CHESAPEAKE BAY TOTAL MAXIMUM DAILY LOAD (TMDL) STUDY FOR JOINT BASE MYER- HENDERSON HALL

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June 2015

Revised December 2015

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EXECUTIVE SUMMARY

Introduction

United States Installation Management Command (IMCOM) tasked the United States Army Corps of Engineers (USACE) to provide technical data pertaining to Chesapeake Bay pollutant load reduction requirements for Joint Base Myer-Henderson Hall (JBM-HH), Virginia. Fort McNair, located in the District of Columbia, will be addressed in a separate opportunity assessment.

The Clean Water Act (CWA) established a basic structure for regulating pollutants in United States waters to keep them "fishable and swimmable". States are responsible for implementing these requirements through Watershed Implementation Plans (WIP), and the Environmental Protection Agency (EPA) is responsible for enforcing the regulation.

There are three pollutants identified as having the greatest impact on the Chesapeake Bay: total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS). States have identified impaired waters; and together with the EPA, developed a "pollution diet" to restore them. This pollution diet is known as a Total Maximum Daily Load (TMDL), or the amount of pollutant a waterbody can carry and still achieve its designated uses (drinking water, recreation, etc.). The Commonwealth of Virginia will utilize Municipal Storm Sewer System (MS4) permits to ensure developed lands achieve nutrient and sediment reduction requirements. This study will satisfy the MS4 Phase II General Permit, Chesapeake Bay TMDL Action Plan requirement (Section I C) and will contribute to the next scheduled MS4 progress report in October 2015.

Data Collection and Mapping

Land use, soils, stormwater infrastructure and drainage area data were collected and mapped in order to calculate baseline and current load rates for TN, TP, and TSS running off of the installation and to determine methods for reducing those pollutant loads.

Field Investigation

Existing infrastructure that is designed to treat stormwater runoff on the installation, or Best Management Practices (BMPs) were inventoried, inspected and entered into a database. The database was designed as a tracking and record keeping tool to help the installation manage their stormwater program over time. It can be used to track required pollutant reductions and to generate annual progress reports.

Establishment of Baseline Pollutant Loads

Virginia Department of Environmental Quality (DEQ) published guidance for pollutant load reduction requirements (DEQ, 2015). They used Chesapeake Bay Program (CBP) models to provide load rates for the Potomac River to be used to calculate installation-specific baseline load rates using land use data. Using 2009 land use data and the methods provided in the DEQ guidance, an estimated 3,272.40 lbs of TN, 252.05 lbs of TP and 168,742.40 lbs of TSS per year are deposited into waterways from JBM-HH.

Pollutant Load Reductions

The Phase I WIP provides a general framework for meeting Chesapeake Bay TMDL requirements. The Phase II WIP provides a more specific plan and schedule for meeting the requirements. It details

that based on the 2009 baseline conditions, 9 percent of TN loads, 16 percent of TP loads, and 20 percent of TSS loads from impervious regulated acres, and 6 percent of TN loads, 7.25 percent of TP loads and 8.75 percent TSS loads from pervious regulated acres be reduced by the end of the third permit cycle in 2027. This equates to 260.72 lbs of TN, 36.31 lbs of TP and 31,535.77 lbs of TSS that need to be reduced from JBM-HH per year by 2027. Five percent of these reductions are required to be completed by the end of the first permit cycle in 2017, and 35 percent are required to be completed by the end of the second permit cycle in 2022.

Virginia Action Plan Guidance provided a table of pollution reduction efficiencies for several types of BMPs (DEQ, 2015). Reduction efficiencies for bioswales, bioretention and permeable pavers were averaged together for each TN, TP, and TSS and applied to the baseline loads for each area of interest.

Since the 2009 baseline, some pollutant reduction has already been realized at JBM-HH. The recent demolition of a barracks building and the land's conversion from impervious surface to grass contributes to 15.07 lbs of TN, 1.61 lbs of TP, and 747.94 lbs of TSS of the required reductions. The remaining 245.65 lbs of TN, 34.70 lbs of TP, and 30,787.83 lbs of TSS may be reduced through proposed structural and non-structural BMPs. Areas in JBM-HH where BMPs can be implemented to achieve these reductions are identified in Section 6 of this report. A schedule for BMP implementation to satisfy each permit cycle requirement is included in Section 6.2. Detailed information about these areas of interest (AOIs) and BMPs are included in Appendix A.

Costs

Generalized, planning level initial construction costs for the BMPs proposed to satisfy the pollution reduction requirements were calculated using University of Maryland research on BMPs built in Maryland and Virginia counties (Hagan, 2011). This tool considered the type of BMP to be constructed and the impervious acreage it will treat. The rate for bioswale ($42,000), bioretention ($46,875) and permeable pavers ($335,412) was averaged to get one cost per impervious acre treated ($141,429).

The cost to implement BMPs to satisfy the first phase of the permit for JBM-HH is $255,986, excluding the cost of the building demolition. The cost to implement BMPs to satisfy the second phase of the permit is an additional $1.2 million. The cost to implement the third phase of the permit cycle is approximately $3.1 million. The total planning level cost estimated to implement all structural BMPs proposed to satisfy the pollution reduction requirements throughout all three phases is approximately $4.6 million.

The costs identified in this study are strictly planning level; many unknowns still exist and can only be captured during the design phase of the selected AOI. During the design phase, the type of BMP, location and results from the utility survey may change what is shown in this study within a selected AOI. Local watershed-specific permit requirements along with regional geology and soils will affect costs. In addition, the type of design/build contracting mechanism that is chosen will also affect the cost. All of these concerns are typically addressed during the design phase, which will establish final construction cost estimates.

Installation Point of Contact

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Appendix A: Factsheets

Appendix B: User's Guide for BMP Database

Appendix C: Stormwater Management Guidance for the Commonwealth of Virginia

ATTACHMENTS

Project Disc containing:

- GIS Data
- BMP Database
- Digital Report

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LIST OF ACRONYMS

Area of Interest ..... AOI
Best Management Practices ..... BMP
Chesapeake Bay Foundation ..... CBF
Chesapeake Bay Program ..... CBP
Chesapeake Bay Program Watershed Model ..... CBPWM
Clean Water Act ..... CWA
Department of Environmental Quality ..... DEQ
Digital Elevation Modeling ..... DEM
Edge of stream ..... EOS
Environmental Site Design ..... ESD
Executive Order ..... EO
Geographic Information System ..... GIS
Global Positioning System ..... GPS
Hydrologic Soil Group ..... HSG
Installation Management Command ..... IMCOM
Joint Base Myer-Henderson Hall ..... JBM-HH
Level 2 ..... L2
Light Detection and Ranging ..... LiDAR
Low Impact Development ..... LID
Municipal Storm Water Sewer System MS4
National Pollutant Discharge Elimination System ..... NPDES
Natural Resource Conservation Service ..... NRCS
North American Vertical Datum of 1988 ..... NAVD88
Pollutants of concern ..... POC
Total Maximum Daily Load ..... TMDL
Total nitrogen ..... TN
Total phosphorus ..... TP
Total suspended solids ..... TSS
United States ..... US
United States Army Corps of Engineers ..... USACE
United States Environmental Protection Agency ..... EPA
Universal Transverse Mercator ..... UTM
Virginia ..... VA
Virginia Pollution Discharge Elimination System ..... VPDES
Watershed Implementation Plans ..... WIP
Web Soil Survey ..... WSS

1 INTRODUCTION

1.1 BACKGROUND AND PURPOSE

The Clean Water Act (CWA) established a basic structure for regulating pollutants in United States (US) waters (EPA, 1972). Despite efforts to comply with these requirements, the Chesapeake Bay continues to fall short of State water quality standards and CWA goals (CBF, 2014). Additional legislation has since been developed to assure the Bay is "fishable and swimmable". The Environmental Protection Agency (EPA) established the requirements for state Watershed Implementation Plans (WIP) as part of a larger Chesapeake Bay Total Maximum Daily Load (TMDL) accountability framework.

Section 303 of the CWA requires States to: establish water quality standards based on achieving their designated uses for that water (drinking, recreation, etc…), develop lists of impaired waters that fail to meet those standards, and estimate the amount of a pollutant that the waterbody can receive and still meet those standards. The amount of a pollutant a waterbody can carry and satisfy its water quality standards is now known as a Total Maximum Daily Load (TMDL).

CWA Section 402 regulates any point sources discharging pollution into U.S. waters through the National Pollutant Discharge Elimination System (NPDES) program. Municipalities with stormwater conveyance systems are required to obtain a Municipal Storm Water Sewer System (MS4) Phase II General Permit for coverage under the NPDES program. States have chosen to use these permits to enforce the TMDL requirements.

The Chesapeake Bay Protection and Restoration Executive Order (EO) 13508 (FLCC, 2009) describes the Chesapeake Bay as a "national treasure" and intends to bring more accountability to Bay cleanup efforts. In response to the EO, EPA published guidance for Federal facilities describing how to comply with the Federal regulations implemented by the States.

In December 2010, EPA published a TMDL for all impaired segments of the Chesapeake Bay watershed in order to help the States establish load allocations. They determined that total nitrogen (TN), total phosphorus (TP) and total suspended solids (TSS) are the pollutants of concern (POC), causing the most environmental damage to the Chesapeake Bay. They then required those states within the Chesapeake Bay watershed to submit Watershed Implementation Plans (WIPs) detailing how they will achieve TMDL requirements for nitrogen, phosphorus and sediment. The Virginia Phase II WIP presented pollutant load reductions, referred to as Level 2 (L2) scoping run reductions requiring that 9 percent of TN loads, 16 percent of TP loads, and 20 percent of TSS loads from impervious regulated acres and 6 percent of TN loads, 7.25 percent of TP loads and 8.75 percent TSS loads from pervious regulated acres be reduced by the end of the third MS4 permit cycle.

United States Army Corps of Engineers (USACE) has been tasked by the Installation Management Command (IMCOM) to provide technical data pertaining to the Chesapeake Bay TMDL for Joint Base Myer-Henderson Hall (JBM-HH). The technical data collected

and/or developed during this investigation includes: existing land use; soils; Best Management Practices (BMPs) and stormwater infrastructure locations and conditions; contributing drainage area to each stormwater BMP; and baseline pollutant load computations. Table 1-1 provides additional description of the data collected.

TABLE 1-1 DATA COLLECTED

Data	Applicability
Facility Boundary	The facility boundary was the first piece of information to be collected. The facility boundary is needed to begin collecting land use, soils, BMPs, and stormwater infrastructure data.
Land Use	A land use category determines the type(s) of practices conducted on that land area. Different practices yield different types and concentrations of pollutants. For example, agricultural land is typically high in nitrogen, due to certain types of fertilizer use.
Soils	Soil characteristics impact the infiltration. For example, urban areas are typically comprised of very compacted soils, which result in higher stormwater and pollutant runoff rates.
BMPs and Drainage to BMPs	Drainage areas to BMPs were identified, so new BMPs were not proposed to treat overlapping areas.
Stormwater Infrastructure	Stormwater infrastructure data shows how the stormwater is managed within the facility. It was used to delineate BMP drainage areas.

The data collected and developed were used to conduct an opportunity assessment to determine if stormwater BMP retrofits will be favorable to reduce pollutant loads to the Chesapeake Bay. The database on the attached project disk will provide a mechanism for managing data and assisting the localities and states with implementing WIPs. Current, accurate Geographic Information System (GIS) data used to conduct this assessment will also assist JBM-HH with future stormwater BMP maintenance and compliance requirements.

This study will satisfy the MS4, Chesapeake Bay TMDL Action Plan requirement (Section I C) and will be part of the next scheduled MS4 progress report in October 2015.

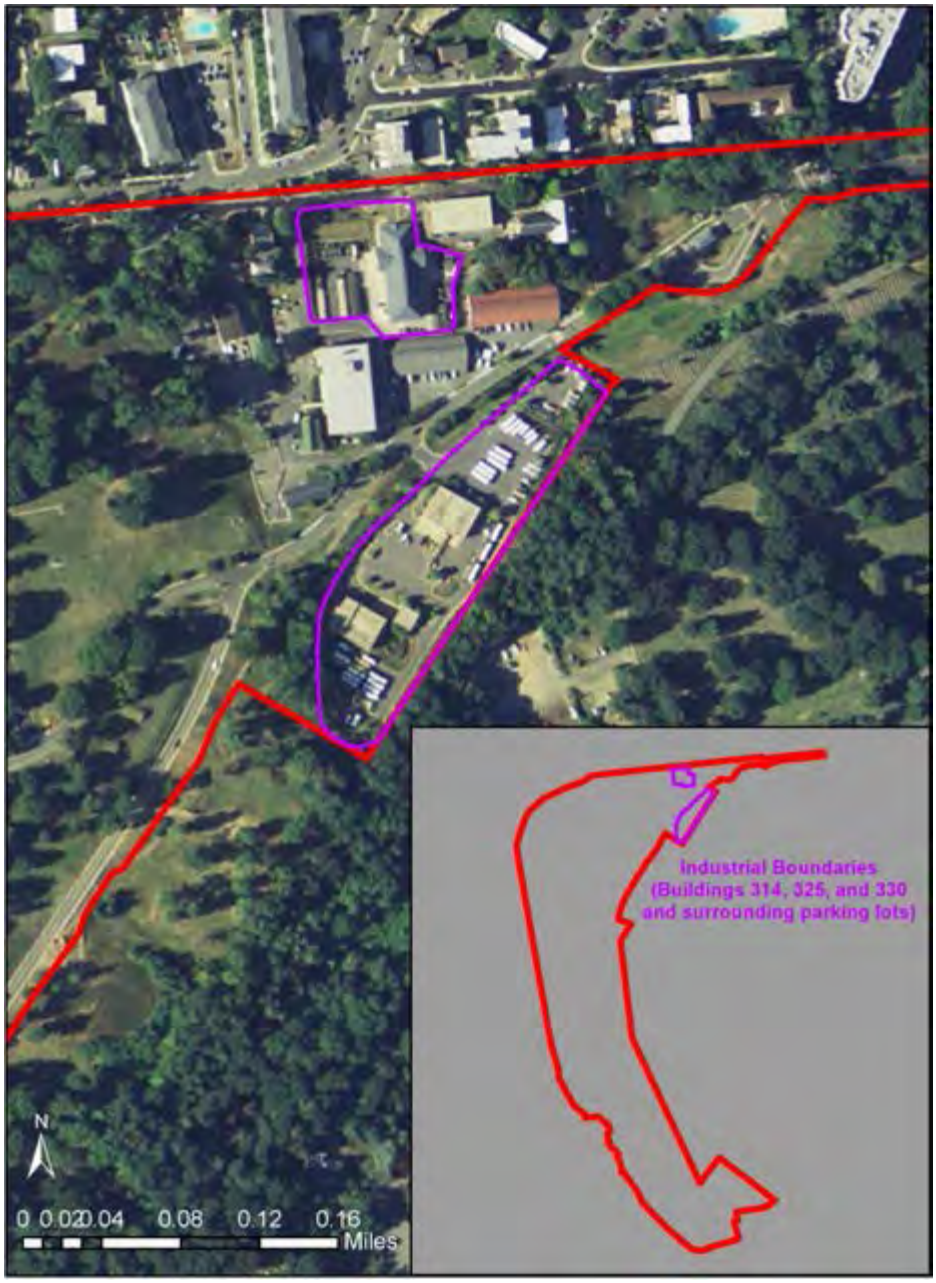
1.2 STUDY AREA

The study area for this investigation is Joint Base Myer-Henderson Hall, which occupies approximately 269 acres within Arlington County, Virginia. The Virginia MS4 General Permit for JBM-HH applies to U.S. Army Installation Fort Myer (Fort Myer) and Marine Corps Headquarters Battalion Henderson Hall (Henderson Hall), which are jointly referred to as "the installation" throughout this Plan. JBM-HH borders Arlington National Cemetery to the west, and is located in the Potomac River watershed, which is part of the Chesapeake Bay Watershed (Figure 1-1). Arlington National Cemetery, adjacent to JBM-HH, and Fort McNair, in the District of Columbia, are not included in this opportunity assessment.

Of the installation's 268.95 acres, 263.03 acres are regulated under the MS4 permit and 5.92 acres are covered by a VPDES permit for industrial discharges (VAR05). Based on Virginia Department of Environmental Quality's (DEQ) May 2015 VA TMDL Guidance (DEQ, 2015), any land regulated under a General VPDES permit for industrial discharges (shown in Figure 1-2) may be excluded from this opportunity assessment.

FIGURE 1-1 JBM-HH LOCATION MAP

FIGURE 1-2 JBM-HH INDUSTRIAL PERMIT AREAS



1.3 REPORT OUTLINE

The tasks required to complete this study and satisfy General MS4 Permit Section I.C.2.a requirements are described in the following sections of this report. Section 2 reviews the current and future MS4 program and legal authorities (I.C.2.a (1, 2)). Section 3 describes the development of GIS data layers that were used in the calculation of current baseline pollutant loads. Section 4 describes the stormwater BMP database created for JBM-HH. Section 5 describes calculation of baseline loads (I.C.2.a (4). Section 6 details the nutrient reduction requirements and a plan to meet those requirements (I.C.2.a (3, 5, 6, 7, 8, and

10). Section 7 explains the costs to complete the reduction requirements (I.C.2.a. (11). Section 8 includes conclusions from this study (I.C.2.a. (9 and 12) (Commonwealth of Virginia, 2013).

The sections of this report are to provide general information on the methodology and results of the study. Specific results for each Area of Interest (AOI) are described in factsheets located in Appendix A. Each factsheet contains five sections. Section I includes general information, including a description of its location, size and an accompanying map. Section II includes a breakdown of the existing land use, including a map identifying the land use area. Section III displays and discusses a map of existing stormwater infrastructure and proposed BMPs. The calculated baseline pollutant and reduction loads are highlighted in Section IV. Section V contains a cost assessment to construct the proposed BMPs.

TABLE 1-2 RELATING MS4 PERMIT TO THIS REPORT

General MS4 Permit Section I.C.2.a subsection	Section in this report addressing the permit requirement
1,2	Section 2
3,5,6,7,8,10	Section 7
4	Section 5
11	Section 7
9, 12	Section 8

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2 MS4 PROGRAM AND LEGAL AUTHORITIES

The provisions contained in the MS4 Permit and associated regulations will be enforced through JBM-HH policy memorandums and standardized procedures for project review and implementation. A draft Installation-wide stormwater policy was recently developed to address the Installation's compliance with the Virginia MS4 permit, the Virginia general industrial stormwater permit, and other stormwater regulations. The policy outlines proper protocols for minimizing stormwater pollution during activities that directly and indirectly impact stormwater. The policy is currently under review. Anticipate full implementation in calendar year 2016.

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3 DATA COLLECTION AND MAPPING

GIS was used to create, analyze and plan all geographically related information. These data were created as shapefiles, which can be used to accurately measure the spatial area needed to perform land use and load reduction calculations. Each data set is in Universal Transverse Mercator (UTM) Zone 18 North American Vertical Datum of 1988 (NAVD88) horizontal coordinate system.

3.1 LAND USE

Accurate land use data is essential for baseline and reduction load calculations. Considerable effort was made to collect and develop the most accurate data and categorize it in two different ways for multiple uses. Virginia TMDL Guidance classification was necessary for Action Plan calculations; Chesapeake Bay Program (CBP) classifications will be used for model runs.

Land use polygons were attributed with land uses relevant to Virginia Guidance calculations (i.e. regulated urban impervious and regulated urban pervious). The polygons were also attributed using the same categories of land cover as those used by the CBP and their watershed model (construction, forest, hay, hay with nutrients, high intensity impervious urban, high intensity pervious urban, low intensity impervious urban, high intensity pervious urban, unfertilized grass, and water) (see Table 3-1 Land Use).

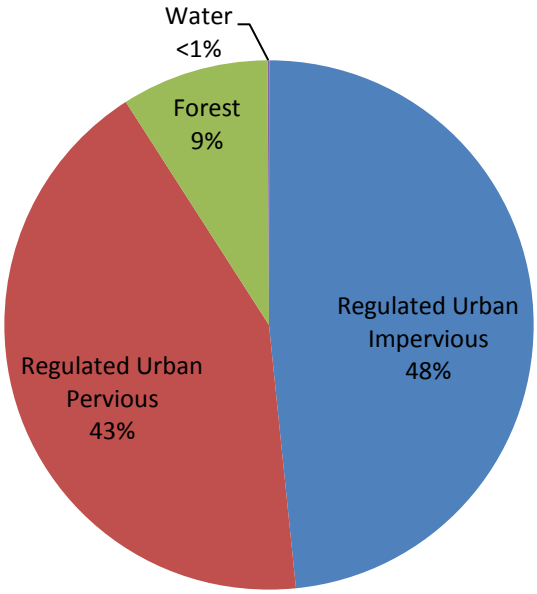
EPA required each state to submit guidance for how to achieve the goals set forth in the WIP. Virginia Department of Environmental Quality provided draft guidance to USACE in 2013, which provided instructions to permittees for estimating pollutant source loads as of June 30, 2009 (DEQ, 2015). Before guidance was released setting 2009 as the baseline year, land use layers were developed using the most up to date information at the time (2013 aerial imagery). In response to that draft guidance, existing land use was digitized using the 2009 aerial imagery. As a result, land use layers were developed for both 2009 and 2013 conditions and will be provided in the attached project disk. The digitized imagery was used to calculate baseline load rates and the baseline load rates were then used to establish L2 reductions (see Section 5-1).

TABLE 3-1 LAND USE CLASSIFICATIONS

VA Land Use	CBP Land Use	General Description
Regulated Urban Impervious	High Intensity Impervious Urban/ Low Intensity Impervious urban	building, road, parking
Regulated Urban Pervious	High Intensity Pervious Urban/ Low Intensity Pervious urban	beach, gravel, lawn, shrubs
N/A	construction	bare earth
N/A	forest	forest, wetland
N/A	hay	row crops, not fertilized
N/A	hay with nutrients	row crops, fertilized
N/A	unfertilized grass	brush
N/A	water	water

Forty-eight percent of JBM-HH's 263.03 acres, excluding the 5.92 acres in industrial areas, is categorized as regulated urban impervious urban land cover (127.27 acres). This includes building rooftops, parking areas, sidewalks, and recreational courts. An estimated 43 percent (111.88 acres) is categorized as regulated urban pervious land cover, or beach, gravel, lawn, or shrubs. Forest comprises 9 percent of the land (23.66 acres). Another 0.22 acres of the installation's total area is comprised of water, which accounts for less than 1 percent of the installations total area (Figure 3-1 Land Use Summary for JBM-HH).

FIGURE 3-1 LAND USE SUMMARY FOR JBM-HH



3.2 SOILS

Soil type was used to determine preliminary BMP site locations for planning purposes. Reduction efficiency and cost effectiveness are generally maximized when BMPs are implemented in A and B soils, and B soils make up 97 percent of the installation (260.05 acres). It is more expensive and fewer nutrients are reduced when BMPs are built in C and D soils, which are not present on the installation. The remaining three percent of the installation (8.9 acres) was not surveyed. Soils data were obtained from the Natural Resource Conservation Service (NRCS) Web Soil Survey (WSS) (USDA NCRS, 2013). The county-wide soils layer obtained from the WSS was clipped to the installation boundary to create a shapefile specific for JBM-HH (Figure 3-2 Soil Type Map). The shapefiles are attributed with soil type and Hydrologic Soil Group (HSG).

FIGURE 3-2 SOIL TYPE MAP

TABLE 3-2 SOIL GROUP DISTRIBUTION

HSG	Total Area (AC)	Percentage of Installation Area
B	260.05	97%
N/A	8.9	3%

3.3 DRAINAGE AREAS

Since as-built and stormwater management plans were not available for planning; drainage areas were delineated using Light Detection and Ranging (LiDAR) data, Digital Elevation Modeling (DEM), topographic contours and 2009 aerials. BMPs were delineated to include all stormwater conveyed to them through existing infrastructure. These areas were portrayed as polygons in GIS (Figure 3-3 JBM-HH BMP Drainage Areas). Once these individual watersheds were identified, these areas were excluded from consideration for new BMP treatment opportunities. Drainage areas to BMPs recommended to meet TMDL requirements were also delineated. These drainage areas are referred to as Areas of Interest (AOIs), and are shown in the fact sheets in Appendix A.

3.4 STORMWATER INFRASTRUCTURE

The stormwater layers used for this investigation were provided by the installation. Separate shapefiles were created for stormwater lines and BMPs. All GIS data created for this project and analyses are included on the attached project disk.

FIGURE 3-3 JBM-HH BMP DRAINAGE AREAS

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4 FIELD INVESTIGATION

A field assessment was performed in August 2011 to confirm land use and installation boundaries, and to inventory and assess stormwater BMPs. Project members traveled to JBM-HH and coordinated with installation points of contact to locate BMP facilities and inspect structural features.

4.1 STORMWATER BMP INVENTORY AND INSPECTION

Several pieces of data were compiled for each stormwater BMP. A field team documented the type of BMP installed (i.e. ponds, infiltration, filtration, manufactured/underground), and the geographic location, using Global Positioning System (GPS) technology. A visual assessment of the condition of the BMP was performed and documented using The Virginia Stormwater Management Handbook (DCR, 1999). Digital photographs were also taken to document the location and condition of each BMP at the time of the inventory and assessment.

The end product of the stormwater BMP inventory and inspections is the BMP database, which is discussed in Section 3.2. Based upon the results of the field inspection, an overall rating was assigned to each BMP. A description of the ratings is provided in Table 4-1 Stormwater BMP Rating Description. These ratings will assist the installation in prioritizing maintenance and improvement activities for each facility.

TABLE 4-1 STORMWATER BMP RATING DESCRIPTION

Rating	Description
A	The BMP is functioning as designed with no problem conditions identified. No signs of impending deterioration.
B	Minor problems are observed, however BMP is functioning as designed with no problem conditions in critical parameters.
C	Minor problems are observed, however BMP is functioning as designed with no problem conditions in critical parameters, but BMP performance is being compromised.
D	Major problems are observed and BMP is not functioning as designed with problem conditions in several critical parameters. Conditions have compromised the BMP performance.
E	Major problems are observed and BMP is not functioning as designed with problem conditions in several critical parameters. Conditions have compromised the BMP performance. BMP shows signs of impending failure.

All stormwater BMPs were assigned a Permanent ID that includes an abbreviation for the type of stormwater BMP (i.e. "P" for pond or "I" infiltration), and then an identification number.

Twelve stormwater BMPs were identified within the study area. All were inventoried by the USACE field crew in 2011 (Table 4-2 BMP Inventory Results), and ratings were assigned based on their conditions (Table 4-3 BMP Inspection Rating Results). The location and type of BMPs are recorded for the inventoried BMPs.

TABLE 4-2 BMP INVENTORY RESULTS

BMP type	Number
Filtration	3
Infiltration	1
Manufactured	3
Miscellaneous	1
Ponds	4

TABLE 4-3 BMP INSPECTION RATING RESULTS

Rating	Number
A	8
B	4
C	0
D	0
E	0

4.2 STORMWATER BMP DATABASE

The data collected from the field assessments was used to create the BMP Database. The BMP database serves as a tracking and record keeping tool, and can also be used to determine the pollutant reductions provided by implementing various BMPs. The BMP Database can be used to create a map of all BMP locations within the installation, by exporting a GIS shapefile. The database is in Microsoft Access format, with forms containing all the inspection results and a digital photograph of each BMP. Should the installation implement any additional stormwater BMPs, the database can be expanded so installation staff can use it to manage their stormwater program over time. A brief user's guide for the BMP Database is located in Appendix B.

Additionally, all historical BMPs have been reported to DEQ.

5 ESTABLISHMENT OF BASELINE POLLUTANT LOADS

Knowledge of baseline (existing) loading conditions for TN, TP and TSS is needed to guide the facilities in their management and implementation of stormwater BMPs to meet the overall Chesapeake Bay TMDL pollution reduction requirements. The Chesapeake Bay Program Watershed Model (CBPWM) is at a macro-scale and typically does not have the level of detail in land use and installation boundary data as was collected in this study. Therefore, independent calculations of baseline pollutant loads, using the best data available, is needed to better understand the actual baseline pollutant contribution from these facilities and what level of improvements, if any, are needed to meet overall Chesapeake Bay TMDL goals.

5.1 METHODOLOGY

Tables provided in the Virginia TMDL Guidance were used to calculate pollutant load rates from JBM-HH (DEQ, 2014). This approach uses tables with established "Edge of Stream" (EOS) loading rates for pervious and impervious land uses in each of the four regional river basins within the Chesapeake Bay watershed – James River, Potomac River, Rappahannock River, and York River. The total existing acreage for each site is then input into the appropriate table and multiplied by the 2009 EOS loading rate to determine the estimated baseline loads.

5.2 RESULTS

JBM-HH falls within the Potomac River watershed. Baseline load rates from the 2009 CBPWM; acres served by JBM-HH's MS4 permit, which excludes the 5.92 acres on JBM-HH within industrial permit areas; and the estimated pollutant loads for JBM-HH based on the 2009 progress run rates are shown in Table 5-1.

TABLE 5-1 BASELINE CALCULATIONS FOR JBM-HH

	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	2009 EOS Rate (lbs/acre)	Estimated Total POC Load (lbs) Based on 2009 Progress Run
Regulated Urban Impervious	Nitrogen	127.27	16.86	2,145.77
Regulated Urban Pervious		111.88	10.07	1,126.63
Regulated Urban Impervious	Phosphorus	127.27	1.62	206.18
Regulated Urban Pervious		111.88	0.41	45.87
Regulated Urban Impervious	Suspended Solids	127.27	1,171.32	149,073.90
Regulated Urban Pervious		111.88	175.80	19,668.50

Table 2-b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River (Based on Chesapeake Bay Program Watershed Model Phase 5.3.2) (DEQ, 2015)

6 POLLUTANT LOAD REDUCTIONS

L2 scoping run reductions, presented in the Phase II WIP and enforced through the MS4 permit equate to a reduction of 9 percent of TN loads, 16 percent of TP loads, and 20 percent of TSS loads from impervious regulated acres, and 6 percent of TN loads, 7.25 percent of TP loads and 8.75 percent TSS loads beyond 2009 progress loads for pervious regulated acreage by the end of the third permit cycle. Virginia (VA) TMDL Guidance provides flexibility in the implementation of specific management technologies employed to meet the required reductions, while stipulating standards and/or objectives. MS4 operators will be able to adjust the levels of reduction between pervious and impervious land uses within their service area, provided the total load reduction for each pollutant is met.

Best Management Practices accepted as methods of reducing pollutant loads for TMDL requirements include: street sweeping, urban stream restoration, shoreline restoration, land use change, structural BMPs, urban nutrient management, and nutrient trade. Street Sweeping is credited based on lane miles swept per year. Permittees may receive credit for urban stream restoration, based on linear footage of restoration completed. Shoreline restoration efficiencies are in review by CBP. The methodology under review is based on linear footage of shoreline restored and was used to calculate reductions in this report (Drescher, 2014). Conversion of land use from impervious to pervious or forest land may also receive POC reductions credits based on the acreage changed and type of change. Urban nutrient management plans developed for unregulated, public land smaller than one acre where nutrients are applied may be considered for credit, but have not yet been developed at JBM-HH. Permittees may also offset pollutant loads trading non-point source nutrients in accordance with Virginia Code (DEQ, 2015).

TABLE 6-1 POLLUTION REDUCTION REQUIREMENTS

Pollutant	Regulated Acreage % Load Reduction Target	
	Impervious	Pervious
TN	9%	6%
TP	16%	7.25%
TSS	20%	8.75%

Table 6-2 shows the "Calculation Sheet for Determining Total POC Reductions Required during the Permit Cycle for the Potomac River Basin" provided in the VA TMDL Guidance completed with total existing acres served by JBM-HH's MS4 permit for regulated urban impervious and pervious land uses and the resulting reduction required by applying the reduction loading rate provided in the fourth column (DEQ, 2015).

TABLE 6-2 FIRST PERMIT CYCLE REDUCTIONS

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total Reduction Required First Permit Cycle (lbs/yr)
Regulated Urban Impervious	Nitrogen	127.27	0.08	10.18
Regulated Urban Pervious		111.88	0.03	3.36
Regulated Urban Impervious	Phosphorus	127.27	0.01	1.27
Regulated Urban Pervious		111.88	0.001	0.11
Regulated Urban Impervious	Total Suspended Solids	127.27	11.71	1,490.33
Regulated Urban Pervious		111.88	0.77	86.15

Table 3 b: Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the Potomac River Basin (*Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

2009 progress run estimated pollutant loads were applied to the load reduction targets to calculate pollutant load reductions required for each of the three permit cycles at JBM-HH, shown in Table 6-3 .

TABLE 6-3 POLLUTANT REDUCTIONS REQUIRED FOR JBM-HH, BY PERMIT CYCLE

Pollutant	First Permit Cycle Reductions (lbs) 5% by 2018	Second Permit Cycle Reductions (lbs) 35% by 2023	Third Permit Cycle Reductions (lbs) 100% by 2028
TN	13.54	94.78	270.80
TP	1.38	9.66	27.60
TSS	1,576.48	11,035.36	31,529.60

6.1 STRUCTURAL BMPS

Areas of Interest (AOIs) were identified by studying the digitized land use maps for concentrated areas of urban impervious and pervious land uses, which are untreated and within the regulated MS4 area. Those areas that have existing stormwater infrastructure were given higher priority, as that infrastructure makes it easier and less expensive to convey the water running off of that area to a BMP, as long as there is adjacent land available to accommodate a BMP. Certain soil types require less work to build BMPs, so soil type was considered for BMP site recommendations as well. Choosing specific BMP types and sizing requires extensive

engineering design analysis, which is appropriate for the design phase of a project and too detailed for this planning study.

VA TMDL Guidance provided a table of CBP BMP load reduction efficiencies, which were used to calculate BMP pollutant removal rates. Soil, site conditions and high pollutant removal rates narrowed structural BMP choices recommended for JBM-HH to bioretention, permeable pavement and swales. These BMP types and efficiencies are shown in Table 6-4. Green roofs are another favorable BMP choice; however, there are limited opportunities for this type of BMP at JBM-HH, so it was not considered a recommended practice. A green roof is recommended for AOI 6a, but this was considered a special circumstance.

TABLE 6-4 CHESAPEAKE BAY PROGRAM BMPS AND EFFICIENCIES

Chesapeake Bay Program BMPs, Established Efficiencies			
	TN	TP	TSS
Bioretention A/B soils, no underdrain	80%	85%	90%
Bioswale	70%	75%	80%
Permeable Pavement w/ Sand, Veg. A/B soils, no underdrain	80%	80%	85%

Load reductions estimated for each proposed AOI and the percentage of the total reduction requirements are shown in Table 6-5. Details for each of the AOIs can be found in Appendix A.

There are three BMPs currently in the design phase within AOI 6 and AOI 7 – one green roof and one parking lot with permeable pavers in AOI 6, and one bioswale in AOI 7. In order to accurately represent the ongoing efforts in the implementation schedule, AOI 6 and AOI 7 have each been split into two subsections. AOI 6a (0.36 acres) and AOI 7a (0.34 acres) will represent the drainage areas for the BMPs currently in design, and AOI 6b and AOI 7b will represent the remaining areas within the AOIs, as there are additional opportunities in those areas.

Table 6-5 Load Reductions for each AOI

AOI	BMP TYPE	Baseline Load (lb/yr)			Proposed BMP Reduction (lb/yr)			Percent of Total Goal		
		N	P	TSS	N	P	TSS	N	P	TSS
1	Bioretention	82.88	7.87	5,673.89	66.30	6.69	5,160.50	25%	18%	16%
	BioSwale	82.88	7.87	5,673.89	58.02	5.90	4,539.11	22%	16%	14%
	Perm Pavers	82.88	7.87	5,673.89	66.30	6.30	4,822.81	25%	17%	15%
2	Bioretention	80.73	6.57	4,487.54	64.58	5.59	4,038.79	25%	15%	13%
	BioSwale	80.73	6.57	4,487.54	56.51	4.93	3,590.03	22%	14%	11%
	Perm Pavers	80.73	6.57	4,487.54	64.58	5.26	3,814.41	25%	15%	12%
3	Bioretention	178.18	13.92	9,372.31	142.54	11.83	8,435.10	55%	33%	27%
	BioSwale	178.18	13.92	9,372.31	124.73	10.44	7,497.85	48%	29%	24%
	Perm Pavers	178.18	13.92	9,372.31	142.54	11.14	7,966.46	55%	31%	25%
4	Bioretention	210.63	17.58	12,140.05	168.50	14.94	10,926.05	65%	41%	35%
	BioSwale	210.63	17.58	12,140.05	147.44	13.19	9,712.04	57%	36%	31%
	Perm Pavers	210.63	17.58	12,140.05	168.50	14.06	10,319.04	65%	39%	33%
5	Bioretention	113.74	8.52	5,633.90	91.0	7.24	5,070.51	35%	20%	16%
	BioSwale	113.74	8.52	5,633.90	79.62	6.39	4,507.12	31%	18%	14%
	Perm Pavers	113.74	8.52	5,633.90	91.0	6.82	4,788.82	35%	19%	15%
6a	Bioretention	6.07	0.58	421.68	4.86	0.50	379.51	2%	1%	1%
	BioSwale	6.07	0.58	421.68	4.25	0.45	337.34	2%	1%	1%
	Perm Pavers	6.07	0.58	421.68	4.86	0.46	358.43	2%	1%	1%
6b	Bioretention	31.81	2.42	1,607.75	25.45	2.06	1,446.98	10%	6%	5%
	BioSwale	31.81	2.42	1,607.75	22.27	1.82	1,286.2	9%	5%	4%
	Perm Pavers	31.81	2.42	1,607.75	25.45	1.94	1,366.59	10%	5%	4%
7a	Bioretention	5.12	0.44	308.65	4.10	0.37	277.79	2%	1%	1%
	BioSwale	5.12	0.44	308.65	3.58	0.33	246.92	1%	1%	1%
	Perm Pavers	5.12	0.44	308.65	4.10	0.35	262.35	2%	1%	1%
7b	Bioretention	35.35	2.73	1,827.38	28.28	2.32	1,644.64	11%	6%	5%
	BioSwale	35.35	2.73	1,827.38	24.75	2.05	1,461.9	9%	6%	5%
	Perm Pavers	35.35	2.73	1,827.38	28.28	2.18	1,553.27	11%	6%	5%

6.2 ALTERNATIVE CREDITS

In addition to structural BMPs, permittees may receive credit for land use change, urban nutrient management, nutrient trading and urban stream restoration. Any conversion of land use from urban impervious to pervious or to forest can receive credit for pollutant removal, as explained in the VA TMDL Guidance (DEQ, 2015). Urban nutrient management plans developed for unregulated, public land smaller than one acre where nutrients are applied may be considered for credit. Permittees may offset pollutant loads trading non-point source nutrients in accordance with Virginia Code. Permittees may also receive credit for urban stream restoration, based on the reduction of nutrients entering streams as a result of the restoration.

6.3 LAND USE CREDITS

Building 406, a former barracks building, was demolished in 2014 and the land was converted from impervious surface to grass. The resulting pollutant reductions are shown in Table 6-5.

TABLE 6-6 BUILDING CONVERSION POLLUTANT REDUCTION AT JBM-HH

	Impervious Acres Converted (ac)	Pollution Reduction Rate for Conversion to Grass (lbs/ac/yr)	Reduction for Conversion (lb/yr)	Percent of Total Goal
TN	1.20	12.56	15.07	6%
TP	1.20	1.34	1.61	4%
TSS	1.20	623.28	747.94	2%

FIGURE 6-1 BUILDING DEMOLITION SITE MAP

6.4 STREET SWEEPING

JBM-HH already has a street sweeping program in place; however, the sweeper being used does not meet the criteria to qualify for alternative credits for this practice. Should JBM-HH purchase the equipment that would meet the qualifications, then credits could be given for the street sweeping program.

Based on the area already being swept by JBM-HH, the Qualifying Lanes Method detailed in the VA TMDL Guidance was used to estimate what the pollutant reductions would be if a vacuum-assisted or regenerative air sweeper was purchased.

JBM-HH currently only sweeps the main roads on the installation, which make up approximately 11 acres. Assuming that 15% of these roads are swept on a monthly basis, 19.8 acres per year would be swept in the aggregate. The VA TMDL Guidance provides a pre-sweeping annual nutrient load of 15.4 lbs/impervious acre/yr for TN and 2 lbs/impervious acre/yr of TP. No annual nutrient loads were provided for TSS, so Potomac River impervious surface baseline load rates were used. The pickup factors for this type of sweeper are 0.05 lbs per year of TN, 0.06 lbs per year of TP and 0.25 lbs per year of TSS. Impervious acres swept per year were multiplied by the pre-sweeping annual nutrient load rates (where provided), then by the pickup factors supplied in the guidance to get the reductions per year shown in Table 6-7 (DEQ, 2015).

TABLE 6-7 STREET SWEEPING REDUCTIONS

	TN	TP	TSS
Regenerative/Vacuum Street Sweeping of ~ 20 acres per year	15.25	2.38	5,798.04

6.5 IMPLEMENTATION SCHEDULE

VA TMDL Guidance provides a timeline for when these pollutant load reductions must be implemented, as described in Table 6-3.

In addition to the pollution reduction credits attributed to the 2014 building demolition and land use conversion, seven AOIs are recommended to treat the stormwater and runoff at JBM-HH. These AOIs are listed in priority order in Table 6-8.

The building demolition and land conversion, along with the implementation of BMPs proposed in AOI 6a, 7a, and 6b will satisfy the first permit cycle requirements. The required 5% is almost met with just the land conversion and planned BMPs in AOI 6a and 7a, so only a small portion of AOI 6b would need to be addressed by 2018 to meet the 5% requirement. Implementation of BMPs in AOIs 7b and 3 will satisfy the second permit cycle requirements. Implementation of BMPs in AOIs 2, 1, 5, and 4 will satisfy the remainder of the L2 reductions required by 2028.

If the required equipment is purchased, the street sweeping program described above in Section 6.4 could be used in place of AOIs 1, 2, or 5 to meet the required reductions by 2028.

TABLE 6-8 PROPOSED AOIS IN PRIORITY ORDER

	BMP Pollution Reduction (lb/yr)			Cumulative Percent of Total Goal		
AOI	TN	TP	TSS	TN	TP	TSS
Bldg Demo/Land Conversion	15.07	1.61	747.94	6%	4%	2%
6a	4.16	0.40	316.26	8%	5%	3%
7a	3.93	0.35	262.35	10%	6%	4%
6b	24.39	1.93	1,366.59	19%	11%	8%
7b	27.10	2.18	1,553.27	29%	17%	13%
3	137.20	11.14	7,966.46	82%	48%	38%
2	62.16	5.26	3,814.41	106%	62%	50%
1	63.54	6.30	4,822.81	130%	79%	65%
5	87.58	6.82	4,788.82	164%	98%	80%
4	162.19	14.06	10,319.04	226%	137%	113%

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7 COSTS

Virginia TMDL Guidance does not provide a tool for estimating BMP costs. Generalized, planning-level construction costs are provided for the proposed BMPs using the *Costs of Stormwater Management Practices in Maryland*. This table was developed using data from Virginia as well as Maryland, and based on impervious acre treated by the BMP (Hagan, 2011).

The same BMPs were used for both cost estimating and pollutant load reductions. The rate for bioswale ($42,000), bioretention ($46,875) and permeable pavers ($335,412) was averaged to get one cost per impervious acre treated ($141,429), as shown in Table 7-1.

At the project planning level, relative cost information is useful for a broad comparison of relative financial commitments required to site, design, and construct each BMP. Costs estimated for each AOI are listed in Table 7-2.

TABLE 7-1 BMP COST

	Pre-Construction	Construction Cost	Total Initial Costs
Bioretention (New - Suburban)	$9,375	$37,500	$46,875
Bioswale (New)	$12,000	$30,000	$42,000
Permeable Pavement w/ Sand, Veg. (New)	$30,492	$304,920	$335,412
Average			$141,429

(Hagan, 2011)

TABLE 7-2 BMP CONSTRUCTION COSTS FOR PROPOSED AOIS

AOI	Impervious Acres Treated	New Suburban Cost
1	4.82	$ 681,688
2	3.51	$ 496,416
3	7.14	$ 1,009,803
4	9.65	$ 1,364,790
5	4.16	$ 588,345
6a	0.36	$ 50,914
6b	1.20	$ 169,715
7a	0.25	$ 35,357
7b	1.38	$ 195,172

Several variables to be explored in later phases of the study can greatly affect the cost to implement a BMP, such as utility placement, regional specific permits, unexploded ordinance surveys, type of contract, acquisition strategy, and real property. With further investigation, these areas of interest can be prioritized based on the cost of logistics to construct the BMPs and divert stormwater to them.

Planning level, order-of-magnitude initial construction costs for the seven AOIs total approximately $4.6 million (Hagan, 2011). These seven AOIs, in addition to the building demolition/land use conversion that took place in 2014, will exceed the L2 reduction requirements through 2028.

8 CONCLUSIONS

The purpose of this study is to provide technical data pertaining to the Chesapeake Bay TMDL Action Plan for JBM-HH. This was executed by locating, inventorying, and assessing the condition of existing stormwater BMPs, quantifying source loads for TN, TP, and TSS within the installation boundary and identifying opportunities to reduce pollutant loads to the Chesapeake Bay.

The results of this investigation conclude that approximately 3,272.40 lbs of TN, 252.05 lbs of TP and 168,742.40 lbs of TSS are loaded into waterways from JBM-HH per year, based on 2009 land use data. JBM-HH must reduce their nutrient loads by 260.72 lbs of TN, 36.31 lbs of TP and 31,535.77 lbs of TSS by the end of the third MS4 permit cycle in 2028.

Seven areas where new stormwater BMPs may be implemented to meet those reduction requirements have been identified. The cost to implement the proposed structural BMPs proposed to meet these requirements is approximately $4.6 million.

JBM-HH will release the Action Plan information to the public on or around 1 August 2015. It will be available for comment for 30 days, and will be accessible by phone or email request. The "public," as defined by JBM-HH's MS4 Program Plan is "the resident and employee population within the fence line of the facility" (JBM-HH, 2013). Therefore, the Action Plan will only be released via installation media outlets, including the weekly newspaper, the Pentagram, and the installation Facebook page.

A BMP database was created to store and organize data collected from the BMP inventory conducted as a part of this study; it also provides the installation with a tool to track L2 reduction progress and generate annual progress reports.

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APPENDIX A

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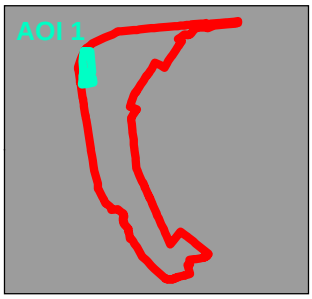
I. Location and General Information **AOI 1**

N 0 237.5 475 950 Feet

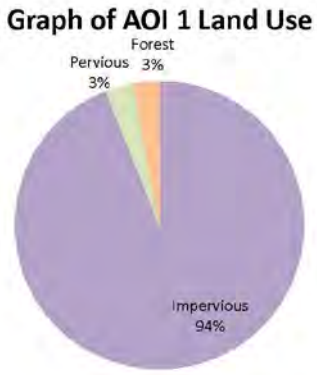


JBM-HH Area of Interest 1 is located along Forrest Circle. It is on the northwestern side of the installation and consists of approximately eight buildings, and a parking area.

Impervious - Building
Impervious - Road/Parking
Pervious
Forest

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

N 0 140 280 560 Feet



JBM-HH Area of Interest 1 consists of:
4.82 acres of impervious surface,
0.16 acres of pervious surface, and
0.15 acres of forest.

N

0 255 510 1,020 Feet

Stormwater BMPs from Table 6-4 were applied to the above AOI.

The baseline load rates below were calculated using 2009 EOS Rates Provided in the Virginia TMDL Guidance and applied to land use delineated by USACE using 2009 aerials.

Baseline Loads (lb/yr)		
TN	TP	TSS
82.88	7.87	5,673.89

The pollution reductions below were calculated by applying CBP reduction efficiency rates to baseline loads shown above. The table shows how many pounds of N, P, and SS will be reduced by the proposed BMPs in AOI 1.

Proposed BMP Reduction (lb/yr)			
BMP TYPE	TN	TP	TSS
Bioretention A/B Soils, no underdrain	66.30	6.69	5,106.50
Bioswale	58.02	5.90	4,539.11
Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	66.30	6.30	4,822.81

The Table below shows the portion of the total L2 Reduction Goals required by 2028 that treatment of AOI 1 will satisfy.

Percent of Total Goal			
BMP TYPE	TN	TP	TSS
Bioretention A/B Soils, no underdrain	25%	18%	16%
Bioswale	22%	16%	14%
Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	25%	17%	15%

Initial planning level construction costs were calculated using the "Cost of Stormwater Management Practices in Maryland" table. This tool is based on impervious acreage in AOI 1 (4.82 acres).

These estimates include capital, labor, material and overhead costs, but not land or maintenance costs.

Several variables to be explored in later phases of the study can greatly affect the cost to implement a BMP, such as utility placement, regional specific permits, unexploded ordinance surveys, type of contract, acquisition strategy, and real property.

Impervious Acres	New Suburban Cost
4.82	$681,688

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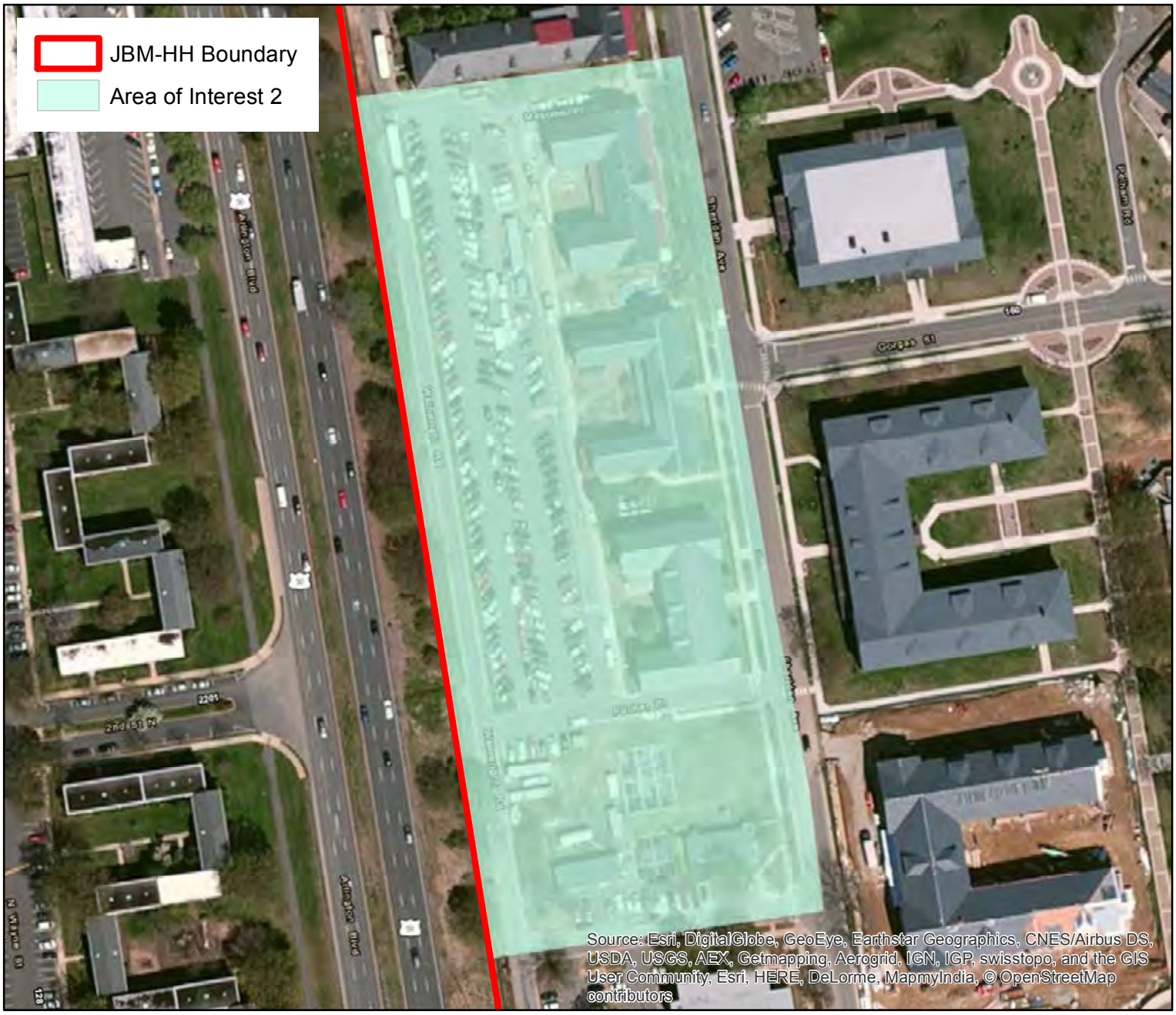
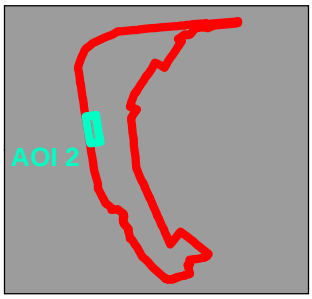
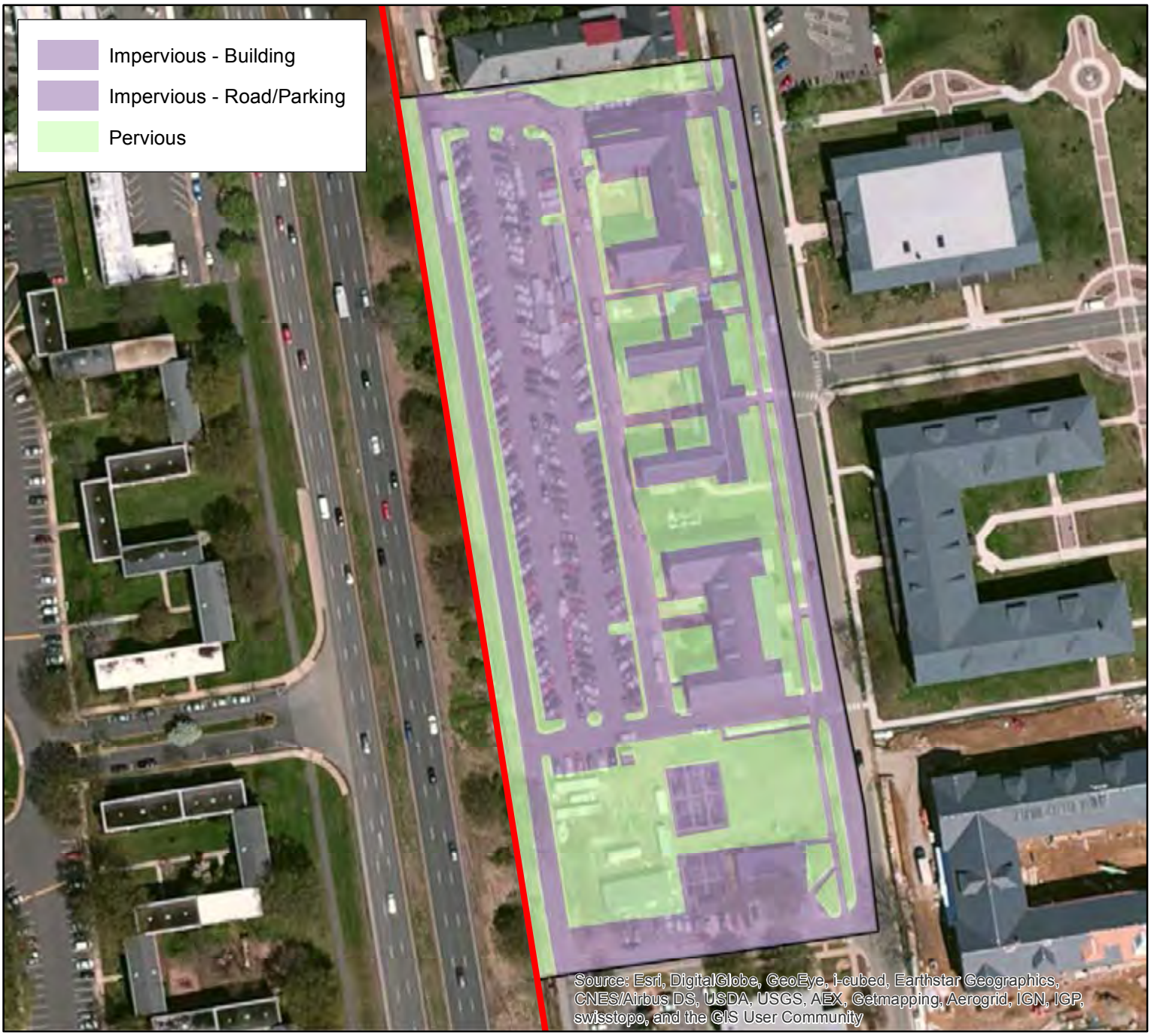
I. Location and General Information **AOI 2**



N 0 185 370 740 Feet

JBM-HH Area of Interest 2 is located along Sheridan Avenue between Macomb Place and Pitcher Place. It is on the western edge of the installation and consists of approximately three buildings and a parking area.

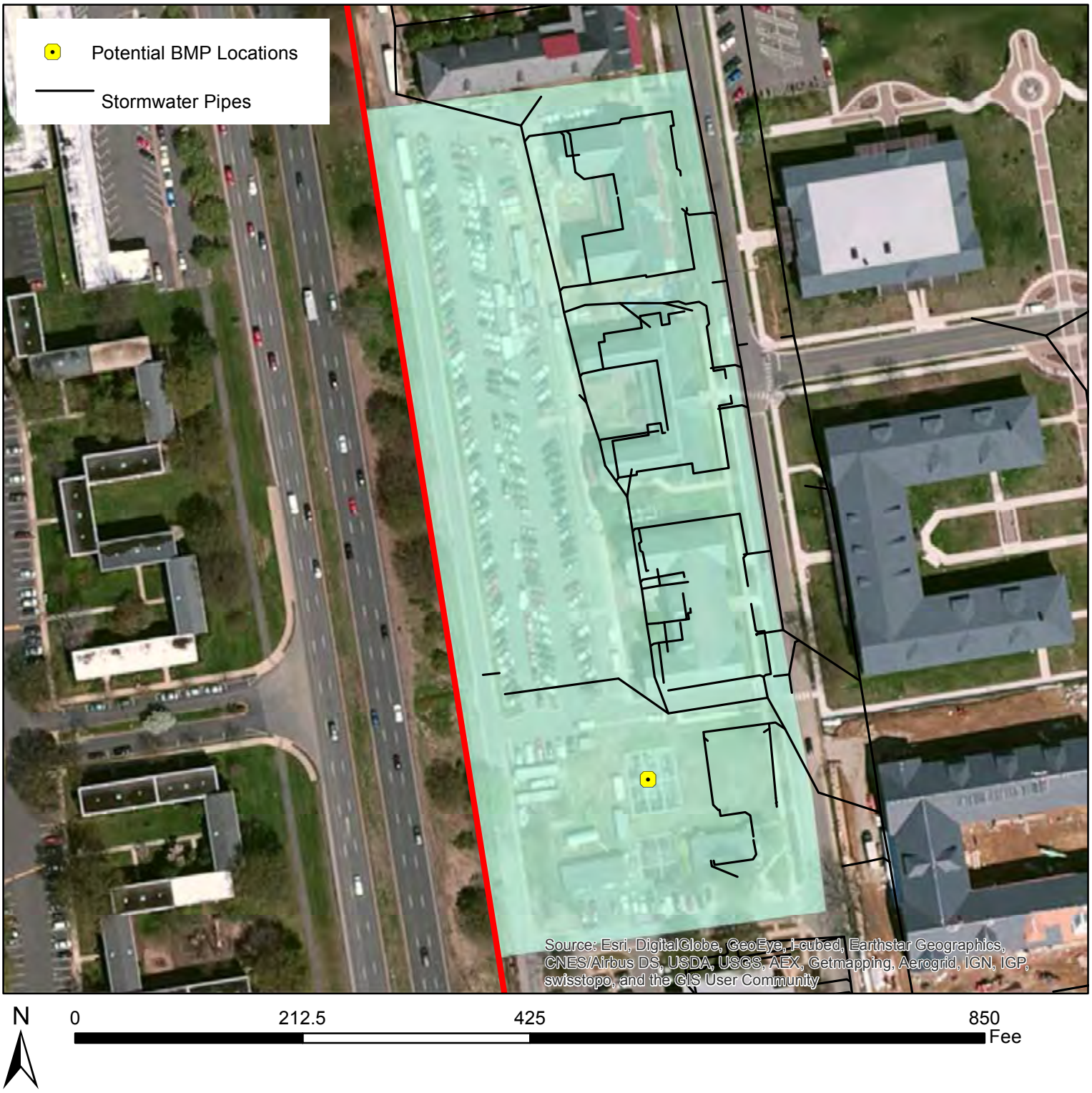




N 0 115 230 460 Feet

JBM-HH Area of Interest 2 consists of:
3.51 acres of impervious surface and
2.14 acres of pervious surface.

AOI 2



Stormwater BMPs from Table 6-4 were applied to the above AOI.

The baseline load rates below were calculated using 2009 EOS Rates Provided in the Virginia TMDL Guidance and applied to land use delineated by USACE using 2009 aerials.

Baseline Loads (lb/yr)		
TN	TP	TSS
80.73	6.57	4,487.54

The pollution reductions below were calculated by applying CBP reduction efficiency rates to baseline loads shown above. The table shows how many pounds of N, P, and SS will be reduced by the proposed BMPs in AOI 2.

Proposed BMP Reduction (lb/yr)			
BMP TYPE	TN	TP	TSS
Bioretention A/B Soils, no underdrain	64.58	5.59	4,038.79
Bioswale	56.51	4.93	3,590.03
Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	64.58	5.26	3,814.41

The Table below shows the portion of the total L2 Reduction Goals required by 2028 that treatment of AOI 2 will satisfy.

Percent of Total Goal			
BMP TYPE	TN	TP	TSS
Bioretention A/B Soils, no underdrain	25%	15%	13%
Bioswale	22%	14%	11%
Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	25%	15%	12%

Initial planning level construction costs were calculated using the "Cost of Stormwater Management Practices in Maryland" table. This tool is based on impervious acreage in AOI 2 (3.51 acres).

These estimates include capital, labor, material and overhead costs, but not land or maintenance costs.

Several variables to be explored in later phases of the study can greatly affect the cost to implement a BMP, such as utility placement, regional specific permits, unexploded ordinance surveys, type of contract, acquisition strategy, and real property.

Impervious Acres	New Suburban Cost
3.51	$496,416

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I. Location and General Information

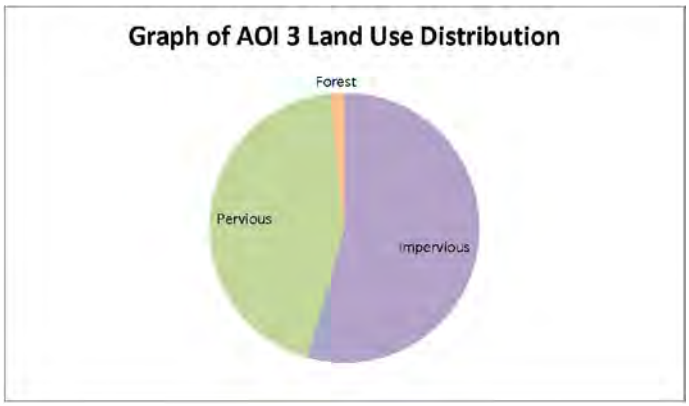
AOI 3

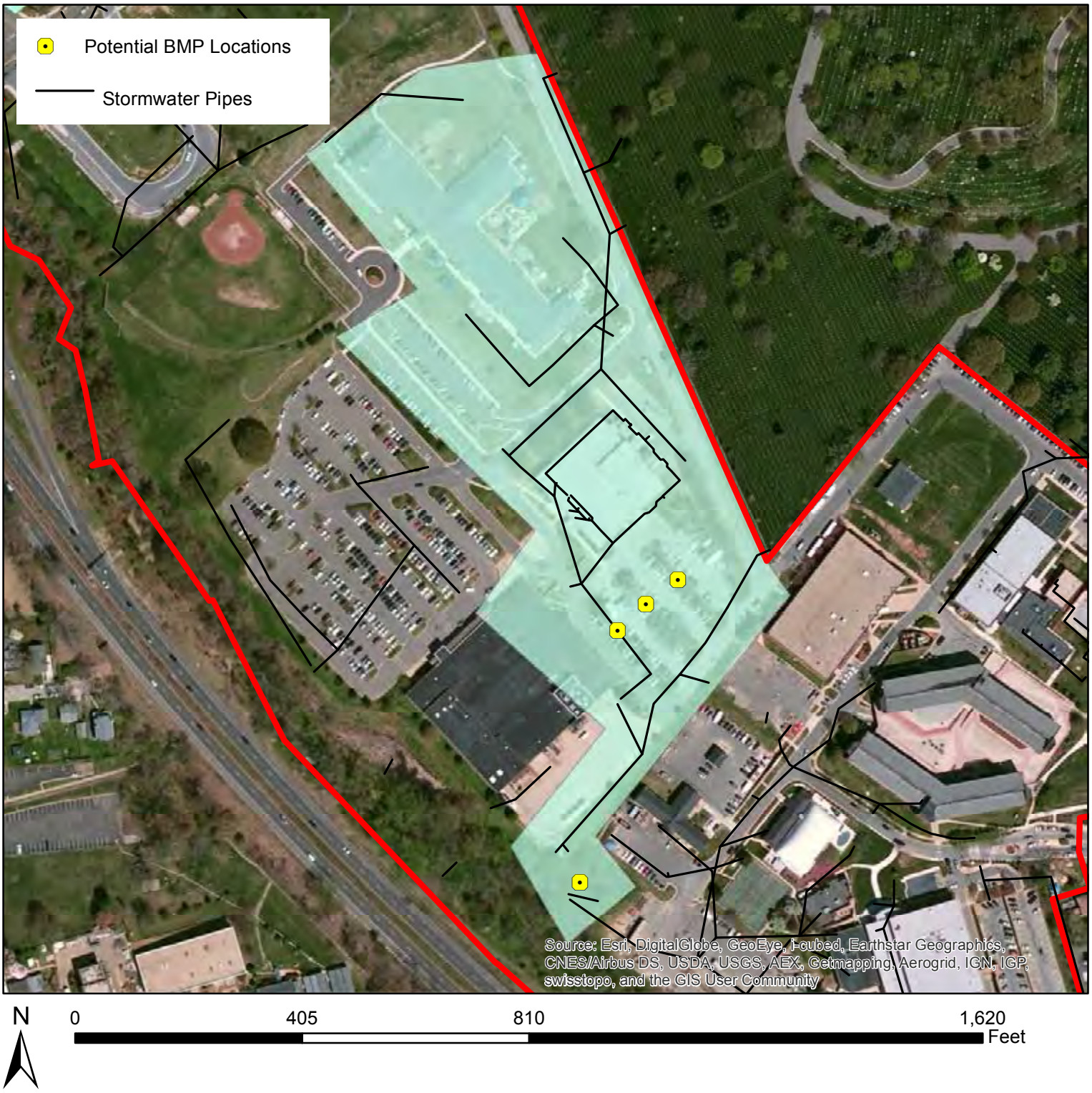
N 0 355 710 1,420 Feet

JBM-HH Area of Interest 3 is located along Carpenter Road and continues down between the Commissary and Northeast Road. It is on the eastern edge of the installation and consists of approximately two buildings and several parking areas.

N 0 225 450 900 Feet

JBM-HH Area of Interest 3 consists of:
7.14 acres of impervious surface,
5.74 acres of pervious surface, and
0.22 acres of forest.





Stormwater BMPs from Table 6-4 were applied to the above AOI.

The baseline load rates below were calculated using 2009 EOS Rates Provided in the Virginia TMDL Guidance and applied to land use delineated by USACE using 2009 aerials.

Baseline Loads (lb/yr)		
TN	TP	TSS
178.18	13.92	9,372.31

The pollution reductions below were calculated by applying CBP reduction efficiency rates to baseline loads shown above. The table shows how many pounds of N, P, and SS will be reduced by the proposed BMPs in AOI 3.

Proposed BMP Reduction (lb/yr)			
BMP TYPE	TN	TP	TSS
Bioretention A/B Soils, no underdrain	142.54	11.83	8,435.10
Bioswale	124.73	10.44	7,497.85
Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	142.54	11.14	7,966.46

The Table below shows the portion of the total L2 Reduction Goals required by 2028 that treatment of AOI 3 will satisfy.

Percent of Total Goal			
BMP TYPE	TN	TP	TSS
Bioretention A/B Soils, no underdrain	55%	33%	27%
Bioswale	48%	29%	24%
Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	55%	31%	25%

Initial planning level construction costs were calculated using the "Cost of Stormwater Management Practices in Maryland" table. This tool is based on impervious acreage in AOI 3 (7.14 acres).

These estimates include capital, labor, material and overhead costs, but not land or maintenance costs.

Several variables to be explored in later phases of the study can greatly affect the cost to implement a BMP, such as utility placement, regional specific permits, unexploded ordinance surveys, type of contract, acquisition strategy, and real property.

Impervious Acres	New Suburban Cost
7.14	$1,009,803

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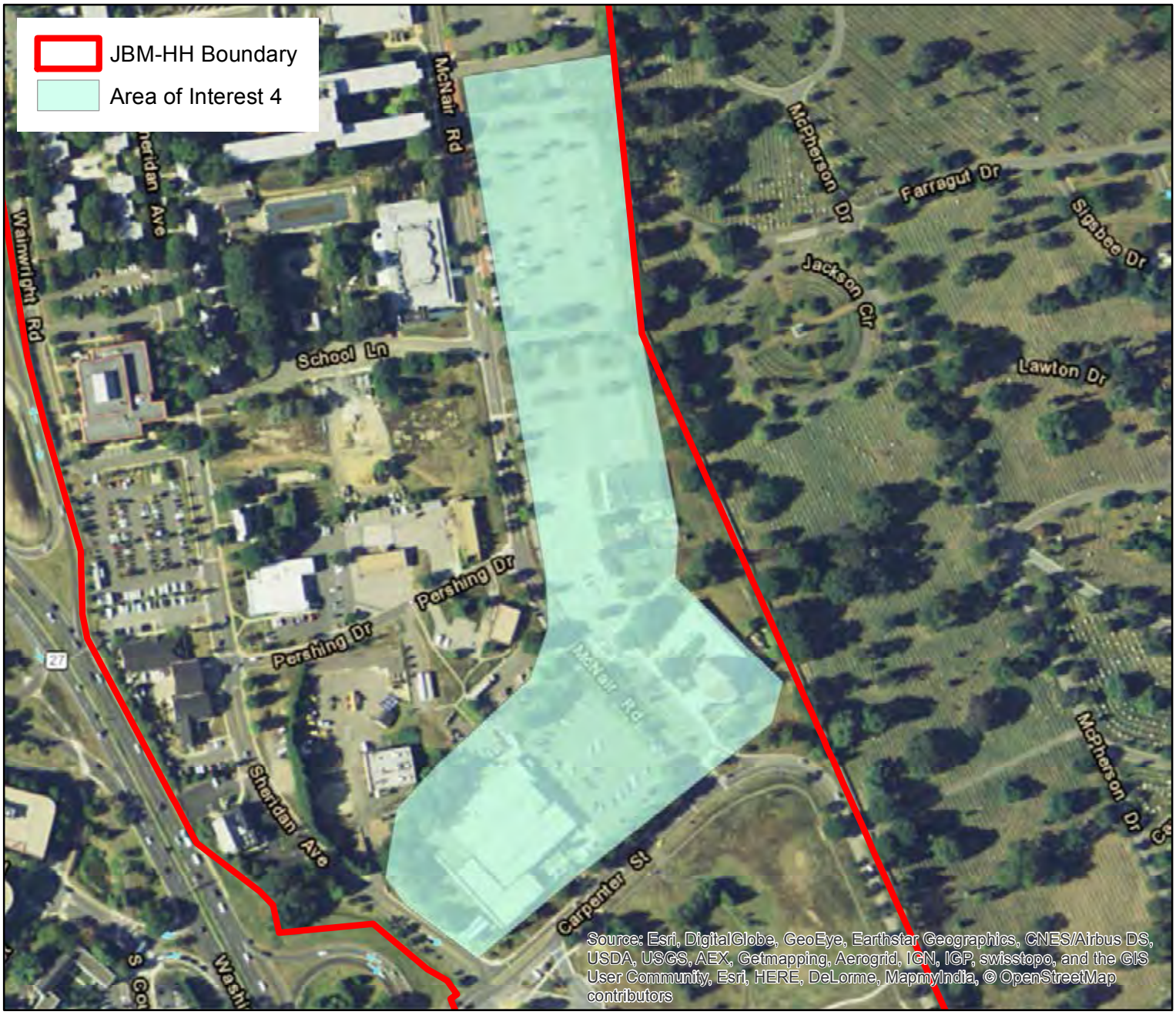
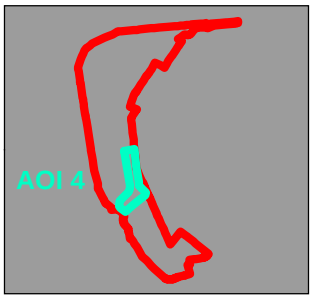
I. Location and General Information

AOI 4



N 0 412.5 825 1,650 Feet



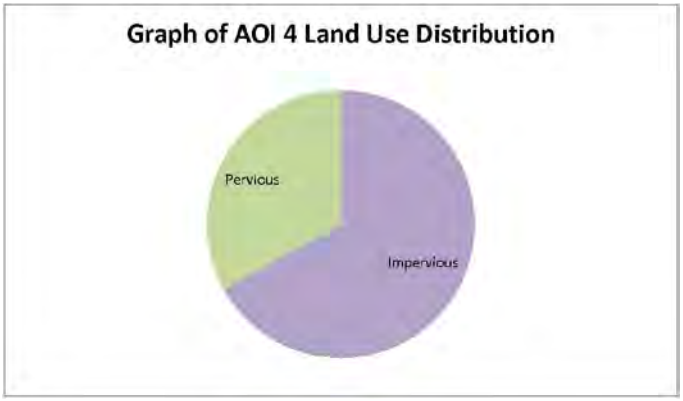
JBM-HH Area of Interest 4 is located between McNair Road and the eastern edge of the facility. It runs past the recreation center and south to include the chapel and PX. The AOI consists of approximately three buildings and several parking areas.

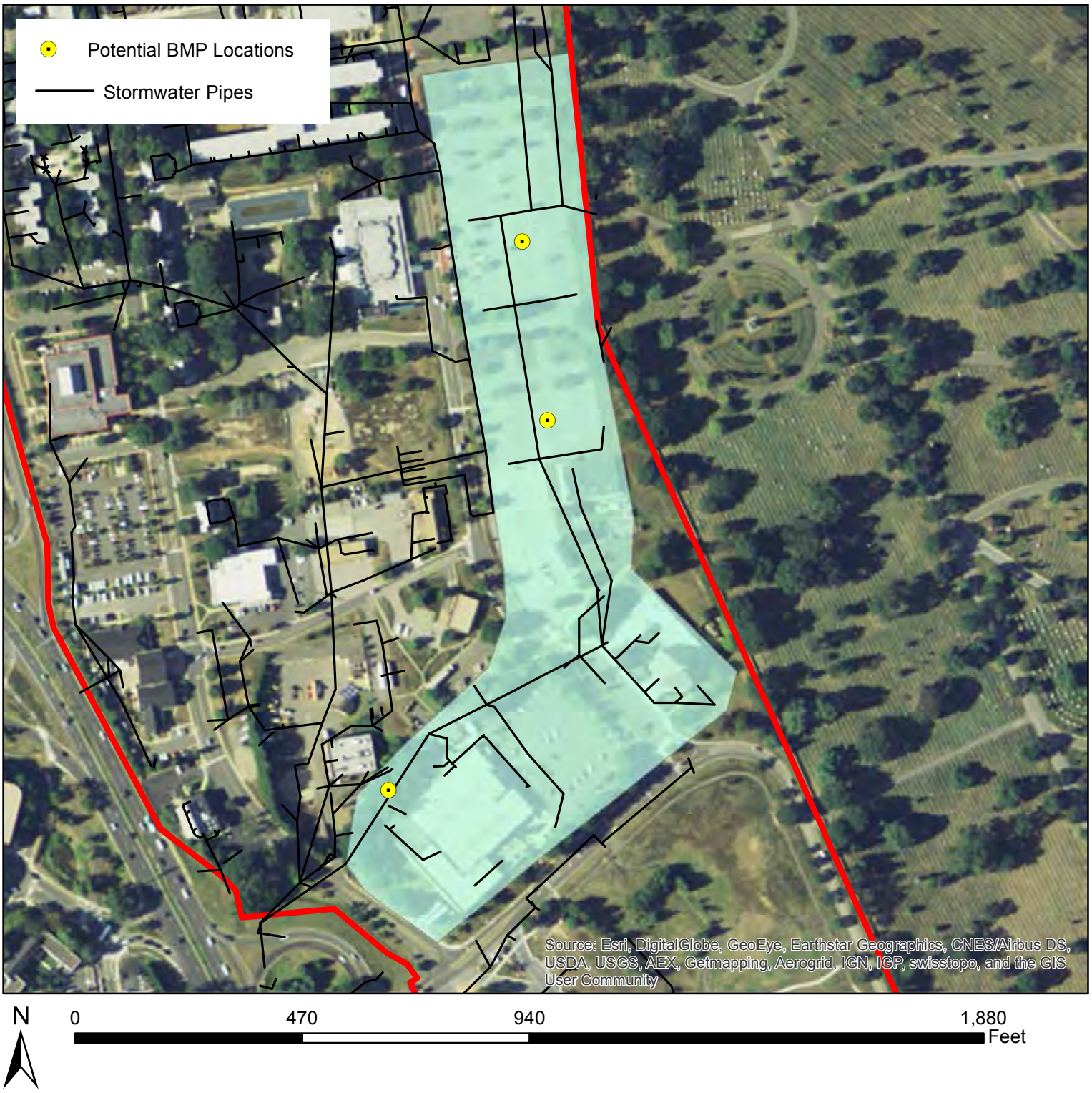
Impervious - Building
Impervious - Road/Parking
Pervious

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

N 0 260 520 1,040 Feet

JBM-HH Area of Interest 4 consists of:
9.65 acres of impervious surface and
4.76 acres of pervious surface.





Stormwater BMPs from Table 6-4 were applied to the above AOI.

The baseline load rates below were calculated using 2009 EOS Rates Provided in the Virginia TMDL Guidance and applied to land use delineated by USACE using 2009 aerials.

Baseline Loads (lb/yr)		
TN	TP	TSS
210.63	17.58	12,140.05

The pollution reductions below were calculated by applying CBP reduction efficiency rates to baseline loads shown above. The table shows how many pounds of N, P, and SS will be reduced by the proposed BMPs in AOI 4.

Proposed BMP Reduction (lb/yr)			
BMP TYPE	TN	TP	TSS
Bioretention A/B Soils, no underdrain	168.50	14.94	10,926.05
Bioswale	147.44	13.19	9,712.04
Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	168.50	14.06	10,319.04

The Table below shows the portion of the total L2 Reduction Goals required by 2028 that treatment of AOI 4 will satisfy.

Percent of Total Goal			
BMP TYPE	TN	TP	TSS
Bioretention A/B Soils, no underdrain	65%	41%	35%
Bioswale	57%	36%	31%
Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	65%	39%	33%

Initial planning level construction costs were calculated using the "Cost of Stormwater Management Practices in Maryland" table. This tool is based on impervious acreage in AOI 4 (9.65 acres).

These estimates include capital, labor, material and overhead costs, but not land or maintenance costs.

Several variables to be explored in later phases of the study can greatly affect the cost to implement a BMP, such as utility placement, regional specific permits, unexploded ordinance surveys, type of contract, acquisition strategy, and real property.

Impervious Acres	New Suburban Cost
9.65	$1,364,790

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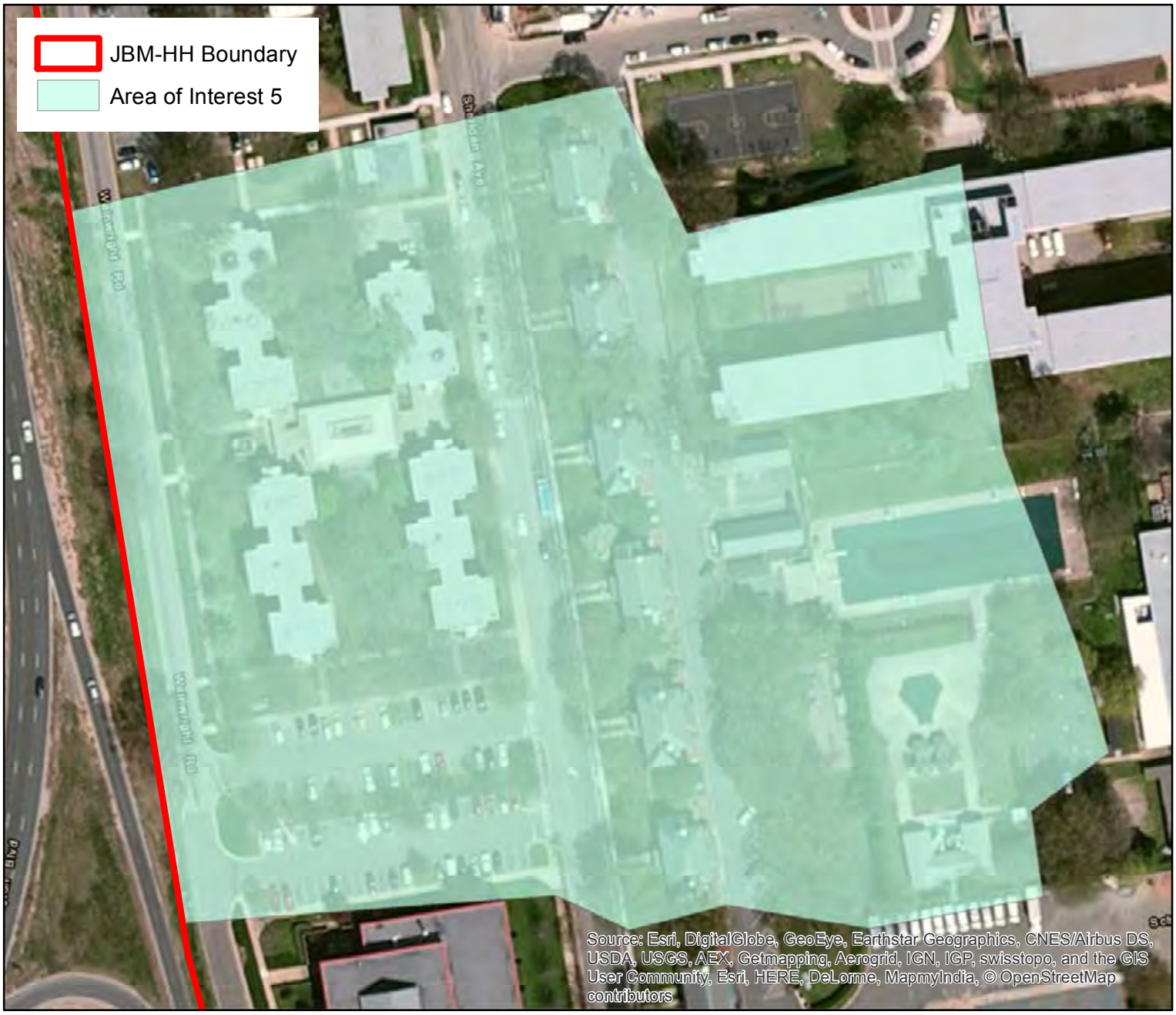
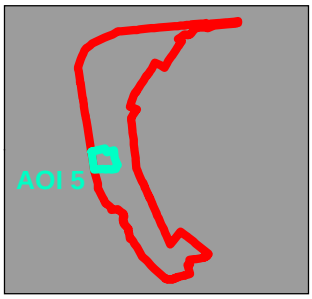
I. Location and General Information

AOI 5



N 0 150 300 600 Feet

JBM-HH Area of Interest 5 is located along Sheridan Avenue on the western edge of the facility. It runs between Pitcher Place and Abrams Lane, and covers part of the recreation center grounds. The AOI consists of approximately ten buildings and several roads and lawn areas.

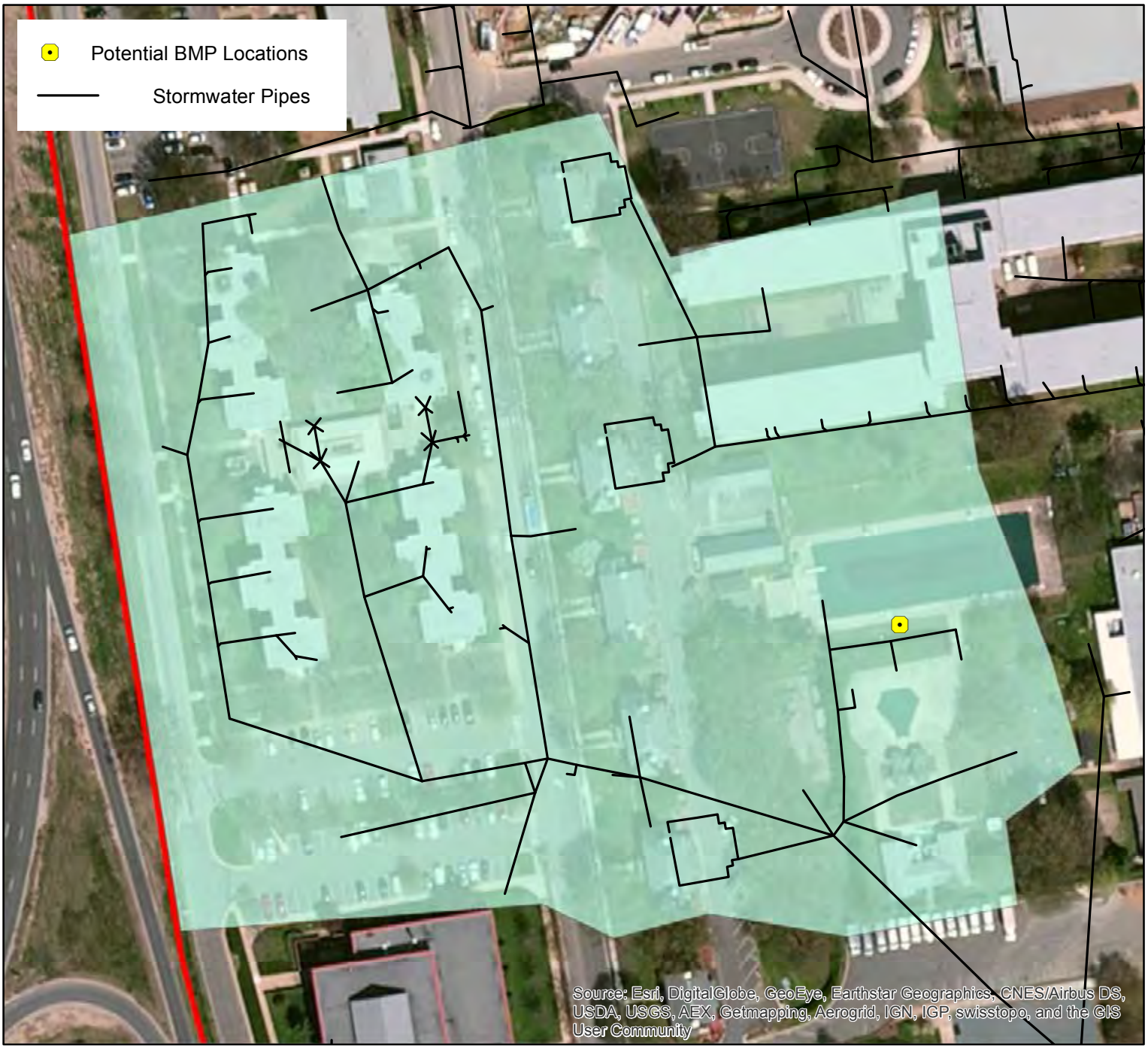


Impervious - Building
Impervious - Road/Parking
Pervious
Water

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

N 0 120 240 480 Feet

JBM-HH Area of Interest 5 consists of:
4.16 acres of impervious surface,
4.33 acres of pervious surface, and
0.19 acres of water.



N

0 180 360 720 Feet

Stormwater BMPs from Table 6-4 were applied to the above AOI.

The baseline load rates below were calculated using 2009 EOS Rates Provided in the Virginia TMDL Guidance and applied to land use delineated by USACE using 2009 aerials.

Baseline Loads (lb/yr)		
TN	TP	TSS
113.74	8.52	5,633.90

The pollution reductions below were calculated by applying CBP reduction efficiency rates to baseline loads shown above. The table shows how many pounds of N, P, and SS will be reduced by the proposed BMPs in AOI 5.

Proposed BMP Reduction (lb/yr)			
BMP TYPE	TN	TP	TSS
Bioretention A/B Soils, no underdrain	91.0	7.24	5,070.51
Bioswale	79.62	6.39	4,507.12
Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	91.0	6.82	4,788.82

The Table below shows the portion of the total L2 Reduction Goals required by 2028 that treatment of AOI 5 will satisfy.

Percent of Total Goal			
BMP TYPE	TN	TP	TSS
Bioretention A/B Soils, no underdrain	35%	20%	16%
Bioswale	31%	18%	14%
Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	35%	19%	15%

Initial planning level construction costs were calculated using the "Cost of Stormwater Management Practices in Maryland" table. This tool is based on impervious acreage in AOI 5 (4.16 acres).

These estimates include capital, labor, material and overhead costs, but not land or maintenance costs.

Several variables to be explored in later phases of the study can greatly affect the cost to implement a BMP, such as utility placement, regional specific permits, unexploded ordinance surveys, type of contract, acquisition strategy, and real property.

Impervious Acres	New Suburban Cost
4.16	$588,345

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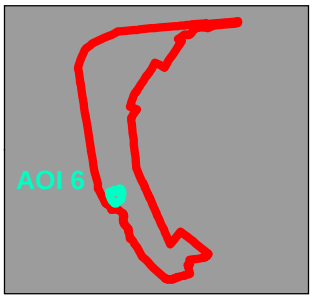
I. Location and General Information

AOI 6

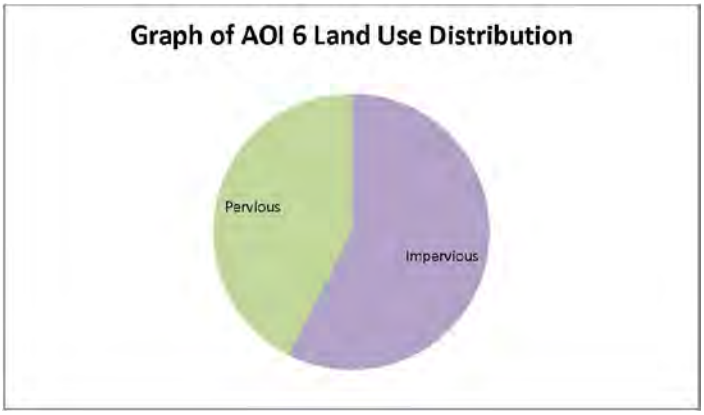
N 0 105 210 420 Feet

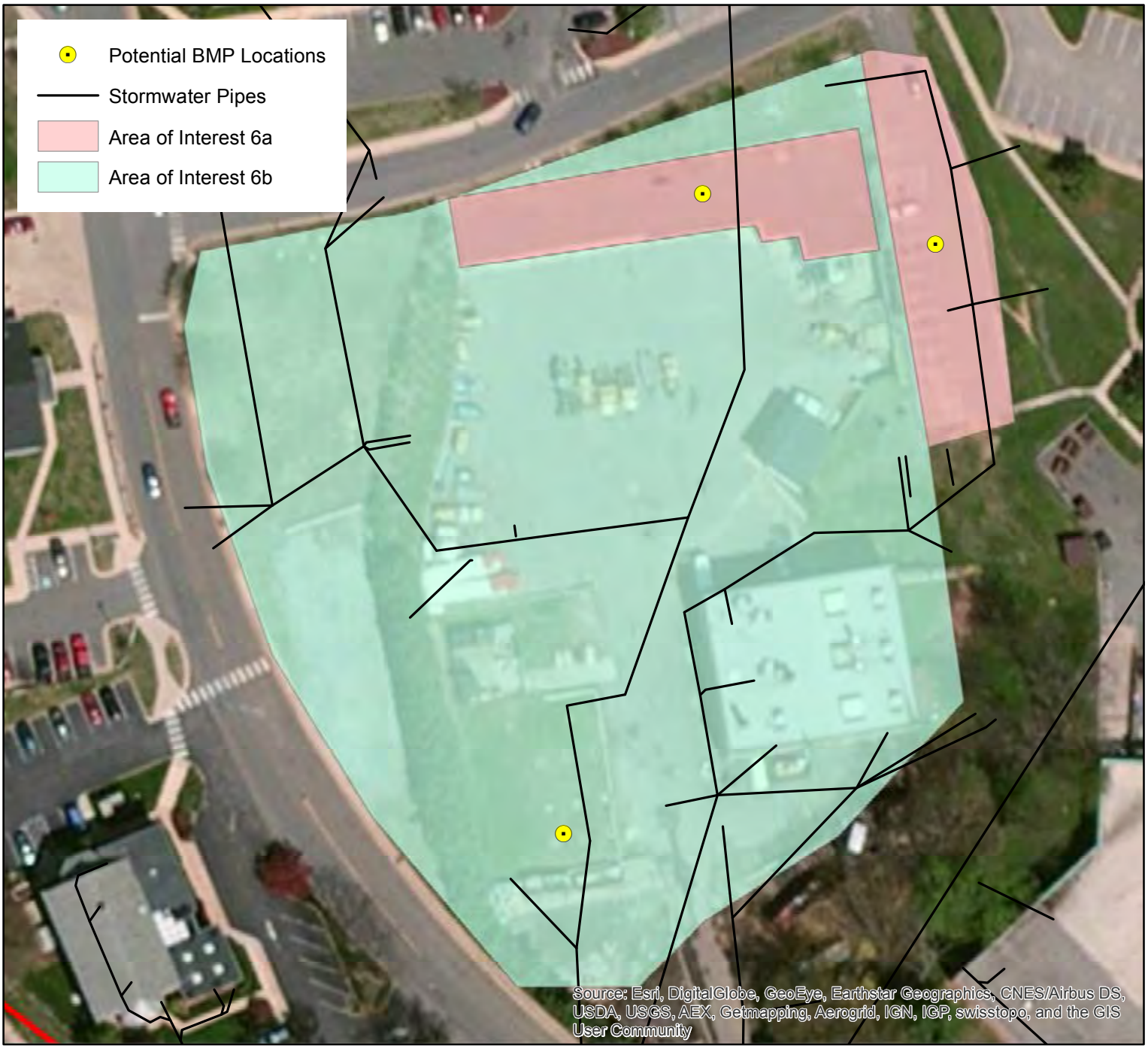


JBM-HH Area of Interest 6 is located at the corner of Sheridan Avenue and Pershing Drive. It contains one small building, a parking lot, and several grassy areas just northwest of the PX.This AOI has been split into two - 6a and 6b - to address that part of the AOI is currently in the design phase for a BMP and that the other part could be used for future BMP implementation.

N 0 60 120 240 Feet

JBM-HH Area of Interest 6 consists of:
1.56 acres of impervious surface (0.36 acres in 6a and 1.20 acres in 6b) and
1.15 acres of pervious surface (entirely in 6b).





N

0 112.5 225 450 Feet

Three opportunities for BMP placement are presented for AOI 6. AOI 6a contains two proposed BMPs - a green roof on the building along the northern edge of the AOI and permeable pavers on the parking lot to the east of that building - that are currently in the design process. They will treat approximately 0.36 acres. A bioretention is proposed in a grassy area close to the southern edge of the AOI to treat the remaining runoff and stormwater from the buildings and parking lot. This bioretention and its treated areas make up AOI 6b.

The baseline load rates below were calculated using 2009 EOS Rates Provided in the Virginia TMDL Guidance and applied to land use delineated by USACE using 2009 aerials.

	Baseline Loads (lb/yr)		
AOI AREA	**TN**	**TP**	**TSS**
AOI 6a	6.07	0.58	421.68
AOI 6b	31.81	2.42	1607.75

The pollution reductions below were calculated by applying CBP reduction efficiency rates to baseline loads shown above. The table shows how many pounds of N, P, and SS will be reduced by the proposed BMPs in AOI 6a and AOI 6b.

Proposed BMP Reduction (lb/yr)			
AOI AREA/BMP TYPE	TN	TP	TSS
AOI 6a/ Bioretention A/B Soils, no underdrain	4.86	0.50	379.51
AOI 6b/ Bioretention A/B Soils, no underdrain	25.45	2.06	1,446.98
AOI 6a/Bioswale	4.25	0.45	337.34
AOI 6b/Bioswale	22.27	1.82	1,286.2
AOI 6a/Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	4.86	0.46	358.43
AOI 6a/Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	25.45	1.94	1,366.59

The Table below shows the portion of the total L2 Reduction Goals required by 2028 that treatment of AOI 6a and AOI 6b will satisfy.

Percent of Total Goal			
AOI AREA/BMP TYPE	TN	TP	TSS
AOI 6a/ Bioretention A/B Soils, no underdrain	2%	1%	1%
AOI 6b/ Bioretention A/B Soils, no underdrain	10%	6%	5%
AOI 6a/Bioswale	2%	1%	1%
AOI 6b/Bioswale	9%	5%	4%
AOI 6a/Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	2%	1%	1%
AOI 6a/Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	10%	5%	4%

Initial planning level construction costs were calculated using the "Cost of Stormwater Management Practices in Maryland" table. This tool is based on impervious acreage in AOI 6 - 0.36 acres in AOI 6a, and 1.20 acres in AOI 6b.

These estimates include capital, labor, material and overhead costs, but not land or maintenance costs.

Several variables to be explored in later phases of the study can greatly affect the cost to implement a BMP, such as utility placement, regional specific permits, unexploded ordinance surveys, type of contract, acquisition strategy, and real property.

	Impervious Acres	New Suburban Cost
AOI 6a	0.36	$50,914
AOI 6b	1.20	$169,715

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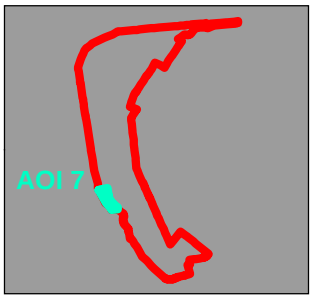
I. Location and General Information

AOI 7

N 0 155 310 620 Feet



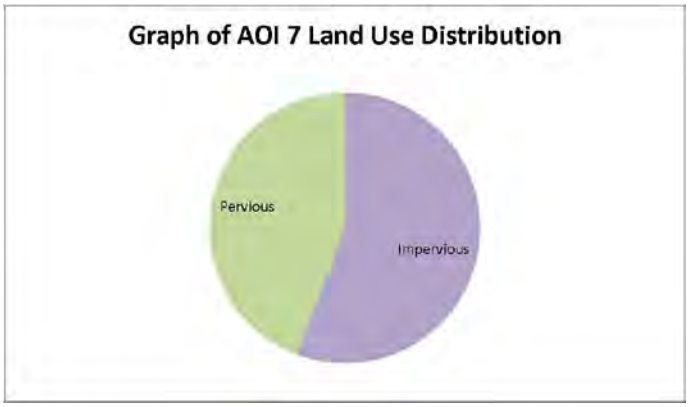
JBM-HH Area of Interest 7 is located between the southwestern edge of the facility and Sheridan Avenue, from Pershing Drive to the ramp from Hatfield gate onto Washington Boulevard. It contains three buildings, a parking lot, and several grassy areas. This AOI has been split into two - 7a and 7b - to address that part of the AOI is currently in the design phase for a BMP and that the other part could be used for future BMP implementation.

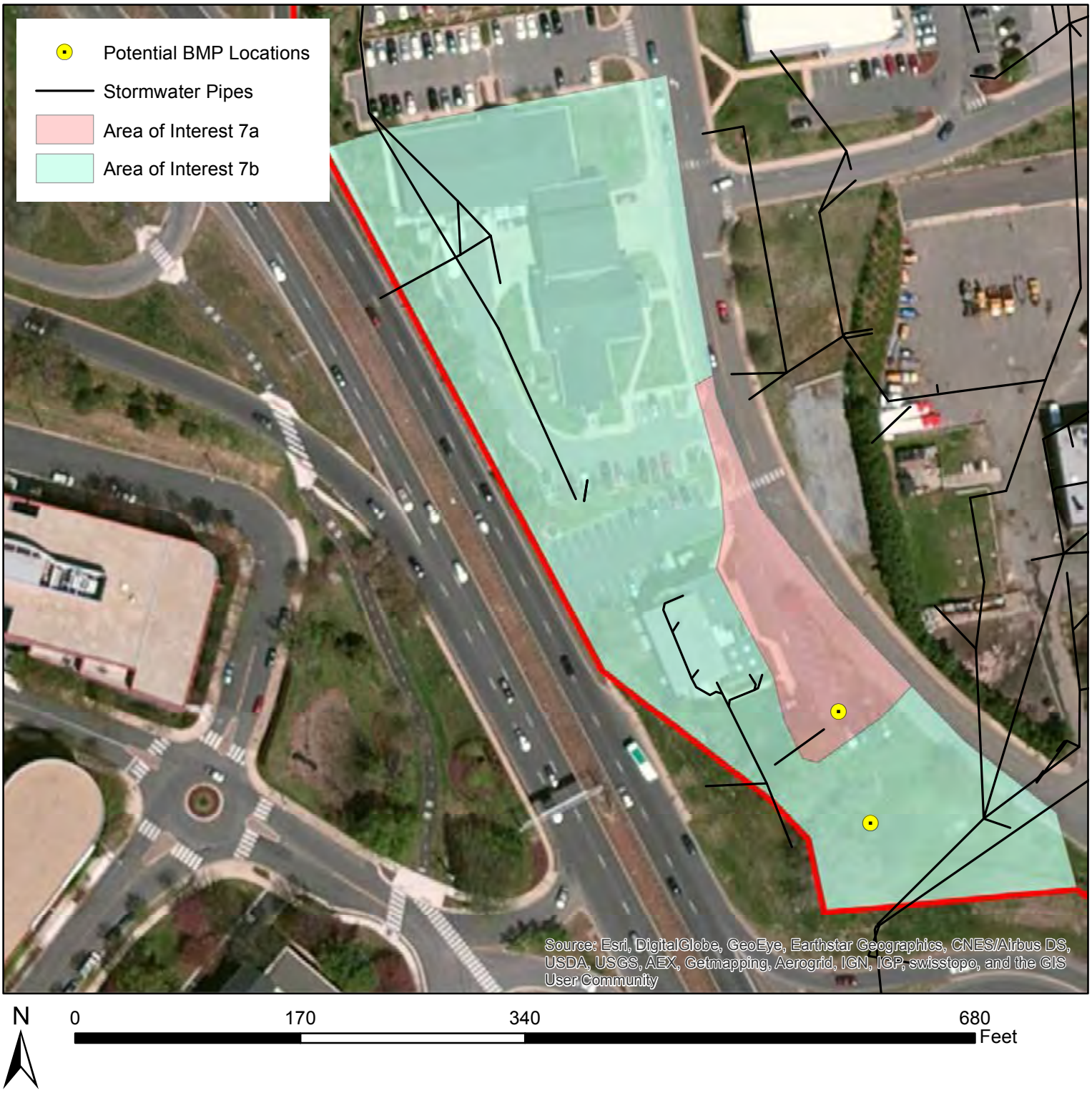
Area of Interest 7a
Area of Interest 7b
Impervious - Building
Impervious - Road/Parking
Pervious

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

N 0 100 200 400 Feet

JBM-HH Area of Interest 7 consists of:
1.63 acres of impervious surface (0.25 acres in 7a and 1.38 acres in 7b) and
1.29 acres of pervious surface (0.09 acres in 7a and 1.20 acres in 7b).





Two opportunities for BMP placement are presented for AOI 7. A small bioswale - which makes up AOI 7a - is proposed, and is currently in the design process, to treat a 0.34 acre area of mostly road and parking lot to the east of the southernmost building in the AOI. A bioretention - AOI 7b - is proposed to treat the remaining runoff and stormwater from the buildings and parking lot to the north. The BMP would be located in a depression in the southern end of the AOI.

The baseline load rates below were calculated using 2009 EOS Rates Provided in the Virginia TMDL Guidance and applied to land use delineated by USACE using 2009 aerials.

	Baseline Loads (lb/yr)		
AOI AREA	**TN**	**TP**	**TSS**
AOI 7a	5.12	0.44	308.65
AOI 7b	35.35	2.73	1827.38

The pollution reductions below were calculated by applying CBP reduction efficiency rates to baseline loads shown above. The table shows how many pounds of N, P, and SS will be reduced by the proposed BMPs in AOI 7a and AOI 7b.

Proposed BMP Reduction (lb/yr)			
AOI AREA/BMP TYPE	TN	TP	TSS
AOI 7a/ Bioretention A/B Soils, no underdrain	4.10	0.37	277.79
AOI 7b/ Bioretention A/B Soils, no underdrain	28.28	2.32	1,644.64
AOI 7a/Bioswale	3.58	0..33	246.92
AOI 7b/Bioswale	24.75	2.05	1,461.9
AOI 7a/Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	4.10	0.35	262.35
AOI 7a/Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	28.28	2.18	1,553.27

The Table below shows the portion of the total L2 Reduction Goals required by 2028 that treatment of AOI 7a and AOI 7b will satisfy.

Percent of Total Goal			
AOI AREA/BMP TYPE	TN	TP	TSS
AOI 7a/ Bioretention A/B Soils, no underdrain	2%	1%	1%
AOI 7b/ Bioretention A/B Soils, no underdrain	11%	6%	5%
AOI 7a/Bioswale	1%	1%	1%
AOI 7b/Bioswale	9%	6%	5%
AOI 7a/Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	2%	1%	1%
AOI 7a/Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	11%	6%	5%

Initial planning level construction costs were calculated using the "Cost of Stormwater Management Practices in Maryland" table. This tool is based on impervious acreage in AOI 7 - 0.25 acres in AOI 7a, and 1.38 acres in AOI 7b.

These estimates include capital, labor, material and overhead costs, but not land or maintenance costs.

Several variables to be explored in later phases of the study can greatly affect the cost to implement a BMP, such as utility placement, regional specific permits, unexploded ordinance surveys, type of contract, acquisition strategy, and real property.

	Impervious Acres	New Suburban Cost
AOI 7a	0.25	$35,357
AOI 7b	1.38	$195,172

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APPENDIX B

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Stormwater BMP Database User Guide

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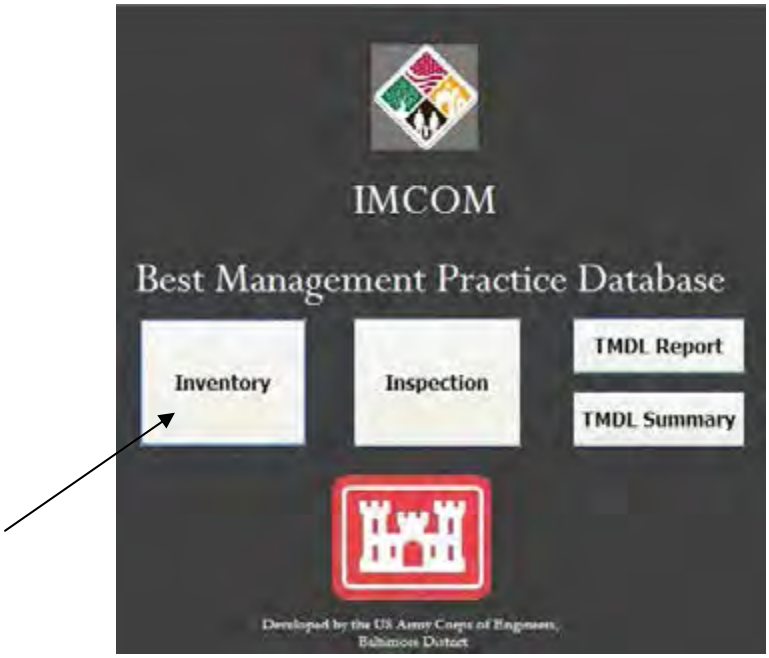
Inventory Database

Upon opening the database users will come to a switchboard:



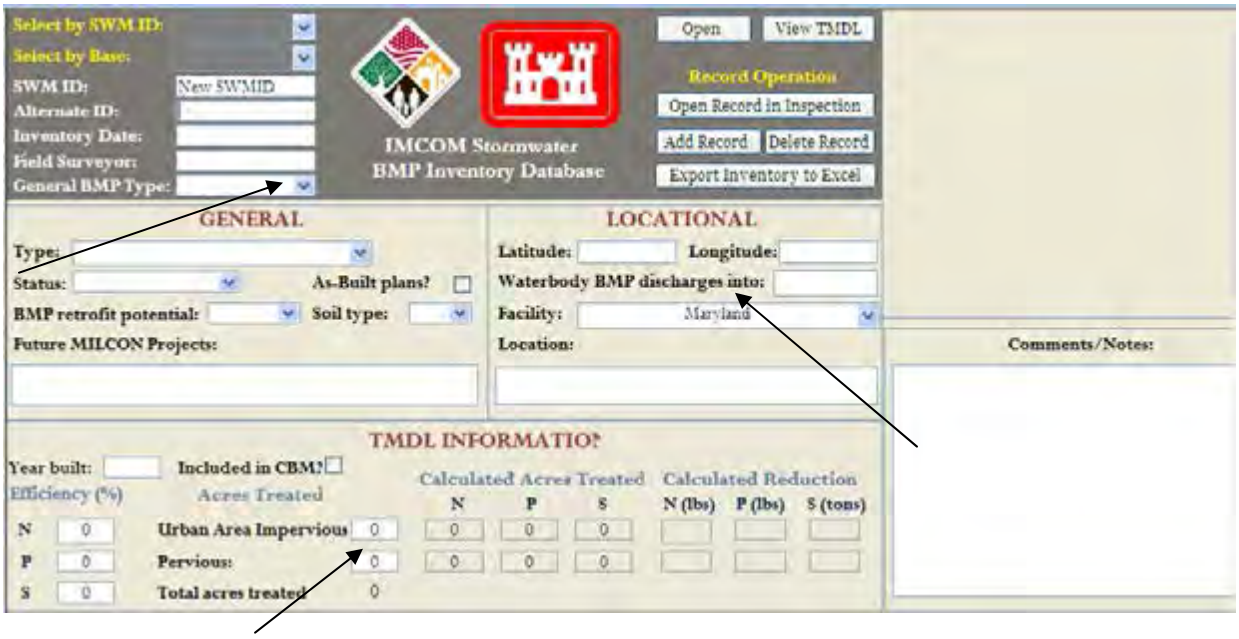
Users must first enter data into the Inventory Database before entering data into the Inspection Database. Clicking the "Inventory" button will take you to the Inventory Database:

Click the "Add Record" button.

Clicking the “Add Record” button will bring up this prompt:

Enter the SWMID of your new record.

A new record will be created and the SWMID will be populated. Enter information in the form, starting with the textboxes located at the top left (Alternate ID, Inventory Date, etc.). Your selection for “General BMP Type” will determine what fields must be populated in the area, so be sure this field is accurately filled out.

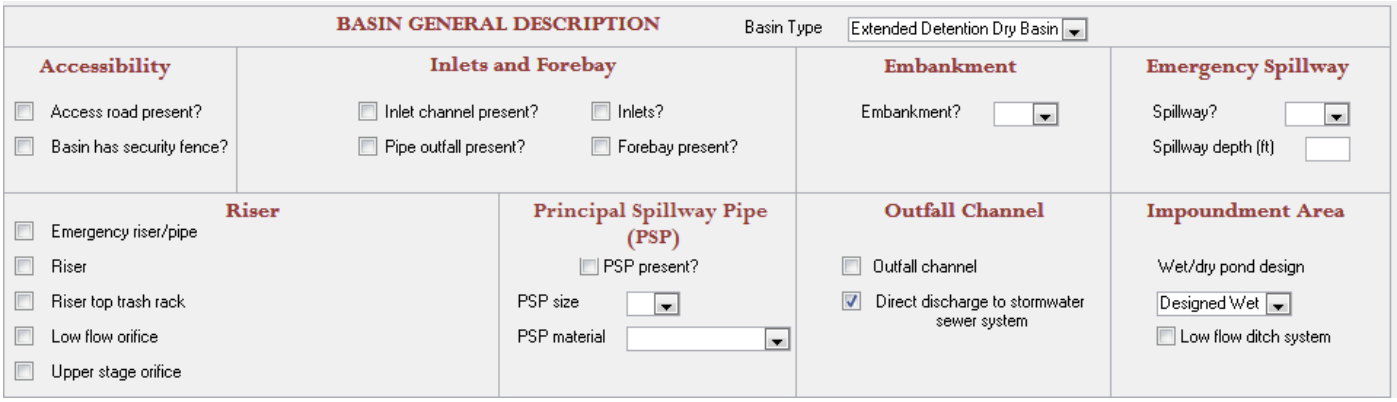


It is also important to correctly input the locational section of the inventory sheet with the GPS position coordinates, the watershed discharged into, and the location.

Finally, the TMDL information is inputted by entering the acres impervious and pervious covered by the specific BMP.

Basin specific fields

If the selection for General BMP Type is “Basin” then a “BASIN GENERAL DESCRIPTION” area will become visible at the bottom of the form:

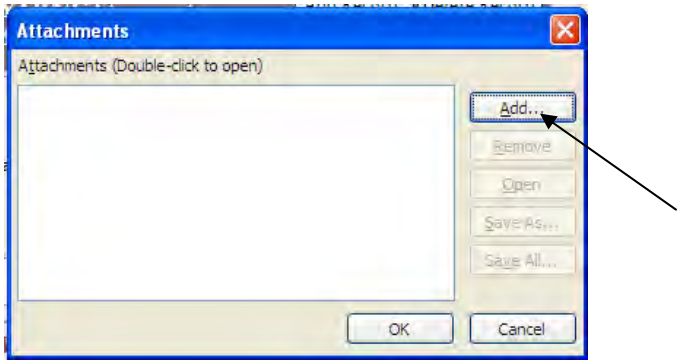


This must be completed before proceeding to the Inspection Database, as the data entered here will impact the structure of the Inspection Form.

Adding Photographs

To add photographs to the selected record, simply click on the empty box in the top right hand corner of the inventory page.

This opens the photograph management box. To add a photo click on the add button on the top right of the box and select the photo from the appropriate file.



Inspections Database

Inspection information can be entered for records already in the Inventory Database using this form. Data entered in the Inventory Form will be visible in the Inspection Form

The tabs that are visible will be based on the "General BMP Type" selected in the Inspections Database. If "Basin" is selected then the tabs will be for basins, if "Filtration" is selected, the tabs will be for filtration, and so on.

Steps to adding a new inspection

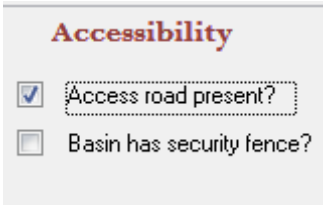
A record must first be entered in the Inventory Form before an inspection can be entered. Do the following to add a new inspection:

Navigate to the SWM ID you wish to update. If you are not already viewing the SWM ID you wish to update, use the "Select by SWM ID" tool in the upper left hand corner to select the appropriate SWM ID.

Click the "Open Record in Inspection" button

Doing this will add a new inspection for the current SWM ID.

Once the SWM ID has been entered the user may begin filling out all the fields in the form, it is important to enter the date of the inspection as this will differentiate the inspection from other records for the same SWM ID. Information from the Inventory Form is imported to the Inspection Form and viewable (but not editable). Information gathered in the Inventory Form will determine whether certain fields are active in the Inspection Form. For instance, take a case where the box is checked next to "Access road present?" under "Accessibility" in the Inventory Form for a "Basin" BMP type:



If this is the case, then in the Inventory Form the checkbox for "Access road eroded or in need of repair" will be active. Had "Access road present?" not been checked in the Inventory Form the "Access road eroded or in need of repair" checkbox would be shown as greyed out, similar to the 3 checkboxes at the bottom of this figure:

Tools

There are several tools that have been created to make the database easier to use.

Inventory Form Tools

This set of tools is in the upper right corner of the Inventory Form:

Open Record in Inspection– This will open up the inspection form with a filter set for the inventory record you are currently in. You will only see the inspections for that particular record after opening the form. There must be an existing inventory for this work correctly.

Delete Record – Deletes the current BMP from the inventory.

Add Record – Use this to add a new BMP to the inventory.

Inspection Form Tools

This set of tools is in the upper left area of the Inspection Form:

View Record in Inventory Form – Opens current inspection record in the Inventory Form. Use this to update any inventory information related to that particular BMP.

Add New Inspection – This should be used whenever you are adding a new inspection to a location that has had a previous inspection entered into the database. This will add a new inspection for the SWM ID you are currently viewing. To change SWM ID's use the "Select by SWM ID" in the upper right hand corner (described below).

Delete Inspection – This deletes the current inspection.

Open Report – Use this button to open a report with all inventory and inspection information for the current SWM ID.

Exit Database – Closes the database.

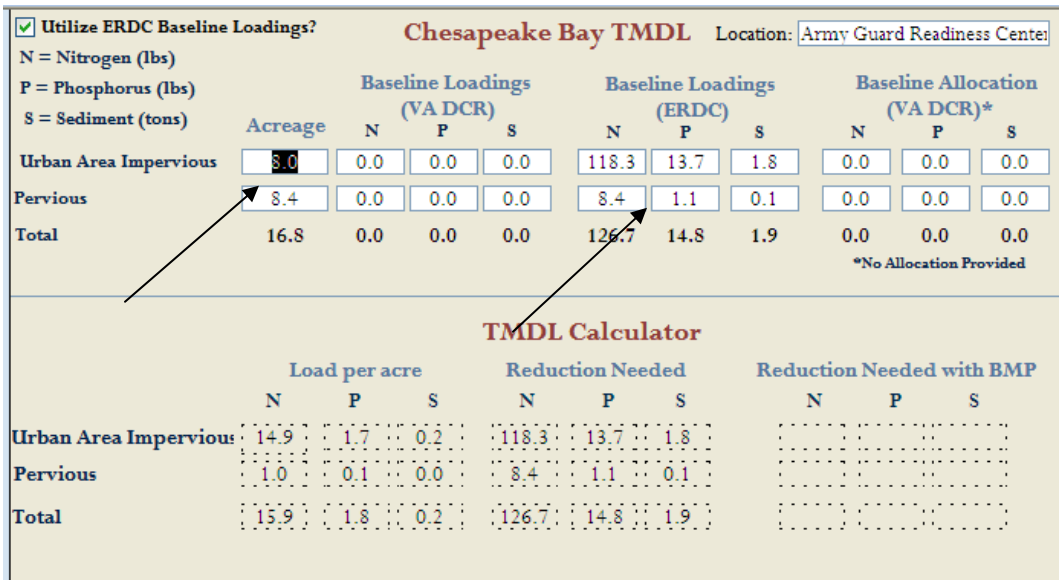
Select by SWM ID dropdown tool

One tool that is in both the Inventory Database and the Inspection Database is the "Select by SWM ID" dropdown box:

This tool is found in the upper left hand corner and has a yellow font. Selecting an SWM ID from the dropdown menu will filter the form so that only records for that SWM ID are shown. In the Inventory Form it will simply take you to the SWM ID as there is only one record per SWM ID.

TMDL Information

The TMDL information can be found in the left shutter bar under the forms group. Double clicking the form labeled TMDL brings up the screen shown below.

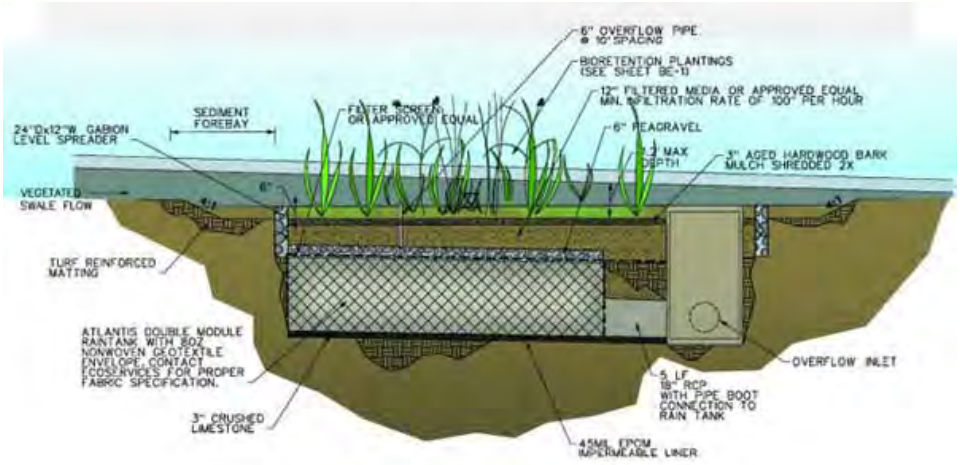


The acreage and the baseline loading information for the site are entered into the indicated boxes. The calculations are then computed based on this information. The site for which the TMDL information is being used for is located in the upper right hand corner.

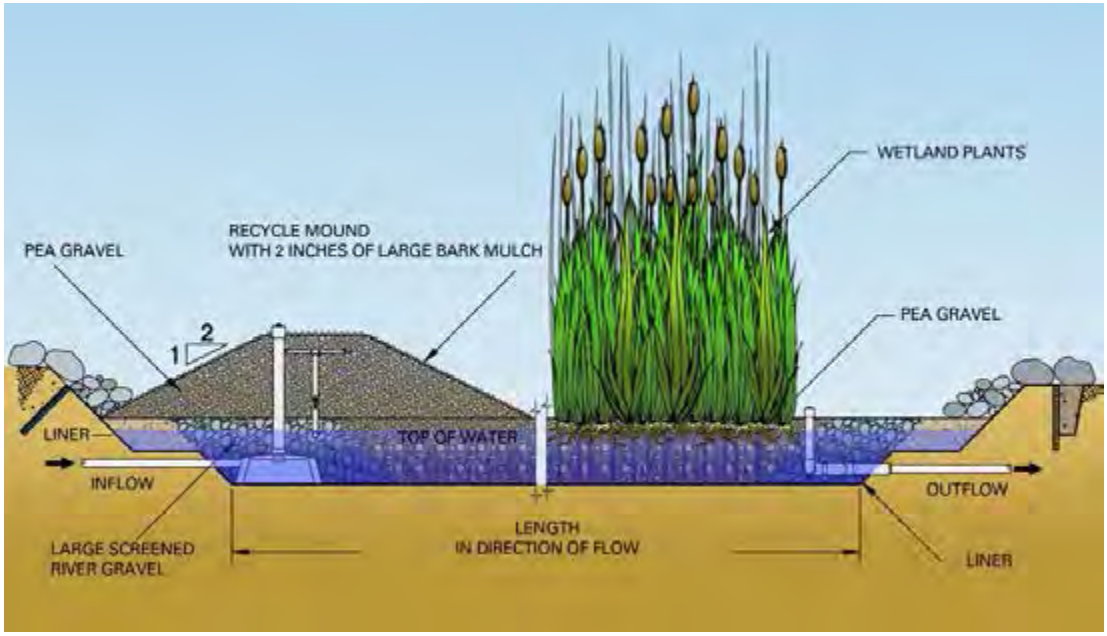
BMP Definition List

Filtration:

Bioretention: Bioretention is a flat-bottomed, shallow landscaped depression or basin used to collect and hold stormwater runoff, allowing pollutants to settle and filter out as the water infiltrates into the ground or to an underdrain, depending on soil conditions. Stormwater runoff enters the basin, where it temporarily ponds within the shallow depression and subsequently filters down through the various layers in the bioretention area.



Constructed Wetlands: Constructed wetlands are shallow marsh systems planted with emergent vegetation to treat stormwater runoff.



Filter Strips: Filter strips, or vegetated filter strips, are densely vegetated strips of gently sloping area that receives runoff from an adjacent impervious area as sheet flow. This filter strip slows the velocity of the runoff and allows for removal of sediment and other pollutants as the runoff flows through the filter strip.

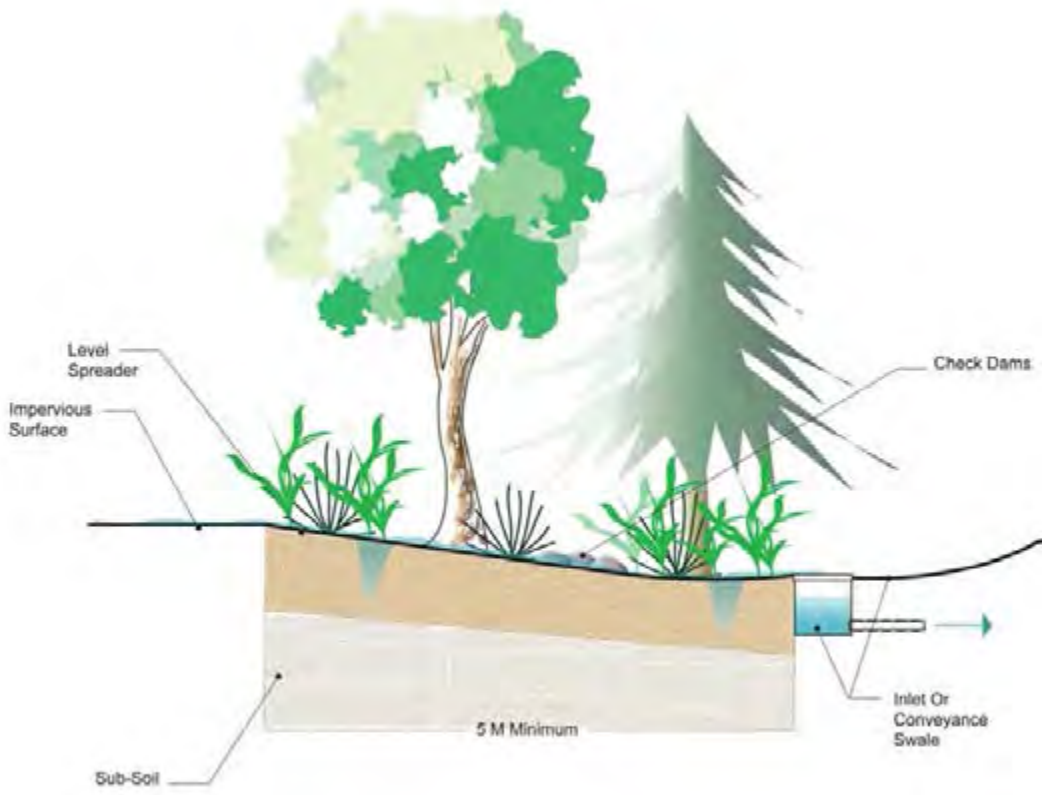
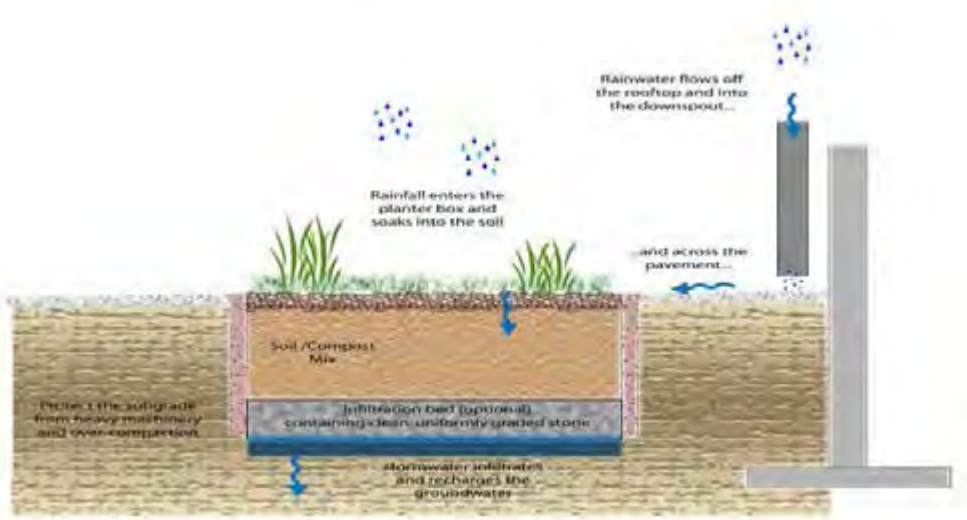


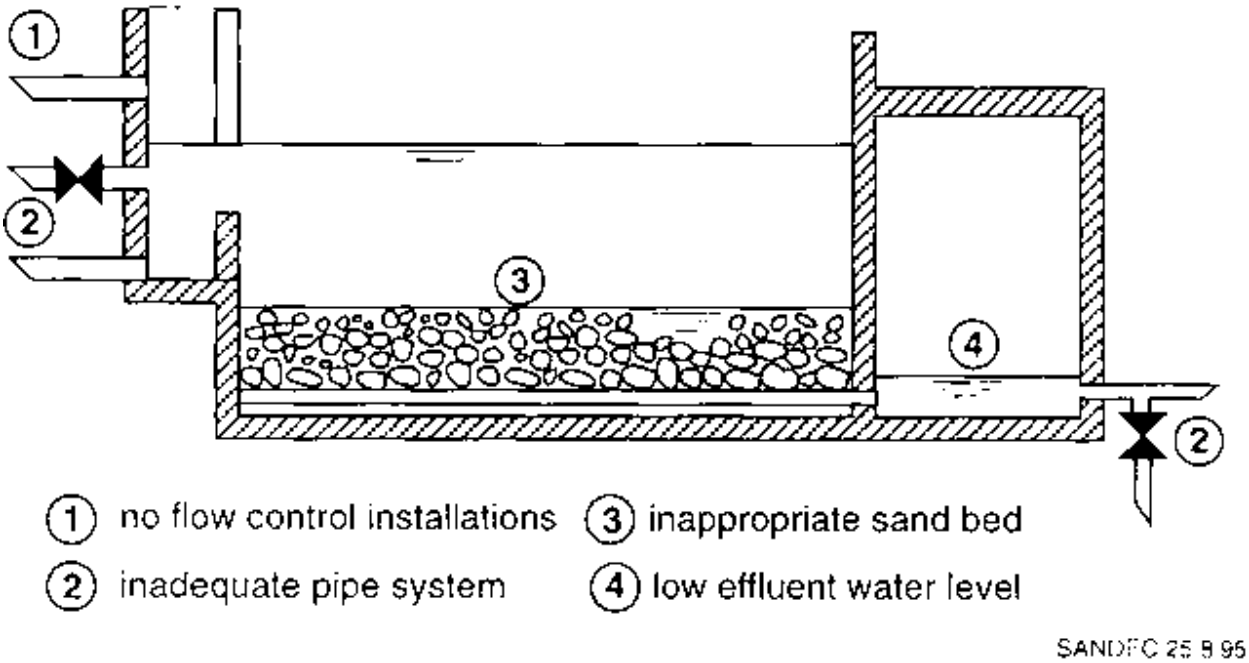
Figure 2-10
Vegetated Filter Strip
(Source: Landmark Design Group)

Green Alley: A green alley is an alley in which water is allowed to infiltrate into the soils through permeable pavement or infiltration basins, instead of being directed into a sewer system.

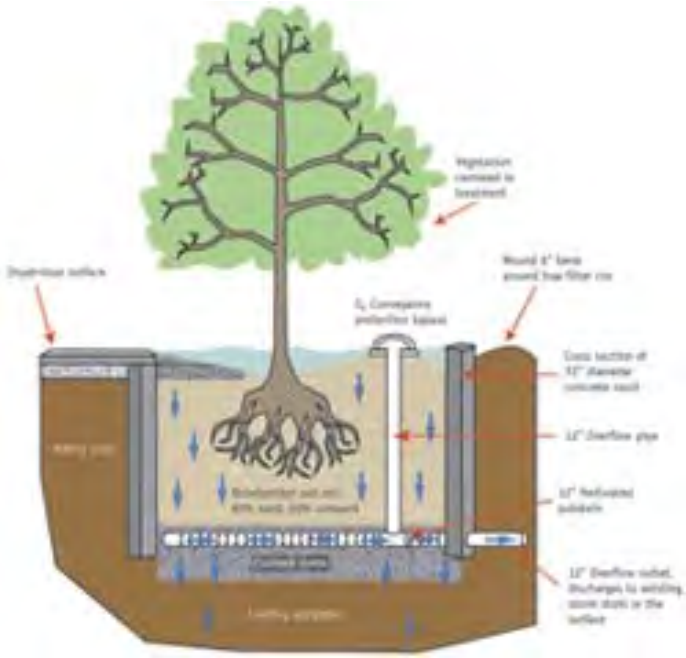
Planter Box: A planter box is a constructed box with vegetation designed to receive runoff from rooftops and filtrates the stormwater runoff.



Sand Filter: A sand filter is a device used to filter stormwater through a layer of sand to an underdrain system that conveys the stormwater to a detention facility or discharge point.



Tree Box Filter: A tree box filter is another type of bioretention filter in which stormwater runoff is directed to a box underneath a tree where the water is treated by vegetation and soil before entering an underdrain system.



Vegetated Buffer: Vegetated buffers are areas of natural or established vegetation maintained to protect water quality. Buffer zones slow stormwater runoff, provide an area where runoff can permeate the soil, contribute to ground water recharge, and filter sediment.

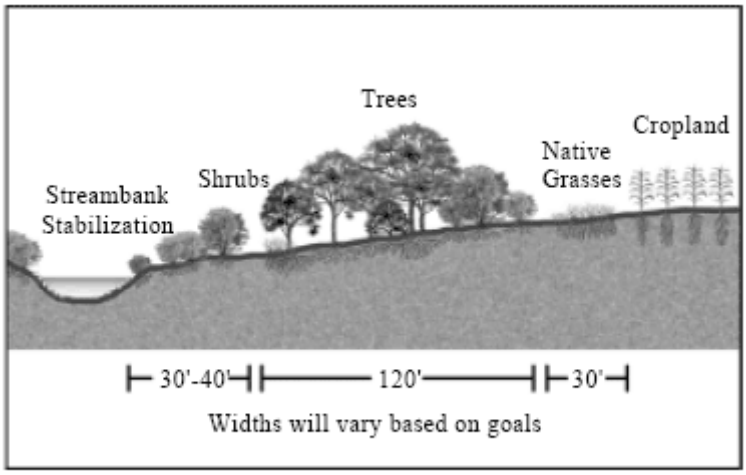
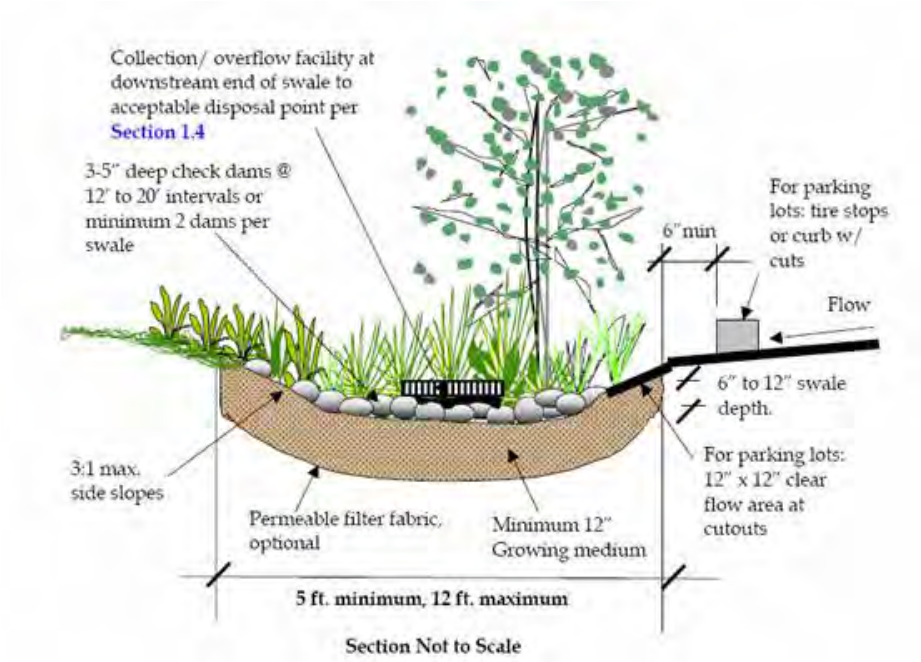


Figure 1. Cross section of an alternative buffer design.

Vegetated Roof: Vegetated (or green) roofs are made up of a layer of vegetation installed on top of a conventional flat or slightly sloped roof that absorbs rainwater in the soil media to be transpired by vegetation or discharged to another BMP or stormwater system.

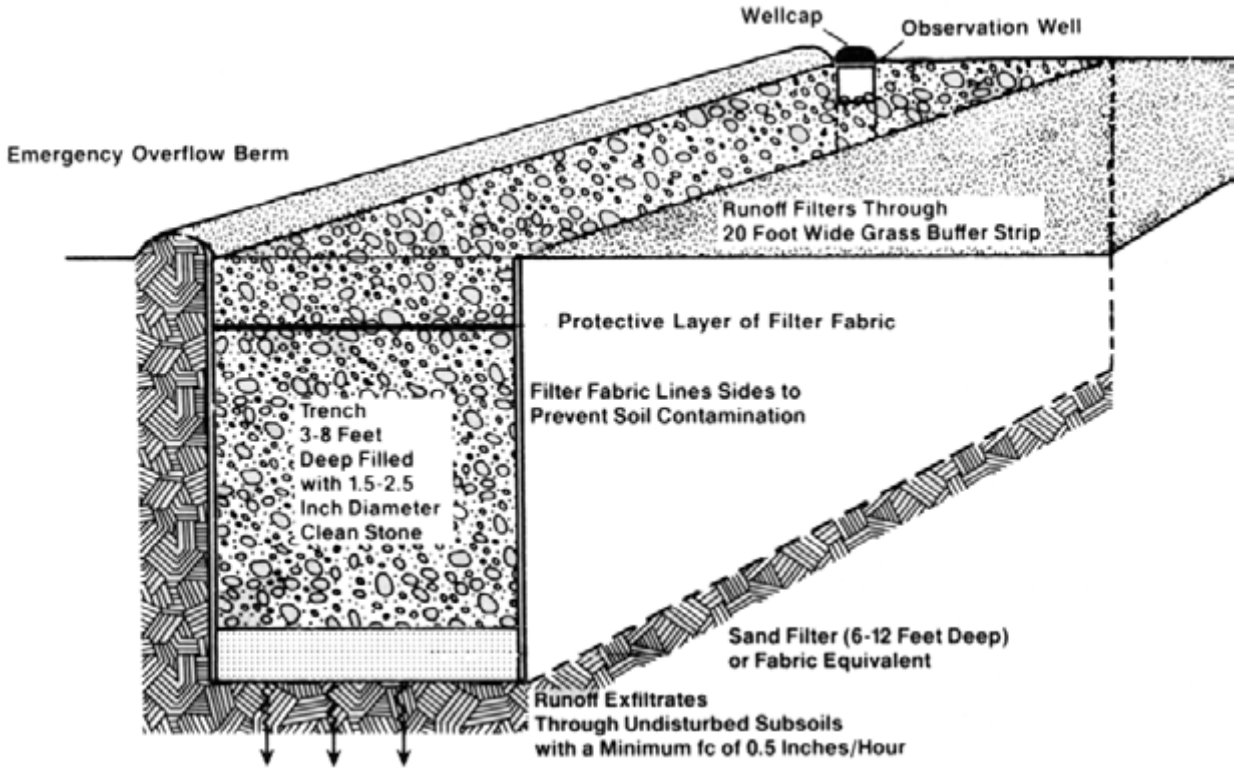
Vegetated Swales: Vegetated swales are gently sloping depressions planted with dense vegetation or grass that treat stormwater runoff from rooftops, streets, and parking lots. As the runoff flows along the length of the swale, the vegetation slows and filters it and allows it to infiltrate into the ground.



Infiltration:

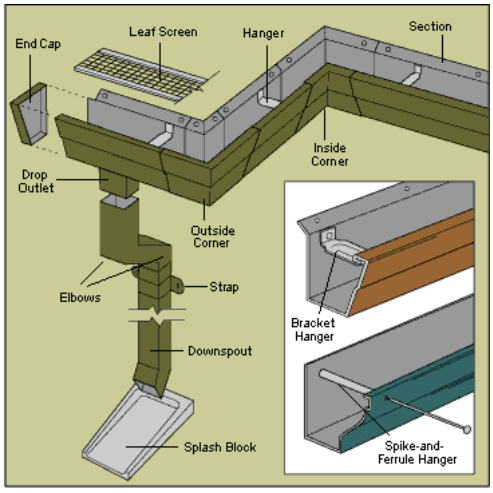
Infiltration Basin: An infiltration basin is either a natural or constructed shallow surface impoundments that often include a flat, density vegetated floor situated over naturally permeable soils.

Infiltration Trench: Infiltration trenches are shallow excavations that are lined with filter fabric and filled with stone to create underground reservoirs for stormwater runoff.

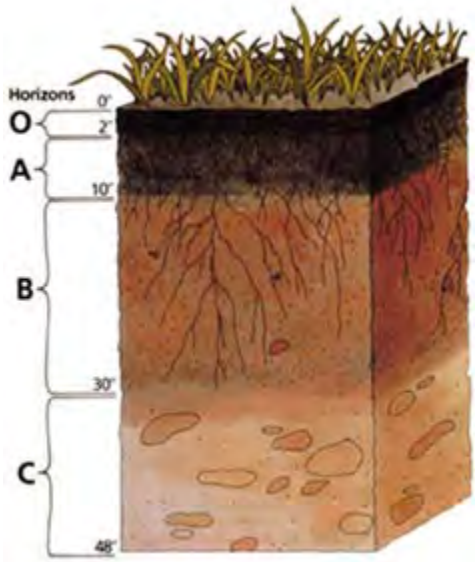


Permeable Pavers: Permeable pavers are similar to conventional pavement, but have pores or voids that allow stormwater runoff to filter through the pavement surface into an underlying stone reservoir.

Roof Downspout System: Downspout dispersion BMPs are splashblocks or gravel-filled trenches that serve to spread roof runoff over vegetated pervious areas.

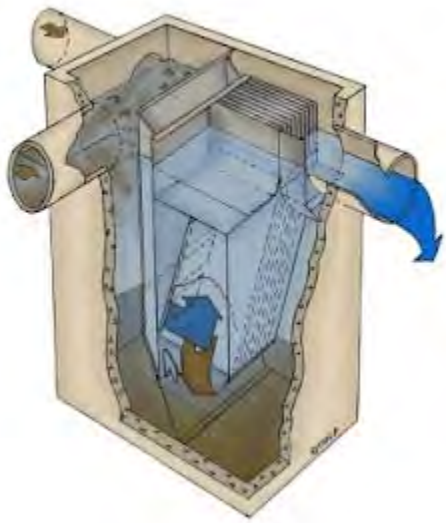


Soil Amendments: A soil amendment is a material added to a soil to improve its water retention, permeability, reduce erosion, and degrade pollutants.

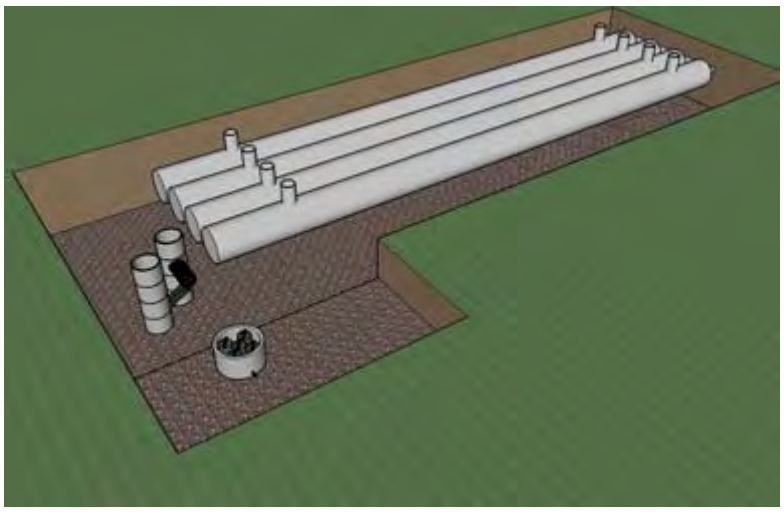


Manufactured:

Proprietary: Proprietary Stormwater BMPS are manufactured systems that use proprietary settling, filtration, absorption/adsorption, vortex principles, vegetation, and other processes to regulate stormwater management.



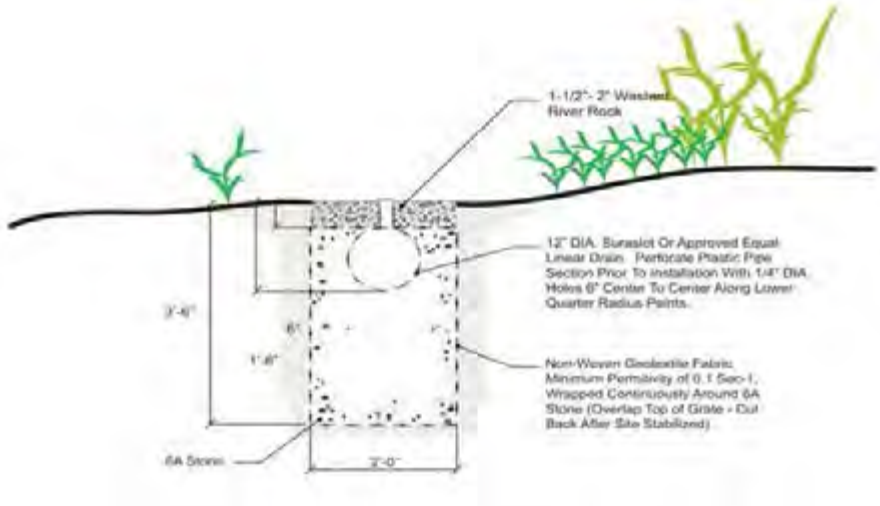
Pipe Detention: Pipe detention systems are underground pipe systems used for storing stormwater runoff.



Parking Lot Storage: A parking lot storage unit is a specialized detention basin used primarily to reduce the peak discharge of stormwater from the surrounding area.

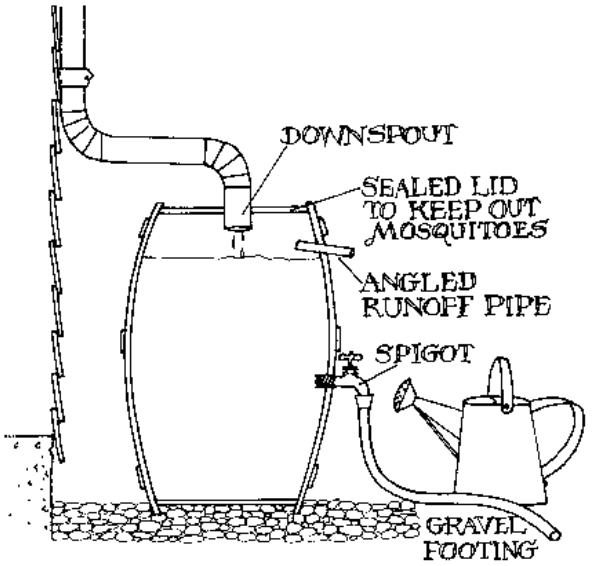
Miscellaneous:

Level Spreader: A level spreader is an erosion control measure that is designed to mitigate the impact of high-velocity stormwater surface runoff, and can also serve to increase infiltration and reduce water pollution.



Check Dam: Check dams are small, temporary structures built across a swale or a channel with the primary purpose of reducing erosion and sediment level in flowing stormwater.

Stormwater Reuse (Rainbarrel): Stormwater reuse involves the collection and storage of rainwater for future use from rooftops or parking lots.



Basin:

Acting as Sediment Basin: A sediment basin is a temporary pond built to capture eroded or disturbed sediment as it is washed away by stormwater.

Dry Basin: A dry basin is a detention pond used next to rivers, streams, or lakes to prevent from flooding by storing water for a limited period of time. They are called dry ponds because no permanent pool of water exists.

Extended Detention Dry Basin: An extended detention dry basin is a dry basin that is designed to retain excess storm water for an extended period of time.

Wet Basin: A wet basin is a detention pond that is designed as an artificial lake with vegetation around the perimeter that is used for water quality improvement, groundwater recharge, flood protection, or aesthetic improvement.

Storm water BMP Retrofitting

Problems	***Solutions***
Basin walls/ structural components eroding.	1. Re-grade the basin to slow flow 2. Plant native vegetation to slow flow. 3. Line walls with geo synthetics or other erosion control systems (i.e. gabion walls) to protect from erosion.
Pollutants are not being treated properly.	1. Re-grade the basin and add native vegetation to slow flow and increase retention/ filtration time. Deep root systems help storm water percolate to the ground (decreasing surface flow) 2. Install weir plate onto outlet structure openings to hold shallow water. 3. Create a sediment fore-bay designed to allow sediment and pollutants to settle out before entering main pond area. 4. Remove concrete low - flow channels to slow water movement and allow for more infiltration.

Too much storm-water entering the basin.	1. Expand water basin size (excavation) 2. Increase size of outfall structure 3. Plant native vegetation (deep root system allows for water to percolate through soil faster). 4. Add adjacent storm water structure 5. Grass swale inlets to pre-treat and infiltrate water. 6. Create rain gardens/ retention basins in pervious zones (i.e. middle of parking lots) to collect and re-route water to main basin.

Database Storage and Installation

The BMP database should be placed in a single centralized location. Ideally, the database will be stored on a server, rather than on a local computer's hard drive. Users should take care to make sure that multiple versions of the database do not exist. If a user must work on the database off of the network the following steps should be taken:

- Download the database to the computer that will be used offline.
- Verify that no users will be editing the database during the time that the user is working offline with the database.
- Upon finishing the offline editing, copy the database back to the server, overwriting the current database stored on the server.
    - Prior to overwriting the database the user may wish to copy the database into a backup folder. This may not be necessary if data is automatically backed up by the network administrators.

Photo Storage

Access databases are limited to a maximum storage size of 2 gigabytes (GB). The attachment field, which is where the photos and other documents can be stored, is the field most likely to impact the size of the database. In instances where it is likely that the total size of the database will exceed 2 GB the following steps should be taken to separate the photos from the database itself.

- Set up a location on a centralized server where the photos will be stored.
- Apply a standardized process for naming photos, for example the names for all photos for a BMP with SWMID ABC12 begin with ABC12.
- Create a field within the database and corresponding field within the forms that will hyperlink to the photos on the servers.

APPENDIX C

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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER DIVISION

Subject: Guidance Memo No. 15-2005

To: Regional Directors

From: Melanie D. Davenport, Director Melanie D. Davenport

Date: May 18, 2015

Copies: James Golden, Fred Cunningham, Allan Brockenbrough, Regional Water Permit Managers

Summary: This guidance document provides staff and permittees in the Chesapeake Bay Watershed with background information and procedures to meet the Chesapeake Bay TMDL Special Condition requirements in the 2013-2018 General Permit for Discharges of Stormwater from Small (Phase II) MS4s, the reissued Phase I MS4 permits, and any Individual Phase II permits that are issued. This document may also be used as a reference to meet the Chesapeake Bay TMDL load allocation for unregulated urban entities as well as local TMDL waste load allocations for nutrients and sediment. This document replaces Guidance Memo No. 14-2012.

Electronic Copy: An electronic copy of this guidance document is available in PDF format through DEQ's MS4 website.

Contact Information: Please contact Jaime Bauer, Office of VPDES permits, at (804) 698-4416 or Jaime.Bauer@deq.virginia.gov or with any questions regarding the application of this guidance.

Disclaimer:
This document is provided as guidance and, as such, sets forth standard operating procedures for the agency. However, it does not mandate or prohibit any particular action not otherwise required or prohibited by law or regulation. If alternative proposals are made, such proposals will be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.

Chesapeake Bay TMDL Action Plan Guidance Revision Change Summary
5/18/2015

Corrections/Updates:
Corrections and updates are made throughout the document where applicable:

- Typos corrected as identified
- Broken links fixed as identified
- Permit citations corrected as identified
- Corrected error in Loading Rate Tables to lbs/ac/yr throughout the document
- Corrected alphabetizing error in definitions
- Corrected definitions to match the VSMP regulations
- Incorporated link for reporting spreadsheet
- Removed "or 8" from the title of Example II.2. The aggregate method may not be used for Special Condition 8.
- The urban stream restoration appendix has been updated to reflect the changes that resulted from the revised Expert Panel Report. The link has been changed to the most recent report.

Additional Clarifying Language:

- Clarifying text added concerning Special Conditions 3, 7, and 8
    - Text added to flow chart in Appendix III concerning Special Condition 3
- Clarifying text added concerning the appropriate loading rates that should be used to determine the additional reductions required under Special Condition 7 and Special Condition 8
- Clarifying text added to explain credit for redevelopment, oversized BMPs, and more stringent development requirements
- Emphasized section concerning calculations for SLAF Grant not impacting permit compliance
- Text added concerning the treatment of lands in transition
- Clarifying text concerning the downward modification procedure was added. Downward modification is only allowable if the Bay Program efficiencies were used.

Substantive Changes:

Loading Rate Tables (Part II.2):

It has been brought to the Department's attention that there is an issue with insufficient significant figures in *Tables 3a-d* that may result in calculated required reduction values that are not 5% of the L2 scoping run reductions. The full reduction requirement values have been included in the guidance and permittees are encouraged to use those corrected values. However, permittees may submit calculations using either set of values for this permit term.

Credit Guarantees (multiple changes made throughout the document):

This section has been updated to reflect a change for credit guarantees from "construction initiated" to "have had, at a minimum, funds approved as part of an adopted Capital Improvement Plan, or an equivalent funding plan for state and federal facilities." Additional clarifying language concerning this change has been added throughout the document.

Crediting BMP Restoration (multiple changes made throughout the document):

The previous version of the guidance stated that permittees could not receive credit for BMP Restoration projects, which are permitted under the Bay Program's *Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects*. The Department has revisited this aspect of the guidance and has determined it is appropriate to allow permittees to receive credit for BMP Restoration. However, permittees may only receive incremental credit for improvements to water quality BMPs or impoundments installed prior to 2006, regardless of whether they have been previously reported to the Department or the Bay Program. This decision is in keeping with a forthcoming Bay Program FAQ document. If the Bay Program revises their approach to this issue, the Department will revisit the applicable sections of the guidance.

Forested Lands (& Ag Lands) (multiple changes made throughout the document)*:*

The previous version of the guidance stated that permittees could exclude forested lands from their system and service area delineation. However, the document also stated permittees could not receive credit for BMPs that treated these excluded lands. Upon further review, the Department has determined permittees may receive credit for these lands, but it is not appropriate to use the loading rates provided in the permit table. In the revised guidance the Department has provided loading rates for forested lands by basin. Permittees may use these values to calculate reductions for BMPs that drain forested lands. Between the March, 2015 draft revision and the final revised guidance the size threshold for "forest" has also been reduced to better match the resolution of the Bay Program Model. It has also been clarified that the minimum size and density requirement do not apply to the Forest Buffer BMP.

Similarly, permittees may receive credit for any agricultural lands draining to a BMP, but it is not appropriate to use the loading rates in the permit for these lands. Given the variability of agricultural lands, a loading rates table has not been included in the guidance. For these BMPs permittees should contact the Department for appropriate loading rates.

The stream restoration section of the guidance has also been revised to reflect these changes. There is no baseline for forested acres or agricultural lands, so permittees may receive full credit for the proportion of forested acres that drain to the BMP. The discussion of Stream Restoration in the appendix and the example has been revised to reflect this change. The stream restoration calculation spreadsheets have also been updated.

Oversized BMP calculations for TN and TSS (Appendix V.E)*:*

In the March 2015 draft revision language was incorporated in to the guidance concerning the method for calculating TN and TSS reductions from oversized BMPs. However, that language did not sufficiently explain the approach the Department recommends for these calculations. That language has been revised and an Appendix (*Appendix V.E*) has been added to the document concerning this subject.

Crediting Pre-July, 1 2009 BMPs (multiple changes made throughout the document)*:*

In the initial guidance, permittees could receive credit for "BMPs installed prior to July 1, 2009 that have not previously been reported to the Department , the structure **must** have been installed as a dedicated stormwater treatment facility (i.e. recreational ponds will **not** receive credit." Upon further review, this section appeared to conflict with "Appendix V.D, Existing BMP Efficiency Modification" as well as the Bay Program's Expert Panel Report.

In the draft revised guidance that was circulated in March 2015 the guidance was revised to indicate that the credit that could be claimed for a BMP installed prior to July 1, 2009 was based on the date the BMP was installed. For BMPs installed:

1. **On or after Jan 1, 2006 and prior to June 30, 2009:** Permittees may receive full credit for BMPs installed between these dates is they were not previously reported to the Department and if the permittee provided a full historical accounting, to the maximum extent practical, of BMPs in their jurisdiction. The Department had records from 11 permittees, which were listed in the revised document.
2. **Prior to Jan 1, 2006:** Permittees may receive incremental credit from any enhancements, conversions, or restoration projects performed on BMPs or Impoundments that were in place prior to Jan 1, 2006. These structures are otherwise implicit in the model and the baseline loading rates through the water quality calibration.

Based on the comments were received and continued discussion with the Bay Program and EPA, the Department has determined that overall this method is appropriate. However, the Department acknowledges that the reported BMP data we have is limited and incomplete and, as such, the reference to the 11 permittees that was included in the draft revision has been removed from the final guidance. *All* permittees may receive credit for any stormwater quality BMPs installed between Jan 1, 2006 and June 30, 2009 within the MS4 service area if the permittee provides a full historical accounting, to the maximum extent practical, of BMPs in their jurisdiction. This crediting method is in line with EPA's expectations and a forthcoming FAQ document from the Bay Program. If the Bay Program or EPA shifts their position on this issue, we will review whether this method remains appropriate.

The Permittee should see Part IV.2 of the guidance for more information on this subject. Changes have also been made to "Appendix V.D, Existing BMP Efficiency Modification" and a new "Appendix VI – Credit for BMPs installed prior to July 1, 2009" has been added to the document and includes a flow chart for additional clarity.

Action Plan Expectations (multiple changes made throughout the document)*:*

Text has been added to Part VI concerning the Department's expectations for the level of detail that will be included in the Action Plan, although this is discussed throughout this section. For Special Condition 3 some text was added that reflects other changes throughout the document concerning the projects that are subject to special condition 3.

Text has also been added to Part VI.5 concerning the Department's expectation for the level of detail we need for BMPs that are implemented to meet Special Condition 6.

Bay Program Retrofit Equations (Appendix V.B)*:*

There have been two changes made to the guidance concerning the Bay Program Retrofit Equations. One is an update: The Bay Program updated the curves in the Expert Panel Report. These have been incorporated in to the guidance along with the old curves. At this time and for this permit cycle the Department will accept calculations using either set of curves.

The other is a correction: We received comments indicating that it is not appropriate to use the RRM spreadsheet as a shortcut for estimating the Runoff Storage for use in the curve equation. This is correct. Upon further review the Department concurs with the comments that use of the RRM spreadsheet for this purpose results in the Runoff Storage being double counted.

Street Sweeping (Appendix V.G):

In the March 2015 draft the street sweeping “efficiency” was removed from the Appendix V.C.1 table and a separate Appendix was added for street sweeping that better reflected the most recent Bay Program guidance on this subject. Based on the comments we received, this section was edited after the draft revision and the qualifying conditions to receive credit for this BMP were removed. Permittees may receive credit for reductions from street sweeping regardless of the number of times per year the streets are swept.

Chesapeake Bay TMDL Action Plan Guidance Change Table
5/18/15

SECTION	Change Date	Page #	Subject	Change
Throughout	3/19/2015	-	Correction	Corrected errors in loading tables. Removal should be in lbs/ac/yr, not lbs/ac.
Throughout	3/19/2015	-	Correction	Typos corrected where identified
PART I - BACKGROUND	3/19/2015	1	Correction	Corrected Alphabetizing Error in Definitions
PART I - BACKGROUND	5/12/2015	1	Correction	Definition corrected/added to match VSMP regulations
PART I.2, Purpose	3/19/2015	2	Clarification	Added additional language to this section concerning required new source reductions
PART II - REQUIRED REDUCTIONS	3/19/2015	3	New Sources	Added additional language discussing the differences between Special Condition 3, 7, and 8
PART II.1, Scope of Reductions Required	3/19/2015	4	Clarification	Added text clarifying the appropriate loading rates to use to calculate additional reductions from new sources
PART II.1, Scope of Reductions Required	5/12/2015	4	Clarification	Added text clarifying when reductions need to be made to meet Special Condition 8
PART II.2, Size and Extent	3/19/2015	5	Clarification	Added additional lands that can be subtracted from the service area - Concrete Products Facilities, NMMP, Ag Lands, Wetlands, Open Waters
PART II.2, Size and Extent	3/19/2015	5	Forested Lands	Edited footnote - removed text about not crediting forested land draining to a BMP. Added footnote about density and acre requirement to meet the definition of "forested."
PART II.2, Permit Tables	3/19/2015	6	Clarification	Clarified permit tables are the reductions for existing sources
PART II.2, Permit Tables	3/19/2015	6	Clarification	Clarified in footnote that once construction is completed on sites that are in transition as of June 30, 2009, those lands should be considered new sources subject to Special Condition 3.
PART II.2, Permit Tables	5/12/2015	7	Permit Tables	Clarification concerning Tables 3a-d loading rates
PART III - Eligible BMPs	3/19/2015	8	Credit Guarantees	Changed credit guarantee from "BMPs that are completed or under construction" to "funds approved as part of an adopted Capital Improvement (or equivalent) Plan."
PART III - ELIGIBLE BMPs	3/19/2015	8	Clarification	Bolded section concerning grants awarded under prior efficiencies
PART III.1, Calculating Credits	3/19/2015	9	Forested Lands	Edited text throughout section to reflect change to crediting for forested lands.
PART III.1, Calculating Credits	3/19/2015	9	Forested Lands	Added forested loading rate table and text concerning loading rates for Ag lands.

Chesapeake Bay TMDL Action Plan Guidance Change Table
5/18/15

PART III.1, Calculating Credits	3/19/2015	9	Forested Lands	Added text stating that permittees may only receive credit for forested land use conversion of 30m x 30m or greater. Added text to clarify this does not apply to the Forest Buffer BMP.
PART III.2, Calculation Credits, Unregulated	3/19/2015	9	Forested Lands	Added text to clarify there is no baseline for forested lands, ag lands
PART III.3	3/19/2015	11	Clarification	Clarifying text added that explains how permittees may receive credit for BMPs that were primarily installed to meet VSMP requirements
Part III.4	3/19/2015	11	Crediting Pre-09 BMPs	Added text concerning credit for BMPs initially installed prior to June 30, 2009. This is discussed in greater depth in Part IV.2 and Appendix VI
PART IV.1	3/19/2015	12	Correction	Added link for reporting spreadsheet
PART IV.2, Historical Data	3/19/2015	12	Crediting Pre-09 BMPs	Added text clarifing the necessary steps permittees must take to receive credit for BMPs installed prior to July 1, 2009.
PART V	5/12/2015	13	Clarification	Added text clarifing BMP eligibility for credit guarantees
PART VI	3/19/2015	14	Correction	Removed "5%" from the discussion of reductions required this permit cycle. Reductions required under Special Condition 8 were not captured in this statement.
PART VI.3	3/19/2015	15	Correction	Corrected citation
PART VI.3	3/19/2015	15	New Sources	Added clarifying text concerning the Department's expectation for meeting Special Condition 3.
PART VI.5	3/19/2015	16	Action Plan Expectations	Added clarifying text concerning the Department's expectation for meeting Special Condition 5.
Appendix II	5/12/2015	27	Clarification	Added text to footnote clarifying reductions do not need to be made beyond the 16% average land cover condition
Appendix II, Example II.1	3/19/2015	37	Clarification	Added text clarifying the appropriate loading rates to use to calculate additional reductions from new sources
Appendix II, Example II.2	3/19/2015	38	Correction	Removed "or 8" from the title of the section. Aggregate Accounting method cannot be used for Special Condition 8.
Appendix II, Example II.2	3/19/2015	38	Clarification	Added text clarifying the appropriate loading rates to use to calculate additional reductions from new sources

Chesapeake Bay TMDL Action Plan Guidance Change Table
5/18/15

Appendix III	3/19/2015	41	Clarification	Added citations for Special Condition 3 where appropriate
Appendix IV	5/12/2015	42	Correction	Corrected citation
Appendix V.B	3/19/2015	48	Retrofit Curves	Retrofit Curves have been updated by the Bay Program. The updated curves and equations have been incorporated in to the guidance. Permittees may use either set of curves for this permit term.
Appendix V.B	3/19/2015	48	Retrofit Curves	Clarified that RRM sppreadsheet may not be used to estimate the RS value for use in the curve equation
Appendix V.B	3/19/2015	48	Clarification	Text added to clarify the retrofit curves/equations cannot be used for dry ponds or extended dentention ponds
Appendix V.D	3/19/2015	57	BMP Restoration	Changed text to incorporate BMP restoration as an option in accordance with the Bay Program's Expert Panel Report.
Appendix V.D, Existing BMP Modification	3/19/2015	58	Clarification	Downward Modification. Permittees may only use downward modification w/ Bay Program Established Efficiencies
Appendix V.D, Existing BMP Modification	3/19/2015	58	BMP Restoration	Removed text stating the credit would not be available for BMP restoration
Appendix V.D, Existing BMP Modification	3/19/2015	59	Credit for Pre-09 BMPs	Edited example to reflect elimination of design era consideration
Appendix V.D, Example V.D.2	5/12/2015	60	Correction	Error in example corrected
Appendix V.E	5/12/2015	61	Oversized BMPs	Appendix added to clarify the calculation method that should be used for oversized BMPs
Appendix V.G	3/19/2015	64	Street Sweeping	Separate appendix for street sweeping added
Appendix V.H	3/19/2015	65	Land Use Change	Additional land uses that should be considered pervious added
Appendix V.J	3/19/2015	69	Urban Stream Restoration	Updated section to reflect expert panel report that was released after the guidance was finalized
Appendix V.J	3/19/2015	69	Urban Stream Restoration	Section edited throughout to reflect change that permittees may receive credit for forested lands
Appendix V.J	5/12/2015	71	Urban Stream Restoration	Added language to clarify how the baseline for unregulated lands impacts the credit available for stream restoration projects
Appendix V.L	3/19/2015	75	Clarification	Language added to clarify that all redevelopment projects are eligible for credit, regardless of the initial land use cover condition
Appendix VI	3/19/2015	76	Crediting Pre-09 BMPs	Added Appendix explaining how permittees may receive credit for BMPs install prior to July 1, 2009

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PART I - BACKGROUND

1. Definitions – For purposes of this guidance document, the following definitions shall apply:

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

Existing Sources – Pervious and impervious urban land uses served by the MS4 as of June 30, 2009

Impervious Cover – A surface composed of material that significantly impedes or prevents natural infiltration of water into soil

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

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

Municipal Separate Storm Sewer System ("MS4") – All separate storm sewers that are defined as "large" or "medium" or "small" municipal separate storm sewer systems or designated under 9VAC25-870-380 A 1.

New Sources – Pervious and impervious urban land uses served by the MS4 developed or redeveloped on or after July 1, 2009

Pollutants of Concern ("POC") – Total nitrogen ("TN"), total phosphorous ("TP"), and total suspended solids ("TSS")

Prior Developed Lands ("Redevelopment") – Land that has been previously utilized for residential, commercial, industrial, institutional, recreation, transportation, or utility facilities or structures, and that will have the impervious areas associated with those uses altered during a land-disturbing activity

Regulated Land – Regulated land refers to the conveyances and drainage area served by the permittee's MS4. For Phase II MS4s regulated land is the conveyances and drainage area that falls within a Census Designated Urbanized Area.

Unregulated Land – Unregulated land means those acres that are not owned or operated by the MS4 permittee AND are located outside the permittee's regulated land.

For terms not defined above, please refer to the 9VAC25-890-1 or 9VAC25-870-10 of the Virginia Administrative Code.

2. Purpose

In the Phase I and Phase II Chesapeake Bay TMDL Watershed Implementation Plan ("WIP") for the Chesapeake Bay Total Maximum Daily Load ("TMDL"), the Commonwealth committed to a phased approach to reducing nutrients and suspended solids discharging from Municipal Separate Storm Sewer Systems ("MS4"). The Special Condition for the Chesapeake Bay TMDL ("Special Condition") in the General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (VAR04), effective July 1, 2013, and the eleven Phase I individual MS4 permits, as they are reissued, requires MS4 operators to develop a Chesapeake Bay TMDL Action Plan ("Action Plan") and submit it to the Virginia Department of Environmental Quality ("Department").

The Action Plan should provide a review of the current MS4 program, which demonstrates the permittee's ability to ensure compliance with the Special Condition and include the means and methods the permittee will use to meet 5.0% of the Level 2 (L2) scoping run reduction for existing development by the end of the first permit cycle as well as any reductions that may be required for new sources **initiating construction** between July 1, 2009 and June 30, 2014 and grandfathered projects that **initiate construction** after July 1, 2014. Level 2 implementation equates to an average reduction 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 beyond 2009 progress loads and beyond urban nutrient management reductions for pervious regulated acres.

The purpose of this guidance is to provide staff and permittees with methods for meeting the requirements of the Special Condition for the Chesapeake Bay TMDL and the WIP, with particular attention to the development of the Action Plan. It is intended to create consistency in reporting to the Department, as well as ensure that compliance and program evaluations are handled uniformly throughout the Commonwealth. This guidance is specific to the first reissuance of the Phase I MS4 permits since approval of the Chesapeake Bay TMDL and the 2013-2018 General Permit for Discharges of Stormwater from Small MS4s ("GP"). **If there are inconsistencies between the requirements described in this guidance document and the requirements in a permittee's individual permit, the individual permit is the controlling document. If additional guidance is needed concerning any inconsistencies, the permittee should contact the Department.**

The GP requires permittees to update their MS4 Program Plans to include the Action Plan no later than 24 months after permit coverage is initiated. Action Plans must be submitted with the Annual Report for the reporting period of July 1, 2014 through June 30, 2015 to the Department by October 1, 2015. Permittees regulated by a VPDES individual permit are required to modify their MS4 Program Plans to include the Action Plan and submit it to the Department in accordance with the schedule listed in the individual permit. The Action Plan becomes an enforceable part of the MS4 Program Plan unless specifically denied in writing by the Department within the time frame specified by the permit. Permittees may modify the Action Plans during the permit cycle to include new opportunities for reductions or address projects that are deemed infeasible. Any updates should be submitted to the Department in accordance with the Program Plan Modification section of the permit (GP Section II.F.1).

For reference, the Special Condition as found in 9VAC25-890-40.C of the General Permit is provided in *Appendix I* of this guidance document.

PART II – REQUIRED REDUCTIONS

The permittee's Action Plan should provide the Department with the means and methods that will be implemented to meet the POC reductions required by the end of the first permit cycle. To develop this plan, the permittee will first need to determine the reductions required for each POC. This section identifies the scope of those reductions based on the Special Condition requirements and indicates the steps permittees should follow when delineating the extent of their MS4 system.

NOTE: As discussed below, existing sources ("pervious or impervious land uses served by the MS4 as of June 30, 2009") are subject to GP Section I.C.2.a.(6). New Sources ("pervious and impervious urban land uses served by the MS4 developed or redeveloped on or after July 1, 2009") are subject to GP Section I.C.2.a.(3). There are no additional reductions required for projects subject to GP Section I.C.2.a.(3), but the permit requires that permittees address the "means and methods that will be utilized to address discharges into the MS4 from new sources." Please see *Part VI* of the guidance for additional information concerning the Department's expectations for meeting GP Section I.C.2.a.(3). Additionally, if projects meet the requirements for GP Section I.C.2.a.(7) or GP Section I.C.2.a.(8) additional reductions are required. For a more detailed description of when additional reductions are necessary under Special Condition 7 and Special Condition 8, see *Appendix II*.

Please see *Appendix III* for additional clarification about which permit requirement applies to a given project.

1. Scope of Reductions Required by the Permit

Existing Development (GP Section I.C.2.a.(6))
The permit requires permittees to reduce 5.0% of the L2 Scoping Run POC reductions required for existing sources as of June 30, 2009. During the first permit cycle, Phase II permittees do not need to account for the expanded urbanized areas that were identified as a result of the 2010 US Census. However, permittees should begin to plan for those areas and will need to include them in the updated draft Action Plan that must accompany the application for reissuance of the permit. The full 40% POC reductions for those "expanded areas" are required by the end of the second permit cycle.

For newly designated Phase II permittees that were required to obtain a permit as a result of the 2010 Census, all regulated lands should be treated as "expanded areas." That means those permittees are not required to implement any BMPs during the first permit cycle. However, the full 40% POC reductions must be met on all regulated lands by the end of the second permit cycle.

New Sources with an Impervious Land Cover Condition Greater than 16% for the design of post-development stormwater management facilities (*GP Section I.C.2.a.(7))*
If a "new source," where construction was initiated between July 1, 2009 and June 30, 2014, meets an average impervious land cover condition of 16% or less for the design of post development stormwater management facilities no additional offsets are required under the Special Condition beyond those required for existing conditions (GP Section I.C.2.a.(6)). If the permittee has adopted an average impervious land cover condition that is greater than 16% or has a "fee-in-lieu of" or similar program that has allowed projects to be built at an average land cover condition greater than 16% for the design of post development stormwater management facilities, those projects may be subject to additional reductions under Special Condition Requirement 7 (GP Section I.C.2.a.(7)) if they disturb one acre or greater. For a more detailed description of when additional reductions are necessary under Special Condition 7, see *Appendix II*.

For accounting consistency, and in accordance with the permit language, permittees that adopted an established land cover condition greater than 16% should use the simple method to determine the excess TP that needs to be offset for projects subject to Special Condition 7. Table 4 in the permit should be used to determine the equivalent required load reductions necessary for TN and TSS. The loading rates from *Tables 2a-d* and *Tables 3a-d may not* be used for site by site calculations to determine the reductions required under Special Condition 7. An example of how these calculations should be performed on a site by site basis is provided in *Appendix II, Example II.1*.

Permittees that adopted a "fee-in-lieu of" or similar program may have sites throughout their service area with variable final land cover conditions that may or may not have been offset through the implementation of BMPs. The Department acknowledges that it may represent a substantial burden to these permittees to determine reductions from these projects on a site by site basis. To simplify the accounting process, an aggregate accounting approach may be used. Aggregate accounting may be done by tracking the land use change on all regulated land between July 1, 2009 and June 30, 2014 to determine the increased loads that were not treated and must be addressed under Special Condition 7. To use the loading rates in Table 3a-d for this purpose, the aggregate approach must be applied to a permittee's entire service area. Permittees should note that using an aggregate approach may capture lands beyond those that fall under this requirement (i.e. lands less than an acre, lands that have an average impervious land use cover less than 16%).

The permittee should choose the most appropriate approach taking into consideration the (1) amount of development that must be accounted for throughout the regulated area, (2) the resources required to perform these calculations on a site by site basis, and (3) the quality of development records available to the permittee.

Grandfathered Projects with an Impervious Land Cover Condition Greater than 16% for the design of post-development stormwater management facilities (*GP Section I.C.2.a.(8))*
The permit also requires permittees to offset any increase in POC from grandfathered projects (as defined in 9VAC 25-870-48) that disturb one acre or greater and have an impervious land cover condition greater than 16% for the design of post-development stormwater management facilities. Those increases should be offset prior to the completion of the grandfathered projects in accordance with GP Section I.C.3.c. Since the increased loads must be entirely offset prior to completion of the project, these projects must be accounted for on a site by site basis. Permittees should use the simple method, in conjunction with permit *Table 4*, to calculate the additional load reductions required under Special Condition 8. The loading rates from permit *Tables 2a-d* and *Tables 3a-d* should not be used to calculate the load reductions required on a site by site basis. For a more detailed description of when additional reductions are required under Special Condition Requirement 8 (GP Section I.C.2.a.(8)), see *Appendix II*.

NOTE: Permittees are not required to offset increased POC from grandfathered sources until construction on those sites is completed and are not required to plan for those reductions until construction is initiated. Therefore, to meet Special Condition 8, permittees should address the offset of any grandfathered projects initiated between July 1, 2014 and Action Plan submission as part of the first Action Plan. Permittees should address reductions for grandfathered projects that initiate construction after the initial Action Plan submission in the Chesapeake Bay TMDL Action Plan section of future annual reports submitted for the reporting period in which the grandfathered construction began. Permittees will still need to develop a list of future projects and associated acreage in accordance with Special Condition 10. That list should serve as an estimate of the projects the permittee anticipates will need to be addressed to meet Special Condition 8.

2. Calculating Reductions for this Permit Cycle

Permittees should use the appropriate basin values provided in the permit to estimate the pollutant source loads as of June 30, 2009 and calculate the pollutant reductions necessary to meet the permit requirements. In order to estimate these reductions, as well as calculate how the required reductions will be met, permittees will first need to estimate:

1. The size and extent of their regulated MS4 system as of June 30, 2009; and
2. The total regulated acres of urban pervious and urban impervious surface served by the MS4 as of June 30, 2009.

If there is incomplete data concerning either the extent of the MS4 system or the number of pervious and impervious acres served, permittees should use their best professional judgment to make the best estimates possible. Diagrams have been included in *Appendix IV* to illustrate some of the potential delineation issues discussed in this section.

Size and Extent of the MS4

When estimating the size of the MS4 system, the permittee should not include in its service area the conveyances and drainage area that are regulated by a separate MS4 permit. For permittees that have interconnected systems, MOUs should be considered as a method to clearly differentiate which operator is responsible for which part of the system. For this permit cycle, permittees may also exclude from their regulated urban impervious and regulated urban pervious cover calculations:

1. Land regulated under any General VPDES permit that addresses industrial stormwater, including the General VPDES Permit for Stormwater Associated with Industrial Activity (VAR05), the General VPDES Permit for Concrete Products Facilities (VAG11), and the Nonmetallic Mineral Processing General Permit (VAR84);
2. Lands regulated under an individual VPDES permit for industrial stormwater discharges;
3. Forested Lands[1];
4. Agricultural Lands;
5. Wetlands; and,
6. Open Waters.

Permittees should clearly document the areas within their jurisdiction that are not included in their regulated acres so the Department is able to verify an appropriate methodology was used. Permittees are encouraged to provide maps depicting the MS4 boundaries, lands served by the MS4, and any lands that the permittee has excluded as allowed above.

For Phase II permittees, the Census designated urbanized areas and jurisdictional boundaries may be used as a conservative estimate of the area the MS4 serves. It is expected that this data will be refined as the permittee completes the mapping exercise required in Section II B.3.a.(3) of the General Permit. Again, any expanded areas that resulted from the 2010 U.S. Census are not required to be included in the first permit cycle reductions, and Phase II permittees that were identified and designated as a result of the 2010 Census are not required to implement BMPs until the second permit cycle. By the end of the next permit cycle these permittees are expected to achieve the full 40% of the L2 scoping run reductions for existing sources in the expanded areas and should plan accordingly. Where data is unavailable or

[1] For the purpose of service area delineation and the land use change BMP "forested" lands must meet the tree density requirements described in Appendix V.H, be undeveloped, and be a minimum of 30m x 30m (900 m^2) contiguous. This minimum threshold is based on the resolution of the Bay Program Model. These minimum requirements do not apply to the forest buffer BMP.

boundaries are unclear, the permittee will need to exercise its best professional judgment in determining the boundaries and service area of its MS4.

Mapping Tools

To estimate the regulated urban impervious and regulated urban pervious acres served by the MS4 as of June 30, 2009 the Department strongly encourages permittees to use the best GIS resources available. In all cases, permittees should use their best professional judgment and the best available data to estimate the number of regulated urban pervious and regulated urban impervious acres served by their MS4 system. Permittees should include a summary of the methodology that was used to estimate the regulated urban impervious acres and regulated urban pervious acres as part of their Action Plan so the Department is able to verify an appropriate method was used.

Base aerial imagery is available to permittees through the Virginia Base Mapping Program, which is administered by the Virginia Geographic Information Network (VGIN). These images can be viewed free of charge using the VEGIS viewer at: http://www.deq.virginia.gov/mapper_ext/default.aspx?service=public/wimby or through VGIN's website. Permittees may use the "Most Recent Imagery" map available through the Virginia GIS Clearinghouse at: http://vgin.maps.arcgis.com/home/ to estimate the amount of pervious and impervious surface in their MS4. This map is a composite of two images that can be accessed separately through this webpage: http://gismaps.vita.virginia.gov/arcgis/rest/services. For Action Plan development permittees may use the "VBMP2009" and "VBMP2011" links. "VBMP2009" contains information for the eastern half of the state, while "VBMP2011" is the most applicable map of the western half of the state. This imagery is provided at 1'X1' resolution, which is the image and analytical resolution the Department recommends permittees use.

Permit Tables – Reductions for Existing Conditions

Once the regulated urban pervious acres and regulated urban impervious acres are estimated, the permittee can calculate the existing source loads for the pollutants of concern. If a permittee has lands that were under construction as of June 30, 2009 the Department recommends the permittee use the pre-construction land use as the baseline.[2] If a permittee's MS4 system discharges to multiple river basins, the permittee will need to calculate pollutant loads and load reductions for each basin to which the MS4 discharges. The first set of tables (*Tables 2a-d*) in the Special Condition provides an estimate of the total pollutant loads entering the applicable river basin based on the June 30, 2009 progress run. Using these values, permittees can determine the reductions required during this permit cycle.

NOTE: It has been brought to the Department's attention that the "first permit cycle required reduction loading rates" presented in the *Tables 3a-d* may result in lbs/yr POC required reduction values that are not 5% of the LT reductions due to an issue with insufficient significant figures. If permittees submit Action Plans that meet reductions requirements calculated using the values in *Tables 3a-d* of the permit that will be acceptable. However, permittees are encouraged, if possible, to use the following, more accurate, values instead:

[2] Once construction is completed, these lands should be considered "new sources" subject to GP Section I.C.2.a.(3)

James River Basin

Subsource	Pollutant	Current Table Loading Rate	Corrected Loading Rate
Regulated Urban Impervious	Nitrogen	.04	.042255
Regulated Urban Pervious		.02	.02097
Regulated Urban Impervious	Phosphorous	.01	.01408
Regulated Urban Pervious		.002	.0018125
Regulated Urban Impervious	Total Suspended Solids	6.67	6.7694
Regulated Urban Pervious		.44	.442225

Potomac River Basin

Subsource	Pollutant	Current Loading Rate	Corrected Loading Rate
Regulated Urban Impervious	Nitrogen	.08	.07587
Regulated Urban Pervious		.03	.03021
Regulated Urban Impervious	Phosphorous	.01	.01296
Regulated Urban Pervious		.001	.00148625
Regulated Urban Impervious	Total Suspended Solids	11.71	11.7132
Regulated Urban Pervious		.77	.769125

Rappahannock River Basin

Subsource	Pollutant	Current Loading Rate	Corrected Loading Rate
Regulated Urban Impervious	Nitrogen	.04	.04221
Regulated Urban Pervious		.02	.01602
Regulated Urban Impervious	Phosphorous	.01	.01128
Regulated Urban Pervious		.002	.0013775
Regulated Urban Impervious	Total Suspended Solids	4.24	4.2397
Regulated Urban Pervious		.25	.24504375

York River Basin

Subsource	Pollutant	Current Loading Rate	Corrected Loading Rate
Regulated Urban Impervious	Nitrogen	.03	.032895
Regulated Urban Pervious		.02	.02295
Regulated Urban Impervious	Phosphorous	.01	.01208
Regulated Urban Pervious		.002	.00184875
Regulated Urban Impervious	Total Suspended Solids	4.60	4.5668
Regulated Urban Pervious		.32	.3184125

Only one set of values should be used for the loading rate calculations and the loading rates that are used should be identified in the Action Plan. For reporting, permittees should round the calculated pounds of reductions required during the first permit cycle to the nearest hundredth.

PART III – ELIGIBLE BMPS AND CREDIT OPPORTUNITIES[3]

To meet the reduction requirements for this permit cycle, permittees should implement BMPs that are in the Virginia Stormwater BMP Clearinghouse (*Appendix V.A*) or have been approved by the Chesapeake Bay Program ("Bay Program") (*Appendices V.B-V.K)*. As BMPs are approved by the Bay Program during the permit cycle, they may also be used to meet the implementation requirements of this permit. Permittees are encouraged to work with the Department throughout Action Plan development, including submitting draft plans for review.

The means and methods provided to the Department must show that, based on the information available at the time the Action Plan is submitted, the BMPs implemented by the permittee will meet the reductions required by the Special Condition for the Chesapeake Bay TMDL for this permit cycle. Implementation of the BMPs in the permittee's approved Action Plan will demonstrate compliance with the reduction requirements for this permit cycle regardless of efficiency changes that may occur after the Action Plan is submitted. After the Action Plan is submitted any changes in established efficiencies will not be retroactively applied to projects approved to meet reductions for this permit cycle. The same credit guarantee will apply to any BMP included in the second Action Plan that has had, at a minimum, funds approved as part of an adopted Capital Improvement Plan, or an equivalent funding plan for state and federal facilities, at the time the application for permit reissuance is submitted. Likewise, if the BMPs included in the initial Action Plan result in reductions beyond the required 5% those reductions will also be guaranteed at the efficiencies available at the time the Action Plan is submitted. For instance, if a permittee's initial Action Plan includes BMPs that result in a 7% reduction in TN and those BMPs are implemented, the permittee will need to reduce an additional 33% TN during the next permit cycle, not an additional 35%, to meet the reduction requirements for the second permit cycle.

Permittees should submit supporting documentation with the application for permit reissuance and the subsequent Action Plan that lists the projects that have not been implemented, but have met this financing requirement. If funds have not been approved for a BMP prior to submission of the second Action Plan, the permittee will need to recalculate reductions from those BMPs based on the most up to date efficiencies. For planning purposes, when multiple reduction efficiencies are available through Bay Program BMPs, expert panel reports, or other sources, the permittee is encouraged to use the most conservative efficiency values

Permittees should also note that projects may require local, state, or federal permits such as the General Permit for Discharges of Stormwater from Construction Activities or Virginia Water Protection Permits and this should be taken into account as BMPs are selected. **NOTE: If a permittee has been awarded a grant for reductions based on efficiencies that are revised prior to submittal of the Action Plan, the award will not be revoked or altered due to these circumstances. However, to meet the Special Condition, permittees will need to recalculate the reductions from those BMPs based on the most up-to-date efficiencies at the time the Action Plan is submitted. The Department's review of nutrient and sediment reductions included in the Action Plan is independent of the review of any previous grant applications for a given BMP.**

[3] This guidance focuses solely on urban BMPs. If there are other types of land that are within a permittee's service area and/or that drain to the permittee's system, the permittee should refer to the Bay Program's guidance for applicable BMPs to reduce pollutant loads. The application of these BMPs for credit will be reviewed on a case by case basis.

1. Calculating Credits

Estimating the pollutant reductions provided by a BMP is primarily a two-step process. First, the permittee should calculate the pollutant load draining to the BMP. Second, the reductions created by a BMP should be applied to that calculated load (for most structural BMPs this will be a percent efficiency). The result is the POC load reduced. Depending on the BMP installed this procedure may vary slightly. More detailed information concerning how to perform calculations for accepted BMPs can be found in *Appendix V*. **Permittees should submit their BMP data with their Annual Report using the spreadsheet provided on DEQ's website.**

Permittees should not use the loading rates in Tables 2a-d of the permit to calculate the pollutant loads draining to a BMP if those loads are from (1) forested lands or (2) agricultural lands. If a permittee has identified forested or agricultural acres that drain to a BMP, the permittee may receive credit for load reductions from those lands, regardless of whether or not they have been included in the initial service area delineation. However, it is not appropriate to use the loading rates found in the permit tables for these land uses. For forested lands, permittees should use the following loading rates:

Table III.1 - Forested loading rates by basin:

River Basin	TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS (lbs/ac/yr)
James	2.36	0.13	77.38
Potomac	5.29	0.13	79.91
Rappahannock	4.03	0.13	57.35
York	2.13	0.07	27.61

Due to the variability of agricultural lands, it is not appropriate to use a single set of loading rates for pollutants loads from these lands. If permittees have or plan to install BMPs that receive drainage from agricultural lands, the Department should be contacted for the appropriate loading rates.

Permittees may receive credit for:

1. *Structural BMPs* –To calculate the credits generated by structural BMPs, the permittees may use, as applicable, (1) the efficiencies in the Virginia Stormwater BMP Clearinghouse (*Appendix V.A*), (2) the retrofit performance curves provided by the Bay Program (*Appendix V.B*), or (3) the approved or interim Bay Program efficiencies (*Appendix V.C*). Permittees may also receive credit for BMP Enhancements, Conversions, and/or Restoration (*Appendix V.D*) or BMPs that were installed to meet development requirements, but exceed those requirements and any applicable state standards (*Appendix V.E)*. The impact of treatment trains should also be considered by permittees (*Appendix V.F*).
2. *Land Use Change* – To calculate the credits generated by a land use change, permittees should use the conversion factors presented in *Appendix V.H*. Conversions to forested land will only be credited at areas greater than 30m x 30m (900m^2). In addition to the Land Use Change Credit, permittees may receive an efficiency credit for Forest Buffers which is explained in greater detail in *Appendix V.I*.
3. *Urban Stream Restoration* – There are five methodologies permittees may use to calculate reductions from Urban Stream Restoration (*Appendix V.J)*. In accordance with GP Section I.C.2.b.(1) any BMPs implemented on unregulated lands must exceed baseline reductions. In accordance with GP Section I.C.2.b, the credit for stream restoration projects must be adjusted to account for the baseline reduction required on the unregulated land draining to the restored stream.

4. *Urban Nutrient Management ("UNM")* – Permittees may receive credit for UNM plans that are developed for unregulated land, public lands one contiguous acre or less[4], and/or privately owned lands that are not golf courses where nutrients are applied. The recommended method for calculating reductions for Urban Nutrient Management is described in *Appendix V.K*.
5. *Nutrient Trading* – Permittees may utilize the DEQ nutrient trading or offset program in accordance with § 62.1-44.19:21.A of the Code of Virginia, governing trading and offsetting. Regulations concerning certification of non-point source nutrient trading along with additional guidance are forthcoming.
6. *Redevelopment* – Permittees may receive credit for redevelopment projects if the calculated pollutant load for the land cover condition prior to redevelopment is reduced (*Appendix V.L*). **NOTE:** Additional nutrient reductions beyond the VSMP requirements are also potentially creditable through the DEQ nutrient trading program; however, the MS4 permittee and land owner may not both take credit for the reductions. Reduction calculations for individual BMPs implemented on redeveloped land should be performed in the same manner as BMPs applied to existing development. Permittees may use the approved site development plans to determine the POC reductions from these projects.

Permittees may submit alternate POC reduction methods, which the Department will review on a case by case basis. The Department has developed guidance for the approval of Manufactured Treatment Devices ("MTD") that permittees may find useful. This guidance can be found on DEQ's website at: http://www.deq.virginia.gov/Portals/0/DEQ/Water/Guidance/142009.pdf. Currently, the MTD approval process only certifies a practice's TP reductions. Permittees should use the Bay Program curves and/or efficiencies to calculate reductions for TN and TSS if there is an analogous BMP. If there is not an analogous Bay Program BMP for an approved MTD, the Department will consider TN and TSS credits for those BMPs on a case-by-case basis.

2. Calculating Credits for BMPs Implemented on Unregulated Lands[5]

In accordance with GP Section I.C.2.b.(1) permittees may receive credit for BMPs implemented on unregulated land provided any necessary baseline is met first. Depending on the BMP type, baseline means:

1. *Baseline for Structural BMPs* **–** The baseline for structural BMPs is intended to be consistent with the nutrient trading regulations. In accordance with §62.1-44.19:21 of the Code of Virginia, baseline for urban practices from new development shall be in compliance with post-construction nutrient loading requirements of the Virginia Stormwater Management Program regulations, which has been set at 0.45 lbs TP/acre/year for practices installed between July 1, 2009 and June 30, 2014 and 0.41 lbs TP/acre/year for projects installed after July 1, 2014. Any POC reductions beyond these values may contribute to the reductions required by the Special Condition. Associated TN and TSS load reductions for BMPs implemented to treat unregulated land should be calculated on a BMP by BMP basis.
2. *Baseline for Stream Restoration* **–** Permittees may receive full credit for the proportion of regulated urban land that drains to a stream restoration project and an adjusted credit for the proportion of unregulated urban land that drains to the stream restoration project. There is no

[4] Permittees may not receive credit for UNM plans developed on "lands owned or operated by the MS4 operator where nutrients are applied to a contiguous area of more than one acre" because those plans are an existing permit requirement (GP Section II.B.6.c) and are assumed reductions in the WIP.
[5] If the BMP was funded by a 319 nonpoint source grant, it may be contrary to the funding award to seek credit towards required reductions under the Special Condition.

baseline that must be met for any forested or agricultural lands that drain to the project. The credit for unregulated land must account for baseline reductions required by the TMDL and WIP. The method permittees should use to calculate baseline for these practices is provided in *Appendix V.J*.

3. *Baseline for Urban Nutrient Management* **–** Baseline for urban nutrient management is based on the commitments the Commonwealth made in the WIP, which calls for Nutrient Management Plans ("NMP"s) on 48% of urban pervious lands. If permittees develop NMPs for either public or privately owned lands (except golf courses) that fall outside of the regulated MS4 service area, the permittee may take credit for the lbs/TN and lbs/TP addressed in the plan minus the 48% required by the WIP. See *Appendix V.K* for additional information.

3. BMPs Installed to meet Development or Redevelopment Requirements

In general, permittees may not receive credit towards the reductions that are required under GP Section I.C.2.a.(6) or may be required under GP Section I.C.2.a.(7) and/or GP Section I.C.2.a.(8) for BMPs installed after July 1, 2009 that were implemented to meet the minimum VSMP technical criteria phosphorous removal requirement (9VAC25-870 Part II B or Part II C) for new development or other minimum regulatory requirements. However, permittees may receive credit for these BMPs under the following circumstances:

1. *Redevelopment* **–** As is mentioned throughout this document permittees may receive credit for pollutant *reductions* as the result of a redevelopment project, regardless of the initial land cover condition of the site. This applies to any redevelopment project completed after July 1, 2009.
2. *Stricter Development Requirements* **–** Permittees may have enacted development requirements that were stricter than the state standards, such as adopted an average land cover condition less than 16% for the design of post-development stormwater management facilities or required the implementation of stormwater management facilities for projects that disturb less than an acre. Any BMPs installed to meet these stricter standards after July 1, 2009 (or any BMP capacity that exceeds the state standards and/or average land cover condition) may be counted towards the reductions required under Special Condition 6, 7, and/or 8. **NOTE:** Permittees subject to the Chesapeake Bay Preservation Act may not receive credit for BMPs installed to meet those requirements. It is assumed that these BMPs will be installed as a method for maintaining baseline conditions and do not result in an additional load reduction.
3. *Oversized BMPs* **–** If an oversized BMP is installed and the excess capacity has not been utilized to offset additional development, permittees may use that capacity to meet the POC reductions required under the TMDL. If permittees choose to use the remaining BMP capacity to meet their TMDL requirements that capacity cannot be used to meet other regulatory requirements for future development. Please see *Appendix V.E* for additional information concerning the appropriate methods that should be used to calculate reductions from these BMPs.

4. Credit for BMPs and Impoundments Initially Installed Prior to July 1, 2009

The Department has revised the crediting procedure for BMPs and impoundments that were initially installed prior to July 1, 2009. This was done to ensure that the guidance is internally consistent, as well as to improve consistency with the Bay Program's *Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects* and simplify the crediting process. Please see *Part IV.2* and *Appendix VI* for additional information on this subject.

PART IV – REPORTING CONTROL MEASURES

1. Implementation for this Permit Cycle

For all BMPs that are implemented to meet the Special Condition requirements, **the permittee should report BMP information in accordance with Section I.C.4 of the General Permit using the spreadsheet developed by the Department**. When submitting this information with the appropriate Annual Report, permittees should designate which BMPs were employed to meet the Chesapeake Bay TMDL POC load reductions.

The method permittees use to estimate the acres treated by each BMP depends on the retrofit. *Appendix VII* provides guidelines for how the acres treated should be considered for each BMP type. In addition to the information required in Section I.C.4 of the General Permit, the permittees should submit calculation information (i.e. the method that is used) for the BMPs that are planned and implemented. This will ensure that the Department can verify the permittee will meet the POC reductions required by the permit.

2. Historical Data

The Department strongly encourages permittees to submit historical data for water quality BMPs installed prior to June 30, 2013.[6] This historical information should include water quality BMPs implemented throughout the permittee's jurisdiction, not just those BMPs implemented in the permittee's regulated service area. If this historical data is provided to the Department by September 1, 2015[7] using the spreadsheet provided on DEQ's MS4 website, permittees will receive full credit for BMPs that were:

1. initially installed on or after January 1, 2006 and prior to July 1, 2009, and;
2. constructed to address water quality within the permittee's regulated service area.

To receive credit for previously unreported BMPs installed on or after January 1, 2006 and prior to July 1, 2009, permittees will need to include the following in their Action Plan:

1. An affirmative statement that a complete list, to the maximum extent practicable, of historical BMPs was or will be submitted to the Department by September 1, 2015. Permittees may submit this data as part of the "Historical Data Clean-Up" effort that is currently ongoing.
2. Appropriate calculations for the BMPs that the permittee is claiming for credit towards its required POC load reductions.

Eligible unreported BMPs must be submitted for credit as part of the permittee's first Chesapeake Bay TMDL Action Plan. Permittees will not receive credit for previously unreported BMPs that are submitted as a component of the second phase and/or third phase Chesapeake Bay TMDL Action Plan.

[6] A more accurate accounting of the permittee's historical BMPs will allow the Bay Program to better refine its load allocations for Virginia in the next phase of the Bay Program Model. If the Department does not receive data from permittees about existing BMPs, no data will be reported to the Bay Program on behalf of that MS4. This may have a direct impact on the permittee's pollutant reduction requirements in subsequent permits.

[7] The Department must receive historical BMPs by this date for inclusion in the Phase 6 Chesapeake Bay Model.

PART V – APPLICATION FOR PERMIT REISSUANCE REQUIREMENTS

As part of the application for permit reissuance, the permittee will need to estimate the POC reductions that will be required for the next permit cycle in accordance with Section I.C.5.b of the General Permit. With the exception of those BMPs that meet the credit guarantee requirements in Part III of this guidance, calculations for BMPs proposed as part of the draft second phase Chesapeake Bay TMDL Action Plan should be developed using the most recently approved BMP efficiencies and crediting protocols available at the time of draft plan submission.

The purpose of the requirements in Section I.C.5.b is to ensure the full 40% reductions are achieved for existing development, expanded Urban Areas designated in the 2010 Census, and new sources developed between 2009 and 2014 for which the land cover condition was greater than 16% impervious for the design of post-development stormwater management facilities.

PART VI – CHESAPEAKE BAY TMDL ACTION PLAN ELEMENTS

This section describes the required and suggested elements that should be included in the Chesapeake Bay TMDL Action Plan to ensure it is approvable. Providing this information as described in this guidance document should ensure consistency in reporting as well as the Action Plan review process. The Action Plan should allow the Department to verify that the permittee will be able to meet the requirements for the Special Condition for the Chesapeake Bay by the end of the first permit cycle.

The Action Plan should include sufficient supporting material to show that the permittee has:

1. Calculated the full scope of offsets for existing development and new sources that are required to be made by the end of the first permit cycle (See *Part II*, *Appendix II*, and *Appendix III*); and,
2. Determined the methods that will be used to meet the reductions required by the end of the first permit cycle (See *Part III* and *Appendix V*)

In addition to this, the permit requires that the Action Plan also include:

1. A review of the current MS4 permit authority and implementation capabilities,
2. Existing, new, and modified legal authorities necessary to meet required reductions;
3. An estimate of future grandfathered projects and their acreage;
4. Expected costs for implementing the Action Plan; and,
5. A public comment process and period.

The references in this section refer to the General Permit requirements which can be found in *Appendix I*. The majority of requirements in the Phase I Permits' Special Condition are the same as those in the General Permit. Note that the Phase I Individual Permits include a more extensive "Public Comments" requirement (section 10.a and 10.b below).

For existing Phase II permittees, the Action Plans must be completed no later than 24 months after permit coverage and submitted to the Department with the appropriate Annual Report. For permittees covered by the GP, the submitted Action Plan becomes effective and enforceable 90 days after the date received by the Department unless specifically denied in writing by the Department in accordance with Section I.C.2.a of the General Permit. Permittees covered by individual permits must follow the schedule in their permit. Permittees with individual permits must receive an affirmative response from the Department before their Action Plans become enforceable.

Permit Requirements

1. Current program and existing legal authority (*General Permit Section I.C.2.a.(1)*)
A review of the current MS4 program implemented as a requirement of this state permit including a review of the existing legal authorities and the operator's ability to ensure compliance with this special condition;

Permittees should include by reference the components of their current MS4 program, or other relevant legal authorities, that will be used to meet the Special Condition. This should include a list of the relevant existing legal authorities (i.e. ordinances, permits, orders, contracts, inter-jurisdictional agreements, and/or other enforceable mechanisms).

2. New or modified legal authority (*General Permit Section I.C.2.a.(2)*)
The identification of any new or modified legal authorities such as ordinances, state and other permits, orders, specific contract language, and interjurisdictional agreements implemented or needing to be implemented to meet the requirements of this special condition;

New or modified legal authorities that were or will be developed to comply with the Special Condition should be listed. The list should include either (1) why the legal authority was or will be developed or (2) why the existing legal authority needs to be modified. If no new legal authorities are required for permit compliance that should be stated in the Action Plan.

3. Means and methods to address discharges from new sources *(General Permit Section I.C.2.a.(3)*)
The means and methods that will be utilized to address discharges into the MS4 from new sources;

"New Sources" means pervious and impervious urban land uses served by the MS4 developed or redeveloped on or after July 1, 2009. This Special Condition requirement applies to all new sources that require post-development stormwater runoff control, as described in GP Section II.B.5.a.

If the new source disturbs 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 permittee should see *Part VI.6*, *Part VI.7,* and *Appendix II* of this guidance. Additional offsets may be necessary. If the new source does not utilize an average impervious land cover condition greater than 16% for the design of post development stormwater management facilities no additional offsets are required under the Special Condition beyond those for existing development. Similarly, if a new source disturbs less than 1 acre, no additional offsets are required under the Special Condition beyond those for existing development.

The permittee may fulfill this requirement with a short narrative describing the programmatic tools the permittee uses to address new sources, such as adherence to the VSMP regulations for the implementation of post-development stormwater management facilities or a description of more stringent local requirements if applicable.

4. Estimated existing source loads and calculated total pollutant of concern (POC) required reductions *(General Permit Section I.C.2.a.(4) and (General Permit Section I.C.2.a.(5)*)
An estimate of the annual POC loads discharged from the existing sources as of June 30, 2009, based on the 2009 progress run. The operator shall utilize the applicable [Table/Tables] in this section based on the river basin to which the MS4 discharges by multiplying the total existing acres served by the MS4 on June 30, 2009, and the 2009 Edge of Stream (EOS) loading rate;

A determination of the total pollutant load reductions necessary to reduce the annual POC loads from existing sources utilizing the applicable [Table/Tables] in this section based on the river basin to which the MS4 discharges. This shall be calculated by multiplying the total existing acres served by the MS4 by the first permit cycle required reduction in loading rate. For the purposes of this determination, the operator shall utilize those existing acres identified by the 2000 U.S. Census Bureau urbanized area and served by the MS4.[8]

[8] This last sentence applies to Phase II MS4s only.

The POC loads and required reductions should be calculated using the tools described in this guidance document. The permittee should, at a minimum, provide a summary describing how pervious and impervious surface for the MS4 was estimated (e.g. the GIS resources that were used). The Department will need this information to verify that the method used is acceptable. Please see *Part II.2* for additional guidance concerning the delineation of these areas.

Completed calculation tables (either the values in Table3a-d of the permit or the corrected values in *Part II* of this document) should be submitted.

5. Means and methods to meet the required reductions and schedule *(General Permit Section I.C.2.a.(6)*)

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

This section should list the management practices and retrofit programs (including improvements from redevelopment) that have or will be implemented between July 1, 2009 and the end of the first permit cycle to achieve the 5.0% reductions required for existing development. The permittee should support its plan with calculations that show how the reductions will be met. Any credit trading that is used to meet reductions should also be described.

Permittees are encouraged to submit this information in an electronic spreadsheet with a summary page that serves as a ledger showing:

- the total reductions required;
- each practice that will be implemented;
- the approximate location of the project, and;
- the load that will be reduced by each project.

Permittees should **not** submit full plans and specs for individual BMPs as part of the Action Plan. However, plans and specs should be available to the Department upon request as they are developed.

The schedule should include estimates of when new management practices will be initiated, when BMP construction will begin, and when BMP installation is expected to be completed. These estimates can be provided as the annual benchmarks required by the permit. For BMPs that have already been implemented at the time the Action Plan is submitted, the permittee should indicate when they were installed.

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 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 the [applicable table] in this section to develop the equivalent pollutant load for nitrogen and total suspended solids. The operator shall offset 5.0% of the calculated increased load from these new sources during the permit cycle.

Permittees may account for these additional offsets on a site by site basis, but the Department recommends taking an aggregate approach to demonstrate compliance with this Special Condition requirement. At a minimum permittees should provide (1) the total additional POC loads created by "new sources" and (2) the 5.0% of those loads permittees must offset by the end of this permit cycle. The BMPs that will be implemented to address them should also be included. See *Appendix II* of this guidance for more information.

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)*)

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

Increases in the POC load from grandfathered projects **initiating** construction after July 1, 2014, must be offset prior to completion of the project, in accordance with GP Section I.C.3.c. Permittees should include an estimate of the number of acres impacted by grandfathered projects, which will be used to estimate the pollutant loadings created by these projects. This estimate can be provided as an aggregate. The best available data should be used, but where data is unavailable permittees should use their best professional judgment. The strategies that will be used to address this type of development, including any nutrient trading, should also be included in the Action Plan.

8. A list of future projects, and associated acreage that qualify as grandfathered (*General Permit Section I.C.2.a.(10)*)

A list of future projects and associated acreage that qualify as grandfathered in accordance with 9VAC25-870-48

To fulfill this requirement, permittees should list projects that have been approved or have an obligation of locality, state, or federal funding prior to July 1, 2012, but have not received coverage under the General Permit for Discharges of Stormwater from Construction Activities prior to July 1, 2014. This permit requirement applies solely to new development, not redevelopment projects.

9. An estimate of the expected cost to implement the necessary reductions (*General Permit Section I.C.2.a.(11)*)

An estimate of the expected costs to implement the requirements of this special condition during the state permit cycle;

This estimate should cover the expected cost to the permittee. Permittees should have a strategy in place to achieve the (1) 5.0% reductions for the existing sources, (2) 5.0% reductions for the new sources that disturb one acre or greater and have an average impervious land cover condition greater than 16% for the design of post-development stormwater management facilities, and (3) any offsets for grandfathered projects that disturb one acre or greater and have an average impervious land cover condition greater than 16% for the design of post-development stormwater management facilities for this permit cycle. Permittees should also begin to plan for the full reductions that will be required by the end of three permit cycles. Permittees are encouraged to be as detailed as possible as this information will be reviewed by the state when it reevaluates the amount of funding that will be available to aid localities with their programs.

10.a Public comments on draft Action Plan (GENERAL PERMIT REQUIREMENTS)

(General Permit Section I.C.2.a.(12))

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

The public comment process and period should be described, including how the process was advertised to the public.

10.b Public comments on draft Action Plan (PHASE I PERMIT REQUIREMENTS)

An opportunity for receipt and consideration of public comment on the draft Chesapeake Bay TMDL Action Plan; and, a list of all comments received as a result of public comment and any modifications made to the draft Chesapeake Bay TMDL Action Plan as a result of the public comments.

The public comment process and period should be described, including how the process was advertised to the public**.** The list should include comments received and the permittee's response to public comments.

APPENDIX I

Special condition for the Chesapeake Bay TMDL from the General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems

C. Special condition for the Chesapeake Bay TMDL. The Commonwealth in its Phase I and Phase II Chesapeake Bay TMDL Watershed Implementation Plans (WIP) committed to a phased approach for MS4s, affording MS4 operators up to three full five-year permit cycles to implement necessary reductions. This permit is consistent with the Chesapeake Bay TMDL and the Virginia Phase I and II WIPs to meet the Level 2 (L2) scoping run for existing developed lands as it represents an implementation of 5.0% of L2 as specified in the 2010 Phase I WIP. Conditions of future permits will be consistent with the TMDL or WIP conditions in place at the time of permit issuance.

1. Definitions. The following definitions apply to this state permit for the purpose of the special condition for discharges in the Chesapeake Bay Watershed:

"Existing sources" means pervious and impervious urban land uses served by the MS4 as of June 30, 2009.

"New sources" means pervious and impervious urban land uses served by the MS4 developed or redeveloped on or after July 1, 2009.

"Pollutants of concern" or "POC" means total nitrogen, total phosphorous, and total suspended solids.

"Transitional sources" means regulated land disturbing activities that are temporary in nature and discharge through the MS4.

2. Chesapeake Bay TMDL planning.

a. In accordance with Table 1[9] in this section, the operator shall develop and submit to the department for its review and acceptance an approvable Chesapeake Bay TMDL Action Plan. Unless specifically denied in writing by the department, this plan becomes effective and enforceable 90 days after the date received by the department. The plan shall include:

(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) The identification of any new 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) The means and methods that will be utilized to address discharges into the MS4 from new sources;

(4) 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 the 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:

[9] See the General Permit for Table 1

Table 2 a: Calculation Sheet for Estimating Existing Source Loads for the James River Basin (* Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	2009 EOS Loading Rate (lbs/acre/yr)	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen		9.39	
Regulated Urban Pervious			6.99	
Regulated Urban Impervious	Phosphorus		1.76	
Regulated Urban Pervious			0.5	
Regulated Urban Impervious	Total Suspended Solids		676.94	
Regulated Urban Pervious			101.08	

Table 2 b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin (* Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	2009 EOS Loading Rate (lbs/acre/yr)	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen		16.86	
Regulated Urban Pervious			10.07	
Regulated Urban Impervious	Phosphorus		1.62	
Regulated Urban Pervious			0.41	
Regulated Urban Impervious	Total Suspended Solids		1,171.32	
Regulated Urban Pervious			175.8	

Table 2 c: Calculation Sheet for Estimating Existing Source Loads for the Rappahannock River Basin (* Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	2009 EOS Loading Rate (lbs/acre/yr)	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen		9.38	
Regulated Urban Pervious			5.34	
Regulated Urban Impervious	Phosphorus		1.41	
Regulated Urban Pervious			0.38	
Regulated Urban Impervious	Total Suspended Solids		423.97	
Regulated Urban Pervious			56.01	

Table 2 d: Calculation Sheet for Estimating Existing Source Loads for the York River Basin (* Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	2009 EOS Loading Rate (lbs/acre/yr)	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen		7.31	
Regulated Urban Pervious			7.65	
Regulated Urban Impervious	Phosphorus		1.51	
Regulated Urban Pervious			0.51	
Regulated Urban Impervious	Total Suspended Solids		456.68	
Regulated Urban Pervious			72.28	

(5) 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 first permit cycle required reduction in loading rate. For the purposes of this determination, the operator shall utilize those existing acres identified by the 2000 U.S. Census Bureau urbanized area and served by the MS4.

Table 3 a: Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the James River Basin (*Based On Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total Reduction Required First Permit Cycle (lbs/yr)[10]
Regulated Urban Impervious	Nitrogen		0.04	
Regulated Urban Pervious			0.02	
Regulated Urban Impervious	Phosphorus		0.01	
Regulated Urban Pervious			0.002	
Regulated Urban Impervious	Total Suspended Solids		6.67	
Regulated Urban Pervious			0.44	

[10] Tables 3a-d replicated in this Appendix are consistent with the tables that appear in the permit. Permittees should note that the Total Reduction's required in the permit represent lbs/yr.

Table 3 b: Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the Potomac River Basin
(*Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total Reduction Required First Permit Cycle (lbs/yr)[8]
Regulated Urban Impervious	Nitrogen		0.08	
Regulated Urban Pervious			0.03	
Regulated Urban Impervious	Phosphorus		0.01	
Regulated Urban Pervious			0.001	
Regulated Urban Impervious	Total Suspended Solids		11.71	
Regulated Urban Pervious			0.77	

Table 3 c: Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the Rappahannock River Basin
(*Based On Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total Reduction Required First Permit Cycle (lbs/yr)[8]
Regulated Urban Impervious	Nitrogen		0.04	
Regulated Urban Pervious			0.02	
Regulated Urban Impervious	Phosphorus		0.01	
Regulated Urban Pervious			0.002	
Regulated Urban Impervious	Total Suspended Solids		4.24	
Regulated Urban Pervious			0.25	

Table 3 d: Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the York River Basin
(*Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total Reduction Required First Permit Cycle (lbs/yr)[8]
Regulated Urban Impervious	Nitrogen		0.03	
Regulated Urban Pervious			0.02	
Regulated Urban Impervious	Phosphorus		0.01	
Regulated Urban Pervious			0.002	
Regulated Urban Impervious	Total Suspended Solids		4.60	
Regulated Urban Pervious			0.32	

(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;
(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 in this section to develop the equivalent pollutant load for nitrogen and total suspended solids. The operator shall offset 5.0% of the calculated increased load from these new sources during the permit cycle.
(8) The means and methods to offset the increased loads from projects as grandfathered in accordance with 9VAC25-870-48, that disturb one acre or greater that begin construction after July 1, 2014, where the project utilizes an average land cover condition greater than 16% impervious cover in the design of post-development stormwater management facilities. The operator shall utilize Table 4 in this section to develop the equivalent pollutant load for nitrogen and total suspended solids.
(9) The operator shall address any modification to the TMDL or watershed implementation plan that occurs during the term of this state permit as part of its permit reapplication and not during the term of this state permit

Table 4: Ratio of Phosphorous Loading Rate to Nitrogen and Total Suspended Solids Loading Rates for Chesapeake Bay Basins

Ratio of Phosphorous to Other POCs (Based on All Land Uses 2009 Progress Run)	Phosphorous Loading Rate (lbs/acre)	Nitrogen Loading Rate (lbs/acre)	Total Suspended Solids Loading Rate (lbs/acre)
James River Basin	1.0	5.2	420.9
Potomac River Basin	1.0	6.9	469.2
Rappahannock River Basin	1.0	6.7	320.9
York River Basin	1.0	9.5	531.6

(10) A list of future projects and associated acreage that qualify as grandfathered in accordance with 9VAC25-870-48;

(11) An estimate of the expected costs to implement the requirements of this special condition during the state permit cycle; and

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

b. As part of development of the Chesapeake Bay TMDL Action Plan, the operator may consider:

(1) Implementation of BMPs on unregulated lands provided any necessary baseline reduction is not included toward meeting the required reduction in this permit;

(2) Utilization of stream restoration projects, provided that the credit applied to the required POC load reduction is prorated based on the ratio of regulated urban acres to total drainage acres upstream of restored area;

(3) Establishment of a memorandum of understanding (MOU) with other MS4 operators that discharge to the same of adjacent eight digit hydrologic unit within the same basin to implement BMPs collectively. The MOU shall include a mechanism for dividing the POC reductions created by BMP implementation between the cooperative MS4s;

(4) Utilization of any pollutant trading or offset program in accordance with 10.1-603.15:1 et seq. of the Code of Virginia, governing trading and offsetting;

(5) A more stringent average land cover condition based on less than 16% impervious cover for new sources initiating construction between July 1, 2009, and June 30, 2014, and all grandfathered projects where allowed by law; and

(6) Any BMPs installed after June 30, 2009, as part of a retrofit program may be applied towards meeting the required load reductions provided any necessary baseline reductions are not included.

3. Chesapeake Bay TMDL Action Plan implementation. The operator shall implement the TMDL Action Plan according to the schedule therein. Compliance with this requirement represents adequate progress for this state permit term towards achieving TMDL waste load allocation consistent with the assumptions and requirement of the TMDL. For the purposes of this permit, the implementation of the following represents implementation to the maximum extent practicable and demonstrated adequate progress:

a. Implementation of nutrient management plans in accordance with the schedule identified in the minimum control measure in Section II related to pollution prevention/good housekeeping for municipal operations;

b. Implementation of the minimum control measure in Section II related to construction site stormwater runoff control in accordance with this state permit shall address discharges from transitional sources;

c. Implementation of the means and methods to address discharges from new sources in accordance with the minimum control measure in Section II related to post-construction stormwater management in new development and development of prior developed lands and in order to offset 5.0% of the total increase in POC loads from grandfathered projects initiating construction after July 1, 2014, must be offset prior to completion of the project; and

d. Implementation of means and methods sufficient to meet the required reductions of POC loads from existing sources in accordance with the Chesapeake Bay TMDL Action Plan.

APPENDIX II – MEETING SPECIAL CONDITION REQUIREMENT 7 AND/OR 8

Special Condition Requirements 7 (GP Section I.C.2.a.(7)) and 8 (GP Section I.C.2.a.(8)) apply to permittees that (1) adopted an average impervious land cover condition greater than 16% for the design of post-development stormwater management facilities under the Chesapeake Bay Preservation Act or (2) have allowed projects to be built with an impervious land cover condition greater than 16% for the design of post-development stormwater management facilities through a "fee-in-lieu of" or similar program. The reductions required under these sections of the Special Condition are to offset *increased* loads from new sources and must be made *in addition* to those required for existing conditions as of June 30, 2009 (GP Section I.C.2.a.(6)).

For projects that initiate construction between July 1, 2009 and June 30, 2014 subject to Special Condition Requirement 7 (GP Section I.C.2.a.(7)), permittees must offset 5.0% of the **increased** POC loads from those projects by the end of the permit cycle. For projects that are grandfathered in accordance with 9VAC25-870-48 and initiate construction or after July 1, 2014 subject to Special Condition Requirement 8 (GP Section I.C.2.a.(8)), permittees must offset the entire increased load prior to completion of the project.

These projects are subject to Technical Criteria II C under the VSMP regulations. If permittees use the technology-based criteria under 9VAC25-870-96.C, no additional reductions are required under the Special Condition beyond those for the existing conditions as of June 30, 2009 under General Permit Section I.C.2.a.(6). This is because the technology based criteria assumes as average land cover condition of 16% for the design of post-development stormwater management facilities.

Permittees using the performance-based criteria under 9VAC25-870-96.B may have projects that require additional reductions under General Permit Section I.C.2.a.(7) or I.C.2.a.(8). The VSMP regulations organize the "performance-based criteria" into "four applicable land development situations." For clarity, this Appendix uses the same "situation" framework to explain when additional reductions are required for "new sources" under the Special Condition.

This Appendix is organized by "situation." Under each "situation" header the following information is provided:

1. Each "situation," as is described in 9VAC-25-870-96.B of the VSMP regulations,
2. The VSMP requirements for each performance-based criteria "situation," and;
3. An example diagram and the reduction requirements for each "situation" beyond those required under Section I.C.2.a.(6) of the general permit for each of the following project types:
    a. Redevelopment with an Average Impervious Land Cover Condition of 16% or Less
    b. Redevelopment with an Average Impervious Land Cover Condition Greater than 16%
    c. New Development with an Average Impervious Land Cover Condition of 16% or Less
    d. New Development with an Average Impervious Land Cover Condition Greater than 16%

NOTE: In some of these "situations" meeting the VSMP requirements will result in POC reductions. If that is the case, permittees may take credit for those reductions on prior developed lands and apply those credits to their 2009 baseline reductions under Special Condition Requirement 6 (GP Section I.C.2.a.(6)). Where applicable, these instances are indicated throughout this section. They are also addressed in *Appendix V.L*.

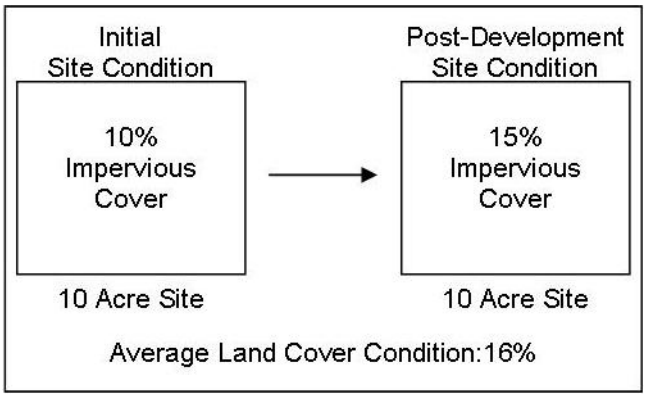
SITUATION 1

Land disturbing activities where the existing percent impervious cover is less than or equal to the average land cover condition and the proposed improvements will create a total percent impervious cover which is less than the average land cover condition.

VSMP Requirement: No reduction in the after disturbance pollutant discharge is required.

Special Condition Requirements*:*

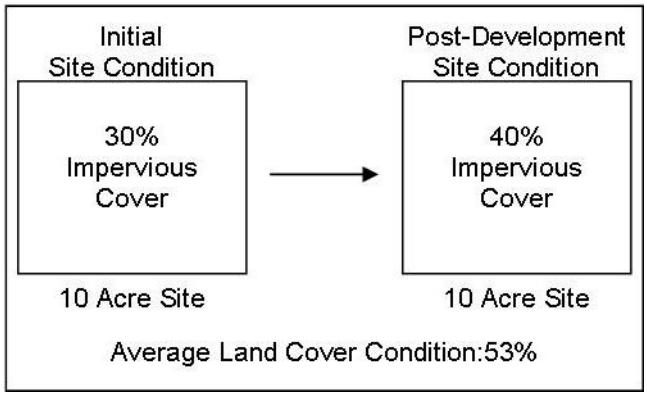
(a) *Redevelopment with an Average Impervious Land Cover Condition of 16% or Less:*



Special Condition Requirement 7: No additional reductions are required for this project type and situation because the average land cover condition is less than 16%.

Special Condition Requirement 8: No additional reductions are required for this project type and situation because the average land cover condition is less than 16%.

(b) *Redevelopment with an Average Impervious Land Cover Condition Greater than 16%:*

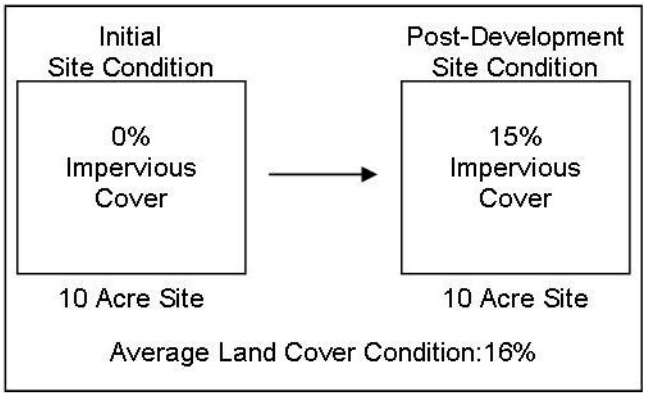


Special Condition Requirement 7: If construction on the project was initiated between July 1, 2009 and June 30, 2014 the permittee must create reductions *in addition* to those required

by Special Condition Requirement 6 (GP Section I.C.2.a.(6)). In this instance, the permittee must offset 5.0% of the incremental[11] increased load from the impervious cover change.

Special Condition Requirement 8: If the project is grandfathered in accordance with 9VAC25-870-48 and initiated or initiates construction after July 1, 2014 the permittee must create reductions *in addition* to those required by Special Condition Requirement 6 (GP Section I.C.2.a.(6)). In this instance, the permittee must offset the entire incremental increased load from the impervious cover change prior to completion of the project.

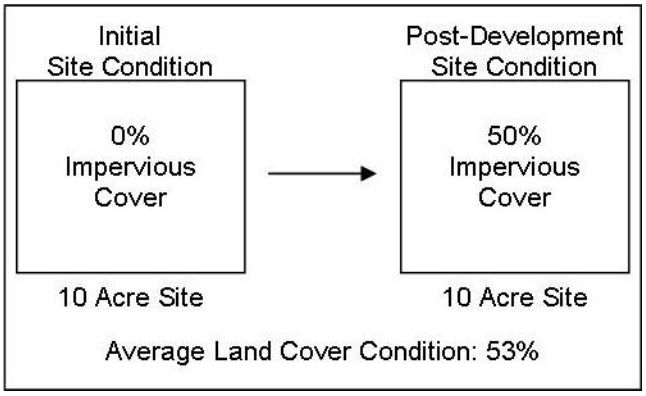
(c) *New Development with an Average Impervious Land Cover Condition of 16% or Less:*



Special Condition Requirement 7: No additional reductions are required for this project type and situation because the average land cover condition is less than 16%.

Special Condition Requirement 8: No additional reductions are required for this project type and situation because the average land cover condition is less than 16%.

(d) *New Development with an Average Impervious Land Cover Condition Greater than 16%*



Special Condition Requirement 7: If construction on the project was initiated between July 1, 2009 and June 30, 2014 the permittee must create reductions *in addition* to those required

[11] Throughout this section incremental refers to the difference between the site's initial impervious cover and the post-development impervious cover. However, permittees do not have to make reductions beyond the 16% average land cover condition or .45lbs TP/ac/yr.

by Special Condition Requirement 6 (GP Section I.C.2.a.(6)). In this instance, the permittee must offset 5.0% of the incremental increased load from the impervious cover change, down to the average land cover condition (50% impervious cover load – 16% impervious cover load).

Special Condition Requirement 8: If the project is grandfathered in accordance with 9VAC25-870-48 and initiated or initiates construction after July 1, 2014 the permittee must create reductions *in addition* to those required by Special Condition Requirement 6 (GP Section I.C.2.a.(6)). In this instance, the permittee must offset the entire incremental increased load from the impervious cover change, down to the average land cover condition (50% Impervious Cover – 16% Impervious Cover) prior to completion of the project.

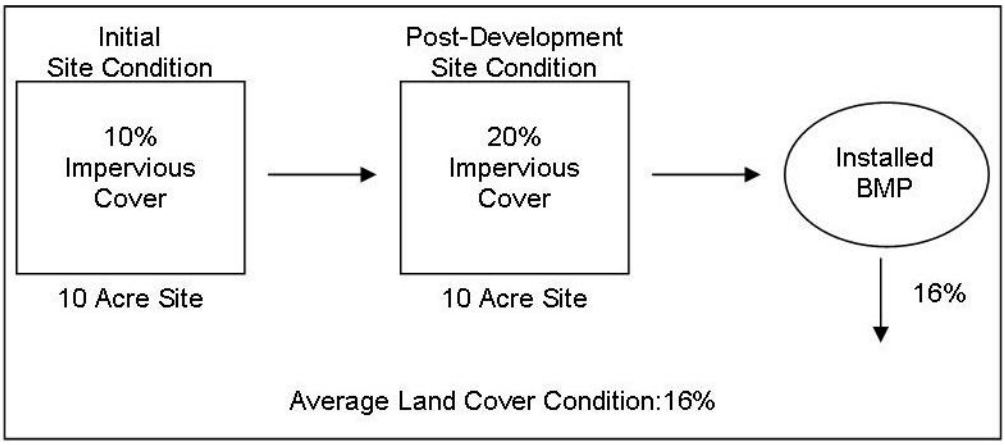
SITUATION 2

Land disturbing activities where the existing percent impervious cover is less than or equal to the average land cover condition and the proposed improvements will create a total percent impervious cover which is greater than the average land cover condition.

VSMP Requirement: The pollutant discharge after disturbance shall not exceed the existing pollutant discharge based on the average land cover condition. If the post-development impervious land cover condition exceeds the average land cover condition, BMPs must be installed on site to offset those increased loads using the techniques described in the Virginia Stormwater Management Handbook, which can be found on DEQ's website.

Special Condition Requirement:

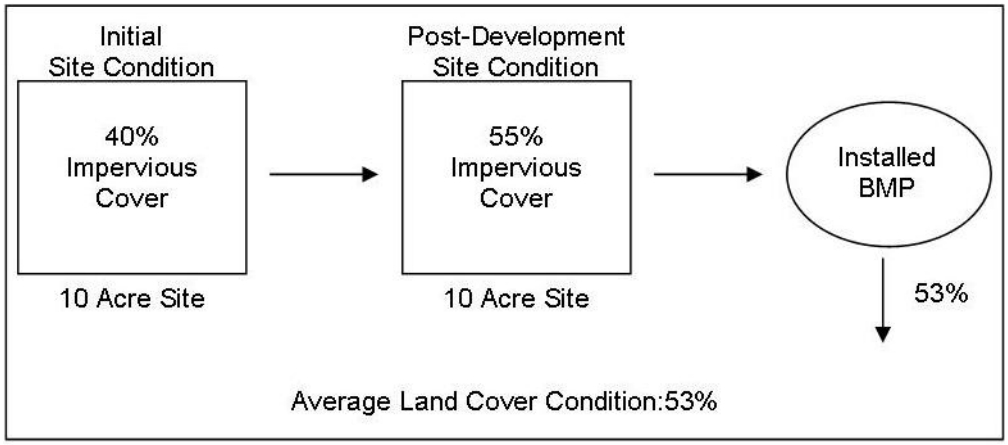
(a) *Redevelopment with an Average Impervious Land Cover Condition of 16% or Less:*



Special Condition Requirement 7: No additional reductions beyond those provided by the "Installed BMP" are necessary because the load draining from the site is equivalent to the load draining from a site with a 16% land cover condition.

Special Condition Requirement 8: No additional reductions beyond those provided by the "Installed BMP" are necessary because the load draining from the site is equivalent to the load draining from a site with a 16% land cover condition.

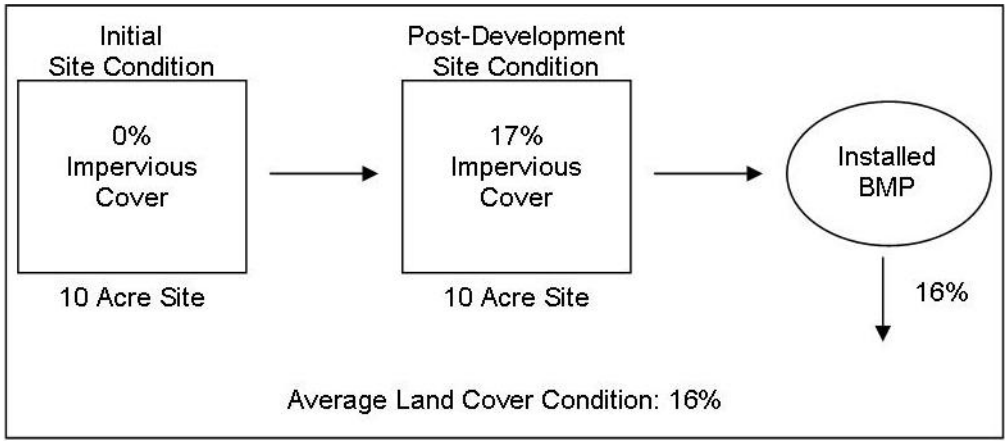
(b) *Redevelopment with an Average Impervious Land Cover Condition Greater than 16%*



Special Condition Requirement 7: If construction on the project was initiated between July 1, 2009 and June 30, 2014 the permittee must create reductions *in addition* to those required by Special Condition Requirement 6 (GP Section I.C.2.a.(6)). The "Installed BMP" meets the VSMP requirements, since it offsets the additional load to the Average Land Cover Condition. To meet Special Condition Requirement 7 the permittee must determine the remaining incremental load increase from the redevelopment project (53% impervious cover load – 40% impervious cover load). By the end of the first permit cycle, the permittee must offset 5.0% of that load.

Special Condition Requirement 8: If the project is grandfathered in accordance with 9VAC25-870-48 and initiated or initiates construction after July 1, 2014 the permittee must create reductions *in addition* to those required by Special Condition Requirement 6 (GP Section I.C.2.a.(6)). The "Installed BMP" meets the VSMP requirements, since it offsets the additional load to the Average Land Cover Condition. To meet Special Condition Requirement 8 the permittee must determine the remaining incremental load increase from the redevelopment project (53% impervious cover load – 40% impervious cover load). The permittee must offset the entire load prior to completion of the project.

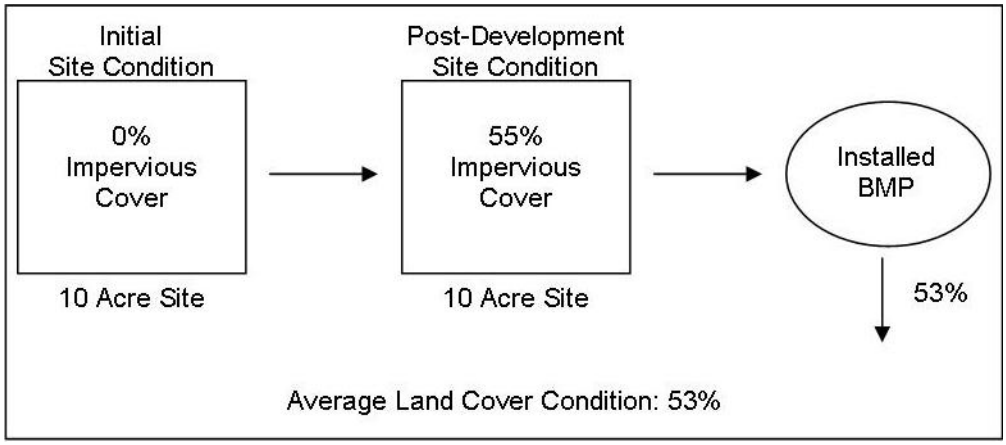
(c) *New Development with an Average Impervious Land Cover Condition of 16% or Less*



Special Condition Requirement 7: No additional reductions beyond those provided by the "Installed BMP" are necessary because the load draining from the site is equivalent to the load draining from a site with a 16% land cover condition.

Special Condition Requirement 8: No additional reductions beyond those provided by the "Installed BMP" are necessary because the load draining from the site is equivalent to the load draining from a site with a 16% land cover condition.

(d) *New Development with an Average Impervious Land Cover Condition Greater than 16%*



Special Condition Requirement 7: If construction on the project was initiated between July 1, 2009 and June 30, 2014 the permittee must create reductions *in addition* to those required by Special Condition Requirement 6 (GP Section I.C.2.a.(6)). The "Installed BMP" meets the VSMP requirements, since it offsets the additional load to the Average Land Cover Condition. To meet Special Condition Requirement 7 the permittee must determine the remaining incremental load increase from the redevelopment project, down to the 16% Average Land Cover Condition (53% impervious cover load – 16% impervious cover load). By the end of the first permit cycle, the permittee must offset 5.0% of that load.

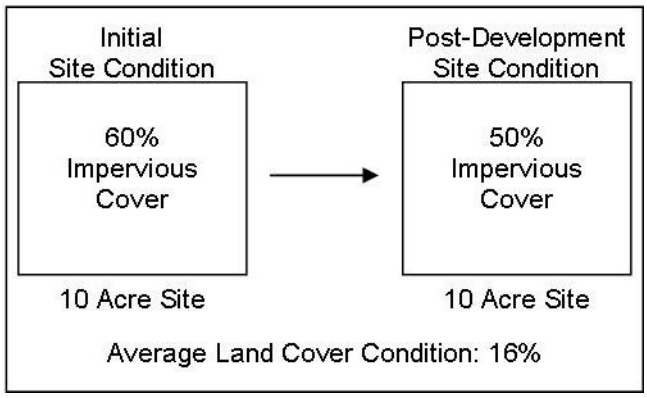
Special Condition Requirement 8: If the project is grandfathered in accordance with 9VAC25-870-48 and initiated or initiates construction after July 1, 2014 the permittee must create reductions *in addition* to those required by Special Condition Requirement 6 (GP Section I.C.2.a.(6)). The "Installed BMP" meets the VSMP requirements, since it offsets the additional load to the Average Land Cover Condition. To meet Special Condition Requirement 8 the permittee must determine the remaining incremental load increase from the redevelopment project (53% impervious cover load – 16% impervious cover load). The permittee must offset the entire incremental load prior to completion of the project.

SITUATION 3
Land disturbing activities where the existing percent impervious cover is greater than the average land cover condition.

VSMP Requirement: The pollutant discharge after development shall not exceed 1) the pollutant discharge based on existing conditions less 10%; or 2) the pollutant discharge based on the average land cover condition, whichever is greater.

Special Condition Requirement:

(a) *Redevelopment with an Average Impervious Land Cover Condition of 16% or Less*

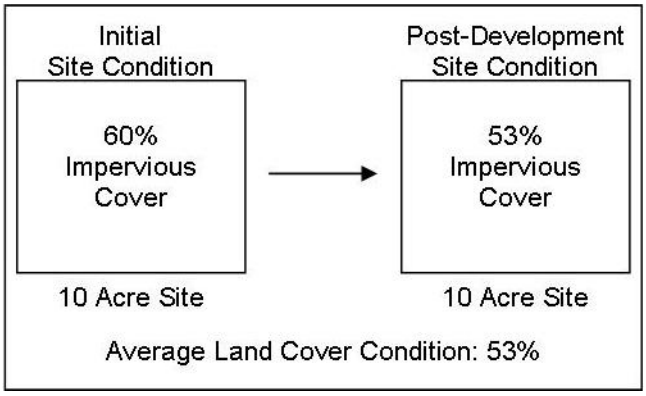


Special Condition Requirement 7: No additional reductions are required because there has not been an *increase* in the load draining from the site.

Special Condition Requirement 8: No additional reductions are required because there has not been an *increase* in the load draining from the site.

NOTE: The permittee may take credit for the 10% reductions and apply it to the existing source reductions required by Special Condition Requirement 6 (GP Section I.C.2.a.(6)). See *Appendix V.L* for additional information concerning credits for redevelopment.

(b) *Redevelopment with an Average Impervious Land Cover Condition Greater than 16%*



Special Condition Requirement 7: No additional reductions are required because there was *no increase* in loads from the post developed site.

Special Condition Requirement 8: No additional reductions are required because there was *no increase* in loads from the post developed site.

NOTE: The permittee may take credit for the 7.0% reductions and apply it to the existing source reduction required by Special Condition Requirement 6 (GP Section I.C.2.a.(6)). See *Appendix V.L* for additional information concerning credits for redevelopment.

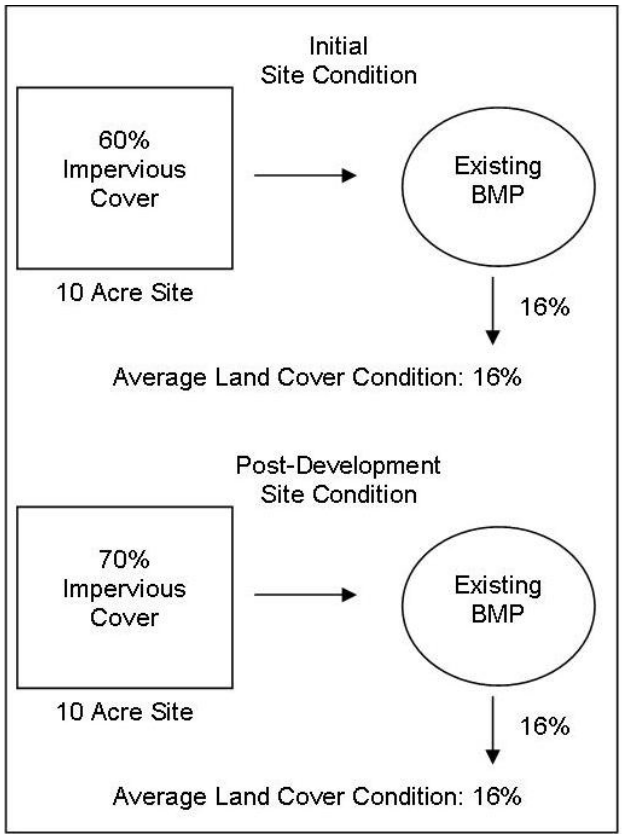
(c) *New Development with an Average Impervious Land Cover Condition of 16% or Less*
This situation does not apply to new development.

(d) *New Development with an Average Impervious Land Cover Condition Greater than 16%*
This situation does not apply to new development.

SITUATION 4
Land disturbing activities where the existing percent impervious cover is served by an existing stormwater management BMP(s) that addresses water quality.

VSMP Requirement: The pollutant discharge after disturbance shall not exceed the existing pollutant discharge based on the existing percent impervious cover while served by the existing BMP. The existing BMP shall be shown to have been designed and constructed in accordance with proper design standards and specifications, and to be in proper functioning condition.

Special Condition Requirement:



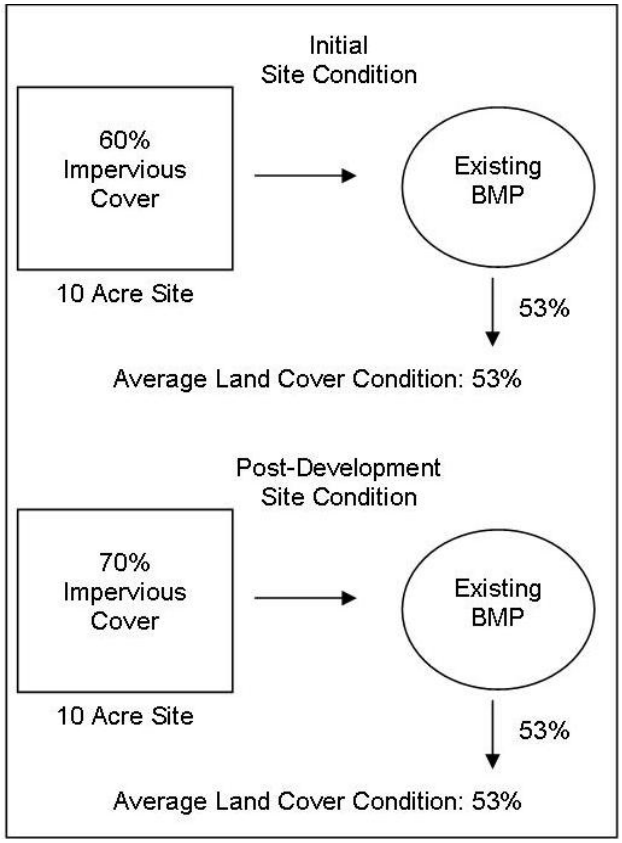
The site drains to an existing stormwater BMP before discharging to an impaired water body. The pollutant load discharged to the receiving stream from the regional BMP is less than or equal to load from a site with an average land cover condition of 16 percent. If the BMP is overdesigned for the current site, it may be possible for redevelopment to result in an increase in impervious cover on the site, but not result in an increased load reaching the stream. If that is the case, additional reductions do not need to be made.

(a) *Redevelopment with an Average Impervious Land Cover Condition of 16% or Less*

Special Condition Requirement 7: No additional reductions are required because the load draining from the BMP to the receiving water body does not increase.

Special Condition Requirement 8: No additional reductions are required because the load draining from the BMP to the receiving water body does not increase.

(b) *Redevelopment with an Average Impervious Land Cover Condition Greater than 16%*



The site drains to an existing stormwater BMP before discharging to an impaired water body. The pollutant load discharged to the receiving stream from the regional BMP is less than or equal to load from a site with an average land cover condition of 53 percent. If the BMP is overdesigned for the current site, it may be possible for redevelopment to result in an increase in impervious cover on the site, but not result in an increased load reaching the stream. If that is the case, additional reductions do not need to be made.

Special Condition Requirement 7: No additional reductions are required because the load draining from the BMP to the receiving water body does not increase.

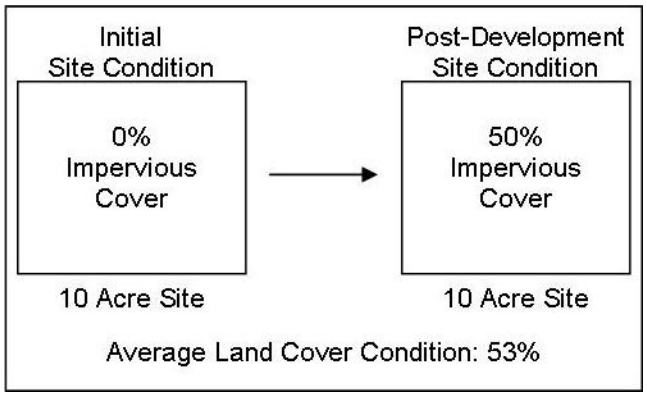
Special Condition Requirement 8: No additional reductions are required because the load draining from the BMP to the receiving water body does not increase.

(c) *New Development with an Average Impervious Land Cover Condition of 16% or Less*
This situation does not apply to new development.

(d) *New Development with an Average Impervious Land Cover Condition Greater than 16%*
This situation does not apply to New Development.

EXAMPLE II.1 – Site Specific Calculation to Meet Special Condition Requirement 7 or 8

A permittee in the James River Basin that adopted an average land cover condition of 53% under the Chesapeake Bay Preservation Act needs to calculate the additional reductions required under Special Condition Requirement 7 (GP Section I.C.2.a.(7)) for a 10 acre new development project where construction was initiated between July 1, 2009 and June 30, 2014. Once completed, the project will have an average land cover condition of 50%, which is less than the locality's adopted average land cover condition.



Step 1: Site Condition as of June 30, 2009 Calculation

The permittee must incorporate the site conditions as of June 30, 2009 into the acreage calculation under Special Condition Requirement 6 (GP Section I.C.2.a.(6)). Once the "existing condition" required reductions are determined using the tables they do not need to be recalculated. In this example, all 10 acres of the pre-development site are pervious regulated acres (there are no forested acres on site).

Step 2: Identifying Additional Reductions under Special Condition 7 or 8

Next the permittee must determine if the project is subject to additional reduction requirements. Referencing Appendix II.1 of this guidance document, the permittee identifies that this project falls under Situation 1.(d). In accordance with Special Condition Requirement 7 (GP Section I.C.2.a.(7)) the permittee must offset 5.0% of the *increased* load from the impervious cover change down to the statewide average land cover condition of 16% by the end of this permit cycle *in addition* to the reductions required under GP Section I.C.2.a.(6).

Step 3: Calculating Additional Required Reductions

The post-development 50% impervious land cover condition has an associated total phosphorous loading of 1.14 lbs TP/ac/yr (calculated using the Simple Method). To calculate the additional offsets that will be necessary for the site the permittee should subtract the phosphorous loading associated with a 16% average impervious land cover condition (0.45 lbs TP/ac/yr) from the load calculated using the simple method for the higher average land cover condition:

1.14 lbs TP/ac/yr - 0.45 lbs TP/ac/yr = 0.69 lbs TP/ac/yr

By the end of the first permit cycle, the permittee must offset 5.0% of this increased load:

0.69 lbs TP/ac/yr * .05 = 0.0345 lbs TP/ac/yr

Since the project is a 10 acre site, the total pounds that must be offset for this site for this permit cycle is:

10 acre site * 0.0345 lbs/ac/yr = 0.345 lbs TP/yr

The permittee must offset 0.345 lbs TP/yr for this site by the end of the permit term. By the end of the next permit term the permittee will need to offset an additional 35% of the increased load from this project and it is expected that by the end of the third permit cycle the increased loading from the site will be fully offset.

To calculate the TN loading rate reduction required by the end of this MS4 permit cycle and TSS loading rate reduction required by the end of this MS4 permit cycle, the permittee will need to use the ratio table provided in the permit. For the James River Basin, the POC ratios are those shown in GP Section I.C.2, *Table 4*, an excerpt of which is provided below (*Table II.1*):

Table II.1 – Ratio of Phosphorous Loading Rate to Nitrogen and Total Suspended Solids Loading Rates for the James River Basin[12]

Ratio of Phosphorous to Other POCs (Based on All Land Uses 2009 Progress Run)	Phosphorous Loading Rate (lbs/ac)	Nitrogen Loading Rate (lbs/ac)	Total Suspended Solids Loading Rate (lbs/ac)
James River Basin	1.0	5.2	420.9

To calculate the additional reductions required for TN for this project the permittee first needs to use the conversion table to calculate the lbs TN/ac/yr that must be reduced as a result of 50% impervious land cover condition:

$$.0345 \text{ lbs TP/ac/yr} * \frac{5.2 \text{ lbs TN/ac}}{1.0 \text{ lbs TP/ac}} = 0.179 \text{ lbs TN/ac/yr}$$

The permittee should then calculate the TN offsets that must be made for this 10 acre project:

$$0.179 \text{ lbs TN/ac/yr} * 10 \text{ acres} = 1.79 \text{ lbs TN/yr}$$

Similar calculations must be performed to determine the offsets for total suspended solids loading rate. Again, the permittee first needs to use the conversion table provided in the permit to determine the lbs TSS/ac/yr that must be reduced as a result of 50% impervious land cover condition.

$$0.0345 \text{ lbs TP/ac/yr} * \frac{420.9 \text{ lbs TSS/ac}}{1.0 \text{ lbs TP/ac}} = 14.521 \text{ lbs TSS/ac/yr}$$

The permittee should then calculate the TSS offsets that must be made for this 10 acre project:

$$14.5211 \text{ lbs TSS/ac/yr} * 10 \text{ acres} = 145.21 \text{ lbs TSS/yr}$$

[12] Table values for the James River Basin can be found in the General Permit or *Appendix I* of this document.

For this project, by the end of the first permit cycle, the permittee must offset an additional 0.345 lbs TP/yr, 1.79 lbs TN/yr, and 145.21 lbs TSS/yr. By the end of the next permit term the permittee will need to offset an additional 35% of the increased load from this project and it is expected that by the end of the third permit cycle the increased loading from the site will be fully offset.

NOTE: Permittees may report the impact of offsets required under Special Condition 7 and/or 8 to the Department in aggregate. However, the data and calculations performed to determine these numbers should be kept on hand.

EXAMPLE II.2[13] – Aggregate Accounting for Special Condition Requirement 7

A permittee in the James River Basin had a fee-in-lieu of program in place through July 1, 2012. Due to the variability in the average land cover condition of projects built under this program, the permittee has decided to take an aggregate approach to addressing Special Condition 7. The permittee has 1000 acres of regulated land throughout its service area, which was 50% impervious and 50% pervious as of June 30, 2009. To estimate the POC reductions required under Special Condition Requirement 7, the permittee first needs to calculate the total POC loads as of June 30, 2009. The permittee should use the "2009 EOS Loading Rate" from Table 2a in the permit for this calculation:

Table II.2 – POC Loads as of June 30, 2009 (Pre-Development)

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 06/30/09	2009 EOS Loading Rate (lbs/acre/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)
Regulated Urban Impervious	Nitrogen	*500*	9.39	*4695*
Regulated Urban Pervious		*500*	6.99	*3495*
Regulated Urban Impervious	Phosphorus	*500*	1.76	*880*
Regulated Urban Pervious		*500*	0.5	*250*
Regulated Urban Impervious	Total Suspended Solids	*500*	676.94	*338,470*
Regulated Urban Pervious		*500*	101.08	*50,540*

As of July 1, 2014 the permittee determines using GIS resources that, as a result of "new sources," the proportion of regulated urban pervious acres to regulated urban impervious acres has changed. The permittee should determine the "post-development" loading rates as a result of the land use change. Again, the "2009 EOS Loading Rate" from Table 2a should be used for this calculation:

[13] **NOTE**: This aggregate method captures all changes in regulated urban impervious and regulated urban pervious loads. Permittees may submit alternative aggregate accounting strategies, but they must ensure that the submitted method captures all additional reductions required under Special Condition Requirement 7 (GP Section I.C.2.a.(7)).

Table II.3 - Post-Development Conditions July 1, 2014

Subsource	Pollutant	Total Existing Acres Served by MS4 (07/01/14)	2009 EOS Loading Rate (lbs/acre/yr)	Estimated Total POC Load as of 07/01/14 (lbs/yr)
Regulated Urban Impervious	Nitrogen	*600*	9.39	*5634*
Regulated Urban Pervious		*400*	6.99	*2796*
Regulated Urban Impervious	Phosphorus	*600*	1.76	*1056*
Regulated Urban Pervious		*400*	0.5	*200*
Regulated Urban Impervious	Total Suspended Solids	*600*	676.94	*406,164*
Regulated Urban Pervious		*400*	101.08	*40,432*

The permittee should then calculate the difference between the post-development and pre-development land cover condition to estimate the Total Load Change (Regulated Urban Impervious Load Change + Regulated Urban Pervious Load Change).

Table II.4 – Total Load Change from "New Sources" between June 30, 2009 and July 1, 2014

Subsource	Pollutant	Estimated Total POC Load as of 07/01/14 (lbs/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)	Load Change (lbs/yr)	Total Load Change (lbs/yr)
Regulated Urban Impervious	Nitrogen	*5634*	*4695*	939	
Regulated Urban Pervious		*2796*	*3495*	-699	240
Regulated Urban Impervious	Phosphorus	*1056*	*880*	176	
Regulated Urban Pervious		*200*	*250*	-50	126
Regulated Urban Impervious	Total Suspended Solids	*406,164*	*338,470*	67,694	
Regulated Urban Pervious		*40,432*	*50,540*	-10,108	57,586

The permittee should also take into account BMPs that were installed on site during the development or redevelopment process to meet other VSMP requirements. The POC loads treated by those BMPs should be subtracted from the Total Load Change.

Table II.5 – Net Load Change (Total Load Change – Reductions from implemented BMPs)

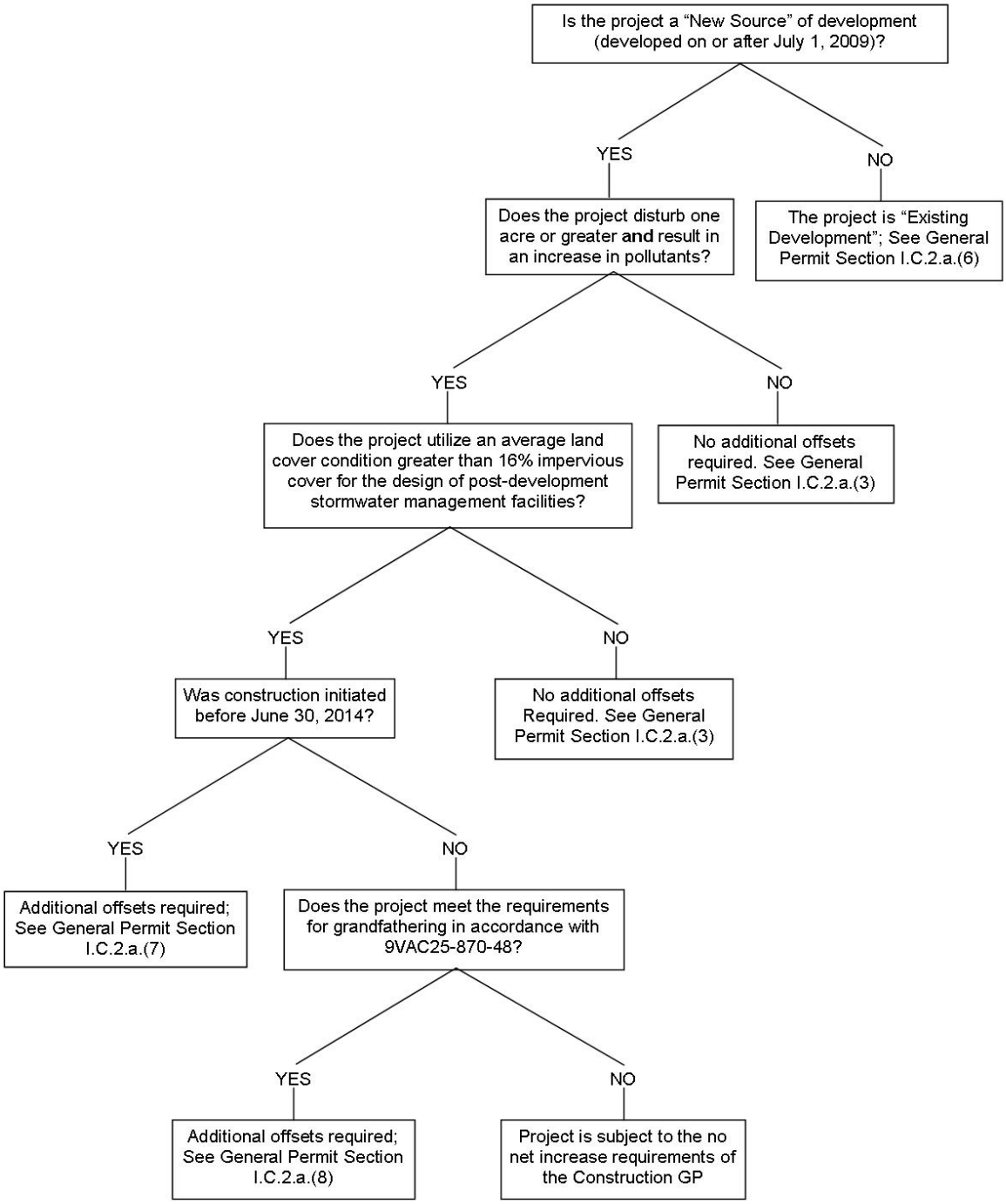
Pollutant	Total Load Change (lbs/yr)	Reductions from on-site BMPs (lbs/yr)	Net Load Change (lbs/yr)
Nitrogen	240	100	140
Phosphorus	126	25	101
Total Suspended Solids	57,586	20,000	37,586

The final column of Table II.5 represents the additional load from New Sources between June 30, 2009 and July 1, 2014 that must be offset. By the end of the first permit cycle, the permittee will need to offset 5.0% of the calculated "Net Load Change."

Pollutant	Net Load Change (lbs/yr)	Required Reduction during first permit cycle	Additional Reductions Required by the end of the first permit cycle (lbs/yr)
Nitrogen	140	0.05	7
Phosphorous	101	0.05	5.05
Total Suspended Solids	37,586	0.05	1879.3

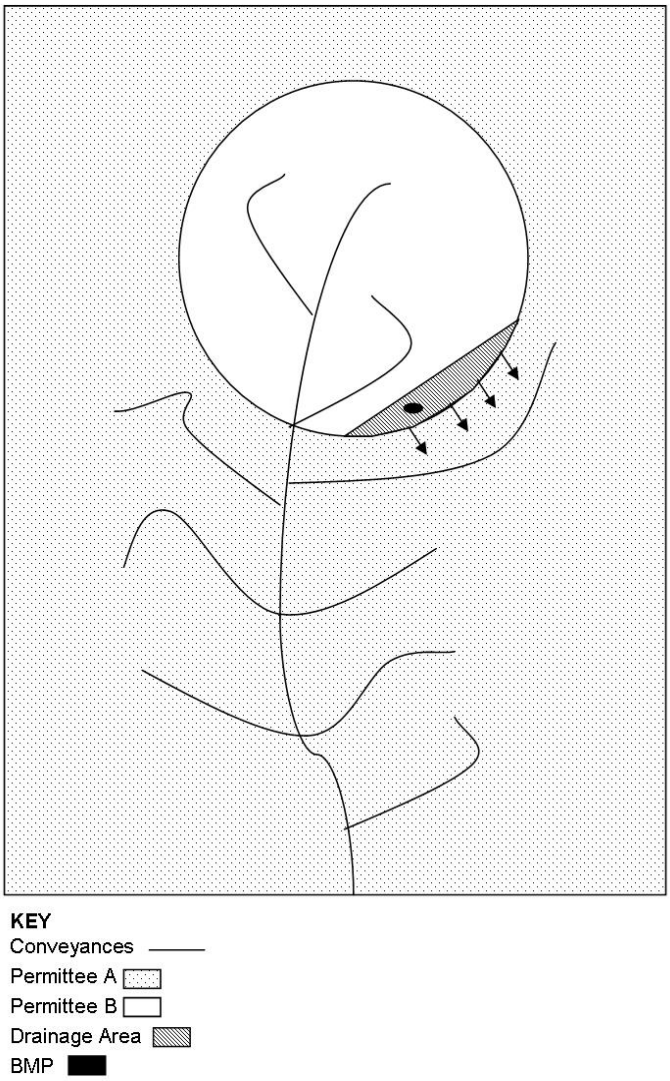
Although this was not the case in this example, if the total load change for any pollutant represents a reduction, the permittee may take credit for the difference and apply it towards the reduction requirements for existing sources.

APPENDIX III – PERMIT POC LOAD REDUCTION FLOW CHART



APPENDIX IV – MS4 BOUNDARY DIAGRAMS

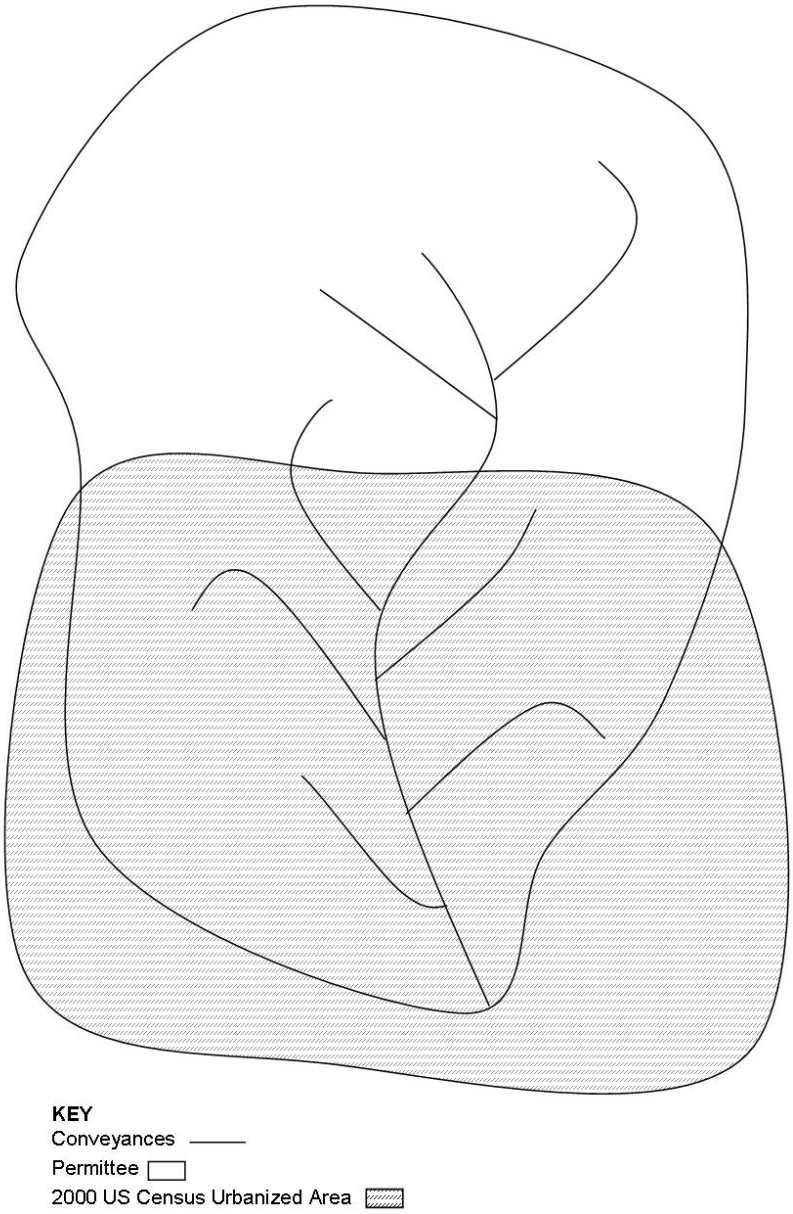
EXAMPLE IV.1 – OVERLAPPING DRAINAGE AREAS



In accordance with GP Section I.C.2.a.(5) permittees must determine the existing acres *served* by the MS4. The system's service area includes those acres that drain to the permittee's system. Permittee B is located within Permittee A's land area and both permittees are located entirely within a Census Designated Urbanized Area. A portion of Permittee B's land area drains, through sheetflow, to Permittee A's system. Although the shaded drainage area is located within Permittee B's jurisdiction, Permittee A is responsible for the POC loads draining from that land. Alternatives to this approach will be considered as long as all lands are accounted for in reduction calculations.

However, if Permittee B installs a BMP within the shaded Drainage Area, they will receive credit for reductions from the BMP. Regardless, it is highly recommended that permittees work together to reduce POC loads in these instances.

EXAMPLE IV.2 – JURISDICTION EXTENDS BEYOND URBANIZED AREA



A portion of the Phase II permittee's system falls outside of the 2000 US Census Urbanized Area. The Phase II permittee is not responsible for any land area draining to the portion of their system that falls outside the Urbanized Area.

APPENDIX V – CALCULATION METHODOLOGIES

Appendix V.A – Structural BMPs, Methodology I – Virginia Stormwater Clearinghouse BMPs

Appendix V.B – Structural BMPs, Methodology II – Bay Program Retrofit Curves

Appendix V.C – Structural BMPs, Methodology III – Bay Program Established Efficiencies

Appendix V.D – BMP Enhancement, Conversion, and Restoration

Appendix V.E – BMPs installed to Meet Development and Redevelopment Requirements

Appendix V.F – BMP Treatment Trains

Appendix V.G – Street Sweeping

Appendix V.H – Land Use Changes

Appendix V.I – Forest Buffers

Appendix V.J – Urban Stream Restoration

Appendix V.K – Urban Nutrient Management

Appendix V.L – Development on Prior Developed Lands (Redevelopment)

APPENDIX V.A – Virginia Stormwater Clearinghouse BMPs[14]

To be eligible for these efficiencies, the BMP must meet all the design requirements that are listed in the Virginia Stormwater BMP Clearinghouse's technical specification for that BMP, not just the one inch requirement for runoff depth treated. There are no established efficiencies for TSS in the Virginia Stormwater BMP Clearinghouse. To calculate the TSS reductions, permittees should use the retrofit curves developed by the Bay Program or the Bay Program Established Efficiencies. The methodology for using the retrofit curves is detailed in *Appendix V.B*. For additional information about the Virginia Stormwater BMP Clearinghouse requirements, permittees should see the BMP design standards and specs, which can be found at http://vwrrc.vt.edu/swc/StandardsSpecs.html.

Table V.A.1 - Virginia Stormwater BMP Clearinghouse BMPs, Established Efficiencies

Practice Number	Practice	TN	TP
1	Rooftop Disconnection[15]	25% or 50%[1]	25% or 50%[1]
2	Sheetflow to Vegetated Filter or Conserved Open Space 1	25% or 50%[1]	25% or 50%[1]
	Sheetflow to Vegetated Filter or Conserved Open Space 2	50% or 75%[1]	50% or 75%[1]
3	Grass Channel	28%	23%
5	Vegetated Roof 1	45%	45%
	Vegetated Roof 2	60%	60%
6	Rainwater Harvesting[15]	Up to 90%	Up to 90%
7	Permeable Pavement 1	59%	59%
	Permeable Pavement 2	81%	81%
8	Infiltration 1	57%	63%
	Infiltration 2	92%	93%
9	Bioretention 1	64%	55%
	Bioretention 2	90%	90%
	Urban Bioretention	64%	55%
10	Dry Swale 1	55%	52%
	Dry Swale 2	74%	76%
11	Wet Swale 1	25%	20%
	Wet Swale 2	35%	40%
12	Filtering Practice 1	30%	60%
	Filtering Practice 2	45%	65%
13	Constructed Wetland 1	25%	50%
	Constructed Wetland 2	55%	75%
14	Wet Pond 1	30% (20%)[2]	50% (45%)[2]
	Wet Pond 2	40% (30%)[2]	75% (65%)[2]
15	Extended Detention Pond 1	10%	15%
	Extended Detention Pond 2	24%	31%

[1]Lower rate is for HSG soils C and D; higher rate is for HSG soils A and B
[2]Lower nutrient removal in parentheses apply to wet ponds in coastal plain terrain

[14] These efficiencies are up to date as of the publication of this guidance. The most up to date list of approved BMPs and their efficiencies can be found on the Virginia Stormwater BMP Clearinghouse website. If there is a discrepancy between this table and the website, the efficiencies on the website supersede those listed in this table. The TN efficiencies may be found in the bodies of the individual BMP reports.

[15] **NOTE:** There are no Bay Program equivalent efficiency BMPs for Rooftop Disconnection and Rainwater Harvesting. Permittees must use the VA Stormwater Clearinghouse technical criteria and efficiencies to receive credit for these practices.

EXAMPLE V.A.1

A small Phase II MS4 with 1000 acres of regulated urban impervious surface and 1000 acres of regulated urban pervious surface is located in the James River Basin. The permittee is planning to implement a constructed wetland that will treat a 50 acre site that is 40% impervious surface and 60% pervious surface.

Prior to considering this project, the permittee has filled out Tables 2a and 3a in their permit, which are incorporated into this example for reference. The permittee will use the loading rates in Table 2a to determine the loads draining to the proposed BMP.

Calculation Sheet for Estimating Existing Source Loads for the James River Basin (*Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	2009 EOS Loading Rate (lbs/acre/yr)[1]	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen	*1000*	9.39	*9390*
Regulated Urban Pervious		*1000*	6.99	*6990*
Regulated Urban Impervious	Phosphorus	*1000*	1.76	*1760*
Regulated Urban Pervious		*1000*	0.5	*500*
Regulated Urban Impervious	Total Suspended Solids	*1000*	676.94	*676,940*
Regulated Urban Pervious		*1000*	101.08	*101,080*

[1]This loading rate can be found in Table 2 a of the General Permit

The second table(s) in the permit must be used to calculate the required reduction for the first permit cycle. This calculation will provide the necessary reductions for the first permit cycle in pounds:

Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the James River Basin (*Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)[1]	Total Reduction Required First Permit Cycle (lbs/yr)
Regulated Urban Impervious	Nitrogen	*1000*	0.04	*40*
Regulated Urban Pervious		*1000*	0.02	*20*
Regulated Urban Impervious	Phosphorus	*1000*	0.01	*10*
Regulated Urban Pervious		*1000*	0.002	*2*
Regulated Urban Impervious	Total Suspended Solids	*1000*	6.67	*6670*
Regulated Urban Pervious		*1000*	0.44	*440*

[1]This loading rate can be found in Table 3 a in the General Permit

Based on the calculations in the table, the permittee must achieve reductions of 60 lbs TN, 12 lbs TP, and 7110 lbs TSS within the first permit cycle. Although this table divides the loads by regulated impervious and regulated pervious, the BMP's efficiencies are applied to the entire POC load, not just the load from the impervious acres. The MS4 intends to offset a portion of this load by installing a constructed wetland to treat a 50 acre site that is 40% impervious (20 acres) and 60% pervious (30 acres).

The BMP being installed meets all the design requirements for the Virginia Stormwater BMP Clearinghouse "Constructed Wetland #1," which has a TN reduction efficiency of 25% and a TP reduction efficiency of 50% (*Table V.A 1*). The BMP's efficiency can be translated into pounds by first calculating the site's POC loading without the BMP. Recall that the BMP is being installed to treat land that is 20 acres impervious and 30 acres pervious surface. The acres should be multiplied by the 2009 EOS loading rate for the appropriate basin (*Appendix I, Table 2a)*. For TN:

$$20\ acres * 9.39\ lbs\ TN/ac/yr = 187.8\ lbs\ TN/yr$$

and for pervious surface:

$$30\ acres * 6.99\ lbs\ TN/ac/yr = 209.7\ lbs\ TN/yr$$

These calculated TN loads should be multiplied by the TN efficiency for a constructed wetland as provided in *Table V.A.1*.

$$187.8\ lbs\ TN/yr * 0.25 = 46.95\ lbs\ TN/yr$$

$$209.7\ lbs\ TN/yr * 0.25 = 52.43\ lbs\ TN/yr$$

Therefore, the total nitrogen reduction from the constructed wetland is:

$$46.95\ lbs\ TN/yr + 52.43\ lbs\ TN/yr = 99.38\ lbs\ TN/yr$$

With the installation of this BMP, the permittee has reduced its annual load of nitrogen by 99.38 lbs. With this BMP the permittee has met the reduction requirements for the first permit cycle for nitrogen. The reductions that are achieved for TP can be calculated using the same methodology. To calculate the reductions for TSS, see *Appendix V.B* or *Appendix V.C.*

APPENDIX V.B – Chesapeake Bay Program, Retrofit Curves/Equations

This credit calculation method should be used when a BMP cannot meet the Virginia Stormwater BMP Clearinghouse criteria. The *Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects* (October 2012) provided "Retrofit Curves" as an acceptable method for determining BMP efficiency. An FAQ published by the Bay Program in May 2013 indicated that the log curves in the October report be superseded by 5th order polynomial equations. The Expert Panel report curves were updated to reflect this change in January 2015. These equations may not provide the same efficiencies as the retrofit curves previously incorporated into this section of the guidance document. However, for this permit cycle, permittees may use either the current or former set of curves for BMP efficiency calculations. As part of the Action Plan, the permittee should clearly identify which set of curves were used for the efficiency calculations. To use the updated retrofit equations or curves, the permittee must first estimate the runoff depth treated per impervious acre by the BMP. This can be done using the following equation:

$$RD = \frac{(RS)(12)}{IA}$$

Where

RD = Runoff Depth Treated (inches)
RS = Runoff Storage (acre-feet)
IA = Impervious Acres (acres)

Runoff Depth or Runoff Storage can be estimated by the engineer who designed the BMP. **NOTE:** The previous version of this guidance document stated that permittees could use the Runoff Reduction Method Spreadsheet to estimate a BMP's Runoff Storage for use in this equation. However, upon further review, it was determined that using the "Runoff Reduction" cell is not an appropriate method, as it results in the "runoff storage" being counted twice

BMPs are categorized as either a Runoff Reduction (RR) Practice or a Stormwater Treatment (ST) Practice (*Table V.B.1)*. Once the runoff depth treated ("X") and BMP type are defined, the user will be able to estimate the total removal percentage using the retrofit curves or equations. **NOTE: The Bay Program retrofit equations and/or curves CANNOT be used for dry ponds or extended detention ponds. Permittees may use either the Bay Program Established Efficiencies or the VA Clearinghouse efficiencies to determine reductions from these practices.**

Table V.B.1 - BMP Characterization for Nutrient Curves

Runoff Reduction Practices (RR)	Stormwater Treatment Practices (ST)
Site Design/Non-Structural Practices	Constructed Practices
Landscape Restoration/Reforestation	Constructed Wetlands
Riparian Buffer Restoration	Filtering Practices (aka Constructed Filters, Sand Filters, Stormwater Filtering Systems)
Rooftop Disconnection (aka Simple Disconnection to Amended Soils, to a Conservation Area, to a Pervious Area, Non-Rooftop Disconnection)	Proprietary Practices (aka Manufactured BMPs)
Sheetflow to Filter/Open Space* (aka Sheetflow to Conservation Area, Vegetated Filter Strip)	Wet Ponds (aka Retention Basin)
All Environmental Site Design BMPS	Wet Swale
Constructed Practices	
Bioretention or Rain Garden (Standard or Enhanced)	
Dry Swale	
Expanded Tree Pits	
Grass Channels (w/ Soil Amendments, aka Bio-swale, Vegetated Swale)	
Green Roof (aka Vegetated Roof)	
Green Streets	
Infiltration (aka Infiltration Basin, Infiltration Bed, Infiltration Trench, Dry Well/Seepage Pit, Landscape Infiltration)	
Permeable Pavement (aka Porous Pavement)	
Rainwater Harvesting (aka Capture and Re-use)	
*May include a berm or a level spreader	

More information concerning the retrofit equation calculations can be found in the Bay Program's:

- *Frequently Asked Questions (FAQ) for Recently Approved Urban BMPs*, May 2013 at: http://www.chesapeakebay.net/channel_files/19172/attach_f--draft_faq_document__template.pdf and more information concerning the retrofit curves can be found in the Bay Program's:
- *Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects*, January 2015, at: http://chesapeakestormwater.net/wp-content/uploads/dlm_uploads/2012/10/Final-CBP-Approved-Expert-Panel-Report-on-Stormwater-Retrofits-long_012015.pdf

The retrofit equations and curves are provided below:

Table V.B.2 – Retrofit Equations

TN	RR	$y = 0.0308\mathbf{x}^5 - 0.2562\mathbf{x}^4 + 0.8634\mathbf{x}^3 - 1.5285\mathbf{x}^2 + 1.501\mathbf{x} - 0.013$
	ST	$y = 0.0152\mathbf{x}^5 - 0.131\mathbf{x}^4 + 0.4581\mathbf{x}^3 - 0.8418\mathbf{x}^2 + 0.8536\mathbf{x} - 0.0046$
TP	RR	$y = 0.0304\mathbf{x}^5 - 0.2619\mathbf{x}^4 + 0.9161\mathbf{x}^3 - 1.6837\mathbf{x}^2 + 1.7072\mathbf{x} - 0.0091$
	ST	$y = 0.0239\mathbf{x}^5 - 0.2058\mathbf{x}^4 + 0.7198\mathbf{x}^3 - 1.3229\mathbf{x}^2 + 1.3414\mathbf{x} - 0.0072$
TSS	RR	$y = 0.0326\mathbf{x}^5 - 0.2806\mathbf{x}^4 + 0.9816\mathbf{x}^3 - 1.8039\mathbf{x}^2 + 1.8292\mathbf{x} - 0.0098$
	ST	$y = 0.0304\mathbf{x}^5 - 0.2619\mathbf{x}^4 + 0.9161\mathbf{x}^3 - 1.6837\mathbf{x}^2 + 1.7072\mathbf{x} - 0.0091$

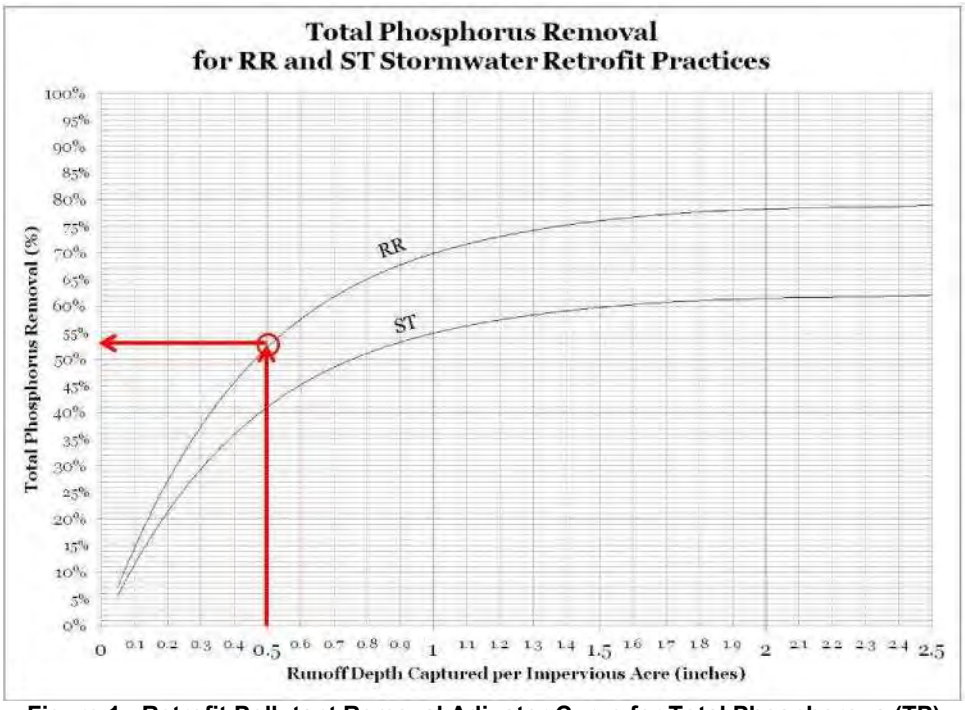


Figure 1 - Retrofit Pollutant Removal Adjustor Curve for Total Phosphorous (TP)

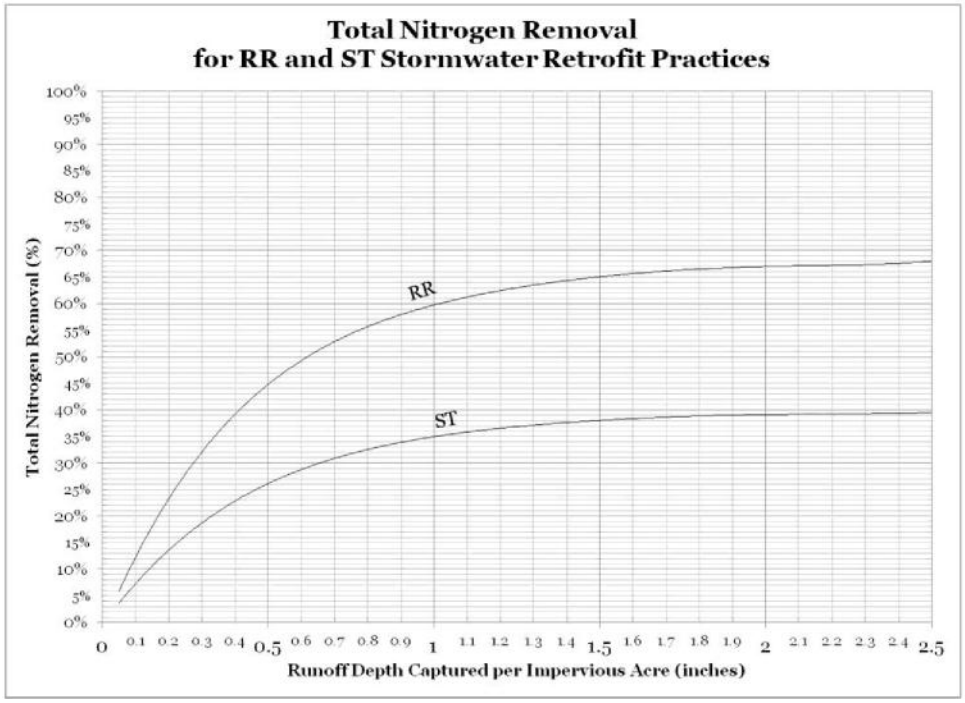


Figure 2 - Retrofit Pollutant Removal Adjustor Curve for Total Nitrogen (TN)

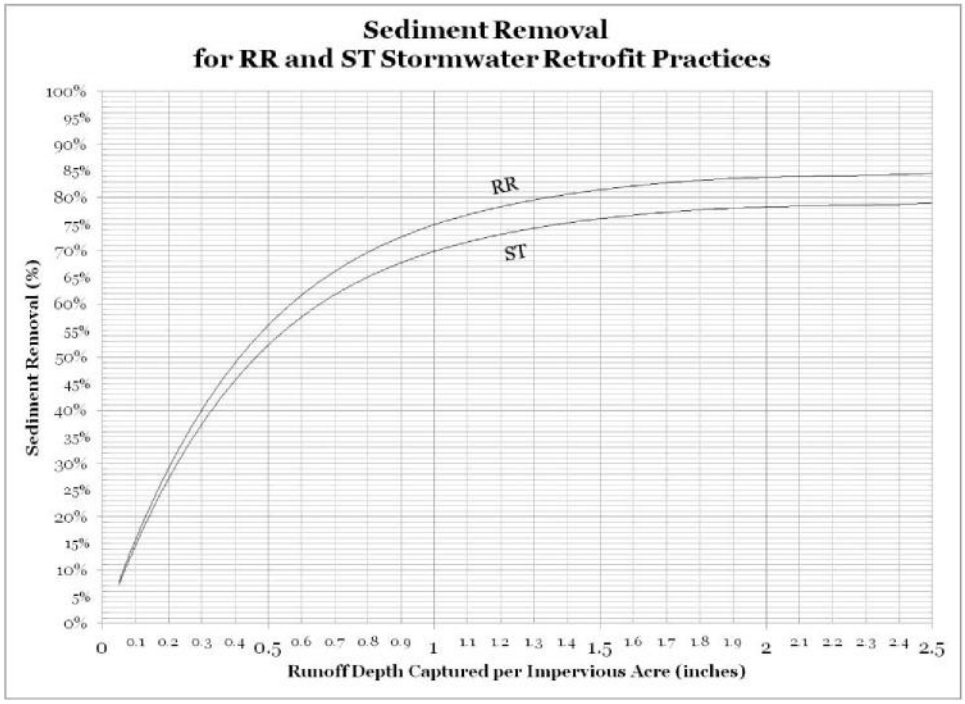


Figure 3 - Retrofit Pollutant Removal Adjustor Curve for Total Sediment (Suspended Solids)

EXAMPLE V.B.1

A small Phase II MS4 with 1000 acres of regulated urban impervious surface and 1000 acres of regulated urban pervious surface is located in the James River Basin. A constructed wetland is planned to treat a 50 acre site that is 40% impervious surface and 60% pervious surface.

Prior to considering this project, the permittee has filled out Tables 2a and 3a in their permit, which are incorporated into this example for reference. The permittee will use the loading rates in Table 2a to determine the loads draining to the proposed BMP.

Calculation Sheet for Estimating Existing Source Loads for the James River Basin (*Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	2009 EOS Loading Rate (lbs/acre/yr)[1]	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen	*1000*	9.39	*9390*
Regulated Urban Pervious		*1000*	6.99	*6990*
Regulated Urban Impervious	Phosphorus	*1000*	1.76	*1760*
Regulated Urban Pervious		*1000*	0.5	*500*
Regulated Urban Impervious	Total Suspended Solids	*1000*	676.94	*676,940*
Regulated Urban Pervious		*1000*	101.08	*101,080*

[1]This loading rate can be found in 9VAC25-890-40 Section I.C Table 2-a of the General Permit

The second table(s) in the permit must be used to calculate the required reduction for the first permit cycle. This calculation will provide the necessary reductions for the first permit cycle in pounds:

Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the James River Basin (*Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)[1]	Total Reduction Required First Permit Cycle (lbs/yr)
Regulated Urban Impervious	Nitrogen	*1000*	0.04	*40*
Regulated Urban Pervious		*1000*	0.02	*20*
Regulated Urban Impervious	Phosphorus	*1000*	0.01	*10*
Regulated Urban Pervious		*1000*	0.002	*2*
Regulated Urban Impervious	Total Suspended Solids	*1000*	6.67	*6670*
Regulated Urban Pervious		*1000*	0.44	*440*

[1]This loading rate can be found in 9VAC25-890-40 Section I.C Table 3-a in the General Permit

Based on the calculations in the table, the permittee must achieve reductions of 60 lbs TN, 12 lbs TP, and 7110 lbs TSS within the first permit cycle. Although this table divides the loads by regulated urban impervious acres and regulated urban pervious acres, the BMP's efficiencies are applied to the entire POC load, not just the load from the impervious acres. The MS4 intends to offset a portion of this load by installing a constructed wetland to treat a 50 acre site that is 40% impervious (20 acres) and 60% pervious (30 acres).

A constructed wetland is an efficiency BMP. As recommended in the guidance, the permittee intends to use the retrofit curves to calculate the percent removal accomplished by the BMP. To do this, the permittee needs to estimate (1) the BMP's runoff storage in acre-feet and (2) the number of impervious acres draining to the BMP. The design engineer determines that the runoff storage of the BMP is 1.25 acre-feet. The runoff depth can be estimated using the "Runoff Depth Treated" equation:

$$\frac{(1.25\ acre - feet)(12)}{20\ acres} = 0.75\ in$$

The runoff depth treated by the constructed wetland is 0.75 inch. From there, the retrofit curves can be used to estimate the removal efficiencies for TP, TN, and TSS. Based on *Table V.B.1* the permittee determines that constructed wetlands are a stormwater treatment (ST) BMP. Using the curves in *Figures 1, 2, and 3,* the permittee estimates that the removal rates are:

TN	TP	TSS
30%	47%	60%

The BMP's efficiency can be translated into pounds by first calculating the site's POC loading without the BMP. Recall that the BMP is being installed to treat land that is 20 acres impervious and 30 acres pervious surface. The acres should be multiplied by the 2009 EOS loading rate for the appropriate basin (*Appendix I, Table 2a)*. For TN:

$$20\ acres * 9.39\ lbs\ TN/ac/yr = 187.8\ lbs\ TN/yr$$

and for pervious surface:

$$30\ acres * 6.99\ lbs\ TN/ac/yr = 209.7\ lbs\ TN/yr$$

These values should be multiplied by the BMP's efficiency for TN that was calculated above.

$$187.8\ lbs\ TN/yr * 0.30 = 56.34\ lbs\ TN/yr$$

$$209.7\ lbs\ TN/yr * 0.30 = 62.91\ lbs\ TN/yr$$

Therefore, the TN reduction from the constructed wetland is:

$$56.34\ lbs\ TN/yr + 62.91\ lbs\ TN/yr = 119.25\ lbs\ TN/yr$$

With the installation of this BMP, the permittee has reduced its annual load of nitrogen by 119.25 lbs. With this BMP the permittee has met the reduction requirements for the first permit cycle for nitrogen. The reductions that are achieved for the other POC can be calculated using the same procedure.

APPENDIX V.C - Chesapeake Bay Program, Established Efficiencies

As an alternative to using the Bay Program Curves, permittees may use the Bay Program's established efficiencies for BMPs. Again, these efficiencies may be used for BMPs that do not meet the Virginia Stormwater BMP Clearinghouse design specifications.

Table V.C.1 – Chesapeake Bay Program BMPs, Established Efficiencies

Chesapeake Bay Program BMPs	TN	TP	TSS
Wet Ponds and Wetlands	20%	45%	60%
Dry Detention Ponds and Hydrodynamic Structures	5%	10%	10%
Dry Extended Detention Ponds	20%	20%	60%
Infiltration Practices w/o Sand, Veg.	80%	85%	95%
Infiltration Practices w/ Sand, Veg.	85%	85%	95%
Filtering Practices	40%	60%	80%
Bioretention C/D soils, underdrain	25%	45%	55%
Bioretention A/B soils, underdrain	70%	75%	80%
Bioretention A/B soils, no underdrain	80%	85%	90%
Vegetated Open Channels C/D soils, no underdrain	10%	10%	50%
Vegetated Open Channels A/B soils, no underdrain	45%	45%	70%
Bioswale	70%	75%	80%
Permeable Pavement w/o Sand, Veg. C/D soils, underdrain	10%	20%	55%
Permeable Pavement w/o Sand, Veg. A/B soils, underdrain	45%	50%	70%
Permeable Pavement w/o Sand, Veg. A/B soils, no underdrain	75%	80%	85%
Permeable Pavement w/Sand, Veg. C/D soils, underdrain	20%	20%	55%
Permeable Pavement w/Sand, Veg. A/B soils, underdrain	50%	50%	70%
Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	80%	80%	85%

BMP efficiencies for wetland restoration vary depending on hydrogeomorphic region as listed below in *Table V.C.2*. To use this table the permittee will need to determine which region their MS4 is in and use the appropriate efficiency. If the permittee is unsure which Hydrogeomorphic Region it is located in, resources are available through the USGS at http://chesapeake.usgs.gov/data.html.

Table V.C.2 – Chesapeake Bay Program BMPs, Established Efficiencies Regionally Impacted

Chesapeake Bay Program Hydrogeomorphic Region affected efficiencies				
BMPs	Region	TN	TP	TSS
Wetland Restoration	Appalachian Plateau Siliciclastic Non-Tidal	7.0%	12%	4.0%
Wetland Restoration	Coastal Plain Dissected Uplands Non-Tidal; Coastal Plain Dissected Uplands Tidal; Coastal Plain Lowlands Tidal; Coastal Plain Uplands Tidal; Coastal Plain Lowlands Non-Tidal; Coastal Plain Uplands Non-Tidal	25%	50%	15%
Wetland Restoration	Blue Ridge Non-Tidal; Mesozoic Lowlands Non-Tidal; Valley and Ridge Carbonate Non-Tidal; Piedmont Crystalline Non-Tidal; Piedmont Carbonate Non-Tidal; Valley and Ridge Siliciclastic Non-Tidal	14%	26%	8.0%

EXAMPLE V.C.1

A small Phase II MS4 with 1000 acres of regulated urban impervious surface and 1000 acres of regulated urban pervious surface is located in the James River Basin. A bioswale is planned to treat a 5 acre site that is 40% impervious surface and 60% pervious surface.

Prior to considering this project, the permittee has filled out Tables 2a and 3a in their permit, which are incorporated into this example for reference. The permittee will use the loading rates in Table 2a to determine the loads draining to the proposed BMP.

Calculation Sheet for Estimating Existing Source Loads for the James River Basin (*Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	2009 EOS Loading Rate (lbs/acre/yr)[1]	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen	*1000*	9.39	*9390*
Regulated Urban Pervious		*1000*	6.99	*6990*
Regulated Urban Impervious	Phosphorus	*1000*	1.76	*1760*
Regulated Urban Pervious		*1000*	0.5	*500*
Regulated Urban Impervious	Total Suspended Solids	*1000*	676.94	*676,940*
Regulated Urban Pervious		*1000*	101.08	*101,080*

[1]This loading rate can be found in 9VAC25-890-40 Section I.C Table 2-a of the General Permit

The second table(s) in the permit must be used to calculate the required reduction for the first permit cycle. This calculation will provide the necessary reductions for the first permit cycle in pounds:

Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the James River Basin (*Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)[1]	Total Reduction Required First Permit Cycle (lbs/yr)
Regulated Urban Impervious	Nitrogen	*1000*	0.04	*40*
Regulated Urban Pervious		*1000*	0.02	*20*
Regulated Urban Impervious	Phosphorus	*1000*	0.01	*10*
Regulated Urban Pervious		*1000*	0.002	*2*
Regulated Urban Impervious	Total Suspended Solids	*1000*	6.67	*6670*
Regulated Urban Pervious		*1000*	0.44	*440*

[1]This loading rate can be found in 9VAC25-890-40 Section I.C Table 3-a of the General Permit

Based on the calculations in the table, the permittee must achieve reductions of 60 lbs TN, 12 lbs TP, and 7110 lbs TSS within the first permit cycle. Although this table divides the loads by regulated urban impervious acres and regulated urban pervious acres, the BMP's efficiencies are applied to the entire POC load, not just the load from the impervious acres. The MS4 intends to offset a portion of this load by installing a bioswale to treat a 5 acre site that is 40% impervious (2 acres) and 60% pervious (3 acres).

The BMP's efficiency can be translated into pounds by first calculating what the site's POC loading would be without the BMP. Recall that the BMP is being installed to treat land that is 2 acres impervious and 3 acres pervious surface. The acres should be multiplied by the 2009 EOS loading rate for the appropriate basin (*Appendix I, Table 2a)*. For TN:

$$2\ acres * 9.39\ lbs\ TN/ac/yr = 18.78\ lbs\ TN/yr$$

and for pervious surface:

$$3\ acres * 6.99\ lbs\ TN/ac/yr = 20.97\ lbs\ TN/yr$$

These values should be multiplied by the BMP's efficiency for TN that was calculated above.

$$18.78\ lbs\ TN/yr * 0.70 = 13.15\ lbs\ TN/yr$$

$$20.97\ lbs\ TN/yr * 0.70 = 14.68\ lbs\ TN/yr$$

Therefore, the total nitrogen reduction from the bioswale is:

$$13.15\ lbs\ TN/yr + 14.68\ lbs\ TN/yr = 27.83\ lbs\ TN/yr$$

With the installation of this BMP, the permittee has reduced its annual load of nitrogen by 27.83 lbs. The permittee will need to implement additional BMPs to reduce the remaining 32.17 lbs of nitrogen. The reductions that are achieved for the other POC can be calculated using the same procedure.

APPENDIX V.D – BMP Enhancement, Conversion, and Restoration[16]

The credit permittees will receive for BMP Enhancement, Conversion, and/or Restoration should be calculated using an incremental rate (enhanced BMP efficiency minus existing BMP efficiency). The permittee should apply the difference between the existing BMPs efficiency and the enhanced or converted BMP's efficiency to the load that is draining to the BMP to calculate the POC reduction that will be credited.

To receive credit for BMP restoration, the project must meet the criteria for a "major restoration." Please see the *Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects* to determine if a project qualifies as a major restoration. The report may be found at*: http://chesapeakestormwater.net/wp-content/uploads/dlm_uploads/2012/10/Final-CBP-Approved-Expert-Panel-Report-on-Stormwater-Retrofits-long_012015.pdf*.

EXAMPLE V.D.1

The same small MS4 is planning to convert a Dry Extended Detention Pond to a Wet Pond. A 10 acre site that is 50% impervious (5 acres) and 50% pervious (5 acres) drains to the existing Pond and the planned upgrades will not alter the BMP's drainage area. Using the same method that was used in *Example V.A.1* and *Example V.B.1* the permittee calculates that the loads draining to the pond are:

for impervious surface:

$$5\ acres * \ 9.39\ lbs\ TN/ac/yr = \ 46.95\ lbs\ TN/yr$$

and for pervious surface:

$$5\ acres * \ 6.99\ lbs\ TN/ac/yr = \ 34.95\ lbs\ TN/yr$$

To calculate the credits for this conversion, the permittee first needs to estimate the removal efficiency of the existing Dry Extended Detention pond. The initial pond was not built to meet VA Stormwater BMP Clearinghouse standards, so the permittee chooses to use the accepted Bay Program Efficiencies as its starting point. For Dry Extended Detention Ponds the accepted Bay Program removal efficiencies are:

TN	TP	TSS
20%	20%	60%

Next the permittee must estimate the efficiency of the Wet Pond that will result from the conversion. For this the permittee elects to use the Bay Program Curves since, as the result of design constraints, the newly converted pond cannot meet all of the Clearinghouse standards for that BMP type. Using the same process described in *Appendix V.B* the permittee estimates the new Wet Pond will have a runoff depth treated of one inch. Since Wet Ponds are a ST practice, the permittee uses the provided curves[17] to estimate that the pollutant removal rates are:

TN	TP	TSS
33%	52%	66%

[16] When enhancing, converting, or restoring existing BMPs and/or impoundments, any existing water quantity criteria should be maintained to avoid potential flooding or additional stream erosion downstream of the BMP.
[17] This example and all other examples in this guidance use the previous (logarithmic) set of Bay Program Curves

To determine the credits, the permittee must subtract the efficiencies from the existing Dry Pond from the efficiencies for the new Wet Pond.

For TN

$$33\% - 20\% = 13\%$$

So for the nitrogen loads draining to the new Wet Pond the permittee will receive credit for reductions of 13 percent.

$$46.95\ lbs\ TN/yr\ *\ 0.13\ =\ 6.104\ lbs\ TN/yr$$

$$34.95\ lbs\ TN/yr *\ 0.13 =\ 4.544\ lbs\ TN/yr$$

The conversion results in a total increased reduction of 10.65 lbs TN/yr. The interim efficiencies and pollutant reductions can be calculated using the same method for the other POC.

Existing BMP Efficiency Modification

If the BMP being enhanced, converted, or restored is missing major design elements or is substantially undersized the permittee may modify the "existing BMP efficiency" that is used to calculate the incremental rate. **NOTE**: Permittees may only use this modification method if the Bay Program Established Efficiencies are used to determine the initial BMP's efficiency prior to an enhancement, conversion, or restoration project. The VA BMP Clearinghouse efficiencies may only be used if all design elements are present. Likewise, the Bay Program curves should not require additional modification to account for missing design elements. Instead any deficiencies should be captured in a reduced initial runoff storage value for the practice. Permittees will need to exercise their best professional judgment if applying an efficiency modification to an existing BMP. To receive credit for this type of modification, permittees should submit the appropriate supporting documentation to the Department for approval. All documentation supporting that modification should also be made available to the Department for verification upon request.

A Visual Inspection Checklist can be used for any design deficiencies that inhibit the full performance of a BMP when calculating credit for an enhancement, conversion, or restoration. Permittees should document how their modification decisions were made so that the Department may verify that the modification applied was appropriate. Supporting documentation, such as a visual inspection checklist and modification tables should be submitted to the Department in support of modifications. In all cases, best professional judgment should be used.

Permittees may apply a downward modification of up to 10% for each design criteria that is missing or each aspect of the practice that is undersized. The total modification should not exceed 50 percent.

EXAMPLE V.D.2

In reviewing the previous BMP conversion, the permittee determines through a field review that the initial dry pond is eligible for an efficiency modification. BMPs should be modified based on any specific deficiencies present.

For instance, elements specific to dry ponds or dry extended detention ponds that permittees might consider for a modification include:

Missing Design Criteria
For each missing design criterion, the permittee should apply an additional downward modification of 10% to the BMP's initial removal efficiency. Missing Design Criteria for a Dry Pond may include:

- *Absence of a sediment forebay*
- *Absence of a micro pool or other form of protection at the riser outlet*
- *Short circuiting due to the initial inlet placement (note: short circuiting can qualify for an efficiency modification only if it is the result of the initial BMP design. If short circuiting is the result of sediment accumulation it should not be considered for an efficiency modification)*

and

Undersized Practice
Permittees may modify the efficiency of the BMP downward by 10% if some aspect of the BMPs original design is undersized. For a dry pond this may include:

- *Small Drainage Area – if the drainage area is 5 acres or less AND the drainage orifice is greater than 3 inches (pre 1999 BMPs only) OR if the Dry Pond has less than a minimum 12 hour draw down time*
- *If the minimum volume of the pond is less than 2 * WQv (where WQv is .5 inches * the area of the impervious cover draining to the pond).*

For the dry pond in question, the permittee determines it was constructed in 1994, is missing a sediment forebay and has no riser outlet protection. The permittee summarizes this information in a spreadsheet for submission to the Department:

Sample Modification Table/Spreadsheet

BMP Type	BMP Location	Modification Type	Downward Modification Applied (%)
Dry Pond	(*Lat, Long*)	Missing Sediment Forebay	10
		No Riser Outlet Protection	10
		Total	20

Based on the review of the BMP, the permittee would be able to apply a 20% downward modification to the initial efficiency of the Dry Extended Detention Pond being enhanced or converted. So instead of the initial practice having efficiencies of 20%, 20%, and 60% for TN, TP, and TSS (*Table V.C.1)* the permittee would calculate the efficiencies 20% downward for initial efficiencies of 16%, 16% and 48 percent. These downward modified efficiencies are then used to calculate the incremental efficiencies applied to their POC loads.

So instead of the calculation shown in *Example V.D.1* to calculate the POC reductions for BMP enhancement from an existing dry extended detention pond to a Wet Pond, the permittee would perform the following calculation to estimate the increased POC reductions from the conversion:

$$33\% - 16\% = 17\%$$

This efficiency is then applied to the calculated load

$$46.95\ \ lbs\ TN/yr\ *\ 0.17\ =\ 7.98\ lbs\ TN/yr$$

$$34.95\ lbs\ TN/yr *\ 0.17 =\ 5.94 lbs\ TN/yr$$

$$7.98\ lbs\ TN/yr + 5.94\ lbs\ TN/yr = 13.92\ lbs\ TN/yr$$

The conversion, with an appropriate modification applied to the existing BMP, results in a total load reduction of 13.92 lbs TN/yr

APPENDIX V.E – BMPs installed to Meet Development and Redevelopment Requirements

Permittees will receive full credit for any POC reductions that result from redevelopment projects. For oversized BMPs and stricter development requirements permittees may receive credit for the difference between the BMP's reductions and the reductions required under the VSMP regulations or other applicable state standards. Under the VSMP regulations, TP serves as an indicator pollutant for TN and TSS and permittees must account for the associated reductions required for those POCs prior to taking credit for reductions that exceed the VSMP requirements.

Permittees may use the conversion factors in Table 4 to account for load reductions that occur as the result of direct reductions in impervious cover. To estimate the credit for TN and TSS from an oversized BMP, the permittee should calculate the proportion of the implemented BMP's total reduction that is available for credit towards the TMDL for TP. The permittee may take credit for the same proportion of the BMP's total reductions for TN and TSS. The following example provides the calculation method permittees should follow to determine reductions from oversized BMPs.

EXAMPLE V.E.1

A permittee in the James River Basin has a new development project that disturbs 10 acres. The site's post-construction average land cover condition is 20%, which has an associated TP load of .52 lbs TP/ac/yr. To meet the VSMP requirements, the permittee needs to install a BMP that reduces the average site load to .45 lbs TP/ac/yr. The permittee decides to install a Wet Pond 1 to treat this site.

Step 1: Determine the proportion of the installed BMP's total TP reductions that may be applied towards the TMDL reduction requirements:

The total TP load for the post-development site is 5.2 lbs TP/yr (.52 lbs TP/ac/yr * 10 acres) and the permittee needs to reduce that site load to 4.5 lbs TP/yr (.45 lbs TP/ac/yr * 10 acres). The total reduction required on the site to meet the VSMP regulations is:

5.2 lbs TP/yr – 4.5 lbs TP/yr = .7 lbs TP/yr reduction required

The Wet Pond 1 the permittee installs has a 50% efficiency for TP in the VA BMP Clearinghouse. The permittee multiples the total site load for TP by the BMP's efficiency and determines that the total reduction the BMP provides for TP is:

5.2 lbs TP/yr * .5 = 2.6 lbs TP/yr

The permittee may take credit for the difference between the BMP's total reductions and the reductions that are required on site to meet the VSMP regulatory requirements. For TP, the permittee may take credit for:

2.6 lbs TP/yr – 0.7 lbs TP/yr = 1.9 lbs TP/yr

Likewise, the permittee may take credit for the same *proportion* of the BMP's total reductions for each POC. The proportion that is available for credit may be determined by dividing the creditable reduction for TP by the BMPs total reduction for TP:

(1.9 lbs TP/yr) / (2.6 lbs TP/yr) = .73

Step 2: Determine the total site loads for TN and TSS:

The total associated site loads for TN and TSS should be calculated using *Table 4* in the permit:

TN: 5.2 lbs TP/yr * 5.2 lbs TN/lb TP = 27.04 lbs TN/yr

TSS: 5.2 lbs TP/yr * 420.9 lbs TSS/lb TP = 2188.68 lbs TSS/yr

Step 3: Determine the total BMP reductions for TN and TSS:

For TN, the permittee should use the VA BMP Clearinghouse efficiency for a Wet Pond 1, which is 30%:

TN: 27.04 * .30 = 8.112 lbs TN/yr

For TSS, the permittee may use either the Bay Program Established Efficiencies or the Bay Program Curves. In this example, the permittee decides to use the Bay Program Established Efficiency, which is 60% for a Wet Pond:

TSS: 2188.68 lbs TSS/yr * .6 = 1313.21 lbs TSS/yr

Step 4: Determine the credit the permittee may receive towards the TMDL reduction requirements for TN and TSS:

The permittee may take credit for the same proportion of the total pollutant load determined in **Step 1** for TN and TSS**:**

TN: 8.112 lbs TN/yr * .73 = 5.92 lbs TN/yr

TSS: 1313.21 lbs TSS/yr * .73 = 958.64 lbs TSS/yr

The permittee may take credit for 1.9 lbs TP/yr, 5.92 lbs TN/yr, and 958.64 lbs TSS/yr towards its TMDL requirements for this oversized BMP.

APPENDIX V.F – Treatment Trains

Although BMPs should be reported to the Department individually, the permittee may receive credit for BMPs that are implemented as part of a treatment train. For treatment trains composed of BMPs from the Virginia Stormwater BMP Clearinghouse the Runoff Reduction Method Spreadsheet can be used to account for the impact of the treatment train. If the retrofit curves are used, the permittee will need to use their best professional judgment to identify the predominant BMP that will be credited. If BMPs with Bay Program approved efficiencies are used, the permittee may calculate the reduced POC loading rate to each BMP in the treatment train to estimate the appropriate reductions for each step.

APPENDIX V.G – Street Sweeping

In the initial publication of this guidance document a street sweeping efficiency was provided in Table V.C.1. Upon further review, it was determined that a single efficiency is not an appropriate method for calculating reductions from this practice. Instead permittees should follow one of the suggested Bay Program methods: the "mass loading approach" or "qualifying street lanes method." Calculation procedures for both methods are provided below:

Mass Loading Approach

1. Determine pounds of material collected
2. Convert to pounds of material to dry weight using a factor of .7 lbs dry weight/lbs material
3. Multiply by the following factors for each POC to determine the reductions from street sweeping:

TN lbs/yr	TP lbs/yr	TSS lbs/yr
.0025	.001	.3

Qualifying Street Lanes Method

1. Determine the lane miles swept
2. Convert to total impervious acres by multiplying the miles swept by the lane width swept (10 ft) and dividing that figure by 43,560. If both side of the street are swept, then use a lane width of 20 feet.
3. Multiply the impervious acres by the pre-sweeping annual nutrient load for TP (2 lbs/impervious acre/yr) and TN (15.4 lbs/impervious acre/yr):
4. Multiply the pre-sweep baseline load by the pickup factors depending on the technology used to determine the reductions from street sweeping:

Technology	TN lbs/yr	TP lbs/yr	TSS lbs/yr
Mechanical	.04	.04	.10
Regenerative/Vacuum	.05	.06	.25

For additional information regarding these calculation procedures, please see:

- March 3, 2011 memo Re: Street Sweeping/BMP Era Recommendations: http://www.chesapeakebay.net/channel_files/13238/bmp_memo_to_wg_for_street_and_era.pdf
- Section 5.3.8 of the Chesapeake Stormwater Network's *Technical Bulletin 9:* http://chesapeakestormwater.net/wp-content/uploads/downloads/2012/03/TB-9-Nutrient-Accounting-FINAL-DRAFT.pdf

Permittees will receive full credit for the POC pounds reduced through their street sweeping program as calculated using either the "mass loading approach" or the "qualifying street lanes method." Permittees do not need to meet the minimum requirement of sweeping 26 times per year to receive credit for this practice.

Regardless of the method that is used to calculate credits for street sweeping, permittees should note that **street sweeping will be credited annually**. If permittees commit to a level of pollutant removal to achieve their 5% reductions and fall short of meeting those pollutant reductions additional reductions will need to be made in those years. Permittees may wish to be conservative in their estimates of the amount of pollutants that will be reduced by street sweeping annually to avoid shortfalls in the future.

APPENDIX V.H – Land Use Change

Permittees may receive credit for land use change conversions based on the number of acres converted. Conversion efficiencies for land use change are dependent on basin and are listed in Table V.H.1. Permittees may receive credit for converting:

1. Impervious to Forest – Permittees may receive credit for converting any Impervious Surface to Forest. To receive credit for the "Forest" land use, permittees should meet the tree density per acre described in the Virginia Department of Forestry's Land Use Tax Assessment Standards (*Table V.H.2*), which can also be found on the Virginia Department of Forestry's website: http://www.dof.virginia.gov/land/usetax/assessment-standards.htm.
2. Impervious to Grass – Permittees may receive credit for converting any Impervious Surface to Grass. To qualify for this credit the "Grass" must be unmanaged (i.e. no nutrient application).
3. Impervious to Pervious – Permittees may receive credit for converting any Impervious Surface to a Pervious Surface other than Forest and/or Grass. Pervious surfaces might include: lawns, unimpacted gravel, railroad embankments/side slopes, etc. If a permittee is unsure if a surface is considered "pervious," the Department should be contacted for further guidance.
4. Pervious to Forest – Permittees may receive credit for converting any Pervious Surface, including unmanaged Grass, to Forest.
5. Pervious to Grass – Permittees may receive credit for converting any Pervious Surface, other than Forest, to unmanaged Grass.

Table V.H.1 – Land Use Change Conversion Efficiency Table

Basin	Land Use from	Conversion	Edge of Stream Reductions TN(lbs/ac/year)	Edge of Stream Reductions TP(lbs/ac/year)	Edge of Stream Reductions TSS(lbs/ac/year)
James	Impervious	Forest	7.31	2.07	875.11
James	Impervious	Grass	6.87	1.55	486.31
James	Impervious	Pervious	2.29	1.60	817.29
James	Pervious	Forest	5.03	0.48	57.82
James	Pervious	Grass	4.58	0.00	0.00
Potomac	Impervious	Forest	13.91	1.80	1252.01
Potomac	Impervious	Grass	12.56	1.34	623.28
Potomac	Impervious	Pervious	6.75	1.42	1119.05
Potomac	Pervious	Forest	7.16	0.38	132.96
Potomac	Pervious	Grass	5.81	0.00	0.00
Rappahannock	Impervious	Forest	11.51	2.26	866.31
Rappahannock	Impervious	Grass	10.04	1.67	206.99
Rappahannock	Impervious	Pervious	4.19	1.74	793.13
Rappahannock	Pervious	Forest	7.32	0.53	73.18
Rappahannock	Pervious	Grass	5.85	0.00	0.00
York	Impervious	Forest	6.83	1.49	749.05
York	Impervious	Grass	6.06	1.17	430.00
York	Impervious	Pervious	1.65	1.10	670.75
York	Pervious	Forest	5.18	0.40	78.30
York	Pervious	Grass	4.41	0.08	0.00

Table V.H.2 - Minimum Number of Trees Required Per Acre to Determine 30 Square Feet of Tree Basal Area of 40% Stocking For Classification as Forest Land

D.B.H.[1] Range	D.B.H. in 2" Classes	Basal Area Per Tree	Per Acre	Per 1/5 Acre	Per 1/10 Acre
up to 2.9"	Seedlings		400	80	40
3.0-4.9"	4	0.0873	400	80	40
5.0-6.9"	6	0.1964	153	31	15
7.0-8.9"	8	0.3491	86	17	9
9.0-10.9"	10	0.5454	55	11	6
11.0-12.9"	12	0.7854	38	8	4
13.0-14.9"	14	1.0690	28	6	3
15.0" +	16+	1.3963	21	4	2

[1] DBH refers to the tree diameter measured at 4.5 feet above the ground.

EXAMPLE V.H.1

A locality in the Potomac River Basin is converting 1.5 acres of contiguous land from impervious surface to forest. The trees being planted all fall between 1 and 2 inches in diameter at breast height (4.5 feet from ground level), so the permittee must plant at least 400 trees per acre or at least 600 trees on the site to qualify for the land use conversion. To calculate the credit the permittee will receive, the appropriate values from *Table V.H.1* should be used.

For TN:

$$1.5\ acres\ converted * 13.91\ lbs\ TN/ac/yr = 20.87\ lbs\ TN/yr$$

For TP:

$$1.5\ acres\ converted * 1.80\ lbs\ TP/ac/yr = 2.7\ lbs\ TP/yr$$

For TSS:

$$1.5\ acres\ converted * 1252.01\ lbs\ TSS/ac/yr = 1{,}878.02\ lbs\ TSS/yr$$

Through the land use conversion the permittee has offset 20.87 lbs TN/yr, 2.7 lbs TP/yr, and 1,878.02 lbs TSS/yr.

APPENDIX V.I – Forest Buffers

Forest Buffers can be credited as both a land use change and efficiency BMP. The land use change component should be credited in accordance with the applicable section of *Table V.H.1* in *Appendix V.H*. The efficiency is applied at up to a 2-to-1 ratio for upland acres that drain to the buffer as sheetflow (i.e. if a one acre buffer is installed, but only 1.5 upland acres drains to the buffer as sheetflow, the permittee may only receive the efficiency credit for 1.5 acres). The following established efficiencies for TP, TN, and TSS should be used (*Table V.I.1*):

Table V.I.1 - Efficiencies for Forest Buffers Applied to Two Upland Acres per Acre of Buffer

Practice	TN	TP	TSS
Forest Buffer	25%	50%	50%

EXAMPLE V.I.1

A permittee in the Potomac River basin has identified an area of regulated land adjacent to a stream as a candidate site for a forest buffer. The site has 311.14 linear feet of stream that can be buffered with an average width of 35 feet for a total of a 0.25 acre forest buffer. The land the forest buffer will be implemented on and the land draining to the buffer is all urban pervious.

Calculating the nutrient reductions provided by this BMP is a two part process. The first step is to calculate the reductions that result from the land use conversion. The permittee is converting pervious surface to forest, so using *Table V.H.1* in *Appendix V.H*, the permittee can identify the appropriate conversion factor, which is 7.16 lbs/acre for nitrogen. The permittee should multiply this value by the acres changed to calculate the land use change reduction for the site:

$$7.16\ lbs\ TN/ac/yr * \ 0.25\ acres = 1.79\ lbs\ TN/yr$$

In addition to the land use change credit, the permittee will also receive an efficiency credit for this BMP. Again, the permittee should calculate the loading rate for the land draining to the BMP. Upland acres are treated by forest buffers at a ratio of 2:1, so there are:

$$0.25\ acres\ converted * 2 = \ 0.5\ upland\ acres\ treated$$

The permittee verifies that there are at least 0.5 upland acres draining to the buffer as sheetflow, so the permittee may take the full efficiency credit for this forest buffer.

The permittee should multiply the number of upland acres treated by the appropriate loading rate from Section I.C.2.a.(4) in the MS4 permit, in this case *Table 2b* for the Potomac watershed. As noted above, all the land draining to the BMP is urban pervious so for TN the loading rate for all acres draining to the buffer is 10.07 lbs. To estimate the loading rate after the BMP is applied, the permittee should multiply the initial loading rate by the BMPs efficiency, which is 25% (*Table V.I.1*):

$$10.07\ lbs\ TN/ac/yr * \ 0.25 = 2.52\ lbs\ TN/ac/yr$$

The permittee should multiply the upland acres treated by this modified loading rate to calculate the pounds of nitrogen reduced:

$$2.52\ lbs\ TN/ac/yr * \ 0.5\ acres = 1.26\ lbs\ TN/yr$$

This result should be added to the result from the land use conversion for a total reduction of:

$$1.79\ lbs\ TN/yr + 1.26\ lbs\ TN/yr = 3.05\ \ lbs\ TN/yr$$

With the installation of the forest buffer, this permittee has reduced its annual load of TN by 3.05 lbs/yr. The same procedure can be followed to calculate the reductions for TP and TSS.

APPENDIX V.J – Urban Stream Restoration

For urban stream restoration projects that have been installed on or after January 1, 2006 and those that cannot conform to any of the four protocols for stream restoration, permittees should use the interim approved removal rates developed by the Bay Program to calculate credits. These efficiencies can be found in *Table V.J.1*.

Table V.J.1 – Urban Stream Restoration Interim Approved Removal Rates

BMPs	How Credited	TN	TP	TSS
Stream Restoration	Mass reduction/length (lbs/linear ft)	0.075	0.068	444.88/15.13*

*The value that should be used to calculate reductions for sediment is dependent on the project's location. Projects located outside the coastal plain should use 44.88 lbs TSS/linear ft. Projects located within the coastal zone should use 15.13 lbs TSS/linear ft.

In addition to the removal rates, there are four established protocols for urban stream restoration that a permittee may use to calculate reductions from urban stream restoration projects. However, the Department strongly recommends that permittees use the interim approved removal rates to calculate reductions for stream restoration projects during Action Plan development because the Stream Restoration Protocols are still actively under review and revision.

The four protocols are:

1. Prevented Sediment During Storm Flow
2. Instream and Riparian Nutrient Processing During Base Flow
3. Floodplain Reconnection Volume
4. Dry Channel Regenerative Stormwater Conveyance (RSC) as an Upland Stormwater Retrofit

These protocols, and the interim removal rates, may be applied to 0-5th order streams that meet the basic qualifying conditions described in the Expert Panel Report. Credit cannot be received for improvements to stream sections that are tidally influenced. The first three protocols require direct measurements to estimate pollutant reductions. Pollutant reductions for the fourth option can be calculated using the curves provided by the Bay Program for the other runoff reduction BMPs. Full requirements for each type of stream restoration and how they are credited in the Bay Program are described in greater detail in the following report:

> *Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects*, September 2014, which can be found at: http://www.chesapeakebay.net/documents/Stream_Panel_Report_Final_08282014_Appendices_A_G.pdf

Once the reductions from an Urban Stream Restoration project are calculated using one of the accepted methodologies, the credit a permittee may receive must be adjusted to account for the baseline required for the proportion of unregulated land that drains to the restored stream section. Permittees do not need to account for any BMPs installed upstream of a stream restoration project when calculating the reduction from the project **NOTE**: In the initial version of this guidance document permittees also had to account for the amount of forested lands draining to a stream restoration project, and subtract from the total reductions the proportion of the upstream area that receives drainage from forested land. This has been revised. Regardless of whether these lands are incorporated into the initial reductions calculated using the tables, permittees do not have to reduce the credit received from a stream restoration project based on the proportion of forested acres draining to the project.

NOTE: Stream Restoration projects included in the Action Plan must include clear documentation of the degraded nature of the stream prior to restoration. Permittees should incorporate verification activities into their stream restoration projects, such as periodic visual inspections, to ensure the project does not degrade.

EXAMPLE V.J.1

To meet its TMDL reduction requirements, a Phase II permittee in the James River basin has decided to implement a stream restoration project. In accordance with the GP, the permittee may receive credit for the implementation of BMPs on unregulated lands provided any necessary baseline reduction is accounted for (Section I.C.2.b.(1)). For stream restoration projects that receive drainage from both regulated and unregulated lands, permittees may take full credit for the loads draining from regulated lands and an adjusted credit for loads draining off unregulated lands that accounts for baseline reductions (Section I.C.2.b.(2)). Permittees may receive full credit for the proportion of unregulated forested acres or agricultural lands draining to the project because there is no baseline requirement for those lands.

Step 1: Calculate the POC Reductions from the Proposed Stream Restoration Project:

The permittee uses the default rate (*Table V.J.1*) to calculate the stream restoration project's POC reductions. The permittee is restoring a 1,000 linear foot stream reach. The calculated reductions for this project are:

TN	TP	TSS
75 lbs/yr	68 lbs/yr	44,880 lbs/yr

Step 2: Characterize the Acres Draining to the Proposed Stream Restoration Project:

To quantify the stream restoration project reductions that can be credited toward meeting the TMDL, the permittee must first characterize the acres that drain to the project. The permittee estimates the regulated urban impervious and urban pervious acres, unregulated urban impervious and urban pervious acres, and forested acres draining to the stream length that will be restored:

	Urban Impervious Acres	Urban Pervious Acres	Total Urban Acres	Forested Acres	
Regulated Land[1]	9.08	6.37	15.45	1.90	
Unregulated Land	.21	1.64	1.85	7.36	Total
		Total	17.3	9.26	26.56

[1]Regulated Land means acres that drain to any MS4 system.

Using this information, ratios of regulated, unregulated, and forested acres to total acres can be calculated:

15.45 acres regulated land/26.56 total acres = 0.58 regulated acreage ratio

1.85 unregulated acres/26.56 total acres = 0.07 unregulated acreage ratio

9.26 forested acres/26.56 total acres = 0.35 forested acres

Step 3: Calculate the Total Reductions for Regulated and Unregulated Urban Lands

Permittees may receive credit for stream restoration projects from:

1. **Regulated Urban Acres**: permittees may receive the full reduction credit for the proportion of the project that receives drainage from regulated acres
2. **Unregulated Urban Acres**: permittees may receive an adjusted reduction credit for the proportion of the project that receives drainage from unregulated acres. **NOTE:** If the baseline requirement for unregulated land exceeds the credit produced on unregulated urban acres, permittees may not receive credit for the proportion of the project that receives drainage from unregulated acres. However, this will not impact the credit received for the proportion of the project that receives drainage from regulated urban acres or forested or agricultural acres.
3. **Forested or Agricultural Acres**: permittees may receive full credit for the proportion of the project that receives drainage from unregulated forested or agricultural lands, as there is no baseline requirement for these lands.

So, to calculate the TSS credits it may receive for this stream restoration project, the permittee should multiply the total project TSS reduction calculated in *Step 1* (45,974 lbs TSS/yr) by the ratios calculated in *Step 2*:

For regulated acres: 44,880 lbs TSS * 0.58 = 26,030.4 lbs TSS

For unregulated urban acres: 44,880 lbs TSS * 0.07 = 3,141.6 lbs TSS

For forested acres: 44,880 lbs TSS * 0.35 = 15,708 lbs TSS

Step 4: Account for the Total Baseline Reductions on Unregulated Land

The load reduction calculated for unregulated acres must be adjusted to account for the baseline reduction required on unregulated land. This calculation is based on the loading rates found in Tables 3a-d of the permit. The impervious and pervious load reductions that must be achieved in the first permit cycle (5.0% of the total required reductions) are multiplied by 20 to estimate the entire baseline reductions needed to comply with the Chesapeake Bay TMDL by the end of the third MS4 permit cycle. For TSS the permittee calculates that the baseline loading rate for its project in the James River Basin (Table 3a) for urban impervious acres is:

6.67 lbs TSS/ac/yr * 20 = 133.40 lbs TSS/ac/yr

and for urban pervious acres is:

0.44 lbs TSS/ac/yr * 20 = 8.80 lbs TSS/ac/yr

The total required baseline reduction can be calculated by multiplying these loading rates by the unregulated urban acres draining to the stream restoration project.

For urban impervious acres this is:

133.40 lbs TSS/ac/yr * 0.21 Unregulated Urban Impervious Acres = 28.01 lbs TSS/yr

and for urban pervious acres this is:

8.80 lbs TSS/ac/yr * 1.64 Unregulated Urban Pervious Acres = 14.43 lbs TSS/yr

for a total baseline reduction of:

28.01 lbs TSS/yr + 14.43 lbs TSS/yr = 42.44 lbs TSS/yr

The permittee *may not* take credit for 42.44 lbs TSS reduction from the unregulated lands draining to the stream restoration project. The permittee should subtract this value from the TSS credit for unregulated acres that was calculated in *Step 3*:

3,141.6 lbs TSS/yr – 42.44 lbs TSS/yr = 3,099.16 lbs TSS/yr

The permittee may take credit for 3,099.16 lbs TSS/yr for the proportion of unregulated land draining to the stream restoration project. Again, if this value is negative the permittee may not receive credit for the proportion of unregulated urban acres draining to the stream restoration project. The total credit for the project will be limited to the credit calculated for regulated urban acres and forested or agricultural acres.

Step 6: Calculate Total Reductions from Regulated and Unregulated (Non-Forested) Acres, Accounting for Required Baseline Reductions:

To calculate the credit towards meeting the reductions required under the TMDL the permittee should receive for this stream restoration project, the adjusted credit for unregulated acres calculated in *Step 5* should be added to the credit the permittee receives for the proportion of regulated acres draining to the restored stream calculated in *Step 3*:

26,030.4 lbs TSS/yr + 3,099.16 lbs TSS/yr +15,708 lbs TSS/yr = 44,837.56 lbs TSS/yr

The permittee should receive credit for reducing 44,837.56 lbs TSS/yr through this stream restoration project. The calculations for TN and TP can be done using the same process.

APPENDIX V.K – Urban Nutrient Management

Permittees are required under the "Turf and Landscape Management" section of the permit (GP Section II.B.6.c) to develop NMPs on "all lands owned or operated by the MS4 operator where nutrients are applied to a contiguous area greater than one acre." Permittees cannot receive credit towards the TMDL reduction requirements for the development of NMPs that are required by Virginia statute or regulation. However, permittees may receive credit for NMPs that are developed for lands outside the MS4 service area[18], public lands within the MS4 service area that are one contiguous acre or less, or privately owned lands where nutrients are applied that are not golf courses. Urban Nutrient Management plans can be applied and reported in partial acres. If any BMPs are installed downstream of land where a credited urban nutrient management plan has been applied, permittees will need to account for the reduced pollutant load going to that BMP. The efficiency accepted for nutrient management is based on the risk level for the site. Where the risk level is unknown, permittees should use the blended efficiency (*Table V.K.1*).

TABLE V.K.1 – Urban Nutrient Management Removal Rate

Site Risk Level	TN	TP
High	20%	10%
Low	6%	3%
Unknown (Blended)	9%	4.5%

The removal rate represents a percent reduction of pervious load based on the number of acres the UNM plan covers. The load that is reduced should be calculated based on the loading rates in permit Tables 2a-d. How risk for the site is estimated is discussed in greater detail in the following report:

- *Recommendation of the Expert Panel to Define Removal Rates for Urban Nutrient Management,* March 2013, which can be found at: http://www.chesapeakebay.net/documents/Final_CBP_Approved_Expert_Panel_Report_on_Urban_Nutrient_Management--short.pdf

EXAMPLE V.K.1 – Nutrient Management on Unregulated Land

A permittee in the York River Basin develops an NMP for 5 acres of privately owned turf fields that are located outside of their regulated MS4 service area. Since the NMP is for unregulated land, the permittee will receive an adjusted credit for the NMP after the baseline reductions are subtracted from the total expected NMP reductions.

To calculate the reductions from the NMP that will be credited towards the TMDL reduction requirements the permittee should first calculate the POC reductions from the NMP based on the *Recommendation of the Expert Panel to Define Removal Rates for Urban Nutrient Management*. The permittee references Table 2d in the permit to calculate the POC loads for the 5 acre project:

5 acres * 7.65 lbs TN/ac/yr = 38.25 lbs TN/yr

5 acres * 0.51 lbs TP/ac/yr = 2.55 = lbs TP/yr

The risk level for the 5 acres is unknown, so the permittee uses the blended efficiency to calculate the reductions from the NMP:

38.25 lbs TN/yr * 0.09 = 3.44 lbs TN/yr

[18] If the BMP was funded by a 319 nonpoint source grant, it may be contrary to the funding award to seek credit towards required reductions under the Special Condition.

2.55 lbs TP/yr * 0.045 = 0.11 lbs TP/yr

In accordance with Section I.C.2.b.(1), the permittee must account for baseline reductions on unregulated land prior to taking credit for any BMP reductions. For NMPs, baseline is the 48% reduction on all urban pervious lands that is assumed under the WIP. The permittee may receive credit for the remaining 52% of the project's reductions:

3.44 lbs TN/yr * .52 = 1.79 lbs TN/yr

.11 lbs TP/yr * .52 = 0.06 lbs TP/yr

For developing a NMP for 5 acres of privately owned turf fields outside of the permittee's MS4 service area, the permittee may take credit for reductions of 1.79 lbs TN/yr and 0.06 lbs TP/yr.

APPENDIX V.L – Development on Prior Developed Lands (Redevelopment)

Permittees may receive credit for redevelopment projects if the pre-development pollutant load is reduced, regardless of the initial land use condition. Under VSMP regulations (9VAC25-870), development projects may be subject to either Technical Criteria II B or Technical Criteria II C:

Projects Subject to Technical Criteria II B:

Under VSMP regulations, those projects subject to Technical Criteria II B permittees are (1) required to reduce phosphorous by 20% for land-disturbing activities disturbing greater than or equal to one acre that result in no net increase in impervious cover from the predevelopment condition or (2) reduce phosphorous by 10% for land-disturbing activities disturbing less than one acre that result in no net increase in impervious cover from the predevelopment condition. Permittees may take credit for these reductions. Permittees may also take credit for any Nitrogen and/or Sediment reductions that are created by the BMPs that are implemented to meet these requirements.

Projects Subject to Technical Criteria II C:

Technical Criteria II C applies to those projects that initiate construction prior to July 1, 2014 or are grandfathered in accordance with 9VAC-25-870-48. For these projects, permittees may use either the (1) performance-based criteria or the (2) technology- based criteria:

(1) Performance Based Criteria – Reductions may be credited to the permittee if the phosphorous load is reduced through development of prior developed lands (See Appendix II – Situation 3).
(2) Technology Based Criteria – If this approach is used, no additional reductions are required under the Special Condition beyond those for existing development under Special Condition requirement 6 (GP Section I.C.2.a.(6)).

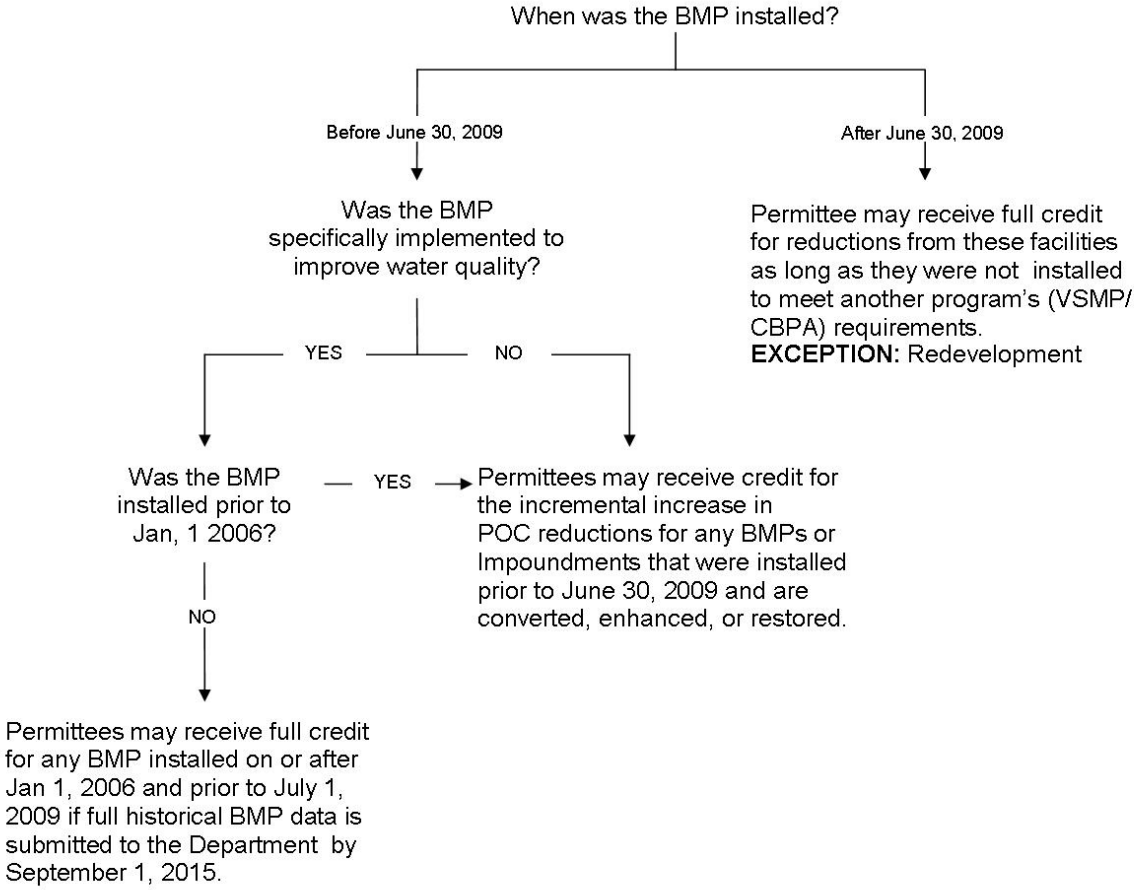
APPENDIX VI – Credit for BMPs installed prior to July 1, 2009

For all BMPs or impoundments that were installed prior to July 1, 2009 permittees may receive credit for any incremental increase in treatment that is the result of an enhancement, conversion, or restoration project. Restoration projects must meet the minimum requirements that are listed in the *Expert Panel to Define Removal Rates for Urban Stormwater Retrofits* report to be eligible for credit. Permittees may not receive full credit for BMPs that were installed prior to January 1, 2006, regardless of whether or not they were previously reported to the Department.

Permittees may receive full credit for BMPs that were initially installed on or after January 1, 2006 and prior to July 1, 2009 within the regulated MS4 service area, if a full account of BMPs throughout the permittee's jurisdiction is submitted to the Department as part of the "Historical Data Clean-Up" effort. **Historical BMP data should be submitted to the Department by September 1, 2015**. Please see Part IV.2 of this document for additional information on receiving credit for these BMPs.

A flowchart showing the credit permittees may receive for BMPs installed prior to July 1, 2009 is included below.

Credit for BMPs installed prior to July 1, 2009



APPENDIX VII – REPORTING ELEMENTS

Table VI.1 – Reporting Elements for Individual BMPs

Virginia Stormwater BMP Clearinghouse BMP	
Practice	Reporting Elements
Rooftop Disconnection	Impervious acres disconnected
Sheetflow to Vegetated Filter or Conserved Open Space 1 & 2	area in acres treated
Grass Channel	area in acres treated by grass channel
Vegetated Roof 1 & 2	area in acres treated by vegetated roof
Rainwater Harvesting	volume of rainwater captured
Permeable Pavement 1	area in acres treated by permeable pavement and upgradient area draining to pavement, so long as it does not exceed a ratio of 2:1
Permeable Pavement 2	area in acres treated by permeable pavement
Infiltration 1 & 2	area in acres treated by infiltration practices
Bioretention 1 & 2, Urban Bioretention	area in acres treated by bioretention practices
Dry Swale 1 & 2	area in acres treated by dry swale
Wet Swale 1 & 2	area in acres treated by wet swale
Filtering Practice 1 & 2	area in acres treated by filtration practices
Constructed Wetland 1 & 2	area in acres treated by constructed wetlands
Wet Pond 1 & 2	area in acres treated by Wet Ponds
Extended Detention Pond 1 & 2	area in acres treated by Extended Detention Ponds
Chesapeake Bay Program BMPs	
Wet Ponds and Wetlands	area in acres treated by Wet Ponds or wetlands
Dry Detention Ponds and Hydrodynamic Structures	area in acres treated by Dry Detention Ponds or Hydrodynamic Structures
Dry Extended Detention Ponds	area in acres treated by Dry Extended Detention Ponds
Infiltration Practices w/o Sand, Veg.	area in acres treated by infiltration practices
Infiltration Practices w/ Sand, Veg.	area in acres treated by infiltration practices
Filtering Practices	area in acres treated by filtration practices
Bioretention C/D soils, underdrain	area in acres treated by bioretention practices
Bioretention A/B soils, underdrain	area in acres treated by bioretention practices
Bioretention A/B soils, no underdrain	area in acres treated by bioretention practices
Vegetated Open Channels C/D soils, no underdrain	area in acres treated by vegetated Open Channels C/D soils, no underdrain
Vegetated Open Channels A/B soils, no underdrain	area in acres treated by vegetated Open Channels A/B soils, no underdrain
Bioswale	area in acres treated by bioswale
Permeable Pavement w/o Sand, Veg. C/D soils, underdrain	area in acres of permeable pavement w/o Sand, Veg. C/D soils, underdrain
Permeable Pavement w/o Sand, Veg. A/B soils, underdrain	area in acres of permeable pavement w/o Sand, Veg. A/B soils, underdrain
Permeable Pavement w/o Sand, Veg. A/B soils, no underdrain	area in acres of permeable pavement w/o Sand, Veg. A/B soils, no underdrain
Permeable Pavement w/Sand, Veg. C/D soils, underdrain	area in acres of permeable pavement w/Sand, Veg. C/D soils, underdrain
Permeable Pavement w/Sand, Veg. A/B soils, underdrain	area in acres of permeable pavement w/Sand, Veg. A/B soils, underdrain
Permeable Pavement w/Sand, Veg. A/B soils, no underdrain	area in acres of permeable pavement w/Sand, Veg. A/B soils, no underdrain

Performance Standard Curve ST or RR, Establishment Retrofit Curve ST or RR, Enhancement Retrofit Curve ST or RR, Restoration Retrofit Curve Pre-restoration condition ST or RR, Restoration Retrofit Curve Post restoration condition ST or RR	total area of runoff collection, impervious area within the total, inches of runoff captured
Wetland Restoration	area in acres of restored wetlands
Stream Restoration	linear feet of stream restoration
Land Use Change BMPs	
Impervious Urban Surface Reduction	area in acres of reduced impervious surface
Forest Buffers	area in acres converted to riparian forest
Grass Buffers	area in acres converted to riparian grasses or herbaceous plants
Tree Planting	area in acres converted to forest

General Permit No.: VAR04

Effective Date: ~~July 9, 2008~~ July 1, 2013

Expiration Date: ~~July 8, 2013~~ June 30, 2018

GENERAL PERMIT FOR DISCHARGES OF STORMWATER FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS

AUTHORIZATION TO DISCHARGE UNDER THE VIRGINIA STORMWATER MANAGEMENT PROGRAM AND THE VIRGINIA STORMWATER MANAGEMENT ACT

In compliance with the provisions of the Clean Water Act, as amended and pursuant to the Virginia Stormwater Management Act and regulations adopted pursuant thereto, this permit authorizes operators of small municipal separate storm sewer systems to discharge to surface waters within the boundaries of the Commonwealth of Virginia, except those waters specifically named in State Water Control Board and Virginia Soil and Water Conservation Board regulations ~~or policies~~ which prohibit such discharges.

The authorized discharge shall be in accordance with this cover page, Section I—Discharge Authorization and Special Conditions, Section II—MS4 Program and Section III—Conditions Applicable To All VSMP Permits, as set forth herein. The operator shall utilize all legal authority provided by the laws and regulations of the Commonwealth of Virginia to control discharges to and from the MS4. This legal authority may be a combination of statute, ordinance, permit, specific contract language, order or interjurisdictional agreements.

For operators who have previously held MS4 state permit coverage, the operator shall update the MS4 Program Plan in accordance with the following schedule. Until such time as the required updates are completed and implemented, the operator shall continue to implement the MS4 Program consistent with the MS4 Program Plan submitted with the registration statement.

For operators of small MS4s that are applying for initial coverage under this general permit, the schedule to develop and implement the MS4 Program Plan shall be submitted with the completed registration statement.

Table 1: Schedule of MS4 Program Plan Updates Required in this Permit

Program Update Requirement	Permit Reference	Update Completed By
Updated TMDL Action Plans (TMDLs approved before July of 2008)	Section I B	24 months after permit coverage
Other TMDL Action Plans for applicable TMDLs approved between July 2008 and June 2013	Section I B	36 months after permit coverage
TMDL Action Plans for applicable TMDLs approved after June of 2013	Section I	36 months after notification by the department of their approval
Chesapeake Bay TMDL Action Plan	Section I C	24 months after permit coverage
Public Education Outreach Plan	Section II B	12 months after permit coverage
Outfall Map Completed	Section II B	48 months after permit coverage
Illicit Discharge Procedures	Section II B	12 months after permit coverage
Single Family SWM Special Criteria	Section II B	12 months after permit coverage
Stormwater Management Progressive Compliance and Enforcement	Section II B	24 months after permit coverage
Operator-Owned Stormwater Management Inspection Procedures	Section II B	12 months after permit coverage
Daily Good Housekeeping Procedures	Section II B	24 months after permit coverage
SWPPP Locations	Section II B	12 months after permit coverage
SWPPP Implementation	Section II B	60 months after permit coverage with internal goals
Nutrient Management Plan (NMP) Locations	Section II B	12 months after permit coverage
NMP Implementation	Section II B	60 months after permit coverage
Training Schedule and Program	Section II B	12 months after permit coverage

SECTION I
DISCHARGE AUTHORIZATION AND SPECIAL CONDITIONS

A. Coverage under this permit. During the period beginning with the date of coverage under this general permit and lasting until the expiration and reissuance of this permit, the operator is authorized to discharge in accordance with this permit from the small municipal separate storm sewer system identified in the registration statement into surface waters.

~~B. Special conditions. A total maximum daily load (TMDL) approved by the State Water Control Board may include a wasteload allocation to the regulated small MS4 that identifies the pollutant for which stormwater controls are necessary for the surface waters to meet water quality standards. The pollutant identified in a wasteload allocation as of the effective date of this permit must be addressed through the measurable goals of the MS4 Program Plan. A wasteload allocation does not establish that the operator of a regulated small MS4 is in or out of compliance with the conditions of this permit.~~

~~1. The operator shall update its MS4 Program Plan to include measurable goals, schedules, and strategies to ensure MS4 Program consistency with the assumptions of the TMDL WLA within 18 months of permit coverage; or, within 18 months of the effective date of any reopening of this permit to include wasteloads allocated to the regulated small MS4 after issuance of permit coverage.~~

~~2. The measurable goals, schedules, strategies, and other best management practices (BMPs), required in an updated MS4 Program Plan to assure MS4 Program consistency with an approved TMDL for the pollutant identified in a WLA are, at a minimum:~~

~~a. The operator shall develop a list of its current ordinances and legal authorities, BMPs, policies, plans, procedures and contracts implemented as part of the MS4 Program that are applicable to reducing the pollutant identified in a WLA.~~

~~b. The operator shall evaluate existing ordinances and legal authorities, BMPs, policies, plans, procedures and contracts of the existing MS4 Program to determine the effectiveness of the MS4 Program in addressing reductions of the pollutant identified in the WLA. The evaluation shall identify any weakness or limitation in the MS4 Program to reduce the pollutant identified in the WLA in a manner consistent with the TMDL.~~

~~c. The operator shall develop a schedule to implement procedures and strategies that address the MS4 Program weaknesses such as timetables to update existing ordinances and legal authorities within two years, BMPs, policies, plans, procedures and contracts to ensure consistency with the assumptions of the TMDL WLA. When possible, source elimination shall be prioritized over load reduction.~~

~~d. The operator shall implement the schedule established in Section I B 2 c.~~

~~3. The operator shall integrate an awareness campaign into its existing public education and outreach program that promotes methods to eliminate and reduce discharges of the pollutant identified in the WLA. This may include additional employee training regarding the sources and methods to eliminate and minimize the discharge of the pollutant identified in the WLA.~~

~~4. The operator is encouraged to participate as a stakeholder in the development of any implementation plans developed to address the TMDL and shall incorporate applicable best management practices identified in the TMDL implementation plan in their MS4 Program Plan. The operator may choose to implement BMPs of equivalent design and efficiency instead of those identified in the TMDL implementation plan, provided that the rationale for any substituted BMP is provided and the substituted BMP is consistent with the TMDL and the WLA.~~

~~5. The operator shall develop and implement outfall reconnaissance procedures to identify potential sources of the pollutant identified in the WLA from anthropogenic activities. The operator shall conduct reconnaissance in accordance with the following:~~

~~a. Should the operator have 250 or more total outfalls discharging to the surface water identified in the WLA, the operator shall perform reconnaissance on a minimum of 250 outfalls for each WLA assigned at least once during the five year permit period and shall perform reconnaissance on a minimum of 35 outfalls per year.~~

~~b. Should the operator have less than 250 total outfalls discharging to an identified surface water, the operator shall perform reconnaissance on all outfalls during the five year permit period and shall annually conduct reconnaissance on a minimum of 15% of its known MS4 outfalls discharging to the surface water for which the WLA has been assigned.~~

~~The department recommends that the operator review the publication entitled "Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments," EPA cooperative agreement number X-82907801-0, for guidance in implementing its outfall reconnaissance procedures. The operator shall implement procedures designed to reduce the discharge of the pollutant in a manner consistent with the TMDL. Physically interconnected MS4s may coordinate outfall reconnaissance to meet the requirements of this subdivision.~~

~~6. The operator shall evaluate all properties owned or operated by the MS4 operator that are not covered under a separate VPDES permit for potential sources of the pollutant identified in the WLA. Within three years of the~~

~~required date for updating the MS4 Program Plan, the operator shall conduct a site review and characterize the runoff for those properties where it determines that the pollutant identified in the WLA is currently stored, or has been transferred, transported or historically disposed of in a manner that would expose it to precipitation in accordance with the following schedule:~~

~~a. As a part of the site review, the operator shall collect a total of two samples from a representative outfall for each identified municipal property. One sample shall be taken during each of the following six month periods: October through March, and April through September.~~

~~b. All collected samples shall be grab samples and collected within the first 30 minutes of a runoff producing event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previous measurable (greater than 0.1 inch rainfall) storm event. The required 72 hour storm event interval is waived where the preceding measurable storm event did not result in a measurable discharge from the property. The required 72 hour storm event interval may also be waived where the operator documents that less than a 72-hour interval is representative for local storm events during the season when sampling is being conducted. Analytical methods shall be conducted according to procedures approved under 40 CFR Part 136 or alternative methods approved by the Environmental Protection Agency (EPA). Where an approved 40 CFR Part 136 method does not exist, the operator must use a method consistent with the TMDL.~~

~~c. For properties where there is found to be a discharge of the pollutant identified in the WLA, the operator shall develop and implement a schedule to minimize the discharge of the pollutant identified in the WLA in a manner consistent with the approved TMDL.~~

~~7. The operator shall conduct an annual characterization that estimates the volume of stormwater discharged, in cubic feet, and the quantity of pollutant identified in the WLA, in a unit consistent with the WLA, discharged by the regulated small MS4.~~

~~8. As part of the annual evaluation, the operator shall update the MS4 Program Plan to include any new information regarding the TMDL in order to ensure consistency with the TMDL.~~

~~9. Along with reporting requirements in Section II E, the operator shall include the following with each annual report:~~

~~a. Copies of any updates to the MS4 Program Plan completed during the reporting cycle and any new information regarding the TMDL in order to evaluate its ability to assure the consistency of its discharge with the assumptions of the TMDL WLA.~~

~~b. The estimate of the volume of stormwater discharged, in cubic feet, and the quantity of pollutant identified in the WLA, in a unit consistent with the WLA discharged by the regulated small MS4 for each WLA.~~

B. Special conditions for approved total maximum daily loads (TMDL) other than the Chesapeake Bay TMDL. An approved TMDL may allocate an applicable wasteload to a small MS4 that identifies a pollutant or pollutants for which additional stormwater controls are necessary for the surface waters to meet water quality standards. The MS4 operator shall address the pollutants in accordance with this special condition where the MS4 has been allocated a wasteload in an approved TMDL.

1. The operator shall maintain an updated MS4 Program Plan that includes a specific TMDL Action Plan for pollutants allocated to the MS4 in approved TMDLs. TMDL Action Plans may be implemented in multiple phases over more than one state permit cycle using the adaptive iterative approach provided adequate progress is demonstrated. These TMDL Actions Plans shall identify the best management practices and other implementation steps to be implemented during the remaining terms of this state permit.

a. In accordance with Table 1 in this section, the operator shall update the MS4 Program Plans to address any new or modified requirements established under this special condition for pollutants identified in TMDL wasteload allocations approved prior to July 8, 2008.

b. In accordance with Table 1 in this section, the operator shall update the MS4 Program Plan to incorporate Action Plans that identify the best management practices and other implementation steps that will be implemented during the remaining term of this permit for pollutants identified in TMDL wasteload allocations approved either on or after July 8, 2008, and prior to issuance of this permit.

c. In accordance with Table 1 in this section, the operator shall update the MS4 Program Plan with TMDL Action Plans that identify the best management practices and other steps that will be implemented during the remaining term of this state permit for pollutants identified in TMDL wasteload allocations approved after issuance of this permit for impairment listed on the 2012 § 303(d)/305(b) list and for which a TMDL schedule identifies its development as occurring during this state permit cycle.

2. The operator shall:

a. Develop and maintain a list of its legal authorities such as ordinances, state and other permits, orders, specific contract language, and interjurisdictional agreements applicable to reducing the pollutant identified in a WLA;

b. Identify and maintain an updated list of all additional management practices, control techniques and system design and engineering methods, beyond those identified in Section II B, that have been implemented as part of the MS4 Program Plan that are applicable to reducing the pollutant identified in the WLA;

c. Enhance the public education and outreach and employee training programs to also promote methods to eliminate and reduce discharges of the pollutants identified in the WLA;

d. Assess all facilities of concern owned or operated by the MS4 operator that are not covered under a separate VPDES permit and identify all municipal facilities that may be a significant source of the identified pollutant. For the purpose of this assessment, significant source is identified as facilities of concern where the pollutant discharge is expected to be greater than that average expected existing discharge for the land use identified in the TMDL. For example, the discharge of bacteria would be expected to be greater at a dog park than at other recreational facilities where dogs are prohibited.

e. Develop and implement a method to assess TMDL Action Plans for their effectiveness in reducing the pollutants identified in the WLAs. The evaluation shall use any newly available information, water quality monitoring results, or modeling tools to estimate pollutant reductions for the pollutant or pollutants of concern from implementation of the MS4 Program Plan. Monitoring may include BMP, outfall, or in-stream monitoring, as appropriate, to estimate pollutant reductions. The operator may conduct monitoring, utilize existing data, establish partnerships, or collaborate with other MS4 operators or other third parties, as appropriate. This evaluation shall include assessment of the facilities identified in subdivision 2 d of this subection. The methodology used for assessment shall be described in the TMDL Action Plan.

3. Analytical methods for any monitoring shall be conducted according to procedures approved under 40 CFR Part 136 or alternative methods approved by the Environmental Protection Agency (EPA). Where an approved 40 CFR Part 136 method does not exist, the operator must use a method consistent with the TMDL.

4. The operator is encouraged to participate as a stakeholder in the development of any TMDL implementation plans applicable to their discharge. The operator may incorporate applicable best management practices identified in the TMDL implementation plan in the MS4 Program Plan or may choose to implement BMPs of equivalent design and efficiency provided that the rationale for any substituted BMP is provided and the substituted BMP is consistent with the assumptions and requirements of the TMDL WLA.

5. Annual reporting requirements.

a. The operator shall submit the required TMDL Action Plans with the appropriate annual report associated schedule identified in this state permit.

b. The operator shall report on the implementation of the TMDL Action Plans and associated evaluation including the results of any monitoring conducted as part of the evaluation.

6. The operator shall identify the best management practices and other steps that will be implemented during the next state permit term as part of the operator's reapplication for coverage as required under Section III M.

C. Special condition for the Chesapeake Bay TMDL.

1. Definitions. The following definitions apply to this state permit for the purpose of the special condition for discharges in the Chesapeake Bay Watershed:

"Existing sources" means pervious and impervious urban land uses serviced by the MS4 as of June 30, 2009.

"New sources" means pervious and impervious urban land uses served by the MS4 developed on or after July 1, 2009.

"Transitional sources" means regulated land disturbing activities that are temporary in nature and discharge through the MS4.

"Pollutants of concern" or "POC" means total nitrogen, total phosphorus, and total suspended solids.

2. Chesapeake Bay TMDL planning.

a. In accordance with Table 1 in this section, the operator shall develop and submit a phased Chesapeake Bay TMDL Action Plan that includes:

(1) A review of the baseline program implemented as a requirement of this state permit including a review of the existing legal authorities;

(2) The identification of any new or modified legal authorities such as ordinances, state and other permits, orders, contracts and interjurisdictional agreements implemented or needing to be implemented to meet the requirements of this special condition;

(3) The means and methods that will be utilized to address discharges into the MS4 from new sources;

(4) An estimate of the annual POC loads discharged from the existing sources as of June 30, 2008, based on the 2009 progress run. The operator shall utilize the appropriate version of Table 2 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 EOS loading rate:

Table 2 a: Calculation Sheet for Estimating Existing Source Loads for the James River Basin				
Subsource	**Pollutant**	**Total Existing Acres Served by MS4 (6/30/09)**	**2009 EOS Loading Rate (lbs/ac)**	**Estimated Total POC Load Based on 2009 Progress Run**
Regulated Urban Impervious	Nitrogen		9.39	
Regulated Urban Pervious			6.99	
Regulated Urban Impervious	Phosphorus		1.76	
Regulated Urban Pervious			0.5	
Regulated Urban Impervious	Total Suspended Solids		676.94	
Regulated Urban Pervious			101.08	

Table 2 b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin				
Subsource	**Pollutant**	**Total Existing Acres Served by MS4 (6/30/09)**	**2009 EOS Loading Rate (lbs/ac)**	**Estimated Total POC Load Based on 2009 Progress Run**
Regulated Urban Impervious	Nitrogen		16.86	
Regulated Urban Pervious			10.07	
Regulated Urban Impervious	Phosphorus		1.62	
Regulated Urban Pervious			0.41	
Regulated Urban Impervious Regulated Urban Pervious	Total Suspended Solids		1,171.32 175.8	

Table 2 c: Calculation Sheet for Estimating Existing Source Loads for the Rappahannock River Basin				
Subsource	**Pollutant**	**Total Existing Acres Served by MS4 (6/30/09)**	**2009 EOS Loading Rate (lbs/ac)**	**Estimated Total POC Load Based on 2009 Progress Run**
Regulated Urban Impervious	Nitrogen		9.38	
Regulated Urban Pervious			5.34	
Regulated Urban Impervious Regulated Urban Pervious	Phosphorus		1.41 0.38	

Regulated Urban Impervious	Total Suspended Solids		423.97	
Regulated Urban Pervious			56.01	

Table 2 d: Calculation Sheet for Estimating Existing Source Loads for the York River Basin				
Subsource	**Pollutant**	**Total Existing Acres Served by MS4 (6/30/09)**	**2009 EOS Loading Rate (lbs/ac)**	**Estimated Total POC Load Based on 2009 Progress Run**
Regulated Urban Impervious	Nitrogen		7.31	
Regulated Urban Pervious			7.65	
Regulated Urban Impervious	Phosphorus		1.51	
Regulated Urban Pervious			0.51	
Regulated Urban Impervious	Total Suspended Solids		456.68	
Regulated Urban Pervious			72.78	

(5) An estimate of the total reductions necessary to reduce the annual POC loads from existing sources to the L2 implementation level utilizing the appropriate version of Table 3 in this section based on the river basin to which the MS4 discharges. This shall be calculated by multiplying the total existing acres service by the MS4 during the first state permit cycle required reduction in loading rate. Existing sources located in any portion of an expanded urbanized area or new urbanized area identified as part of an urbanized area by the 2010 U.S. Census shall not be included in the total acreage in determining the 5.0% reduction requirement in this state permit.

Table 3 a: Calculation Sheet for Determining Total POC Reductions Required During this Permit Cycle for the James River Basin				
Subsource	**Pollutant**	**Total Existing Acres Served by MS4 (7/1/09)**	**First Permit Cycle Requiring Reduction in Loading Rate (lbs/ac)**	**Total Reduction Required First Permit Cycle (lbs)**
Regulated Urban Impervious	Nitrogen		0.04	
Regulated Urban Pervious			0.02	
Regulated Urban Impervious	Phosphorus		0.01	
Regulated Urban Pervious			0.002	
Regulated Urban Impervious	Total Suspended Solids		6.67	
Regulated Urban Pervious			0.44	

Table 3 b: Calculation Sheet for Determining Total POC Reductions Required During this Permit Cycle for the Potomac River Basin				
Subsource	**Pollutant**	**Total Existing Acres Served by MS4 (7/1/09)**	**First Permit Cycle Requiring Reduction in Loading Rate (lbs/ac)**	**Total Reduction Required First Permit Cycle (lbs)**
Regulated Urban Impervious	Nitrogen		0.08	
Regulated Urban Pervious			0.03	
Regulated Urban Impervious	Phosphorus		0.01	
Regulated Urban Pervious			0.001	
Regulated Urban Impervious	Total Suspended Solids		11.71	
Regulated Urban Pervious			0.77	

Table 3 c: Calculation Sheet for Determining Total POC Reductions Required During this Permit Cycle for the Rappahannock River Basin				
Subsource	**Pollutant**	**Total Existing Acres Served by MS4 (7/1/09)**	**First Permit Cycle Requiring Reduction in Loading Rate (lbs/ac)**	**Total Reduction Required First Permit Cycle (lbs)**
Regulated Urban Impervious	Nitrogen		0.04	
Regulated Urban Pervious			0.02	
Regulated Urban Impervious	Phosphorus		0.01	
Regulated Urban Pervious			0.002	
Regulated Urban Impervious	Total Suspended Solids		4.24	
Regulated Urban Pervious			0.25	

Table 3 d: Calculation Sheet for Determining Total POC Reductions Required During this Permit Cycle for the York River Basin				
Subsource	**Pollutant**	**Total Existing Acres Served by MS4 (7/1/09)**	**First Permit Cycle Requiring Reduction in Loading Rate**	**Total Reduction Required First Permit Cycle (lbs)**

			(lbs/ac)	
Regulated Urban Impervious	Nitrogen		0.03	
Regulated Urban Pervious			0.02	
Regulated Urban Impervious	Phosphorus		0.01	
Regulated Urban Pervious			0.002	
Regulated Urban Impervious	Total Suspended Solids		4.60	
Regulated Urban Pervious			0.32	

(6) The means and methods that will be utilized to implement sufficient reductions from existing sources equal to 5.0% of the estimated total reductions necessary. The methodology may incorporate reductions documented through the implementation of this state permit;

(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 greater than one acre 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 in this section to develop the equivalent pollutant load for nitrogen and total suspended solids. The operator shall offset 5.0% of the calculated increased load from these new sources during the permit cycle.

(8) The means and methods to offset the increased loads from grandfathered projects that disturb greater than one acre that begin construction after July 1, 2014, where the project utilized an average land cover condition greater than 16% impervious cover in the design of post-development stormwater management facilities. The operator shall utilize Table 4 in this section to develop the equivalent pollutant load for nitrogen and total suspended solids.

(9) The operator shall address any modification to the TMDL or watershed implementation plan that occurs during the term of this state permit as part of its permit reapplication and not during the term of this state permit.

Table 4: Ratio of Phosphorus Loading Rate to Nitrogen and Total Suspended Solids Loading Rates for Chesapeake Bay Basins

Ratio of Phosphorus to Other POCs (Based on All Land Uses 2009 Progress Run)	Phosphorus Loading Rate (lbs/ac)	Nitrogen Loading Rate (lbs/ac)	Total Suspended Solids Loading Rate (lbs/ac)
James River Basin	1.0	5.2	420.9
Potomac River Basin	1.0	6.9	469.2
Rappahannock River Basin	1.0	6.7	320.9
York River Basin	1.0	9.5	531.6

(10) A list of future projects and associated acreage that qualify as grandfathered in accordance with 4VAC50-60-48;

(11) An estimate of the expected costs to implement the requirements of this special condition during the state permit cycle; and

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

b. As part of development of the Chesapeake Bay TMDL Action Plan, the operator may consider:

(1) Placement of BMPs on unregulated lands. Reductions may only be credited towards the required reductions after any required unregulated land baseline pollutant reductions are met for treated acres;

(2) Utilization of stream restoration projects;

(3) Establishment of a memorandum of understanding (MOU) with other MS4 operators that discharge to the same or adjacent eight digit hydrologic unit to implement BMPs collectively. The MOU shall include a mechanism for dividing the POC reductions created by BMP implementation between the cooperative MS4s;

(4) Utilization of any pollutant trading or offset program in accordance with §§ 10.1-603.15:1 and 10.1-603.8:1 of the Code of Virginia, governing trading and offsetting; and

(5) A more stringent average land cover condition based on less than 16% impervious cover for new sources initiating construction between July 1, 2009, and June 30, 2014, and all grandfathered projects where allowed by law.

3. Chesapeake Bay TMDL Action Plan implementation. The operator shall implement the TMDL Action Plan to the maximum extent practicable and demonstrate adequate progress for this state permit term towards the long-term compliance targets for TMDL wasteload allocations. For the purposes of this permit, the implementation of the following represents implementation to the maximum extent practicable and demonstrates adequate progress:

a. Implementation of nutrient management plans in accordance with the schedule identified in the minimum control measure in Section II related to pollution prevention/good housekeeping for municipal operations;

b. Implementation of the minimum control measure in Section II related to construction site stormwater runoff control in accordance with this state permit shall address discharges from transitional sources;

c. Implementation of the means and methods to address discharges from new sources in accordance with the minimum control measure in Section II related to post-construction stormwater management in new development and development of prior developed lands and in order to offset 5.0% of the total increase in POC loads between July 1, 2009, and June 30, 2014. Increases in the POC load from grandfathered projects initiating construction after July 1, 2014, must be offset prior to completion of the project; and

d. Implementation of means and methods sufficient to meet 5.0% of the total required reductions of POC loads from existing sources in accordance with the Chesapeake Bay TMDL Action Plan.

4. Annual reporting requirements.

a. In accordance with Table 1 in this section, the operator shall submit the Chesapeake Bay Action Plan.

b. Each subsequent annual report shall included a list of control measures implemented during the reporting period and the cumulative progress toward meeting the compliance targets for total nitrogen, phosphorus, and total suspended soils.

c. Each subsequent annual report shall include a list of control measures in an electronic format provided by the department that were implemented during the reporting cycle and the estimated reduction achieved by the control. For stormwater management controls, the report shall include the information required in Section II B 5 e and shall include whether an existing stormwater management control was retrofitted, and if so, the existing stormwater management control type retrofit used.

d. Each annual report shall include a list of control measures that are expected to be implemented during the next reporting period and the expected progress toward meeting the compliance targets for total nitrogen, phosphorus, and total suspended solids.

5. The operator shall include the following as part of its reapplication package due in accordance with Section III M:

a. Documentation that sufficient control measures have been implemented to meet the compliance target identified in this special condition. If temporary credits or offsets have been purchased in order to meet the compliance target, the list of temporary reductions utilized to meet the 5.0% reduction in this state permit and a schedule of implementation to ensure a permanent 5.0% reduction must be provided; and

b. A draft second phase Chesapeake Bay TMDL Action Plan designed to reduce the existing pollutant load by an additional 35% (or a total of 40% if more than a 5.0% reduction is achieved during the first phase) as determined using Table 3 in this section unless alternative calculations have been provided by the Commonwealth.

SECTION II
MUNICIPAL SEPARATE STORM SEWER SYSTEM MANAGEMENT PROGRAM

A. The operator of a ~~regulated~~ small MS4 must develop, implement, and enforce a MS4 Program designed to reduce the discharge of pollutants from the ~~regulated~~ small MS4 to the maximum extent practicable (MEP), to protect water quality, to ensure compliance by the operator with water quality standards, and to satisfy the appropriate water quality requirements of the Clean Water Act and regulations. The MS4 Program must include the minimum control measures described in paragraph B of this section. Implementation of best management practices consistent with the provisions of an iterative MS4 Program required pursuant to this section constitutes compliance with the standard of reducing pollutants to the "maximum extent practicable", protects water quality in the absence of a TMDL wasteload allocation, ensures compliance by the operator with water quality

standards, and satisfies the appropriate water quality requirements of the Clean Water Act and regulations in the absence of a TMDL WLA. The requirements of this section and those special conditions set out in Section I B also apply where a WLA is applicable.

~~No later than January 9, 2009, the operator shall review its existing MS4 Program Plan and submit a schedule to develop and implement programs to meet the conditions established by this permit. For operators of regulated small MS4s that are applying for initial coverage under this general permit, the schedule to develop and implement the MS4 Program Plan shall be submitted with the completed registration statement.~~

B. Minimum control measures.

1. Public education and outreach on stormwater impacts. ~~Implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps that the public can take to reduce pollutants in stormwater runoff. The department recommends that the operator review the Environmental Protection Agency (EPA) publication entitled "Getting in Step: A Guide for Conducting Watershed Outreach Campaigns," publication number EPA 841-B-03-002, for guidance in developing a public education program.~~

~~The operator shall identify, schedule, implement, evaluate and modify, as necessary, BMPs to meet the following public education and outreach measurable goals:~~

~~a. Increased individual and household knowledge about the steps that they can take to reduce stormwater pollution, placing priority on reducing impacts to impaired waters and other local water pollution concerns;~~

~~b. Increased public employee, business, and general public knowledge of hazards associated with illegal discharges and improper disposal of waste, including pertinent legal implications;~~

~~c. Increased individual and group involvement in local water quality improvement initiatives including the promotion of local restoration and clean up projects, programs, groups, meetings and other opportunities for public involvement;~~

~~d. Diverse strategies to target audiences specific to the area serviced by the regulated small MS4;~~

~~e. Improved outreach program to address viewpoints and concerns of target audiences, with a recommended focus on minorities, disadvantaged audiences and minors; and~~

~~f. Targeted strategies towards local groups of commercial, industrial, and institutional entities likely to have significant stormwater impacts.~~

a. The operator shall continue to implement the public education and outreach program as included in the registration statement until the program is updated to meet the conditions of this state permit. Operators who have not previously held MS4 permit coverage shall implement this program in accordance with the schedule in Table 1 of this section.

b. The public education and outreach program should be designed with consideration of the following goals:

(1) Increasing target audience knowledge about the steps that can be taken to reduce stormwater pollution, placing priority on reducing impacts to impaired waters and other local water pollution concerns;

(2) Increasing target audience knowledge of hazards associated with illegal discharges and improper disposal of waste, including pertinent legal implications; and

(3) Implementing a diverse program with strategies that are targeted towards audiences most likely to have significant stormwater impacts.

c. The updated program shall be designed to:

(1) Identify, at a minimum, three high-priority water quality issues, contributed to by the discharge of stormwater (e.g., Chesapeake Bay nutrients, pet wastes and local bacteria TMDLs, high-quality receiving waters, and illicit discharges from commercial sites) and a rationale for the selection of the three high-priority water quality issues;

(2) Identify and estimate the population size of the target audience or audiences who is most likely to have significant impacts for each high-priority water quality issue;

(3) Develop relevant message or messages and associated educational and outreach materials (e.g., various media such as printed materials, billboard and mass transit advertisements, signage at select locations, radio advertisements, television advertisements, websites, and social media) for message distribution to the selected target audiences while considering the viewpoints and concerns of the target audiences including minorities, disadvantaged audiences, and minors;

(4) Provide for public participation during public education and outreach program development;

(5) Annually conduct sufficient education and outreach activities designed to reach an equivalent 20% of each high-priority issue target audience. It shall not be considered noncompliance for failure to reach 20% of the target audience. However, it shall be a compliance issue if insufficient effort is made to annually reach a minimum of 20% of the target audience; and

(6) Provide for the adjustment of target audiences and messages including educational materials and delivery mechanisms to reach target audiences in order to address any observed weaknesses or shortcomings as necessary.

d. The operator may coordinate their public education and outreach efforts with other MS4 operations;

however, each operator shall be individually responsible for meeting all of its state permit requirements.

e. Prior to application for continued state permit coverage required in Section III M, the operator shall evaluate the education and outreach program for:

(1) Appropriateness of the high-priority stormwater issues;

(2) Appropriateness of the selected target audiences for each high-priority stormwater issue;

(3) Effectiveness of the message or messages being delivered; and

(4) Effectiveness of the mechanism or mechanisms of delivery employed in reaching the target audiences.

f. The MS4 Program Plan shall describe how the conditions of this permit shall be updated in accordance with Table 1 in this section.

g. The operator shall include in the annual report the following:

(1) A list of the education and outreach activities conducted during the reporting period for each high-priority water quality issue, the estimated number of people reached, and an estimated percentage of the target audience or audiences that will be reached; and

(2) A list of the education and outreach activities that will be conducted during the next reporting period for each high-priority water quality issue, the estimated number of people that will be reached, and an estimated percentage of the target audience or audiences that will be reached.

2. Public involvement/participation.

~~The operator shall comply with applicable state, tribal, and local public notice requirements and identify, schedule, implement, evaluate and modify, as necessary, BMPs to meet the following public involvement/participation measurable goals:~~

~~a. Promote the availability of the operator's MS4 Program Plan and any modifications for public review and comment. Public notice shall be given by any method reasonably calculated to give actual notice of the action in question to the persons potentially affected by it, including press releases or any other forum or medium to elicit public participation. Provide access to or copies of the MS4 Program Plan or any modifications upon request of interested parties in compliance with all applicable freedom of information regulations;~~

~~b. Provide access to or copies of the annual report upon request of interested parties in compliance with all applicable freedom of information regulations; and~~

~~c. Participate, through promotion, sponsorship, or other involvement, in local activities aimed at increasing public participation to reduce stormwater pollutant loads and improve water quality.~~

a. Public involvement.

(1) The operator shall comply with any applicable federal, state, and local public notice requirements.

(2) The operator shall:

(a) Maintain an updated MS4 Program Plan on the operator's web page. Updates to the MS4 Program Plan shall be completed a minimum of once a year and should be updated in conjunction with the annual report.

(b) Post copies of each annual report on the operator's web page within 30 days of submittal to the department and retain copies of annual reports online for the duration of this state permit; and

(c) Prior to reapplying for coverage as required by Section III M, notify the public and provide for receipt of comment of the proposed MS4 Program Plan that will be submitted with the registration statement. As part of the reapplication, the operator shall address how the received comments were considered in the development of the MS4 Program Plan. Public notice shall be given by a method reasonably calculated to give actual notice of the action in question to the persons potentially affected by it, including press releases or any other forum or medium to solicit public participation.

b. Public participation. The operator shall participate, through promotion, sponsorship, or other involvement, in a minimum of four local activities annually. The activities shall be aimed at increasing public participation to reduce stormwater pollutant loads; improve water quality; and support local restoration and clean-up projects, programs, groups, meetings, or other opportunities for public involvement.

c. The MS4 Program Plan shall include written procedures for implementing this program.

d. Each annual report shall include:

(1) A web link to the MS4 Program Plan and annual report; and

(2) Documentation of compliance with the public participation requirements of this section.

3. Illicit discharge detection and elimination. ~~The MS4 Program shall:~~

~~a. Develop, implement and enforce a program to detect and eliminate illicit discharges, as defined at 4VAC50-60-10, into the regulated small MS4. The department recommends that the operator review the publication entitled "Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments," Environmental Protection Agency (EPA) cooperative agreement number X-82907801-0, for guidance in implementing and evaluating its illicit discharge detection and elimination program;~~

~~b. Develop, if not already completed, and maintain, an updated storm sewer system map, showing the location~~

~~of all known outfalls of the regulated small MS4 including those physically interconnected to a regulated MS4, the associated surface waters and HUCs, and the names and locations of all impaired surface waters that receive discharges from those outfalls. The operator shall also estimate the acreage within the regulated small MS4 discharging to each HUC and impaired water;~~

~~c. To the extent allowable under state, tribal or local law or other regulatory mechanism, effectively prohibit, through ordinance, or other regulatory mechanism, nonstormwater discharges into the storm sewer system and implement appropriate enforcement procedures and actions;~~

~~The following categories of nonstormwater discharges or flows (i.e., illicit discharges) must be addressed only if they are identified by the operator, the State Water Control Board, or by the board as significant contributors of pollutants to the regulated small MS4: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration, uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, street wash water, discharges or flows from fire fighting activities, and flows that have been identified in writing by the Department of Environmental Quality as de minimis discharges that are not significant sources of pollutants to state waters and not requiring a VPDES permit;~~

~~d. Develop and implement procedures to detect and address nonstormwater discharges, including illegal dumping, to the regulated small MS4;~~

~~e. Prevent or minimize to the maximum extent practicable, the discharge of hazardous substances or oil in the stormwater discharge(s) from the regulated small MS4. In addition, the MS4 Program must be reviewed to identify measures to prevent the recurrence of such releases and to respond to such releases, and the program must be modified where appropriate. This permit does not relieve the operator or the responsible part(ies) of any reporting requirements of 40 CFR Part 110 (2001), 40 CFR Part 117 (2001) and 40 CFR Part 302 (2001) or § 62.1-44.34:19 of the Code of Virginia;~~

~~f. Track the number of illicit discharges identified, provide narrative on how they were controlled or eliminated, and submit the information in accordance with Section II E 3; and~~

~~g. Notify, in writing, any downstream regulated MS4 to which the small regulated MS4 is physically interconnected of the small regulated MS4's connection to that system.~~

a. The operator shall maintain an accurate storm sewer system map and information table and shall update it in accordance with the schedule set out in Table 1 of this section.

(1) The storm sewer system map must show the following, at a minimum:

(a) The location of all MS4 outfalls. In cases where the outfall is located outside of the MS4 operator's legal responsibility, the operator may elect to map the known point of discharge location closest to the actual outfall. Each mapped outfall must be given a unique identifier, which must be noted on the map; and

(b) The name and location of all waters receiving discharges from the MS4 outfalls and the associated HUC.

(2) At a minimum, the associated information table shall include for each outfall the following:

(a) The unique identifier;

(b) The estimated MS4 acreage served;

(c) The name of the receiving surface water and indication as to whether the receiving water is listed as impaired on the Virginia 2012 303(d)/305(b) list; and

(d) The name of any applicable TMDL or TMDLs.

(3) Within 48 months of coverage under this state permit, the operator shall have a complete and updated storm sewer system map and information table that includes all MS4 outfalls located within the boundaries identified as "urbanized" areas in the 2010 Decennial Census and shall submit the updated information table as an appendix to the annual report.

(4) The operator shall maintain a copy of the current storm sewer system map and outfall information table for review upon request by the public or by the department.

(5) The operator shall continue to identify other points of discharge. The operator shall notify in writing the downstream MS4 of any known physical interconnection.

b. The operator shall effectively prohibit, through ordinance or other legal mechanism, nonstormwater discharges into the storm sewer system to the extent allowable under federal, state, or local law or regulation. Categories of nonstormwater discharges or flows (i.e., illicit discharges) identified in 4VAC50-60-400 D 2 c (3) must be addressed only if they are identified by the operator, the State Water Control Board, or by the board as significant contributors of pollutants to the small MS4. Flows that have been identified in writing by the Department of Environmental Quality as de minimis discharges are not significant sources of pollutants to surface water and do not require a VPDES permit.

c. The operator shall develop and implement written procedures to detect, identify, and address nonstormwater

discharges, including illegal dumping, to the small MS4. These procedures shall include:

(1) Written dry weather field screening methodologies to detect and eliminate illicit discharges to the MS4 that include field observations and field screening monitoring and that provide:

(a) A prioritized schedule of field screening activities determined by the operator based on such things as age of the infrastructure, land use, historical illegal discharges, dumping or cross connections.

(b) The minimum number of field screening activities the operator shall complete annually to be determined as follows: (i) if the total number of outfalls in the small MS4 is less than 50, all outfalls shall be screened annually or (ii) if the small MS4 has 50 or more total outfalls, a minimum of 50 outfalls shall be screened annually.

(c) Methodologies to collect the general information such as time since the last rain, the quantity of the last rain, site descriptions (e.g., conveyance type and dominant watershed land uses), estimated discharge rate (e.g., width of water surface, approximate depth of water, approximate flow velocity, and flow rate), and visual observations (e.g., order, color, clarity, floatables, deposits or stains, vegetation condition, structural condition, and biology;

(d) A time frame upon which to conduct an investigation or investigations to identify and locate the source of any observed continuous or intermittent nonstormwater discharge prioritized as follows: (i) illicit discharges suspected of being sanitary sewage or significantly contaminated must be investigated first and (ii) investigations of illicit discharges suspected of being less hazardous to human health and safety such as noncontact cooling water or wash water may be delayed until after all suspected sanitary sewage or significantly contaminated discharges have been investigated, eliminated, or identified. Discharges authorized under a separate VDPES or state permit are natural flow and require no further action.

(e) Methodologies to determine the source of all illicit discharges shall be conducted. If an illicit discharge is found, but within six months of the beginning of the investigation neither the source nor the same nonstormwater discharge has been identified, then the operator shall document such in accordance with Section II B 3 f. If the observed discharge is intermittent, the operator must document that a minimum of three separate investigations were made in an attempt to observe the discharge when it was flowing. If these attempts are unsuccessful, the operator shall document such in accordance with Section II B 3 f.

(f) Mechanisms to eliminate identified sources of illicit discharges including a description of the policies and procedures for when and how to use legal authorities;

(g) Methods for conducting a follow-up investigation in order to verify that the discharge has been eliminated.

(h) A mechanism to track all investigations to document at a minimum: (i) the date or dates that the illicit discharge was observed and reported; (ii) the results of the investigation; (iii) any follow-up of the investigation; (iv) resolution of the investigation; and (v) the date that the investigation was closed.

d. The operator shall eliminate or minimize to the maximum extent practicable, the discharge of hazardous substance or oil in the stormwater discharge or discharges from the small MS4. In addition, the MS4 Program Plan must be reviewed to identify measures to prevent the recurrence of such releases, and respond to such releases, and must be modified where appropriate.

e. The operator shall promote, publicize, and facilitate public reporting of illicit discharges into or from MS4s. The operator shall conduct inspections in response to complaints and follow-up inspections as needed to ensure that corrective measures have been implemented by the responsible party.

f. The MS4 Program Plan shall include all procedures developed by the operator to detect, identify, and address nonstormwater discharges to the MS4 in accordance with the schedule in Table 1 in this section. In the interim, the operator shall continue to implement the program as included as part of the registration statement until the program is updated to meet the conditions of this permit. Operators, who have not previously held MS4 permit coverage, shall implement this program in accordance with the schedule provided in Table 1 in this section.

g. Annual reporting requirements. Each annual report shall include:

(1) A list of any written notifications of physical interconnection given by the operator to other MS4s;

(2) The total number of outfalls screened during the reporting period, the screening results, and detail of any follow-up necessary based on screening results; and

(3) A summary of each investigation conducted by the operator of any suspected illicit discharge. The summary must include: (i) the date that the suspect discharge was observed or reported or both; (ii) how the investigation was resolved, including any follow-up, and (iii) resolution of the investigation and the date the investigation was closed.

4. Construction site stormwater runoff control.

~~a. The operator shall develop, implement, and enforce procedures to reduce pollutants in any stormwater runoff to the regulated small MS4 from construction activities that result in a land disturbance of greater than or equal~~

~~to one acre or equal to or greater than 2,500 square feet in all areas of the jurisdictions designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations adopted pursuant to the Chesapeake Bay Preservation Act. Additionally, reduction of stormwater discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more.~~

~~The procedures must include the development and implementation of, at a minimum:~~

~~(1) An ordinance or other mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance with the Erosion and Sediment Control Law and attendant regulations, to the extent allowable under state, tribal, or local law. Such ordinances and other mechanisms shall be updated as necessary;~~

~~(2) Requirements for construction site owners and operators to implement appropriate erosion and sediment control best management practices as part of an erosion and sediment control plan that is consistent with the Erosion and Sediment Control Law and attendant regulations and other applicable requirements of state, tribal, or local law. Where determined appropriate by the operator, the operator shall encourage the use of structural and nonstructural design techniques to create a design that has the goal of maintaining or replicating predevelopment runoff characteristics and site hydrology;~~

~~(3) Requirements for construction site owners and operators to secure authorization to discharge stormwater from construction activities under a VSMP permit for construction activities that result in a land disturbance of greater than or equal to one acre or equal to or greater than 2,500 square feet in all areas of the jurisdictions designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations adopted pursuant to the Chesapeake Bay Preservation Act. Additionally, stormwater discharges from construction activity disturbing less than one acre must secure authorization to discharge under a VSMP permit if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more;~~

~~(4) Procedures for receipt and consideration of information submitted by the public; and~~

~~(5) Procedures for site inspection and enforcement of control measures.~~

~~b. The operator shall ensure that plan reviewers, inspectors, program administrators and construction site owners and operators obtain the appropriate certifications as required under the Erosion and Sediment Control Law;~~

~~c. The operator shall track regulated land-disturbing activities and submit the following information in accordance with Section II E 3:~~

~~(1) Total number of regulated land-disturbing activities; and~~

~~(2) Total disturbed acreage.~~

a. Applicable oversight requirements. The operator shall utilize its legal authority, such as ordinances, permits, orders, specific contract language, and interjurisdictional agreements, to address discharges entering the MS4 from the following land-disturbing activities:

(1) Land-disturbing activities as defined in § 10.1-560 of the Code of Virginia that result in the disturbance of 10,000 square feet or greater;

(2) Land-disturbing activities in Tidewater jurisdictions, as defined in § 10.1-2101 of the Code of Virginia, that disturb 2,500 square feet or greater and are located in areas designated as Resource Protection Areas (RPA), Resource Management Areas (RMA) or Intensely Developed Acres (IDA), pursuant to the Chesapeake Bay Preservation Area Designation and Management Regulations adopted pursuant to the Chesapeake Bay Preservation Act;

(3) Land-disturbing activities disturbing less than the minimum land disturbance identified in subdivision (1) or (2) above for which a local ordinance requires that an erosion and sediment control plan be developed; and

(4) Land-disturbing activities on individual residential lots or sections of residential developments being developed by different property owners and where the total land disturbance of the residential development is 10,000 square feet or greater. The operator may utilize an agreement in lieu of a plan as provided in § 10.1-563 of the Code of Virginia for these land disturbances.

b. Required plan approval prior to commencement of the land disturbing activity. The operator shall require that land disturbance not begin until an erosion and sediment control plan or an agreement in lieu of a plan as provided in § 10.1-563 is approved by a VESCP authority in accordance with the Erosion and Sediment Control Act (§ 10.1-560 et seq.). The plan shall be:

(1) Compliant with the minimum standards identified in 4VAC-50-30-40 of the Erosion and Sediment Control Regulations; or

(2) Compliant with department-approved annual standards and specifications. Where applicable, the plan shall be consistent with any additional or more stringent, or both, erosion and sediment control requirements established by state regulation or local ordinance.

c. Compliance and enforcement.

(1) The operator shall inspect land-disturbing activities for compliance with an approved erosion and sediment

control plan or agreement in lieu of a plan in accordance with the minimum standards identified in 4VAC50-30-40 or with board-approved standards and specifications.

(2) The operator shall implement an inspection schedule for land-disturbing activities identified in Section II B 4 a as follows:

(a) Upon initial installation of erosion and sediment controls;

(b) At least once during every two-week period;

(c) Within 48 hours of any runoff-producing storm event; and

(d) Upon completion of the project and prior to the release of any applicable performance bonds.

Where an operator establishes an alternative inspection program as provided for in 4VAC50-30-60 B 2, the written schedule shall be implemented in lieu of Section II B 4 c (2) and the written plan shall be included in the MS4 Program Plan.

(3) Operator inspections shall be conducted by personnel who hold an appropriate certificate of competence in accordance with 4VAC-50-50-40. Documentation of certification shall be made available upon request by the VESCP authority or other regulatory agency.

(4) The operator shall promote to the public a mechanism for receipt of complaints regarding regulated land-disturbing activities and shall follow up on any complaints regarding potential water quality and compliance issues.

(5) The operator shall utilize, as appropriate, its legal authority to require compliance with the approved plan where an inspection finds that the approved plan is not being properly implemented.

(6) The operator shall utilize, as appropriate, its legal authority to require changes to an approved plan when a inspection finds that the approved plan is inadequate to effectively control soil erosion, sediment deposition, and runoff to prevent the unreasonable degradation of properties, stream channels, waters, and other natural resources.

(7) The operator shall required implementation of appropriate controls to prevent nonstormwater discharges to the MS4, such as wastewater, concrete washout, fuels and oils, and other illicit discharges identified during land-disturbing activity inspections of the MS4. The discharge of nonstormwater discharges other than those identified in 4VAC50-60-1220 through the MS4 is not authorized in this state permit.

(8) The operator may develop and implement a progressive compliance and enforcement strategy provided that such strategy is included in the MS4 Program Plan.

d. Regulatory coordination. The operator shall implement enforceable procedures to require that large construction activities as defined in 4VAC50-60-10 and small construction activities as defined in 4VAC50-60-10, including municipal construction activities, secure necessary state permit authorizations from the department to discharge stormwater.

e. MS4 Program requirements. The operator's MS4 Program Plan shall include:

(1) A description of the legal authorities utilized to ensure compliance with the minimum control measure in Section II related to construction site stormwater runoff control such as ordinances, permits, orders, specific contract language, and interjurisdictional agreements;

(2) Written plan review procedures and all associated documents utilized in plan review;

(3) For the MS4 operators who obtain department-approved standards and specifications, a copy of the current standards and specifications;

(4) Written inspection procedures and all associated documents utilized in plan review including the inspection schedule;

(5) Written procedures for compliance and enforcement, including a progressive compliance and enforcement strategy, where appropriate; and

(6) The roles and responsibilities of each of the operator's departments, divisions, or subdivisions in implementing the minimum control measure in Section II related to construction site stormwater runoff control. If the operator utilizes another entity to implement portions of the MS4 Program Plan, a copy of the written agreement must be retained in the MS4 Program Plan. The description of the roles and responsibilities, including any written agreements with third parties, shall be updated as necessary.

Reference may be made to any listed requirements in this subdivision provided the location of where to find the reference material can be found is included and the reference material is made available to the public upon request.

f. Reporting requirements. The operator shall track regulated land-disturbing activities and submit the following information in all annual reports:

(1) Total number of regulated land-disturbing activities;

(2) Total disturbed acreage;

(3) Total number of inspections performed; and

(4) A summary of the enforcement actions taken.

5. Post-construction stormwater management in new development and development on prior developed lands ~~redevelopment~~.

~~a. The operator shall develop, implement, and enforce procedures to address stormwater runoff to the regulated~~

~~small MS4 from new development and redevelopment projects that disturb greater than or equal to one acre or equal to or greater than 2,500 square feet in all areas of the jurisdictions designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations adopted pursuant to the Chesapeake Bay Preservation Act, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the regulated small MS4. The procedures must ensure that controls are in place that would prevent or minimize water quality and quantity impacts in accordance with this section.~~

~~b. The operator shall:~~

~~(1) Develop and implement strategies which include a combination of structural and/or nonstructural best management practices (BMPs) appropriate for the operator's community. Where determined appropriate by the operator, the operator shall encourage the use of structural and nonstructural design techniques to create a design that has the goal of maintaining or replicating predevelopment runoff characteristics and site hydrology;~~

~~(2) Use an ordinance, regulation, or other mechanism to address post-construction runoff from new development and redevelopment projects to ensure compliance with the Virginia Stormwater Management Act (§ 10.1-603.1 et seq. of the Code of Virginia) and attendant regulations, and to the extent allowable under state, tribal or local law. Such ordinances and other mechanisms shall be updated as necessary;~~

~~(3) Require construction site owners and operators to secure authorization to discharge stormwater from construction activities under a VSMP permit for new development and redevelopment projects that result in a land disturbance of greater than or equal to one acre or equal to or greater than 2,500 square feet in all areas of the jurisdictions designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations adopted pursuant to the Chesapeake Bay Preservation Act. Additionally, stormwater discharges from construction activity disturbing less than one acre must secure authorization to discharge under a VSMP permit if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more;~~

~~(4) Require adequate long-term operation and maintenance by the owner of structural stormwater management facilities through requiring the owner to develop a recorded inspection schedule and maintenance agreement to the extent allowable under state, tribal or local law or other legal mechanism. The operator shall additionally develop, through the maintenance agreement or other method, a mechanism for enforcement of maintenance responsibilities by the operator if they are neglected by the owner;~~

~~(5) Conduct site inspection and enforcement measures consistent with the Virginia Stormwater Management Act and attendant regulations; and~~

~~(6) Track all known permanent stormwater management facilities that discharge to the regulated small MS4 and submit the following information in accordance with Section II E 3:~~

~~(a) Type of structural stormwater management facility installed as defined in the Virginia Stormwater Management Handbook;~~

~~(b) Geographic location (HUC);~~

~~(c) Where applicable, the impaired surface water that the stormwater management facility is discharging into; and~~

~~(d) Number of acres treated.~~

a. Applicable oversight requirements. The operator shall address post-construction stormwater runoff that enters the MS4 from the following land-disturbing activities:

(1) New development and development on prior developed lands that are defined as large construction activities or small construction activities in 4VAC50-60-10;

(2) New development and development on prior developed lands that disturb greater than or equal to 2,500 square feet, but less than one acre, located in a Chesapeake Bay Preservation Area designated by a local government located in Tidewater, Virginia; and

(3) New development and development on prior developed lands where an applicable state regulation or local ordinance has designated a more stringent regulatory size threshold than that identified in subdivision (1) or (2) above.

b. Required design criteria for stormwater runoff controls. The operator shall utilize appropriate legal authority, such as ordinances, permits, orders, specific contract language, and interjurisdictional agreements, to require that activities identified in Section II B 5 a address stormwater runoff in such a manner that stormwater runoff controls are designed and installed:

(1) In accordance with the appropriate water quality and water quantity design criteria as required in Part II (4VAC50-60-40 et seq.) of 4VAC50-60;

(2) In accordance with any additional applicable state or local design criteria required at project initiation; and

(3) Where applicable, in accordance with any department-approved annual standards and specifications.

Upon board approval of a Virginia Stormwater Management Program authority (VSMP authority) as defined in § 10.1-603.2 of the Code of Virginia and reissuance of the Virginia Stormwater Management

Program (VSMP) General Permit for Discharges of Stormwater from Construction Activities, the operator shall require that stormwater management plans are approved by the appropriate VSMP authority prior to land disturbance. The expected implementation date of this requirement is July 1, 2014; as per § 10.1-603.3 M of the Code of Virginia, VSMPS shall become effective July 1, 2014, unless otherwise specified by the board.

c. Inspection, operation, and maintenance verification of stormwater management facilities.

(1) For stormwater management facilities not owned by the MS4 operator, the following conditions apply:

(a) The operator shall require adequate long-term operation and maintenance by the owner of the stormwater management facility by requiring the owner to develop a recorded inspection schedule and maintenance agreement to the extent allowable under state or local law or other legal mechanism;

(b) The operator shall implement a schedule designed to inspect all privately owned stormwater management facilities that discharge into the MS4 at least once every five years to document that maintenance is being conducted in such a manner to ensure long-term operation in accordance with the approved designs.

(c) The operator shall utilize its legal authority for enforcement of maintenance responsibilities by the operator if maintenance is neglected by the owner. The operator may develop and implement a progressive compliance and enforcement strategy provided that the strategy is included in the MS4 Program Plan.

(d) Beginning with the issuance of this state permit, the operator may utilize strategies other than maintenance agreements such as periodic inspections, homeowner outreach and education, and other methods targeted at promoting the long-term maintenance of stormwater control measures that are designed to treat stormwater runoff solely from the individual residential lot. Within 12 month of coverage under this permit, the operator shall develop and implement these alternative strategies.

(2) For stormwater management facilities owned by the MS4 operator, the following conditions apply:

(a) The operator shall provide for adequate long-term operation and maintenance of its stormwater management facilities in accordance with written inspection and maintenance procedures included in the MS4 Program Plan.

(b) The operator shall inspect these stormwater management facilities annually. The operator may choose to implement an alternative schedule to inspect these stormwater management facilities based on facility type and expected maintenance needs provided that the alternative schedule is included in the MS4 Program Plan.

(c) The operator shall conduct maintenance on its stormwater management facilities as necessary.

d. MS4 Program Plan requirements. The operator's MS4 Program Plan shall be updated in accordance with Table 1 in this section to include:

(1) A list of the applicable legal authorities such as ordinance, state and other permits, orders, specific contract language, and interjurisdictional agreements to ensure compliance with the minimum control measure in Section II related to post-construction stormwater management in new development and development on prior developed lands;

(2) Written policies and procedures utilized to ensure that stormwater management facilities are designed and installed in accordance with Section II B 5 b;

(3) Written inspection policies and procedures utilized in conducting inspections;

(4) Written procedures for inspection, compliance and enforcement to ensure maintenance is conducted on private stormwater facilities to ensure long-term operation in accordance with approved design;

(5) Written procedures for inspection and maintenance of operator-owned stormwater management facilities;

(6) The roles and responsibilities of each of the operator's departments, divisions, or subdivisions in implementing the minimum control measure in Section II related to post-construction stormwater management in new development and development on prior developed lands. If the operator utilizes another entity to implement portions of the MS4 Program Plan, a copy of the written agreement must be retained in the MS4 Program Plan. Roles and responsibilities shall be updated as necessary.

e. Stormwater management facility tracking and reporting requirements. The operator shall maintain an updated electronic database of all known operator-owned and privately-owned stormwater management facilities that discharge into the MS4. The database shall include the following:

(1) The stormwater management facility type;

(2) A general description of the facility's location, including the address or latitude and longitude;

(3) The acres treated by the facility, including total acres, as well as the breakdown of pervious and impervious acres;

(4) The date the facility was brought online (MMYYYY). If the date is not known, the operator shall use June 2005 as the date brought online for all previously existing stormwater management facilities;

(5) The sixth order hydrologic unit code (HUC) in which the stormwater management facility is located;

(6) The name of any impaired water segments within each HUC listed on the 2012 § 305(b)/303(d) Water

Quality Assessment Integrate Report to which the stormwater management facility discharges;

(7) Whether the stormwater management facility is operator-owned or privately-owned;

(8) Whether a maintenance agreement exists if the stormwater management facility is privately owned; and

(9) The date of the last inspection.

In addition, the operator shall annually track and report the total number of inspections completed and, when applicable, the number of enforcement actions taken to ensure long-term maintenance.

An electronic database or spreadsheet of all stormwater management facilities brought online during each reporting year shall be submitted with the appropriate annual report. Upon such time as the department provides the operators access to a statewide web-based reporting database, the operator shall utilize such database to complete the pertinent reporting requirements of this state permit.

6. Pollution prevention/good housekeeping for municipal operations. ~~Develop and implement an operation and maintenance program consistent with the MS4 Program Plan that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations. Using training materials including those available from EPA, state, tribe, or other organizations, the program shall include employee training to prevent and reduce stormwater pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and MS4 maintenance. The operator is encouraged to review the Environmental Protection Agency's (EPA's) National Menu of Stormwater Best Management Practices for ideas and strategies to incorporate into its program. The menu can be accessed at http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm.~~

~~The operator shall identify, implement, evaluate and modify, as necessary, BMPs to meet the following pollution prevention/good housekeeping for municipal operations measurable goals:~~

~~a. Operation and maintenance programs including activities, schedules, and inspection procedures shall include provisions and controls to reduce pollutant discharges into the regulated small MS4 and receiving surface waters;~~

~~b. Illicit discharges shall be eliminated from storage yards, fleet or maintenance shops, outdoor storage areas, rest areas, waste transfer stations, and other municipal facilities;~~

~~c. Waste materials shall be disposed of properly;~~

~~d. Materials that are soluble or erodible shall be protected from exposure to precipitation;~~

~~e. Materials, including but not limited to fertilizers and pesticides, that have the potential to pollute receiving surface waters shall be applied according to manufacturer's recommendations; and~~

~~f. For state agencies with lands where nutrients are applied, nutrient management plans shall be developed and implemented in accordance with the requirements of § 10.1-104.4 of the Code of Virginia.~~

a. Operations and maintenance activities. The MS4 Program Plan submitted with the registration statement shall be implemented by the operator until updated in accordance with this state permit. In accordance with Table 1 in this section, the operator shall develop and implement written procedures designed to minimize or prevent pollutant discharge from: (i) daily operations such as road, street, and parking lot maintenance; (ii) equipment maintenance; and (iii) the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers. The written procedures shall be utilized, as appropriate, as part of the employee training. At a minimum, the written procedures shall be designed to:

(1) Prevent illicit discharges;

(2) Ensure the proper disposal of water materials, including landscape wastes;

(3) Prevent the discharge of municipal vehicle wash water into the MS4 without authorization under a separate VPDES permit;

(4) Prevent the discharge of wastewater into the MS4 without authorization under a separate VDPES permit;

(5) Require implementation of best management practices when discharging water pumped from utility construction and maintenance activities;

(6) Minimize the pollutants in stormwater runoff from bulk storage areas (e.g., salt storage, topsoil stockpiles) through the use of best management practices;

(7) Prevent pollutant discharge into the MS4 from leaking municipal automobiles and equipment; and

(8) Ensure that the application of materials, including fertilizers and pesticides, is conducted in accordance with the manufacturer's recommendations.

b. Municipal facility pollution prevention and good housekeeping.

(1) Within 12 months of state permit coverage, the operator shall identify all municipal high-priority facilities. These high-priority facilities shall include (i) composting facilities, (ii) equipment storage and maintenance facilities, (iii) materials storage yards, (iv) pesticide storage facilities, (v) public works yards, (vi) recycling facilities, (vii) salt storage facilities, (viii) solid waste handling and transfer facilities, and (viii) vehicle storage and maintenance yards.

(2) With 12 months of state permit coverage, the operator shall identify which of the municipal high-priority facilities have a high potential of chemicals or other materials to be discharged in stormwater.

(3) The operator shall develop and implement specific stormwater pollution prevention plans for all high-priority facilities identified as having a high potential for the discharge of chemicals and other materials in stormwater. SWPPP development and implementation shall be completed within four years of coverage under this state permit. Facilities covered under a separate VDPES permit shall adhere to the conditions established in that permit and are excluded from this requirement.

(4) Each SWPPP shall include:

(a) A site description that includes a site map identifying all outfalls, direction of flows, existing source controls, and receiving water bodies;

(b) A discussion and checklist of potential pollutants and pollutant sources;

(c) A discussion of all potential nonstormwater discharges;

(d) Written procedures designed to reduce and prevent pollutant discharge;

(e) A description of the applicable training as required in Section II B 6 c;

(f) Procedures to conduct an annual comprehensive site compliance evaluation;

(g) An inspection and maintenance schedule for site specific source controls. The date of each inspection and associated findings and follow-up shall be logged in each SWPPP;

(h) The contents of each SWPPP shall be evaluated and modified as necessary as the result of any release or spill from the high priority facility reported in accordance with Section III G. The date of the release, material spilled and the amount of the release must be listed in each SWPPP; and

(i) A copy of each SWPPP shall be kept at each facility and shall be kept updated and utilized as part of staff training required in Section II B 6 d.

c. Nutrient management.

(1) The operator shall implement nutrient management plans that have been developed by a certified nutrient management planner in accordance with § 10.1-104.2 of the Code of Virginia on all lands owned or operated by the MS4 operator where nutrients are applied to a contiguous area greater than one acre. Implementation shall be in accordance with the following schedule:

(a) Within 12 months of state permit coverage, the operator shall identify all applicable lands where nutrients are applied to a contiguous area of more than one acre. A latitude and longitude shall be provided for each such piece of land and reported in the annual report.

(b) Within 60 months of state permit coverage, the operator shall implement nutrient management plans on all lands where nutrients are applied to a contiguous area of more than one acre. The following measurable goals are established for the implementation of nutrient management plans: (i) within 24 months of permit coverage, not less than 15% of all identified acres will be covered by nutrient management plans; (ii) within 36 months of permit coverage, not less than 40% of all identified acres will be covered by nutrient management plans; and (iii) within 48 months of permit coverage, not less than 75% of all identified acres will be covered by nutrient management plans. The operator shall not fail to meet the measurable goals for two consecutive years.

(c) MS4 operators with lands regulated under § 10.1-104.4 of the Code of Virginia shall continue to implement nutrient management plans in accordance with this statutory requirement.

(2) Operators shall annually track the following:

(a) The total acreage of lands where nutrient management plans are required; and

(b) The acreage of lands upon which nutrient management plans have been implemented.

(3) The operator shall not apply any deicing agent containing urea or other forms of nitrogen or phosphorus to parking lots, roadways, and sidewalks, or other paved surfaces.

d. Training. The operator shall conduct training for employees. The training requirements may be fulfilled, in total or in part, through regional training programs involving two or more MS4 localities provided; however, that each operator shall remain individually liable for its failure to comply with the training requirements in this permit. Training is not required if the topic is not applicable to the operator's operations and therefore does not have applicable relevant personnel provided the lack of applicability is documented in the MS4 Program Plan. The operator shall determine the relevant employees to receive training. The operator shall develop an annual written training plan including a schedule of training events that ensures implementation of the training requirements as follows:

(1) The operator shall provide biennial training to relevant field personnel in the recognition and reporting of illicit discharges.

(2) The operator shall provide biennial training to relevant employees in good housekeeping and pollution prevention practices that are to be employed during road, street, and parking lot maintenance.

(3) The operator shall provide biennial training to relevant employees in good housekeeping and pollution

prevention practices that are to be employed in and around maintenance and public works facilities.

(4) The operator shall ensure that employees, and require that contractors, applying pesticides and herbicides are properly trained or certified in accordance with the Virginian Pesticide Control Act (§ 3.1-249.27 et seq. of the Code of Virginia).

(5) The operator shall ensure that employees and contractors employed as plan reviewers, inspectors, program administrators, and construction site operators obtain the appropriate certifications as required under the Virginia Erosion and Sediment Control Law and its attendant regulations.

(6) The operator shall ensure that the relevant employees obtain the appropriate certifications as required under the Virginia Erosion and Sediment Control Law and its attendant regulations.

(7) The operators shall provide biennial training to appropriate employees in good housekeeping and pollution prevention practices that are to be employed in and around recreational facilities.

(8) The appropriate emergency response employees shall have training in spill responses. A summary of the training or certification program provided to emergency response employees shall be included in the first annual report.

(9) The operator shall keep documentation on each training event including the training date, the number of employees attending the training, and the objective of the training event for a period of three years after each training event.

e. The operator shall require that municipal contractors use appropriate control measures and procedures for stormwater discharges to the MS4 system. Oversight procedures shall be described in the MS4 Program Plan.

f. In accordance with the schedule of development in Table 1 of this section, the MS4 Program Plan shall contain:

(1) The written protocols being used to satisfy the daily operations and maintenance requirements;

(2) A list of all municipal high-priority facilities that denotes those facilities that have a high potential of chemicals or other materials to be discharged in stormwater and a schedule that identifies the year in which an individual SWPPP will be developed for those facilities required to have SWPPP. Upon completion of a SWPPP, the SWPPP shall be part of the MS4 Program Plan. The MS4 Program Plan shall include the location in which the individual SWPPP is located;

(3) A list of lands where nutrients are applied to a contiguous area of more than one acre. Upon completion of a nutrient management plan, the nutrient management plan shall be part of the MS4 Program Plan. The MS4 Program Plan shall include the location in which the individual nutrient management plan is located; and

(4) The annual written training plan for the next reporting cycle.

g. Reporting requirements.

(1) A summary report on the development and implementation of the daily operational procedures;

(2) A summary report on the development and implementation of the required SWPPPs;

(3) A summary report on the development and implementation of the nutrient management plans that includes:

(a) The total acreage of lands where nutrient management plans are required; and

(b) The acreage of lands upon which nutrient management plans have been implemented; and

(4) A summary report on the required training, including a list of training events, the training date, the number of employees attending training and the objective of the training.

C. If an existing program requires the implementation of one or more of the minimum control measures of Section II B, the operator, with the approval of the board, may follow that program's requirements rather than the requirements of Section II B. A program that may be considered includes, but is not limited to, a local, state or tribal program that imposes, at a minimum, the relevant requirements of Section II B.

The operator's MS4 Program Plan shall identify and fully describe any program that will be used to satisfy one or more of the minimum control measures of Section II B.

If the program the operator is using requires the approval of a third party, the program must be fully approved by the third party, or the operator must be working towards getting full approval. Documentation of the program's approval status, or the progress towards achieving full approval, must be included in the annual report required by Section II E 3. The operator remains responsible for compliance with the permit requirements if the other entity fails to implement the control measures (or component thereof.)

D. The operator may rely on another entity to satisfy the VSMP permit ~~obligations~~ requirements to implement a minimum control measure if: (i) the other entity, in fact, implements the control measure; (ii) the particular control measure, or component thereof, is at least as stringent as the corresponding VSMP permit requirement; and (iii) the other entity agrees to implement the control measure on behalf of the operator. The agreement between the parties must be documented in writing and retained by the operator with the MS4 Program Plan for the duration of this permit.

In the annual reports that must be submitted under Section II E 3, the operator must specify that another entity is being

relied on to satisfy some of the permit ~~obligations~~ requirements.

If the operator is relying on another governmental entity regulated under 4VAC50-60-380 to satisfy all of the permit obligations, including the obligation to file periodic reports required by Section II E 3, the operator must note that fact in the registration statement, but is not required to file the periodic reports.

The operator remains responsible for compliance with the permit ~~obligations~~ requirements if the other entity fails to implement the control measure (or component thereof).

E. Evaluation and assessment.

1. MS4 Program Evaluation. The operator must annually evaluate:

~~a. The operator must annually evaluate:~~

~~(1)~~ a. Program compliance;

~~(2)~~ b. The appropriateness of the identified BMPs (as part of this evaluation, the operator shall evaluate the effectiveness of BMPs in addressing discharges into waters that are identified as impaired in the ~~2006~~ 2012 § 305(b)/303(d) Water Quality Assessment Integrated Report); and

~~(3)~~ c. Progress towards achieving the identified measurable goals.

~~b. The operator must evaluate its MS4 Program once during the permit cycle using the "Municipal Stormwater Program Evaluation Guidance," Environmental Protection Agency EPA-833-R-07-003. Such information shall be utilized when reapplying for permit coverage. Results of this evaluation shall be kept on file and made available during audits and inspections.~~

2. Recordkeeping. The operator must keep records required by the NPDES permit for at least three years. These records must be submitted to the ~~NPDES permitting authority~~ department only upon specific request. The operator must make the records, including a description of the stormwater management program, available to the public at reasonable times during regular business hours.

3. Annual reports. The operator must submit an annual report for the reporting period of July 1 through June 30 to the department by the following October 1. The reports shall include:

a. Background Information.

(1) The name and permit number of the program submitting the annual report;

(2) The annual report permit year;

(3) Modifications to any operator's department's roles and responsibilities;

(4) Number of new MS4 outfalls and associated acreage by HUC added during the permit year; and

(5) Signed certification.

b. The status of compliance with permit conditions, an assessment of the appropriateness of the identified best management practices and progress towards achieving the identified measurable goals for each of the minimum control measures;

c. Results of information collected and analyzed, including monitoring data, if any, during the reporting period;

d. A summary of the stormwater activities the operator plans to undertake during the next reporting cycle;

e. A change in any identified best management practices or measurable goals for any of the minimum control measures including steps to be taken to address any deficiencies;

f. Notice that the operator is relying on another government entity to satisfy some of the permit obligations (if applicable);

g. The approval status of any programs pursuant to Section II C (if appropriate), or the progress towards achieving full approval of these programs; and

h. Information required ~~pursuant to Section I B 9;~~ for any applicable TMDL special condition.

~~i . The number of illicit discharges identified and the narrative on how they were controlled or eliminated pursuant to Section II B 3 f;~~

~~j. Regulated land disturbing activities data tracked under Section II 4 c;~~

~~k. All known permanent stormwater management facility data tracked under Section II B 5 b (6) submitted in a database format to be prescribed by the department. Upon filing of this list, subsequent reports shall only include those new stormwater management facilities that have been brought online;~~

~~l. A list of any new or terminated signed agreements between the operator and any applicable third parties where the operator has entered into an agreement in order to implement minimum control measures or portions of minimum control measures; and~~

~~m. Copies of any written comments received during a public comment period regarding the MS4 Program Plan or any modifications.~~

F. Program Plan modifications. ~~The board may require modifications to the MS4 Program Plan as needed to address adverse impacts on receiving surface water quality caused, or contributed to, by discharges from the regulated small MS4. Modifications required by the board shall be made in writing and set forth the time schedule to develop and implement the modification. The operator may propose alternative program modifications and time schedules to meet the objective of the required modification. The board retains the authority to require any modifications it determines are necessary.~~

1. Modifications requested by the operator. Modifications to the MS4 Program are expected throughout the life of this state permit as part of the iterative process to reduce the pollutant loadings and to protect water quality. As such, modifications made in accordance with this state permit as a result of the iterative process do not require modification of this permit unless the department determines that the changes met the criteria referenced in 4VAC50-60-630 or 4VAC50-60-650. Updates and modifications to the MS4 Program may be made during the life of this state permit in accordance with the following procedures:

a. Adding (but not eliminating or replacing) components, controls, or requirements to the MS4 Program may be made by the operator at any time. Additions shall be reported as part of the annual report.

b. Updates and modifications to specific standards and specifications, schedules, operating procedures, ordinances, manuals, checklists, and other documents routinely evaluated and modified are permitted under this state permit provided that the updates and modifications are done in a manner that (i) is consistent with the conditions of this state permit, (ii) follow any public notice and participation requirements established in this state permit, and (iii) are documented in the annual report.

c. Replacing, or eliminating without replacement, any ineffective or infeasible strategies, policies, and BMPs specifically identified in this permit with alternate strategies, policies, and BMPs may be requested at any time. Such requests must include the following:

(1) An analysis of how or why the BMPs, strategies, or policies are ineffective or infeasible, including cost prohibitive;

(2) Expectations on the effectiveness of the replacement BMPs, strategies, or policies;

(3) An analysis of how the replacement BMPs are expected to achieve the goals of the BMP's to be replaced;

(4) A schedule for implementing the replacement BMPs, strategies, and policies;

(5) An analysis of how the replacement strategies and policies are expected to improve the operator's ability to meet the goals of the strategies and policies being replaced; and

(6) Requests or notifications must be made in writing to the department and signed in accordance with 4VAC-50-60-370.

d. The operator follows the public involvement requirements identified in Section II B 2 (a).

2. MS4 Program updates requested by the department. In a manner and following procedures in accordance with the Virginia Administrative Process Act, the Virginia Stormwater Management regulations, and other applicable state law and regulations, the department may request changes to the MS4 Program to assure compliance with the statutory requirements of the Virginia Stormwater Management Act and its attendant regulations to:

a. Address impacts on receiving water quality caused by discharges from the MS4;

b. Include more stringent requirements necessary to comply with new state or federal laws or regulations; or

c. Include such other conditions necessary to comply with state or federal law or regulation.

Proposed changes requested by the department shall be made in writing and set forth the basis for and objective of the modification as well as the proposed time schedule for the operator to develop and implement the modification. The operator may propose alternative program modifications or time schedules to meet the objective of the requested modification, but any such modifications are at the discretion of the department.

SECTION III
CONDITIONS APPLICABLE TO ALL VSMP PERMITS

A. Monitoring.

1. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

2. Monitoring shall be conducted according to procedures approved under 40 CFR Part 136 (2001) or alternative methods approved by the U.S. Environmental Protection Agency, unless other procedures have been specified in this permit.

3. The operator shall periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals that will insure accuracy of measurements.

B. Records.

1. Monitoring records/reports shall include:

a. The date, exact place, and time of sampling or measurements;

b. The individual(s) who performed the sampling or measurements;

c. The date(s) and time(s) analyses were performed;

d. The individual(s) who performed the analyses;

e. The analytical techniques or methods used; and

f. The results of such analyses.

2. The operator shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the registration statement for this permit, for a period of at least three years from the date of the sample,

measurement, report or request for coverage. This period of retention shall be extended automatically during the course of any unresolved litigation regarding the regulated activity or regarding control standards applicable to the operator, or as requested by the board.

C. Reporting monitoring results.

1. The operator shall submit the results of the monitoring required by this permit with the annual report unless another reporting schedule is specified elsewhere in this permit.

2. Monitoring results shall be reported on a Discharge Monitoring Report (DMR); on forms provided, approved or specified by the department; or in any format provided the date, location, parameter, method, and result of the monitoring activity are included.

3. If the operator monitors any pollutant specifically addressed by this permit more frequently than required by this permit using test procedures approved under 40 CFR Part 136 (2001) or using other test procedures approved by the U.S. Environmental Protection Agency or using procedures specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or reporting form specified by the department.

4. Calculations for all limitations that require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

D. Duty to provide information. The operator shall furnish to the department, within a reasonable time, any information that the board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The board may require the operator to furnish, upon request, such plans, specifications, and other pertinent information as may be necessary to determine the effect of the wastes from his discharge on the quality of surface waters, or such other information as may be necessary to accomplish the purposes of the CWA and Virginia Stormwater Management Act. The operator shall also furnish to the department upon request, copies of records required to be kept by this permit.

E. Compliance schedule reports. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. Unauthorized stormwater discharges. Pursuant to § 10.1-603.2:2 A of the Code of Virginia, except in compliance with a permit issued by the board, it shall be unlawful to cause a stormwater discharge from a MS4.

G. Reports of unauthorized discharges. Any operator of a ~~regulated~~ small MS4 who discharges or causes or allows a discharge of sewage, industrial waste, other wastes or any noxious or deleterious substance or a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110 (2002), 40 CFR Part 117 (2002) or 40 CFR Part 302 (2002) that occurs during a 24-hour period into or upon surface waters; or who discharges or causes or allows a discharge that may reasonably be expected to enter surface waters, shall notify the Department of Environmental Quality of the discharge immediately upon discovery of the discharge, but in no case later than within 24 hours after said discovery. A written report of the unauthorized discharge shall be submitted to the Department of Environmental Quality and the Department of Conservation and Recreation, within five days of discovery of the discharge. The written report shall contain:

1. A description of the nature and location of the discharge;

2. The cause of the discharge;

3. The date on which the discharge occurred;

4. The length of time that the discharge continued;

5. The volume of the discharge;

6. If the discharge is continuing, how long it is expected to continue;

7. If the discharge is continuing, what the expected total volume of the discharge will be; and

8. Any steps planned or taken to reduce, eliminate and prevent a recurrence of the present discharge or any future discharges not authorized by this permit.

Discharges reportable to the Department of Environmental Quality and the Department of Conservation and Recreation under the immediate reporting requirements of other regulations are exempted from this requirement.

H. Reports of unusual or extraordinary discharges. If any unusual or extraordinary discharge including a " bypass " or " upset," as defined herein, should occur from a facility and the discharge enters or could be expected to enter surface waters, the operator shall promptly notify, in no case later than within 24 hours, the Department of Environmental Quality and the Department of Conservation and Recreation by telephone after the discovery of the discharge. This notification shall provide all available details of the incident, including any adverse affects on aquatic life and the known number of fish killed. The operator shall reduce the report to writing and shall submit it to the Department of Environmental Quality and the Department of Conservation and Recreation within five days of discovery of the discharge in accordance with Section III I 2. Unusual and extraordinary discharges include but are not limited to any discharge resulting from:

1. Unusual spillage of materials resulting directly or indirectly from processing operations;

2. Breakdown of processing or accessory equipment;

3. Failure or taking out of service some or all of the facilities; and

4. Flooding or other acts of nature.

I. Reports of noncompliance. The operator shall report any noncompliance which may adversely affect surface waters or may endanger public health.

1. An oral report shall be provided within 24 hours to the Department of Environmental Quality and the Department of Conservation and Recreation from the time the operator becomes aware of the circumstances. The following shall be included as information which shall be reported within 24 hours under this paragraph:

a. Any unanticipated bypass; and

b. Any upset which causes a discharge to surface waters.

2. A written report shall be submitted within five days and shall contain:

a. A description of the noncompliance and its cause;

b. The period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and

c. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

The board or its designee may waive the written report on a case-by-case basis for reports of noncompliance under Section III I if the oral report has been received within 24 hours and no adverse impact on surface waters has been reported.

3. The operator shall report all instances of noncompliance not reported under Sections III I 1 or 2, in writing, at the time the next monitoring reports are submitted. The reports shall contain the information listed in Section III I 2.

NOTE: The immediate (within 24 hours) reports required to be provided to the Department of Environmental Quality in Sections III G, H and I may be made to the appropriate Department of Environmental Quality's Regional Office Pollution Response Program as found at http://www.deq.virginia.gov/prep/homepage.html#. Reports may be made by telephone or by fax. For reports outside normal working hours, leave a message and this shall fulfill the immediate reporting requirement. For emergencies, the Virginia Department of Emergency Services maintains a 24-hour telephone service at 1-800-468-8892.

4. Where the operator becomes aware of a failure to submit any relevant facts, or submittal of incorrect information in any report to the department or the Department of Environmental Quality, it shall promptly submit such facts or correct information.

J. Notice of planned changes.

1. The operator shall give notice to the department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

a. The operator plans an alteration or addition to any building, structure, facility, or installation from which there is or may be a discharge of pollutants, the construction of which commenced:

(1) After promulgation of standards of performance under § 306 of the Clean Water Act that are applicable to such source; or

(2) After proposal of standards of performance in accordance with § 306 of the Clean Water Act that are applicable to such source, but only if the standards are promulgated in accordance with § 306 within 120 days of their proposal;

b. The operator plans alteration or addition that would significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in this permit; or

2. The operator shall give advance notice to the department of any planned changes in the permitted facility or activity; which may result in noncompliance with permit requirements.

K. Signatory requirements.

1. Registration statement. All registration statements shall be signed as follows:

a. For a corporation: by a responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

c. For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a public agency includes:

(1) The chief executive officer of the agency, or

(2) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

2. Reports, etc. All reports required by permits, and other information requested by the board shall be signed by a person described in Section III K 1, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Section III K 1;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the operator. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

c. The written authorization is submitted to the department.

3. Changes to authorization. If an authorization under Section III K 2 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Section III K 2 shall be submitted to the department prior to or together with any reports, or information to be signed by an authorized representative.

4. Certification. Any person signing a document under Sections III K 1 or 2 shall make the following certification:

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

L. Duty to comply. The operator shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Virginia Stormwater Management Act and the Clean Water Act, except that noncompliance with certain provisions of this permit may constitute a violation of the Virginia Stormwater Management Act but not the Clean Water Act. Permit noncompliance is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

The operator shall comply with effluent standards or prohibitions established under § 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if this permit has not yet been modified to incorporate the requirement.

M. Duty to reapply. If the operator wishes to continue an activity regulated by this permit after the expiration date of this permit, the operator shall submit a new registration statement at least 90 days before the expiration date of the existing permit, unless permission for a later date has been granted by the board. The board shall not grant permission for registration statements to be submitted later than the expiration date of the existing permit.

N. Effect of a permit. This permit does not convey any property rights in either real or personal property or any exclusive privileges, nor does it authorize any injury to private property or invasion of personal rights, or any infringement of federal, state or local law or regulations.

O. State law. Nothing in this permit shall be construed to preclude the institution of any legal action under, or relieve the operator from any responsibilities, liabilities, or penalties established pursuant to any other state law or regulation or under authority preserved by § 510 of the Clean Water Act. Except as provided in permit conditions on "bypassing" (Section III U), and "upset" (Section III V) nothing in this permit shall be construed to relieve the operator from civil and criminal penalties for noncompliance.

P. Oil and hazardous substance liability. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the operator from any responsibilities, liabilities, or penalties to which the operator is or may be subject under §§ 62.1-44.34:14 through 62.1-44.34:23 of the State Water Control Law or § 311 of the Clean Water Act.

Q. Proper operation and maintenance. The operator shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances), which are installed or used by the operator to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes effective plant performance, adequate funding, adequate staffing, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by the operator only when the operation is necessary to achieve compliance with the conditions of this permit.

R. Disposal of solids or sludges. Solids, sludges or other pollutants removed in the course of treatment or management of pollutants shall be disposed of in a manner so as to prevent any pollutant from such materials from entering surface waters.

S. Duty to mitigate. The operator shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

T. Need to halt or reduce activity not a defense. It shall not be a defense for an operator in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

U. Bypass.

1. "Bypass," as defined in 4VAC50-60-10, means the intentional diversion of waste streams from any portion of a treatment facility. The operator may allow any bypass to occur that does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Sections III U 2 and U 3.

2. Notice.

a. Anticipated bypass. If the operator knows in advance of the need for a bypass, prior notice shall be submitted, if possible at least 10 days before the date of the bypass.

b. Unanticipated bypass. The operator shall submit notice of an unanticipated bypass as required in Section III I.

3. Prohibition of bypass.

a. Bypass is prohibited, and the board or its designee may take enforcement action against an operator for bypass, unless:

(1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance; and

(3) The operator submitted notices as required under Section III U 2.

b. The board or its designee may approve an anticipated bypass, after considering its adverse effects, if the board or its designee determines that it will meet the three conditions listed above in Section III U 3 a.

V. Upset.

1. An upset, as defined in 4VAC50-60-10, constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of Section III V 2 are met. A determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is not a final administrative action subject to judicial review.

2. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

3. An operator who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

a. An upset occurred and that the operator can identify the cause(s) of the upset;

b. The permitted facility was at the time being properly operated;

c. The operator submitted notice of the upset as required in Section III I; and

d. The operator complied with any remedial measures required under Section III S.

4. In any enforcement proceeding the operator seeking to establish the occurrence of an upset has the burden of proof.

W. Inspection and entry. The operator shall allow the department as the board's designee, or an authorized representative (including an authorized contractor acting as a representative of the administrator), upon presentation of credentials and other documents as may be required by law, to:

1. Enter upon the operator's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act and the Virginia Stormwater Management Act, any substances or parameters at any location.

For purposes of this subsection, the time for inspection shall be deemed reasonable during regular business hours, and whenever the facility is discharging. Nothing contained herein shall make an inspection unreasonable during an emergency.

X. Permit actions. Permits may be modified, revoked and reissued, or terminated for cause. The filing of a request by the operator for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Y. Transfer of permits.

1. Permits are not transferable to any person except after notice to the department. Except as provided in Section III Y 2, a permit may be transferred by the operator to a new

owner or operator only if the permit has been modified or revoked and reissued, or a minor modification made, to identify the new operator and incorporate such other requirements as may be necessary under the Virginia Stormwater Management Act and the Clean Water Act.

2. As an alternative to transfers under Section III Y 1, this permit may be automatically transferred to a new operator if:

a. The current operator notifies the department at least two days in advance of the proposed transfer of the title to the facility or property;

b. The notice includes a written agreement between the existing and new operators containing a specific date for transfer of permit responsibility, coverage, and liability between them; and

c. The board does not notify the existing operator and the proposed new operator of its intent to modify or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in Section III Y 2 b.

Z. Severability. The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

NOTICE: The following forms used in administering the regulation were filed by the agency. The forms are not being published; however, online users of this issue of the Virginia Register of Regulations may click on the name to access a form. The forms are also available from the agency contact or may be viewed at the Office of the Registrar of Regulations, General Assembly Building, 2nd Floor, Richmond, Virginia 23219.

FORMS (4VAC50-60)

Application Form 1-General Information, Consolidated Permits Program, EPA Form 3510-1, DCR 199-149 (August 1990).

~~Department of Conservation and Recreation Permit Fee Form, DCR 199-145 (10/09).~~

Department of Conservation and Recreation MS4 Operator Permit Fee Form, DCR 199-145 (10/09) (09/12).

VSMP General Permit for Discharges of Stormwater from Construction Activities (VAR10) - Registration Statement, DCR 199-146 (03/09).

VSMP General Permit Notice of Termination - Construction Activity Stormwater Discharges (VAR10), DCR 199-147 (03/09).

VSMP General Permit for Discharges of Stormwater from Construction Activities (VAR10) - Transfer Agreement, DCR199-191 (03/09).

~~VSMP General Permit Registration Statement for Stormwater Discharges From Small Municipal Separate Storm Sewer Systems (VAR04), DCR 199-148 (07/08).~~

VSMP General Permit Registration Statement for Stormwater Discharges From Small Municipal Separate Storm Sewer Systems (VAR04) and Instructions, DCR 199-148 (09/12).

DOCUMENTS INCORPORATED BY REFERENCE (4VAC50-60)

~~Illicit Discharge Detection and Elimination — A Guidance Manual for Program Development and Technical Assessments, EPA Cooperative Agreement X-82907801-0, October 2004, by Center for Watershed Protection and Robert Pitt, University of Alabama, available on the Internet at http://cfpub.epa.gov/npdes/stormwater/idde.cfm.~~

~~Getting in Step — A Guide for Conducting Watershed Outreach Campaigns, EPA 841-B-03-002, December 2003, U.S. Environmental Protection Agency, Office of Wetlands, Oceans, and Watersheds, available on the Internet at http://www.epa.gov/owow/watershed/outreach/documents/getnstep.pdf, or may be ordered from National Service Center for Environmental Publications, telephone 1-800-490-9198.~~

~~Municipal Stormwater Program Evaluation Guidance, EPA-833-R-07-003, January 2007 (field test version), U.S. Environmental Protection Agency, Office of Wastewater Management, available on the Internet at http://cfpub.epa.gov/npdes/docs.cfm?program_id=6&view=allprog&sort=name#ms4_guidance, or may be ordered from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, telephone 1-800-553-6847 or (703) 605-6000.~~

Virginia Runoff Reduction Method: Instructions & Documentation, March 28, 2011.

VA.R. Doc. No. R12-3136; Filed October 16, 2012, 3:43 p.m.

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TITLE 6. CRIMINAL JUSTICE AND CORRECTIONS

CRIMINAL JUSTICE SERVICES BOARD

Fast-Track Regulation

Title of Regulation: **6VAC20-30. Rules Relating to Compulsory In-Service Training Standards for Law-Enforcement Officers, Jailors or Custodial Officers, Courtroom Security Officers, Process Server Officers and Officers of the Department of Corrections, Division of Operations (amending 6VAC20-30-80).**

Statutory Authority: § 9.1-102 of the Code of Virginia.

Public Hearing Information: No public hearings are scheduled.