** -0.7%, -0.7%, -0.7%
- **N Removal Efficiency:** -0.5%, 10.0%, -0.9%
- **TSS Removal Efficiency:** -0.9%, 10.0%, -0.9%
- **P Reduction per Retrofit Curves (lbs/yr):** -0.11, 2.21, -0.11
- **N Reduction per Retrofit Curves (lbs/yr):** -0.80, 17.41, -0.80
- **TSS Reduction per Retrofit Curves (lbs/yr):** -33.15, 81.86, -33.15

#### BAY PROGRAM BMP EFFICIENCY
- **CBP BMP Type:** Dry Detention, Extended Detention, Dry Detention, Bioretention A/B
- **P Removal Efficiency:** 10%, 5%, 10%, 5%
- **N Removal Efficiency:** 20%, 5%, 5%, 5%
- **TSS Removal Efficiency:** 10%, 60%, 10%, 80%
- **P Reduction per CBP Efficiency Table (lbs/yr):** 1.47, 2.94, 2.94, 3.72
- **N Reduction per CBP Efficiency Table (lbs/yr):** 8.71, 34.83, 34.83, 3.72
- **TSS Reduction per CBP Efficiency Table (lbs/yr):** 364.24, 2185.43, 2185.43, 494.2

#### Notes:
- **Maximum Phosphorus Credit per Site (lbs/yr):** 1.47, 5.15, 0.32, 0.67
- **Maximum Nitrogen Credit per Site (lbs/yr):** 8.71, 34.83, 0.57, 3.72
- **Maximum Suspended Solids Credit per Site (lbs/yr):** 364.24, 2185.43, 81.86, 264.12
- **TP Additional Credit (lbs/yr):** 3.68, 0.32, 0.67, 0.19
- **TN Additional Credit (lbs/yr):** 1821.19, 81.86, 264.12, 494.2
- **TSS Additional Credit (lbs/yr):** 1821.19, 81.86, 264.12, 494.2

### Notes:
## Historical BMPs

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<tr>
<th>Site Name</th>
<th>Culbreth Rd Garage</th>
<th>Hereford College Basin</th>
<th>Nursing Ed</th>
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<td>P Reduction per Clearinghouse (lbs/yr)</td>
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<td>N Reduction per Clearinghouse (lbs/yr)</td>
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<td>BAY PROGRAM RETROFIT PERFORMANCE CURVES</td>
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<tr>
<td>Type (ST or RR)</td>
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<td>Runoff Depth Treated (Inches)</td>
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<td>10.0%</td>
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<td>CBP BMP Type</td>
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<td>P Removal Efficiency</td>
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<tr>
<td>N Removal Efficiency</td>
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<td></td>
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<tr>
<td>TSS Removal Efficiency</td>
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<tr>
<td>P Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>0.11</td>
<td>2.69</td>
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<td>Maximum Phosphorus Credit per Site (lbs/yr)</td>
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<td>2.69</td>
<td>9.43</td>
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<td>Maximum Nitrogen Credit per Site (lbs/yr)</td>
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<td>14.18</td>
<td>56.71</td>
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<td>Maximum Suspended Solids Credit per Site (lbs/yr)</td>
<td>37.73</td>
<td>741.35</td>
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<td>TP Additional Credit (lbs/yr)</td>
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Notes:
## Historical BMPs

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<th>Site Name</th>
<th>Observatory Hill Stone Storage System</th>
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<td>Site Area (Ac)</td>
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<tr>
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<td>Dry Extended Detention</td>
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<td>MO3A-0201-01</td>
<td>MO6A-0057-01</td>
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<tr>
<td>WQV (CF)</td>
<td>30,564.6</td>
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### PERFORMANCE BASED CRITERIA

| Drainage Area to BMP-Impervious (Ac) | 8.42 | 0.15 |
| Drainage Area to BMP-Pervious (Ac)  | 10.35| 0.00 |

### JAMES RIVER POC RATES

| Phosphorus (P) Loads (lbs/yr) | 19.99 | 0.26 |
| Nitrogen (N) Loads (lbs/yr)   | 151.41| 1.41 |
| Total Suspended Solids (TSS) Loads (lbs/yr) | 6746.01 | 101.54 |

### VA STORMWATER MANAGEMENT HANDBOOK (1999)

<table>
<thead>
<tr>
<th>BMP Type</th>
<th>Extended Detention</th>
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### VA STORMWATER BMP CLEARINGHOUSE

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<th>BMP Type</th>
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<tr>
<td>N Removal Efficiency</td>
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<td>P Reduction per Clearinghouse (lbs/yr)</td>
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<tr>
<td>N Reduction per Clearinghouse (lbs/yr)</td>
<td>4047.61</td>
</tr>
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</table>

### BAY PROGRAM RETROFIT PERFORMANCE CURVES

| Type (ST or RR) | N/A | RR |
| Runoff Depth Treated (Inches) | 0.00 | 0.95 |
| P Removal Efficiency | 15.0% | 68.9% |
| N Removal Efficiency | 10.0% | 58.9% |
| TSS Removal Efficiency | -0.9% | 73.8% |
| P Reduction per Retrofit Curves (lbs/yr) | 3.00 | 0.18 |
| N Reduction per Retrofit Curves (lbs/yr) | 15.14 | 0.83 |
| TSS Reduction per Retrofit Curves (lbs/yr) | -61.39 | 74.96 |

### BAY PROGRAM BMP EFFICIENCY

| CBP BMP Type | Extended Detention |
| P Removal Efficiency | 20% | 75% |
| N Removal Efficiency | 20% | 70% |
| TSS Removal Efficiency | 60% | 80% |
| P Reduction per CBP Efficiency Table (lbs/yr) | 4.00 | 0.20 |
| N Reduction per CBP Efficiency Table (lbs/yr) | 30.28 | 0.99 |
| TSS Reduction per CBP Efficiency Table (lbs/yr) | 4047.61 | 81.23 |

Maximum Phosphorus Credit per Site (lbs/yr) | 7.00 | 0.20 |
Maximum Nitrogen Credit per Site (lbs/yr) | 30.28 | 0.99 |
Maximum Suspended Solids Credit per Site (lbs/yr) | 4047.61 | 81.23 |

### Credit Totals

| TP Additional Credit (lbs/yr) | 7.00 | 0.20 |
| TN Additional Credit (lbs/yr) | 30.28 | 0.99 |
| TSS Additional Credit (lbs/yr) | 4047.61 | 81.23 |

Notes:
### BMPs on Projects That Reduced Impervious or Installed in Addition to VSMP Requirements

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Date BMP Installed</th>
<th>Reduced Impervious or In Addition to VSMP Requirements</th>
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<td>MR-6</td>
<td>2009</td>
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<tr>
<td>South Lawn</td>
<td>2010</td>
<td>Reduced Impervious</td>
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#### Site Area (Ac)
- MR-6: 0.65
- South Lawn: 11.26

#### BMP Type (UVA Description)
- MR-6: Green Roof
- South Lawn: Biofilter 1, Biofilter 2, Biofilter 3, Biofilter 4

#### SWMF ID#
- MR-6: MO6A-1161-01
- South Lawn: MO5B-0070-01, MO5B-0070-02, MO5B-0070-03, MO5B-0070-04

#### WQV (CF)
- MR-6: 827.6
- South Lawn: Biofilter 1: 1,587.6, Biofilter 2: 2,080.7, Biofilter 3: 2,164.5, Biofilter 4: 1,780.4

### PERFORMANCE BASED CRITERIA
- **Drainage Area to BMP-Impervious (Ac)**
  - MR-6: 0.24
  - South Lawn: Biofilter 1: 0.38, Biofilter 2: 0.89, Biofilter 3: 0.93, Biofilter 4: 0.81
- **Drainage Area to BMP-Pervious (Ac)**
  - MR-6: 0.41
  - South Lawn: Biofilter 1: 0.22, Biofilter 2: 0.84, Biofilter 3: 0.84, Biofilter 4: 0.05

### JAMES RIVER POC RATES
- **Phosphorus (P) Loads (lbs/yr)**
  - MR-6: 0.63
  - South Lawn: Biofilter 1: 0.78, Biofilter 2: 1.99, Biofilter 3: 2.06, Biofilter 4: 1.45
- **Nitrogen (N) Loads (lbs/yr)**
  - MR-6: 5.12
- **Total Suspended Solids (TSS) Loads (lbs/yr)**
  - MR-6: 203.91
  - South Lawn: Biofilter 1: 279.47, Biofilter 2: 687.38, Biofilter 3: 714.46, Biofilter 4: 553.38

### VA STORMWATER BMP CLEARINGHOUSE
- **BMP Type**
  - MR-6: P Removal Efficiency
  - South Lawn: P Reduction per Clearinghouse (lbs/yr)
- **N Removal Efficiency**
  - MR-6: N Reduction per Clearinghouse (lbs/yr)
  - South Lawn: N Reduction per Retrofit Curves (lbs/yr)

### BAY PROGRAM RETROFIT PERFORMANCE CURVES
- **Type (ST or RR)**
  - MR-6: RR
  - South Lawn: RR
- **Runoff Depth Treated (Inches)**
  - MR-6: 0.95
  - South Lawn: RR
- **P Removal Efficiency**
  - MR-6: 68.9%
  - South Lawn: 72.4%
- **N Removal Efficiency**
  - MR-6: 58.9%
  - South Lawn: 61.9%
- **P Reduction per Retrofit Curves (lbs/yr)**
  - MR-6: 0.43
  - South Lawn: RR
- **N Reduction per Retrofit Curves (lbs/yr)**
  - MR-6: 3.01
  - South Lawn: RR
- **TSS Reduction per Retrofit Curves (lbs/yr)**
  - MR-6: 150.52
  - South Lawn: RR

### BAY PROGRAM BMP EFFICIENCY
- **CBP BMP Type**
  - MR-6: Bioretention A/B
  - South Lawn: Bioretention
- **P Removal Efficiency**
  - MR-6: 75%
  - South Lawn: Bioretention
- **N Removal Efficiency**
  - MR-6: 70%
  - South Lawn: Bioretention
- **TSS Removal Efficiency**
  - MR-6: 73.8%
  - South Lawn: Bioretention
- **P Reduction per CBP Efficiency Table (lbs/yr)**
  - MR-6: 0.47
  - South Lawn: Bioretention
- **N Reduction per CBP Efficiency Table (lbs/yr)**
  - MR-6: 3.58
  - South Lawn: Bioretention
- **TSS Reduction per CBP Efficiency Table (lbs/yr)**
  - MR-6: 163.13
  - South Lawn: Bioretention

### Maximum Phosphorus Credit per Site (lbs/yr)
- MR-6: 0.47
- South Lawn: 0.56
- **Maximum Nitrogen Credit per Site (lbs/yr)**
  - MR-6: 3.58
  - South Lawn: 3.16
- **Maximum Suspended Solids Credit per Site (lbs/yr)**
  - MR-6: 163.13
  - South Lawn: 216.86
## BMPs on Projects That Reduced Impervious or Installed in Addition to VSMP Requirements

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<th>New Cabell</th>
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<td>MOS8-0060-02</td>
<td>ME12-0583-02</td>
</tr>
<tr>
<td>WQV (CF)</td>
<td>50.4</td>
<td>549.0</td>
<td>549.0</td>
<td>48.8</td>
</tr>
</tbody>
</table>

### PERFORMANCE BASED CRITERIA

| Drainage Area to BMP-Impervious (Ac) | 0.10 | 0.08 | 0.06 | 2.55 | 0.03 |
| Drainage Area to BMP-Pervious (Ac) | 0.00 | 0.10 | 0.11 | 0.19 | 0.00 |

### JAMES RIVER POC RATES

| Phosphorus (P) Loads (lbs/yr) | 0.18 | 0.19 | 0.16 | 4.58 | 0.05 |
| Nitrogen (N) Loads (lbs/yr) | 0.94 | 1.45 | 1.33 | 25.27 | 0.28 |
| Total Suspended Solids (TSS) Loads (lbs/yr) | 67.69 | 64.26 | 51.74 | 1745.40 | 20.31 |

### VA STORMWATER BMP CLEARINGHOUSE

<table>
<thead>
<tr>
<th>BMP Type</th>
<th>P Removal Efficiency</th>
<th>N Removal Efficiency</th>
<th>P Reduction per Clearinghouse (lbs/yr)</th>
<th>N Reduction per Clearinghouse (lbs/yr)</th>
</tr>
</thead>
</table>

### BAY PROGRAM RETROFIT PERFORMANCE CURVES

<table>
<thead>
<tr>
<th>Type (ST or RR)</th>
<th>ST</th>
<th>RR</th>
<th>RR</th>
<th>ST</th>
<th>RR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runoff Depth Treated (Inches)</td>
<td>0.14</td>
<td>1.89</td>
<td>2.52</td>
<td>0.01</td>
<td>0.80</td>
</tr>
<tr>
<td>P Removal Efficiency</td>
<td>15.5%</td>
<td>77.9%</td>
<td>78.8%</td>
<td>0.0%</td>
<td>65.1%</td>
</tr>
<tr>
<td>N Removal Efficiency</td>
<td>9.9%</td>
<td>66.7%</td>
<td>66.7%</td>
<td>0.0%</td>
<td>55.7%</td>
</tr>
<tr>
<td>TSS Removal Efficiency</td>
<td>19.8%</td>
<td>83.6%</td>
<td>84.9%</td>
<td>0.0%</td>
<td>69.7%</td>
</tr>
<tr>
<td>P Reduction per Retrofit Curves (lbs/yr)</td>
<td>0.03</td>
<td>0.15</td>
<td>0.13</td>
<td>0.00</td>
<td>0.03</td>
</tr>
<tr>
<td>N Reduction per Retrofit Curves (lbs/yr)</td>
<td>0.09</td>
<td>0.97</td>
<td>0.89</td>
<td>0.00</td>
<td>0.16</td>
</tr>
<tr>
<td>TSS Reduction per Retrofit Curves (lbs/yr)</td>
<td>13.39</td>
<td>53.76</td>
<td>43.92</td>
<td>-0.26</td>
<td>14.16</td>
</tr>
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</table>

### BAY PROGRAM BMP EFFICIENCY

<table>
<thead>
<tr>
<th>CBP BMP Type</th>
<th>Dry Detention</th>
<th>Bioretention</th>
<th>Bioretention</th>
<th>Dry Detention</th>
<th>Bioretention A/B</th>
</tr>
</thead>
<tbody>
<tr>
<td>P Removal Efficiency</td>
<td>10%</td>
<td>45%</td>
<td>45%</td>
<td>10%</td>
<td>75%</td>
</tr>
<tr>
<td>N Removal Efficiency</td>
<td>5%</td>
<td>25%</td>
<td>25%</td>
<td>5%</td>
<td>70%</td>
</tr>
<tr>
<td>TSS Removal Efficiency</td>
<td>10%</td>
<td>55%</td>
<td>55%</td>
<td>10%</td>
<td>80%</td>
</tr>
<tr>
<td>P Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>0.02</td>
<td>0.09</td>
<td>0.07</td>
<td>0.46</td>
<td>0.04</td>
</tr>
<tr>
<td>N Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>0.05</td>
<td>0.36</td>
<td>0.33</td>
<td>1.26</td>
<td>0.20</td>
</tr>
<tr>
<td>TSS Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>6.77</td>
<td>35.34</td>
<td>28.45</td>
<td>174.54</td>
<td>16.25</td>
</tr>
</tbody>
</table>

- Maximum Phosphorus Credit per Site (lbs/yr) | 0.03 | 0.15 | 0.13 | 0.46 | 0.04 |
- Maximum Nitrogen Credit per Site (lbs/yr) | 0.09 | 0.97 | 0.89 | 1.26 | 0.20 |
- Maximum Suspended Solids Credit per Site (lbs/yr) | 13.39 | 53.76 | 43.92 | 174.54 | 16.25 |
### BMPs on Projects That Reduced Impervious or Installed in Addition to VSMP Requirements

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Date BMP Installed</th>
<th>Reduced Impervious or In Addition to VSMP Requirements</th>
<th>Site Area (Ac)</th>
<th>BMP Type (UVA Description)</th>
<th>SWMF ID#</th>
<th>WQV (CF)</th>
<th>PERFORMANCE BASED CRITERIA</th>
<th>Drainage Area to BMP-Impervious (Ac)</th>
<th>Drainage Area to BMP-Pervious (Ac)</th>
<th>JAMES RIVER POC RATES</th>
<th>VA STORMWATER BMP CLEARINGHOUSE</th>
<th>BAY PROGRAM RETROFIT PERFORMANCE CURVES</th>
<th>BAY PROGRAM BMP EFFICIENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruffner Hall</td>
<td>2014</td>
<td>In Addition</td>
<td>0.4</td>
<td>Biofilter</td>
<td>ME03-0260-01</td>
<td>1,219.7</td>
<td>0.33</td>
<td>0.62</td>
<td>230.47</td>
<td>RR</td>
<td>1.02</td>
<td>70.2%</td>
<td>60.0%</td>
</tr>
<tr>
<td>Ruffner Hall</td>
<td>2014</td>
<td>In Addition</td>
<td>0.23</td>
<td>Biofilter</td>
<td>ME03-0260-02</td>
<td>479.2</td>
<td>0.13</td>
<td>0.27</td>
<td>95.81</td>
<td>RR</td>
<td>1.05</td>
<td>70.8%</td>
<td>60.5%</td>
</tr>
<tr>
<td>Ruffner Hall</td>
<td>2014</td>
<td>In Addition</td>
<td>0.12</td>
<td>Permeable Pavement</td>
<td>ME03-0260-03</td>
<td>435.6</td>
<td>0.12</td>
<td>0.21</td>
<td>79.20</td>
<td>RR</td>
<td>1.03</td>
<td>70.4%</td>
<td>60.2%</td>
</tr>
<tr>
<td>Hospital</td>
<td>October 2014</td>
<td>In Addition</td>
<td>0.60</td>
<td>Green Roof</td>
<td>MO6A-1150-02</td>
<td>2,710.0</td>
<td>0.60</td>
<td>1.06</td>
<td>406.16</td>
<td>RR</td>
<td>1.24</td>
<td>73.6%</td>
<td>62.9%</td>
</tr>
</tbody>
</table>

#### VA STORMWATER BMP CLEARINGHOUSE

- **BMP Type**
  - P Removal Efficiency
  - N Removal Efficiency
  - P Reduction per Clearinghouse (lbs/yr)
  - N Reduction per Clearinghouse (lbs/yr)

#### BAY PROGRAM RETROFIT PERFORMANCE CURVES

- **Type (ST or RR)**
- Runoff Depth Treated (Inches)
- P Removal Efficiency
- N Removal Efficiency
- TSS Removal Efficiency
- P Reduction per Retrofit Curves (lbs/yr)
- N Reduction per Retrofit Curves (lbs/yr)
- TSS Reduction per Retrofit Curves (lbs/yr)

#### BAY PROGRAM BMP EFFICIENCY

- **CBP BMP Type**
- P Removal Efficiency
- N Removal Efficiency
- TSS Removal Efficiency
- P Reduction per CBP Efficiency Table (lbs/yr)
- N Reduction per CBP Efficiency Table (lbs/yr)
- TSS Reduction per CBP Efficiency Table (lbs/yr)

- **Maximum Phosphorus Credit per Site (lbs/yr)**
- **Maximum Nitrogen Credit per Site (lbs/yr)**
- **Maximum Suspended Solids Credit per Site (lbs/yr)**
### BMPs on Projects That Reduced Impervious or Installed in Addition to VSMP Requirements

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Leake II</th>
<th>Future (Fall 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date BMP Installed</td>
<td>BMP Type (UVA Description)</td>
<td>BMP Type (UVA Description)</td>
</tr>
<tr>
<td>Reduced Impervious or In Addition to VSMP Requirements</td>
<td>Site Area (Ac)</td>
<td>Site Area (Ac)</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>BMP Type (UVA Description)</td>
<td>BMP Type (UVA Description)</td>
</tr>
<tr>
<td>SWMF ID#</td>
<td>WQV (CF)</td>
<td>WQV (CF)</td>
</tr>
<tr>
<td>Reduced Impervious or In Addition to VSMP Requirements</td>
<td>Performance Based Criteria</td>
<td>Performance Based Criteria</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>James River POC Rates</td>
<td>James River POC Rates</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>VA Stormwater BMP Clearinghouse</td>
<td>VA Stormwater BMP Clearinghouse</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>Bay Program Retrofit Performance Curves</td>
<td>Bay Program Retrofit Performance Curves</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>Bay Program BMP Efficiency</td>
<td>Bay Program BMP Efficiency</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>Credit Totals</td>
<td>Credit Totals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Leake II</th>
<th>Future (Fall 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date BMP Installed</td>
<td>BMP Type (UVA Description)</td>
<td>BMP Type (UVA Description)</td>
</tr>
<tr>
<td>Reduced Impervious or In Addition to VSMP Requirements</td>
<td>Site Area (Ac)</td>
<td>Site Area (Ac)</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>BMP Type (UVA Description)</td>
<td>BMP Type (UVA Description)</td>
</tr>
<tr>
<td>SWMF ID#</td>
<td>WQV (CF)</td>
<td>WQV (CF)</td>
</tr>
<tr>
<td>Reduced Impervious or In Addition to VSMP Requirements</td>
<td>Performance Based Criteria</td>
<td>Performance Based Criteria</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>James River POC Rates</td>
<td>James River POC Rates</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>VA Stormwater BMP Clearinghouse</td>
<td>VA Stormwater BMP Clearinghouse</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>Bay Program Retrofit Performance Curves</td>
<td>Bay Program Retrofit Performance Curves</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>Bay Program BMP Efficiency</td>
<td>Bay Program BMP Efficiency</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>Credit Totals</td>
<td>Credit Totals</td>
</tr>
</tbody>
</table>

**Performance Based Criteria**

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Date BMP Installed</th>
<th>BMP Type (UVA Description)</th>
<th>WQV (CF)</th>
<th>Reduced Impervious or In Addition to VSMP Requirements</th>
<th>Site Area (Ac)</th>
<th>BMP Type (UVA Description)</th>
<th>WQV (CF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Name</td>
<td>Date BMP Installed</td>
<td>BMP Type (UVA Description)</td>
<td>WQV (CF)</td>
<td>Reduced Impervious or In Addition to VSMP Requirements</td>
<td>Site Area (Ac)</td>
<td>BMP Type (UVA Description)</td>
<td>WQV (CF)</td>
</tr>
<tr>
<td>Site Name</td>
<td>Date BMP Installed</td>
<td>BMP Type (UVA Description)</td>
<td>WQV (CF)</td>
<td>Reduced Impervious or In Addition to VSMP Requirements</td>
<td>Site Area (Ac)</td>
<td>BMP Type (UVA Description)</td>
<td>WQV (CF)</td>
</tr>
</tbody>
</table>
## BMPs on Sites Less Than 1 Acre

<table>
<thead>
<tr>
<th>Site Name</th>
<th>PCC Annex</th>
<th>Amphitheater</th>
<th>Newcomb Hall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date BMP Installed</td>
<td>March 2010</td>
<td>May 2010</td>
<td>July 2010</td>
</tr>
<tr>
<td>Redevelopment or Retrofit</td>
<td>Redevelopment</td>
<td>Redevelopment</td>
<td>Redevelopment</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>0.228</td>
<td>0.25</td>
<td>0.593</td>
</tr>
<tr>
<td>BMP Type (UVA Description)</td>
<td>Filterra (6x4)</td>
<td>Porous Pavers</td>
<td>Green Roof</td>
</tr>
<tr>
<td>SWMF ID#</td>
<td>MO6A-1164-01</td>
<td>MOSB-0062-02</td>
<td>ME06-0122-02</td>
</tr>
<tr>
<td>WQV (CF)</td>
<td>35.0</td>
<td>363.0</td>
<td>172.4</td>
</tr>
</tbody>
</table>

### PERFORMANCE BASED CRITERIA

- Drainage Area to BMP-Impervious (Ac): 0.06, 0.10, 0.05
- Drainage Area to BMP-Pervious (Ac): 0.00, 0, 0.00

### JAMES RIVER POC RATES

<table>
<thead>
<tr>
<th></th>
<th>P (lbs/yr)</th>
<th>N (lbs/yr)</th>
<th>TSS (lbs/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphorus</td>
<td>0.11</td>
<td>0.18</td>
<td>42.65</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>0.59</td>
<td>0.94</td>
<td>67.69</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>42.65</td>
<td>0.18</td>
<td>33.85</td>
</tr>
</tbody>
</table>

### VA STORMWATER BMP CLEARINGHOUSE

<table>
<thead>
<tr>
<th>BMP Type</th>
<th>P Removal Efficiency</th>
<th>N Removal Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>P Reduction per Clearinghouse (lbs/yr)</td>
<td>0.02</td>
<td>0.11</td>
</tr>
<tr>
<td>N Reduction per Clearinghouse (lbs/yr)</td>
<td>0.06</td>
<td>0.28</td>
</tr>
</tbody>
</table>

### BAY PROGRAM RETROFIT PERFORMANCE CURVES

<table>
<thead>
<tr>
<th>Type (ST or RR)</th>
<th>RR</th>
<th>RR</th>
<th>RR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runoff Depth Treated (Inches)</td>
<td>0.15</td>
<td>1.00</td>
<td>0.95</td>
</tr>
<tr>
<td>P Removal Efficiency</td>
<td>21.6%</td>
<td>69.9%</td>
<td>68.9%</td>
</tr>
<tr>
<td>N Removal Efficiency</td>
<td>18.4%</td>
<td>58.9%</td>
<td></td>
</tr>
<tr>
<td>TSS Removal Efficiency</td>
<td>23.1%</td>
<td>73.8%</td>
<td></td>
</tr>
</tbody>
</table>

### BAY PROGRAM BMP EFFICIENCY

<table>
<thead>
<tr>
<th>CBP BMP Type</th>
<th>Filterra</th>
<th>Permeable Pavement</th>
<th>Bioretention A/B</th>
</tr>
</thead>
<tbody>
<tr>
<td>P Removal Efficiency</td>
<td>80%</td>
<td>20%</td>
<td>55%</td>
</tr>
<tr>
<td>N Removal Efficiency</td>
<td>65%</td>
<td>10%</td>
<td>70%</td>
</tr>
<tr>
<td>TSS Removal Efficiency</td>
<td>90%</td>
<td>55%</td>
<td>80%</td>
</tr>
<tr>
<td>P Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>0.09</td>
<td>0.04</td>
<td>0.07</td>
</tr>
<tr>
<td>N Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>0.38</td>
<td>0.09</td>
<td>0.33</td>
</tr>
<tr>
<td>TSS Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>38.38</td>
<td>37.23</td>
<td>27.08</td>
</tr>
</tbody>
</table>

### Maximum Credits

<table>
<thead>
<tr>
<th></th>
<th>P (lbs/yr)</th>
<th>N (lbs/yr)</th>
<th>TSS (lbs/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Phosphorus Credit per Site</td>
<td>0.09</td>
<td>0.12</td>
<td>0.07</td>
</tr>
<tr>
<td>Maximum Nitrogen Credit per Site</td>
<td>0.38</td>
<td>0.56</td>
<td>0.33</td>
</tr>
<tr>
<td>Maximum Suspended Solids Credit per Site</td>
<td>38.38</td>
<td>50.71</td>
<td>27.08</td>
</tr>
</tbody>
</table>
# BMPs on Sites Less Than 1 Acre

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Arlington Blvd</th>
<th>Garrett Hall</th>
<th>North Grounds Mechanical Plant</th>
<th>Alderman Pedestrian Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date BMP Installed</td>
<td>2011</td>
<td>2011</td>
<td>2015</td>
<td>2015</td>
</tr>
<tr>
<td>Redevelopment or Retrofit</td>
<td>Redevelopment</td>
<td>Redevelopment</td>
<td>Redevelopment</td>
<td>Redevelopment</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>0.85</td>
<td>0.69</td>
<td>0.71</td>
<td>0.62</td>
</tr>
<tr>
<td>BMP Type (UVA Description)</td>
<td>Detention</td>
<td>Green Roof</td>
<td>Water Quality Filters</td>
<td>Biofilter</td>
</tr>
<tr>
<td>SWMF ID#</td>
<td>ME12-BLVD-01</td>
<td>MOS5-0055-02</td>
<td>ME11-7533-02</td>
<td>TBD</td>
</tr>
<tr>
<td>WQV (CF)</td>
<td>1,051.1</td>
<td>620.7</td>
<td>308.6</td>
<td>1,383.8</td>
</tr>
</tbody>
</table>

## PERFORMANCE BASED CRITERIA

| Drainage Area to BMP-Impervious (Ac) | 0.77 | 0.18 | 0.17 | 0.01 |
| Drainage Area to BMP-Pervious (Ac)  | 0.64 | 0.18 | 0 | 0.38 |

## JAMES RIVER POC RATES

| Phosphorus (P) Loads (lbs/yr) | 1.68 | 0.41 | 0.30 | 0.21 |
| Nitrogen (N) Loads (lbs/yr)   | 11.70 | 2.95 | 1.60 | 2.75 |
| Total Suspended Solids (TSS) Loads (lbs/yr) | 585.94 | 140.04 | 115.08 | 45.18 |

## VA STORMWATER BMP CLEARINGHOUSE

<table>
<thead>
<tr>
<th>BMP Type</th>
<th>Bioretention #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>P Removal Efficiency</td>
<td>90%</td>
</tr>
<tr>
<td>N Removal Efficiency</td>
<td>90%</td>
</tr>
<tr>
<td>P Reduction per Clearinghouse (lbs/yr)</td>
<td>0.19</td>
</tr>
<tr>
<td>N Reduction per Clearinghouse (lbs/yr)</td>
<td>1.40</td>
</tr>
</tbody>
</table>

## BAY PROGRAM RETROFIT PERFORMANCE CURVES

<table>
<thead>
<tr>
<th>Type (ST or RR)</th>
<th>ST</th>
<th>RR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runoff Depth Treated (Inches)</td>
<td>0.38</td>
<td>0.95</td>
</tr>
<tr>
<td>P Removal Efficiency</td>
<td>34.5%</td>
<td>68.9%</td>
</tr>
<tr>
<td>N Removal Efficiency</td>
<td>21.9%</td>
<td>58.9%</td>
</tr>
<tr>
<td>TSS Removal Efficiency</td>
<td>43.9%</td>
<td>73.8%</td>
</tr>
<tr>
<td>P Reduction per Retrofit Curves (lbs/yr)</td>
<td>0.58</td>
<td>0.28</td>
</tr>
<tr>
<td>N Reduction per Retrofit Curves (lbs/yr)</td>
<td>2.57</td>
<td>1.74</td>
</tr>
<tr>
<td>TSS Reduction per Retrofit Curves (lbs/yr)</td>
<td>256.94</td>
<td>103.38</td>
</tr>
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</table>

## BAY PROGRAM BMP EFFICIENCY

<table>
<thead>
<tr>
<th>CBP BMP Type</th>
<th>Dry Detention</th>
<th>Bioretention A/B</th>
<th>Filtering Practice</th>
<th>Bioretention</th>
</tr>
</thead>
<tbody>
<tr>
<td>P Removal Efficiency</td>
<td>10%</td>
<td>75%</td>
<td>60%</td>
<td>45%</td>
</tr>
<tr>
<td>N Removal Efficiency</td>
<td>5%</td>
<td>70%</td>
<td>40%</td>
<td>25%</td>
</tr>
<tr>
<td>TSS Removal Efficiency</td>
<td>10%</td>
<td>80%</td>
<td>80%</td>
<td>55%</td>
</tr>
<tr>
<td>P Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>0.17</td>
<td>0.31</td>
<td>0.18</td>
<td>0.09</td>
</tr>
<tr>
<td>N Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>0.59</td>
<td>2.06</td>
<td>0.64</td>
<td>0.69</td>
</tr>
<tr>
<td>TSS Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>58.59</td>
<td>112.03</td>
<td>92.06</td>
<td>24.85</td>
</tr>
</tbody>
</table>

| Maximum Phosphorus Credit per Site (lbs/yr) | 0.58 | 0.31 | 0.18 | 0.19 |
| Maximum Nitrogen Credit per Site (lbs/yr) | 2.57 | 2.06 | 0.64 | 1.83 |
| Maximum Suspended Solids Credit per Site (lbs/yr) | 256.94 | 112.03 | 92.06 | 38.36 |
### BMPs on Sites Less Than 1 Acre

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Dawson's Row</th>
<th>Recycle Center</th>
<th>Education Resource Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date BMP Installed</td>
<td>2015 Redevelopment</td>
<td>2016 Redevelopment</td>
<td>Future (Spring 2017) Redevelopment</td>
</tr>
<tr>
<td>redevelopment or retrofit</td>
<td>0.75</td>
<td>0.87</td>
<td>0.88</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>Biofilter</td>
<td>Infiltration</td>
<td>Biofilter</td>
</tr>
<tr>
<td>BMP Type (UVA Description)</td>
<td>TBD</td>
<td>TBD</td>
<td>MO7-0604-01</td>
</tr>
<tr>
<td>SWMF ID#</td>
<td>231.0</td>
<td>300.0</td>
<td>700.0</td>
</tr>
<tr>
<td>WQV (CF)</td>
<td>231.0</td>
<td>300.0</td>
<td>700.0</td>
</tr>
</tbody>
</table>

#### PERFORMANCE BASED CRITERIA

| Drainage Area to BMP-Impervious (Ac) | 0.05 | 0.06 | 0.57 | 0.53 |
| Drainage Area to BMP-Pervious (Ac)  | 0.09 | 0.12 | 0.79 | 0.03 |

#### JAMES RIVER POC RATES

| Phosphorus (P) Loads (lbs/yr) | 0.13 | 0.17 | 1.39 | 0.95 |
| Nitrogen (N) Loads (lbs/yr)   | 1.10 | 1.40 | 10.86 | 5.19 |
| Total Suspended Solids (TSS) Loads (lbs/yr) | 42.94 | 52.75 | 463.27 | 361.81 |

#### VA STORMWATER BMP CLEARINGHOUSE

<table>
<thead>
<tr>
<th>BMP Type</th>
<th>Bioretention #1</th>
<th>Infiltration #1</th>
<th>Infiltration #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>P Removal Efficiency</td>
<td>55%</td>
<td>63%</td>
<td>25%</td>
</tr>
<tr>
<td>N Removal Efficiency</td>
<td>64%</td>
<td>57%</td>
<td>15%</td>
</tr>
<tr>
<td>P Reduction per Clearinghouse (lbs/yr)</td>
<td>0.09</td>
<td>0.13</td>
<td>1.11</td>
</tr>
<tr>
<td>N Reduction per Clearinghouse (lbs/yr)</td>
<td>0.78</td>
<td>0.87</td>
<td>7.84</td>
</tr>
</tbody>
</table>

#### BAY PROGRAM RETROFIT PERFORMANCE CURVES

<table>
<thead>
<tr>
<th>Type (ST or RR)</th>
<th>Runoff Depth Treated (Inches)</th>
<th>P Removal Efficiency</th>
<th>N Removal Efficiency</th>
<th>TSS Removal Efficiency</th>
<th>P Reduction per Retrofit Curves (lbs/yr)</th>
<th>N Reduction per Retrofit Curves (lbs/yr)</th>
<th>TSS Reduction per Retrofit Curves (lbs/yr)</th>
<th>P Reduction per Retrofit Curves (lbs/yr)</th>
<th>N Reduction per Retrofit Curves (lbs/yr)</th>
<th>TSS Reduction per Retrofit Curves (lbs/yr)</th>
<th>Credit Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR</td>
<td>1.27</td>
<td>73.9%</td>
<td>63.2%</td>
<td>79.3%</td>
<td>0.10</td>
<td>0.69</td>
<td>34.03</td>
<td>1.27</td>
<td>0.69</td>
<td>34.03</td>
<td>3.51</td>
</tr>
<tr>
<td>RR</td>
<td>1.38</td>
<td>75.0%</td>
<td>64.1%</td>
<td>80.4%</td>
<td>0.12</td>
<td>0.90</td>
<td>42.41</td>
<td>1.38</td>
<td>0.90</td>
<td>42.41</td>
<td>3.15</td>
</tr>
<tr>
<td>RR</td>
<td>0.34</td>
<td>41.0%</td>
<td>35.2%</td>
<td>43.9%</td>
<td>0.57</td>
<td>3.82</td>
<td>203.53</td>
<td>0.34</td>
<td>3.82</td>
<td>203.53</td>
<td>275.48</td>
</tr>
</tbody>
</table>

#### BAY PROGRAM BMP EFFICIENCY

<table>
<thead>
<tr>
<th>CBP BMP Type</th>
<th>Bioretention</th>
<th>Infiltration w/o Sand</th>
<th>Bioretention</th>
<th>Infiltration w/o Sand</th>
</tr>
</thead>
<tbody>
<tr>
<td>P Removal Efficiency</td>
<td>45%</td>
<td>85%</td>
<td>45%</td>
<td>85%</td>
</tr>
<tr>
<td>N Removal Efficiency</td>
<td>25%</td>
<td>80%</td>
<td>25%</td>
<td>80%</td>
</tr>
<tr>
<td>TSS Removal Efficiency</td>
<td>55%</td>
<td>95%</td>
<td>55%</td>
<td>95%</td>
</tr>
<tr>
<td>P Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>0.06</td>
<td>0.14</td>
<td>0.63</td>
<td>0.81</td>
</tr>
<tr>
<td>N Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>0.27</td>
<td>1.12</td>
<td>2.72</td>
<td>4.15</td>
</tr>
<tr>
<td>TSS Reduction per CBP Efficiency Table (lbs/yr)</td>
<td>23.62</td>
<td>50.11</td>
<td>254.80</td>
<td>343.72</td>
</tr>
</tbody>
</table>

| Maximum Phosphorus Credit per Site (lbs/yr) | 0.10 | 0.14 | 0.63 | 1.11 |
| Maximum Nitrogen Credit per Site (lbs/yr) | 0.78 | 1.12 | 3.82 | 7.84 |
| Maximum Suspended Solids Credit per Site (lbs/yr) | 34.03 | 50.11 | 254.80 | 343.72 | 1,298.22 |

Credit Totals

---

**Note:** The table above provides a detailed overview of BMPs installed on sites less than 1 acre, including site name, date BMP installed, redevelopment or retrofit status, site area, BMP type, SWMF ID#, and performance criteria such as drainage area to BMP, JJames River POC rates, and VA Stormwater BMP Clearinghouse criteria. The table also includes retrofitted performance curves and CBP BMP efficiency metrics, along with maximum credits for phosphorus, nitrogen, and suspended solids.
### Site Name

<table>
<thead>
<tr>
<th>Date BMP Installed</th>
<th>Redevelopment or Retrofit</th>
<th>Site Area (Ac)</th>
<th>BMP TYPE (UVA Description)</th>
<th>SWMF ID#</th>
<th>WQF (CF)</th>
<th>Post-development Impervious Area (acres)</th>
<th>Pre-development Impervious Area (acres)</th>
<th>IPRE Percent Impervious Cover (percent expressed in whole numbers)</th>
<th>I watersh (percent expressed in whole numbers)</th>
<th>Pre-development Total Phosphorous Site Load (lbs/yr)</th>
<th>Post-development Total Phosphorous Site Load (lbs/yr)</th>
<th>ITPwatershed Percent Impervious Cover (expressed in whole numbers)</th>
<th>TPwatershed (Itpwatershed) Total Phosphorous Reduction Required (lbs/yr)</th>
<th>TPwatershed Combined Reductions from BMP(s) (lbs/yr)</th>
<th>TNwatershed Combined Reductions from BMP(s) (lbs/yr)</th>
<th>TSSwatershed Combined Reductions from BMP(s) (lbs/yr)</th>
<th>CBP BMP Type</th>
<th>Bioretention A/B</th>
<th>Bioretention A/B soils, no underdrain</th>
<th>TSS Additional Credit (lbs/yr)</th>
<th>TN Additional Credit (lbs/yr)</th>
<th>TP Additional Credit (lbs/yr)</th>
<th>Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sieg Warehouse</td>
<td>October 2009</td>
<td>PCS Addition, ITC Basin</td>
<td>Biofilter 1</td>
<td>MO-1693-01</td>
<td>1,227.0</td>
<td>0.49</td>
<td>2.4</td>
<td>0.46</td>
<td>0.03</td>
<td>93</td>
<td>0.99</td>
<td>0.77</td>
<td>0.77</td>
<td>0.18</td>
<td>0.25</td>
<td>0.56</td>
<td>75%</td>
<td>85%</td>
<td>20%</td>
<td>11.01</td>
<td>11.01</td>
<td>2.22</td>
<td>1. Per correspondence with DEQ, for redevelopment projects completed prior to January 1, 2014, permittees need to reduce the post-redevelopment pollutant load to the pre-redevelopment pollutant load level prior to taking credit for any additional reductions produced by a BMP.</td>
</tr>
</tbody>
</table>
### Performance Based Criteria

<table>
<thead>
<tr>
<th>Site Name</th>
<th>North Grounds Rec Center</th>
<th>Alderman Building 6 (Gibbons)</th>
<th>Rugby Administration Building (O’Neill)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date BMP Installed</td>
<td>September 2014</td>
<td>August 2015</td>
<td>August 2015</td>
</tr>
<tr>
<td>Redevelopment or Retrofit</td>
<td>Redevelopment</td>
<td>Redevelopment</td>
<td>Redevelopment</td>
</tr>
<tr>
<td>Site Area (Ac)</td>
<td>3.9</td>
<td>1.97</td>
<td>1.17</td>
</tr>
<tr>
<td>BMP TYPE (UVA Description)</td>
<td>Bioretention</td>
<td>Infiltration Chamber</td>
<td>Rain Garden</td>
</tr>
<tr>
<td>SWMP ID#</td>
<td>ME10-5562-01</td>
<td>MO3A-2375-01</td>
<td>ME13-2422-01</td>
</tr>
<tr>
<td>WQV (CF)</td>
<td>24,350.0</td>
<td>2,400.0</td>
<td>654.0</td>
</tr>
</tbody>
</table>

#### Performance Based Criteria

**Total Site**

<table>
<thead>
<tr>
<th></th>
<th>Total Site</th>
<th>Post-development Impervious Area</th>
<th>Pre-development Impervious Area</th>
<th>Total Phosphorous Site Load (lbs/yr)</th>
<th>Total Phosphorous Reduction Required (lbs/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Applicable Area (acres)</td>
<td>1.2</td>
<td>1.97</td>
<td>1.17</td>
<td>0.73</td>
<td>1.08</td>
</tr>
<tr>
<td>IPOST Percent Impervious Cover (percent expressed in whole numbers)</td>
<td>61</td>
<td>55</td>
<td>38</td>
<td>0.29</td>
<td>0.84</td>
</tr>
<tr>
<td>Iwaterhed (percent expressed in whole numbers)</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>0.73</td>
<td>1.95</td>
</tr>
<tr>
<td>TP (Lpre)Relative Total Phosphorous Site Load (lbs/yr)</td>
<td>0.73</td>
<td>1.95</td>
<td>0.97</td>
<td>0.53</td>
<td>0.87</td>
</tr>
<tr>
<td>TP (Lpost)Relative Total Phosphorous Site Load (lbs/yr)</td>
<td>1.63</td>
<td>2.44</td>
<td>1.04</td>
<td>0.53</td>
<td>0.87</td>
</tr>
<tr>
<td>RR (Lpre) Total Phosphorous Reduction Required (lbs/yr)</td>
<td>0.98</td>
<td>0.69</td>
<td>0.16</td>
<td>0.98</td>
<td>0.69</td>
</tr>
<tr>
<td>RR (Lwaterhed) Total Phosphorous Reduction Required (lbs/yr)</td>
<td>1.10</td>
<td>1.57</td>
<td>0.52</td>
<td>0.98</td>
<td>0.69</td>
</tr>
<tr>
<td>RR (LPOST) Total Phosphorous Reduction Required (lbs/yr)</td>
<td>0.98</td>
<td>0.69</td>
<td>0.16</td>
<td>0.98</td>
<td>0.69</td>
</tr>
<tr>
<td>RR (LTP) Total Phosphorous Reduction Required (lbs/yr)</td>
<td>0.90</td>
<td>0.49</td>
<td>0.06</td>
<td>0.90</td>
<td>0.49</td>
</tr>
</tbody>
</table>

#### Drainage Area

<table>
<thead>
<tr>
<th>DA (Acre)</th>
<th>I (Acre)</th>
<th>PA (Acre)</th>
<th>IA (Acre)</th>
<th>Proportion of Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total BMP</td>
<td>1.2</td>
<td>1.32</td>
<td>0.73</td>
<td>0.66</td>
</tr>
<tr>
<td>Impervious Area to BMP (acres)</td>
<td>0.73</td>
<td>0.66</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>Percent Impervious Cover (expressed in whole numbers)</td>
<td>61</td>
<td>50</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>Total Phosphorous Load (lbs/yr)</td>
<td>1.63</td>
<td>1.50</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>Proportion of Reduction</td>
<td>0.26</td>
<td>0.61</td>
<td>0.78</td>
<td></td>
</tr>
</tbody>
</table>

#### CBP BMP Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Bioretention A/B</th>
<th>Infiltration w/o Sand</th>
<th>Bioretention A/B</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP Removal Efficiency</td>
<td>75%</td>
<td>85%</td>
<td>75%</td>
</tr>
<tr>
<td>TP Reduction from BMP</td>
<td>1.23</td>
<td>1.28</td>
<td>0.28</td>
</tr>
<tr>
<td>Combined Reductions from BMP(s)</td>
<td>1.23</td>
<td>1.28</td>
<td>0.28</td>
</tr>
<tr>
<td>TN Relative Total Nitrogen Load (lbs/yr)</td>
<td>8.50</td>
<td>7.82</td>
<td>1.91</td>
</tr>
<tr>
<td>Removal Efficiency</td>
<td>70%</td>
<td>80%</td>
<td>70%</td>
</tr>
<tr>
<td>TN Reduction from BMP</td>
<td>5.95</td>
<td>6.26</td>
<td>1.34</td>
</tr>
<tr>
<td>Combined Reductions from BMP(s)</td>
<td>5.95</td>
<td>6.26</td>
<td>1.34</td>
</tr>
<tr>
<td>TSS Relative Total Suspended Solids Load (lbs/yr)</td>
<td>688.07</td>
<td>633.37</td>
<td>154.70</td>
</tr>
<tr>
<td>Removal Efficiency</td>
<td>80%</td>
<td>95%</td>
<td>80%</td>
</tr>
<tr>
<td>TSS Reduction of BMP</td>
<td>550.46</td>
<td>601.70</td>
<td>123.76</td>
</tr>
<tr>
<td>Combined Reductions from BMP(s)</td>
<td>550.46</td>
<td>601.70</td>
<td>123.76</td>
</tr>
</tbody>
</table>

#### Credit Totals

<table>
<thead>
<tr>
<th>Type</th>
<th>Total Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP Additional Credit (lbs/yr)</td>
<td>0.25</td>
</tr>
<tr>
<td>TN Additional Credit (lbs/yr)</td>
<td>1.57</td>
</tr>
<tr>
<td>TSS Additional Credit (lbs/yr)</td>
<td>145.10</td>
</tr>
</tbody>
</table>

**Notes:**