Arlington National Cemetery Year (2015) MS4 Annual Report
Permit Number VAR040139
FACILITY INFORMATION

Name of Facility Arlington National Cemetery

Street Address 1 Memorial Drive

City Arlington **State** VA **Zip Code** 22211

County Arlington

SIGNATURE AND CERTIFICATION

Certification, as required by Virginia Administrative Code (9VAC25-890-40):
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.

Douglas B. Guttormsen, Colonel, U.S. Army
Printed Name

Signature

Chief, Engineering Division
Title

OCT 0 1 2015
Date

Arlington National Cemetery
MS4 Permit Year 2014/2015
Permit Number VAR040139
Annual Report and Program Plan Update

Reporting Period
July 1, 2014 through June 30, 2015
(Due: October 1, 2015)

Submitted to:
Virginia Department of Environmental Quality
Office of Stormwater Management
P.O. Box 1105
Richmond, VA 23218

Prepared by:
Arlington National Cemetery
1 Memorial Drive
Arlington, VA 22211

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Douglas B. Guttormsen, Colonel, U.S. Army	Chief, Engineering Division
Printed Name	Title
Signature	Date

1.0 INTRODUCTION

The following report has been prepared by Arlington National Cemetery (ANC) to comply with the requirements of the Virginia Stormwater Management Program (VSMP) General Permit for Discharges of Stormwater from Small Municipal Storm Sewer Systems (MS4). The Virginia Department of Environmental Quality (VDEQ) originally issued General Permit Number VAR040139 to ANC on December 11, 2014.

Under the terms of the permit, ANC is developing a MS4 Program Plan and plans to submit to VDEQ by December 11, 2015. The MS4 Program Plan is designed to implement six minimum control measures (MCMs) and to reduce the discharges of pollutants into the storm sewer system to the maximum extent practicable (MEP). The MCMs are:

1) Public Education and Outreach
2) Public Involvement and Participation
3) Illicit Discharge Detection and Elimination
4) Construction Site and Stormwater Runoff Control
5) Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands
6) Pollution Prevention and Good Housekeeping for Municipal Operations

In accordance with Part II E 3 of the General Permit, ANC is submitting this annual report to DEQ to report the status of compliance with permit conditions, an assessment of the appropriateness of the identified best management practices (BMPs) and progress towards achieving the identified measurable goals for each of the MCMs in this reporting period.

1.1 Modifications to ANC's Roles and Responsibilities

No modifications to ANC's roles and responsibilities during this reporting year.

1.2 New MS4 Outfalls Added During this Permit Year

No new MS4 outfalls added during this reporting year.

2.0 PROGRESS ON MINIMUM CONTROL MEASURES

This section provides progress during this reporting period and planned activities for the next reporting period for each BMP within the six MCMs. These BMPs have been identified in the ANC's registration statement. ANC conducted an assessment of the appropriateness of the identified BMPs. The following table provides assessment comments in columns, Progress Goals and Planned Activities.

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BMP ID #	BMP Description	Responsible Party	Measurable Goal(s)	Progress on Goal(s) Permit Year 2014/2015	Planned Activities
2.1 MCM 1 – Public Education and Outreach on Stormwater Impacts					
1.a	Information plaques at BMPs	Environmental / Facilities Maintenance	Installation of information plaques at BMPs. At least 20% of the target audience will be reached.	Evaluated component for potential removal.	It is not expected to be effective in reaching target audience. ANC considering removal of component.
1.b	Storm drain inlet markings	Environmental / Facilities Maintenance	Installation of storm drain inlet markings. At least 20% of the target audience will be reached.	Installed stormdrains marked with "Dump No Waste Drains to Chesapeake Bay." in highly visited locations. Estimate 1 million visitors (33% of target audience) traversed the area. This component addresses illicit discharge minimization as a high priority water quality issue.	Continue to install stormdrains marked with"Dump No Waste Drains to Chesapeake Bay" in highly visited locations. Estimate 1 million visitors (33% of target audience) traversed the area. This component addresses illicit discharge minimization as a high priority water quality issue.
1.c	Display printed materials at the Welcome Center and distribute information via email, websites, and social media	Environmental / Public Affairs Office	Development of outreach materials focusing on minimizing stormwater pollution and procedures implemented at ANC for reducing stormwater pollution. At least 20% of the target audience will be reached.	ANC employees received training during Town Hall events held in February 2015 and May 2015. Additional training was provided to maintenance personnel in March and April 2015. Provided environmental brochures regarding stormwater management. Published brochures on ANC SharePoint site. Estimate 150 employees (80% of target audience) reached through the Town Hall events and ANC SharePoint site. This component addresses illicit discharge minimization, Chesapeake Bay nutrients, and sediment and stomwater run-off as a high priority water quality issue.	Provide training during quarterly Town Hall events, post brochures and training presentations on Sharepoint. Update target audience to reflect ANC personnel only and evlauate BMP description. Estimate 150 employees (80% of target audience) reached through the Town Hall events and ANC SharePoint site. This component addresses illicit discharge minimization, Chesapeake Bay nutrients, and sediment and stomwater run-off as a high priority water quality issue.
1.d	Develop training plans and training materials	Environmental / Operations	The training plans and materials increase employee knowledge on reducing stormwater pollution and other high priority water quality issues. At least 20% of the target audience will be reached.	ANC employees received training during Town Hall events held in February 2015 and May 2015. Additional training was provided to maintenance personnel in March and April 2015. Provided environmental brochures regarding stormwater management. Published brochures on ANC SharePoint site. Estimate 150 employees (80% of target audience) reached through the Town Hall events and ANC SharePoint site. This component addresses illicit discharge minimization, Chesapeake Bay nutrients, and sediment and stomwater run-off as a high priority water quality issue. Continue development of training plan and materials.	Provide training during quarterly Town Hall events, post brochures and training presentations on Sharepoint. Update target audience to reflect ANC personnel only and evlauate BMP description. Estimate 150 employees (80% of target audience) reached through the Town Hall events and ANC SharePoint site. This component addresses illicit discharge minimization, Chesapeake Bay nutrients, and sediment and stomwater run-off as a high priority water quality issue. Complete development of training plan and materials.

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BMP ID #	BMP Description	Responsible Party	Measurable Goal(s)	Progress on Goal(s) Permit Year 2014/2015	Planned Activities
2.2 MCM 2 – Public Involvement and Participation					
2.a	Maintain an updated MS4 Program Plan	Environmental	Evaluate the effectiveness of the MCMs documented in the MS4 Program Plan and revise/add new MCMs as appropriate. Any required updates to the MS4 Program Plan will be completed annually in conjunction with the annual report.	Continued development of MS4 Program Plan. Submit plan NLT December 11, 2015.	The MS4 Program Plan will be reviewed annually and updated as necessary. A web link will be provided with the plan.
2.b	Promote availability of the MS4 Program Plan and any annual modifications for public review and comment	Environmental / Public Affairs Office (PAO) / Office of the Chief Information Officer (OCIO)	Post copies of the MS4 Program Plan on the ANC webpage at a minimum of once a year and no later than 30 days following submittal of the annual report to DEQ.	Continued development of MS4 Program Plan. Submit plan NLT December 11, 2015.	Copies of the MS4 Program Plan will be posted on the ANC Sharepoint page at a minimum of once per year and no later than 30 days following the submittal of the annual report to DEQ.
2.c	Provide public access to the annual report in compliance with Freedom of Information Act	Environmental / PAO / OCIO	Provide the annual report to the public via the ANC SharePoint no later than 30 days following submittal to DEQ and retain copies of annual reports online for the duration of the Small MS4 General Permit.	Copies of the annual report will be posted on the ANC Sharepoint page no later than 30 days following the submittal of the annual report to DEQ.	Post future annual reports on SahrePoint and retain copies of annual reports for the duration of the Small MS4 General Permit.
2.d	Promotion of Local Activities	Horticulture / Environmental / PAO	Sponsor and host a minimum of four special guided tours of the facility with a focus on stormwater related topics at ANC. These guided tours will be open to the public and be promoted on the ANC webpage.	http://www.arlingtoncemetery.mil/Explore-the-Cemetery/Memorial-Arboretum-and-Horticulture/Tours April 24, 2015: Arbor Day - Horticulture provided visitors with a tour on trees within the cemetery and a tree planting followed. May 15, 2015: Horticulture provided visitors with a tour of shrubs and landscapes throughout the cemetery. June 5, 2015: Horticulture provided visitors with a tour on trees within the cemetery. June 19, 2015: Horticulture provided visitors with a pollinator tour of the cemetery	Host four special guided tours of the facility with a focus on stormwater related topics at ANC, and promote on ANC webpage.

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BMP ID #	BMP Description	Responsible Party	Measurable Goal(s)	Progress on Goal(s) Permit Year 2014/2015	Planned Activities
2.3 MCM 3 – Illicit Discharge Detection and Elimination					
3.a	Conduct a Storm Sewer Delineation Pilot to result in a storm sewer system map and outfall information table.	Environmental / OCIO	Create and update the Geographic Information Systems (GIS) mapping files for ANC to ensure storm sewer infrastructure is documented. Develop a storm sewer system map and an associated outfall information table consistent with the Small MS4 General Permit.	Completed and included as an Appendix.	Completed and included as an Appendix. See 3.b for planned activities.
3.b	Maintain an updated storm sewer system map and outfall information table	Engineering / OCIO	Update the GIS mapping files and the outfall information table as new data become available. Maintain a copy of the current storm sewer system map and outfall information table for review upon request by the public or by DEQ.	Maintained and updated storm sewer system map and outfall information table as needed.	Maintain and update storm sewer system map and outfall information table as needed.
3.c	Coordinate with adjacent MS4s on physically interconnected discharge locations	Environmental	Notify in writing physically interconnected MS4s to promote continued awareness of ANC's points of stormwater discharge.	Continued development of notification methodologies for inclusion in MS4 program plan.	Notify in writing physically interconnected downstream MS4s.
3.d	Develop and implement procedures to detect and address non-stormwater discharges, including illegal dumping, to ANC.	Environmental / Facilities Maintenance	Document when illicit discharge detection and elimination program is developed. Document regular implementation of program following program development.	Continued development of procedures for inclusion in MS4 program plan.	Implement procedures for field screening of regulated outfalls.
3.e	Track the illicit discharges identified.	Facilities Maintenance / Environmental	Develop a tracking database to record illicit discharges identified from dry weather monitoring.	Tracked releases of pollutants using a spreadsheet.	Continue to document releases and track illicit discharges identified during field screening activities.
3.f	Incorporate standard nonstormwater compliance language into all contracts.	Contract Support Command/ Engineering	Develop standard language and document that the standard language is incorporated into contracts during the review process.	Drafted generic standard language for inclusion in ANC contract actions.	Provide language to ANC contracting personnel.
3.g	Encourage public to notify ANC of possible illicit discharges	Environmental	Promote and facilitate employee reporting of illicit discharges observed at ANC or along ANC boundary.	Continued development of illicit discharge training and distribute illicit discharge pamphlet.	Provide illicit discharge training and distribute illicit discharge pamphlet to ANC personnel.

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BMP ID #	BMP Description	Responsible Party	Measurable Goal(s)	Progress on Goal(s) Permit Year 2014/2015	Planned Activities
2.4 MCM 4 – Construction Site and Stormwater Runoff Control					
4.a	Comply with Virginia laws and regulations governing construction site runoff control.	Engineering	Identify the appropriate regulations, check for updates to the regulations, and inform appropriate contractors, reviewers, and inspectors of the regulations.	Language incorporated into contracts.	Monitor changes to laws and regulations and modify contract language as appropriate.
4.b	Incorporate standard stormwater compliance language into all construction designs and contracts	Contract Support Command/ Engineering	Develop standard language and ensure such language is incorporated into construction designs and contracts to address discharges entering the MS4 from land-disturbing activities	Language incorporated into contracts.	Monitor changes to laws and regulations and modify contract language as appropriate.
4.c	Plan approval and permit authorizations obtained prior to commencement of the land disturbing activity	Engineering	Require that land disturbance not begin until: 1) an erosion and sediment control plan is approved by a VESCP authority in accordance with the Erosion and Sediment Control Act, and 2) that construction activities secure necessary state permit authorizations from DEQ to discharge stormwater.	VDEQ approved erosion and sediment control plan plan and issued permit, VAR10C624, to Forrester Construction Company for the Millennum Project at Arlington National Cemetery (Ord and Weitzel Dr) on July 25, 2014. One regulated land disturbing activity, 26 acres.	Ensure plan approvals and permits issued for land disturbing activities occur prior to land disturbance.
4.d	Conduct construction site compliance inspections by ANC personnel	Engineering	Inspect land-disturbing activities for compliance with an approved erosion and sediment control plan. Conduct inspections based on implementation schedule.	ANC personnel (certified Combined Administrator) conducts periodic inspections (May 2015 and June 2015) of construction sites to ensure compliance with regulations. At the Milennium site, contract personnel (certified Responsible Land Disturbers) conducted 56 routine and 34 after significant rain event inpsections in accordance with erosion and sediment control plan. ANC issued two notices of non-compliance (enforcement actions). The contractor addressed deficiencies each time.	Continue periodic inspections by ANC and contractor personnel.
4.e	Ensure that plan reviewers, inspectors, and program administrators obtain the appropriate certifications as required under the Virginia Erosion and Sedimentation Law	Environmental	Document the types of certificates required under the Erosion and Sedimentation laws and regulations. Document required training and certification frequency. Ensure appropriate personnel have such certificates.	Stacey Rosenquist, ESC Combined Administrator Certification, #6164, expires 11/30/2015. Completed training required for certification renewal. Verified contractors have certified Responsible Land Disturbers.	Track personnel training and certification requirements through VDEQ Knowledge and Certification and Accreditation Tracking System (CATS).

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BMP ID #	BMP Description	Responsible Party	Measurable Goal(s)	Progress on Goal(s) Permit Year 2014/2015	Planned Activities
2.5 MCM 5 - Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands					
5.a	Encourage the use of low impact development (LID)	Engineering/ Contract Support Command	Encourage implementation of LID (as appropriate to local and regional conditions) in standardized contract language for addressing post-construction stormwater runoff that enters the MS4 from all applicable land-disturbing activities.	Army LID Technical User Guide - 4 Jan 2013. Continue development of additional implementation procedures for meeting this component.	As a result of the Army's LID policy, ANC considering removal of this component.
5.b	Incorporate required design criteria for stormwater runoff controls into standard stormwater compliance language for all construction designs and contracts	Contract Support Command/ Engineering	Coordinate MS4 program requirements with contracting center (US Army Corps of Engineers) during design and contracting process.	For Queuing Project and Salt, Sand, and Soil Building, ANC participated in the design process by reviewing designs, plans, and specifications.	ANC participates in the design process by reviewing designs, plans, and specifications.
5.c	Implement an inspection and maintenance program for structural BMPs at ANC	Facilities Maintenance	Implement regular inspection and long-term operation and maintenance of ANC's stormwater management facilities	Continued development of inspection and maintenance methodologies and tools for inclusion in MS4 program plan.	Conduct inspections of existing stormwater management facilities. Where maintenance is deemed necessary according to the inspection forms, confirm that maintenance is planned or has been conducted.
5.d	Electronic database of all known stormwater management facilities at ANC	Environmental/ Facilities Maintenance	Maintain an updated electronic database of all known ANC-owned stormwater management facilities that discharge into the MS4.	TMDL Action Plan includes a table of all BMPS including those brought inlone this reporting period. See Appendix B.	Continue to update table as new BMPs are brought online.

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BMP ID #	BMP Description	Responsible Party	Measurable Goal(s)	Progress on Goal(s) Permit Year 2014/2015	Planned Activities
2.6 MCM 6 – Pollution Prevention and Good Housekeeping for Municipal Operations					
6.a	Minimize or prevent pollutant discharge from daily operations such as road, street, and parking lot maintenance	Field Operation Officer/Deputy Superintendent	Implement written protocols included in the MS4 Program Plan for minimizing or preventing pollutant discharge from daily operations. Document BMPs in SWPPPs for high-priority areas.	Continue development of written protocols and identify high priority areas for inclusion in MS4 program plan.	Conduct inspections of identified high priority areas.
6.b	Minimize or prevent pollutant discharge from equipment and vehicle maintenance activities	Field Operation Officer/Deputy Superintendent	Implement written protocols included in the MS4 Program Plan for minimizing or preventing pollutant discharge from equipment and vehicle maintenance. Document BMPs in SWPPPs for high-priority areas.	Continue development of written protocols and identification of high priority areas for inclusion in MS4 program plan.	Conduct inspections of identified high priority areas.
6.c	Minimize or prevent pollutant discharge from the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers	Field Operation Officer/Deputy Superintendent	Refer to written protocols included in theANC Integrated Pest Management Plan for minimizing or preventing pollutant discharge from the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers.	Pesticides, herbicides, and fertilizers are managed in accordance with the ANC Integrated Pest Management Plan.	Usage reports are maintained by Horticulture.
6.d	Identify SWPPP sites at ANC	Environmental	Identify high-priority facilities at the installation that have a high potential of discharging pollutants	Continue identification of high priority areas for inclusion in MS4 program plan.	Continue to evaluate activities for SWPPP development.
6.e	Develop and implement facility-specific SWPPPs for all applicable sites at ANC	Environmental	Develop and implement SWPPPs for all high-priority facilities that have a high potential of discharging pollutants to the stormwater system	No progress towards meeting this goal.	Develop SWPPP for high priority areas.

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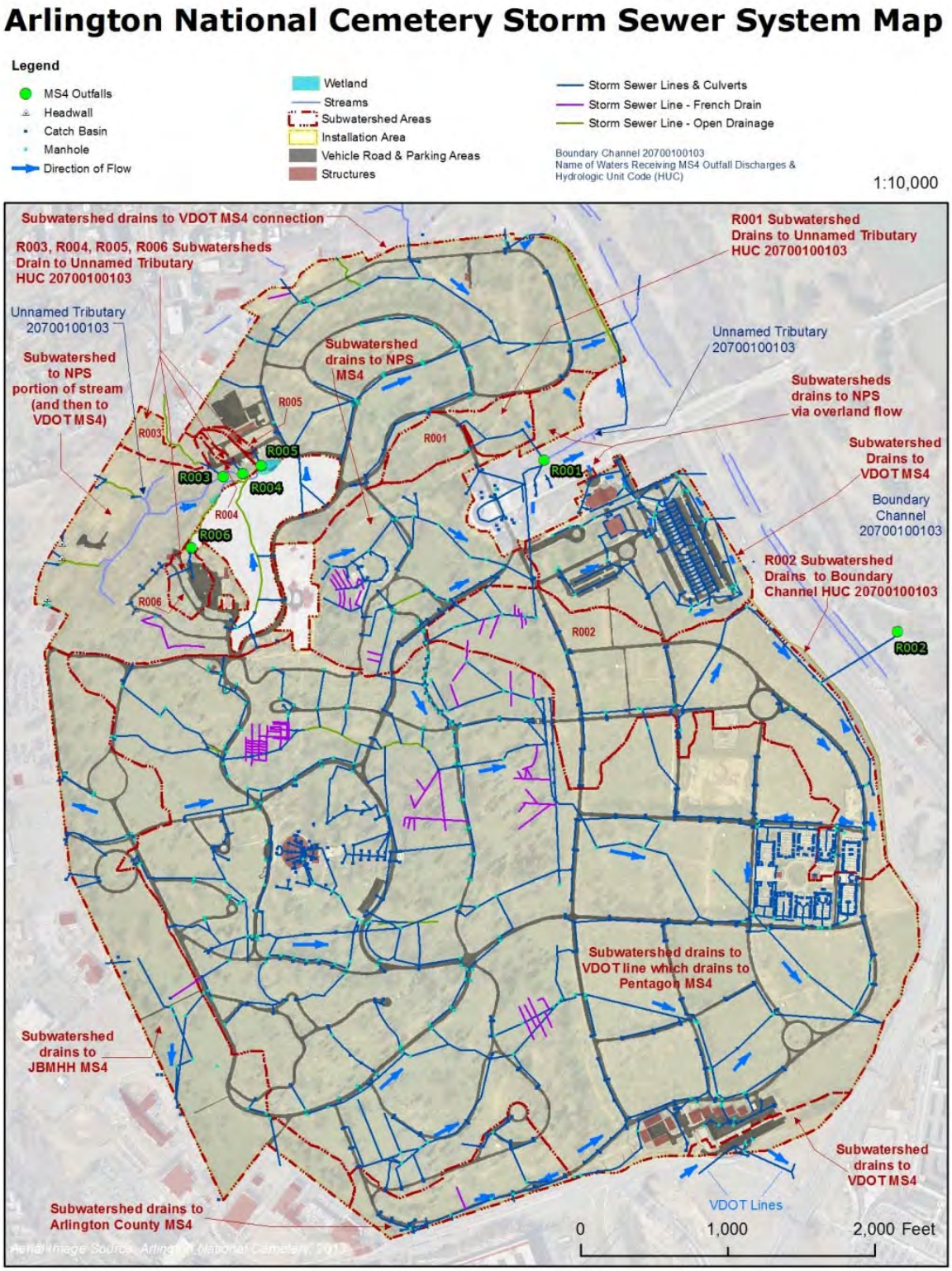
BMP ID #	BMP Description	Responsible Party	Measurable Goal(s)	Progress on Goal(s) Permit Year 2014/2015	Planned Activities
6.f	Update the ANC SWPPPs on an annual basis following SWPPP development	Environmental	Conduct Comprehensive Site Compliance Evaluations (CSCEs) annually to compare current conditions at high-priority facilities to SWPPPs	No progress towards meeting this goal.	Conduct CSCEs following SWPPP development.
6.g	Develop a Turf and Landscape Nutrient Management Plan	Horticulture	Develop Nutrient Management Plan in accordance with appropriate regulations.	Continue development of Nutrient Management Plan for inclusion with MS4 program plan.	Submit and implement Nutrient Management Plan.
6.h	Conduct appropriate training for all applicable employees in compliance with the small MS4 General Permit	Environmental	Develop a Training Plan (MCM 1.d) to determine and document required training and provide training frequency	Continue development of Training Plan for inclusion with MS4 program plan. See BMP 1.c.	Submit and implement Training Plan. See BMP 1.c.

Appendix A: Storm Sewer System Map and Outfall Information Table



Regulated MS4 Outfalls and Information Table for Arlington National Cemetery

Unique Identifier	Estimated MS4 Acreage Served	Name of the Receiving Surface Water	HUC	Is the receiving water listed as impaired in the Virginia 2010 303(d)/305(b) Water Quality Assessment Integrated Report?	Applicable TMDLs
R001	7.6	Unnamed Tributary	20700100103	No (Potomac River Embayments are listed as impaired, but further evaluation indicates these to include embayments from the I-395 bridge in Arlington County south to the Potomac River Bridge at Route 301. This impairment is not applicable to ANC because ANC discharges to water bodies located just north of the I-395 bridge.)	Chesapeake Bay TMDL
R002	52.5	Boundary Channel			
R003	2.7	Unnamed Tributary			
R004	0.3	Unnamed Tributary			
R005	0.4	Unnamed Tributary			
R006	2.5	Unnamed Tributary			

Appendix B

ARLINGTON NATIONAL CEMETERY

Final Chesapeake Bay TMDL Action Plan

25 July 2014

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LIST OF ACRONYMS AND ABBREVIATIONS

ac	Acre
ANC	Arlington National Cemetery
Bldg	Building
BMP	Best Management Practice
CTC	Concurrent Technologies Corporation
DC	District of Columbia
DoD	Department of Defense (U.S.)
EOS	Edge of Stream
GIS	Geographic Information Systems
HUC	Hydrologic Unit Code
IA	Impervious Acre
lbs	pounds
LF	Linear Feet
MCM	Minimum Control Measure
MEP	Maximum Extent Practicable
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
NDCEE	National Defense Center for Energy and Environment
NMP	Nutrient Management Plan
NPS	National Park Service
OWS	Oil/Water Separator
P	Phosphorus
POC(s)	Pollutant(s) of Concern
RAR	Rapid Action Revision
RD	Runoff Depth
RR	Runoff Reduction
RS	Runoff Storage
ST	Stormwater Treatment
TA	Treatment Area
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
U.S.	United States
U.S.C.	United States Code
VAC	Virginia Administrative Code
VADEQ	Virginia Department of Environmental Quality
Veg.	Vegetation
VPDES	Virginia Pollutant Discharge Elimination System
VWRRC	Virginia Water Resources Research Center
w/	With
w/o	Without
WIP	Watershed Implementation Plan
yr	year

ARLINGTON NATIONAL CEMETERY

1.0 INTRODUCTION

The Virginia Administrative Code (VAC) 9VAC25-890, is the Final Virginia Pollutant Discharge Elimination System (VPDES) General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4s) (Virginia Small MS4 General Permit). This code will impact Arlington National Cemetery (ANC) and other U.S. Department of Defense (DoD) installations located in urban areas in Virginia.

ANC is a DoD facility under the command of the U.S. Army and is required to meet all applicable federal and state regulations, pursuant to 33 United States Code (U.S.C.) Section 1323 (a). Storm sewer systems owned or operated by federal facilities located in urbanized areas (as defined by the latest decennial census), such as military bases and DoD facilities, are categorized as small MS4s and are regulated under the Virginia Stormwater Management Act and associated regulations (9VAC25-870 through 9VAC25-890) and specifically the Virginia Small MS4 General Permit (9VAC25-890).

The Virginia Small MS4 General Permit was recently revised by the Commonwealth of Virginia on 23 September 2013 and became effective on 23 October 2013 (The 9VAC25-890 was renumbered from the former 4VAC50-60-1200). Operators of small MS4s in urbanized areas, such as ANC, are required to obtain coverage under the Virginia Small MS4 General Permit to discharge stormwater runoff to surface waters of the Commonwealth of Virginia and implement programs to protect the water quality in nearby water bodies. Due to its location in Arlington, Virginia, ANC must evaluate and ensure compliance with these new regulations. Due to ANC's location within the Chesapeake Bay Watershed, in accordance with 9VAC25-890, the Virginia Small MS4 General Permit, Section I.C, ANC is required to develop a Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan.

There are no other TMDLs applicable to ANC, based on the Final 2010 and 2012 Virginia Water Quality Assessment Integrated Reports (VADEQ, 2011 and 2014). Therefore, ANC currently is not required by the Virginia Small MS4 General Permit to develop any additional TMDL Action Plans other than the Chesapeake Bay TMDL Action Plan.

This document meets the requirements for the Chesapeake Bay TMDL Action Plan for ANC, in accordance with 9VAC25-890, the Virginia Small MS4 General Permit, Section I.C. This document also meets the requirements contained within the Virginia Department of Environmental Quality (VADEQ) July 2013 Draft Guidance for the Chesapeake Bay TMDL Action Plan Memorandum. This Chesapeake Bay TMDL Action Plan is valid for this permit cycle (1 July 2013 through 30 June 2018).

The Virginia Small MS4 General Permit requires that ANC complete the Chesapeake Bay TMDL Action Plan within 24 months of permit coverage and submit it to the VADEQ with the annual report for the permit year during which the plan was developed. After this plan is submitted to the VADEQ by ANC, unless specifically denied in writing by the VADEQ, this plan becomes effective and enforceable 90 days after the date received by the VADEQ.

ANC followed the VADEQ July 2013 Draft Guidance for the Chesapeake Bay TMDL Action Plan Memorandum (2013 VADEQ Draft Guidance Memo) for the format, organization, and content of this document, including the order of the sections in this plan. The 2013 VADEQ Draft Guidance Memo is intended to provide staff and permittees with information and procedures for developing a Chesapeake Bay TMDL Action Plan and meeting the Chesapeake Bay TMDL Special Condition requirements in the Virginia Small MS4 General Permit.

The remainder of this Chesapeake Bay TMDL Action Plan is organized as follows:

- Section 2 provides background information, including Chesapeake Bay TMDL Action Plan requirements, the types of construction projects that must be incorporated into this plan and a site description for ANC.

- Section 3 provides a review of ANC's current MS4 Program and the legal authority that ANC possesses to implement its MS4 Program.

- Section 4 reviews new or modified legal authorities that ANC plans to establish, and includes a discussion of ANC's adherence to Virginia's 2009 and 2014 General Permits for Discharges of Stormwater from Construction Activities as well as ANC's plan to develop specific contract language to meet Virginia Small MS4 General Permit requirements.

- Section 5 provides a narrative that discusses in general terms, the means and methods to address New Sources developed on or after 1 July 2009 at ANC, and a table that lists these New Sources.

- Section 6 presents, for the 30 June 2009 MS4 boundary, the urban land uses (Existing Sources) at ANC, the Existing Source loads, and the required nutrient and sediment reductions from the Existing Sources.

- Section 7 provides the means and methods (i.e., stormwater best management practices) that ANC will utilize to meet the required reductions from Existing Sources. Methods for determining treatment areas and reduction efficiencies for stormwater best management practices (BMPs) are provided. Existing BMPs and planned BMPs are described and their reduction credits presented. ANC's progress in conceptualizing additional potential BMPs is described.

- Section 8 provides the means and methods to offset increased loads from New Sources, for permittees that have adopted an average land cover condition greater than 16 percent impervious cover for the design of post-development stormwater management facilities under the Chesapeake Bay Preservation Act. ANC has not adopted this condition, and this is further explained in this section.

- Section 9 provides the means and methods to offset increased loads from grandfathered projects, for permittees that have adopted an average land cover

condition greater than 16 percent impervious cover for the design of post-development stormwater management facilities under the Chesapeake Bay Preservation Act. ANC has not adopted this condition, and this is further explained in this section.

- Section 10 provides discussion of future projects and associated acreage that qualify as grandfathered. It is further explained that ANC does not have any grandfathered projects.

- Section 11 addresses the costs to implement the necessary reductions in total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS).

- Section 12 describes the public comment process and period that will be used to advertise the Chesapeake Bay TMDL Action Plan to the public.

- Section 13 provides discussion and recommendations, including information regarding Chesapeake Bay TMDL Action Plan submittal and implementation, Annual Report development, and reapplication requirements pertaining to the Chesapeake Bay TMDL Action Plan for the next permit cycle.

- Section 14 contains the references used in this document.

2.0 BACKGROUND

This section provides background information, including Chesapeake Bay TMDL Action Plan requirements, the types of construction projects that must be incorporated into this plan and a site description for ANC.

2.1 Chesapeake Bay TMDL Action Plan Requirements

The Chesapeake Bay TMDL Action Plan must be completed within 24 months of permit coverage, and submitted with the annual report for the permit year during which the plan was developed. The Chesapeake Bay TMDL Action Plan provided in this document is for the permit cycle of the Virginia Small MS4 General Permit extending from 1 July 2013 to 30 June 2018. VADEQ recommends that permittees also begin planning for the next permit cycle, from 1 July 2018 to 30 June 2023, at this time.

MS4 Extent

For this permit cycle, the Virginia Small MS4 General Permit regulations requires permittees to estimate the size and extent of their MS4 system as of 30 June 2009, and the total regulated acreage of pervious and impervious surface served by the MS4 as of 30 June 2009. The extent of an MS4 system for this permit cycle is based on the extent to which land owned by the MS4 operator is located within an urbanized area (according to the 2000 U.S. Census). For ANC, because the entire property was located within an urbanized area according to the 2000 U.S. Census, the extent of the MS4 system as of 30 June 2009 would be consistent with the ANC property boundary on that date.

ANC determined that the entirety of the ANC property should be considered regulated land[1]. This is because all stormwater flow eventually enters ANC's MS4, including flows in open drainage ditches, which eventually discharge to the MS4. In addition, there are no stormwater flows at ANC that directly enters an adjacent MS4 without first flowing through the ANC MS4.

Offsets: Existing Sources

Section I.C of the Virginia Small MS4 General Permit requires offsets of nutrient and sediment loads for all Existing Sources[2] and some New Sources[3], depending on the site status. For Existing Sources, five percent of the full pollutant of concern (POC)[4] reductions required by 2025 based on the Virginia Phase II Watershed Implementation Plan (WIP) is required during this permit cycle. This is calculated from Table 3b in the Virginia Small MS4 General Permit for the Potomac River Basin, by multiplying the urban acreage served by the MS4 by a loading rate that represents this five percent decrease in loading rate. These reductions can be achieved through implementation of management practices (BMPs or credit trading) and/or retrofit programs (installation of BMPs on land uses existing as of 30 June 2009).

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[1] According to the 2013 VADEQ Draft Guidance Memo, "Regulated Land" refers to the conveyances and drainage areas served by the MS4 that fall within the census urbanized area and "Unregulated Land" refers to those acres that are not regulated by the Virginia Small MS4 General Permit, including those acres that drain directly to a waterway or drain to another permittees MS4 system.

[2] According to Section I.C of the Virginia Small MS4 General Permit, and the 2013 VADEQ Draft Guidance Memo, "Existing Sources" means pervious and impervious urban land uses served by the MS4 as of 30 June 2009.

[3] According to Section I.C of the Virginia Small MS4 General Permit, and the 2013 VADEQ Draft Guidance Memo, "New Sources" means pervious and impervious urban land uses served by the MS4 developed on or after 1 July 2009.

[4] According to Section I.C of the Virginia Small MS4 General Permit, and the 2013 VADEQ Draft Guidance Memo "Pollutants of Concern" or "POC" means TN, TP and TSS.

Offsets: New Sources

For this permit cycle for the New Sources developed on or after 1 July 2009, for most permittees, these will be construction projects that either took place under the Virginia 2009 General Permit for Discharges of Stormwater from Construction Activities (for construction initiating between 1 July 2009 and 30 June 2014), or under the Virginia 2014 General Permit for Discharges of Stormwater from Construction Activities (for construction that will initiate between 1 July 2014 and 30 June 2019) (Brooks, 2014).

Some permittees, typically localities such as municipalities or counties, may have adopted an average land cover condition of greater than 16 percent (>16 percent) impervious cover under the Chesapeake Bay Preservation Act. Federal facilities were not expected to adopt an impervious cover under the Chesapeake Bay Preservation Act, as municipalities may have done in the 1990s, nor does an impervious cover adopted by a municipality in which a Federal facility is located transfer to the Federal facility (Brooks, 2014). In other words, ANC does not need to coordinate with Arlington County regarding this criteria, nor was ANC expected to adopt an impervious cover >16 percent. As of 30 June 2009, ANC's impervious cover was approximately 12 percent.

The Section I.C requirements of the Virginia Small MS4 General Permit distinguishes between permittees that adopted an average land cover condition >16 percent impervious cover, and those that did not. Permittees that did adopt an average land cover >16 percent impervious cover are required to conduct additional offsets for construction projects as part of the Chesapeake Bay TMDL Action Plan because it is assumed that the baseline phosphorus load equivalent to 16 percent impervious land is not being met by these permittees. However, for ANC, the only requirement for New Sources is that they follow the appropriate Construction General Permit that covers the project. New Sources that initiated construction between 1 July 2009 and 30 June 2014 would be conducted under the 2009 Construction General Permit, which requires a post-development Phosphorus (P) load of 0.45 pounds per acre per year (lbs P/ac/yr). New Sources that initiate construction between 1 July 2014 and 30 June 2019 would be conducted under the 2014 Construction General Permit, which requires a lower post-development P load of 0.41 lbs P/ac/yr.

For the next permit cycle (1 July 2018 to 30 June 2023), an additional 35 percent reduction will be required for the Existing Sources in addition to those reductions already required for this permit cycle. VADEQ also requires that new urbanized areas as defined by the U.S. Census (defined as "expanded areas"), must be included in the next permit cycle (Brooks, 2014). ANC's property was already designated as 100 percent urban in both the 2000 and 2010 U.S. Census and this requirement will not apply. Instead, ANC's property boundary is used to define the extent of its MS4. For ANC, the Chesapeake Bay TMDL Action Plan under the next permit cycle will likely address the property boundary as of 30 June 2014 (this is in the process of being confirmed by VADEQ). If this is the case, the Southern Expansion (former Navy Annex) should be included in the Chesapeake Bay TMDL Action Plan under the next permit cycle if the acquisition is completed by 30 June 2014.

2.2 Project Types for Incorporation into Chesapeake Bay TMDL Action Plan

Figure 1 provides the flow chart that is included with the 2013 VADEQ Draft Guidance Memo, which is helpful for visualizing the Section I.C requirements of the Virginia Small MS4 General Permit that are applicable to an individual construction project. As seen in the flow chart, if a project is developed on or after 1 July 2009, it is considered a New Source, as previously described. If the project disturbs less than one acre, it need only comply with its Construction General Permit and local ordinances and no additional offsets are required under Section I.C of the Virginia Small MS4 General Permit, the Special Condition for the Chesapeake Bay TMDL.

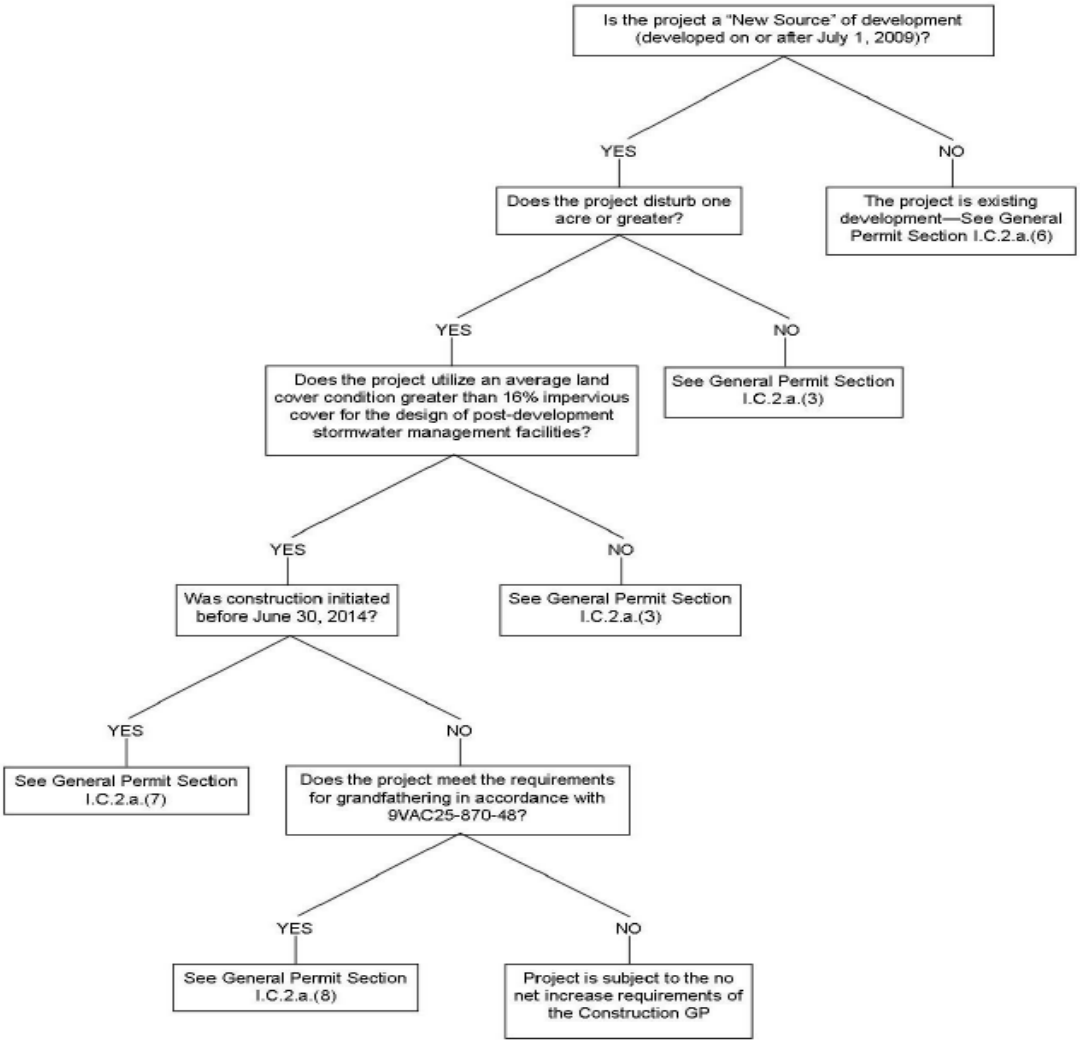

Figure 1. 2013 VADEQ Draft Guidance Memo Flow Chart

Table 1 provides a summary of the five different types of New Sources as categorized in the flow chart in Figure 1. This section of the Virginia Small MS4 General Permit describes the type of New Source, and the applicability of the New Source type to ANC. Discussion of New Sources is required in this Chesapeake Bay TMDL Action Plan, including an evaluation of offsets required if needed.

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Table 1. Different Types of New Sources in Section I.C of the Virginia Small MS4 General Permit

Virginia Small MS4 General Permit Section Number	New Source Type and Description	Applicability to ANC	Section in this Plan
I.C.2.a(3)	Construction initiated ON/AFTER 1 July 2009 that disturbed less than one acre.	ANC has conducted such projects; however, no additional offsets are required under Section I.C of the Virginia Small MS4 General Permit.	5.0, 8.0
I.C.2.a(3)	Construction initiated ON/AFTER 1 July 2009 that disturbed greater than one acre but will result in 16% or less impervious acreage within the limits of disturbance.	ANC has not conducted such projects; however, no additional offsets are required under Section I.C of the Virginia Small MS4 General Permit because the project does not exceed the baseline condition of 16% impervious urban.	5.0, 8.0
I.C.2.a(7)	Construction initiated BETWEEN 1 July 2009 and 30 June 2014 that disturbed greater than one acre AND will result in >16% impervious acreage within the limits of disturbance.	ANC has conducted projects that meet this New Source type. Because ANC has not adopted a >16% land cover condition under the Chesapeake Bay Preservation Act, BMPs required under the 2009 Construction General Permit for these New Sources reduced post-development loads to a level equivalent to 16% impervious urban (0.45 lbs P/ac/yr), and therefore no additional offsets are required under Section I.C of the Virginia Small MS4 General Permit (Brooks, 2014).	5.0, 8.0

Table 1. Different Types of New Sources in Section I.C of the Virginia Small MS4 General Permit (Continued)

Virginia Small MS4 General Permit Section Number	New Source Type and Description	Applicability to ANC	Section in this Plan
I.C.2.a(8)	Construction initiated ON/AFTER 1 July 2014 that will disturb greater than one acre, AND will result in > 16% impervious acreage within the limits of disturbance AND are grandfathered (Project approved by DEQ or funding allocated before 1 July 2012).	This New Source type does not apply to ANC because there are no projects at ANC that meet this definition.	9.0, 10.0
N/A – Offset requirements addressed in the 2014 Construction General Permit	Construction initiated ON/AFTER 1 July 2014 that will disturb greater than one acre, AND will result in > 16% impervious acreage within the limits of disturbance AND are NOT grandfathered (Project approved by DEQ or funding allocated before 1 July 2012).	ANC will conduct projects that meet this New Source type. Because ANC has not adopted a >16% land cover condition under the Chesapeake Bay Preservation Act, BMPs required under the 2014 Construction General Permit for these New Sources will reduce post-development loads to a level equivalent to 16% impervious urban (0.41 lbs P/ac/yr) and therefore no additional offsets are required under Section I.C of the Virginia Small MS4 General Permit (Brooks, 2014).	9.0, 10.0

It is important to note that ANC will obtain and follow Construction General Permits for all applicable future construction projects to ensure that post-development stormwater runoff quality requirements will be met. ANC's compliance with Construction General Permits ensures that where their construction projects result in >16 percent impervious cover within the limit of disturbance of the project, the BMPs that are required for post-construction conditions by the Construction General Permits will result in POC loads that are equivalent to a 16 percent impervious cover condition.

2.3 Site Description

ANC serves as a place of interment for military servicemen and women, historically significant political figures, and explorers of earth and space. In addition, ANC serves as a historical military shrine and active cemetery for today's Armed Services, a Washington, District of Columbia (DC) area visitor attraction, and a setting for high-level government events. Approximately 27-30 funerals are conducted each day and many individuals come to pay final respects at graveside services. With more than three million visitors to this site annually, the average visitor population is over 8,000 persons per day. The mission at ANC is to, on behalf of the American people, lay to rest those who have served our Nation with dignity and honor, treating their families with respect and compassion, and connecting guests to the rich tapestry of the cemetery's living history, while maintaining these hallowed grounds befitting the sacrifice of all those who rest here in quiet repose. ANC's unique mission, activities, and land uses contribute to stormwater runoff into the Potomac River and Chesapeake Bay; therefore, ANC must achieve and maintain compliance with new stormwater regulations while sustaining the mission.

ANC is located in Arlington County, Virginia, across the Potomac River from Washington, DC. It is under the operational ownership and management of the U.S. Army. ANC was officially designated as a military cemetery on 15 June 1864 (Arlington National Cemetery, 2014)[5]. As of 30 June 2009 ANC included approximately 620 acres. The majority of land uses at ANC include pervious land, with some impervious land, and limited forested land. In addition, the National Park Service (NPS) has ownership of property located within the ANC boundaries, which includes the Arlington House. Memorial Drive and the Women in Military Service for America Memorial, which are adjacent to the main ANC entrances, are also NPS property. These NPS properties are not the responsibility of ANC; therefore, this plan will not discuss these properties further. ANC also operates a non-contiguous parcel that contains the U.S. Soldiers' and Airmen's Home National Cemetery located in Washington, DC. Because that property is not located in the Commonwealth of Virginia, it is not subject to the Virginia Small MS4 General Permit, and this plan will not discuss this property further.

The entirety of ANC is located in the Potomac River Basin. Rainfall and runoff on ANC's property is captured and conveyed by its MS4 system. Stormwater runoff throughout the entire ANC property discharges into its MS4 system, although some areas first drain into open ditches prior to entering the ANC MS4 system. In the northwestern area of ANC, there

[5] "*History of Arlington National Cemetery – Arlington House*," Accessed on September 18, 2013. Available at http://www.arlingtoncemetery.mil/History/Facts/ArlingtonHouse.aspx.

is a natural stream; however, it eventually discharges into ANC's MS4 as well. Therefore, since all of ANC stormwater drainage ultimately enters its MS4 system, the entire property is considered to be regulated land under the definition given in the 2013 VADEQ Draft Guidance Memo (VADEQ, 2013).

All runoff from ANC's MS4, flows directly to the Boundary Channel or into storm sewer systems of adjacent regulated small MS4s, such as Virginia Department of Transportation, Arlington County, the NPS/George Washington Memorial Parkway, the Pentagon Reservation, and Joint Base Myer-Henderson Hall. From those MS4s, stormwater runoff is conveyed directly or indirectly to the Boundary Channel and the Pentagon Lagoon. These water bodies are segmented portions of the Potomac River located just east of ANC and are the property of the NPS.

3.0 CURRENT PROGRAM AND EXISTING LEGAL AUTHORITY

This section provides a review of ANC's current MS4 Program and the legal authority that ANC possesses to implement its MS4 Program. The Virginia Small MS4 General Permit Section I.C.2.a(1) requires a review of the current MS4 Program implemented as a requirement of the permit, including a review of the existing legal authorities and the operator's ability to ensure compliance with permit Section I.C. ANC applied for permit coverage under the Virginia Small MS4 General Permit by submitting its Registration Statement in May 2014.

MS4 Program Plan

ANC's Final MS4 Program Plan (NDCEE, 2014) details its comprehensive program to be implemented under the Virginia Small MS4 General Permit to reduce pollutants in the stormwater discharged from the MS4. The MS4 Program Plan includes both discussion of how ANC plans to meet each of the six Minimum Control Measures (MCMs) identified in the Virginia Small MS4 General Permit, and also discusses ANC's plans to meet the Special Condition for the Chesapeake Bay TMDL. As such, this Chesapeake Bay TMDL Action Plan is one of the documents referenced in ANC's MS4 Program Plan and specifically addresses the requirements found in Section I.C of the Virginia Small MS4 General Permit.

According to Section I.C.3 of the Virginia Small MS4 General Permit, the implementation of the following MS4 Program components documented in the MS4 Program Plan represents implementation of the Chesapeake Bay TMDL Action Plan to the maximum extent practicable (MEP) and demonstrates adequate progress:

- Implementation of Nutrient Management Plans (NMPs) in accordance with the schedule identified in the MCM in Section II related to pollution prevention/good housekeeping for municipal operations. ANC's plans for complying with this MCM are addressed in more detail in Sections 3.6.3 and 3.6.7 of the MS4 Program Plan.

- Implementation of the MCM in Virginia Small MS4 General Permit Section II related to construction site stormwater runoff to address discharges from Transitional Sources[6]. ANC's plans for complying with this MCM are addressed in more detail in Section 3.4 of the MS4 Program Plan.

- Implementation of the means and methods to address discharges from New Sources in accordance with the MCM in Virginia Small MS4 General Permit Section II related to post-construction stormwater management in new development, development of prior developed lands, in order to offset 5.0 percent of the total increase in POC loads between 1 July 2009 and 30 June 2014, where applicable. Increases in the POC load from grandfathered projects initiating construction after 1 July 2014 must be offset prior to completion of the project; however ANC does not have grandfathered projects. ANC's plans for complying with this MCM are addressed in more detail in Section 3.5 of the MS4 Program Plan and Sections 5, 8, 9, and 10 of this plan.

- Implementation of the means and methods sufficient to meet the required reductions of POC loads from Existing Sources in accordance with the Chesapeake Bay TMDL Action Plan, which are addressed further in Section 7 of this plan.

Legal Authorities

ANC has the appropriate legal authorities and ability to ensure compliance with Virginia Small MS4 General Permit Section I.C. ANC is a U.S. Army facility and therefore has direct legal authority over use and condition of the land and infrastructure it owns and operates within its legal boundaries (except for the parcels owned and operated by the NPS as discussed in Section 2.1 of this report). According to Army Regulation 600-20 (U.S. Army, Revised 2012), which prescribes the policies and responsibilities for the U.S. Army command, and the Tenth Edition of *The Military Commander and the Law* (Stone, 2010), ANC's designated commanders have the authority to ensure the property is operated in accordance with applicable regulations, including the Virginia Small MS4 General Permit.

In addition, as a federal facility, ANC is responsible for managing stormwater and its MS4 system on its property. ANC understands that it is responsible, through its contractors, to obtain and follow the appropriate Construction General Permits as applicable to construction projects. ANC is required to comply with the Construction General Permit for construction projects disturbing 2,500 square feet or greater as described in Section 3.4 and 3.5 of the MS4 Program Plan.

Lastly, enforcement language in existing contract language includes that, in the event of non-compliance with ANC's legal or other requirements, ANC requires the contractor to take immediate corrective action, perform a root-cause analysis and develop a preventative action plan to keep the non-compliance/non-conformance from recurring. In addition, ANC

[6] According to Section I.C of the Virginia Small MS4 General Permit, and the 2013 VADEQ Draft Guidance Memo, "Transitional Sources" are regulated land disturbing activities that are temporary in nature and discharge through the MS4.

requires the contractor to ensure their employees are aware of how these requirements affect the work performed under the contract.

4.0 NEW OR MODIFIED LEGAL AUTHORITY

This section reviews new or modified legal authorities that ANC plans to establish, and includes a discussion of ANC's adherence to Construction General Permits as well as ANC's plan to develop specific contract language to meet Virginia Small MS4 General Permit requirements. According to the Virginia Small MS4 General Permit Section I.C.2.a(2), ANC must identify 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 Virginia Small MS4 General Permit Section I.C.

Section 3.0 of ANC's Final MS4 Program Plan (NDCEE, 2014), describes the BMPs that ANC will implement to meet each of the six MCMs required by the Virginia Small MS4 General Permit, 9VAC25-890-40 Section II B. Although ANC already developed some contract language, additional standardized contract language will be developed to comply with several of the MCMs as listed below and documented in the MS4 Program Plan:

- **MCM 3f: Standard Nonstormwater Compliance:** ANC will incorporate standard nonstormwater compliance language into all contracts to address nonstormwater discharges to the storm sewer system. Section 3.3.6 of ANC's Final MS4 Program Plan details ANC's plans to implement this BMP.

- **MCM 4: Construction Site and Stormwater Runoff Control:** ANC will develop specific contract language to address discharges entering the MS4 from various land-disturbing activities. Section 3.4 of ANC's Final MS4 Program Plan details ANC's plans to implement BMPs to address this requirement.

- **MCM 4b: Standard Stormwater Compliance Language**: ANC will develop standard language and include such language into construction designs and contracts to address discharges entering the MS4 from land-disturbing activities listed in Virginia Small MS4 General Permit Section II B 4 (a) that are applicable to ANC. Section 3.4.2 of ANC's Final MS4 Program Plan details ANC's plans to implement this BMP.

- **MCM 5: Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands:** ANC will develop specific contract language among other requirements to require that land-disturbing activities address stormwater runoff in such a manner that stormwater runoff controls are designed and installed in accordance with various design criteria in Virginia Small MS4 General Permit Section II B 5 b. Section 3.5.2 of ANC's Final MS4 Program Plan details ANC's plans to implement this BMP.

- **MCM5a: Low Impact Development**: ANC will encourage the use of low impact development in standardized contract language. Section 3.5.1 of ANC's Final MS4 Program Plan details ANC's plans to implement this BMP.

- **MCM 5.b: Design Criteria Standard Stormwater Compliance:** ANC will incorporate required design criteria for stormwater runoff controls into standard stormwater compliance language for all construction designs and contracts. ANC will develop standard compliance language to require design and installation of post-construction stormwater runoff controls in accordance with various criteria outlined in Section 3.5, Program Element 1 of the Final MS4 Plan for incorporation into all construction contracts. Section 3.5.2 of ANC's Final MS4 Program Plan details ANC's plans to implement this BMP.

- **MCM 6.i: Ensure Contractors use Control Measures and Procedures:** ANC will require that contractors use appropriate control measures and procedures for stormwater discharges to the MS4 system. ANC will incorporate a summary of the MS4 Program Plan into standard language for all appropriate contracts (as documented in MCM 4.b) for conducting work at ANC to document appropriate pollution prevention and good housekeeping procedures. Section 3.6.9 of ANC's Final MS4 Program Plan details ANC's plans to implement this BMP.

According to the MS4 Program Plan, ANC's standard contract language will also include specific language to enable compliance with several additional MCMs: 1) MCM 4.c: Plan Approval and Permit Authorizations Prior to Land Disturbing Activity; 2) MCM 4.d: Construction Site Compliance Inspection; 3) MCM 4.e: Certifications for Plan Reviewers, Inspections, and Administrators, as applicable.

5.0 MEANS AND METHODS TO ADDRESS DISCHARGES FROM NEW SOURCES

This section provides a narrative that discusses in general terms, the means and methods to address New Sources developed on or after 1 July 2009 at ANC, and a table that lists these New Sources.

Virginia Small MS4 General Permit Section I.C.2.a(3) (Permit Requirement 3) requires a discussion on the means and methods that will be utilized to address discharges into the MS4 from New Sources. Based on Section I.C.2.a(3) of the Virginia Small MS4 General Permit, "New Sources" means pervious and impervious urban land used served by the MS4 developed on or after 1 July 2009. Based on discussions with VADEQ (Brooks, 2014), this requirement applies to all new development that does not fall under permit requirements I.C.2.a(7) or I.C.2.a(8), also known as Permit Requirement 7 and Permit Requirement 8, respectively[7]. Therefore, as seen in Figure 1, New Sources subject to Permit Requirement 3

[7] Permit Requirement 7 states that the plan shall include the means and methods to offset the increased loads from new sources initiating construction between 1 July 2009 and 30 June 2014. This includes new sources that disturb one acre or greater as a result of an average land cover condition greater than 16 percent impervious cover (for the design of post-development stormwater management facilities). Permit Requirement 8 states that the plan shall include the means and methods to offset the increased loads from projects as grandfathered in accordance with 9VAC25-870-48, that disturb

include only construction initiated on or after 1 July 2009 that either disturbed one acre or less, or disturbed greater than one acre, but has a land use condition of 16 percent or less impervious cover used in design of post-development stormwater management facilities.

VADEQ (Brooks, 2014), has also clarified that facilities that have not adopted a land cover condition of >16 percent impervious cover under the Chesapeake Bay Preservation Act, which applies to ANC, are not subject to Permit Requirements 7 or 8. Therefore, as seen in Table 1 above, all of ANC's construction projects are subject only to Permit Requirement 3. Construction General Permits have been and will be obtained by ANC as appropriate, and followed for these projects. Projects conducted under the Construction General Permits must be designed to meet the phosphorus load that is equivalent to a land cover condition of 16 percent imperviousness; therefore, these projects would meet Virginia Small MS4 General Permit Section I.C and not require additional offsets.

6.0 ESTIMATED EXISTING SOURCE LOADS AND CALCULATED TOTAL POLLUTANT OF CONCERN REQUIRED REDUCTIONS

The section presents, for the 30 June 2009 MS4 boundary, the urban land uses (Existing Sources) at ANC, the Existing Source loads, and the required nutrient and sediment reductions from the Existing Sources. Virginia Small MS4 General Permit Section I.C.2.a.(4) requires an estimate of the annual POC loads discharged from the Existing Sources as of 30 June 2009, based on the 2009 Progress Run[8]. Section 6.1 of this report provides this estimate. Virginia Small MS4 General Permit Section I.C.2.a.(5) requires a determination of the total pollutant load reductions necessary to reduce the annual POC loads from Existing Sources. Section 6.2 of this report provides this determination.

ANC's 30 June 2009 property boundary and land uses as of 30 June 2009 were considered as Existing Sources, based on definitions in the Virginia Small MS4 General Permit. The 30 June 2009 land uses determined for this exercise are from ANC's Geographic Information Systems (GIS) data. The NDCEE determined, through discussion with VADEQ (Brooks, 2014), that using the 30 June 2009 ANC property boundary is appropriate to define the extent of the ANC MS4 because: 1) the entire property is located in an urbanized area according to the 2000 U.S. Census; and 2) the property is fully drained by its storm sewer system either directly, or through discharge from streams or open drainage ditches. In addition, the NDCEE determined that because the entire ANC property ultimately enters the MS4, the entire property consists of regulated land.

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one acre or greater that begin construction after 1 July 2014, where the project utilizes an average land cover condition greater than 16 percent impervious cover (for the design of post-development stormwater management facilities).

[8] Progress Runs refer to iterative calibrations of the Chesapeake Bay TMDL Community Model performed by the Chesapeake Bay Program using input from jurisdictions within the Chesapeake Bay Watershed to evaluate progress toward meeting the goals of the Chesapeake Bay TMDL.

6.1 Annual POC Loads from Existing Sources as of 30 June 2009

The land use acreages were combined as shown in Table 2 to determine the total regulated impervious urban and regulated pervious urban acreages served by the ANC MS4 as of 30 June 2009.

Table 2. 30 June 2009 Land Use Acreage at ANC

Land Use	Acreage	Urban Categorization (Acreage)
Building/Structure	3.23	**Regulated Impervious Urban (73.80 acres)**
Pavement	70.05	
Gravel	0.52	
Dirt	4.41	**Regulated Pervious Urban (528.80 acres)**
Grass	524.39	
Forest	19.65	**Non-urban Lands (20.10 acres)**
Water	0.45	
Total	**622.70**	**NA**

Note: (1) The non-urban lands (forest and water) are not included for purposes of calculating Existing Source loads. (2) Expanded areas identified in the 2010 U.S. Census do not need to be accounted for during this permit cycle, but permittees should begin to plan for those areas and they must be included in an updated Chesapeake Bay TMDL Action Plan for Virginia Small MS4 General Permit reapplication. ANC will not have any expanded areas.

In accordance with Virginia Small MS4 General Permit Section I.C.2.a.(4) and due to ANC's location within the Potomac River Basin, the regulated impervious urban and regulated pervious urban acres and estimated total POC loads are shown in Table 3. The 2009 Edge of Stream (EOS) loading rates were provided in the Table 2b Calculation Sheet from Virginia Small MS4 General Permit Section I.C.2.a.(4).

Table 3. Calculation of Estimated Existing Source Loads for ANC

Subsource	Pollutant	Total Existing Acres Served by ANC (6/30/09)	2009 EOS Loading Rate (lbs/acre)	Estimated Total POC Load for ANC Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	73.80	16.86	**1,244**
Regulated Urban Pervious		528.80	10.07	**5,325**
Regulated Urban Impervious	Phosphorus	73.80	1.62	**120**
Regulated Urban Pervious		528.80	0.41	**217**
Regulated Urban Impervious	Total Suspended Solids	73.80	1,717.32	**86,443**
Regulated Urban Pervious		528.80	175.80	**92,963**

Based on Table 3, the total POC loads for Existing Sources at ANC are: TN – 6,569 lbs; TP – 337 lbs; and TSS - 179,406 lbs.

6.2 Total POC Load Reductions Required from Existing Sources

In accordance with Virginia Small MS4 General Permit Section I.C.2.a.(5) and due to ANC's location within the Potomac River Basin, the regulated impervious urban and regulated pervious urban acres and total POC reductions required in the this permit cycle for Existing Sources are shown in Table 4. The reductions for this permit cycle were determined using information from Virginia Small MS4 General Permit Section I.C.2.a.(5). The Virginia Small MS4 General Permit is consistent with the Chesapeake Bay TMDL and the Virginia Phase I and II WIPs. For Existing Sources, five percent of the full POC reductions required by 2025, based on the Virginia Phase II WIP, are required during this permit cycle. This is calculated from Table 3b in the Virginia Small MS4 General Permit for the Potomac River Basin, by multiplying the urban acreage served by the MS4 by a loading rate that represents this five percent decrease in loading rate.

Table 4. Total POC Reductions Required During this Permit Cycle for ANC

Subsource	Pollutant	Total Existing Acres Served by ANC (6/30/09)	This Permit Cycle Required Reduction in Loading Rate (lbs/acre)	Total Reduction Required for ANC: This Permit Cycle (lbs)
Regulated Urban Impervious	Nitrogen	73.80	0.08	**5.90**
Regulated Urban Pervious		528.80	0.03	**15.86**
Regulated Urban Impervious	Phosphorus	73.80	0.01	**0.74**
Regulated Urban Pervious		528.80	0.001	**0.53**
Regulated Urban Impervious	Total Suspended Solids	73.80	11.71	**864**
Regulated Urban Pervious		528.80	0.77	**407**

Based on Table 4, the total reductions required for Existing Sources at ANC for this permit cycle are: TN – 21.76 lbs; TP – 1.27 lbs; and TSS – 1,271 lbs.

7.0 MEANS AND METHODS TO MEET THE REQUIRED REDUCTIONS FROM EXISTING SOURCES AND SCHEDULE

This section provides the means and methods (i.e., stormwater BMPs) that ANC will utilize to meet the required reductions from Existing Sources. Methods for determining treatment areas and reduction efficiencies for stormwater BMPs are provided. Existing BMPs and planned BMPs are described and their reduction credits presented. ANC's progress in conceptualizing additional potential BMPs is described.

The Virginia Small MS4 General Permit Section I.C.2.a.(6) refers to the means and methods, such as management practices and retrofit programs (i.e., installing BMPs to treat land uses existing as of 30 June 2009) that will be utilized to meet the required reductions included in Virginia Small MS4 General Permit Section I.C.2.a.(5) (as shown in Table 4). Permittees are required to describe the means and methods that will be implemented to meet the POC reductions consistent with a five percent reduction of the loading rate required for existing development (i.e., as of 30 June 2009), and provide a schedule to achieve these reductions, including annual benchmarks to demonstrate ongoing progress. Part II.IV of the 2013 VADEQ Draft Guidance Memo specifies the type of information permittees should report for all BMPs implemented to meet the Special Condition requirements. This information should be reported with the appropriate Annual Report, and permittees should designate which BMPs are being employed to meet the Chesapeake Bay TMDL POC load reductions. Calculations to illustrate how reductions will be met should be provided (Brooks, 2014).

Section II.II of the 2013 VADEQ Draft Guidance Memo specifies methods to estimate POC reductions that will be credited.

In addition, permittees have the option of considering techniques suggested in Section I.C.2.b, which include the following and which are described in further detail in the 2013 VADEQ Draft Guidance Memo:

- Implementing BMPs on unregulated lands. This option is not applicable to ANC, which has no unregulated lands;
- Utilizing stream restoration projects;
- Establishment of Memorandums of Understanding (MOUs) with other MS4 operators discharging to the same or adjacent eight digit hydrologic unit within the same basin to implement BMPs collectively (MOU to include mechanism to divide POC reductions);
- Utilization of any pollutant trading or offset program in accordance with § 62.1-44.19:20 through 62.1-44.19:23 of the Code of Virginia;
- A more stringent average land cover condition based on less than 16 percent impervious cover for New Sources initiating construction between 1 July 2009, and 30 June 2014; and,
- Any BMPs installed after 30 June 2009, as part of a retrofit program, may be applied towards meeting the required load reductions.

Based on additional communication with VADEQ (Brooks, 2014), the following BMPs can provide reduction credits to Existing Sources as described:

- Existing BMPs installed prior to or on 30 June 2009 that treat only Existing Sources may have 100 percent of their reduction credits applied, if they have not yet been reported to VADEQ. ANC has not yet reported any BMP implementation to VADEQ as of June 2014 (Rogers, 2014).
- Existing BMPs installed after 30 June 2009 that treat only Existing Sources may have 100 percent of their reduction credits applied;
- Existing or New BMPs treating New Sources may have excess reductions applied to Existing Sources. These excess reductions may result from either: 1) post-development BMPs installed as part a project initiating construction after 30 June 2009 that treat land uses outside of the area of disturbance; or 2) reductions above those required to achieve the baseline phosphorus load applicable to the New Source.

7.1 Existing BMP Inventory and Treatment Areas

At ANC, there are 16 existing BMPs, and all are listed in Table 5, along with description information expected by VADEQ according to Section IV of the 2013 VADEQ Draft Guidance Memo for each BMP. The NDCEE determined treatment areas (TAs) for BMPs providing treatment of Existing Sources (30 June 2009 urban land use) for each existing BMP. The majority of the 16 existing BMPs treat only existing land use, but two BMPs existed prior to New Source development and therefore provide some treatment to both Existing and New Sources (Post 30 June 2009 urban land use). These two BMPs are the

Oil/Water Separator (OWS) and Underground Stormwater Chamber treatment train at Building (Bldg.) 123 Complex.

In addition, several BMPs have been installed to treat New Sources. Most of these BMPs (Columbarium 9 Stormceptors®) and Rain Gardens 1 and 3 at Bldg. 123, treat only the New Source. Rain Garden 2 captures stormwater runoff from Existing Sources land that was outside the perimeter of the area of disturbance for the Bldg. 123 Southern Storage Bays project, and therefore captures and treats Existing Sources. Therefore, while all existing BMPs are shown in Table 5, those that treat only New Sources are shown as having a TA of zero acres. For the OWS and Underground Stormwater Chamber at Bldg. 123 and Rain Garden 2 at Bldg. 123, the TA provided in Table 5 is only that for the Existing Sources. These three BMPs treat acreage from the New Sources in addition to existing BMPs, but the acreage treated for the New Sources is not provided in Table 5. As discussed in Section 5.0 of this plan, the reductions for New Sources are not required for presentation in this Chesapeake Bay TMDL Action Plan because they are consistent with requirements under the Construction General Permits, which ensure that stormwater quality is sufficiently treated by the post-development stormwater management required under these Construction General Permits and no additional offsets for the New Sources are required for this plan.

The TAs presented in Table 5 for the existing BMPs were estimated as follows for each type of BMP:

- Three Rain Gardens at Bldg. 123 – TAs were determined from construction drawings.
- Stormceptors® (hydrodynamic structures) - The TAs were determined by using the actual design data for each Stormceptor® from construction drawings, if available, or by using topographic maps and maps of storm sewer infrastructure.
- OWSs –TAs were determined by construction drawings, if available, or by using topographic maps and maps of storm sewer infrastructure.
- Underground Stormwater Chamber - TA was determined from construction drawings.
- Permeable Pavement – TA is equivalent to the area covered by the permeable pavement (sidewalk).
- Sand Filter - TA was determined using topographic maps and maps of storm sewer infrastructure.
- Non-contiguous Urban Tree Planting – As given in the 2013 VADEQ Draft Guidance Memo, TAs were determined from the number of trees planted, with 100 trees equivalent to one acre.

The NDCEE used current GIS data to establish 2009 land uses (Existing Sources). Next, TAs for existing BMPs were evaluated alongside the 2009 land uses using GIS to determine impervious and pervious acreage currently receiving treatment within each TA. Table 5 includes only the Existing Sources TAs, but all existing BMPs are shown in the table for BMP inventory completeness.

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Table 5. Existing Sources Treated by Existing Stormwater BMPs/Control Measures

Stormwater Management Facility Type	Facility Location (Address or Latitude/ Longitude)	Existing Sources Acreage Treated			Date Brought Online (MM/YYYY) (1)
		Total	Impervious	Pervious	
Street Sweeping (Vacuum-type sweeper; contents to solid waste dumpster)	All roads, not parking lots, once or twice per week (Sweeper used daily; focus on roads with high visibility and debris)	N/A	162,000 lbs (2)	N/A	2013
Non-contiguous Urban Tree Planting	"Barrow Pit" Section 61 (38.877044/ -77.062922)	0.89	0.00	0.89	2014
Non-contiguous Urban Tree Planting	"Barrow Pit" Section 61 (38.877044/ -77.062922)	0.43	0.00	0.43	2013
Non-contiguous Urban Tree Planting	Columbarium Court 9 Landscape (38.875423/ -77.059783)	1.69	0.00	1.69	2012
Non-contiguous Urban Tree Planting	Facility Maintenance Complex and Parking Lot Landscape (38.871345/ -77.061292)	1.11	0.00	1.11	2012
Non-contiguous Urban Tree Planting	Niche Wall Plantings (Inside the Wall) (38.878669/ -77.059724)	0.46	0.00	0.46	2011
Non-contiguous Urban Tree Planting	Niche Wall Plantings along RTE 110 (Outside the Wall) (38.878644/ -77.059459)	2.89	0.00	2.89	2009
Non-contiguous Urban Tree Planting	Columbarium Court 7 (38.875401/ -77.060357)	0.45	0.00	0.45	2007

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Table 5. Existing Sources Treated by Existing Stormwater BMPs/Control Measures (Continued)

Stormwater Management Facility Type	Facility Location (Address or Latitude/ Longitude)	Existing Sources Acreage Treated			Date Brought Online (MM/YYYY) (1)
		Total	Impervious	Pervious	
Non-contiguous Urban Tree Planting	LD90 Development Project (38.879294/ -77.060599)	3.14	0.00	3.14	2006
OWS 2	Bldg. 117 (38.871291/ -77.064324)	0.30	0.30	0.00	2013
Stormceptor® 3 (STC 900) (2)	Columbarium 9 (North) (38.876759/ -77.060035)	0.00	0.00	0.00	2013
Stormceptor® 4 (STC 900) (2)	Columbarium 9 (South) (38.874941/ -77.059919)	0.00	0.00	0.00	2013
Permeable Pavement	Sidewalk along Meigs Drive (38.880097/ -77.0769)	0.03	0.03	0.00	2014
Permeable Pavement	Sidewalks along Eisenhower Avenue (38.876097/ -77.066287)	0.36	0.36	0.00	2012
Rain Garden 1 (3)	Bldg. 123 (38.870719/ -77.062615)	0.00	0.00	0.00	2012
Rain Garden 2 (3)	Bldg. 123 (38.870692/ -77.062356)	0.23	0.16	0.09	2012
Rain Garden 3 (3)	Bldg. 123 (38.870924/ -77.062085)	0.00	0.00	0.00	2012
Stormceptor® 5 (STC 2400)	North of McClellan Circle (Near Niche Wall) (38.880872/ -77.062114)	1.50	1.50	0.00	2006
Stormceptor® 6 (STC 1800)	Southeast of McClellan Circle (38.877506/ -77.059327)	1.43	1.43	0.00	2006
Stormceptor® 1 (STC 1800)	Columbarium 7 (38.876651/ -77.060503)	1.05	1.05	0.00	2002-2003

Table 5. Existing Sources Treated by Existing Stormwater BMPs/Control Measures (Continued)

Stormwater Management Facility Type	Facility Location (Address or Latitude/ Longitude)	Existing Sources Acreage Treated			Date Brought Online (MM/YYYY) (1)
		Total	Impervious	Pervious	
Stormceptor® 2 (STC 1800)	Columbarium 8 (38.87486/ -77.06051)	0.98	0.98	0.00	2002-2003
Sand Filter	Northern Columbariums (38.876891/ -77.061833)	2.48	0.37	2.11	1998
OWS 1 (3)	Bldg. 123 (38.871205/ -77.062595)	2.43	1.55	0.88	1996
Underground Stormwater Chamber (3)	Bldg. 123 (38.871088/ -77.062886)	2.43	1.55	0.88	1996

Notes: Rounding errors may occur. (1) Currently, only BMP installation or implementation years are known. However, VADEQ requests month and year of installation. If the date that a previously existing stormwater management facility was brought online cannot be confirmed, ANC should use 30 June 2005 as the default date, as described in Section IV of the 2013 VADEQ Draft Guidance Memo. (2) Street sweeping is not tracked according to acreage, but by the total pounds of street sweepings collected annually, as consistent with the 2013 VADEQ Draft Guidance Memo. Assumptions are detailed in Appendix B. (3) Stormceptors® 3 and 4, and Rain Gardens 1 and 3 treat only New Sources, therefore are shown as treating no Existing Sources acreage. Rain Garden 2 and the OWS and Underground Stormwater Chamber at Bldg. 123 all treat a combination of Existing Sources and New Sources, with only the Existing Sources acreage treated shown. Reductions for New Sources are not presented in this document because they are not eligible for load reduction credits and instead are managed by VADEQ through the Construction General Permits (Brooks, 2014).

For each BMP listed in Table 5, the following information also applies:

- The sixth order Hydrologic Unit Code (HUC) is 020700100103;
- The impaired segments to which the BMP Discharges is "POTTF_VA";
- The BMP is owned by the MS4 operator, ANC;
- None of the existing BMPs are retrofits of existing stormwater management facilities;
- ANC will begin an inspection and maintenance program for its existing BMPs as required by the Virginia Small MS4 General Permit, and detailed in the MS4 Program Plan.

7.2 Determination of Reduction Efficiencies for Existing BMPs at ANC

Each existing BMP at ANC must be assigned reduction efficiencies to be applied to the stormwater runoff from the impervious and pervious acreage draining to that BMP in order to determine the TN, TP and TSS pollutant reductions. The efficiencies assigned to a BMP depend on the type of design data available for that BMP. The 2013VADEQ Draft Guidance

Memo explains the appropriate methods for determining BMP efficiencies, which are described in further detail below.

Virginia Stormwater BMP Clearinghouse

The Virginia Stormwater BMP Clearinghouse[9] is jointly administered by the VADEQ and the Virginia Water Resources Research Center (VWRRC). The Clearinghouse provides documents for design standards and specifications of all stormwater BMPs approved for use in Virginia. The performance criteria in the design standards are based on the 90th percentile rainfall event. The rational for using the 90th percentile event is that it represents the majority of runoff volume on an annual basis. The 90th percentile rainfall event was determined for ANC by referencing the Center for Watershed Protection, which gives a value of one inch for Ronald Reagan National Airport in Arlington, VA (Center for Watershed Protection, 2008).

The pollutant removal efficiencies provided in the Clearinghouse BMP design standards include only TN and TP; no TSS efficiencies are listed. In order to achieve the pollutant efficiencies given in the Clearinghouse BMP design standards, the BMP must meet all design criteria. Another procedure is required, subsequently discussed later in this section, to obtain the TSS removal efficiency.

Construction design drawings and related reports typically include the design procedures and details for BMPs for a given project. However, research of existing records by the NDCEE has determined that none of the existing BMPs at ANC have been explicitly designed according to the Clearinghouse design standards. Therefore, other methods were used to determine the pollutant removal efficiencies for the existing BMPs at ANC as described in the 2013 VADEQ Draft Guidance Memo and detailed in the following subsections below.

Removal Rates for Urban Stormwater Retrofit Projects

Stormwater retrofits include a diverse group of BMPs that provide pollutant reduction for an Existing Source that is currently untreated by a BMP or is inadequately treated by an existing BMP. Schueler and Lane (2012) and an expert panel developed a retrofit reporting criteria for the Chesapeake Stormwater Network to ensure that pollutant reductions are systematically applied in stormwater retrofit situations throughout the Chesapeake Bay watershed. Although this process was developed for evaluating removal rates for urban stormwater retrofit projects, the 2013 VADEQ Draft Guidance Memo recommends use of these criteria for determining removal rates for existing BMPs if those BMPs do not meet the requirements documented in the previous subsection of this report.

Applying this Schueler and Lane (2012) method is a two-step process. The first step is to use existing design or field-obtained information to determine the runoff storage volume of the BMP. This step is then followed by using an equation that relates the runoff depth treated by the BMP to the runoff storage volume of the BMP and the impervious acreage treated. The equation for calculating the treated runoff depth is:

[9] Available at: http://vwrrc.vt.edu/swc/

RD = (RS)(12)/IA*

Where
RD = runoff depth treated (inches)
RS = runoff storage volume (acre-feet)
IA = impervious acre (acres)

A table provided in Schueler and Lane (2012) lists the approved BMPs for utilizing this methodology for determining pollutant removal rates. That table also categorizes the BMPs in either a runoff reduction (RR) or stormwater treatment (ST) category, where the RR or ST category is based on the primary treatment practice employed by the BMP. Three adjustor curves, one each for TN, TP and TSS, show an RR curve and a ST curve, and are provided in Appendix A of this plan. The pollutant removal efficiencies for a BMP can therefore be found by locating the points on the curves for the appropriate BMP type that corresponds to the treated runoff depth calculated using the equation above.

Chesapeake Bay Program BMP Efficiencies

According to 2013 VADEQ Draft Guidance Memo, if BMP reduction efficiencies cannot be determined from the adjustor curves or the BMPs listed on the Clearinghouse website based on the available data, the permittee may choose to use the established Chesapeake Bay Program BMP reduction efficiencies as shown in Table 6.

Table 6. Established Efficiencies for Chesapeake Bay Program BMPs

Chesapeake Bay Program BMPs	Efficiencies		
	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 without (w/o) Sand, Vegetation (Veg.)	80%	85%	95%
Infiltration Practices with (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%
Street Sweeping Mass Reduced per pound of sediment swept (1)	0.18%	0.07%	100%

Note: (1) Interim rate – expert panel under review at the time of publication.

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Reduction Efficiencies for Existing BMPs at ANC

There are 16 existing BMPs at ANC as shown in Table 5. Sufficient data were available for the three rain gardens at Bldg. 123 to apply the adjustor curves to determine the reduction efficiencies, the calculations for which are detailed in Appendix B. The Chesapeake Bay Program BMP efficiences were applied to all remaining existing BMPs. Clearinghouse BMP efficiencies did not apply to any of these existing BMPs because data were not available to confirm the BMPs were designed according to the Clearinghouse BMP design criteria.

Calculated Reduction Credits for Existing Sources from Existing BMPs at ANC

Appendix B provides a detailed worksheet, including an existing BMP inventory and their calculated reductions. The worksheet includes important data for calculating pollutant reductions, such as the applicable EOS loading rates for TN, TP, and TSS for impervious urban and pervious urban land uses at ANC, the EOS loads that the land uses treated by the BMP generates based on the TAs, the reduction efficiencies for each BMP, and the calculated reductions applied to Existing Sources by land use for each of ANC's existing BMPs. In addition, in a separate tab, Appendix B provides the details for the individual non-contiguous urban tree planting projects.

The NDCEE calculated BMP reduction credits for treatment of Existing Sources - in the form of load reductions from BMPs - for all existing structural BMPs at ANC. In order to do so, the NDCEE used the TAs determined for Existing Sources presented in Table 5 (acreage of impervious and urban land use type within each BMP TA).

The acreage for each land use type within each treatment area was multiplied by the TN, TP, and TSS EOS loading rates from the Virginia Small MS4 General Permit for the Potomac River Basin. The product of that calculation was then multiplied by the reduction efficiency for the appropriate type of BMP. The result was the load reduction in pounds for a particular land use within a particular BMP treatment area. This calculation was conducted for all land use types within a BMP treatment area, and the sum of these results represents the total load reduction for a BMP. The formula provided below illustrates the calculation of the TN load reduction for a single BMP. Load reductions for TP and TSS were calculated similarly, using the appropriate loading rates and reduction efficiencies:

$$Tr_N = -((Area_{LI} * LR_{N,LI} * RE_N) + (Area_{LP} * LR_{N,LP} * RE_N))$$

Where:
Tr_N *= Total Load Reduction for nitrogen for a BMP (pounds).*
$Area_{LI}$ *= Area of impervious land use (acres) within the BMP treatment area.*
$Area_{LP}$ *= Area of pervious land use (acres) within the BMP treatment area.*
$LR_{N,LI}$ *= Loading rate (pounds/acre) of nitrogen for the Potomac River Basin, for impervious land use.*
$LR_{N,LP}$ *= Loading rate (pounds/acre) of nitrogen for the Potomac River Basin, for pervious land use.*
RE_N *= Reduction Efficiency (%) of nitrogen by BMP.*

In the case of tree planting, the reduction rates given in the 2013 VADEQ Draft Guidance Memo reflect the land use change from pervious urban to forest land use rather than a BMP efficiency. The product of this reduction rate (lbs/ac) multiplied by the acreage of the tree planting area (for every 100 non-contiguous trees planted, one acre of tree planting is credited based on the 2013 VADEQ Draft Guidance Memo) provides the load reductions (lbs).

Table 7 provides a partial summary of the data shown in Appendix B for each BMP, and also provides the calculated reduction by land use and the total reduction for each BMP considering both impervious and pervious land use treated. BMPs shown in Table 5 above as treating zero acres are not presented in Table 7. In some cases, the acreage shown in Table 7 is only the Existing Sources acreage the BMP treats, because the BMP treats both Existing Sources and New Sources. In addition, the eight tree planting projects were combined in this table. Additional offsets for New Sources are not required under the Chesapeake Bay TMDL Action Plan because adherence to the Construction General Permits ensures that the New Sources are adequately treated by stormwater controls to meet required post-development stormwater quality requirements in the Chesapeake Bay Watershed.

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Table 7. Reductions for Existing Sources from Existing Stormwater BMPs/Control Measures

Stormwater Management Facility Type (Year Installed)	Facility Location	Sources Treated by BMP	Land Use Treated	Existing Sources Treatment Area (acres)	Reduction Efficiencies from BMPs (1)			Load Reductions for Existing Sources (lbs)		
					TN	TP	TSS	DEL TN	DEL TP	DEL TSS
Permeable Pavement (2014)	Meigs Drive	Treats only Existing Source	Regulated Impervious Urban	0.03	65%	75%	80%	0.3	0.04	29.0
Total Reduction for Planned Permeable Pavement:								**0.3**	**0.04**	**29.0**
Non-contiguous Urban Tree Planting 2014, 2013, 2012 (2 sites), 2011, 2009, 2007, 2006	Eight tree planting projects	Treats only Existing Source	Regulated Pervious Urban	11.06	7.16	0.38	132.96	79.2	4.2	1,470.5
Total Reduction for Urban Tree Planting:								**79.2**	**4.2**	**1,470.5**
OWS 2 (2013)	Bldg. 117	Treats only Existing Sources	Regulated Impervious Urban	0.30	5%	10%	10%	0.3	0.05	35.1
			Regulated Pervious Urban	0.00	5%	10%	10%	0.0	0.0	0.0
Total Reduction for OWS 2:								**0.3**	**0.05**	**35.1**

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Table 7. Reductions for Existing Sources from Existing Stormwater BMPs/Control Measures (Continued)

Stormwater Management Facility Type (Year Installed)	Facility Location	Sources Treated by BMP	Land Use Treated	Existing Sources Treatment Area (acres)	Reduction Efficiencies from BMPs			Load Reductions for Existing Sources (lbs)		
					TN	TP	TSS	DEL TN	DEL TP	DEL TSS
Permeable Pavement (2012)	Sidewalks along Eisenhower Avenue	Treats only Existing Source	Regulated Impervious Urban	0.36	65%	75%	80%	3.9	0.4	337.3
Total Reduction for Permeable Pavement:								**3.9**	**0.4**	**337.3**
Rain Garden 2 (2012) (2)	Bldg. 123	Treats both Existing Sources and New Sources	Regulated Impervious Urban	0.16	35%	40%	45%	0.9	0.1	84.3
			Regulated Pervious Urban	0.09	35%	40%	45%	0.3	0.01	7.1
Total Reduction for Rain Garden 2:								**1.2**	**0.11**	**91.4**
Stormceptor ® 5 (STC 2400) (2006)	North of McClellan Circle (Near Niche Wall)	Treats only Existing Sources	Regulated Impervious Urban	1.50	5%	10%	10%	1.3	0.2	175.7
			Regulated Pervious Urban	0.00	5%	10%	10%	0.0	0.0	0.0
Total Reduction for Stormceptor® 5:								**1.3**	**0.2**	**175.7**
Stormceptor ® 6 (STC 1800) (2006)	Southeast of McClellan Circle	Treats only Existing Sources	Regulated Impervious Urban	1.43	5%	10%	10%	1.2	0.2	167.5
			Regulated Pervious Urban	0.00	5%	10%	10%	0.0	0.0	0.0
Total Reduction for Stormceptor® 6:								**1.2**	**0.2**	**167.5**

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Table 7. Reductions for Existing Sources from Existing Stormwater BMPs/Control Measures (Continued)

Stormwater Management Facility Type (Year Installed)	Facility Location	Sources Treated by BMP	Land Use Treated	Existing Sources Treatment Area (acres)	Reduction Efficiencies from BMPs			Load Reductions for Existing Sources (lbs)		
					TN	TP	TSS	DEL TN	DEL TP	DEL TSS
Stormceptor ® 1 (STC 1800) (2002-2003)	Columbarium 7	Treats only Existing Sources	Regulated Impervious Urban	1.05	5%	10%	10%	0.9	0.2	123.0
			Regulated Pervious Urban	0.00	5%	10%	10%	0.0	0.0	0.0
Total Reduction for Stormceptor® 1:								**0.9**	**0.2**	**123.0**
Stormceptor ® 2 (STC 1800) (2002-2003)	Columbarium 8	Treats only Existing Sources	Regulated Impervious Urban	0.98	5%	10%	10%	0.8	0.2	114.8
			Regulated Pervious Urban	0.00	5%	10%	10%	0.0	0.0	0.0
Total Reduction for Stormceptor® 2:								**0.8**	**0.2**	**114.8**
Sand Filter (1998)	Northern Columbariums	Treats only Existing Sources	Regulated Impervious Urban	0.37	40%	60%	80%	2.5	0.4	346.7
			Regulated Pervious Urban	2.11	40%	60%	80%	8.5	0.5	296.8
Total Reduction for Sand Filter:								**11.0**	**0.9**	**643.5**
OWS 1 (1996) (2)	Bldg. 123	Treats both Existing Sources and New Sources	Regulated Impervious Urban	1.55	5%	10%	10%	1.3	0.3	181.6
			Regulated Pervious Urban	0.88	5%	10%	10%	0.4	0.04	15.5
Total Reduction for OWS 1:								**1.7**	**0.34**	**197.1**
Underground Stormwater Chamber (1996) (2)	Bldg. 123	Treats both Existing Sources and New Sources	Regulated Impervious Urban	1.55	5%	10%	10%	1.3	0.3	181.6
			Regulated Pervious Urban	0.88	5%	10%	10%	0.4	0.04	15.5
Total Reduction for Bldg 123 Underground Stormwater Chamber:								**1.7**	**0.34**	**197.1**
Grand Total Reductions for all Existing BMPs:								**395.3**	**120.5**	**165,582**

Notes: Rounding errors may occur. (1) Street sweeping is not tracked according to acreage, but by the total pounds of street sweepings collected annually, as consistent with the 2013 VADEQ Draft Guidance Memo. Assumptions are detailed in Appendix B. (2) Rain Garden 2 and the OWS and Underground Stormwater Chamber at Bldg. 123 all treat a combination of Existing Sources and New Sources, with only the Existing Sources acreage treated shown. Reductions for New Sources are not presented in this document because they are not eligible for load reduction credits and instead are managed by VADEQ through the Construction General Permits (Brooks, 2014).

The determination of whether the 16 existing BMPs are eligible for full or partial credit toward Existing Sources (30 June 2009 land use) depends on their year of installation or implementation, whether they have been reported to VADEQ, and whether the BMP treats Existing Sources, New Sources, or a combination. In the case of ANC, BMPs have never been reported to VADEQ; therefore, all existing ANC BMPs may be considered for potential credit regardless of installation date.

Table 8 summarizes the total reduction credits eligible for application to the Chesapeake Bay TMDL Action Plan by BMP and the progress toward ANC's required reductions for this permit cycle. As seen in the summary at the bottom of Table 8, ANC has already met and exceeded its required reductions this permit cycle, and also has additional reduction credits that may be applied toward the requirements of the next permit cycle.

Table 8. Progress Toward ANC's Required Reductions for this Permit Cycle

Stormwater Management Facility Type (Year Installed)	Facility Location	BMP Load Reductions for Existing Sources (lbs)		
		TN	TP	TSS
Total Allowable Existing Source Reductions from Existing BMPs:		395.3	120.5	165,582
Total Reductions Required for this Permit Cycle:		21.76	1.27	1,271
Remaining Reductions Needed:		0.00	0.00	0
Surplus Reductions to Apply Toward next Permit Cycle:		373.54	119.23	164,311

7.3 Planned Future BMPs

ANC is planning to implement several planned BMPs in the future that will be eligible for credits to further reduce the loads from Existing Sources, in addition to the existing BMPs already described. These planned BMPs include permeable pavement installation, urban stream restoration, urban tree planting, and installation of an underground stormwater chamber. Appendix B provides detailed information on the acreage to be treated, EOS loading rates and loads from the impervious and pervious lands in the treatment area, reduction efficiencies, and the reduction credits for these BMPs.

ANC will also be implementing NMPs during this permit cycle. VADEQ will not currently allow NMPs on regulated lands or on golf courses to receive reduction credit under the Chesapeake Bay TMDL Action Plan, so the NMPs are not included for evaluating reductions at this time[10]. This may be an issue that ANC would like to discuss with VADEQ, along

[10] Implementation of NMPs is required by the Virginia Small MS4 General Permit to demonstrate implementation of the Chesapeake Bay TMDL Action Plan to the MEP and to demonstrate adequate progress. NMPs are also required as a MCM under Section II of the Virginia Small MS4 General Permit. NMPs developed for ANC are presented in separate documents. However, permittees cannot currently receive credit for NMP implementation on regulated lands for the

with other permittees or groups that are advocating to allow permittees to receive credit for their NMPs.

Table 9 provides a summary of the planned BMPs reductions as given in Appendix B. Credits for these BMPs should be verified after installation. The final credits, in addition to the surplus credits from existing BMPs, can be applied toward the required reductions during the next permit cycle.

It is important to note that while BMPs proposed for construction during implementation of the Millennium Site project are discussed in Table 9 below, the land uses resulting from the Millennium Site project were not evaluated for this Plan. This because the baseline land use evaluated for this Chesapeake Bay TMDL Action Plan is based on 2009 land use, which is consistent with the 2013 VADEQ Draft Guidance Memo. During future permit cycles, this baseline will need to be revised with land use changes resulting from any future development projects, including the Millennium and Southern Expansion (former Navy Annex) projects.

Future baselines cannot be accurately predicted at this time because loading rates are likely to change in the next permit cycle, based on outputs from the EPA's Chesapeake Bay Model; therefore future land uses were not evaluated. Tree removal would be included within this category of future land uses. Therefore, the purpose of Table 9 is to provide information on the BMPs to be installed in the future that would be eligible for credit toward the 2009 baseline because they would treat Existing Sources (land use as it existed on 30 June 2009). This differs from BMPs that will be installed at the Millennium Site and other development projects to treat new land uses resulting from development. Future BMPs that treat New Sources (land developed after 30 June 2009) are not eligible for similar reduction credits unless they also treat Existing Sources.

Special Condition Chesapeake Bay TMDL Action Plan based on the 2013 VADEQ Draft Guidance Memo. (Only NMPs applied to unregulated, private lands that are not golf courses may receive credit).

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Table 9. Expected Reductions for Existing Sources from Planned Stormwater BMPs/Control Measures

Stormwater Management Facility Type (Year to be Implemented)	Facility Location	Land Use Treated	BMP Treatment Area (acres)	Reduction Efficiencies from BMPs			Load Reductions from BMP (lbs)		
				TN	TP	TSS	DEL TN	DEL TP	DEL TSS
Urban Stream Restoration (2016)	Millennium Site	Regulated Impervious and Pervious Urban	1900 Linear Feet (LF)	0.2 lbs/LF	0.068 lbs/LF	54.25 lbs/LF	380.0	129.2	103,075
Total Reduction for Planned Urban Stream Restoration:							**380.0**	**129.2**	**103,075**
Non-contiguous Urban Tree Planting (2016)	Old Maintenance Yard at Millennium Site	Regulated Pervious Urban	1.75	7.16 lbs/ac	0.38 lbs/ac	132.96 lbs/ac	12.5	0.7	232.7
Total Reduction for Planned Non-contiguous Urban Tree Planting:							**12.5**	**0.7**	**232.7**
Underground Stormwater Detention Chamber (2016)	Chaffee Place Parking Lot	Regulated Impervious Urban	1.08	5%	10%	10%	0.91	0.18	126.62
		Regulated Pervious Urban	1.22	5%	10%	10%	0.61	0.05	21.43
Total Reduction for Planned Underground Stormwater Chamber:							**1.52**	**0.23**	**148.05**
Total Reductions for All Planned BMPs:							**394.29**	**130.13**	**103,456**

Notes: Rounding errors may occur. None of the planned BMPs listed in this table are retrofits of existing stormwater management facilities, but all will treat only Existing Sources. ANC will begin an inspection and maintenance program for its existing BMPs as required by the Virginia Small MS4 General Permit, and detailed in the MS4 Program Plan. (1) Reduction credits for Urban Stream Restoration are based on linear feet (LF) restored, rather than acreage.

7.4 Concept BMPs

ANC is in the pre-design stage of conceptualizing several additional structural BMPs for possible implementation if needed for the next permit cycle. At this time, ANC has not made any decisions about which, if any Concept BMPs to implement in the future. In addition, all of ANC's Stormceptors® have excess capacity, such that additional Existing Sources (30 June 2009 land uses) could be diverted to these Stormceptors® as well, if desired.

7.5 Implementation Schedule

The BMPs listed in Tables 5 and 7 are already in place at ANC and treating Existing Sources. Table 9 illustrates the total expected reductions for planned future BMPs, which provides an estimated implementation schedule. Because the reductions required under this permit cycle are already being met in 2014, no additional BMP implementation is necessary to treat Existing Sources during this permit cycle.

8.0 MEANS AND METHODS TO OFFSET INCREASED LOADS FROM NEW SOURCES INITIATING CONSTRUCTION BETWEEN 1 JULY 2009 AND 30 JUNE 2014

This section is a required section to provide the means and methods to offset increased loads from New Sources, for permittees that have adopted an average land cover condition of >16 percent impervious cover for the design of post-development stormwater management facilities under the Chesapeake Bay Preservation Act.

Virginia Small MS4 General Permit Section I.C.2.a.(7) requires the Chesapeake Bay TMDL Action Plan to include the means and methods to offset increased loads from New Sources initiating construction between 1 July 2009 and 30 June 2014 that disturb one acre or greater as a result of the utilization of an average land cover condition of >16 percent impervious cover for the design of post-development stormwater management facilities. Table 4 in the Virginia Small MS4 General Permit is to be used to develop the equivalent pollutant load for nitrogen and total suspended solids based on the total phosphorus pollutant load. The operator must offset five percent of the calculated increased load from these New Sources during the permit cycle.

The following is a list of New Sources that have been developed or are under development at ANC since 1 July 2009, all of which fall under Permit Requirement 3 and obtained coverage under the appropriate Construction General Permits. Also provided below is a brief summary of the means and methods (structural BMPs) that address discharges from each of the New Sources:

- Columbarium 9 initiated construction in 2010, and disturbed 3.4 acres. Two Stormceptors® were installed during the project to treat stormwater runoff generated by this New Source.

- Building 123 Southern Storage Bays, including new parking lots, initiated construction in 2010, and disturbed 2.5 acres. Three rain gardens were installed during the project to treat stormwater runoff generated by a portion of this New Source. In addition, excess capacity of an existing underground stormwater chamber provides treatment of stormwater runoff generated by the other portion of this New Source.

- Millennium Site, to consist of 26 disturbed acres, initiated construction in spring 2014. Construction is still ongoing and is expected to be completed in 2016. Stream restoration (1,900 linear feet) will be conducted, and permeable pavement, soil compost amendment, sheet flow to conserved open space, and bioretention will be implemented and/or installed during the project to treat stormwater runoff generated by this New Source.

In addition, the following is a list of construction projects that ANC will implement in the near future, which fall under Permit Requirement 3:

- Administration Building Queuing Area Project
- Southern Expansion (former Navy Annex)
- Other small projects (utility relocation, road repair) may or may not reach the threshold for obtaining a Construction General Permit.

These projects are currently in the conceptual phase, and construction will not begin until after 2014. At this time, the exact means and methods for addressing discharges from these New Sources are unknown. However, coverage under the appropriate Construction General Permits will be obtained for these projects, when applicable, to ensure that the means and methods are sufficient so that additional offsets will not be required under Section I.C under the Virginia Small MS4 General Permit.

ANC has not adopted an average land cover condition of >16 percent impervious cover under the Chesapeake Bay Preservation Act. ANC obtained and complied with the 2009 Construction General Permit for its three regulated construction projects initiated between 1 July 2009 and 30 June 2014, including construction at Columbarium 9, Bldg. 123 Southern Storage Bays, and the Millennium Site. At this time, construction has been completed at Columbarium 9 and Bldg. 123 Southern Storage Bays and construction at the Millennium Site is underway. The post-development stormwater runoff quality requirements for the 2009 Construction General Permit ensure that these New Sources are treated by stormwater BMPs to achieve equivalent 16 percent impervious cover baseline loads for New Sources (0.45 lbs TP/ac/yr), and therefore no additional offsets are required under the Chesapeake Bay TMDL Action Plan. Section 5.0 can be referenced for additional details on these New Sources.

9.0 MEANS AND METHODS TO OFFSET INCREASED LOADS FROM GRANDFATHERED PROJECTS THAT BEGIN CONSTRUCTION AFTER 1 JULY 2014

This section is a required section to provide the means and methods to offset increased loads from grandfathered projects, for permittees that have adopted an average land cover condition of >16 percent impervious cover for the design of post-development stormwater management facilities under the Chesapeake Bay Preservation Act.

Virginia Small MS4 General Permit Section I.C.2.a.(8) requires the Chesapeake Bay TMDL Action Plan to include the means and methods to offset increased loads from projects grandfathered in accordance with 9VAC25-870-48, that disturb one acre or greater that begin construction after 1 July 2014, where the project utilizes an average land cover condition of >16 percent impervious cover in the design of post-development stormwater management facilities. Table 4 in the Virginia Small MS4 General Permit must be used to develop the equivalent pollutant load for nitrogen and total suspended solids based on the total phosphorus pollutant load. The operator must offset increases in the POC load prior to completion of the project in accordance with Section I.C.3.c of the Virginia Small MS4 General Permit.

Grandfathered projects are generally projects that are: 1) approved by a locality; 2) had submitted a layout or plan to a locality; 3) had funding obligated prior to 1 July 2012, but did not have coverage under the Construction General Permit issued before 1 July 2014; 4) did not have land disturbance started before 1 July 2014; and 5) where no changes have occurred to the project plan[11]. Projects that disturb one acre or more, for which >16 percent impervious cover is used in design of post-development stormwater management facilities, which did not initiate construction prior to 1 July 2014, and are not grandfathered are subject to the "no net increase" requirement of the 2014 Construction General Permit.

No portions of any of ANC's construction projects that will initiate construction after 1 July 2014 are grandfathered. Therefore the Virginia Small MS4 General Permit provisions for grandfathered projects for the Chesapeake Bay TMDL Action Plan do not apply.

10.0 LIST OF FUTURE PROJECTS, AND ASSOCIATED ACREAGE THAT QUALIFY AS GRANDFATHERED

This section provides discussion of future projects and associated acreage that qualify as grandfathered. Virginia Small MS4 General Permit Section I.C.2.a(10) requires a list of future projects and associated acreage that qualify as grandfathered in accordance with 9VAC25-870-48. Table 10 lists future construction projects ANC is planning at the time this report was written, although the exact acreages of land disturbance associated with these projects is not yet known. None of these projects will have associated acreage that is grandfathered.

[11] 9VAC25-870-48. Available at http://register.dls.virginia.gov/details.aspx?id=

Table 10. Future Construction Projects at ANC

Construction Project	Status as of June 2014	Grandfathered Acreage
Administration Building Queuing Area Project	Construction General Permit will be obtained when appropriate.	None
Southern Expansion (former Navy Annex)	ANC does not currently own the property. After property transfer, the design phase will begin, with construction starting after 2014.	None
Other Projects	Other small projects (utility relocation, road repair) may or may not reach the threshold for obtaining a Construction General Permit. ANC will apply for and obtain a Construction General Permit before initiating such projects as appropriate.	None

11.0 ESTIMATE OF THE EXPECTED COST TO IMPLEMENT THE NECESSARY REDUCTIONS

This section is a required section to address the costs to implement the necessary reductions in TN, TP, and TSS. Virginia Small MS4 General Permit Section I.C.2.a(11) requires cost estimates for BMPs and management practices needed to implement the requirements of the Special Condition for the Chesapeake Bay TMDL during this permit cycle. Because the reductions required under this permit cycle are already being met in 2014, no additional BMP implementation is necessary and therefore, no additional costs are anticipated to treat Existing Sources during this permit cycle.

12.0 PUBLIC COMMENTS ON DRAFT ACTION PLAN (GENERAL PERMIT REQUIREMENTS)

This section describes the public comment process and period that will be used to advertise the Chesapeake Bay TMDL Action Plan to the public. In accordance with Virginia Small MS4 General Permit requirements, ANC must provide an opportunity for receipt and consideration of public comment on the Chesapeake Bay TMDL Action Plan. The public comment process and period must be described in this section of the Chesapeake Bay TMDL Action Plan, including how the process was advertised to the public. As detailed in the MS4 Program Plan, the "public" for ANC is defined as the annual employee and visitor population.

ANC will solicit feedback from the public on its Chesapeake Bay TMDL Action Plan. Feedback mechanisms may consist of feedback from employees via email to the appropriate

ANC staff and from the public via a feedback form on the website and/or comments via social media.

13.0 DISCUSSION AND RECOMMENDATIONS

This section of the report is not a section specifically required to be submitted as part of the Chesapeake Bay TMDL Action Plan according to the 2013 VADEQ Draft Guidance Memo for the Chesapeake Bay TMDL Action Plan Memorandum, but instead provides useful information to ANC regarding submittal and implementation of the Chesapeake Bay TMDL Action Plan, Annual Report development, and reapplication requirements for the next permit cycle.

13.1 Submittal of Chesapeake Bay TMDL Action Plan

According to Table 1 contained within the Virginia Small MS4 General Permit, ANC must complete the Chesapeake Bay TMDL Action Plan within 24 months of permit coverage. ANC must then submit the Chesapeake Bay TMDL Action Plan with the annual report for the permit year during which the Action Plan is developed. ANC committed to this schedule in its MS4 Program Plan.

13.2 Chesapeake Bay TMDL Action Plan Implementation

Section I.C.3 of the Virginia Small MS4 General Permit describes implementation of the Chesapeake Bay TMDL Action Plan, and requires implementation to be consistent with the schedule provided in the Chesapeake Bay TMDL Action Plan. Compliance with this requirement will represent adequate progress for this permit cycle towards achieving the TMDL wasteload allocations consistent with the assumptions and requirements of the TMDL. Implementation of the following represents implementation to the MEP and demonstrates adequate progress. The MS4 Program Plan discussion in Section 3.0 of this document provides further detail and cross-references where ANC's plans to implement these elements are described within the MS4 Program Plan.

- Implementation of NMPs
- Implementation of MCMs related to construction site stormwater runoff control
- Implementation of the means and methods to address discharges from New Sources
- Implementation of the means and methods sufficient to meet the required reductions of POC loads from Existing Sources.

13.3 Annual Reports

After submittal of Chesapeake Bay TMDL Action Plan, each subsequent annual report will include the following information related to the Chesapeake Bay TMDL Action Plan, where and when applicable:

- 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 solids;

- A list of control measures, in an electronic format provided by VADEQ, that were implemented during the reporting period and the estimated reduction achieved by the control. For stormwater management controls, the report will include the information required in Section II.B.5.e of the Virginia Small MS4 General Permit and will include whether an existing stormwater management control was retrofitted, and if so, the existing stormwater management control type retrofit used; and

- 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 TN, TP, and TSS.

13.4 Reapplication of Chesapeake Bay TMDL Action Plan

During reapplication for the next Virginia Small MS4 General Permit cycle (1 July 2018 through 30 June 2023), ANC will address any modifications to the Chesapeake Bay TMDL Action Plan or WIP developed during the term of their most recent permit coverage. ANC will provide:

- Documentation that sufficient control measures were implemented to meet the identified compliance target. A list of all temporary credits or offsets that were purchased to meet compliance must be provided during reapplication, and a schedule of implementation to ensure permanent reduction, if applicable.

- A Draft second phase Chesapeake Bay TMDL Action Plan designed to reduce the existing POC loads as follows:
  - Existing POC loads (included in the 2000 U.S. Census Bureau urbanized areas) must be reduced an additional seven times the required reductions in loading rates using Table 3b in the Virginia Small MS4 General Permit;
  - Existing expanded sources (identified in the U.S. Census Bureau 2010 urbanized areas) must be reduced by an additional eight times the required reductions in loading rates using Table 3b in Virginia Small MS4 General Permit;
  - An additional 35 percent reduction in New Sources developed between 2009 and 2014 and for which the land use cover condition was > 16 percent; and,
  - Accounts for any modifications to the applicable loading rates as a result of any TMDL modification.

Permittees are required to reduce POC loads by a 40 percent reduction in pollutant loading rate during the next permit cycle for both Existing Sources and expanded areas. ANC will not have expanded areas, however, as these are defined by changes in urbanized areas defined by the U.S. Census. ANC's property was designated at 100 percent urban in both the

2000 and 2010 U.S. Census, and therefore ANC's property boundary is used to define the extent of its MS4.

The NDCEE has determined from VADEQ (Brooks, 2014), that ANC should consider the 30 June 2009 land use condition for property acquired after 30 June 2009 when they acquire additional land during future permit cycles. Therefore, any new property will be viewed by VADEQ as an Existing Source for compliance purposes, and redevelopment of that land will be viewed as a New Source.

Importantly, it must be noted that ANC obtains and complies with the Virginia Construction General Permits for its construction projects, and has not adopted an average land use cover of >16 percent impervious cover under the Chesapeake Bay Preservation Act. Therefore, as the NDCEE has determined from discussions with VADEQ (Brooks, 2014), ANC will not be required to make additional offsets for New Sources under the Chesapeake Bay TMDL Action Plan for compliance with the Virginia Small MS4 General Permit for New Sources initiating construction between 30 June 2009 and 1 July 2014, or for New Sources initiating construction on or after 1 July 2014.

14.0 REFERENCES

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APPENDIX A

Retrofit Removal Adjustor Curves

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Retrofit Removal Adjustor Curves

Schueler and Lane (2012) and an expert panel developed a retrofit reporting criteria for the Chesapeake Stormwater Network, which is recommended for use in the 2013 VADEQ Draft Guidance Memo for determining removal rates for existing best management practices (BMPs) that do not meet Virginia Stormwater BMP Clearinghouse requirements. Schueler and Lane (2012) list the approved BMPs for utilizing this methodology. The first step in the method provided in Schueler and Lane (2012) is to calculate the treated runoff depth. A table provided in Schueler and Lane (2012) categorizes the BMPs in either a runoff reduction (RR) or stormwater treatment (ST) category, where the RR or ST category is based on the primary treatment practice employed by the BMP.

Three adjustor curves, one each for total nitrogen (TN), total phosphorus (TP) and total suspended solids (TSS), show an RR curve and an ST curve, are provided in Schueler and Lane (2012), and shown below. The pollutant removal efficiencies for a BMP can be found by locating the points on the curves for the appropriate BMP type that corresponds to the calculated treated runoff depth. The TP adjustor curve below demonstrates how to obtain the TP removal for a runoff depth of 0.5 inches for a RR classified BMP.

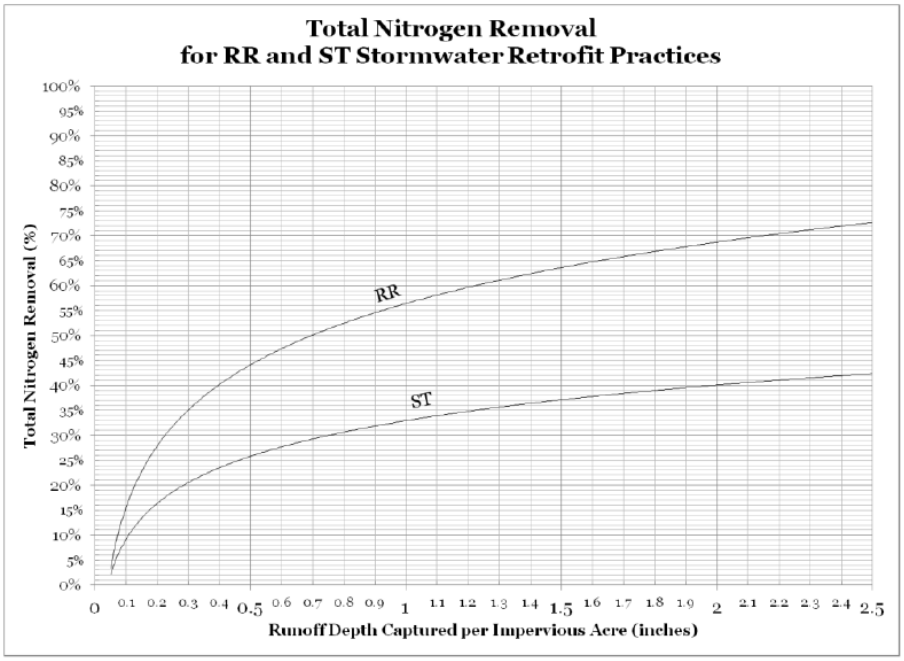

Figure A-1. Retrofit Removal Adjustor Curve for Total Nitrogen

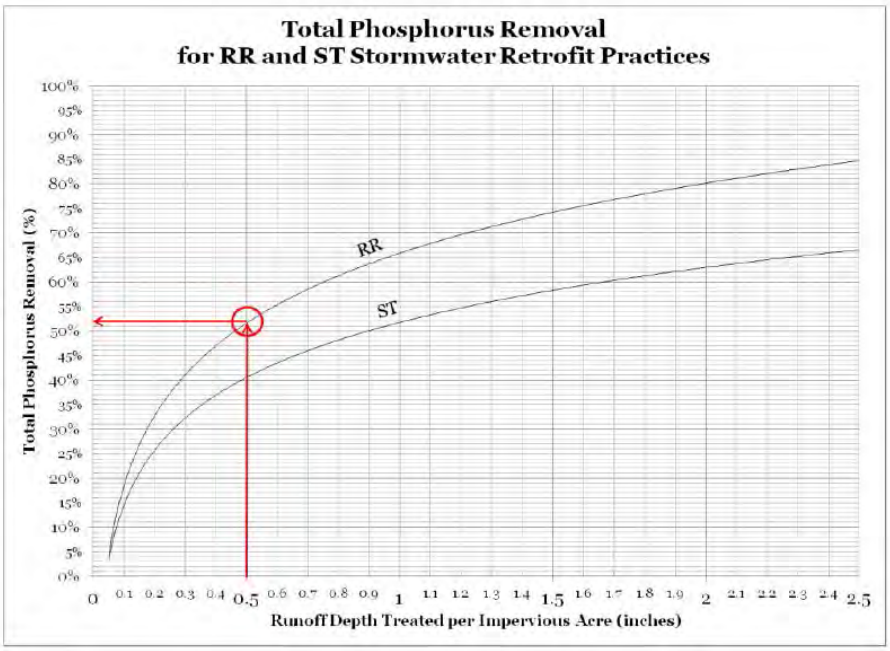

Figure A-2. Retrofit Removal Adjustor Curve for Total Phosphorus

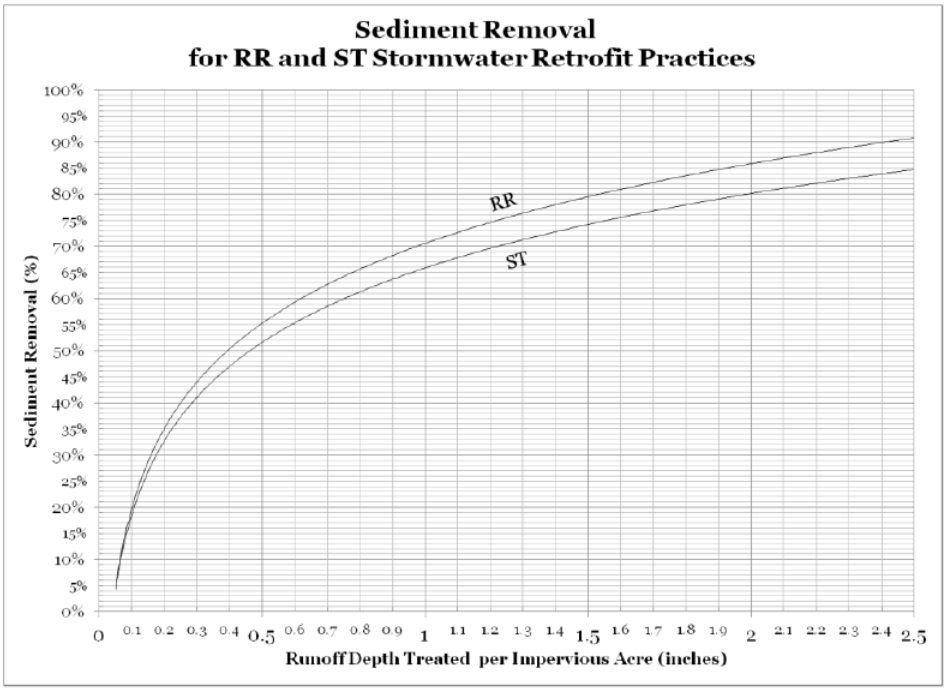

Figure A-3. Retrofit Removal Adjustor Curve for Total Suspended Solids

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APPENDIX B

Existing Source Loads and Reductions from Existing BMPs and Planned BMPs

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Source Loads and Load Reductions for Potomac River Basin Watersheds

Subsource	Pollutant	Total Exist. Acres Served by MS4 (6/30/09)	2009 EOS Loading Rates (lbs/ac) (1)	Estimated Total POC Load Based on 2009 Progress Run (lbs)	This Permit Cycle Required Reduction in Loading Rate (lbs/ac) (1)	Total Reduction *Required* this Permit Cycle (lbs)	Total Reduction *Achieved* (from Existing BMPs) First Permit Cycle (lbs)	Total Reduction *Planned* First Permit Cycle (lbs) from Planned BMPs	GRAND TOTAL Reductions First Permit Cycle (lbs) from Existing and Planned BMPs
Regulated Urban Impervious	Nitrogen	73.80	16.86	1,244.27	0.08	5.90			
Regulated Urban Pervious		528.80	10.07	5,325.02	0.03	15.86			
		TOTALS FOR NITROGEN:		6,569.28	N/A	**21.77**	395.26	394.06	**789.32**
Regulated Urban Impervious	Phosphorous	73.80	1.62	119.56	0.01	0.74			
Regulated Urban Pervious		528.80	0.41	216.81	0.001	0.53			
		TOTALS FOR PHOSPHORUS:		336.36	N/A	**1.27**	120.50	130.09	**250.59**
Regulated Urban Impervious	Total Suspended Solids	73.80	1,171.32	86,443.42	11.71	864.20			
Regulated Urban Pervious		528.80	175.80	92,963.04	0.77	407.18			
		TOTALS FOR TOTAL SUSPENDED SOLIDS:		179,406.46	N/A	**1,271.37**	165,582.00	103,455.73	**269,037.73**

(1) EOS indicated Edge of Stream. EOS Loading rates and First Permit Cycle Required Reduction in Loading Rate from Virginia General MS4 Permit Section I.C.2.a.(4)

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Load Reductions for Existing BMPs Treating Existing Sources (Land Use as of June 30, 2009)

Existing BMP Type	Year Installed	Location	Subsource	Pollutant	Acres Served by BMP	EOS[2] Loading Rates (lbs/ac)	EOS Load (lbs)	Reduction Efficiencies	Total Load Reductions (lbs)	Comments
BMP ANC Location / Type										
Vacuum-type sweeper used on all roads, not parking lots, once or twice a week. Contents dumpted in solid waste dumpster	2014	Roadways throughout ANC	Regulated Urban Impervious	Nitrogen	162,000	N/A	N/A	0.18%	291.6	2009-2014 BMP ELIGIBLE FOR CREDIT BECAUSE IT TREATS LAND USE EXISTING IN 2009. Assume sweeping occurs 5 days/week and avg. 8 months/yr = 160 days Estimate 0.5 CY material collected each day. Unit wt. of material = 75 #/CF Wt. of material collected per day = 0.5 CY *27 CF/CY*75 #/CF = 1012.5 #/day Annual wt. of material = 1012.5 #/day * 160 days = 162,000 lbs BMP not measured in TA acres but in lbs of stret sweepings collected. Load reduction based on mass reduction (percentage of pounds removed).
			Regulated Urban Pervious		LBS	N/A	N/A	0.00%	0.0	
			Regulated Urban Impervious	Phosphorous	162,000	N/A	N/A	0.07%	113.4	
			Regulated Urban Pervious		LBS	N/A	N/A	0.00%	0.0	
			Regulated Urban Impervious	Total Suspended Solids	162,000	N/A	N/A	100.00%	162,000.0	
			Regulated Urban Pervious		LBS	N/A	N/A	0.00%	0.0	
OWS 2	2013	Bldg. 117	Regulated Urban Impervious	Nitrogen	0.30	16.86	5.1	5.00%	0.3	2009-2014 BMP ELIGIBLE FOR CREDIT BECAUSE IT TREATS LAND USE EXISTING IN 2009. No classification for OWS in adjustor curve documents. Use Ches. Bay Efficiencies (Table 1b DEQ Guidance Memo)
			Regulated Urban Pervious		0.00	10.07	0.0	5.00%	0.0	
			Regulated Urban Impervious	Phosphorous	0.30	1.62	0.5	10.00%	0.05	
			Regulated Urban Pervious		0.00	0.41	0.0	10.00%	0.0	
			Regulated Urban Impervious	Total Suspended Solids	0.30	1171.32	351.4	10.00%	35.1	
			Regulated Urban Pervious		0.00	175.8	0.0	10.00%	0.0	
Stormceptor 3	2013	Columbarium 9 (North)	N/A	N/A	N/A	N/A	N/A	N/A	0.0	2009-2014 BMP **NOT** ELIGIBLE FOR CREDIT BECAUSE IT TREATS LAND USE REDEVELOPED AFTER 2009.
Stormceptor 4	2013	Columbarium 9 (South)	N/A	N/A	N/A	N/A	N/A	N/A	0.0	2009-2014 BMP **NOT** ELIGIBLE FOR CREDIT BECAUSE IT TREATS LAND USE REDEVELOPED AFTER 2009.
Permeable Pavement, no underdrain, with gravel	2012	Sidewalk along Eisenhower Ave	Regulated Urban Impervious	Nitrogen	0.36	16.86	6.1	65.00%	3.9	2009-2014 BMP ELIGIBLE FOR CREDIT BECAUSE IT TREATS LAND USE EXISTING IN 2009. Treatment volume based on 4" gravel bed under permeable pavement. Adjustor curves used to determine removal efficiencies
			Regulated Urban Pervious		0.00	10.07	0.0	65.00%	0.0	
			Regulated Urban Impervious	Phosphorous	0.36	1.62	0.6	75.00%	0.4	
			Regulated Urban Pervious		0.00	0.41	0.0	75.00%	0.0	
			Regulated Urban Impervious	Total Suspended Solids	0.36	1171.32	421.7	80.00%	337.3	
			Regulated Urban Pervious		0.00	175.8	0.0	80.00%	0.0	

Arlington National Cemetery

Load Reductions for Existing BMPs Treating Existing Sources (Land Use as of June 30, 2009)

Existing BMP Type	Year Installed	Location	Subsource	Pollutant	Acres Served by BMP	EOS[2] Loading Rates (lbs/ac)	EOS Load (lbs)	Reduction Efficiencies	Total Load Reductions (lbs)	Comments
Rain Garden 1, No underdrain	2012	Bldg. 123	N/A	N/A	N/A	N/A	N/A	N/A	0.0	2009-2014 BMP **NOT** ELIGIBLE FOR CREDIT BECAUSE IT TREATS LAND USE REDEVELOPED AFTER 2009.
Rain Garden 2, No underdrain	2012	Bldg. 123	Regulated Urban Impervious	Nitrogen	0.16	16.86	2.7	35.00%	0.9	2009-2014 BMP ELIGIBLE FOR **PARTIAL** CREDIT BECAUSE IT TREATS SOME LAND USE EXISTING IN 2009 THAT REMAINED UNCHANGED DURING THE DEVELOPMENT PROJECT ASSOCIATED WITH THIS RAIN GARDEN. Acreage values provided in this table are those located inside the treatment area for this BMP according to asbuilt plans, but acreage that existed outside the limit of disturbance for the project (therefore, acreage that was existing in 2009 and that was not altered during construction). This is the only acreage within the TA for this BMP that is eligible for credit. BMP volume based on info from asbuilt plans. Impervious area from GIS data. Used this info and adjustor curves to obrain removal efficiencies.
			Regulated Urban Pervious		0.09	10.07	0.9	35.00%	0.3	
			Regulated Urban Impervious	Phosphorous	0.16	1.62	0.3	40.00%	0.1	
			Regulated Urban Pervious		0.09	0.41	0.0	40.00%	0.01	
			Regulated Urban Impervious	Total suspended Solids	0.16	1171.32	187.4	45.00%	84.3	
			Regulated Urban Pervious		0.09	175.8	15.8	45.00%	7.1	
Rain Garden 3, No underdrain	2012	Bldg. 123	N/A	N/A	N/A	N/A	N/A	N/A	0.0	2009-2014 BMP **NOT** ELIGIBLE FOR CREDIT BECAUSE IT TREATS LAND USE REDEVELOPED AFTER 2009.
Stormceptor 5	2006	North of McClellan Circle - (near Niche Wall)	Regulated Urban Impervious	Nitrogen	1.50	16.86	25.3	5.00%	1.3	Max. area for the STC 2400 is 2.0 acres. Per plan sheets the Stormceptor treats 1.5 impervious ac; therefore, use 1.5 ac. as effective TA Used Ches. Bay Efficiencies (Table 1b DEQ Guidance Memo)
			Regulated Urban Pervious		0.00	10.07	0.0	5.00%	0.0	
			Regulated Urban Impervious	Phosphorous	1.50	1.62	2.4	10.00%	0.2	
			Regulated Urban Pervious		0.00	0.41	0.0	10.00%	0.0	
			Regulated Urban Impervious	Total Suspended Solids	1.50	1171.32	1757.0	10.00%	175.7	
			Regulated Urban Pervious		0.00	175.8	0.0	10.00%	0.0	

Arlington National Cemetery

Load Reductions for Existing BMPs Treating Existing Sources (Land Use as of June 30, 2009)

Existing BMP Type	Year Installed	Location	Subsource	Pollutant	Acres Served by BMP	EOS[2] Loading Rates (lbs/ac)	EOS Load (lbs)	Reduction Efficiencies	Total Load Reductions (lbs)	Comments
Stormceptor 6	2006	Southeast of McClellan Circle	Regulated Urban Impervious	Nitrogen	1.43	16.86	24.1	5.00%	1.2	Max. area for the STC 1800 is 1.5 acres. Per plan sheets the Stormceptor treats 1.43 impervious ac; therefore, use 1.43 ac. as effective TA Used Ches. Bay Efficiencies (Table 1b DEQ Guidance Memo)
			Regulated Urban Pervious		0.00	10.07	0.0	5.00%	0.0	
			Regulated Urban Impervious	Phosphorous	1.43	1.62	2.3	10.00%	0.2	
			Regulated Urban Pervious		0.00	0.41	0.0	10.00%	0.0	
			Regulated Urban Impervious	Total Suspended Solids	1.43	1171.32	1675.0	10.00%	167.5	
			Regulated Urban Pervious		0.00	175.8	0.0	10.00%	0.0	
Stormceptor 1	2002-2003	Columbarium 7	Regulated Urban Impervious	Nitrogen	1.05	16.86	17.7	5.00%	0.9	Max. area for the STC 1800 is 1.5 acres. Actual TA is 1.05 ac per plans. Used Ches. Bay Efficiencies (Table 1b DEQ Guidance Memo)
			Regulated Urban Pervious		0.00	10.07	0.0	5.00%	0.0	
			Regulated Urban Impervious	Phosphorous	1.05	1.62	1.7	10.00%	0.2	
			Regulated Urban Pervious		0.00	0.41	0.0	10.00%	0.0	
			Regulated Urban Impervious	Total Suspended Solids	1.05	1171.32	1229.9	10.00%	123.0	
			Regulated Urban Pervious		0.00	175.8	0.0	10.00%	0.0	
Stormceptor 2	2002-2003	Columbarium 8	Regulated Urban Impervious	Nitrogen	0.98	16.86	16.5	5.00%	0.8	Max. area for the STC 1800 is 1.5 acres. Actual TA is 0.98 imp acres per plans. Used Ches. Bay Efficiencies (Table 1b DEQ Guidance Memo)
			Regulated Urban Pervious		0.00	10.07	0.0	5.00%	0.0	
			Regulated Urban Impervious	Phosphorous	0.98	1.62	1.6	10.00%	0.2	
			Regulated Urban Pervious		0.00	0.41	0.0	10.00%	0.0	
			Regulated Urban Impervious	Total Suspended Solids	0.98	1171.32	1147.9	10.00%	114.8	
			Regulated Urban Pervious		0.00	175.8	0.0	10.00%	0.0	
Sand Filter	1998	Northern Columbariums	Regulated Urban Impervious	Nitrogen	0.37	16.86	6.2	40.00%	2.5	No specific design details are available, therefore adjustor curves cannot be used. Used Ches. Bay Efficiencies (Table 1b DEQ Guidance Memo)
			Regulated Urban Pervious		2.11	10.07	21.2	40.00%	8.5	
			Regulated Urban Impervious	Phosphorous	0.37	1.62	0.6	60.00%	0.4	
			Regulated Urban Pervious		2.11	0.41	0.9	60.00%	0.5	
			Regulated Urban Impervious	Total Suspended Solids	0.37	1171.32	433.4	80.00%	346.7	
			Regulated Urban Pervious		2.11	175.8	370.9	80.00%	296.8	

Arlington National Cemetery

Load Reductions for Existing BMPs Treating Existing Sources (Land Use as of June 30, 2009)

Existing BMP Type	Year Installed	Location	Subsource	Pollutant	Acres Served by BMP	EOS[2] Loading Rates (lbs/ac)	EOS Load (lbs)	Reduction Efficiencies	Total Load Reductions (lbs)	Comments
OWS 1	1996	Bldg. 123	Regulated Urban Impervious	Nitrogen	1.55	16.86	26.1	5.00%	1.3	Land uses acreages in this TA represent 2009 land use conditions. After 2009, additional development occurred in this area and resulted in pervious acreage in this TA being converted to impervious acreage. However, because that development occurred after 2009, credits associated with providing treatment to those additional impervious acres are not eligible for credit. No classification for OWS in adjustor curve documents. Used Ches. Bay Efficiencies (Table 1b DEQ Guidance Memo).
			Regulated Urban Pervious		0.88	10.07	8.9	5.00%	0.4	
			Regulated Urban Impervious	Phosphorous	1.55	1.62	2.5	10.00%	0.3	
			Regulated Urban Pervious		0.88	0.41	0.4	10.00%	0.04	
			Regulated Urban Impervious	Total Suspended Solids	1.55	1171.32	1815.5	10.00%	181.6	
			Regulated Urban Pervious		0.88	175.8	154.7	10.00%	15.5	
Underground Stormwater Chamber	1996	Bldg. 123	Regulated Urban Impervious	Nitrogen	1.55	16.86	26.1	5.00%	1.3	Land uses acreages in this TA represent 2009 land use conditions. After 2009, additional development occurred in this area and resulted in pervious acreage in this TA being converted to impervious acreage. However, because that development occurred after 2009, credits associated with providing treatment to those additional impervious acres are not eligible for credit. No classification for underground stormwater chambers in adjustor curve documents. Used Ches. Bay Efficiencies (Table 1b DEQ Guidance Memo).
			Regulated Urban Pervious		0.88	10.07	8.9	5.00%	0.4	
			Regulated Urban Impervious	Phosphorous	1.55	1.62	2.5	10.00%	0.3	
			Regulated Urban Pervious		0.88	0.41	0.4	10.00%	0.04	
			Regulated Urban Impervious	Total Suspended Solids	1.55	1171.32	1815.5	10.00%	181.6	
			Regulated Urban Pervious		0.88	175.8	154.7	10.00%	15.5	
Permeable Pavement, no underdrain, with gravel	2014	Sidewalk near Chapel Gate	Regulated Urban Impervious	Nitrogen	0.03	16.86	0.5	65.00%	0.3	Treatment volume based on 4" gravel bed under permeable pavement. Adjustor curves used to determine removal efficiencies.
			Regulated Urban Pervious		0.00	10.07	0.0	65.00%	0.0	
			Regulated Urban Impervious	Phosphorous	0.03	1.62	0.1	75.00%	0.04	
			Regulated Urban Pervious		0.00	0.41	0.0	75.00%	0.0	
			Regulated Urban Impervious	Total Suspended Solids	0.03	1171.32	36.3	80.00%	29.0	
			Regulated Urban Pervious		0.00	175.8	0.0	80.00%	0.0	

Total Load of Nitrogen Reduced (lbs) **316.1**

Total Load of Phosphorous Reduced (lbs) **116.3**

Total Load of Suspended Solids Reduced (lbs) **164,111.5**

[2]Edge of Stream loading rates for Potomac River basin from the MS4 permit

Arlington National Cemetery
Load Reductions for Past Tree Planting

Existing BMP Type	Year Planted	Location	Subsource	Pollutant	Acres Served by BMP	Reduction Rate (lbs/ac)	Total Load Reductions (lbs)	Comments (2)
Urban Tree Planting (Non-contiguous)	2006	LD90 Development Project	Regulated Urban Pervious	Nitrogen	3.14	7.16	22.5	314 trees planted equivalent to 3.14 acres
			Regulated Urban Pervious	Phosphorus	3.14	0.38	1.2	
			Regulated Urban Pervious	Total Suspended Solids	3.14	132.96	417.5	
Urban Tree Planting (Non-contiguous)	2007	Columbarium Court 7	Regulated Urban Pervious	Nitrogen	0.45	7.16	3.2	45 trees planted equivalent to 0.45 acres
			Regulated Urban Pervious	Phosphorus	0.45	0.38	0.2	
			Regulated Urban Pervious	Total Suspended Solids	0.45	132.96	59.8	
Urban Tree Planting (Non-contiguous)	2009	Niche Wall Plantings along RTE 110 (Outside the Wall)	Regulated Urban Pervious	Nitrogen	2.89	7.16	20.7	289 trees planted equivalent to 2.89 acres
			Regulated Urban Pervious	Phosphorus	2.89	0.38	1.1	
			Regulated Urban Pervious	Total Suspended Solids	2.89	132.96	384.3	
Urban Tree Planting (Non-contiguous)	2011	Niche Wall Plantings (Inside the Wall)	Regulated Urban Pervious	Nitrogen	0.46	7.16	3.3	46 trees planted equivalent to 0.46 acres
			Regulated Urban Pervious	Phosphorus	0.46	0.38	0.2	
			Regulated Urban Pervious	Total Suspended Solids	0.46	132.96	61.2	
Urban Tree Planting (Non-contiguous)	2012	Facility Maintenance Complex and Parking Lot Landscape	Regulated Urban Pervious	Nitrogen	1.11	7.16	7.9	111 trees planted equivalent to 1.11 acres
			Regulated Urban Pervious	Phosphorus	1.11	0.38	0.4	
			Regulated Urban Pervious	Total Suspended Solids	1.11	132.96	147.6	
Urban Tree Planting (Non-contiguous)	2012	Columbarium Court 9 Landscape	Regulated Urban Pervious	Nitrogen	1.69	7.16	12.1	169 trees planted equivalent to 1.69 acres
			Regulated Urban Pervious	Phosphorus	1.69	0.38	0.6	
			Regulated Urban Pervious	Total Suspended Solids	1.69	132.96	224.7	
Urban Tree Planting (Non-contiguous)	2013	"Barrow Pit" Section 61	Regulated Urban Pervious	Nitrogen	0.43	7.16	3.1	43 trees planted equivalent to 0.43 acres
			Regulated Urban Pervious	Phosphorus	0.43	0.38	0.2	
			Regulated Urban Pervious	Total Suspended Solids	0.43	132.96	57.2	
Urban Tree Planting (Non-contiguous)	2014	"Barrow Pit" Section 61	Regulated Urban Pervious	Nitrogen	0.89	7.16	6.4	89 trees planted equivalent to 0.89 acres
			Regulated Urban Pervious	Phosphorus	0.89	0.38	0.3	
			Regulated Urban Pervious	Total Suspended Solids	0.89	132.96	118.3	

Total Load of Nitrogen Reduced (lbs) 79.2
Total Load of Phosphorous Reduced (lbs) 4.2
Total Load of Suspended Solids Reduced (lbs) 1,470.5

(1) Edge of Stream efficiency for land use conversion from pervious to forest for Potomac River Basin (Table 10, July 2013 VDEQ Guidance Memorandum).
(2) Non-contiguous urban tree planting may be credited where 100 trees is equal to 1 acre of tree planting (Page 10, July 2013 VDEQ Guidance Memorandum).

Arlington National Cemetery
Load Reductions for Planned BMPs

Planned BMP Type	Year To Be Installed	Location	Subsource	Pollutant	Acres Served by BMP	EOS[2] Loading Rates (lbs/ac)	EOS Load (lbs)	Reduction Efficiencies	Total Load Reductions (lbs)	Comments
Stream Restoration	2016	Millennium Site	Regulated Urban Impervious/Pervious	Nitrogen	1900.00	N/A	N/A	0.20	380.0	BMP not measured in TA acres but in LF of stream restoration. Load reduction based on mass reduction (lbs removed/LF of stream restored).
					LF	N/A	N/A	0.00	0.0	
			Regulated Urban Impervious/Pervious	Phosphorous	1900.00	N/A	N/A	0.068	129.2	
					LF	N/A	N/A	0.000	0.0	
			Regulated Urban Impervious/Pervious	Total Suspended Solids	1900.00	N/A	N/A	54.25	103,075.0	
					LF	N/A	N/A	0.00	0.0	
Urban Tree Planting (Non-contiguous)	2016	Old Warehouse Area (part of Millennium Site Project)	Regulated Urban Pervious	Nitrogen	1.75	N/A	N/A	7.16	12.5	Estimate 175 trees to be planted on 1.75 acres of pervious land use (mostly dirt); Reduction Efficiency in this case is actually a reduction rate (lbs/ac/yr) based on land use conversion from pervious urban to forest.
			Regulated Urban Pervious	Phosphorous	1.75	N/A	N/A	0.38	0.7	
			Regulated Urban Pervious	Total Suspended Solids	1.75	N/A	N/A	132.96	232.7	
Underground Stormwater Detention Chamber	2016	Chaffee Place Parking Lot (part of Millennium Site Project)	Regulated Urban Impervious	Nitrogen	1.08	16.86	18.2	5.00%	0.91	No classification for underground stormwater chambers in adjustor curve documents. Used Ches. Bay Efficiencies
			Regulated Urban Pervious		1.22	10.07	12.3	5.00%	0.61	
			Regulated Urban Impervious	Phosphorous	1.08	1.62	1.8	10.00%	0.18	
			Regulated Urban Pervious		1.22	0.41	0.5	10.00%	0.05	
			Regulated Urban Impervious	Total Suspended Solids	1.08	1171.32	1266.2	10.00%	126.62	
			Regulated Urban Pervious		1.22	175.8	214.3	10.00%	21.43	

Total Load of Nitrogen Reduced (lbs) 394.1
Total Load of Phosphorous Reduced (lbs) 130.1
Total Load of Suspended Solids Reduced (lbs) 103,455.7

[2]Edge of Stream loading rates for Potomac River basin from the MS4 permit

Bldg 123 Rain Garden Efficiencies

BMP #	Soil Media Depth	Footprint Area	Imp. Area Treated	Storage Volume	Runoff Depth Treated
1	21	4072.7	15485	1781.80625	1.38079916
2	21	1275.1	20057	557.85625	0.333762527
3	21	812.2	19167	355.3375	0.222468305

Storage Volume = (Footprint Area sf) * (Depth ft) * Void Ratio

Runoff Depth Treated (inches) = (Storage Volume ac-ft) * 12 / (Impervious Acres ac-ft)

Note: Void ratio for soil = 0.25

Approx. Efficiency from Adjustor Curves

	TN	TP	TSS
BMP 1	60%	70%	75%
BMP 2	35%	40%	45%
BMP 3	30%	35%	35%

Eisenhower Permeable Pavement

Media Depth (ft)	Footprint Area (SF)	Imp. Area Treated (SF)	Storage Volume (CF)	Runoff Depth Treated (in.)
0.33333333	15504	15504	2067.2	1.6

Storage Volume = (Footprint Area sf) * (Depth ft) * Void Ratio

Runoff Depth Treated (inches) = (Storage Volume ac-ft) * 12 / (Impervious Acres ac-ft)

Note: Void ratio for gravel = 0.4

Approx. Efficiency from Adjustor Curves

TN	TP	TSS
65%	75%	80%

Meigs Drive Permeable Pavement

Media Depth (ft)	Footprint Area (SF)	Imp. Area Treated (SF)	Storage Volume (CF)	Runoff Depth Treated (in.)
0.33333333	1350	1350	180	1.6

Storage Volume = (Footprint Area sf) * (Depth ft) * Void Ratio
Runoff Depth Treated (inches) = (Storage Volume ac-ft) * 12 / (Impervious Acres ac-ft)

Note: Void ratio for gravel = 0.4

Approx. Efficiency from Adjustor Curves

TN	TP	TSS
65%	75%	80%