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Chesapeake Bay
TMDL Action Plan

Hampton Roads Installations
Contract No: N62470-10-D-3000: WE21

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Chesapeake Bay TMDL Action Plan for Hampton Roads Installations

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LIST OF ACRONYMS

Baker	Michael Baker International
BMP	Best Management Practice
CBP	Chesapeake Bay Program
CNRMA	Commander, Navy Region Mid-Atlantic
CWA	Clean Water Act
DEQ	Department of Environmental Quality (Virginia)
DoD	Department of Defense
DON	Department of the Navy
EDB	Extended Detention Basin
EISA	Energy Independence and Security Act
EOS	Edge of Stream
EPA	Environmental Protection Agency (United States)
GIS	Geographic Information Systems
HUC	Hydrologic Unit Code
JEB	Joint Expeditionary Base, Fort Story
LID	Low Impact Development
MCON	Military Construction
MIDLANT	Mid-Atlantic
MS4	Municipal Separate Storm Sewer Systems
MWR	Morale, Welfare, and Recreation
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NPDES	National Pollutant Discharge Elimination System
NSA	Naval Support Activity
NSAP	Naval Support Activity Hampton Roads Portsmouth Annex
NSN	Naval Station Norfolk
OA	Opportunity Assessment
POC	Pollutants of Concern

SOP	Standard Operating Procedure
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
UFC	Unified Facilities Criteria
VDOT	Virginia Department of Transportation
VPDES	Virginia Pollutant Discharge Elimination System
VSMP	Virginia Stormwater Management Program
WIP	Watershed Implementation Plan
WLA	Waste Load Allocation

Executive Summary

This Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan presents Commander, Navy Region Mid-Atlantic's (CNRMA's) plan to meet the requirements found in Section I.C.a of the Virginia Stormwater Management Program (VSMP) General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems. General Permit Number VAR040114 issued on 1 July 2013 is a consolidated or regional five-year permit that encompasses eight installations in the Hampton Roads, Virginia area. The installations include:

- Naval Station Norfolk (excluding Craney Island)
- Naval Support Activity (NSA) Hampton Roads (excluding NSA Northwest)
- Joint Expeditionary Base (JEB) Little Creek
- JEB Fort Story
- Naval Air Station (NAS) Oceana
- NAS Oceana Dam Neck Annex (Dam Neck Annex)
- NSA Hampton Roads Portsmouth Annex (Portsmouth Annex)
- Norfolk Naval Shipyard Scott Center Annex (Scott Center Annex)

The General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4s) outlines a phased approach to addressing the Chesapeake Bay TMDL. Each permittee is responsible for reducing pollutant loads from their regulated MS4 areas. A reduction of five percent is due by the end of the first permit cycle (June 30, 2018); an additional 35 percent reduction by the end of the second permit cycle (June 30, 2023); and the final 60 percent reduction by the end of the third permit cycle (June 30, 2028).

The calculations show that the Best Management Practices (BMPs) installed between January 1, 2006, and June 30, 2014, provide pollutant reductions for the pollutants of concern (POCs) that go beyond the required reductions for the first permit cycle (218.8 lbs/yr for TN, 37.7 lbs/yr for TP, and 25,891 lbs/yr for TSS). Therefore, no additional BMPs are required to be installed before the end of the first permit cycle (June 30, 2018).

This plan also presents a preliminary strategy for implementation of additional BMPs to address pollutant load reductions required in the second permit cycle (July 2018 to July 2023). This strategy is based on current data and approaches and are subject to change if new and/or modified information becomes available. During the second permit cycle, the Hampton Roads installations plan to install structural BMPs at various locations. If every planned BMP is implemented in the second permit cycle, the corresponding POC reductions are expected to fall short of the second permit cycle required reductions. Therefore, planning and investigation into additional BMP installation are needed to meet the second permit cycle reductions.

This Chesapeake Bay TMDL Action Plan was developed using the Chesapeake Bay TMDL Special Condition Guidance (Guidance) issued by Virginia DEQ on May 18, 2015.

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1 Introduction

This Chesapeake Bay TMDL Action Plan presents CNRMA's plan to meet the requirements found in Section I.C.a of the VSMP General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4s). General Permit Number VAR040114 is a consolidated or regional five-year permit that encompasses eight installations that are located within urbanized areas as defined by the 2000 Census mapping and are therefore, deemed regulated MS4s:

- Naval Station Norfolk (excluding Craney Island)
- NSA Hampton Roads (excluding NSA Northwest)
- JEB Little Creek
- JEB Fort Story
- NAS Oceana
- Dam Neck Annex
- Portsmouth Annex
- Scott Center Annex

The current MS4 permit was issued on 1 July 2013. The permit requires development and submittal of a Chesapeake Bay TMDL Action Plan to the Virginia Department of Environmental Quality (DEQ) no later than 24 months after permit coverage is initiated. The Action Plan must be submitted with the Annual Report for the reporting period of July 1, 2014, through June 30, 2015, to DEQ by October 1, 2015.

1.1 Background

In December 1999, the National Pollutant Discharge Elimination System (NPDES) program was expanded to include provisions for discharges from small MS4s. The second phase of the regulations, Stormwater Phase II (64 FR 68722), extended the requirements for NPDES permits to stormwater discharges from:

1) "Small" MS4s serving populations of less than 100,000 people in an "urbanized" area; and
2) Construction activities disturbing between one and five acres of land.

The regulations allowed the Environmental Protection Agency (EPA) to designate the States as Stormwater Permitting Authorities, allowing each authorized State to administer and enforce stormwater requirements consistent with the NPDES program. As a result, stormwater discharges from Phase I and Phase II MS4s are authorized under individual VSMP permits. Under these permits, the MS4 owner/operator must implement a collective series of programs to reduce pollutant discharges from the given storm sewer system to the maximum extent practicable in a manner that protects the water quality of nearby streams, rivers, wetlands, and bays.

1.2 Chesapeake Bay TMDL

The EPA developed the Bay TMDL, or "pollution diet," in December 2010 as an initial step in restoring clean and healthy water in the Chesapeake Bay (Bay) and surrounding streams, lakes, and rivers. The TMDL for the 64,000 square mile watershed was the largest ever developed by EPA and includes land from six states (New York, Pennsylvania, Maryland, Delaware, Virginia, and West Virginia) and the District of Columbia. The TMDL identifies the maximum levels of nitrogen, phosphorus, and sediment that can be discharged into the Bay while still meeting water quality standards. These values represent an overall watershed reduction of 25 percent for nitrogen, 24 percent for phosphorus, and 20 percent for sediment. The TMDL is designed to ensure that the means and methods to restore the Bay are in place by the year 2025, and 60 percent of the means and measures are in place by 2017.

Watershed Implementation Plans (WIPs) outlining the schedule and methods for meeting the pollution allocations have been developed by the six States and the District of Columbia. As of the date of this report, both the Phase I and Phase II WIPs have been developed for all Bay jurisdictions. The Phase II WIPs were prepared after the EPA provided detailed expectations and coordinated extensively with the jurisdictions. See Section 5 of this report for specific information about the Virginia WIP.

This Chesapeake Bay TMDL Action Plan was developed using the Chesapeake Bay TMDL Special Condition Guidance (Guidance) issued by Virginia DEQ on May 18, 2015.

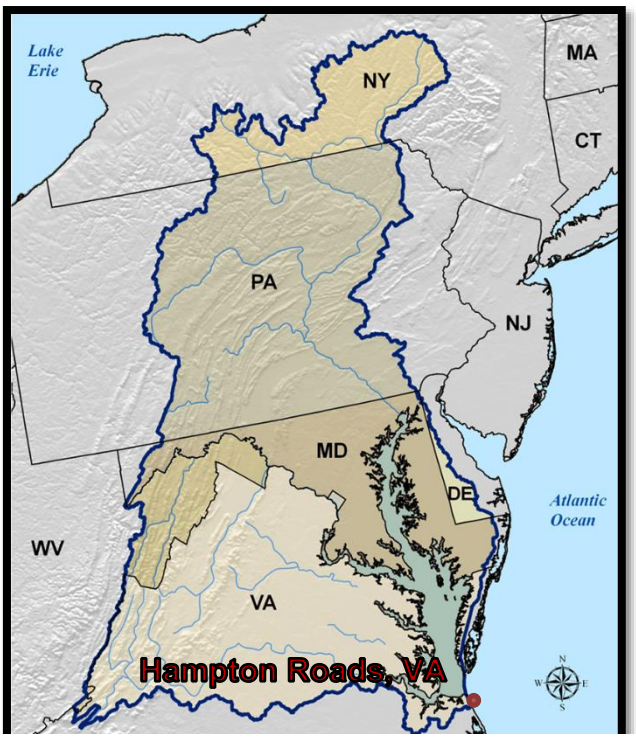

Figure 1-1 Chesapeake Bay Watershed
(Source: Chesapeake Bay Watershed Program)

1.3 Installation Descriptions

The Navy's Regional MS4 Permit includes eight installations in the Hampton Roads region of Virginia. Brief descriptions of the eight individual installations are provided below. Refer to Figure 1-2 for a map illustrating the installation locations.

Joint Expeditionary Base Fort Story

JEB Fort Story is located in the northeast corner of the City of Virginia Beach, Virginia. JEB Fort Story occupies 1,550 acres of sandy trails, cypress swamps, grassy dunes, and soft and hard sand beaches. The receiving waters for JEB Fort Story are the Chesapeake Bay, Broad Bay, and Long Creek. JEB Fort Story is part of JEB Little Creek-Fort Story, which was established on October 1, 2009, the first Joint Base in Hampton Roads. The joint base is bounded to the north by the Chesapeake Bay, to the east by the Atlantic Ocean, and to the south and west by the City of Virginia Beach, Virginia.

The mission of JEB Fort Story is to provide exceptional installation customer service to ensure maximum combat readiness. JEB Fort Story is the prime location and training environment for Army amphibious operations and joint logistics-over-the-shore training events. Notably, the 11th Transportation Battalion is located at JEB Fort Story. The 11th Battalion houses a number of vehicle and equipment maintenance facilities.

Joint Expeditionary Base Little Creek

JEB Little Creek is located between Norfolk and the City of Virginia Beach, Virginia, and borders the Chesapeake Bay. The receiving waters for JEB Little Creek are the Little Creek Channel, Desert Cove, Little Creek Cove, and Lake Bradford. JEB Little Creek is part of JEB Little Creek-Fort Story, which occupies 2,363 acres of sandy trails, grassy dunes, and soft and hard sand beaches. JEB Little Creek-Fort Story was established on October 1, 2009, the first Joint Base in Hampton Roads. The joint base is bounded to the north by the Chesapeake Bay and to the south, east, and west by the City of Virginia Beach, Virginia.

The mission of JEB Little Creek-Fort Story is to provide exceptional installation customer service to ensure maximum combat readiness. JEB Little Creek is comprised of the former Naval Amphibious Base Little Creek and the Army Post of Fort Story. Little Creek began as a dynamic training ground for World War II amphibious forces.

Naval Air Station Oceana

NAS Oceana is located in the eastern section of the City of Virginia Beach, Virginia. The installation occupies approximately 5,412 acres near the Atlantic Ocean and is the U.S. Navy East Coast Master Jet Base. The receiving waters for NAS Oceana are West Neck Creek, Wolfsnare Creek, Great Neck Cree, and London Bridge Creek. The installation is bounded on all sides by the City of Virginia Beach, Virginia.

The primary mission of NAS Oceana is as a Shore-Based Readiness Integrator, providing the facilities, equipment, and personnel to support shore-based readiness, total force readiness, and maintain operational access of Oceana-based forces.

NAS Oceana Dam Neck Annex

Dam Neck Annex is located in the eastern section of the City of Virginia Beach, Virginia and borders the Atlantic coast, 5 miles south of downtown Virginia Beach. Dam Neck has 3.2 miles of some of the most beautiful beach front in Virginia and covers over 1,100 acres of highlands,

marshes, coastal beaches, and sand dunes. The receiving waters for Dam Neck Annex are the Atlantic Ocean, Redwing Lake, and Brinson Inlet Lake. The installation is bounded to the east by the Atlantic Ocean and to the north, south, and west by the City of Virginia Beach.

The mission of Dam Neck Annex is to support the Navy's Atlantic and Pacific Fleet Force of Strike-Fighter Aircraft and Joint/Inter-Agency Operations. Dam Neck Annex was established in 1941 as an anti-aircraft gunnery range to train fleet personnel in the operation of 20 millimeter (mm) and 40 mm anti-aircraft guns. Today, Dam Neck Annex houses 20 tenant commands primarily focused on Navy fleet training and support activities.

Naval Station Norfolk

Naval Station Norfolk is located in the northwest corner of the City of Norfolk, Virginia and is the largest naval complex in the world, encompassing 4,300 acres in the Sewells Point area. The receiving waters for stormwater discharge at Naval Station Norfolk are the Lafayette River, Elizabeth River, James River, Mason Creek, Bousch Creek and Willoughby Bay. The site is bounded on the south and east by the City of Norfolk, on the west by the Elizabeth and James Rivers, and on the north by Willoughby Bay.

The mission of Naval Station Norfolk is to provide support and readiness for the U.S. Atlantic Fleet through activities such as berthing, logistical support, and intermediate maintenance and fleet repair. Naval Station Norfolk includes 14 piers for berthing of ships and submarines; six finger piers; a ship deperming facility; two golf courses; and a marina. The Naval Air Station operates facilities that provide support to aviation activities conducted by the U.S. Navy and the Air Mobility Command of the U.S. Air Force. The Naval Air Station includes an airfield and terminal.

Naval Support Activity Hampton Roads

NSA Hampton Roads, located in the City of Norfolk, Virginia, has the largest concentration of fleet headquarters administrative and communication facilities outside of Washington, D.C. The receiving waters for NSA Hampton Roads are Mason Creek, the Elizabeth River, and Bousch Creek. NSA Hampton Roads is bounded to the north by Naval Station Norfolk, to the west by the Elizabeth River, and to the south and east by the City of Norfolk.

The mission of NSA Hampton Roads is to provide consistent, operationally ready, and secure shore installation support services that allow tenant activities to dedicate their resources to warfighting, forward operations, and combat readiness. The installation includes the following tenant commands: U.S. Fleet Forces Command, Joint Staff Hampton Roads, U.S. Marine Corps Forces Command, Naval Submarine Forces, Atlantic, and Naval Reserve Forces Command.

NSA Hampton Roads Portsmouth Annex

Portsmouth Annex is located in downtown Portsmouth, Virginia and borders the Elizabeth River to the east. The facility encompasses 116 acres and includes the oldest continuously running hospital in the Navy medical system, which began operations in 1830. The receiving waters to NSA Hampton Roads Portsmouth Annex are the Elizabeth River and Scott Creek. The

installation is bounded to the north and east by the Elizabeth River and to the south and west by Portsmouth, Virginia.

This facility contains 26 buildings and the main campus is home to 5,000 men and women. The medical center employs approximately 7,000 doctors, nurses, and support staff and is open 24 hours a day. The staff operates a variety of medical clinics, an emergency room, numerous laboratories, and several research and training facilities. Portsmouth Annex provides medical care to military personnel, retirees, and family members. In addition to two patient care buildings, the facility includes a steam plant, a child development center, several recreation centers, maintenance shops, barracks, offices, and a fire station.

Norfolk Naval Shipyard Scott Center Annex

The Scott Center Annex is located in the City of Portsmouth, Virginia in the southeastern corner of Virginia. The facility is approximately 60 acres in size bordering Paradise Creek (filtering into the Elizabeth River) to the south. The installation is bounded on all sides by the City of Portsmouth, Virginia. This facility contains an auto hobby shop; a bowling alley; a commissary; an exchange; a carwash; morale, welfare, and recreation (MWR) offices and outdoor activities rental; a swimming pool; and a closed landfill. A regional medical prescription refill center is also located on the premises.

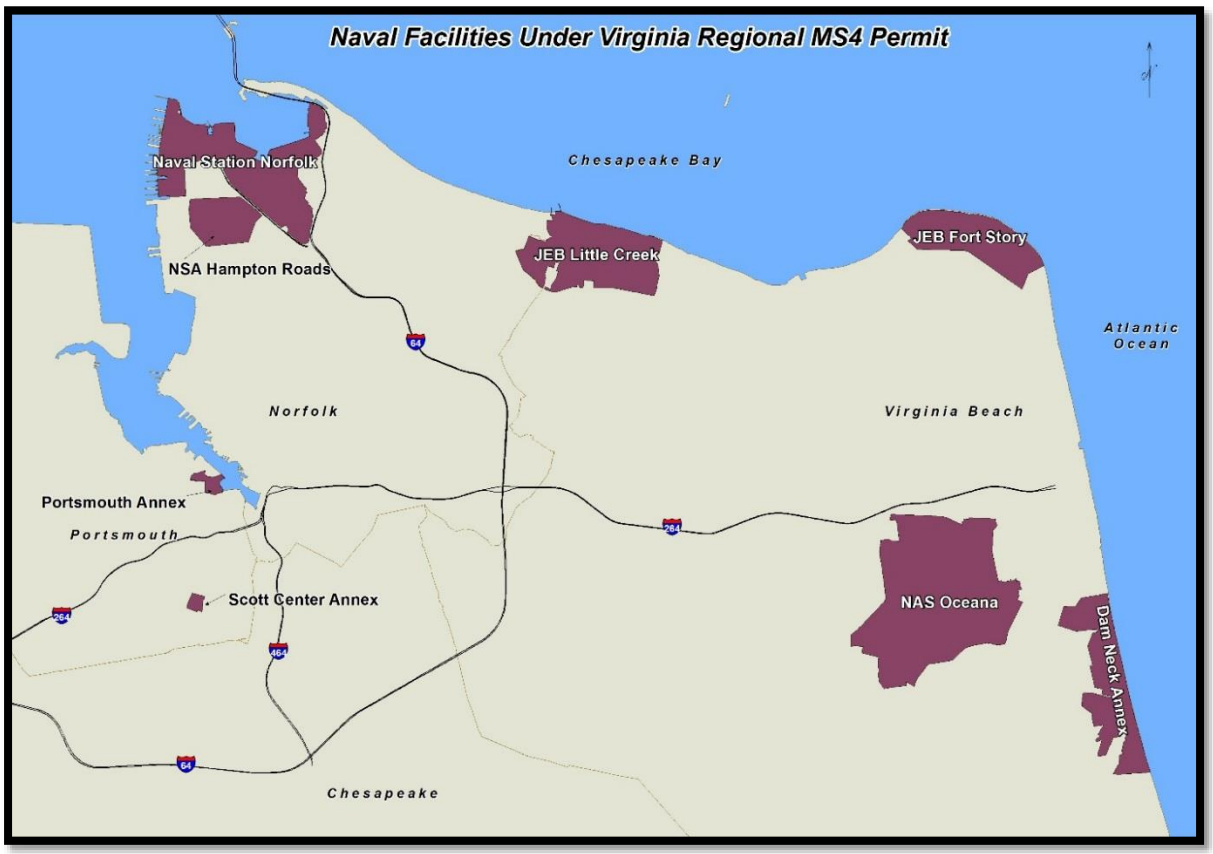

Figure 1-2 Naval Facilities Under Virginia Regional MS4 Permit

1.4 Authorization, Scope, and Purpose

The EPA is leading a major initiative to establish and oversee achievement of a strict "pollution diet" to restore the Bay and its network of local rivers, streams, and creeks. Despite significant and very costly efforts, the Bay fails to comply with the water quality standards established by the Clean Water Act (CWA). Because of this, President Obama issued Executive Order (EO) 13508, *Chesapeake Bay Protection and Restoration*, to intensify Bay cleanup efforts and improve CWA compliance. In addition, the EPA developed the Bay TMDL for three POCs as the first major step in restoring the Bay. The POCs are total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS).

Of the federally owned land within the Chesapeake Bay watershed, the Department of Defense (DoD) is the second largest land owner and is significantly affected by the EO. In response to the requirements of the EO, the Navy conducted stormwater BMP opportunity assessments of all of its installations in the Bay watershed to support the generation of a Chesapeake Bay Action Plan. Naval Facilities Engineering Command Mid-Atlantic (NAVFAC MIDLANT) retained Michael Baker Jr., Inc. (Baker) under Contract No. N62470-10-D-3000, WE21 to provide engineering services to prepare a Chesapeake Bay TMDL Action Plan for the Hampton Roads installations.

The NAVFAC MIDLANT's MS4 permit requires that the MS4 operator develop and submit to Virginia DEQ for review and acceptance an approvable Chesapeake Bay TMDL Action Plan. The TMDL Action Plan is to be developed and implemented for all regulated areas that drain to receiving waters flowing to the Bay.

The purpose of this TMDL Action Plan Report is to outline NAVFAC MIDLANT's plan to address required pollutant reductions as required by the MS4 permit. The Plan presents NAVFAC MIDLANT's tentative schedule to implement BMPs to reduce nitrogen, phosphorus, and sediment associated with existing stormwater discharges from the Hampton Roads MS4.

1.5 Report Organization

The TMDL Action Plan is organized into 11 primary sections including:

- **Section 1** – Introduction (including background information; installation descriptions; authorization, scope, and purpose; and report organization)
- **Section 2** – Current Program (overview of the MS4 Program including regulated areas)
- **Section 3** – Existing and New/Modified Legal Authority (existing and new/modified legal authority for implementing the MS4 Program and addressing the Bay TMDL)
- **Section 4** – Discharges from New Sources (means and methods to address discharges from areas that are developed or redeveloped on or after July 1, 2009)
- **Section 5** – Existing Source Loads and Required Reductions (estimation of the existing annual pollutant loads discharged as of June 30, 2009, and the required POC reductions)

- **Section 6** – Meeting the Required Reductions (means and methods to meet the required reductions, including a brief discussion regarding the next permit cycle)
- **Section 7** – New Sources and Grandfathered Projects (means and methods to offset increased loads from new sources initiating construction between July 1, 2009, and June 30, 2014, and grandfathered projects that begin construction after July 1, 2014)
- **Section 8** – Cost of Implementation (estimate of the expected cost to implement the necessary reductions)
- **Section 9** – Public Comments on Draft Action Plan
- **Section 10** – Reporting and Second Permit Cycle (discusses the annual reports and the pollutant loads for the next permit cycle)
- **Section 11** – References (providing a list of references utilized in development of this plan).

The report also includes the following Appendices:

- **Appendix A** – Existing Pollutant Source Loads and Total Pollutant of Concern Reductions Required
- **Appendix B** – Historical (Existing) BMP List
- **Appendix C** –Existing BMP Calculations, Aggregate Accounting Method Calculations, and Pollutant of Concern Offset Calculations

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2 Current Program

This section addresses Special Condition 1 as found in the permit by describing CNRMA's MS4 program and the characteristics of the Hampton Road's Regulated MS4 Areas. The legal authorities are addressed in Section 3 of this report.

> *(1) A review of the current MS4 program implemented as a requirement of this state permit including a review of the existing legal authorities and the operator's ability to ensure compliance with this special condition;*

CNRMA is one of the few permitted MS4s in Virginia that also has industrial stormwater permits. The industrial permit has numerous additional regulatory requirements regarding stormwater pollution prevention including the development of industrial stormwater pollution prevention plans and completion of annual site compliance evaluations. The below MS4 installations are also covered by an individual or general industrial stormwater Virginia Pollutant Discharge Elimination System (VPDES) permit:

- JEB Fort Story
- JEB Little Creek
- NAS Oceana
- Dam Neck Annex
- Naval Station Norfolk
- NSA Hampton Roads

2.1 MS4 Program Plan

As a requirement in the MS4 permit, CNRMA is required to develop and implement an MS4 Program Plan for the eight installations. The current MS4 Program Plan was updated in July 2013 and presents CNRMA's plan to meet the requirements of its MS4 permit. The plan addresses the six Minimum Control Measures and discusses the requirements regarding the Bay and other TMDLs. One of the components of the MS4 Program Plan is to develop and implement this Chesapeake Bay TMDL Action Plan.

The MS4 Program Plan also discusses other local TMDLs and their corresponding Action Plans. In addition to this Chesapeake Bay TMDL Action Plan, CNRMA is also responsible for developing Action Plans for other water quality impaired waters including West Neck Creek (Upper) and London Bridge Creek at Naval Air Station Oceana, Paradise Creek at Scott Center Annex, and the Elizabeth River main stem (Upper) at NSA Hampton Roads Portsmouth Annex.

2.2 MS4 Regulated Areas and Impervious Areas

For the purposes of this Action Plan, the MS4 regulated area refers to the lands that were used to calculate the pollutant loadings as required by the permit. As a result, the MS4 regulated areas exclude forested areas, wetlands, and open waters.

To determine the MS4 regulated area, the following geographic information systems (GIS) data were used:

- Installation boundary
- Topographic contour data
- Storm drain system including open ditches
- Aerial photography
- Drainage areas for the storm drain system
- Wetlands
- Open water

This information was obtained from NAVFAC MIDLANT's GIS Coordinator who gathered the data from the US Navy GeoReadiness Center. The following steps were completed to delineate the MS4 regulated areas based on DEQ's Guidance:

1. Imported the necessary files as identified above.
2. Identified areas where the runoff would sheet flow to adjacent waters and remove these areas from the MS4 regulated area.
3. Identified areas that are considered forested in accordance with the area (at least 30 meters (m) by 30 m) and density specifications in the Guidance. The measure tool in ArcMap was used to determine the length and width of forested areas. In addition, the tree density was estimated using aerial photographs and engineering judgement. Forested areas that met the Guidance criteria were removed from the MS4 regulated area.
4. Removed wetland areas from the MS4 regulated area. The wetlands that were delineated by the U.S. Army Corps of Engineers were used, when available, otherwise Navy delineated wetlands were used.
5. Removed open water areas from the MS4 regulated area.
6. Removed any agricultural lands from the MS4 regulated area.
7. Incorporated any lands into the MS4 regulated area that had runoff that entered the installation boundary and corresponding MS4 through sheet flow.

DEQ's Guidance also allows for permittees to remove lands regulated under any General VPDES permit that addresses stormwater or under an individual VPDES permit for industrial

stormwater discharges. Although several installations do have either general or individual permits for industrial stormwater discharges, CNRMA has chosen to leave these industrial regulated areas within the MS4 regulated boundary at this time. This decision may be revisited in the next permit cycle.

Table 2-1 provides the total acres of MS4 regulated area per installation. Figures 2-1 through 2-7 present the installation boundary as well as the MS4 regulated boundary for each permitted installation.

Impervious areas within the MS4 regulated area were estimated for each installation to correspond with conditions on July 1, 2009, and June 30, 2014. Impervious area GIS files were obtained from NAVFAC MIDLANT's GIS Coordinator for each installation at dates closest to July 1, 2009 and June 30, 2014. Through GIS processing, the impervious area GIS files were clipped by the MS4 regulated area to obtain the impervious areas within the regulated area. Table 2-1 provides the approximate acres of impervious area within the MS4 regulated area in July 1, 2009, and June 30, 2014. Figures 2-1 through 2-7 present the MS4 Regulated Areas for each installation. Note that Dam Neck Annex is not included in Table 2-1 or the figures because it does not drain to the Bay.

Table 2-1 Regulated Areas and Impervious Regulated Areas

Installation	MS4 Regulated Area (ac)*	June 2014 Impervious Regulated Area (ac)	Percent Impervious
JEB Fort Story	281.1	139.3	50%
JEB Little Creek	1,177.5	568.8	48%
NAS Oceana	1,666.6	306.7	18%
Naval Station Norfolk	2,481.4	1,456.9	59%
NSA Hampton Roads	747.4	299.9	40%
Portsmouth Annex	90.2	51.4	57%
Scott Center Annex	52.8	30.6	58%
TOTALS	**6,497.1**	**2,853.6**	

*The regulated areas do not include land exclusions allowed by DEQ's Guidance (forested lands, agricultural lands, wetlands, open waters, etc.).

2.3 MS4 System, Outfalls, and Receiving Waters

Discussions of the outfalls and the receiving waters of the eight regulated installations covered under the regional MS4 permit are provided below.

JEB Fort Story

JEB Fort Story has several small drainage systems throughout the facility. The storm sewer systems service most of the developed areas and storm runoff is collected by curb and drop inlets and is conveyed to the outfalls though piped and open channel systems. The majority of the stormwater drains to the north and discharges directly to the Bay through five outfalls. The remaining systems either drain off the south side of the facility into an area of woody wetlands or infiltrates into the sandy soils and do not discharge to surface waters. The wetlands drain to Broad Bay, which flows out to Long Creek and into the Bay.

JEB Little Creek

The storm sewer system at JEB Little Creek is defined by several large systems that drain to various water bodies surrounding the facility. The runoff from the western part of the facility is collected by curb and drop inlets and is conveyed by underground pipes then discharged to Little Creek Channel, which discharges to the Bay. The runoff from the central area of the facility is collected by curb and drop inlets and is conveyed by a mix of underground pipes and open channels that discharge to Desert and Little Creek Cove, both of which flow into Little Creek Channel. The eastern part of the facility contains mostly residential houses and the storm runoff is collected by curb and drop inlets and discharged to either Lake Bradford or a large drainage ditch. Lake Bradford drains into the large drainage ditch which flows to the west and eventually discharges to Little Creek Cove.

NAS Oceana

According to the 2010 urbanized area delineated by the US Census Bureau, the majority of the MS4 area that drains to the Bay is not considered urbanized (see Figure 2-3). Due to the large amount of contributing impervious area that the runway and flight line provide, all of what is considered non-urbanized area but still drains to the Bay was included in this TMDL Action Plan. Approximately half of the installation drains to the Bay because the developed area south of the flight line drains to West Neck Creek, which does not drain to the Bay. The storm sewer that drains to the Bay services the runway area. The runoff is collected through drop inlets and is then conveyed through underground pipes that eventually daylight and discharges to the north and west. The north runway runoff then discharges to Wolfsnare Creek and runoff that discharges to the west enters London Bridge Creek. Both Wolfsnare and London Bridge Creek flow into the Lynnhaven River, which discharges into the Bay. A small area in the northeastern corner of the facility drains to Great Neck Creek through open channels. Great Neck Creek flows into Linkhorn Bay, which flows into Broad Bay, which then discharges to Long Creek and finally the Bay.

Dam Neck Annex

All outfalls at Dam Neck Annex drain directly to the Atlantic Ocean and not the Bay. Therefore, the receiving waters will not be discussed in detail because Dam Neck Annex is not subject to the requirements under the Chesapeake Bay TMDL Special Condition.

Naval Station Norfolk

Naval Station Norfolk has a large storm sewer system made of curb and drop inlets and the runoff is conveyed by both underground pipes and open channels. The runoff discharges to several water bodies surrounding the facility. The eastern section of the facility is mostly pier and pier support buildings whose runoff is conveyed by underground pipes to the east and discharged to the Elizabeth River. The north central area includes administrative buildings, helipad areas, and the north section of the runway. The runoff from these areas drains to the north and discharges into Willoughby Bay. The southeast corner of the facility includes the southern half of the runway and wooded area and its runoff is discharged to Mason Creek, which flows back through the storm sewer system to the north and discharges into Willoughby Bay. Willoughby Bay and the Elizabeth River both flow into the Hampton Roads channel and into the Bay.

NSA Hampton Roads

NSA Hampton Roads consists of three facilities: the main NSA Hampton Roads area east of Hampton Boulevard; the South Depot Annex (SDA) area west of Hampton Boulevard, and the Fire Fighting School which is west of the SDA area. The SDA and the Fire Fighting School areas both drain to the west and into the Elizabeth River. Most of the main NSA Hampton Roads area drains north and discharges to Bousch Creek and wetlands that flow into the Naval Station Norfolk system and into Willoughby Bay. The golf course area in the southeast corner drains east into the Naval Station Norfolk system that discharges into Mason Creek and then Willoughby Bay.

NSA Hampton Roads Portsmouth Annex

Portsmouth Annex consists of a large hospital in the central part of the facility, some support buildings to the west and a large park to the east. The drainage system is mainly curb and drop inlets with underground conveyance. There are several outfalls along the perimeter of the facility that discharge to Scott Creek and the Elizabeth River. The helipad and surrounding open space drain to the west into Scott Creek. The remainder of the facility discharges to the Elizabeth River. Scott Creek flows into the Elizabeth River, which flows north and into the Bay.

Scott Center Annex

The storm sewer system for Scott Center Annex has a centralized network of curb and drop inlets and the runoff is conveyed generally south by underground pipes. The storm sewer system on the western third of the facility drains to the south and discharges into a wetland that joins with Paradise Creek. A small portion of the facility north of the old commissary drains to the north and into a concrete channel that flows to the east and out of the installation. The remaining approximately eastern two-thirds of the facility drains to the south and into Paradise Creek. Paradise Creek flows into the Elizabeth River that eventually discharges to the Bay.

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Figure 2-1
JEB Fort Story
Regulated MS4 Boundary
Virginia Beach, Virginia

Legend

- Gate Location
- Storm Sewer
- MS4 Regulated Areas
- Installation Boundary

Michael Baker INTERNATIONAL

1,500 750 0 1,500 Feet

1 inch = 1,500 feet

Chesapeake Bay TMDL Action Plan
Bakeapr Project No: 143392
Contract No: N62470-10-D-3000
Delivery Order No: WE21

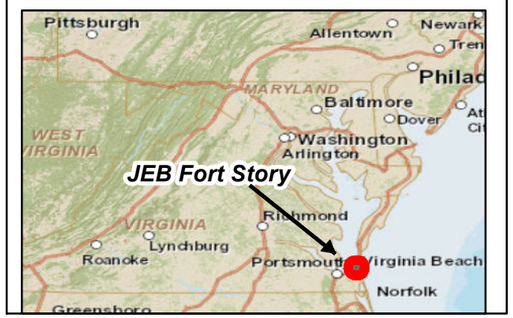


Figure 2-2
JEB Little Creek
Regulated MS4 Boundary
Virginia Beach, Virginia

Legend

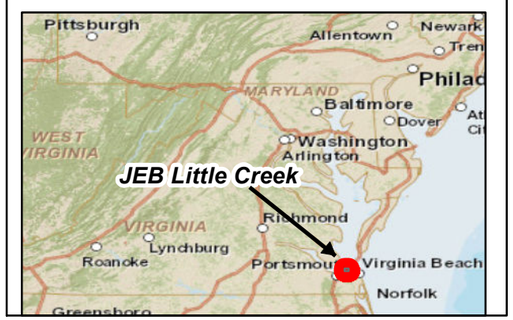
- Gate Location
- Storm Sewer
- MS4 Regulated Areas
- Installation Boundary

Michael Baker INTERNATIONAL

1,500 750 0 1,500 Feet

1 inch = 1,500 feet

Chesapeake Bay TMDL Action Plan
Baker Project No: 143392
Contract No: N62470-10-D-3000
Delivery Order No: WE21



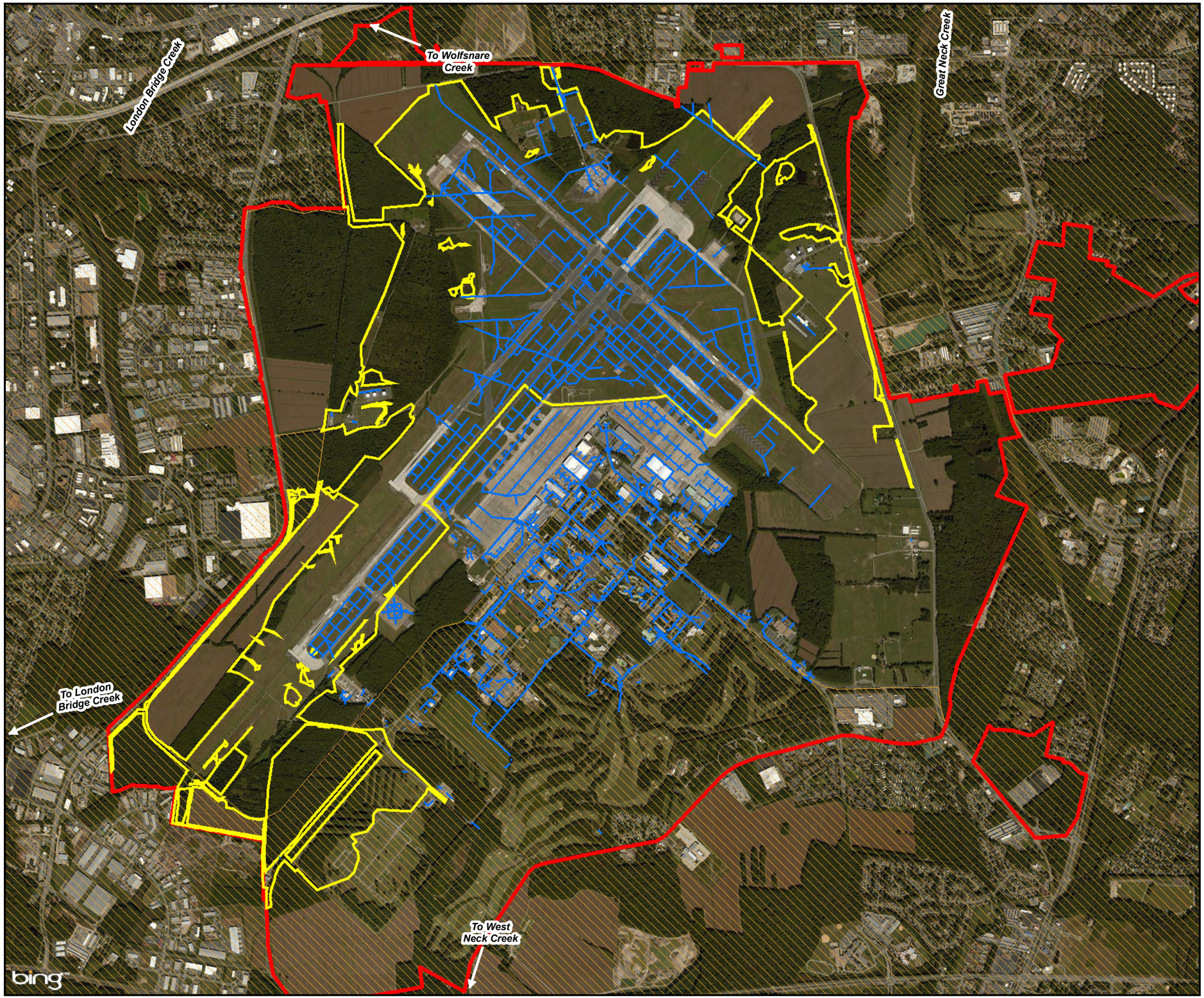


Figure 2-3
NAS Oceana
Regulated MS4 Boundary

Virginia Beach, Virginia

Legend

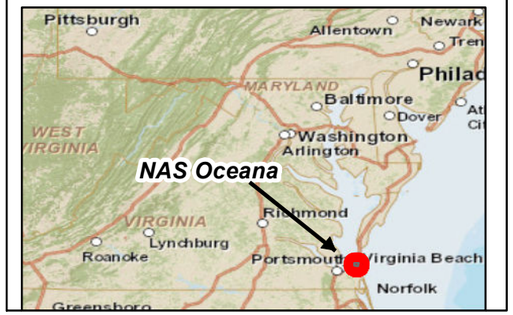
- Gate Location
- Storm Sewer
- MS4 Regulated Areas (within Chesapeake Bay)
- Installation Boundary
- 2010 Census Urbanized Area

Michael Baker INTERNATIONAL

2,000 1,000 0 2,000 Feet

1 inch = 2,000 feet

Chesapeake Bay TMDL Action Plan
Baker Project No: 143392
Contract No: N62470-10-D-3000
Delivery Order No: WE21



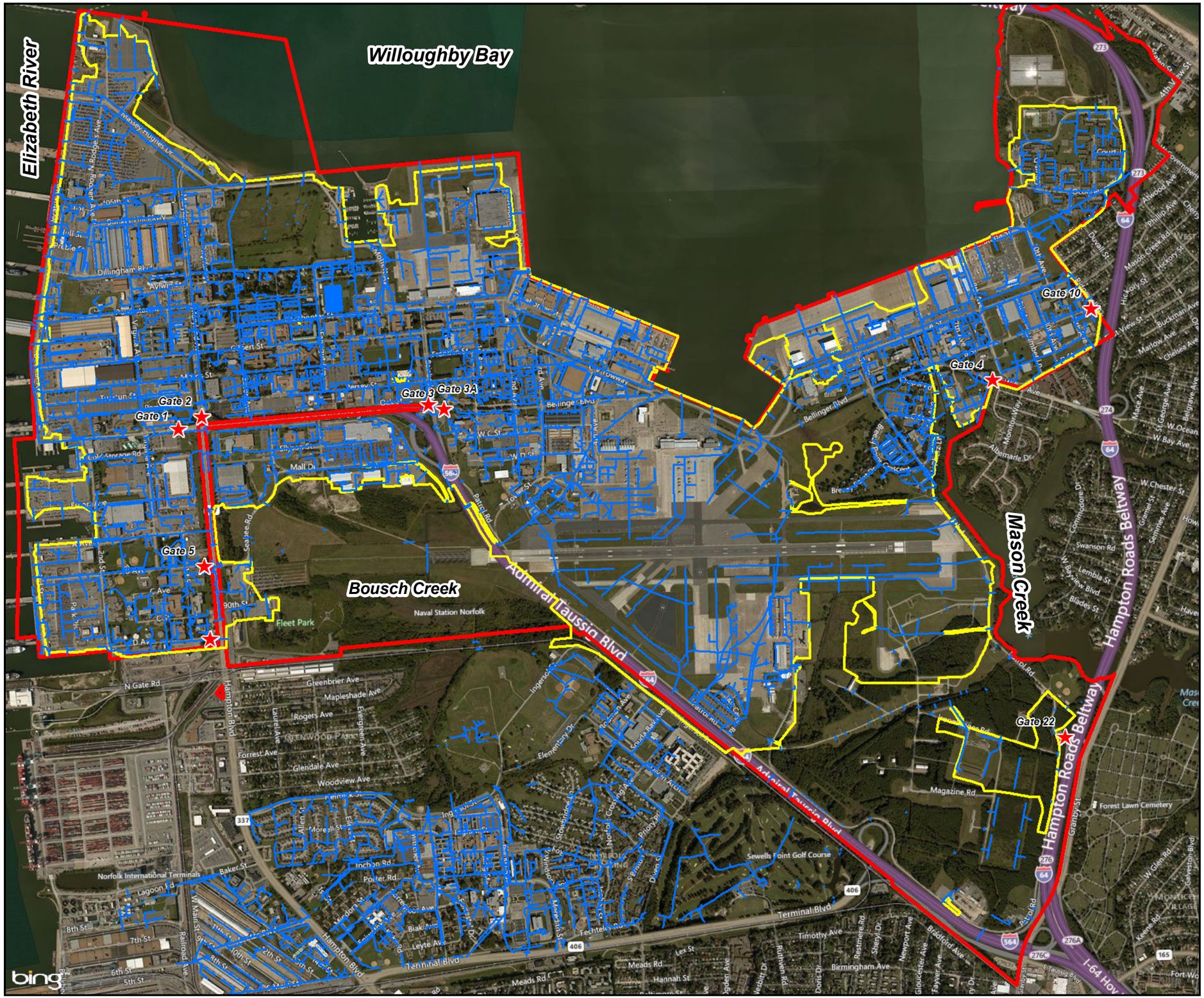


Figure 2-4
Naval Station Norfolk
Regulated MS4 Boundary

Norfolk, Virginia

Legend

- Gate Locations
- Storm Sewer
- MS4 Regulated Areas
- Installation Boundary

Michael Baker INTERNATIONAL

1,650 825 0 1,650 Feet

1 inch = 1,650 feet

Chesapeake Bay TMDL Action Plan
Baker Project No: 143392
Contract No: N62470-10-D-3000
Delivery Order No: WE21

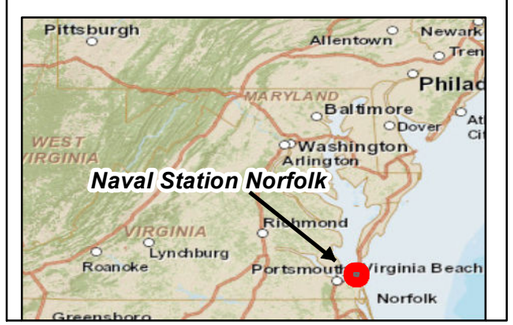
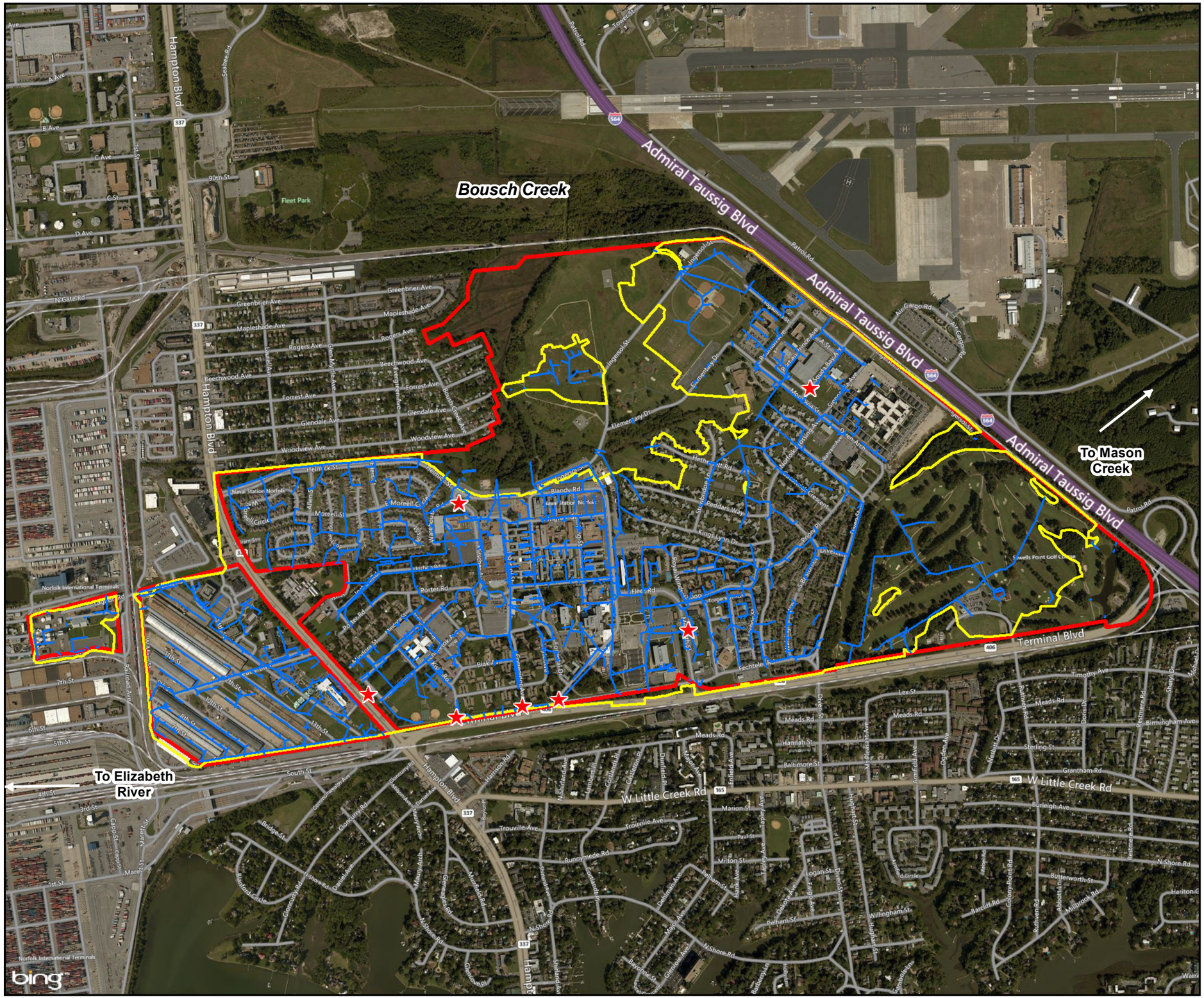


Figure 2-5
NSA Hampton Roads Regulated MS4 Boundary
Norfolk, Virginia



Legend

- ★ Gate Locations
- Storm Sewer
- MS4 Regulated Areas
- Installation Boundary

Michael Baker INTERNATIONAL

1,000 500 0 1,000 Feet

1 inch = 1,100 feet

ChesBay TMDL Action Plan
Baker Project No: 143392
Contract No: N62470-10-D-3000
Delivery Order No: WE21

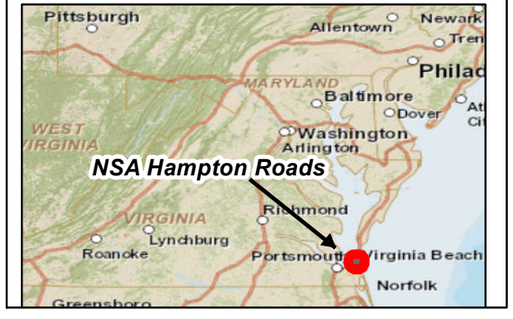


Figure 2-6
Portsmouth Annex
Regulated MS4 Boundary
Portsmouth, Virginia

Legend

- ★ Gate Location
- Storm Sewer
- MS4 Regulated Areas
- Installation Boundary

Michael Baker INTERNATIONAL

350 175 0 350 Feet

1 inch = 350 feet

Chesapeake Bay TMDL Action Plan
Baker Project No: 143392
Contract No: N62470-10-D-3000
Delivery Order No: WE21

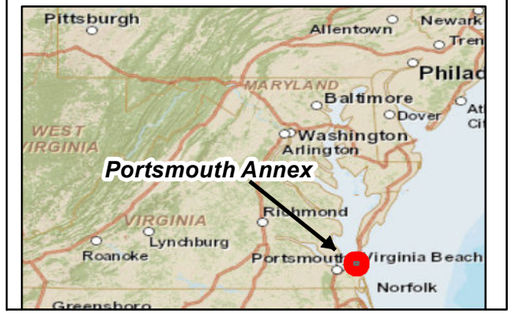


Figure 2-7
Scott Center Annex
Regulated MS4 Boundary
Portsmouth, Virginia

N

Legend

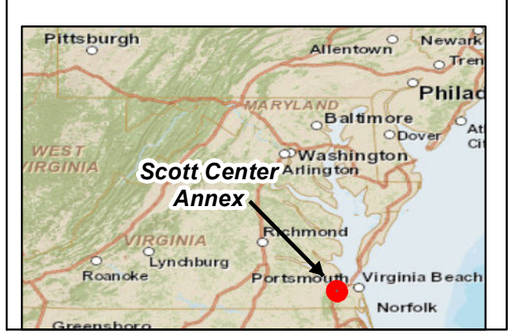
- Gate Location
- Storm Sewer
- MS4 Regulated Areas
- Installation Boundary

Michael Baker INTERNATIONAL

250 125 0 250 Feet

1 inch = 250 feet

ChesBay TMDL Action Plan
Baker Project No: 143392
Contract No: N62470-10-D-3000
Delivery Order No: WE21



3 Existing and New/Modified Legal Authority

This section addresses Special Condition 2 as found in the permit by describing existing and new or modified legal authority.

> *(2) The identification of any new or modified legal authorities such as ordinances, state and other permits, orders, specific contract language, and interjurisdictional agreements implemented or needing to be implemented to meet the requirements of this special condition;*

Because CNRMA is not a municipality, it does not have the authority to issue ordinances; however, CNRMA does have authority over their tenants through their host tenant agreements. In addition, all development and redevelopment inside the installation and annex boundaries must meet local, state, and federal requirements for erosion and sediment control and stormwater management. This includes the Virginia Erosion and Sediment Control Program Regulations, Virginia Pollutant Discharge Elimination System Permit, the Navy Low Impact Development (LID) policy, and Energy Independence and Security Act (EISA) Section 438. The federal policies are described below.

In November 2007, the Department of the Navy (DON) issued an LID policy with the stated objective of "no net increase in stormwater runoff volume and sediment or nutrient loading from major renovation and construction projects." In the policy, major renovation projects are defined as projects having a stormwater components and which exceed $5 million annually when initially approved by the Deputy Assistant Secretary of the Navy. Major construction projects are defined as those exceeding $750K. Approximately one month later, in December 2007, Section 438 of the EISA was issued, which requires that Federal facility projects over 5,000 square feet must "maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to temperature, rate, volume, and duration of flow."

In October 2009, EO 13514 was issued and required all Federal agencies to comply with the requirements of EISA Section 438 and other sustainability measures, such as water and energy conservation. In January 2010, the DoD Policy of Implementing Section 438 of the EISA was issued and included a flowchart with implementation steps. As a result of these policies, the DoD updated the Unified Facilities Criteria (UFC) Low Impact Development Manual in November 2010 to address both EISA and LID.

At this time, no new or modifications to existing policies are expected. Note that the Navy LID policy, EISA, and EO 13514 are not enforceable under the MS4 permit nor this plan. The background on these policies has been provided for informational purposes only.

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4 Discharges from New Sources

This section addresses Special Condition 3 as found in the permit by discussing how discharges from new sources will be addressed.

> *(3) The means and methods that will be utilized to address discharges into the MS4 from new sources;*

Any new construction at the permitted Hampton Roads installations will have to follow EISA and the DON LID policy of no increase in stormwater runoff volume and sediment or nutrient loading through future development and redevelopment projects. The DON has incorporated these policy requirements into all construction project design documents and continually evaluates the effectiveness of the requirements. In addition, the DON documents lessons learned to ensure future projects meet and exceed their stormwater management goals. Note that EISA and the DON LID policy is included in this plan for informational purposes only and is not enforceable under the MS4 permit nor this plan.

CNRMA also adheres to the VSMP regulations for the implementation of post-development stormwater management facilities. In addition, CNRMA has developed a draft set of instructions related to post-construction site runoff control, entitled "COMNAVREG MIDLANT Post Construction Stormwater Runoff Management Instruction." These instructions require minimum post-construction best management practices at installations. The instruction applies to all development and redevelopment activities greater than or equal to one acre in size. The instruction also applies to land development activities for an area smaller than one acre, if the activities are part of a larger common plan of development. It is anticipated that these instructions will be converted to standard operating procedures (SOPs) and updated to conform to the permit requirements.

These regulations and policies should be sufficient to address the necessary stormwater management controls to be implemented during new and redevelopment projects.

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5 Existing Source Loads and Required Reductions

This section addresses Special Conditions 4 and 5 as found in the permit by estimating the existing source loads and the required pollutant load reductions. In addition, a brief description of the Virginia WIP and previous studies is provided.

(4) An estimate of the annual POC loads discharged from the existing sources as of June 30, 2009, based on the 2009 progress run. The operator shall utilize the applicable versions of Tables 2 a-d in this section based on the river basin to which the MS4 discharges by multiplying the total existing acres served by the MS4 on June 30, 2009, and the 2009 Edge of Stream (EOS) loading rate:

(5) A determination of the total pollutant load reductions necessary to reduce the annual POC loads from existing sources utilizing the applicable versions of Tables 3 a-d in this section based on the river basin to which the MS4 discharges. This shall be calculated by multiplying the total existing acres served by the MS4 by the first permit cycle required reduction in loading rate. For the purposes of this determination, the operator shall utilize those existing acres identified by the 2000 U.S. Census Bureau urbanized area and served by the MS4.

5.1 Virginia Watershed Implementation Plan

The Commonwealth of Virginia's Phase II WIP was submitted to the EPA in March 2012. The WIP was developed as part of the Chesapeake Bay TMDL effort. The purpose of the Phase II WIP was to:

- Divide the Bay TMDL allocations into local area targets.
- Work with local partners to help them to better understand their expected contribution to and responsibility for meeting the TMDL allocations.
- Describe how partners will help to reduce loads delivered to the Bay.
- Identify those resources, authorities, and other forms of assistance needed to implement actions that achieve TMDL allocations.
- Provide additional demonstration of reasonable assurance.
- Identify local, State and Federal partners who will assist with achieving nutrient and sediment reductions.
- Describe how the State is working with its key partners.
- Identify State strategies to help facilitate implementation of local strategies.

- Develop clear quantifiable goals.
- Define systems for tracking, verifying, and reporting progress.
- Involve Federal agencies.

The WIP discusses the utilization of the MS4 permit to ensure BMP implementation of existing land development to achieve the necessary reductions equivalent to Level 2 (L2) scoping run reductions. The L2 implementation equates to an average reduction of 9 percent of nitrogen loads, 16 percent of phosphorus loads, and 20 percent of sediment loads from impervious regulated acres, and 6 percent of nitrogen loads, 7.25 percent of phosphorus loads, and 8.75 percent of sediment loads beyond 2009 progress loads and beyond urban nutrient management reductions for pervious regulated acreage.

In addition, the WIP states that MS4 operators will develop a phased Chesapeake Bay Watershed Action Plan in the first permit cycle. The plan will include a review of the baseline program and include an outline of the means and methods that will be used to meet the L2 level necessary for the permit. The phased approach is documented with the reduction of 5 percent of the pollutant loads due by the end of the first permit cycle (June 30, 2018), an additional 35 percent due by the end of the second permit cycle (June 30, 2023), and the final 60 percent due by the end of the third permit cycle (June 30, 2028).

5.2 Opportunity Assessment Studies

Opportunity Assessments (OAs) were conducted at all seven permitted installations that drain to the Bay. The purpose of these OAs was to identify opportunities to strengthen stormwater management. The scope of the study included identifying, analyzing, and evaluating stormwater management opportunities to comply with EO 13508. The following number of opportunities were identified:

- Naval Station Norfolk and NSA Hampton Roads: 217 opportunities
- NAS Oceana: 77 opportunities (3 that drain to the Bay)
- Scott Center Annex: 42 opportunities
- JEB Fort Story: 91 opportunities
- Portsmouth Annex: 47 opportunities
- JEB Little Creek: 163 opportunities

Focus was placed on green infrastructure and LID practices instead of the conventional stormwater management facilities because of DON's focus on using environmentally sustainable solutions to stormwater management and its LID policy. Furthermore, non-LID practices tend to have reduced pollutant reduction efficiency and are therefore a less cost-effective option for implementation activities.

In total, 563 opportunities were identified at locations that would treat runoff to the Bay. These opportunities were ranked based on various criteria including environmental impacts, benefits,

constraints, and costs. NAVFAC MIDLANT reviewed these opportunities and selected several for conceptual designs and more detailed cost estimates.

5.3 Existing Pollutant Source Loads

All of the permitted Hampton Roads installations that drain into the Bay are categorized within the James River Basin, although many of them drain directly to the Bay. The *Draft Fact Sheet for the General Permit for Discharges of Stormwater from MS4s* dated March 12, 2013, was consulted to determine the appropriate basin and corresponding pollutant load calculation table to use from the permit. Table 2 in the *Fact Sheet* presents the 6th order Hydrologic Unit Codes (HUCs) that correspond with the pollutant load reduction table for the four different river basins. The table lists the MS4 permitted installation HUCs as corresponding to the James River Basin.

In the Permit, *Table 2a: Calculation Sheet for Estimating Existing Source Loads for the James River Basin* provides the 2009 Edge of Stream (EOS) loading rate for each pollutant of concern for lands within the James River Basin. Once the total existing acres served by the MS4 (urban impervious and pervious) is known, the estimated pollutant loads based on the 2009 progress run can be computed. Table 5-1 is the completed Table 2a found in the Permit. The values in this table are the combined acreage and pollutant loads for all seven installations that drain to the Bay. For each installation's specific information, please see Appendix A of this document. For a description of the delineation of the urban impervious and pervious regulated areas, see Section 2.2.

Table 5-1 Existing Source Loads for the James River Basin (Permit Table 2a)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	2009 EOS Loading Rate (lbs/acre/yr)	Estimated Total POC Load Based on 2009 Progress Run (lbs/yr)
Regulated Urban Impervious	Nitrogen	2,790	9.39	26,194
Regulated Urban Pervious		3,708	6.99	25,915
Regulated Urban Impervious	Phosphorus	2,790	1.76	4,910
Regulated Urban Pervious		3,708	0.5	1,854
Regulated Urban Impervious	Total Suspended Solids	2,790	676.94	1,888,402
Regulated Urban Pervious		3,708	101.08	374,754

5.4 Required Pollutant Load Reductions

In the Permit, *Table 3a: Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the James River Basin* provides the first permit cycle required reduction loading rate for each POC for lands within the James River Basin. This value represents 5 percent of the total pollutant reduction to be met at the end of the third permit cycle, or by 2028. Once the total existing acres served by the MS4 (urban impervious and pervious) is known, the total reduction required in the first permit cycle can be computed. Table 5-2 is the completed Table 3a found in the Permit. The values in this table are the combined acreage and pollutant loads for all seven installations that drain to the Bay. Table 5-3 presents the sum of the required reductions for the regulated urban impervious and impervious lands per pollutant of concern. For each installation's specific information, please see Appendix A of this document. For a description of the delineation of the urban impervious and pervious regulated areas, see Section 2.2.

Table 5-2 Total POC Reduction Required During the Permit Cycle for the James River Basin (Permit Table 3a)

Subsource	Pollutant	Total Existing Acres Served by MS4 (06/30/09)	First Permit Cycle Required Reduction in Loading Rate (lbs/acre/yr)	Total Reduction Required First Permit Cycle (lbs/yr)
Regulated Urban Impervious	Nitrogen	2,790	0.042255	117.9
Regulated Urban Pervious		3,708	0.02097	77.7
Regulated Urban Impervious	Phosphorus	2,790	0.01408	39.3
Regulated Urban Pervious		3,708	0.0018125	6.7
Regulated Urban Impervious	Total Suspended Solids	2,790	6.7694	18,884
Regulated Urban Pervious		3,708	0.44225	1,640

Table 5-3 Total POC Reductions Required During the Permit Cycle (James River Basin)

	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)
First Permit Cycle Required Reductions (2009)	195.6	46.0	20,524

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6 Meeting the Required Reductions

This section addresses Special Condition 6 as found in the permit by describing the structural BMPs currently installed or likely to be installed to meet the required reductions.

> *(6) The means and methods, such as management practices and retrofit programs that will be utilized to meet the required reductions included in subdivision 2 a (5) of this subsection, and a schedule to achieve those reductions. The schedule should include annual benchmarks to demonstrate the ongoing progress in meeting those reductions;*

6.1 Best Management Practices

The seven permitted installations that drain to the Bay have implemented hundreds of BMPs on their grounds to treat stormwater runoff. The current inventory of BMPs documents 205 water quality treatment devices at regulated MS4 installations that drain to the Bay. This list can be found in Appendix B of this document. Descriptions of the structural BMPs that exist or are likely to be installed at the permitted installations are below. These practices include bioretention, rooftop disconnection, filtering practices, infiltration practices, porous pavement, retention ponds/basins, constructed wetlands, detention ponds, extended detention basins, underground detention, grass channels, dry swales, proprietary devices, green roofs, and reforestation.

<u>Bioretention</u>

Bioretention areas can serve highly impervious drainage areas less than 2 acres in size. Bioretention creates a good environment for runoff reduction, filtration, biological uptake, and microbial activity providing high pollutant removal. Surface runoff is directed into a shallow landscaped depression that incorporates many of the pollutant removal mechanisms that operate in forested ecosystems. The primary component of a bioretention practice is the filter bed, which has filtering media composed of sand, soil, and organic material, with a surface mulch layer. During storms, runoff temporarily ponds 6 to 12 inches above the mulch layer and then rapidly filters through the bed. Normally, the filtered runoff is collected in an underdrain and returned to the storm drain system. The underdrain consists of a perforated pipe in a gravel layer installed along the bottom of the filter bed. A bioretention facility with an underdrain system is commonly referred to as a Bioretention Filter.

<u>Disconnection of Rooftop Runoff</u>

Rooftop disconnection involves managing runoff close to its source by intercepting, infiltrating, filtering, treating, or reusing it as it moves from the impervious surface to the drainage system. Two kinds of disconnection are allowed: (1) simple disconnection, whereby rooftops and/or impervious surfaces are directed to pervious areas, and (2) disconnection leading to an alternate runoff reduction practice(s) adjacent to the roof or impervious area. With proper design

and maintenance, the simple rooftop (impervious area) disconnection options can provide relatively high runoff reduction rates. The runoff reduction achieved by rooftop disconnections can help reduce the overall channel protection and flood control volume for the site.

Filtering Practices (e.g., Organic Media Filter)

Stormwater filters are a useful practice to treat stormwater runoff from small, highly impervious sites. Stormwater filters capture, temporarily store, and treat stormwater runoff by passing it through an engineered filter media, collecting the filtered water in an underdrain, and then returning it to the storm drainage system. The filter consists of two chambers. The first is devoted to settling, and the second serves as a filter bed consisting of sand or another filter media. Stormwater filters provide moderate pollutant removal performance and provide no runoff volume reduction credit. Stormwater filters are a versatile option because they consume very little surface land and have few site restrictions.

Infiltration Practices (e.g., Infiltration Basin, Infiltration Trench)

Infiltration practices use temporary surface or underground storage to allow incoming stormwater runoff to exfiltrate into underlying soils. Runoff first passes through multiple pretreatment mechanisms to trap sediment and organic matter before it reaches the practice. As the stormwater penetrates the underlying soil, chemical and physical adsorption processes remove pollutants. Infiltration practices have the greatest runoff reduction capability of any stormwater practice and are suitable for use in residential and other urban areas where measured soil permeability rates exceed 1/2 inch per hour. To prevent possible groundwater contamination, infiltration should not be utilized at sites designated as stormwater hotspots. When used appropriately, infiltration has a very high runoff volume reduction capability.

Porous Pavement

Porous pavements are alternative paving surfaces that allow stormwater runoff to filter through voids in the pavement surface and into an underlying stone reservoir where it is temporarily stored and/or infiltrated. A variety of permeable pavement surfaces are available including pervious concrete, porous asphalt, and permeable grid pavers and interlocking concrete pavers. While the specific design may vary, all permeable pavements consist of a permeable surface pavement layer, an underlying stone aggregate reservoir layer, and a filter layer or fabric installed on the bottom. The thickness of the reservoir layer is determined by both a structural and hydrologic design analysis. The reservoir layer serves to retain stormwater and also supports the design traffic loads for the pavement. In low-infiltration soils, some or all of the filtered runoff is collected in an underdrain and returned to the storm drain system. If infiltration rates in the native soils permit, porous pavement can be designed without an underdrain to enable full infiltration of runoff.

Porous pavement is typically designed to treat stormwater that falls on the pavement surface area, but it may also be used to accept run-on from small adjacent impervious areas, such as impermeable driving lanes or rooftops. However, careful sediment control is needed for any run-on areas to avoid clogging of the down-gradient porous pavement. Porous pavement has been used at commercial, institutional, and residential sites in spaces that are traditionally

impervious. Porous pavement promotes a high degree of runoff volume reduction and nutrient removal, and it can also reduce the effective impervious cover of a development site.

Retention Ponds/Basins

Retention Ponds/Basins, also known as wet ponds, consist of a permanent pool of water that promotes a better environment for gravitational settling, biological uptake, and microbial activity. Runoff from each new storm enters the pond and partially displaces pool water from previous storms. The pool also acts as a barrier to re-suspension of sediments and other pollutants deposited during prior storms. When sized properly, wet ponds have a residence time that ranges from many days to several weeks depending on the volume of the permanent pool, which allows numerous pollutant removal mechanisms to operate. Wet ponds can also help meet channel protection requirements by utilizing detention storage above the permanent pool and extended detention storage volumes to reduce peak flows from the 1-year design storm using the energy balance method described in the VSMP regulations (4VAC50-60-66).

A wet pond is typically the final element in the roof-to-stream pollutant removal sequence and provides no volume reduction credit. Therefore, it is usually only considered if there is remaining pollutant removal or channel protection volume to manage after all other upland runoff reduction options have been considered.

Constructed Wetlands

Constructed wetlands are shallow basins that receive stormwater runoff for water quality treatment. The constructed wetland permanent pool is typically 6 to 18 inches deep (although it may have greater depths in the forebay and micropool) and possesses variable microtopography to promote dense and diverse wetland cover. Runoff from each new storm displaces runoff from previous storms and the long residence time allows multiple pollutant removal processes to operate. The wetland environment is ideal for gravitational settling, biological uptake, and microbial activity. Constructed wetlands also help meet channel protection requirements by utilizing detention storage above the permanent pool to reduce peak flows from the 1-year design storm using the energy balance method described in the VSMP regulations (4VAC50-60-66).

Constructed wetland is typically the final element in the roof-to-stream pollutant removal sequence and provides no volume reduction credit. Therefore, it is usually only considered if there is remaining pollutant removal or channel protection volume to manage after all other upland runoff reduction options have been considered.

Detention/Dry Ponds

A detention or dry pond consists of a temporary pool of water that is conveyed to the receiving waters over an extended period of time. An undersized outlet structure restricts stormwater flow so that it backs up and is stored within the basin. Most of these ponds have outlets consisting of a riser structure with multiple outlet openings to control different storm events. This practice aims to control peak flow rates, but can also provide water quality benefits. Sediment and other particulate pollutants settle out in the temporary pool of water. Dry ponds

typically include an offline sediment forebay to trap sediment and preserve the capacity of the main treatment cell.

Extended Detention Basins

An Extended Detention Basin (EDB) relies on 24 to 36-hour detention of stormwater runoff after each rain event. An under-sized outlet structure restricts stormwater discharge so it backs up and is stored within the basin. The temporary ponding enables particulate pollutants to settle out and reduces the maximum peak discharge to the downstream channel, thereby reducing the effective shear stress on banks of the receiving stream. EDBs rely on gravitational settling as their primary pollutant removal mechanism. Consequently, they generally provide fair-to-good removal for particulate pollutants, but low or negligible removal for soluble pollutants, such as nitrate and soluble phosphorus. The use of EDB alone generally results in the lowest overall pollutant removal rate of any single stormwater treatment option. Alternatively, an EDB component is combined with wet ponds and constructed wetlands to help maximize pollutant removal rates of those practices.

An EDB is typically the final element in the roof-to-stream pollutant removal sequence and provides limited volume reduction credit (L2 only). Therefore, it is usually only considered if there is remaining treatment volume or channel protection volume to manage after all other upland runoff reduction practices have been considered.

Underground Detention

Similar to EDPs, this practice temporarily detains runoff in an underground storage chamber and releases it at a defined rate through an outlet. The storage chambers rest on stone beds, which serve the dual purpose as a structural component while allowing conveyance and storage of water. Infiltration through the bottom of the storage chambers may also occur as part of this practice, and the system can be modified to limit infiltration. The storage chambers can be concrete vaults or proprietary systems, such as StormTech chambers.

Grass Channels

Grass channels can provide a modest amount of runoff filtering and volume attenuation within the stormwater conveyance system, resulting in the delivery of less runoff and pollutants than a traditional system of curb and gutter, storm drain inlets, and pipes. The performance of grass channels will vary depending on the underlying soil permeability. Grass channels, however, are not capable of providing the same stormwater functions as dry swales because they lack the storage volume and filtering capabilities associated with the engineered soil media. Their runoff reduction performance can be boosted when compost amendments are added to the bottom of the swale. Grass channels are a preferable stormwater conveyance alternative to both curb and gutter and storm drains where development density, topography, and soils permit. Grass channels can also be used to treat runoff from the managed turf areas of turf-intensive land uses, such as sports fields and golf courses, and drainage areas with combined impervious and turf cover (e.g., roads and yards).

Dry Swales

Dry swales are essentially bioretention cells that are shallower, configured as linear channels, and covered with turf or other surface material (other than mulch and ornamental plants). The primary pollutant removal mechanisms operating in swales are settling, filtering infiltration, and plant uptake.

The dry swale is a soil filter system that temporarily stores and then filters the stormwater runoff. Dry swales rely on a pre-mixed soil media filter below the channel that is the same as that used for bioretention. If soils are extremely permeable, runoff infiltrates into underlying soils. In most cases, however, the runoff treated by the soil media flows into an underdrain, which conveys treated runoff back to the conveyance system further downstream. The underdrain system consists of a perforated pipe within a gravel layer on the bottom of the swale, beneath the filter media. Dry swales may appear as simple grass channels with the same shape and turf cover, while others may have more elaborate landscaping. Swales can be planted with turf grass, tall meadow grasses, decorative herbaceous cover, or trees.

Proprietary Devices

Proprietary devices are devices that were designed and developed by a private manufacturer. Typical proprietary devices include Filterra® Tree Box Filters, hydrodynamic catch basin inserts, and Modular Wetlands®. Tree box filters are miniature bioretention areas installed beneath trees. They are an example of an urban micro-practice (<1,000 square feet contributing drainage area) that can be used adjacent to roads, buildings, and sidewalks to provide some level of biofiltration treatment. Hydrodynamic catch basin inserts include a large variety of structures that remove nonpoint source pollutants from runoff. Typically, each structure can provide water quality benefits to small drainage areas (less than 1 acre) and are most useful in combination with other BMPs. Modular wetlands are linear mini bioretention or wetland-type systems that are installed along parking lots, roads, and sidewalks to provide treatment through biofiltration and biological uptake.

Green Roof

Green or vegetated roofs are an alternative roof surface typically consisting of an engineered soil media with vegetation, waterproofing, and drainage materials. Runoff is stored and treated in the soil media before continuing through an underdrain. Plant uptake and evapotranspiration reduce the amount of runoff that enters the underdrain. There are two levels of green roofs: intensive and extensive. Extensive green roofs have growing media depths that range from 2 to 6 inches, while intensive systems have media depths of over 6 inches. This practice, especially the intensive system, will require additional load-bearing capacity for the roof. Low-maintenance plants that do not need supplemental irrigation or fertilization after they are established are generally selected for installation.

It may be possible to install extensive green roofs on buildings with flat roofs without any structural modifications to the existing roof. However, the cost to install these practices is high in comparison with other treatment practices.

Reforestation or Tree Planting

This control measure involves planting trees within the MS4 drainage area. After the trees are planted, it is important to establish a tree maintenance program and provide frequent care of the trees for the first 3 years.

During the OAs (previously described in Section 5.2), several locations for urban tree planting opportunities were developed where landscaping trees could replace pavement. This practice will be considered as a complementary practice with the installation of the planned BMPs as well as during each annual assessment.

Larger areas where reforestation is feasible and a complete land use change is possible were also identified during a previous study. Locations identified are currently not serving a specific purpose and are unutilized. Reforestation will be considered and evaluated during each annual assessment.

Oyster Reef

This project involves the placement of oysters along a shoreline to create or restore an oyster reef. These reefs buffer coastal areas from waves and improve water quality by filtering impurities from the water. NAVFAC has identified one existing oyster reef project at JEB Little Creek cove that consisted of the placement of 6,000 oyster spat over a 3,010 square foot area. Research reports from the Virginia Institute of Marine Science were used to estimate the pollutant removals from this project.

6.2 Pollutant Removals from Existing BMPs

As outlined in DEQ's Guidance, the pollutant removals from the existing BMPs have been categorized into three different groups:

1. BMPs brought online between January 1, 2006, and prior to July 1, 2009
2. BMPs brought online between July 1, 2009, and prior to July 1, 2014
3. BMPs brought online on or after July 1, 2014

According to DEQ's Guidance, if historical data are provided to DEQ by September 1, 2015, using the spreadsheet provided on their MS4 website, the permittee will received full credit for the pollutant load reduction associated with BMPs that were:

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

The completed spreadsheet from DEQ's MS4 website with the BMPs that meet the above criteria can be found in Appendix B of this document. This list is a complete list, to the maximum extent practicable, of historical BMPs and will be submitted to DEQ prior to September 1, 2015. This information is submitted as part of the "Historical Data Clean-Up" effort.

Pollutant load reductions were calculated for the individual existing BMPs to determine the total pollutant reduction. The pollutant removal efficiencies used to compute the corresponding load reductions were from the *Chesapeake Bay Program BMPs, Established Efficiencies Table* (Table V.C.1 in DEQ's Guidance). Other pollutant load removal efficiencies like the values in the *Virginia BMP Clearinghouse* and the *Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects* were also investigated. However, the curve/equations found in the *Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects* required a known runoff depth captured per impervious acre. Because this information was not readily available for the existing BMPs, it was not feasible to use the curves/equations found in the report. A comparison was made between the POC reductions from the efficiencies in the *Virginia BMP Clearinghouse* and the *Chesapeake Bay Program BMPs, Established Efficiencies Table.* In most instances, the pollutant removals were lower when using the *Chesapeake Bay Program BMPs, Established Efficiencies Table.* Therefore, the *Chesapeake Bay Program BMPs, Established Efficiencies Table* was considered to be conservative and was used to compute the corresponding pollutant reductions for the existing BMPs.

NAVFAC provided a BMP database for Baker to use in the development of this Action Plan. Initially, numerous existing BMPs were missing contributing draining areas and/or the appropriate categorization of the impervious and pervious portions of the draining area. Baker populated this missing data through the use of plan sets provided by CNRMA and by delineating approximate boundaries using GIS information (contours, aerial photographs, storm drain network, impervious areas, etc.). A complete list of all of CNRMA's BMPs that were brought online prior to July 1, 2014, can be found in Appendix B.

In addition, DEQ's Guidance states that permittees may receive credit for BMPs implemented on unregulated land provided the necessary baseline pollutant reduction is met first. NAVFAC identified a porous pavement BMP installed in 2011 at St. Juliens Creek Annex (an unregulated installation). This was the only BMP documented that was on unregulated lands within the James River Basin. According to the Guidance, any pollutant reduction greater that the 0.45 lbs TP/acre/year baseline amount can be credited toward the Chesapeake Bay TMDL pollutant reduction. The porous pavement BMP has a pollutant reduction of 0.21 lbs TP/acre/year; therefore, there are no additional credits to be applied to the pollutant reduction required by the Chesapeake Bay TMDL from this unregulated land BMP.

The total pollutant load reduction for the January 1, 2006 to June 30, 2009 BMPs was computed to be 98.1 lbs/yr for TN, 21.5 lbs/yr for TP, and 9,809 lbs/yr for TSS, as presented in Table 6-1. The total pollutant load reduction for the July 1, 2009, to June 30, 2014, BMPs was computed to be 323.9 lbs/yr for TN, 66.2 lbs/yr for TP, and 38,447 lbs/yr for TSS, as presented in Table 6-1. The existing BMP pollutant reductions calculations for each installation can be found in Appendix C.

Table 6-1 Pollutant Reduction Associated with Existing BMPs and Remaining Reduction

	TN (LBS/YR)	TP (LBS/YR)	TSS (LBS/YR)
First Permit Cycle Required Reductions (2009)	195.6	46.0	20,524
Reductions from Jan. 2006 to June 2009 BMPs	98.1	21.5	9,809
Reductions from July 2009 to June 2014 BMPs	323.9	66.2	38,447
Remaining Reductions for First Permit Cycle	**-226.5**	**-41.7**	**-27,733**

Table 6-1 illustrates that the required POC reductions for the first permit cycle are met with the existing BMPs brought online from January 1, 2006, to June 30, 2014. A net surplus of 226.5 lbs/yr for TN, 41.7 lbs/yr for TP, and 27,733 lbs/yr for TSS was computed. These existing BMPs are sufficient to meet the required reductions of the POC loads from existing sources.

7 New Sources and Grandfathered Projects

This section addresses Special Conditions 7 through 10 as found in the Permit.

(7) The means and methods to offset the increased loads from new sources initiating construction between July 1, 2009, and June 30, 2014, that disturb one acre or greater as a result of the utilization of an average land cover condition greater than 16% impervious cover for the design of post-development stormwater management facilities. The operator shall utilize Table 4 in this section to develop the equivalent pollutant load for nitrogen and total suspended solids. The operator shall offset 5.0% of the calculated increased load from these new sources during the permit cycle.

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

(9) The operator shall address any modification to the TMDL or watershed implementation plan that occurs during the term of this state permit as part of its permit reapplication and not during the term of this state permit.

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

7.1 New Sources Initiating Construction between July 1, 2009, and June 30, 2014

The Hampton Roads Installations experience a significant amount of construction every year. Because many of the installations are fully developed, most construction is related to redevelopment projects. In page 4 of the Guidance, DEQ acknowledged the significant burden to determine pollutant reductions on a site by site basis. An accounting method, referred to as the "aggregate accounting approach," was documented as an acceptable alternative to the site by site computations. Aggregate accounting tracks the land-use change on all regulated land between July 1, 2009, and June 30, 2014, to determine the increased loads that were not treated and must be addressed under Special Condition 7. It is understood that using an aggregate approach may capture lands beyond those that fall under this requirement (i.e. lands less than an acre, lands that have an average impervious land use cover less than 16 percent).

To complete the aggregate account approach, a comparison was made between the impervious areas from July 1, 2009, and June 30, 2014, to determine the net increase in impervious area from development and re-development projects. The net increase in impervious area is 64.0 acres. Table 7-1 presents a comparison of the impervious acres at the permitted installations

that drain to the Bay. Appendix C presents the detailed calculations regarding the aggregate accounting method.

Table 7-1 Impervious Area Comparison for Aggregate Accounting

Installation	June 2009 Impervious Regulated Area (ac)	June 2014 Impervious Regulated Area (ac)	Impervious Regulated Area Increase (ac)
JEB Fort Story	133.1	139.3	6.2
JEB Little Creek	545.7	568.8	23.1
NAS Oceana	306.7	306.7	0.0
Naval Station Norfolk	1,434.1	1,456.9	22.8
NSA Hampton Roads	291.4	299.9	8.5
Portsmouth Annex	51.0	51.4	0.4
Scott Center Annex	27.6	30.6	3.0
TOTALS	**2,789.6**	**2,853.6**	**64.0**

As shown in Example II.2 in DEQ's Guidance, the estimated pollutant loads for pre- and post-development conditions were computed using the "2009 EOS Loading Rate" from Table 2a in the permit. These values were compared in order to obtain the "Total Load Change." Table 7-2 represents the total POC loading from the increase in impervious areas or "new sources." The permit requires that CNRMA offsets 5 percent of these "new sources" pollutant loads by the end of the first permit cycle.

Table 7-2 Increase in Impervious Area and Corresponding POC Loads

Impervious Regulated Area Increase (ac)	Additional TN (lbs/yr)	Additional TP (lbs/yr)	Additional TSS (lbs/yr)
64.0	153.6	80.6	36,845

As shown in Table 7-3, these loads are offset through the implementation of BMPs installed between January 1, 2009, and June 30, 2014. For detailed calculations demonstrating the pollutant offsets through existing BMPs, see Appendix C of this report. After meeting the

required POC reduction for this permit cycle, the computation results in a net surplus of 218.8 lbs/yr for TN, 37.7 lbs/yr for TP, and 25,891 lbs/yr for TSS.

Table 7-3 New Source Load Reductions

	Additional TN (lbs/yr)	Additional TP (lbs/yr)	Additional TSS (lbs/yr)
5% of New Source Loads	7.7	4.0	1,842
Remaining Reductions after Meeting 5% of 2009 Loads	-226.5	-41.7	-27,733
Remaining Reductions after Meeting 5% of New Source Loads	**-218.8**	**-37.7**	**-25,891**

7.2 Grandfathered Projects

The Permit requires that any project that falls under Special Condition 8 (grandfathered projects in accordance with 9VAC25-870-48) should offset any increased pollutant loads prior to the completion of the grandfathered projects. There is one future project identified at Naval Station Norfolk that qualifies as grandfathered which is described below. In general, as soon as funding is secured for a project at the installations, the project is initiated. Delays, like the projects that fall under Special Condition 8, are uncommon at the permitted installations.

The I-564 Intermodal Connector project in Norfolk, Virginia is proposed to connect Naval Station Norfolk at 2nd Street and Norfolk International Terminal to the existing I-564 near Terminal Boulevard. Components on the project include 2.82 miles of new four-lane limited access highway, construction of the I-564 interchange, bridges and local connectors, stormwater management areas, relocation rail lines, possible noise walls, connectivity to Naval Station Norfolk Gate 6, and other general infrastructure improvements.

The construction will affect two areas within the Naval Station Norfolk MS4 regulated lands: the Commercial Vehicle Inspection Station (CVIS) and Gate 6. These two areas currently exist, but will be redeveloped/improved during the construction of the I-564 Intermodal Connector. In addition, some lands affected by the projects, which are currently owned by the Navy, will be transferred over to the Virginia Department of Transportation (VDOT) after the project is complete. These lands will primarily be right-of-way access areas along the edge of the roadway.

Below is an excerpt from the Stormwater Master Plan that details the support for grandfathered status under Part IIC of the Virginia Stormwater Management Program.

"Funds were obligated over time as the original permitting and design effort culminated in agency approvals, such as the DEQ Virginia Water Protection (VWP) Individual Permit coverage (effective November 4, 2002), and subsequent design iterations by the Parsons Brinckerhoff/Baker team (2011/2012), prior to July 1st, 2012 (or the RFP Design). As such, the project is subject to Technical Criteria Part IIC for one additional Construction General Permit (CGP) cycle, or through June 30th, 2019. It is the intent of Cherry Hill Construction that construction activities commence prior to this date."

Although this project does meet the requirements for grandfathering, NAVFAC has met with VDOT and requested that current VSMP regulations for the implementation of post-development stormwater management facilities be adhered to in the design of both the CVIS and Gate 6 improvements. As a result, no pollutant loads will need to be offset from this grandfathered project.

Any other projects that have been previously designed but have sat "on the shelf" will be reviewed and redesigned as needed to meet the new VSMP requirements. These projects will be redesigned since all regulated activities conducted by the Navy must have their stormwater management plans reviewed and approved by DEQ.

8 Cost of Implementation

This section addresses Special Condition 11 as found in the permit.

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

Because the required reductions have been met with existing (pre-July 2014) BMPs, there is no cost associated with this permit cycle. For the next two permit cycles, it is anticipated that numerous BMPs will have to be installed to meet the required reductions. Cost estimates have been developed for the 46 conceptual designs of BMPs that were developed during the OAs. These estimates will be incorporated into the updated Chesapeake Bay TMDL Action Plan for the next permit cycle as part of the cost of implementation.

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9 Public Comments on Draft Action Plan

This section addresses Special Condition 12 as found in the permit.

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

The Draft Chesapeake Bay TMDL Action Plan was made available through <INSERT> on <INSERT> for comment by individuals who are served by the installations MS4. The comment period was for <INSERT> days and <INSERT> comments were received regarding the plan.

<THIS SECTION WILL BE COMPLETED ONCE THE COMMENT PERIOD IS OVER. REPLACEMENT PAGES WILL BE SENT TO UPDATE THIS SECTION.>

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10 Reporting and Second Permit Cycle

This section describes the Chesapeake Bay TMDL reporting that will be included in the MS4 annual report and discusses the second permit cycle.

10.1 Annual Reports

Updates on the status of the implementation of the Action Plan will be provided with the annual report. These reports will include a list of BMPs implemented, the associated pollutant reductions, and other pertinent information as required by DEQ. In addition, a narrative describing the progress in implementing the Chesapeake Bay TMDL Action Plan will be submitted.

10.2 Second Permit Cycle

The next permit cycle is the second cycle in meeting the Chesapeake Bay POC load reductions. The cycle requires POC reductions that are equal to 35 percent of the total required reduction. Table 10-1 presents the required reductions for the second permit cycle.

Table 10-1 Pollutant Reduction to Meet 35% Goal

TN Reductions to Meet 35% (lbs/yr)	TP Reductions to Meet 35% (lbs/yr)	TSS Reductions to Meet 35% (lbs/yr)
1,423.1	350.2	156,561

The net surplus of 218.8 lbs/yr for TN, 37.7 lbs/yr for TP, and 25,891 lbs/yr for TSS remains after the required POC reductions were met for the first permit cycle. This surplus, or excess pollutant removal progress, will be applied to the second permit cycle. In addition, CNRMA has conceptual designs for 46 BMPs within the Bay and regulated MS4s that were identified during the OA (Section 5.2). Based on current preliminary calculations, the surplus from this permit cycle and the construction of the 46 BMPs with conceptual designs will not meet the 35 percent reduction. As a result, additional investigation into possible solutions to meet the required POC reductions will be completed.

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APPENDIX A

Table 2a: Calculation Sheet for Estimating Existing Source Loads (James River Basin)
JEB Fort Story

Subsource	Pollutant	Area Served by MS4 (ac)	2009 EOS Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	133.08	9.39	1,249.6
Regulated Urban Pervious		148.07	6.99	1,035.0
Regulated Urban Impervious	Phosphorus	133.08	1.76	234.2
Regulated Urban Pervious		148.07	0.5	74.0
Regulated Urban Impervious	Total Suspended Solids	133.08	676.94	90,087
Regulated Urban Pervious		148.07	101.08	14,967

Table 2a: Calculation Sheet for Estimating Existing Source Loads (James River Basin)
JEB Little Creek

Subsource	Pollutant	Area Served by MS4 (ac)	2009 EOS Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	545.72	9.39	5,124.3
Regulated Urban Pervious		631.81	6.99	4,416.4
Regulated Urban Impervious	Phosphorus	545.72	1.76	960.5
Regulated Urban Pervious		631.81	0.5	315.9
Regulated Urban Impervious	Total Suspended Solids	545.72	676.94	369,419
Regulated Urban Pervious		631.81	101.08	63,863

Table 2a: Calculation Sheet for Estimating Existing Source Loads (James River Basin)
Naval Air Station Oceana

Subsource	Pollutant	Area Served by MS4 (ac)	2009 EOS Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	306.68	9.39	2,879.7
Regulated Urban Pervious		1359.93	6.99	9,505.9
Regulated Urban Impervious	Phosphorus	306.68	1.76	539.8
Regulated Urban Pervious		1359.93	0.5	680.0
Regulated Urban Impervious	Total Suspended Solids	306.68	676.94	207,603
Regulated Urban Pervious		1359.93	101.08	137,462

Table 2a: Calculation Sheet for Estimating Existing Source Loads (James River Basin)
Naval Station Norfolk

Subsource	Pollutant	Area Served by MS4 (ac)	2009 EOS Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	1434.10	9.39	13,466.2
Regulated Urban Pervious		1047.30	6.99	7,320.6
Regulated Urban Impervious	Phosphorus	1434.10	1.76	2,524.0
Regulated Urban Pervious		1047.30	0.5	523.6
Regulated Urban Impervious	Total Suspended Solids	1434.10	676.94	970,798
Regulated Urban Pervious		1047.30	101.08	105,861

Table 2a: Calculation Sheet for Estimating Existing Source Loads (James River Basin)
Naval Support Activity Hampton Roads

Subsource	Pollutant	Area Served by MS4 (ac)	2009 EOS Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	291.47	9.39	2,736.9
Regulated Urban Pervious		455.97	6.99	3,187.3
Regulated Urban Impervious	Phosphorus	291.47	1.76	513.0
Regulated Urban Pervious		455.97	0.5	228.0
Regulated Urban Impervious	Total Suspended Solids	291.47	676.94	197,308
Regulated Urban Pervious		455.97	101.08	46,090

Table 2a: Calculation Sheet for Estimating Existing Source Loads (James River Basin)
Portsmouth Annex

Subsource	Pollutant	Area Served by MS4 (ac)	2009 EOS Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	51.00	9.39	478.9
Regulated Urban Pervious		39.15	6.99	273.7
Regulated Urban Impervious	Phosphorus	51.00	1.76	89.8
Regulated Urban Pervious		39.15	0.5	19.6
Regulated Urban Impervious	Total Suspended Solids	51.00	676.94	34,525
Regulated Urban Pervious		39.15	101.08	3,957

Table 2a: Calculation Sheet for Estimating Existing Source Loads (James River Basin)

Scott Center Annex

Subsource	Pollutant	Area Served by MS4 (ac)	2009 EOS Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	27.57	9.39	258.9
Regulated Urban Pervious		25.27	6.99	176.6
Regulated Urban Impervious	Phosphorus	27.57	1.76	48.5
Regulated Urban Pervious		25.27	0.5	12.6
Regulated Urban Impervious	Total Suspended Solids	27.57	676.94	18,663
Regulated Urban Pervious		25.27	101.08	2,554

Table 2a: Calculation Sheet for Estimating Existing Source Loads (James River Basin)

SUMMARY - ALL INSTALLATIONS

Subsource	Pollutant	Area Served by MS4 (ac)	2009 EOS Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	2789.62	9.39	26,194.5
Regulated Urban Pervious		3707.50	6.99	25,915.4
Regulated Urban Impervious	Phosphorus	2789.62	1.76	4,909.7
Regulated Urban Pervious		3707.50	0.5	1,853.8
Regulated Urban Impervious	Total Suspended Solids	2789.62	676.94	1,888,402
Regulated Urban Pervious		3707.50	101.08	374,754

Table 3a: Calculation Sheet for Determining Total POC Reductions Required
Permit Cycle 1 (James River Basin)
JEB Fort Story

Subsource	Pollutant	Area Served by MS4 (ac)	First Permit Cycle Required Reduction in Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	133.08	0.042255	5.6
Regulated Urban Pervious		148.07	0.02097	3.1
Regulated Urban Impervious	Phosphorus	133.08	0.01408	1.9
Regulated Urban Pervious		148.07	0.0018125	0.3
Regulated Urban Impervious	Total Suspended Solids	133.08	6.7694	901
Regulated Urban Pervious		148.07	0.442225	65

Table 3a: Calculation Sheet for Determining Total POC Reductions Required
Permit Cycle 1 (James River Basin)
JEB Little Creek

Subsource	Pollutant	Area Served by MS4 (ac)	First Permit Cycle Required Reduction in Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	545.72	0.042255	23.1
Regulated Urban Pervious		631.81	0.02097	13.2
Regulated Urban Impervious	Phosphorus	545.72	0.01408	7.7
Regulated Urban Pervious		631.81	0.0018125	1.1
Regulated Urban Impervious	Total Suspended Solids	545.72	6.7694	3,694
Regulated Urban Pervious		631.81	0.442225	279

Table 3a: Calculation Sheet for Determining Total POC Reductions Required
Permit Cycle 1 (James River Basin)
Naval Air Station Oceana

Subsource	Pollutant	Area Served by MS4 (ac)	First Permit Cycle Required Reduction in Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	306.68	0.042255	13.0
Regulated Urban Pervious		1359.93	0.02097	28.5
Regulated Urban Impervious	Phosphorus	306.68	0.01408	4.3
Regulated Urban Pervious		1359.93	0.0018125	2.5
Regulated Urban Impervious	Total Suspended Solids	306.68	6.7694	2,076
Regulated Urban Pervious		1359.93	0.442225	601

Table 3a: Calculation Sheet for Determining Total POC Reductions Required
Permit Cycle 1 (James River Basin)
Naval Station Norfolk

Subsource	Pollutant	Area Served by MS4 (ac)	First Permit Cycle Required Reduction in Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	1434.10	0.042255	60.6
Regulated Urban Pervious		1047.30	0.02097	22.0
Regulated Urban Impervious	Phosphorus	1434.10	0.01408	20.2
Regulated Urban Pervious		1047.30	0.0018125	1.9
Regulated Urban Impervious	Total Suspended Solids	1434.10	6.7694	9,708
Regulated Urban Pervious		1047.30	0.442225	463

Table 3a: Calculation Sheet for Determining Total POC Reductions Required
Permit Cycle 1 (James River Basin)
Naval Support Activity Hampton Roads

Subsource	Pollutant	Area Served by MS4 (ac)	First Permit Cycle Required Reduction in Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	291.47	0.042255	12.3
Regulated Urban Pervious		455.97	0.02097	9.6
Regulated Urban Impervious	Phosphorus	291.47	0.01408	4.1
Regulated Urban Pervious		455.97	0.0018125	0.8
Regulated Urban Impervious	Total Suspended Solids	291.47	6.7694	1,973
Regulated Urban Pervious		455.97	0.442225	202

Table 3a: Calculation Sheet for Determining Total POC Reductions Required
Permit Cycle 1 (James River Basin)
Portsmouth Annex

Subsource	Pollutant	Area Served by MS4 (ac)	First Permit Cycle Required Reduction in Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	51.00	0.042255	2.2
Regulated Urban Pervious		39.15	0.02097	0.8
Regulated Urban Impervious	Phosphorus	51.00	0.01408	0.7
Regulated Urban Pervious		39.15	0.0018125	0.1
Regulated Urban Impervious	Total Suspended Solids	51.00	6.7694	345
Regulated Urban Pervious		39.15	0.442225	17

Table 3a: Calculation Sheet for Determining Total POC Reductions Required
Permit Cycle 1 (James River Basin)
Scott Center Annex

Subsource	Pollutant	Area Served by MS4 (ac)	First Permit Cycle Required Reduction in Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	27.57	0.042255	1.2
Regulated Urban Pervious		25.27	0.02097	0.5
Regulated Urban Impervious	Phosphorus	27.57	0.01408	0.4
Regulated Urban Pervious		25.27	0.0018125	0.0
Regulated Urban Impervious	Total Suspended Solids	27.57	6.7694	187
Regulated Urban Pervious		25.27	0.442225	11

Table 3a: Calculation Sheet for Determining Total POC Reductions Required
SUMMARY - ALL INSTALLATIONS

Subsource	Pollutant	Area Served by MS4 (ac)	First Permit Cycle Required Reduction in Loading Rate (lbs/ac)	Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	Nitrogen	2789.62	0.042255	117.9
Regulated Urban Pervious		3707.50	0.02097	77.7
Regulated Urban Impervious	Phosphorus	2789.62	0.01408	39.3
Regulated Urban Pervious		3707.50	0.0018125	6.7
Regulated Urban Impervious	Total Suspended Solids	2789.62	6.7694	18,884
Regulated Urban Pervious		3707.50	0.442225	1,640

APPENDIX B

Date Installed	BMP Name	Practice Description	Impervious Acres Treated	Total Acres Treated	Runoff Captured*	Measurement Unit	Amount Applied	Latitude	Longitude	HUC12	State FIPS	Lifespan	Inspect Date	Maint Date	Contact Name	Contact Phone	Contact Email
<2003	SCA-1583-DP-01	Dry Pond	1.20	2.30	NA	System	1 of 1	36.810838	-76.3148	020802080203	51	20 to 50 years	7-Jan-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
<2003	SCA-1579-RP-01	Retention Pond (Wet)	2.40	7.70	NA	System	1 of 1	36.808924	-76.3135	020802080203	51	20 to 50 years	7-Jan-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2013	SCA-1717-RP-01	Retention Pond (Wet)	7.47	9.52	NA	System	1 of 1	36.808248	-76.3113	020802080203	51	20 to 50 years	7-Jan-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
pre-2006	NSAN-MCA600-EDB-01	Extended Detention Basin	6.15	20.00	NA	System	1 of 1	36.931254	-76.2965	020802080302	51	25 years	25-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
Unknown	NSAN-MCA614-BR-01	Bioretention Area	1.24	2.47	NA	System	1 of 1	36.928861	-76.2952	020802080302	51	10 to 25 years	25-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
08/2012	NSAN-NH32-IB-01	Infiltration Basin	2.03	2.88	NA	System	1 of 2	36.920367	-76.2998	020802080302	51	25 years	17-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
08/2012	NSAN-NH32-IB-02	Infiltration Basin	0.46	0.78	NA	System	2 of 2	36.920292	-76.3007	020802080302	51	25 years	17-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
05/2006	NSAN-NH33-DP-01	Dry Pond	1.68	2.50	NA	System	1 of 1	36.921639	-76.3036	020802080302	51	20 to 50 years	9-Jan-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2012	NSAN-NH46-IB-01	Infiltration Basin	0.90	1.51	NA	System	1 of 1	36.921353	-76.3059	020802080302	51	25 years	25-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
39904	NSAN-NH95-BR-01	Bioretention Area	0.10	0.10	NA	System	1 of 4	36.923306	-76.3076	020802080302	51	10 to 25 years	25-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
39904	NSAN-NH95-BR-02	Bioretention Area	0.09	0.09	NA	System	2 of 4	36.923305	-76.3076	020802080302	51	10 to 25 years	25-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
39904	NSAN-NH95-BR-03	Bioretention Area	0.11	0.11	NA	System	3 of 4	36.923899	-76.3077	020802080302	51	10 to 25 years	25-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
39904	NSAN-NH95-BR-04	Bioretention Area	0.13	0.13	NA	System	4 of 4	36.923872	-76.3081	020802080302	51	10 to 25 years	25-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
1995	NSAN-SDA336-RB-01	Retention Basin	2.42	4.55	NA	System	1 of 1	36.921558	-76.3175	020802080206	51	20 to 50 years	25-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2010	NSN-A50-GR-01	Green Roof	0.25	0.25	NA	System	1 of 1	36.949171	-76.319	020802080302	51	25 years	27-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-01	Bioretention Area	0.51	0.51	NA	System	1 of 13	36.943668	-76.3079	020802080302	51	10 to 25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-02	Bioretention Area	0.51	0.51	NA	System	2 of 13	36.943172	-76.3074	020802080302	51	10 to 25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-03	Bioretention Area	0.51	0.51	NA	System	3 of 13	36.943125	-76.3078	020802080302	51	10 to 25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-04	Bioretention Area	0.51	0.51	NA	System	4 of 13	36.942766	-76.3072	020802080302	51	10 to 25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-05	Bioretention Area	0.51	0.51	NA	System	5 of 13	36.942439	-76.307	020802080302	51	10 to 25 years	21-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-06	Bioretention Area	0.51	0.51	NA	System	6 of 13	36.942081	-76.3069	020802080302	51	10 to 25 years	21-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-07	Bioretention Area	0.51	0.51	NA	System	7 of 13	36.942012	-76.3076	020802080302	51	10 to 25 years	21-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-08	Bioretention Area	0.51	0.51	NA	System	8 of 13	36.941984	-76.3082	020802080302	51	10 to 25 years	21-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-09	Bioretention Area	0.51	0.51	NA	System	9 of 13	36.941957	-76.3086	020802080302	51	10 to 25 years	21-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-10	Bioretention Area	0.51	0.51	NA	System	10 of 13	36.941929	-76.3092	020802080302	51	10 to 25 years	21-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-11	Bioretention Area	0.51	0.51	NA	System	11 of 13	36.941794	-76.3091	020802080302	51	10 to 25 years	21-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-12	Bioretention Area	0.51	0.51	NA	System	12 of 13	36.941812	-76.3087	020802080302	51	10 to 25 years	21-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-BR-13	Bioretention Area	0.51	0.51	NA	System	13 of 13	36.94186	-76.3076	020802080302	51	10 to 25 years	21-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2011	NSN-CD13-DP-01	Dry Pond	0.51	0.51	NA	System	1 of 1	36.942044	-76.3065	020802080302	51	20 to 50 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
08/2011	NSN-CEP178-BR-01	Bioretention Area	0.49	0.49	NA	System	I of 2	36.94311	-76.324	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
08/2011	NSN-CEP178-BR-02	Bioretention Area	0.89	0.89	NA	System	2 of 2	36.943394	-76.3236	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
Unknown	NSN-LF**-HDS-01	Hydrodynamic Structures	3.79	7.57	NA	System	1 of 1	Unknown	Unknown	020802080302	51	Indefinite	27-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
Unknown	NSN-LF**-UDD-01	Underground Dry Detention Facility	3.79	7.57	NA	System	1 of 1	Unknown	Unknown	020802080302	51	10 to 30 years	27-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
12/2012	NSN-LP21-BR-01	Bioretention Area	0.10	0.10	NA	System	1 of 1	Unknown	Unknown	20802080302	51	10 to 25 years	Recently Located		Angela Gent	(757) 341-0423	angela.gent@navy.mil
12/2012	NSN-LP33-BR-01	Bioretention Area	0.14	0.14	NA	System	1 of 2	Unknown	Unknown	20802080302	51	10 to 25 years	Recently Located		Angela Gent	(757) 341-0423	angela.gent@navy.mil
12/2012	NSN-LP33-BR-02	Bioretention Area	0.01	0.01	NA	System	2 of 2	Unknown	Unknown	20802080302	51	10 to 25 years	Recently Located		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2006	NSN-LP34-BR-01	Bioretention Area	1.67	1.67	NA	System	1 of 1	36.943813	-76.291	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
12/2012	NSN-LP34-BR-02	Bioretention Area	0.06	0.06	NA	System	1 of 2	36.94251	-76.2901	20802080302	51	10 to 25 years	Recently Located		Angela Gent	(757) 341-0423	angela.gent@navy.mil
12/2012	NSN-LP34-BR-03	Bioretention Area	0.03	0.03	NA	System	2 of 2	36.942481	-76.2961	20802080302	51	10 to 25 years	Recently Located		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2010	NSN-LP49-BR-01	Bioretention Area	1.00	1.00	NA	System	1 of 2	36.943665	-76.2931	020802080302	51	10 to 25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2011	NSN-LP49-BR-02	Bioretention Area	0.66	0.66	NA	System	2 of 2	36.944311	-76.2934	020802080302	51	10 to 25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2009	NSN-O27-BR-01	Bioretention Area	0.30	0.30	NA	System	1 of 7	36.945402	-76.3076	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2009	NSN-O27-BR-02	Bioretention Area	0.30	0.30	NA	System	2 of 7	36.945353	-76.3076	020802080302	51	10 to 25 years	7-Jan-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2009	NSN-O27-BR-03	Bioretention Area	0.30	0.30	NA	System	3 of 7	36.94507	-76.3076	020802080302	51	10 to 25 years	17-Jul-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2009	NSN-O27-BR-04	Bioretention Area	0.30	0.30	NA	System	4 of 7	36.945021	-76.3076	020802080302	51	10 to 25 years	17-Jul-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2009	NSN-O27-BR-05	Bioretention Area	0.31	0.31	NA	System	5 of 7	36.94473	-76.3076	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2009	NSN-O27-BR-06	Bioretention Area	0.22	0.22	NA	System	6 of 7	36.944747	-76.307	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2009	NSN-O27-BR-07	Bioretention Area	0.27	0.27	NA	System	7 of 7	36.945875	-76.3061	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2009	NSN-O27-EDB-01	Extended Detention Basin	3.36	5.17	NA	System	1 of 1	36.945821	-76.3074	020802080302	51	25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2008	NSN-P1-BR-01	Bioretention Area	0.26	0.26	NA	System	1 of 1	36.945245	-76.3117	020802080302	51	10 to 25 years	17-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-P86-BR-01	Bioretention Area	0.22	0.22	NA	System	1 of 2	36.945073	-76.3087	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-P86-BR-02	Bioretention Area	0.26	0.26	NA	System	2 of 2	36.945023	-76.3086	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-P86-EDB-01	Extended Detention Basin	0.48	0.77	NA	System	1 of 1	36.944984	-76.3086	020802080302	51	25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-01	Bioretention Area	1.64	1.97	NA	System	1 of 13	36.943813	-76.291	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-02	Bioretention Area	1.74	1.96	NA	System	2 of 13	36.943665	-76.2931	020802080302	51	10 to 25 years	17-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-03	Bioretention Area	1.64	1.95	NA	System	3 of 13	36.944311	-76.2934	020802080302	51	10 to 25 years	19-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-04	Bioretention Area	0.64	0.75	NA	System	4 of 13	36.945402	-76.3076	020802080302	51	10 to 25 years	19-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-05	Bioretention Area	0.80	0.94	NA	System	5 of 13	36.945353	-76.3076	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-06	Bioretention Area	0.38	0.44	NA	System	6 of 13	36.94507	-76.3076	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-07	Bioretention Area	0.67	0.80	NA	System	7 of 13	36.945021	-76.3076	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-08	Bioretention Area	0.37	0.42	NA	System	8 of 13	36.94473	-76.3076	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-09	Bioretention Area	0.21	0.25	NA	System	9 of 13	36.944747	-76.307	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-10	Bioretention Area	0.46	0.54	NA	System	10 of 13	36.945875	-76.3061	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-11	Bioretention Area	0.32	0.43	NA	System	11 of 13	36.945821	-76.3074	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-12	Bioretention Area	0.46	0.58	NA	System	12 of 13	36.945245	-76.3117	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Q47-BR-13	Bioretention Area	1.44	1.52	NA	System	13 of 13	36.945073	-76.3087	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
09/2009	NSN-V70-FLT-01	Organic Media Filter	4.91	4.96	NA	System	1 of 2	36.948017	-76.2939	020802080302	51	20 to 50 years	27-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
09/2009	NSN-V70-FLT-02	Organic Media Filter	4.91	4.96	NA	System	2 of 2	36.947978	-76.2938	020802080302	51	20 to 50 years	27-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
09/2009	NSN-V71-FLT-01	Hydrodynamic Structures	9.51	9.51	NA	System	1 of 1	36.949108	-76.2966	020802080302	51	Indefinite	27-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil

Date Installed	BMP Name	Practice Description	Impervious Acres Treated	Total Acres Treated	Runoff Captured*	Measurement Unit	Amount Applied	Latitude	Longitude	HUC12	State FIPS	Lifespan	Inspect Date	Maint Date	Contact Name	Contact Phone	Contact Email
2008	NSN-SP28-BR-01	Bioretention Area	0.47	0.52	NA	System	1 of 1	36.946057	-76.2731	020802080302	51	10 to 25 years	25-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2008	NSN-SP48-BR-01	Bioretention Area	1.01	1.58	NA	System	1 of 2	36.962573	-76.3222	020802080302	51	10 to 25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2008	NSN-SP48-BR-02	Bioretention Area	0.71	0.74	NA	System	2 of 2	36.960578	-76.3228	020802080302	51	10 to 25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2008	NSN-SP48-EDB-01	Extended Detention Basin	0.78	0.97	NA	System	1 of 1	36.960901	-76.3216	020802080302	51	25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2011	NSN-V47-IB-01	Infiltration Basin	0.33	0.33	NA	System	1 of 1	36.946476	-76.2927	020802080302	51	25 years	17-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2010	NSN-SP233-EDB-01	Extended Detention Basin	5.50	6.80	NA	System	1 of 1	36.951322	-76.2727	020802080302	51	25 years	19-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
04/2008	NSN-V88-FLT-01	Organic Media Filter	0.75	0.75	NA	System	12	36.961715	-76.3224	020802080302	51	20 to 50 years	27-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
09/2011	NSN-WB200-IB-01	Infiltration Basin	2.45	8.41	NA	System	1 of 1	36.956663	-76.2692	020802080302	51	25 years	25-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Y109-BR-01	Bioretention Area	0.94	1.50	NA	System	1 of 2	36.945557	-76.3271	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2009	NSN-Y109-BR-02	Bioretention Area	1.08	1.50	NA	System	2 of 2	36.94567	-76.3253	020802080302	51	10 to 25 years	20-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2006	NSN-Z312-BR-01	Bioretention Area	0.19	0.19	NA	System	1 of 1	36.944389	-76.3251	020802080302	51	10 to 25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2006	NSN-Z312-DRR-01	Disconnection of Rooftop Runoff	0.25	0.25	NA	System	1 of 1	36.943681	-76.3248	020802080302	51	Indefinite	17-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2012	NSN-W5-SW-01	Swale	0.17	0.43	NA	System	1 of 4	36.952841	-76.3271	020802080302	51	25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2012	NSN-W5-SW-02	Swale	0.17	0.43	NA	System	2 of 4	36.952541	-76.3272	020802080302	51	25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2012	NSN-W5-SW-03	Swale	0.17	0.22	NA	System	3 of 4	36.952888	-76.3266	020802080302	51	25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2012	NSN-W5-SW-04	Swale	0.17	0.22	NA	System	4 of 4	36.952502	-76.3267	020802080302	51	25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
04/2013	NSN-CEP76-IB-01	Infiltration Basin	0.42	0.56	NA	System	1 of 2	36.937047	-76.3227	020802080302	51	25 years	24-Nov-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
04/2013	NSN-CEP76-IB-02	Infiltration Basin	0.78	1.99	NA	System	2 of 2	36.936256	-76.3225	020802080302	51	25 years	17-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2010	NSAP-247-BR-01	Bioretention Area	0.20	0.37	NA	System	1 of 2	36.843353	-76.3084	020802080206	51	10 to 25 years	7-Jan-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2010	NSAP-247-BR-02	Bioretention Area	0.12	0.42	NA	System	2 of 2	36.84305	-76.308	020802080206	51	10 to 25 years	7-Jan-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
Unknown	NSAP-288-IT-01	Infiltration Trench	0.20	0.30	NA	System	1 of 2	36.848153	-76.3102	020802080206	51	10 years	7-Jan-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
Unknown	NSAP-288-IT-02	Infiltration Trench	0.20	0.30	NA	System	2 of 2	36.848153	-76.3105	020802080206	51	10 years	7-Jan-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
<2003	NSAP-288-FLT-01	Organic Media Filter	1.00	1.40	NA	System	1 of 1	36.848566	-76.3109	020802080206	51	20 to 50 years	7-Jan-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
<2003	NSAP-1-PP-01	Porous Pavement	0.70	4.70	NA	System	1 of 3	36.848171	-76.3029	020802080206	51	20 to 40 years	7-Jan-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
<2003	NSAP-1-PP-02	Porous Pavement	0.30	0.60	NA	System	2 of 3	36.847359	-76.3064	020802080206	51	20 to 40 years	7-Jan-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
<2003	NSAP-2-PP-03	Porous Pavement	0.50	1.40	NA	System	3 of 3	36.844843	-76.3058	020802080206	51	20 to 40 years	7-Jan-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2011	FS-1090-IB-01	Infiltration Basin	0.60	1.09	NA	System	1 of 1	36.924671	-76.0216	020801080202	51	25 years	13-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2011	FS-1090-IT-01	Infiltration Trench	0.41	0.85	NA	System	1 of 1	36.924671	-76.0216	020801080202	51	10 years	13-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
Unknown	FS-118-EDB-01	Extended Detention Basin	1.10	3.80	NA	System	1 of 1	36.919162	-75.9969	020403040501	51	25 years	13-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2013	FS-310-BR-01	Bioretention Area	0.07	0.08	NA	System	1 of 2	36.92422	-76.002	020403040501	51	10 to 25 years	13-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2013	FS-310-BR-02	Bioretention Area	0.07	0.08	NA	System	2 of 2	36.924059	-76.0018	020403040501	51	10 to 25 years	13-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2013	FS-310-IB-01	Infiltration Basin	0.43	0.79	NA	System	1 of 1	36.924411	-76.002	020403040501	51	25 years	13-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2013	FS-310-PP-01	Porous Pavement	0.14	0.16	NA	System	1 of 2	36.924604	-76.0023	020403040501	51	20 to 40 years	13-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2013	FS-310-PP-02	Porous Pavement	0.22	0.35	NA	System	2 of 2	36.923913	-76.0017	020403040501	51	20 to 40 years	13-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2006	LC-1126-DP-01	Dry Pond	0.53	0.86	NA	System	1 of 1	36.914703	-76.1885	020801080202	51	20 to 50 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2006	LC-1126-SW-01	Swale	0.19	0.30	NA	System	1 of 1	36.914505	-76.1883	020801080202	51	25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2010	LC-124-EEDB-01	Enhanced Extended Detention Basin	4.03	10.89	NA	System	1 of 1	36.910012	-76.1764	020801080202	51	25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
11/2012	LC-1259-IB-01	Infiltration Basin	0.48	1.03	NA	System	1 of 3	36.917145	-76.1849	020801080202	51	25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
11/2012	LC-1259-IB-02	Infiltration Basin	0.14	0.34	NA	System	2 of 3	36.917171	-76.1856	020801080202	51	25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
11/2012	LC-1259-IB-03	Infiltration Basin	0.02	0.02	NA	System	3 of 3	36.917319	-76.1853	020801080202	51	25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2006	LC-126-SW-01	Swale	4.25	4.99	NA	System	1 of 1	36.915403	-76.1899	020801080202	51	25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2011	LC-1559-IT-01	Infiltration Trench	0.00	1.70	NA	System	1 of 1	36.918232	-76.1858	020801080202	51	10 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2004	LC-1602-BR-01	Bioretention Area	0.18	0.26	NA	System	1 of 6	36.915295	-76.1896	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2004	LC-1602-BR-02	Bioretention Area	0.05	0.10	NA	System	2 of 6	36.915295	-76.1896	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2004	LC-1602-BR-03	Bioretention Area	0.27	0.39	NA	System	3 of 6	36.915295	-76.1896	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2004	LC-1602-BR-04	Bioretention Area	0.10	0.17	NA	System	4 of 6	36.915295	-76.1896	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2004	LC-1602-BR-05	Bioretention Area	0.15	0.20	NA	System	5 of 6	36.915295	-76.1896	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2004	LC-1602-BR-06	Bioretention Area	0.15	0.18	NA	System	6 of 6	36.915295	-76.1896	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2005	LC-1609-BR-01	Bioretention Area	0.25	0.50	NA	System	1 of 4	36.916295	-76.1881	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2005	LC-1609-BR-02	Bioretention Area	0.19	0.50	NA	System	2 of 4	36.915203	-76.1881	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2005	LC-1609-BR-03	Bioretention Area	0.48	0.50	NA	System	3 of 4	36.915364	-76.1878	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2005	LC-1609-BR-04	Bioretention Area	0.47	0.50	NA	System	4 of 4	36.915632	-76.1877	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2011	LC-1622-IT-01	Infiltration Trench	0.65	1.00	NA	System	2 of 2	36.91986	-76.1885	020801080202	51	10 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2010	LC-1625-EDB-01	Extended Detention Basin	1.95	3.15	NA	System	1 of 1	36.920745	-76.1871	020801080202	51	25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2009	LC-2002-BR-01	Bioretention Area	0.15	0.24	NA	System	1 of 6	36.910102	-76.1811	020801080202	51	10 to 25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2009	LC-2002-BR-02	Bioretention Area	0.19	0.39	NA	System	2 of 6	36.909294	-76.1813	020801080202	51	10 to 25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2009	LC-2002-BR-03	Bioretention Area	0.42	0.42	NA	System	3 of 6	36.909047	-76.1817	020801080202	51	10 to 25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2009	LC-2002-BR-04	Bioretention Area	0.37	0.40	NA	System	4 of 6	36.909331	-76.1819	020801080202	51	10 to 25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2009	LC-2002-BR-05	Bioretention Area	0.39	0.44	NA	System	5 of 6	36.909573	-76.182	020801080202	51	10 to 25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2009	LC-2002-BR-06	Bioretention Area	0.16	0.23	NA	System	6 of 6	36.909144	-76.182	020801080202	51	10 to 25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
08/2012	LC-3093-BR-01	Bioretention Area	0.35	0.49	NA	System	1 of 1	36.911001	-76.1481	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
08/2012	LC-3093-PP-01	Porous Pavement	0.02	0.02	NA	System	1 of 4	36.910855	-76.1491	020801080202	51	20 to 40 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
08/2012	LC-3093-PP-02	Porous Pavement	0.03	0.03	NA	System	2 of 4	36.910905	-76.1487	020801080202	51	20 to 40 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
08/2012	LC-3093-PP-03	Porous Pavement	0.05	0.05	NA	System	3 of 4	36.910815	-76.1487	020801080202	51	20 to 40 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
08/2012	LC-3093-PP-04	Porous Pavement	0.02	0.02	NA	System	4 of 4	36.910905	-76.1487	020801080202	51	20 to 40 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
08/2012	LC-3093-UDD-01	Underground Dry Detention Facility	1.29	1.33	NA	System	1 of 1	36.91075	-76.149	020801080202	51	10 to 30 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2008	LC-3147-BR-01	Bioretention Area	0.72	0.93	NA	System	1 of 4	36.912134	-76.1521	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2008	LC-3147-BR-02	Bioretention Area	0.72	0.93	NA	System	2 of 4	36.912095	-76.1525	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2008	LC-3147-BR-03	Bioretention Area	0.72	0.93	NA	System	3 of 4	36.911819	-76.1517	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil

Date Installed	BMP Name	Practice Description	Impervious Acres Treated	Total Acres Treated	Runoff Captured*	Measurement Unit	Amount Applied	Latitude	Longitude	HUC12	State FIPS	Lifespan	Inspect Date	Maint Date	Contact Name	Contact Phone	Contact Email
2008	LC-3147-BR-04	Bioretention Area	0.72	0.93	NA	System	4 of 4	36.91157	-76.1522	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2014	LC-3335-BR-01	Bioretention Area	0.06	0.12	NA	System	1 of 7	36.911199	-76.1414	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2014	LC-3335-BR-02	Bioretention Area	0.17	0.33	NA	System	2 of 7	36.911	-76.1414	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2014	LC-3335-BR-03	Bioretention Area	0.08	0.16	NA	System	3 of 7	36.911071	-76.1414	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2014	LC-3335-BR-04	Bioretention Area	0.09	0.52	NA	System	4 of 7	36.910898	-76.1421	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2014	LC-3335-BR-05	Bioretention Area	0.13	0.40	NA	System	5 of 7	36.911065	-76.1425	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2014	LC-3335-BR-06	Bioretention Area	0.34	0.66	NA	System	6 of 7	36.911231	-76.1429	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2014	LC-3335-BR-07	Bioretention Area	0.14	0.22	NA	System	7 of 7	36.911203	-76.1433	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2003	LC-3430-BR-01	Bioretention Area	0.77	1.12	NA	System	1 of 1	36.907446	-76.1411	020801080202	51	10 to 25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2012	LC-3432-IT-01	Infiltration Trench	0.82	1.92	NA	System	1 of 3	36.908558	-76.1424	020801080202	51	10 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2012	LC-3432-IT-02	Infiltration Trench	1.12	2.71	NA	System	2 of 3	36.907364	-76.1418	020801080202	51	10 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2012	LC-3432-IT-03	Infiltration Trench	0.43	0.61	NA	System	3 of 3	36.907505	-76.1425	020801080202	51	10 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2012	LC-3432-SW-01	Swale	0.19	0.26	NA	System	1 of 1	36.907849	-76.1417	020801080202	51	25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
04/2004	LC-3447-SW-01	Swale	0.23	0.37	NA	System	1 of 2	36.90859	-76.147	020801080202	51	25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
04/2012	LC-3509-IB-01	Infiltration Basin	0.60	1.97	NA	System	1 of 2	36.915319	-76.1568	020801080202	51	25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
04/2012	LC-3509-IB-02	Infiltration Basin	0.33	1.07	NA	System	2 of 2	36.915559	-76.1578	020801080202	51	25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
04/2012	LC-3509-PP-01	Porous Pavement	1.07	1.09	NA	System	1 of 1	36.915827	-76.1574	020801080202	51	20 to 40 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2007	LC-3537-EDB-01	Extended Detention Basin	0.54	1.25	NA	System	1 of 1	36.911964	-76.1552	020801080202	51	25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2007	LC-3537-IB-01	Infiltration Basin	0.18	0.29	NA	System	1 of 5	36.912024	-76.1549	020801080202	51	25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2007	LC-3537-IB-02	Infiltration Basin	0.11	0.18	NA	System	2 of 5	36.91235	-76.1549	020801080202	51	25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2007	LC-3537-IB-03	Infiltration Basin	0.17	0.23	NA	System	3 of 5	36.912586	-76.1548	020801080202	51	25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2007	LC-3537-IB-04	Infiltration Basin	0.23	0.34	NA	System	4 of 5	36.912434	-76.1539	020801080202	51	25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2007	LC-3537-IB-05	Infiltration Basin	0.24	0.42	NA	System	5 of 5	36.911874	-76.1541	020801080202	51	25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2007	LC-3537-SW-01	Swale	0.21	0.36	NA	System	1 of 1	36.912899	-76.1542	020801080202	51	25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-3808-BR-01	Bioretention Area	0.14	0.31	NA	System	1 of 7	36.918223	-76.166	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-3808-BR-02	Bioretention Area	0.20	0.46	NA	System	2 of 7	36.917637	-76.1664	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-3808-BR-03	Bioretention Area	0.34	0.36	NA	System	3 of 7	36.917783	-76.1677	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-3808-BR-04	Bioretention Area	0.30	0.32	NA	System	4 of 7	36.917622	-76.1678	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-3808-BR-05	Bioretention Area	0.16	0.26	NA	System	5 of 7	36.917457	-76.1681	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-3808-BR-06	Bioretention Area	0.15	0.22	NA	System	6 of 7	36.91755	-76.1686	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-3808-BR-07	Bioretention Area	0.05	0.15	NA	System	7 of 7	36.917486	-76.1686	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2004	LC-3808-HDS-01	Hydrodynamic Structures	1.96	2.33	NA	System	1 of 2	36.918047	-76.1659	020801080202	51	Indefinite	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2004	LC-3808-HDS-02	Hydrodynamic Structures	1.63	2.83	NA	System	2 of 2	36.917254	-76.1668	020801080202	51	Indefinite	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
10/2011	LC-3811-IB-01	Infiltration Basin	0.23	0.49	NA	System	1 o f 1	36.91806	-76.1584	020801080202	51	25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-3841-BR-01	Bioretention Area	0.17	0.35	NA	System	1 of 2	36.916815	-76.1644	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-3841-BR-02	Bioretention Area	0.17	0.28	NA	System	2 of 2	36.916752	-76.1635	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-3842-BR-01	Bioretention Area	0.13	0.22	NA	System	1 of 2	36.917067	-76.1655	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-3842-BR-02	Bioretention Area	0.18	0.33	NA	System	2 of 2	36.916978	-76.165	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2006	LC-3849-BR-01	Bioretention Area	0.19	0.30	NA	System	1 of 5	36.916317	-76.1625	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2006	LC-3849-BR-02	Bioretention Area	0.27	0.30	NA	System	2 of 5	36.916168	-76.1627	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2006	LC-3849-BR-03	Bioretention Area	0.28	0.30	NA	System	3 of 5	36.916131	-76.1625	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2006	LC-3849-BR-04	Bioretention Area	0.18	0.30	NA	System	4 of 5	36.915696	-76.1634	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2006	LC-3849-BR-05	Bioretention Area	0.14	0.30	NA	System	5 of 5	36.915562	-76.1624	020801080202	51	10 to 25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2003	LC-3857-BR-01	Bioretention Area	0.30	0.30	NA	System	1 of 7	36.918178	-76.1604	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2003	LC-3857-BR-02	Bioretention Area	0.30	0.30	NA	System	2 of 7	36.918123	-76.1597	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2003	LC-3857-BR-03	Bioretention Area	0.30	0.30	NA	System	3 of 7	36.917686	-76.1596	020801080202	51	10 to 25 years	12-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2003	LC-3857-BR-04	Bioretention Area	0.30	0.30	NA	System	4 of 7	36.917222	-76.1597	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2003	LC-3857-BR-05	Bioretention Area	0.30	0.30	NA	System	5 of 7	36.917193	-76.1601	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2003	LC-3857-BR-06	Bioretention Area	0.30	0.30	NA	System	6 of 7	36.917446	-76.1607	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2003	LC-3857-BR-07	Bioretention Area	0.30	0.30	NA	System	7 of 7	36.917907	-76.1606	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2013	LC-3889-BR-01	Bioretention Area	0.07	0.12	NA	System	1 of 4	36.921718	-76.1653	020801080202	51	10 to 25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2013	LC-3889-BR-02	Bioretention Area	0.11	0.12	NA	System	2 of 4	36.921469	-76.1653	020801080202	51	10 to 25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2013	LC-3889-BR-03	Bioretention Area	0.09	0.12	NA	System	3 of 4	36.921257	-76.1653	020801080202	51	10 to 25 years	22-Jul-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2013	LC-3889-IB-01	Infiltration Basin	3.79	4.99	NA	System	1 of 1	36.920991	-76.1654	020801080202	51	25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2013	LC-3889-PP-01	Porous Pavement	0.20	0.20	NA	System	1 of 2	36.921632	-76.1637	020801080202	51	20 to 40 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
06/2013	LC-3889-PP-02	Porous Pavement	0.21	0.21	NA	System	2of 2	36.921523	-76.1633	020801080202	51	20 to 40 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
Unknown	LC-3897-IB-01	Infiltration Basin	0.92	1.27	NA	System	1 of 1	36.918666	-76.1605	020801080202	51	25 years	24-Mar-15		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2006	LC-7-DP-01	Dry Pond	0.16	0.28	NA	System	1 of 1	36.913614	-76.1877	020801080202	51	20 to 50 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2006	LC-7-SW-01	Swale	0.20	0.34	NA	System	1 of 1	36.913202	-76.1877	020801080202	51	25 years	10-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2008	LC-CB125-BR-01	Bioretention Area	0.02	0.11	NA	System	1 of 4	36.918442	-76.1694	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
2008	LC-CB125-BR-02	Bioretention Area	0.04	0.10	NA	System	2 of 4	36.918502	-76.1691	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-CB125-BR-03	Bioretention Area	0.19	0.49	NA	System	3 of 4	36.91767	-76.1695	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
01/2011	LC-CB125-BR-04	Bioretention Area	0.06	0.28	NA	System	4 of 4	36.917551	-76.1694	020801080202	51	10 to 25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2004	LC-Gate3-EDB-01	Extended Detention Basin	1.27	2.00	NA	System	1 of 1	36.908158	-76.1619	020801080202	51	25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2004	LC-Gate3-RB-01	Retention Basin	0.43	2.00	NA	System	1 o f 1	36.908986	-76.1621	020801080202	51	20 to 50 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
07/2004	LC-Gate3-SW-01	Swale	0.42	1.00	NA	System	1 of 1	36.908372	-76.1626	020801080202	51	25 years	11-Dec-14		Angela Gent	(757) 341-0423	angela.gent@navy.mil
09/2014	LC-Cove-OYS-01	Oyster Reef	NA	NA	NA	System	1 of 1	36.912500	-76.1644	020801080202	51	Indefinite	Recently Installed		Angela Gent	(757) 341-0423	angela.gent@navy.mil

*The pollutant load removal calculations for the existing BMPs were completed using the Chesapeake Bay Program Established Efficiencies. Therefore, the runoff captured was not a necessary parameter for the computations.

APPENDIX C

JEB Fort Story BMPs (July 1, 2009 to June 30, 2014)

NAVFAC BMP Inventory							VA Clearinghouse BMP Type	Ches Bay Program Efficiency			Ches Bay Program Efficiency POC Reduction (lbs/yr)		
BMP	BMP Category	BMP Class	Treatment (ac)	Impervious (ac)	Pervious (ac)	Install Year		TN	TP	TSS	TN	TP	TSS
FS-1090-IB-01	Category E: Filtering Practices	Infiltration Basin	1.09	0.49	0.60	2011	Infiltration	40%	60%	80%	3.52	0.70	313.88
FS-1090-IT-01	Category E: Filtering Practices	Infiltration Trench	0.85	0.44	0.41	2011	Infiltration	40%	60%	80%	2.80	0.59	271.44
FS-310-BR-01	Category E: Filtering Practices	Bioretention Areas	0.08	0.07	0.01	201306	Bioretention	25%	45%	55%	0.18	0.06	27.25
FS-310-BR-02	Category E: Filtering Practices	Bioretention Areas	0.08	0.07	0.01	201306	Bioretention	25%	45%	55%	0.18	0.06	27.57
FS-310-IB-01	Category E: Filtering Practices	Infiltration Basin	0.79	0.43	0.36	201306	Infiltration	40%	60%	80%	2.62	0.56	261.98
FS-310-PP-01	Category D: Infiltration Practices	Porous Pavement	0.16	0.14	0.20	201306	Permeable Pavement	10%	20%	55%	0.27	0.07	63.24
FS-310-PP-02	Category D: Infiltration Practices	Porous Pavement	0.35	0.22	0.13	201306	Permeable Pavement	10%	20%	55%	0.30	0.09	89.14
								Total POC Reduction (lbs/yr)			9.9	2.1	1,054

JEB Little Creek BMPs (January 1, 2006 to June 30, 2009)

NAVFAC BMP Inventory							VA Clearinghouse BMP Type	Ches Bay Program Efficiency			Ches Bay Program Efficiency POC Reduction (lbs/yr)		
BMP	BMP Category	BMP Class	Treatment (ac)	Impervious (ac)	Pervious (ac)	Install Year		TN	TP	TSS	TN	TP	TSS
LC-1126-DP-01	Category B: Dry Detention, Hydrodynamic Structure	Dry Pond	0.86	0.53	0.33	07/2006	Dry Swale	25%	45%	55%	1.82	0.49	215.67
LC-1126-SW-01	Category E: Filtering Practices	Swale	0.30	0.19	0.11	07/2006	Wet Swale	20%	45%	60%	0.51	0.18	83.84
LC-126-SW-01	Category E: Filtering Practices	Swale	4.99	4.25	0.74	07/2006	Wet Swale	20%	45%	60%	9.02	3.53	1771.08
LC-2002-BR-01	Category E: Filtering Practices	Bioretention Areas	0.24	0.15	0.09	06/2009	Bioretention	25%	45%	55%	0.51	0.14	60.85
LC-2002-BR-02	Category E: Filtering Practices	Bioretention Areas	0.39	0.19	0.20	06/2009	Bioretention	25%	45%	55%	0.80	0.20	81.86
LC-2002-BR-03	Category E: Filtering Practices	Bioretention Areas	0.42	0.42	0.00	06/2009	Bioretention	25%	45%	55%	0.99	0.33	156.37
LC-2002-BR-04	Category E: Filtering Practices	Bioretention Areas	0.40	0.37	0.03	06/2009	Bioretention	25%	45%	55%	0.92	0.30	139.43
LC-2002-BR-05	Category E: Filtering Practices	Bioretention Areas	0.44	0.39	0.05	06/2009	Bioretention	25%	45%	55%	1.00	0.32	147.98
LC-2002-BR-06	Category E: Filtering Practices	Bioretention Areas	0.23	0.16	0.07	06/2009	Bioretention	25%	45%	55%	0.50	0.14	63.46
LC-3147-BR-01	Category E: Filtering Practices	Bioretention Areas	0.93	0.72	0.21	2008	Bioretention	25%	45%	55%	2.06	0.62	279.74
LC-3147-BR-02	Category E: Filtering Practices	Bioretention Areas	0.93	0.72	0.21	2008	Bioretention	25%	45%	55%	2.06	0.62	279.74
LC-3147-BR-03	Category E: Filtering Practices	Bioretention Areas	0.93	0.72	0.21	2008	Bioretention	25%	45%	55%	2.06	0.62	279.74
LC-3147-BR-04	Category E: Filtering Practices	Bioretention Areas	0.93	0.72	0.21	2008	Bioretention	25%	45%	55%	2.06	0.62	279.74
LC-3537-EDB-01	Category C: Dry Extended Detention	Extended Detention Basin	1.25	0.54	0.71	07/2007	Extended Detention Pond	20%	20%	60%	2.01	0.26	262.39
LC-3537-IB-01	Category E: Filtering Practices	Infiltration Basin	0.29	0.18	0.11	07/2007	Infiltration	40%	60%	80%	0.98	0.22	104.53
LC-3537-IB-02	Category E: Filtering Practices	Infiltration Basin	0.18	0.11	0.08	07/2007	Infiltration	40%	60%	80%	0.60	0.13	62.93
LC-3537-IB-03	Category E: Filtering Practices	Infiltration Basin	0.23	0.17	0.07	07/2007	Infiltration	40%	60%	80%	0.80	0.19	94.61
LC-3537-IB-04	Category E: Filtering Practices	Infiltration Basin	0.34	0.23	0.11	07/2007	Infiltration	40%	60%	80%	1.18	0.28	135.29
LC-3537-IB-05	Category E: Filtering Practices	Infiltration Basin	0.42	0.24	0.18	07/2007	Infiltration	40%	60%	80%	1.40	0.31	143.61
LC-3537-SW-01	Category E: Filtering Practices	Swale	0.36	0.21	0.15	07/2007	Wet Swale	20%	45%	60%	0.60	0.20	94.39
LC-3849-BR-01	Category E: Filtering Practices	Bioretention Areas	0.30	0.19	0.11	00/2006	Bioretention	25%	45%	55%	0.64	0.17	76.57
LC-3849-BR-02	Category E: Filtering Practices	Bioretention Areas	0.30	0.27	0.03	00/2006	Bioretention	25%	45%	55%	0.68	0.22	101.06
LC-3849-BR-03	Category E: Filtering Practices	Bioretention Areas	0.30	0.28	0.02	00/2006	Bioretention	25%	45%	55%	0.69	0.23	105.21
LC-3849-BR-04	Category E: Filtering Practices	Bioretention Areas	0.30	0.18	0.12	00/2006	Bioretention	25%	45%	55%	0.63	0.17	74.31
LC-3849-BR-05	Category E: Filtering Practices	Bioretention Areas	0.30	0.14	0.16	00/2006	Bioretention	25%	45%	55%	0.61	0.15	62.45
LC-7-DP-01	Category B: Dry Detention, Hydrodynamic Structure	Dry Pond	0.28	0.16	0.12	07/2006	Dry Swale	25%	45%	55%	0.59	0.15	66.24
LC-7-SW-01	Category E: Filtering Practices	Swale	0.34	0.20	0.14	07/2006	Wet Swale	20%	45%	60%	0.57	0.19	89.72
LC-CB125-BR-01	Category E: Filtering Practices	Bioretention Areas	0.11	0.02	0.09	00/2008	Bioretention	25%	45%	55%	0.20	0.04	12.45
LC-CB125-BR-02	Category E: Filtering Practices	Bioretention Areas	0.10	0.04	0.06	00/2008	Bioretention	25%	45%	55%	0.20	0.05	18.23
								Total POC Reduction (lbs/yr)			36.7	11.1	5,344

JEB Little Creek BMPs (July 1, 2009 to June 30, 2014)

NAVFAC BMP Inventory							VA Clearinghouse BMP Type	Ches Bay Program Efficiency			Ches Bay Program Efficiency POC Reduction (lbs/yr)		
BMP	BMP Category	BMP Class	Treatment (ac)	Impervious (ac)	Pervious (ac)	Install Year		TN	TP	TSS	TN	TP	TSS
LC-124-EEDB-01	Category C: Dry Extended Detention	Enhanced Extended Detention Basin	10.89	4.03	6.86	07/2010	Extended Detention Pond	20%	20%	60%	17.16	2.10	2052.89
LC-1259-IB-01	Category E: Filtering Practices	Infiltration Basin	1.03	0.48	0.55	11/2012	Infiltration	40%	60%	80%	3.34	0.67	304.42
LC-1259-IB-02	Category E: Filtering Practices	Infiltration Basin	0.34	0.14	0.20	11/2012	Infiltration	40%	60%	80%	1.09	0.21	91.99
LC-1259-IB-03	Category E: Filtering Practices	Infiltration Basin	0.02	0.02	0.00	11/2012	Extended Detention Pond	20%	20%	60%	0.04	0.01	8.12
LC-1559-IT-01	Category E: Filtering Practices	Infiltration Trench	1.70	0.00	1.70	00/2011	Infiltration	40%	60%	80%	4.75	0.51	137.47
LC-1622-IT-01	Category E: Filtering Practices	Infiltration Trench	1.00	0.65	0.35	00/2011	Infiltration	40%	60%	80%	3.42	0.79	380.31
LC-1625-EDB-01	Category C: Dry Extended Detention	Extended Detention Basin	3.15	1.95	1.20	00/2010	Extended Detention Pond	20%	20%	60%	5.34	0.81	864.80
LC-3093-BR-01	Category E: Filtering Practices	Bioretention Areas	0.49	0.35	0.14	08/2012	Bioretention	25%	45%	55%	1.07	0.31	138.09
LC-3093-PP-01	Category D: Infiltration Practices	Porous Pavement	0.02	0.02	0.00	08/2012	Permeable Pavement	10%	20%	55%	0.02	0.01	7.45
LC-3093-PP-02	Category D: Infiltration Practices	Porous Pavement	0.03	0.03	0.00	08/2012	Permeable Pavement	10%	20%	55%	0.03	0.01	11.17
LC-3093-PP-03	Category D: Infiltration Practices	Porous Pavement	0.05	0.05	0.00	08/2012	Permeable Pavement	10%	20%	55%	0.05	0.02	18.62
LC-3093-PP-04	Category D: Infiltration Practices	Porous Pavement	0.02	0.02	0.00	08/2012	Permeable Pavement	10%	20%	55%	0.02	0.01	7.45
LC-3093-UDD-01	Category B: Dry Detention, Hydrodynamic Structure	Underground Dry Detention Facility	1.33	1.29	0.04	08/2012	Extended Detention Pond	20%	20%	60%	2.48	0.46	526.38
LC-3335-BR-01	Category E: Filtering Practices	Bioretention Areas	0.12	0.06	0.06	2014	Bioretention	25%	45%	55%	0.25	0.06	25.67
LC-3335-BR-02	Category E: Filtering Practices	Bioretention Areas	0.33	0.17	0.17	2014	Bioretention	25%	45%	55%	0.70	0.17	72.74
LC-3335-BR-03	Category E: Filtering Practices	Bioretention Areas	0.16	0.08	0.08	2014	Bioretention	25%	45%	55%	0.33	0.08	34.23
LC-3335-BR-04	Category E: Filtering Practices	Bioretention Areas	0.52	0.09	0.43	2014	Bioretention	25%	45%	55%	0.96	0.17	57.41
LC-3335-BR-05	Category E: Filtering Practices	Bioretention Areas	0.40	0.13	0.27	2014	Bioretention	25%	45%	55%	0.78	0.16	63.41
LC-3335-BR-06	Category E: Filtering Practices	Bioretention Areas	0.66	0.34	0.32	2014	Bioretention	25%	45%	55%	1.36	0.34	144.38
LC-3335-BR-07	Category E: Filtering Practices	Bioretention Areas	0.22	0.14	0.09	2014	Bioretention	25%	45%	55%	0.49	0.13	57.13
LC-3432-IT-01	Category E: Filtering Practices	Infiltration Trench	1.92	0.82	1.10	07/2012	Infiltration	40%	60%	80%	6.16	1.20	533.02
LC-3432-IT-02	Category E: Filtering Practices	Infiltration Trench	2.71	1.12	1.59	07/2012	Infiltration	40%	60%	80%	8.65	1.66	735.11
LC-3432-IT-03	Category E: Filtering Practices	Infiltration Trench	0.61	0.43	0.18	07/2012	Infiltration	40%	60%	80%	2.12	0.51	247.42
LC-3432-SW-01	Category E: Filtering Practices	Swale	0.26	0.19	0.07	06/2012	Wet Swale	20%	45%	60%	0.45	0.17	81.42
LC-3509-IB-01	Category E: Filtering Practices	Infiltration Basin	1.97	0.60	1.37	04/2012	Infiltration	40%	60%	80%	6.08	1.04	433.63
LC-3509-IB-02	Category E: Filtering Practices	Infiltration Basin	1.07	0.33	0.74	04/2012	Infiltration	40%	60%	80%	3.31	0.57	239.98
LC-3509-PP-01	Category D: Infiltration Practices	Porous Pavement	1.09	1.07	0.02	04/2012	Permeable Pavement	10%	20%	55%	1.02	0.38	401.06

JEB Little Creek BMPs (July 1, 2009 to June 30, 2014)

NAVFAC BMP Inventory							VA Clearinghouse BMP Type	Ches Bay Program Efficiency			Ches Bay Program Efficiency POC Reduction (lbs/yr)		
BMP	BMP Category	BMP Class	Treatment (ac)	Impervious (ac)	Pervious (ac)	Install Year		TN	TP	TSS	TN	TP	TSS
LC-3808-BR-01	Category E: Filtering Practices	Bioretention Areas	0.31	0.14	0.17	01/2011	Bioretention	25%	45%	55%	0.63	0.15	61.58
LC-3808-BR-02	Category E: Filtering Practices	Bioretention Areas	0.46	0.20	0.26	01/2011	Bioretention	25%	45%	55%	0.92	0.22	88.28
LC-3808-BR-03	Category E: Filtering Practices	Bioretention Areas	0.36	0.34	0.02	01/2011	Bioretention	25%	45%	55%	0.83	0.27	127.70
LC-3808-BR-04	Category E: Filtering Practices	Bioretention Areas	0.32	0.30	0.02	01/2011	Bioretention	25%	45%	55%	0.74	0.24	112.81
LC-3808-BR-05	Category E: Filtering Practices	Bioretention Areas	0.26	0.16	0.10	01/2011	Bioretention	25%	45%	55%	0.55	0.15	65.13
LC-3808-BR-06	Category E: Filtering Practices	Bioretention Areas	0.22	0.15	0.07	01/2011	Bioretention	25%	45%	55%	0.47	0.13	59.74
LC-3808-BR-07	Category E: Filtering Practices	Bioretention Areas	0.15	0.05	0.10	01/2011	Bioretention	25%	45%	55%	0.29	0.06	24.18
LC-3811-IB-01	Category E: Filtering Practices	Infiltration Basin	0.49	0.23	0.26	10/2011	Infiltration	40%	60%	80%	1.59	0.32	145.58
LC-3841-BR-01	Category E: Filtering Practices	Bioretention Areas	0.35	0.17	0.18	01/2011	Bioretention	25%	45%	55%	0.71	0.18	73.30
LC-3841-BR-02	Category E: Filtering Practices	Bioretention Areas	0.28	0.17	0.11	01/2011	Bioretention	25%	45%	55%	0.59	0.16	69.41
LC-3842-BR-01	Category E: Filtering Practices	Bioretention Areas	0.22	0.13	0.09	01/2011	Bioretention	25%	45%	55%	0.46	0.12	53.40
LC-3842-BR-02	Category E: Filtering Practices	Bioretention Areas	0.33	0.18	0.15	01/2011	Bioretention	25%	45%	55%	0.68	0.18	75.36
LC-3889-BR-01	Category E: Filtering Practices	Bioretention Areas	0.12	0.07	0.05	06/2013	Bioretention	25%	45%	55%	0.25	0.07	28.84
LC-3889-BR-02	Category E: Filtering Practices	Bioretention Areas	0.12	0.11	0.01	06/2013	Bioretention	25%	45%	55%	0.28	0.09	41.51
LC-3889-BR-03	Category E: Filtering Practices	Bioretention Areas	0.12	0.09	0.04	06/2013	Bioretention	25%	45%	55%	0.26	0.08	33.59
LC-3889-IB-01	Category E: Filtering Practices	Infiltration Basin	4.99	3.79	1.20	06/2013	Infiltration	40%	60%	80%	17.59	4.36	2149.52
LC-3889-PP-01	Category D: Infiltration Practices	Porous Pavement	0.20	0.20	0.00	06/2013	Permeable Pavement	10%	20%	55%	0.19	0.07	74.46
LC-3889-PP-02	Category D: Infiltration Practices	Porous Pavement	0.21	0.21	0.00	06/2013	Permeable Pavement	10%	20%	55%	0.20	0.07	78.19
LC-CB125-BR-03	Category E: Filtering Practices	Bioretention Areas	0.49	0.19	0.30	01/2011	Bioretention	25%	45%	55%	0.97	0.22	87.42
LC-CB125-BR-04	Category E: Filtering Practices	Bioretention Areas	0.28	0.06	0.22	01/2011	Bioretention	25%	45%	55%	0.53	0.10	35.84
LC-Cove-OYS-01*	NA	Oyster Reef	0.07	NA	NA	09/2014	Not Applicable	103**	NA	64,700**	7.12	0.00	4470.78
								Total POC Reduction (lbs/yr)			107.3	19.8	15,632

*Pollutant removals based on research completed by the Virginia Institute of Marine Science
**lbs/ac/yr

Naval Station Norfolk BMPs (January 1, 2006 to June 30, 2009)

NAVFAC BMP Inventory							VA Clearinghouse BMP Type	Ches Bay Program Efficiency			Ches Bay Program Efficiency POC Reduction (lbs/yr)		
BMP	BMP Category	BMP Class	Treatment (ac)	Impervious (ac)	Pervious (ac)	Install Year		TN	TP	TSS	TN	TP	TSS
NSN-LP34-BR-01	Category E: Filtering Practices	Bioretention Areas	1.67	0.00	1.67	2006	Bioretention	25%	45%	55%	2.92	0.38	92.84
NSN-O27-BR-01	Category E: Filtering Practices	Bioretention Areas	0.30	0.00	0.30	01/2009	Bioretention	25%	45%	55%	0.52	0.07	16.68
NSN-O27-BR-02	Category E: Filtering Practices	Bioretention Areas	0.30	0.00	0.30	01/2009	Bioretention	25%	45%	55%	0.52	0.07	16.68
NSN-O27-BR-03	Category E: Filtering Practices	Bioretention Areas	0.30	0.00	0.30	01/2009	Bioretention	25%	45%	55%	0.52	0.07	16.68
NSN-O27-BR-04	Category E: Filtering Practices	Bioretention Areas	0.30	0.00	0.30	01/2009	Bioretention	25%	45%	55%	0.52	0.07	16.68
NSN-O27-BR-05	Category E: Filtering Practices	Bioretention Areas	0.31	0.00	0.31	01/2009	Bioretention	25%	45%	55%	0.54	0.07	17.23
NSN-O27-BR-06	Category E: Filtering Practices	Bioretention Areas	0.22	0.00	0.22	01/2009	Bioretention	25%	45%	55%	0.38	0.05	12.23
NSN-O27-BR-07	Category E: Filtering Practices	Bioretention Areas	0.27	0.00	0.27	01/2009	Bioretention	25%	45%	55%	0.47	0.06	15.01
NSN-O27-EDB-01	Category C: Dry Extended Detention	Extended Detention Basin	5.17	1.81	3.36	01/2009	Extended Detention Pond	20%	20%	60%	8.10	0.97	938.24
NSN-P1-BR-01	Category E: Filtering Practices	Bioretention Areas	0.26	0.00	0.26	2008	Bioretention	25%	45%	55%	0.46	0.06	14.68
NSN-P86-BR-01	Category E: Filtering Practices	Bioretention Areas	0.22	0.00	0.22	2009	Bioretention	25%	45%	55%	0.38	0.05	12.23
NSN-P86-BR-02	Category E: Filtering Practices	Bioretention Areas	0.26	0.00	0.26	2009	Bioretention	25%	45%	55%	0.45	0.06	14.45
NSN-P86-EDB-01	Category C: Dry Extended Detention	Extended Detention Basin	0.77	0.29	0.48	2009	Extended Detention Pond	20%	20%	60%	1.22	0.15	146.90
NSN-Q47-BR-01	Category E: Filtering Practices	Bioretention Areas	1.97	0.33	1.64	2009	Bioretention	25%	45%	55%	3.64	0.63	215.59
NSN-Q47-BR-02	Category E: Filtering Practices	Bioretention Areas	1.96	0.22	1.74	2009	Bioretention	25%	45%	55%	3.55	0.56	177.25
NSN-Q47-BR-03	Category E: Filtering Practices	Bioretention Areas	1.95	0.31	1.64	2009	Bioretention	25%	45%	55%	3.59	0.62	207.23
NSN-Q47-BR-04	Category E: Filtering Practices	Bioretention Areas	0.75	0.11	0.64	2009	Bioretention	25%	45%	55%	1.38	0.23	77.33
NSN-Q47-BR-05	Category E: Filtering Practices	Bioretention Areas	0.94	0.14	0.80	2009	Bioretention	25%	45%	55%	1.73	0.29	96.92
NSN-Q47-BR-06	Category E: Filtering Practices	Bioretention Areas	0.44	0.06	0.38	2009	Bioretention	25%	45%	55%	0.80	0.13	42.58
NSN-Q47-BR-07	Category E: Filtering Practices	Bioretention Areas	0.80	0.13	0.67	2009	Bioretention	25%	45%	55%	1.47	0.25	85.02
NSN-Q47-BR-08	Category E: Filtering Practices	Bioretention Areas	0.42	0.05	0.37	2009	Bioretention	25%	45%	55%	0.77	0.13	40.64
NSN-Q47-BR-09	Category E: Filtering Practices	Bioretention Areas	0.25	0.04	0.21	2009	Bioretention	25%	45%	55%	0.46	0.08	25.78
NSN-Q47-BR-10	Category E: Filtering Practices	Bioretention Areas	0.54	0.08	0.46	2009	Bioretention	25%	45%	55%	0.99	0.17	55.68
NSN-Q47-BR-11	Category E: Filtering Practices	Bioretention Areas	0.43	0.11	0.32	2009	Bioretention	25%	45%	55%	0.82	0.16	57.95
NSN-Q47-BR-12	Category E: Filtering Practices	Bioretention Areas	0.58	0.12	0.46	2009	Bioretention	25%	45%	55%	1.09	0.20	70.82
NSN-Q47-BR-13	Category E: Filtering Practices	Bioretention Areas	1.52	0.08	1.44	2009	Bioretention	25%	45%	55%	2.70	0.39	108.57
NSN-SP28-BR-01	Category E: Filtering Practices	Bioretention Areas	0.52	0.05	0.47	2008	Bioretention	25%	45%	55%	0.93	0.14	44.52
NSN-SP48-BR-01	Category E: Filtering Practices	Bioretention Areas	1.58	0.58	1.01	2008	Bioretention	25%	45%	55%	3.11	0.68	269.95
NSN-SP48-BR-02	Category E: Filtering Practices	Bioretention Areas	0.74	0.03	0.71	2008	Bioretention	25%	45%	55%	1.32	0.19	51.96
NSN-SP48-EDB-01	Category C: Dry Extended Detention	Extended Detention Basin	0.97	0.20	0.78	2008	Extended Detention Pond	20%	20%	60%	1.46	0.15	127.48
NSN-V88-FLT-01	Category E: Filtering Practices	Organic Media Filter	0.75	0.00	0.75	4/1/2008	Filtering Practice	40%	60%	80%	2.09	0.22	60.49
NSN-Y109-BR-01	Category E: Filtering Practices	Bioretention Areas	1.50	0.57	0.94	2009	Bioretention	25%	45%	55%	2.96	0.66	262.34
NSN-Y109-BR-02	Category E: Filtering Practices	Bioretention Areas	1.50	0.42	1.08	2009	Bioretention	25%	45%	55%	2.87	0.57	215.46
NSN-Z312-BR-01	Category E: Filtering Practices	Bioretention Areas	0.19	0.00	0.19	2006	Bioretention	25%	45%	55%	0.33	0.04	10.34

Naval Station Norfolk BMPs (January 1, 2006 to June 30, 2009)

NAVFAC BMP Inventory							VA Clearinghouse BMP Type	Ches Bay Program Efficiency			Ches Bay Program Efficiency POC Reduction (lbs/yr)		
BMP	BMP Category	BMP Class	Treatment (ac)	Impervious (ac)	Pervious (ac)	Install Year		TN	TP	TSS	TN	TP	TSS
NSN-Z312-DRR-01	Category G: Impervious Surface Reduction	Disconnection of Rooftop Runoff	0.25	0.00	0.25	2006	Rooftop	0%	0%	0%	0.00	0.00	0.00
								Total POC Reduction (lbs/yr)			55.1	8.6	3,634

Naval Station Norfolk BMPs (July 1, 2009 to June 30, 2014)

NAVFAC BMP Inventory							VA Clearinghouse BMP Type	Ches Bay Program Efficiency			Ches Bay Program Efficiency POC Reduction (lbs/yr)		
BMP	BMP Category	BMP Class	Treatment (ac)	Impervious (ac)	Pervious (ac)	Install Year		TN	TP	TSS	TN	TP	TSS
NSN-A50-GR-01	Category G: Impervious Surface Reduction	Green Roof	0.25	0.00	0.25	2010	Vegetated Roof	0%	0%	0%	0.00	0.00	0.00
NSN-CD13-BR-01	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-BR-02	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-BR-03	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-BR-04	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-BR-05	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-BR-06	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-BR-07	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-BR-08	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-BR-09	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-BR-10	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-BR-11	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-BR-12	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-BR-13	Category E: Filtering Practices	Bioretention Areas	0.51	0.00	0.51	06/2011	Bioretention	25%	45%	55%	0.89	0.11	28.35
NSN-CD13-DP-01	Category B: Dry Detention, Hydrodynamic Structure	Dry Pond	0.51	0.00	0.51	06/2011	Dry Swale	25%	45%	55%	0.89	0.11	28.35
NSN-CEP178-BR-01	Category E: Filtering Practices	Bioretention Areas	0.49	0.00	0.49	08/2011	Bioretention	25%	45%	55%	0.86	0.11	27.24
NSN-CEP178-BR-02	Category E: Filtering Practices	Bioretention Areas	0.89	0.00	0.89	08/2011	Bioretention	25%	45%	55%	1.56	0.20	49.48
NSN-LF**-HDS-01	Category H: Street Sweeping, Catch Basin Inserts	Hydrodynamic Structures	7.57	3.785	3.785	09/2009	Filtering Practice	40%	60%	80%	24.80	5.13	2355.84
NSN-LF**-UDD-01	Category B: Dry Detention, Hydrodynamic Structure	Underground Dry Detention Facility	7.57	3.785	3.785	09/2009	Extended Detention Pond	20%	20%	60%	12.40	1.71	1766.88
NSN-LP21-BR-01	Category E: Filtering Practices	Bioretention Areas	0.1	0.1	0	12/2012	Bioretention	25%	45%	55%	0.23	0.08	37.23
NSN-LP33-BR-01	Category E: Filtering Practices	Bioretention Areas	0.14	0.14	0	12/2012	Bioretention	25%	45%	55%	0.33	0.11	52.12
NSN-LP33-BR-02	Category E: Filtering Practices	Bioretention Areas	0.01	0.01	0	12/2012	Bioretention	25%	45%	55%	0.02	0.01	3.72
NSN-LP34-BR-02	Category E: Filtering Practices	Bioretention Areas	0.06	0.06	0	12/2012	Bioretention	25%	45%	55%	0.14	0.05	22.34
NSN-LP34-BR-03	Category E: Filtering Practices	Bioretention Areas	0.03	0.03	0	12/2012	Bioretention	25%	45%	55%	0.07	0.02	11.17
NSN-LP49-BR-01	Category E: Filtering Practices	Bioretention Areas	1.00	0.00	1.00	2010	Bioretention	25%	45%	55%	1.75	0.23	55.59
NSN-LP49-BR-02	Category E: Filtering Practices	Bioretention Areas	0.66	0.00	0.66	2011	Bioretention	25%	45%	55%	1.15	0.15	36.64
NSN-V47-IB-01	Category E: Filtering Practices	Infiltration Basin	0.33	0.00	0.33	2011	Infiltration	40%	60%	80%	0.92	0.10	26.69
NSN-SP233-EDB-01	Category C: Dry Extended Detention	Extended Detention Basin	6.80	1.30	5.50	2010	Extended Detention Pond	20%	20%	60%	10.13	1.01	861.58
NSN-WB200-IB-01	Category E: Filtering Practices	Infiltration Basin	8.41	5.96	2.45	9/30/2011	Infiltration	40%	60%	80%	29.24	7.03	3425.77
NSN-W5-SW-01	Category E: Filtering Practices	Swale	0.43	0.15	0.17	2012	Wet Swale	20%	45%	60%	0.53	0.16	72.75
NSN-W5-SW-02	Category E: Filtering Practices	Swale	0.43	0.15	0.17	2012	Wet Swale	20%	45%	60%	0.53	0.16	72.75
NSN-W5-SW-03	Category E: Filtering Practices	Swale	0.22	0.15	0.17	2012	Wet Swale	20%	45%	60%	0.53	0.16	72.75

Naval Station Norfolk BMPs (July 1, 2009 to June 30, 2014)

NAVFAC BMP Inventory							VA Clearinghouse BMP Type	Ches Bay Program Efficiency			Ches Bay Program Efficiency POC Reduction (lbs/yr)		
BMP	BMP Category	BMP Class	Treatment (ac)	Impervious (ac)	Pervious (ac)	Install Year		TN	TP	TSS	TN	TP	TSS
NSN-W5-SW-04	Category E: Filtering Practices	Swale	0.22	0.15	0.17	2012	Wet Swale	20%	45%	60%	0.53	0.16	72.75
NSN-CEP76-IB-01	Category E: Filtering Practices	Infiltration Basin	0.56	0.14	0.42	04/2013	Infiltration	40%	60%	80%	1.70	0.27	109.78
NSN-CEP76-IB-02	Category E: Filtering Practices	Infiltration Basin	1.99	1.21	0.78	04/2013	Infiltration	40%	60%	80%	6.73	1.51	718.35
NSN-V70-FLT-01	Category E: Filtering Practices	Organic Media Filter	4.96	0.25	4.71	09/2009	Filtering Practice	40%	60%	80%	14.11	1.68	516.26
NSN-V70-FLT-02	Category E: Filtering Practices	Organic Media Filter	4.96	0.25	4.71	09/2009	Filtering Practice	40%	60%	80%	14.11	1.68	516.26
NSN-V71-FLT-01	Category H; Street Sweeping, Catch Basin Inserts	Hydrodynamic Structures	9.51	9.51	0.00	09/2009	Filtering Practice	40%	60%	80%	35.72	10.04	5150.16
								Total POC Reduction (lbs/yr)			170.5	33.4	16,431

NSA Hampton Roads BMPs (January 1, 2006 to June 30, 2009)

NAVFAC BMP Inventory							VA Clearinghouse BMP Type	Ches Bay Program Efficiency			Ches Bay Program Efficiency POC Reduction (lbs/yr)		
BMP	BMP Category	BMP Class	Treatment (ac)	Impervious (ac)	Pervious (ac)	Install Year		TN	TP	TSS	TN	TP	TSS
NSA-NH33-DP-01	Category B: Dry Detention, Hydrodynamic Structure	Dry Pond	2.5	1.68	0.82	05/2006	Dry Swale	25%	45%	55%	5.38	1.52	671.08
NSA-NH95-BR-01	Category E: Filtering Practices	Bioretention Areas	0.1	0.1	0	04/2009	Bioretention	25%	45%	55%	0.23	0.08	37.23
NSA-NH95-BR-02	Category E: Filtering Practices	Bioretention Areas	0.09	0.09	0	04/2009	Bioretention	25%	45%	55%	0.21	0.07	33.51
NSA-NH95-BR-03	Category E: Filtering Practices	Bioretention Areas	0.11	0.11	0	04/2009	Bioretention	25%	45%	55%	0.26	0.09	40.95
NSA-NH95-BR-04	Category E: Filtering Practices	Bioretention Areas	0.13	0.13	0	04/2009	Bioretention	25%	45%	55%	0.31	0.10	48.40
								Total POC Reduction (lbs/yr)			6.4	1.9	831

NSA Hampton Roads BMPs (July 1, 2009 to June 30, 2014)

NAVFAC BMP Inventory							VA Clearinghouse BMP Type	Ches Bay Program Efficiency			Ches Bay Program Efficiency POC Reduction (lbs/yr)		
BMP	BMP Category	BMP Class	Treatment (ac)	Impervious (ac)	Pervious (ac)	Install Year		TN	TP	TSS	TN	TP	TSS
NSA-NH32-IB-01	Category E: Filtering Practices	Infiltration Basin	2.88	2.03	0.84	08/2012	Infiltration	40%	60%	80%	9.97	2.40	1167.28
NSA-NH32-IB-02	Category E: Filtering Practices	Infiltration Basin	0.78	0.46	0.31	08/2012	Infiltration	40%	60%	80%	2.59	0.58	274.18
NSA-NH46-IB-01	Category E: Filtering Practices	Infiltration Basin	1.51	0.90	0.61	2012	Infiltration	40%	60%	80%	5.09	1.13	536.72
								Total POC Reduction (lbs/yr)			17.7	4.1	1,978

Portsmouth Annex BMPs (July 1, 2009 to June 30, 2014)

NAVFAC BMP Inventory							VA Clearinghouse BMP Type	Ches Bay Program Efficiency			Ches Bay Program Efficiency POC Reduction (lbs/yr)		
BMP	BMP Category	BMP Class	Treatment (ac)	Impervious (ac)	Pervious (ac)	Install Year		TN	TP	TSS	TN	TP	TSS
NMC-247-BR-01	Category E: Filtering Practices	Bioretention Area	0.37	0.17	0.20	2010	Bioretention	25%	45%	55%	0.75	0.18	74.4
NMC-247-BR-02	Category E: Filtering Practices	Bioretention Area	0.42	0.30	0.12	2010	Bioretention	25%	45%	55%	0.91	0.26	118.4
								Total POC Reduction (lbs/yr)			1.7	0.4	193

Scott Center Annex BMPs (July 1, 2009 to June 30, 2014)

NAVFAC BMP Inventory							VA Clearinghouse BMP Type	Ches Bay Program Efficiency			Ches Bay Program Efficiency POC Reduction (lbs/yr)		
BMP	BMP Category	BMP Class	Treatment (ac)	Impervious (ac)	Pervious (ac)	Install Year		TN	TP	TSS	TN	TP	TSS
SC-1717-RP-01	Category A: Wet Ponds and Wetlands	Retention Pond (Wet)	9.52	7.47	2.05	2013	Wet Pond	20%	45%	60%	16.89	6.38	3158.37
								Total POC Reduction (lbs/yr)			16.9	6.4	3,158

POC Loads as of June 30, 2009
JEB Fort Story

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 06/30/09	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)
Regulated Urban Impervious	Nitrogen	133.08	9.39	1,250
Regulated Urban Pervious		148.07	6.99	1,035
Regulated Urban Impervious	Phosphorus	133.08	1.76	234
Regulated Urban Pervious		148.07	0.5	74
Regulated Urban Impervious	Total Suspended Solids	133.08	676.94	90,087
Regulated Urban Pervious		148.07	101.08	14,967

POC Loads as of July 1, 2014
JEB Fort Story

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 07/01/14	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 07/01/14 (lbs/yr)
Regulated Urban Impervious	Nitrogen	139.26	9.39	1,308
Regulated Urban Pervious		141.89	6.99	992
Regulated Urban Impervious	Phosphorus	139.26	1.76	245
Regulated Urban Pervious		141.89	0.5	71
Regulated Urban Impervious	Total Suspended Solids	139.26	676.94	94,270
Regulated Urban Pervious		141.89	101.08	14,342

Total Load Change from "New Sources" between June 30, 2009 and July 1, 2014
JEB Fort Story

Subsource	Pollutant	Estimated Total POC Load as of 07/01/14 (lbs/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)	Load Change (lbs/yr)	Total Load Change (lbs/yr)	5% Reduction of Total Load Change
Regulated Urban Impervious	Nitrogen	1307.64	1,250	58.03	14.8	0.74
Regulated Urban Pervious		991.79	1,035	-43.20		
Regulated Urban Impervious	Phosphorus	245.10	234	10.88	7.8	0.39
Regulated Urban Pervious		70.94	74	-3.09		
Regulated Urban Impervious	Total Suspended Solids	94270.15	90,087	4183.58	3,559	177.94
Regulated Urban Pervious		14341.98	14,967	-624.69		

POC Loads as of June 30, 2009
JEB Little Creek

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 06/30/09	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)
Regulated Urban Impervious	Nitrogen	545.72	9.39	5,124
Regulated Urban Pervious		631.81	6.99	4,416
Regulated Urban Impervious	Phosphorus	545.72	1.76	960
Regulated Urban Pervious		631.81	0.5	316
Regulated Urban Impervious	Total Suspended Solids	545.72	676.94	369,419
Regulated Urban Pervious		631.81	101.08	63,863

POC Loads as of July 1, 2014
JEB Little Creek

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 07/01/14	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 07/01/14 (lbs/yr)
Regulated Urban Impervious	Nitrogen	568.83	9.39	5,341
Regulated Urban Pervious		608.70	6.99	4,255
Regulated Urban Impervious	Phosphorus	568.83	1.76	1,001
Regulated Urban Pervious		608.70	0.5	304
Regulated Urban Impervious	Total Suspended Solids	568.83	676.94	385,064
Regulated Urban Pervious		608.70	101.08	61,527

Total Load Change from "New Sources" between June 30, 2009 and July 1, 2014
JEB Little Creek

Subsource	Pollutant	Estimated Total POC Load as of 07/01/14 (lbs/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)	Load Change (lbs/yr)	Total Load Change (lbs/yr)	5% Reduction of Total Load Change
Regulated Urban Impervious	Nitrogen	5341.31	5,124	217.01	55.5	2.77
Regulated Urban Pervious		4254.81	4,416	-161.54		
Regulated Urban Impervious	Phosphorus	1001.14	960	40.67	29.1	1.46
Regulated Urban Pervious		304.35	316	-11.56		
Regulated Urban Impervious	Total Suspended Solids	385063.78	369,419	15644.60	13,309	665.43
Regulated Urban Pervious		61527.40	63,863	-2336.04		

POC Loads as of June 30, 2009
Naval Air Station Oceana

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 06/30/09	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)
Regulated Urban Impervious	Nitrogen	306.68	9.39	2,880
Regulated Urban Pervious		1359.93	6.99	9,506
Regulated Urban Impervious	Phosphorus	306.68	1.76	540
Regulated Urban Pervious		1359.93	0.5	680
Regulated Urban Impervious	Total Suspended Solids	306.68	676.94	207,603
Regulated Urban Pervious		1359.93	101.08	137,462

POC Loads as of July 1, 2014
Naval Air Station Oceana

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 07/01/14	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 07/01/14 (lbs/yr)
Regulated Urban Impervious	Nitrogen	306.68	9.39	2,880
Regulated Urban Pervious		1359.93	6.99	9,506
Regulated Urban Impervious	Phosphorus	306.68	1.76	540
Regulated Urban Pervious		1359.93	0.5	680
Regulated Urban Impervious	Total Suspended Solids	306.68	676.94	207,603
Regulated Urban Pervious		1359.93	101.08	137,462

Total Load Change from "New Sources" between June 30, 2009 and July 1, 2014
Naval Air Station Oceana

Subsource	Pollutant	Estimated Total POC Load as of 07/01/14 (lbs/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)	Load Change (lbs/yr)	Total Load Change (lbs/yr)	5% Reduction of Total Load Change
Regulated Urban Impervious	Nitrogen	2879.71	2,880	0.00	0.0	0.00
Regulated Urban Pervious		9505.92	9,506	0.00		
Regulated Urban Impervious	Phosphorus	539.75	540	0.00	0.0	0.00
Regulated Urban Pervious		679.97	680	0.00		
Regulated Urban Impervious	Total Suspended Solids	207602.56	207,603	0.00	0	0.00
Regulated Urban Pervious		137461.88	137,462	0.00		

POC Loads as of June 30, 2009
Naval Station Norfolk

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 06/30/09	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)
Regulated Urban Impervious	Nitrogen	1434.10	9.39	13,466
Regulated Urban Pervious		1047.30	6.99	7,321
Regulated Urban Impervious	Phosphorus	1434.10	1.76	2,524
Regulated Urban Pervious		1047.30	0.5	524
Regulated Urban Impervious	Total Suspended Solids	1434.10	676.94	970,798
Regulated Urban Pervious		1047.30	101.08	105,861

POC Loads as of July 1, 2014
Naval Station Norfolk

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 07/01/14	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 07/01/14 (lbs/yr)
Regulated Urban Impervious	Nitrogen	1456.89	9.39	13,680
Regulated Urban Pervious		1024.50	6.99	7,161
Regulated Urban Impervious	Phosphorus	1456.89	1.76	2,564
Regulated Urban Pervious		1024.50	0.5	512
Regulated Urban Impervious	Total Suspended Solids	1456.89	676.94	986,229
Regulated Urban Pervious		1024.50	101.08	103,557

Total Load Change from "New Sources" between June 30, 2009 and July 1, 2014
Naval Station Norfolk

Subsource	Pollutant	Estimated Total POC Load as of 07/01/14 (lbs/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)	Load Change (lbs/yr)	Total Load Change (lbs/yr)	5% Reduction of Total Load Change
Regulated Urban Impervious	Nitrogen	13680.22	13,466	214.04	54.7	2.74
Regulated Urban Pervious		7161.28	7,321	-159.33		
Regulated Urban Impervious	Phosphorus	2564.13	2,524	40.12	28.7	1.44
Regulated Urban Pervious		512.25	524	-11.40		
Regulated Urban Impervious	Total Suspended Solids	986228.53	970,798	15430.16	13,126	656.31
Regulated Urban Pervious		103556.85	105,861	-2304.02		

POC Loads as of June 30, 2009
Naval Support Activity Hampton Roads

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 06/30/09	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)
Regulated Urban Impervious	Nitrogen	291.47	9.39	2,737
Regulated Urban Pervious		455.97	6.99	3,187
Regulated Urban Impervious	Phosphorus	291.47	1.76	513
Regulated Urban Pervious		455.97	0.5	228
Regulated Urban Impervious	Total Suspended Solids	291.47	676.94	197,308
Regulated Urban Pervious		455.97	101.08	46,090

POC Loads as of July 1, 2014
Naval Support Activity Hampton Roads

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 07/01/14	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 07/01/14 (lbs/yr)
Regulated Urban Impervious	Nitrogen	299.93	9.39	2,816
Regulated Urban Pervious		447.52	6.99	3,128
Regulated Urban Impervious	Phosphorus	299.93	1.76	528
Regulated Urban Pervious		447.52	0.5	224
Regulated Urban Impervious	Total Suspended Solids	299.93	676.94	203,033
Regulated Urban Pervious		447.52	101.08	45,235

Total Load Change from "New Sources" between June 30, 2009 and July 1, 2014
Naval Support Activity Hampton Roads

Subsource	Pollutant	Estimated Total POC Load as of 07/01/14 (lbs/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)	Load Change (lbs/yr)	Total Load Change (lbs/yr)	5% Reduction of Total Load Change
Regulated Urban Impervious	Nitrogen	2816.32	2,737	79.42	20.3	1.01
Regulated Urban Pervious		3128.13	3,187	-59.12		
Regulated Urban Impervious	Phosphorus	527.87	513	14.89	10.7	0.53
Regulated Urban Pervious		223.76	228	-4.23		
Regulated Urban Impervious	Total Suspended Solids	203033.09	197,308	5725.35	4,870	243.52
Regulated Urban Pervious		45234.85	46,090	-854.90		

POC Loads as of June 30, 2009
Portsmouth Annex

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 06/30/09	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)
Regulated Urban Impervious	Nitrogen	51.00	9.39	479
Regulated Urban Pervious		39.15	6.99	274
Regulated Urban Impervious	Phosphorus	51.00	1.76	90
Regulated Urban Pervious		39.15	0.5	20
Regulated Urban Impervious	Total Suspended Solids	51.00	676.94	34,525
Regulated Urban Pervious		39.15	101.08	3,957

POC Loads as of July 1, 2014
Portsmouth Annex

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 07/01/14	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 07/01/14 (lbs/yr)
Regulated Urban Impervious	Nitrogen	51.40	9.39	483
Regulated Urban Pervious		38.75	6.99	271
Regulated Urban Impervious	Phosphorus	51.40	1.76	90
Regulated Urban Pervious		38.75	0.5	19
Regulated Urban Impervious	Total Suspended Solids	51.40	676.94	34,796
Regulated Urban Pervious		38.75	101.08	3,917

Total Load Change from "New Sources" between June 30, 2009 and July 1, 2014
Portsmouth Annex

Subsource	Pollutant	Estimated Total POC Load as of 07/01/14 (lbs/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)	Load Change (lbs/yr)	Total Load Change (lbs/yr)	5% Reduction of Total Load Change
Regulated Urban Impervious	Nitrogen	482.66	479	3.75	1.0	0.05
Regulated Urban Pervious		270.86	274	-2.79		
Regulated Urban Impervious	Phosphorus	90.47	90	0.70	0.5	0.03
Regulated Urban Pervious		19.37	20	-0.20		
Regulated Urban Impervious	Total Suspended Solids	34795.73	34,525	270.59	230	11.51
Regulated Urban Pervious		3916.83	3,957	-40.40		

POC Loads as of June 30, 2009
Scott Center Annex

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 06/30/09	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)
Regulated Urban Impervious	Nitrogen	27.57	9.39	259
Regulated Urban Pervious		25.27	6.99	177
Regulated Urban Impervious	Phosphorus	27.57	1.76	49
Regulated Urban Pervious		25.27	0.5	13
Regulated Urban Impervious	Total Suspended Solids	27.57	676.94	18,663
Regulated Urban Pervious		25.27	101.08	2,554

POC Loads as of July 1, 2014
Scott Center Annex

Subsource	Pollutant	Total Existing Acres Served by MS4 as of 07/01/14	2009 EOS Loading Rate (lbs/ac/yr)	Estimated Total POC Load as of 07/01/14 (lbs/yr)
Regulated Urban Impervious	Nitrogen	30.61	9.39	287
Regulated Urban Pervious		22.23	6.99	155
Regulated Urban Impervious	Phosphorus	30.61	1.76	54
Regulated Urban Pervious		22.23	0.5	11
Regulated Urban Impervious	Total Suspended Solids	30.61	676.94	20,721
Regulated Urban Pervious		22.23	101.08	2,247

Total Load Change from "New Sources" between June 30, 2009 and July 1, 2014
Scott Center Annex

Subsource	Pollutant	Estimated Total POC Load as of 07/01/14 (lbs/yr)	Estimated Total POC Load as of 06/30/09 (lbs/yr)	Load Change (lbs/yr)	Total Load Change (lbs/yr)	5% Reduction of Total Load Change
Regulated Urban Impervious	Nitrogen	287.42	259	28.54	7.3	0.36
Regulated Urban Pervious		155.40	177	-21.25		
Regulated Urban Impervious	Phosphorus	53.87	49	5.35	3.8	0.19
Regulated Urban Pervious		11.12	13	-1.52		
Regulated Urban Impervious	Total Suspended Solids	20720.55	18,663	2057.82	1,751	87.53
Regulated Urban Pervious		2247.19	2,554	-307.27		

Pollutant Calculations for Permit Cycle 1, Post 2006 BMPs Incorporated

JEB Fort Story

	Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Total Suspended Solids (lbs/yr)
5% of Existing Loads Required Reductions	8.73	2.14	966.3
5% of New Source Loads Required Reductions	0.74	0.39	177.9
Reduction from January 2006 to June 2009 BMPs	0.00	0.00	0.0
Reduction from July 2009 to June 2014 BMPs	9.87	2.13	1,054.5
Reqd Red. after January 2006 to June 2014 BMPs Incorp.	**-0.40**	**0.41**	**89.8**

Pollutant Calculations for Permit Cycle 1, Post 2006 BMPs Incorporated

JEB Little Creek

	Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Total Suspended Solids (lbs/yr)
5% of Existing Loads Required Reductions	36.31	8.83	3,973.6
5% of New Source Loads Required Reductions	2.77	1.46	665.4
Reduction from January 2006 to June 2009 BMPs	36.68	11.06	5,343.5
Reduction from July 2009 to June 2014 BMPs	107.30	19.79	15,632.4
Reqd Red. after January 2006 to June 2014 BMPs Incorp.	**-104.90**	**-20.56**	**-16,336.9**

Pollutant Calculations for Permit Cycle 1, Post 2006 BMPs Incorporated

Naval Air Station Oceana

	Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Total Suspended Solids (lbs/yr)
5% of Existing Loads Required Reductions	41.48	6.78	2,677.4
5% of New Source Loads Required Reductions	0.00	0.00	0.0
Reduction from January 2006 to June 2009 BMPs	0.00	0.00	0.0
Reduction from July 2009 to June 2014 BMPs	0.00	0.00	0.0
Reqd Red. after January 2006 to June 2014 BMPs Incorp.	**41.48**	**6.78**	**2,677.4**

Pollutant Calculations for Permit Cycle 1, Post 2006 BMPs Incorporated

Naval Station Norfolk

	Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Total Suspended Solids (lbs/yr)
5% of Existing Loads Required Reductions	82.56	22.09	10,171.1
5% of New Source Loads Required Reductions	2.74	1.44	656.3
Reduction from January 2006 to June 2009 BMPs	55.08	8.61	3,634.4
Reduction from July 2009 to June 2014 BMPs	170.55	33.36	16,431.0
Reqd Red. after January 2006 to June 2014 BMPs Incorp.	**-140.33**	**-18.44**	**-9,238.0**

Pollutant Calculations for Permit Cycle 1, Post 2006 BMPs Incorporated

Naval Support Activity Hampton Roads

	Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Total Suspended Solids (lbs/yr)
5% of Existing Loads Required Reductions	21.88	4.93	2,174.7
5% of New Source Loads Required Reductions	1.01	0.53	243.5
Reduction from January 2006 to June 2009 BMPs	6.39	1.86	831.2
Reduction from July 2009 to June 2014 BMPs	17.65	4.11	1,978.2
Reqd Red. after January 2006 to June 2014 BMPs Incorp.	**-1.15**	**-0.50**	**-391.1**

Pollutant Calculations for Permit Cycle 1, Post 2006 BMPs Incorporated

Portsmouth Annex

	Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Total Suspended Solids (lbs/yr)
5% of Existing Loads Required Reductions	2.98	0.79	362.6
5% of New Source Loads Required Reductions	0.05	0.03	11.5
Reduction from January 2006 to June 2009 BMPs	0.00	0.00	0.0
Reduction from July 2009 to June 2014 BMPs	1.66	0.44	192.8
Reqd Red. after January 2006 to June 2014 BMPs Incorp.	**1.36**	**0.37**	**181.3**

Pollutant Calculations for Permit Cycle 1, Post 2006 BMPs Incorporated

Scott Center Annex

	Nitrogen (lbs/yr)	Phosphorus (lbs/yr)	Total Suspended Solids (lbs/yr)
5% of Existing Loads Required Reductions	1.69	0.43	197.8
5% of New Source Loads Required Reductions	0.36	0.19	87.5
Reduction from January 2006 to June 2009 BMPs	0.00	0.00	0.0
Reduction from July 2009 to June 2014 BMPs	16.89	6.38	3,158.4
Reqd Red. after January 2006 to June 2014 BMPs Incorp.	**-14.83**	**-5.75**	**-2,873.0**