FINAL
Municipal Separate Storm Sewer System (MS4) Program Plan

JBLE–Eustis, Virginia

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Statement of Limitations

This report was prepared in accordance with the customary thoroughness and competence of environmental science and engineering consulting professionals and in accordance with the standard for professional services for a national consulting firm at the time these services were provided. The analysis, conclusions, and recommendations expressed in this report were developed based upon a limited scope of services and the information made available to AECOM at the time this work was conducted.

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LIST OF ABBREVIATIONS AND ACRONYMS

733d CED	773rd Civil Engineer Division
733d CED/CEIE	733rd Civil Engineer Division / Environmental Element
733d CED/CENM	733d Civil Engineer Division / Engineering Flight Project Management
733d CED/CENP	733d Civil Engineer Division / Engineering Flight Portfolio Optimization
733d CED/CEO	733rd Civil Engineer Division / Operations
733d CED/GIO	733rd Civil Engineer Division / GeoBase
AAFES	Army Air Force Exchange Service
AEC	Activity Environmental Coordinator
AEM	Advanced Environmental Management
AF	Air Force
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFCEE/EQ	Air Force Center for Environmental Excellence / Environmental Quality Directorate
AFDPO	Air Force Departmental Publishing Office
AFI	Air Force Instruction
AFOSH	Air Force Occupation Safety and Health
AFPD	Air Force Policy Directive
AST	Aboveground Storage Tank
ATSC	Army Training Support Center
BMP	Best Management Practice
BX	Base Exchange
CFT	Cross Functional Team
cfu	Colony-forming Units
CSCE	Comprehensive Site Compliance Evaluation
DoD	Department of Defense
DSN	Defense Switched Network
E&SC	Erosion and Sediment Control
EM	Emergency Management
EMAC	Environmental Management Awareness and Competency
EMP	Environmental Management Procedure
EMS	Environmental Management System
EPA	Environmental Protection Agency
EPC	Environmental Protection Committee
ESOH	Environmental, Safety, and Occupational Health
ESOHTN	Environmental, Safety, and Occupational Health Training Network
ETL	Engineering Technical Letter
FOG	Fats, Oils, and Grease
FSE	Food Service Establishment
FSS	Force Support Squadron
GIS	Geographic Information System
GMS	Global Management Services
GOV	Government Owned Vehicle
HQ AFCESA/CESC	Headquarters Air Force Civil Engineer Support Agency / Community and Environment Scrutiny Committee

LIST OF ABBREVIATIONS AND ACRONYMS (Continued)

HUC	Hydrologic Unit Code
HWC	Hazardous Waste Coordinator
ICP	Integrated Contingency Plan
IDDE	Illicit Discharge Detection and Elimination
ISO	International Organization for Standardization
ISS	Installation Support Section
JBLE–I	Joint Base Langley-Eustis Instruction
JRRF	James River Reserve Fleet
L2	Level 2
MARAD	Maritime Administration
MCM	Minimum Control Measure
MFH	Military Family Housing
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NCO	Non-Commissioned Officer
NMP	Nutrient Management Plan
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
ODUS	Old Dominion Utility Services
OPR	Office of Primary Responsibility
P2	Pollution Prevention
P4	Public-Public; Public-Private
PAO	Public Affairs Office
PCB	Polychlorinated Biphenyl
POC	Pollutants of Concern
POI	Program of Instruction
POL	Petroleum, Oil, and Lubricants
POV	Privately Owned Vehicle
PY	Permit Year
SDSFIE	Spatial Data Standards for Facilities, Infrastructure, and Environment
SMART	Specific, Measurable, Achievable, Realistic, and Timely
SMF	Stormwater Management Facility
SPCC	Spill Prevention, Control, and Countermeasures
SRP	Sustainable Range Program
SWCB	State Water Control Board
SPPP	Stormwater Pollution Prevention Plan
TA	Training Area
TEACH	The Environmental Awareness Course Hub
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TRADOC	United States Army Training and Doctrine Command
TSE	Training Support Enterprise
TSS	Total Suspended Solids
UA	Urbanized Areas
UEC	Unit Environmental Coordinator
U.S.	United States
USATC	United States Army Transportation Corps

LIST OF ABBREVIATIONS AND ACRONYMS (Continued)

VDEQ	Virginia Department of Environmental Quality
VDH	Virginia Department of Health
VESC	Virginia Erosion and Sediment Control
VESCL	Virginia Erosion and Sediment Control Law
VPDES	Virginia Pollutant Discharge Elimination System
VSMA	Virginia Stormwater Management Act
VSMP	Virginia Stormwater Management Program
WG	Working Group
WIP	Watershed Implementation Plan
WLA	Waste Load Allocation
WOAC	Warrant Officers Advanced Course

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January 2019

JBLE–Eustis
733d CED

SUBJECT: INSTALLATION-WIDE IMPLEMENTATION OF THE MS4 PROGRAM
TO: DISTRIBUTION

1. Forwarded is the "Municipal Separate Storm Sewer System (MS4) Program Plan" for Joint Base Langley Eustis–Eustis (JBLE–Eustis).

2. The long title of this document is the "Municipal Separate Storm Sewer System Program Plan for JBLE–Eustis" and the short title is "MS4 Program Plan."

3. This plan satisfies applicable state and federal requirements for the development of a MS4 Program Plan.

4. This document is UNCLASSIFIED; however, the maps included in Appendix B are FOR OFFICIAL USE ONLY in accordance with Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*.

5. This plan is effective for implementation upon receipt, and it has full support of the Installation Commander.

6. The Office of Primary Responsibility (OPR) for this document is 733rd Civil Engineer Division (733d CED).

7. This document will be reviewed annually and updated as is appropriate. All addressees of the plan are requested to advise this office of any factors that may prevent the execution of this plan as presented herein. Recommendations for changes should be submitted within 60 days after receipt of this document.

8. The OPR shall properly coordinate with the Environmental Protection Committee (EPC) to develop policies for employees and public awareness, staff training requirements, daily operating procedures, and internal inspection or auditing programs for this plan.

9. The OPR shall coordinate with the EPC to identify and correct deficiencies in the daily operating procedures, storage facilities, equipment, structures, and associated facilities.

Mr. Mark Sciacchitano
Director, 733d Civil Engineer Division

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)
PROGRAM PLAN CERTIFICATION

As required by Section III.K.2 of General Permit No. VAR040035, all reports required by state permits, and other information requested by the board shall be signed by a principal executive office or ranking elected official as described in 9 VAC 25-870-370(A), or a duly authorized representative.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Type or Print the following information:

Name: Mark Sciacchitano Area Code and Telephone No.: 757-878-3642

Official Title: Director, 733d Civil Engineer Division

Signature: Mark Sciacchitano Date Signed: 23 Apr 19

Permit Number: VAR040035 MS4 Name: Joint Base Langley Eustis – Eustis

MS4 Program Plan Requirements Cross-Reference Table

General Permit No. VAR040035		JBLE–Eustis MS4 Program Plan
Section / Table	**Description**	
Table 1	Schedule for MS4 Program Plan Updates Required in the Permit	Table 1-1
I.E.1	Minimum Control Measure (MCM) 1: Public Education and Outreach	Section 3.1
I.E.1.c	Updates to the education and outreach program and determination of program effectiveness	Sections 3.1.2 and 3.1.3
I.E.1.f	MS4 Program Plan Requirements for MCM 1	Section 3.1
I.E.2	MCM 2: Public Involvement and Participation	Section 3.2
I.B.2.e	MS4 Program Plan Requirements for MCM 2	Section 3.2
I.E.3	MCM 3: Illicit Discharge Detection and Elimination (IDDE)	Section 3.3 and Appendix D
I.E.3.b	Prohibit illicit discharges through ordinance	Section 3.3.2 and Appendix D
I.E.3.c	IDDE Procedures	Appendix D
I.E.3.d	MS4 Program Plan Requirements for MCM 3	Section 3.3
I.E.4	MCM 4: Construction Site Stormwater Runoff Control	Section 3.4 and Appendix E
I.E.4.b	MS4 Program Plan Requirements for MCM 4	Section 3.4 and Appendix E
I.E.5	MCM 5: Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands	Section 3.5
I.E.5.h	MS4 Program Plan Requirements for MCM 5	Section 3.5
I.E.6	MCM 6: Pollution Prevention / Good Housekeeping for Municipal Operations	Section 3.6
I.E.6.a	Municipal facility pollution prevention and good housekeeping Section	Sections 3.6.2 and 3.6.3; Appendix F
I.E.6.i	Turf and Landscape Management	Sections 3.6.2 and 3.6.3; Appendix G
I.E.6.m	Employee Training	Sections 3.6.2 and 3.6.3
I.E	MS4 Program Evaluation and Assessment	Sections 3.1.3, 3.2.3, 3.3.3, 3.4.3, 3.5.3, and 3.6.3; Appendix C
II.A	Special Condition for the Chesapeake Bay total maximum daily load (TMDL)	Sections 4.1; Appendix H
II.B	Special conditions for approved TMDLs for local TMDL	Section 4.2; Appendix I

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EXECUTIVE SUMMARY

Discharges from municipal separate storm sewer systems (MS4) are regulated under the Virginia Stormwater Management Act (VSMA), the Virginia Stormwater Management Program (VSMP) permit regulations, and the Clean Water Act as point source discharges. MS4 regulations were developed and implemented in two phases. Implementation of the first phase began in the early 1990s and required that operators of MS4s serving populations of greater than 100,000 people (per the 1990 decennial census) apply for and obtain a permit to discharge stormwater from their outfalls. The second phase of MS4 regulations became effective 23 March 2003 and required that operators of small MS4s in "urbanized areas" (UA) (as defined by the latest census) obtain a permit to discharge stormwater from their outfalls.

Joint Base Langley-Eustis – Fort Eustis (JBLE–Eustis), Virginia, holds a General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems, General Permit No. VAR040035, issued by the Commonwealth of Virginia Department of Environmental Quality (VDEQ) on 1 November 2018. In accordance with provisions outlined in this permit, JBLE–Eustis has developed and implemented a comprehensive stormwater management program designed to prevent or reduce the discharge of sediment and other pollutants into the installation's stormwater conveyance system. General Permit No. VAR040035 Section I.D.1 requires JBLE–Eustis to evaluate the MS4 program on an annual basis to assess program compliance, the appropriateness of the identified best management practices (BMPs), and progress towards achieving the identified measurable goals. Table ES-1 provides a checklist of compliance items for Permit Year 1 to be used to assist the installation with maintaining compliance with the permit and completing an assessment of the status of the six minimum control measures (MCM).

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Table ES-1. MS4 Program Plan Annual MCM Compliance Checklist

Minimum Control Measure / Special Condition	Program Compliance Requirement	
MCM 1: Public Education and Outreach	□	Review previous identified high-priority water quality issues for applicability. Identify new water quality issues as needed and provide justification for update in the program plan and annual report.
	□	Identify the target audience or audience who is most likely to have significant impacts for each high-priority water quality issue. **This should be reviewed and updated at least annually for existing issues.**
	□	Develop relevant messages and associated educational and outreach materials for message distribution to the selected target audiences from Table 1 in Part I.E.d of the permit.
	□	Provide for public participation during public education and outreach program development.
	□	Annually conduct sufficient education and outreach activities to reach the target audience. **Documentation of public participation opportunities for the permit year must be maintained and included in the annual report. **
	□	Assess the education and outreach program, identify any weaknesses or shortcomings, and provide for the adjustment of target audiences and messages including educational materials and delivery mechanisms.
	□	Update the Plan to include: 1. A list of high-priority stormwater issues to be communicated to the public 2. Rationale for selection of the issues 3. Identification of the audience 4. Strategies from Table 1 to be utilized 5. Anticipated time periods for the message

Table ES-1. MS4 Program Plan Annual MCM Compliance Checklist (Continued)

Minimum Control Measure / Special Condition		Program Compliance Requirement
MCM 1: Public Education and Outreach	□	Ensure that the following information is tracked for inclusion in the annual report: 1. A list of the high-priority stormwater issues addressed in the public education and outreach program 2. A list of the strategies used to communicate each high-priority stormwater issue
MCM 2: Public Involvement/Participation	□	Update the MS4 Program Plan at least annually.
	□	Post the MS4 Program Plan on the JBLE–Eustis Environmental website within 30 days of the submittal of the annual report to VDEQ.[1]
	□	Post the annual report for each permit year on the Environmental website within 30 days of submittal to VDEQ and retain copies of each annual report on the website for the duration of the permit term.
	□	Participate in at least four public activities from two separate categories from Table 2 in Part I.E.2.c, annually via promotion, sponsorship, or other involvement. **Documentation to justify the participation must be maintained for submittal with the annual report.**
	□	Maintain mechanisms for public comments and complaints, as well as a record of responses to public comments on the JBLE–Eustis Environmental website.
	□	Update the Plan to include: 1. Website address for public information regarding the MS4 program a. Mechanisms for the public to report (i) potential illicit discharges, improper disposal, or spills to the MS4; (ii) complaints regarding land disturbing activities; or (iii) other potential stormwater pollutant concerns b. Methods for how the public can provide input on the permittee's MS4 Program 2. A description of public involvement activities to be implemented by the permittee including the anticipated time period for activities and a metric for each activity to determine if it's beneficial to water quality.

Table ES-1. MS4 Program Plan Annual MCM Compliance Checklist (Continued)

Minimum Control Measure / Special Condition	Program Compliance Requirement	
MCM 2: Public Involvement/Participation	□	Ensure that the following information is tracked for inclusion in the annual report: 1. A summary of any public input on the MS4 program received (including stormwater complaints) and how it was responded to 2. A webpage address to the JBLE–Eustis MS4 program and stormwater website 3. A description of the public involvement activities implemented 4. A report of the metric as defined for each activity and an evaluation as to whether or not the activity is beneficial to improving water quality 5. The name of other MS4 permittees with whom JBLE–Eustis collaborated in the public involvement opportunities
MCM 3: Illicit Discharge Detection and Elimination	□	Maintain accurate stormwater discharge system maps with information specified in Section 3.3.1.
	□	Maintain an information table with information specified in Section 3.3.1.
	□	Prohibit non-stormwater discharges to the stormwater drainage system through an installation policy (equivalent of an ordinance and EMP).
	□	Promote, publicize, or otherwise facilitate public reporting of illicit discharges into or from MS4s (e.g., IDDE reporting hotline).
	□	Include all IDDE procedures developed with the MS4 Program Plan.
	□	Maintain a list of any notifications of physical interconnections that the installation provides to other MS4s.
	□	Maintain a list of the outfalls screened during the reporting period (i.e., permit year), dry weather screening results at each outfall, and details for any follow-up activities based on the screening results.
	□	Develop a brief summary to be included with the annual report of each suspected illicit discharge investigation conducted by 733d CED/CEIE personnel.
	□	Update the Plan to include: 1. MS4 map and information table required in Part I.E.3.a 2. Copies of written notifications of new physical interconnections given to other MS4s 3. IDDE Procedures described in Part I.E.3.c

Table ES-1. MS4 Program Plan Annual MCM Compliance Checklist (Continued)

Minimum Control Measure / Special Condition	Program Compliance Requirement	
MCM 3: Illicit Discharge Detection and Elimination	☐	Ensure that the following information is tracked for inclusion in the annual report: 1. A confirmation statement that the MS4 map and information table have been updates to reflect any changes to the MS4 occurring on or before 30 June of the reporting yeat 2. The total number of outfalls screened during the reporting period as part of the dry weather screening program 3. A list of illicit discharges to the MS4 including spills reaching the MS4 with information as follows: a. The source of the illicit discharge b. The date the discharge was observed, reported or both c. Whether the discharge was discovered during dry weather screening, reported by the public, or other method (describe) d. How the investigation was resolved e. A description of any follow-up activities f. The date the investigation was closed
MCM 4: Construction Site Stormwater Runoff Control	☐	Address discharges entering the MS4 from land-disturbing activities as defined in Section 3.4.1 of the MS4 Program Plan through the JBLE–Eustis Construction Site Stormwater Runoff Control Program.
	☐	Maintain and implement the Standards and Specifications for E&SC document, which outlines the installation Construction Site Stormwater Runoff Control Program.
	☐	Track on-going land-disturbing activities including completion of E&SC inspections.
	☐	Maintain required certifications for inspectors and plan reviewers. (See Section 3.4.2 for requirements)
	☐	Maintain the stormwater hotline and track reports of observations related to construction site stormwater control.
	☐	Incorporate E&SC control issues into required training for installation personnel.
	☐	Update the Plan to include: 1. Description of legal authorities utilized to ensure compliance with Part I.E.4.a. 2. Written inspection procedures to ensure the E&SCs are properly implemented and all associated documents utilized during inspection (including the inspection schedule) 3. Written procedures for requiring compliance through corrective action or enforcement action to the extent allowable 4. Roles and responsibilities of each of the permittee's departments/divisions/subdivisions for implementing the controls

Table ES-1. MS4 Program Plan Annual MCM Compliance Checklist (Continued)

Minimum Control Measure / Special Condition	Program Compliance Requirement	
MCM 4: Construction Site Stormwater Runoff Control	□	Ensure that the following information is tracked for inclusion in the annual report: 1. Total number of inspections conducted 2. Total number and type of enforcement actions implemented
MCM 5: Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands	□	Develop, implement and enforce a program for post-construction stormwater management. Review the program for the following items: • Description of legal authorities utilized to ensure compliance with the MCM. • Written procedures for SMF BMP • Written inspection procedures and associated documents utilized during the inspection (including inspection of privately-owned facilities [i.e., MFH])
	□	Implement ETL 14-1, Construction and Operations and Maintenance Guidance for Stormwater Systems.
	□	Completion of SMF inspections in accordance with ETL 14-1 and/or the manufacturer's and/or engineer of record's recommendations, but no less than annually.
	□	Track and maintain an up to date spreadsheet of all installation and privately-owned SMFs that discharge to the MS4. See Section 3.5.2 for items to be included in the tracking file. **This will be included in the annual report submitted to VDEQ. **
	□	Develop a report with the total number of SMF inspections completed during the reporting year, as well as the number of enforcement actions taken to ensure long term maintenance.
	□	Update the Plan to include: 1. A description of the legal authorities utilized to ensure compliance with Part I.E.5.a of the permit (e.g., ordinances, permits, orders, specific contract language, and interjurisdictional agreements 2. Written inspection procedures and all associated documents utilized during inspection of SMFs owned and/or operated by the permittee 3. Roles and responsibilities of each of the permittee's departments, divisions, etc. with regards to implementation of the post-construction program

Table ES-1. MS4 Program Plan Annual MCM Compliance Checklist (Continued)

Minimum Control Measure / Special Condition		Program Compliance Requirement
MCM 5: Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands	□	Ensure that the following information is tracked for inclusion in the annual report: 1. Total number of inspections conducted on SMFs owned or operated by the permittee 2. Description of significant maintenance, repair, or retrofit activities performed on the SMFs to ensure continued performance (exclude routine maintenance) 3. Confirmation statement that the permittee submitted SMF information through the Virginia Construction Stormwater General Permit database in accordance with Part I.E.5.g (or a statement saying no project requiring coverage were completed) 4. Confirmation statement that the permittee electronically reports BMPs using the VDEQ BMP Warehouse in accordance with Part I.E.5.g.
MCM 6: Pollution Prevention/Good Housekeeping for Municipal Operations	□	Develop and implement written procedures designed to minimize or prevent pollutant discharge from daily operations (e.g., road, street, and parking lot maintenance); equipment maintenance; and the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers.
	□	Maintain an up to date list of identified high-priority municipal (non-industrial) facilities and determine which facilities have a high potential of discharging pollutants. See Appendix F.
	□	Develop an SPPP for each facility determined to have a high potential of discharging pollutants based on Part I.E.6.b of the permit.
	□	Implement turf and landscape NMPs for all lands owned or operated by the installation where nutrients are applied to a contiguous area greater than one acre. Facilities that currently have a NMP are the Pines Golf Course, FSS Athletic Fields, and MFH.
	□	Annually track the total acreage of lands where NMPs are required as well as lands where NMPs have been implemented.
	□	Do not apply deicing agents containing urea or other forms of nitrogen or phosphorus to parking lots, roadways, sidewalks, or other paved surfaces.
	□	Conduct employee training as discussed in the Section 3.6.2 of the MS4 Program Plan, which outlines the installation annual training plan.

Table ES-1. MS4 Program Plan Annual MCM Compliance Checklist (Continued)

Minimum Control Measure / Special Condition		Program Compliance Requirement
MCM 6: Pollution Prevention/Good Housekeeping for Municipal Operations	□	Update the Plan to include: 2. Written procedures as required in Part I.E.6.a. 3. A list of all high priority facilities owned or operated by the permittee and whether the facility has a high potential for discharge. 4. A list of lands where NMPs are required and include the following information: a. Total acreage on which nutrients are applied b. Date of most recent approved NMP c. Location of the NMP 5. Summary of mechanisms implemented by the permittee to ensure contractors employed by the permittee implement the necessary P2 and good housekeeping procedures and SWPPPs. 6. Written training plan
	□	Ensure that the following information is tracked for inclusion in the annual report: 1. Summary of operational procedures developed or modified 2. Summary of any new SWPPPs developed 3. Summary of any modified SWPPPs, including the rationale of any high priority facilities delisted a. Summary of any new NMPs, including location, total acreage, and date of approved NMP 4. List of training events conducted, including the following information: a. Date of the training event b. Number of employees attending c. Objective of the training event
Chesapeake Bay TMDL Special Condition	□	Review and update the Chesapeake Bay TMDL Action Plan on an annual basis and report of the progress made to meet the Chesapeake Bay TMDL pollutant reduction requirements.
	□	Document methods utilized to implement the Chesapeake Bay TMDL Action Plan.
	□	Ensure that the following information is tracked for inclusion in the annual report: 1. A list of BMPs implemented during the reporting period but not reported to the VDEQ BMP Warehouse and the estimated reduction of pollutants of concern (lbs/year) for each. 2. If credits were acquired, a statement of the credits. 3. Progress toward meeting the required cumulative reductions for TN, TP, and TSS. 4. A list of BMPs that are planned to be implemented during the next reporting period.
Local TMDL Special Condition	□	Update and implement the Fecal Coliform TMDL Action Plans for the James River, Warwick River, and Skiffes Creek.

Table ES-1. MS4 Program Plan Annual MCM Compliance Checklist (Continued)

Minimum Control Measure / Special Condition		Program Compliance Requirement
Local TMDL Special Condition	□	Update the plan to include: 1. Incorporation of each local TMDL Action Plan. Local TMDL Action Plans may be incorporated by reference provided that the program plan includes the date of the most recent TMDL Action Plan and identification of the location where a copy of the Local TMDL Action Plan may be obtained
	□	Ensure that the following information is tracked for inclusion in the annual report: 1. A summary of actions conducted to implement each local TMDL Action Plan
Overall Program	□	Develop and deploy surveys to installation personnel and residents for feedback related to the implementation of each MCM, knowledge of the hotline, and general stormwater education awareness.

Note and Acronyms:

[1] Maps showing JBLE–Eustis assets and infrastructure are considered to be "For Official Use Only". Maps of the installation showing this information, specifically Appendix B of this Program Plan, will be removed from the version posted to the Environmental website.

BMP – Best Management Practice

EMP – Environmental Management Procedure

ETL – Engineering Technical Letter

E&SC – Erosion and sediment control

FSS – Force Support Squadron

IDDE – Illicit Discharge Detection and Elimination

MCM – Minimum Control Measure

MFH – Military Family Housing

MS4 – Municipal Separate Storm Sewer System

NMP – Nutrient Management Plan

SMF – Stormwater Management Facility

SPPP – Stormwater Pollution Prevention Plan

TMDL – Total Maximum Daily Load

VDEQ – Virginia Department of Environmental Quality

733d CED/CEIE – 733rd Civil Engineer Division / Environmental Element

1.0 INTRODUCTION

1.1 Purpose and Objectives

Joint Base Langley-Eustis – Fort Eustis (JBLE–Eustis), Virginia, holds a General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems, General Permit No. VAR040035, issued by the Commonwealth of Virginia Department of Environmental Quality (VDEQ) on 1 November 2018. In accordance with provisions outlined in this permit, JBLE–Eustis has developed and implemented a comprehensive stormwater management program designed to prevent or reduce the discharge of sediment and other pollutants into the installation's stormwater conveyance system.

The purpose of this Program Plan is to satisfy the regulatory requirements associated with the installation Municipal Separate Storm Sewer System (MS4) General Permit No. VAR040035 and to facilitate the management of activities that may affect water quality. The objective of this document is to serve as the primary reference for implementation of the MS4 Program and requirements outlined in General Permit No. VAR040035 including the six (6) minimum control measures (MCM) and two (2) special conditions related to water quality conditions. JBLE–Eustis is required to develop measurable goals and objectives, best management practices (BMP), and schedule for implementation. The six MCMs and two special conditions presented in the permit include:

- MCM 1: Public Education and Outreach
- MCM 2: Public Involvement and Participation
- MCM 3: Illicit Discharge Detection and Elimination (IDDE)
- MCM 4: Construction Site Stormwater Runoff Control
- MCM 5: Post-Construction Stormwater Management for New Development and Development on Prior Developed Lands
- MCM 6: Pollution Prevention and Good Housekeeping for Facilities Owned or Operated by the Permittee
- Chesapeake Bay Total Maximum Daily Load (TMDL) Special Condition
- Local TMDL Special Condition

This Plan documents the installation's efforts to comply with General Permit No. VAR040035 throughout the permit term (1 November 2018 – 31 October 2023). The Plan is required to be updated on an annual basis in conjunction with the Annual Report submitted to the VDEQ.

1.2 Plan Organization

This MS4 Program Plan is organized into the following sections:

- Section 1 includes the purpose and objectives of the MS4 Program Plan, plan organization, implementation authority, and records retention requirements.
- Section 2 discusses the MS4 service area as well as the subwatersheds located within the installation's boundaries.
- Section 3 describes each of the six MCMs, how JBLE–Eustis will implement and demonstrate compliance with each MCM listed in Section I.E of General Permit No. VAR040035; as well as annual reporting requirements related to each MCM.
- Section 4 presents the special condition requirements of General Permit No. VAR040035.
- Section 5 provides a list of additional documents that have been incorporated into the plan by reference as well as additional reference materials utilized by JBLE–Eustis to ensure compliance with the General Permit.
- Section 6 presents a list of references used during the preparation of this plan.

Additional information and documents incorporated into the MS4 Program Plan are included in the appendices listed below:

- Appendix A MS4 General Permit No. VAR040035
- Appendix B Overview Maps
- Appendix C MS4 Program Annual Reports
- Appendix D IDDE Procedure Manual
- Appendix E Standards and Specifications for Erosion and Sediment Control
- Appendix F Structural Stormwater Best Management Practices Inventory, Annual Inspection, and Management Plan
- Appendix G High Priority Facility Stormwater Pollution Prevention Plans
- Appendix H Nutrient Management Plans
- Appendix I Draft Phase II Chesapeake Bay TMDL Action Plan
- Appendix J Fecal Coliform TMDL Action Plan

1.3 MS4 Program Overview

Discharges from MS4s are regulated under the Virginia Stormwater Management Act (VSMA), the Virginia Stormwater Management Program (VSMP) Permit regulations, and the Clean Water Act as point source discharges. MS4 regulations were developed and implemented in two phases. Implementation of the first phase began in the early 1990s and required that operators of MS4s serving populations of greater than 100,000 people (per the 1990 decennial census) apply for and obtain a permit to discharge stormwater from their outfalls. The second phase of MS4 regulations became effective 23 March 2003 and required that

operators of small MS4s in "urbanized areas" (UA) (as defined by the latest census) obtain a permit to discharge stormwater from their outfalls.

The United States (U.S.) Environmental Protection Agency (EPA) defines a small MS4 as “any MS4 not already covered by the Phase I Program as a medium or large MS4. The Phase II Rule automatically covers on a nationwide basis all small MS4s located in UA as defined by the Bureau of the Census (unless waived by the National Pollutant Discharge Elimination System [NPDES] permitting authority), and on a case-by-case basis those small MS4s located outside of UAs that the NPDES permitting authority designates.” In addition to this, the Phase II Final Rule, as stated in EPA’s Fact Sheet 2.1, requires the NPDES permitting authority to develop a set of designation criteria and apply them, at a minimum, to all small MS4s located outside of a UA serving a jurisdiction with a population of at least 10,000 and a population density of at least 1,000 people per square mile.

The EPA defines medium and large MS4s under the Phase I Stormwater Program. The two categories are for incorporated places or counties with populations of 100,000 or greater. JBLE–Eustis has been designated as a small MS4 as defined by the EPA’s *Stormwater Phase II Final Rule* (EPA, 2005a and EPA, 2005b).

1.4 Roles and Responsibilities

Stormwater Program Manager

The Stormwater Program Manager at JBLE–Eustis is tasked with the responsibility of overseeing the Stormwater Program as prescribed in General Permit No. VAR040035. All questions and comments regarding the implementation of the installation Stormwater Program should be directed to the following contact:

Stormwater Program Manager

733d Civil Engineering Division

1407 Washington Blvd.

JBLE–Eustis, VA 23604

Phone: (757) 878-5218

Environmental Management System Cross Functional Team Water Quality Working Group

As part of Virginia Pollutant Discharge Elimination System (VPDES) Permit No. VA0025216, JBLE–Eustis has identified a team of individuals that help to develop, implement, maintain, and revise the installation industrial stormwater pollution prevention plan (SPPP). In addition to these responsibilities, JBLE–Eustis has incorporated the Environmental Management System (EMS) Cross Functional Team (CFT) Water Quality Working Group into the MS4 Program in order to help implement the individual

MCM programs. The 733rd Civil Engineer Division / Environmental Element (733d CED/CEIE) Stormwater Program Manager acts as the Water Quality Working Group Team Leader.

The purpose of the EMS CFT Water Quality Working Group is to assist in the implementation, evaluation, and revision of the installation MS4 Program. Team responsibilities include, but are not limited to, the following:

- Implementing MS4 Permit No. VAR040035 and MS4 Program Plan requirements
- Defining and agreeing upon an appropriate set of goals for the stormwater management programs
- Being aware of any changes that are made in operations to determine whether any changes must be made to the MS4 Program Plan
- Maintaining a clear line of communication with installation leadership to ensure a cooperative partnership

The EMS CFT Water Quality Working Group at JBLE–Eustis is outlined in Table 1-1.

Table 1-1. EMS CFT Water Quality Working Group and Responsibilities, JBLE–Eustis

Title	Responsibilities
EMS CFT Water Quality Working Group Team Leader *Stormwater Program Manager*	• Schedules EMS CFT Water Quality Working Group meetings. • Reviews and approves SPPP updates and modifications, including the annual Comprehensive Site Compliance Evaluation (CSCE) report. • Coordinates implementation of the SPPP. • Reviews and approves MS4 Program Plan updates and modifications. • Coordinates implementation of the MS4 Program Plan • Prepares cost estimates for BMP implementation. • Monitors compliance with schedule plan activities. • Conducts or contracts the annual inspection. • Prepares/reviews the CSCE and other documents prior to submittal to the 733d CED/CEIE Chief. • Monitors activity operations for changes that may affect the SPPP and MS4 Program Plan. • Conducts or contracts for the annual inspection and certification of non-stormwater dry weather discharges (i.e., illicit discharge dry weather screening) for industrial and MS4 outfalls. (MS4 outfall inspection schedules are provided in the IDDE Procedure Manual in Appendix D of the MS4 Program Plan.) • Updates the SPPP to reflect recent spills and BMPs implemented to prevent reoccurrences. • Reviews and updates the SPPP and MS4 Program Plan, at a minimum, annually. • Develops an MS4 Program Annual Report and completes an assessment of the program implementation for the reporting period. • Coordinates with VDEQ regarding spills and mitigation measures. • Assists industrial activity areas with BMP implementation. • Arranges appropriate SPPP and MS4 required training for EMS CFT Water Quality Working Group members. • Arranges for additional training for facility personnel as needed on good housekeeping and procedural BMPs (e.g., drip pans and vehicle/equipment washing). • Conducts or selects another EMS CFT Water Quality Working Group member with knowledge of the stormwater system to visually inspect industrial outfalls.
Team Member *733d CED/CEIE Chief*	• Reviews the CSCE and other documents.

Table 1-1. EMS CFT Water Quality Working Group and Responsibilities, JBLE-Eustis (Continued)

Team Member *Hazardous Materials/Waste Program Manager*	• Updates the hazardous materials/waste management standard operating procedure (SOP). • Conducts inspections of hazardous material and hazardous waste accumulation sites to determine compliance with hazardous materials/waste management SOP and SPPP.
Team Member *CE Engineering Flight Chief and CE Operations Flight Chief*	• Plans, manages, directs, and coordinates the operation and maintenance activities of the municipal utility systems (i.e., water, wastewater, and stormwater).
Team Member *Air Force Civil Engineer Center (AFCEC) Installation Support Section (ISS) Water Programs Support*	• Conducts/contracts the annual inspection, if required. • Reviews the CSCE and other documents prior to submittal to the SPPT Leader, as requested. • Conducts/contracts for the annual inspection and certification of non-stormwater dry weather discharges (i.e., illicit discharge dry weather screening) for industrial and MS4 outfalls. (MS4 outfall inspection schedules are provided in the IDDE Procedure Manual in Appendix D of the MS4 Program Plan.), if required. • Programs funding for stormwater-related services to support industrial and municipal stormwater compliance.
Team Member *733d Civil Engineering Division / Engineering Flight Portfolio Optimization (733d CED/CENP)*	• Responsible for planning and programming military construction, alteration, and improvement projects. • Responsible for oversight of contractor and Erosion and Sediment Control (E&SC) measures during construction projects.
Team Member *733d Civil Engineering Division / Engineering Flight Project Management (733d CED/CENM)*	• The 733d CED/CENM is responsible for professional engineering and architectural services to encompass the design and design review of facilities, including new construction, alteration, and repair projects.
Team Member *Fire and Emergency Services*	• Performs first responder duties for spills and implement BMPs to contain and clean up the spill. • Relays spill information and clean up measures to the Stormwater Program Manager.
Team Member(s) *Water/Land/Air Sector Maintenance Units*	• Performs facility inspections. • Implements SPPP BMPs for site-specific industrial activities.
Team Member(s) *Army Air Force Exchange Service (AAFES), Force Support Squadron (FSS), Pines Golf Course, Balfour Beatty, Range Control*	• Implement SPPP BMPs for site-specific MS4 activities included in the MS4 Program Plan (Appendix G). • Performs facility inspections. • Implement Nutrient Management Plans (FSS, Pines Golf Course, Balfour Beatty).

Table 1-1. EMS CFT Water Quality Working Group and Responsibilities, JBLE-Eustis (Continued)

Team Member *Public Affairs Office*	• Coordinates statements to the media and the Commonwealth's congressional delegation concerning any oil or hazardous substance spill events, in accordance with the JBLE–Eustis Integrated Contingency Plan (ICP). • Provides guidance to the EMS CFT Water Quality Working Group on the release of information related to stormwater management to the public.
Team Member *Judge Advocate*	• Provides guidance related to regulatory requirements applicable to the Stormwater Program.
Team Member *Qualified Contractor*	• Assist the Stormwater Program Manager and AFCEC ISS with the following tasks as requested: o Annual inspections o CSCE review and updates o Annual inspection and certification of non-stormwater dry weather discharges for industrial and MS4 outfalls • Review of permit and other regulatory requirements to which JBLE–Eustis is subject.

1.5 Regulatory Authority

The VDEQ has been delegated authority over Virginia's MS4 Program. All questions and comments regarding the implementation of the installation MS4 Program should be directed to the following contact:

MS4 Permits and Compliance Coordinator
Virginia Department of Environmental Quality
Tidewater Regional Office
5636 Southern Blvd
Virginia Beach, Virginia 23462
Phone: (757) 518-2136

1.6 Signatory Authority

General Permit No. VAR040035 Part III.K outlines the prescribed signatory authority criteria. The designated person for federal facilities is defined in General Permit No. VAR040035 Part III.K.1 (c) as a "principal executive officer or ranked elected official." As for the installation, a ranking official must sign all applications. All reports must be signed by the ranking official or by a duly authorized representative of that person, as allowed by Part III.K.2 of the permit. The 633rd Air Base Wing Commander will determine the authorized representative of JBLE–Eustis. A signed signatory authorization form is included in Appendix A.

Part III.K.2 further states that "A person is a duly authorized representative only if:

a) The authorization is made in writing by a person described in Part III.K.1;
b) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and
c) The signed and dated written authorization is submitted to the Department."

1.7 Program Management

General Permit No. VAR040035 requires JBLE–Eustis to evaluate the MS4 program on an annual basis to assess the following:

- Program compliance
- The appropriateness of the identified BMPs
- Progress towards achieving the identified measurable goals

Installation-wide orders to implement this MS4 Program Plan and the aspects of the Stormwater Management Program are signed by the Commander and are provided at the front of this document.

In addition, the installation must:

- Maintain records required by the permit for at least three (3) years. These records should only be submitted to VDEQ upon request.
- Submit annual reports for the reporting period (1 July through 30 June) to VDEQ by 1 October of the following year.

1.7.1 Environmental Program Management

JBLE–Eustis manages its environmental program through policy and installation specific environmental management instructions including:

- JBLE–Eustis Environmental Policy Statement (4 June 2013)
- JBLE–Eustis Instruction (JBLE–I) 32-101 – Environment Management (28 January 2014)
- JBLE–Eustis Environmental Management Procedures (EMPs) (updated annually)

Environmental Policy

The JBLE-Eustis Environmental Policy Statement published 4 June 2013 implements the C.L.E.A.N. approach.

- **C**omply – The installation will comply with all environmental regulations and all other requirements while reducing compliance costs and liabilities.
- **L**imit Impact – JBLE–Eustis will prevent pollution and minimize waste while cleaning up previously identified sites of environmental concern as well as striving to achieve Chesapeake Bay conservation.
- **E**xecute Plans – The installation will identify and attain energy, environment, safety, and occupational health objectives and targets through Specific, Measurable, Achievable, Realistic, and Timely (SMART) planning.
- **A**chieve Improvements – The installation will continuously improve the programs and processes currently being implemented at JBLE–Eustis through the use of effective management and planning.
- **N**otify – JBLE–Eustis will communicate environmental commitments and performance to all levels of the installation organization as well as the local community.

Environmental Management System

In addition to the Environmental Policy Statement, JBLE–I 32-101, *Environment Management*, published 28 January 2014, has been developed in order to define the framework for the Environmental Management System (EMS) and conform to International Organization for Standardization (ISO) 14001:2004.

The core component of the JBLE–Eustis EMS program consists of one cross functional team (CFT) with Working Groups (WG). The WGs will meet at least quarterly throughout the year and then brief the CFT. The CFT will meet semi-annually in February and August at JBLE–Eustis' Environmental, Safety, and Occupational Health (ESOH) Council meeting.

The ESOH Council is a forum to provide senior leadership involvement and direction at all levels of command; establish goals, measures, objectives and targets; and provide additional guidance to subordinate commands. The JBLE–Eustis ESOH Council is chaired by the 633d Air Base Wing Vice Commander.

The WGs develop objectives, targets, and tasks related to the previously determined significant aspects related to stormwater and then brief the CFT at the semiannual meetings. Significant aspects are re-evaluated every three years. The following significant aspects related to stormwater were identified by the CFT and updated in November 2018.

- Wetland Protection – Educate Mission Partners to avoid damage during operations and training, limit impact from construction and maintenance, and obtain proper permits
- Stormwater (Quality) – Identify best management practices and integrate the best management apparatus into all construction and repair projects
- Spills – Reduce number of reportable and non-reportable spills
- Hazardous Waste Reductions – Reduce waste but also reduce use, where possible, of hazardous materials that become wastes (Life Cycle approach)
- Stormwater (Quantity) – Ensure no net gain and reduce stormwater runoff as possible; identify Low Impact Development projects

During the recurring WG and CFT meetings, significant aspects will be reviewed and amended if emergent issues are identified. Emergent issues will also be presented to the ESOH Council.

Environmental Management Procedures

JBLE–Eustis has developed and implemented EMPs to address specific activities and installation operational requirements. JBLE–I 32-101 defines the installation's environmental policies and requirements, whereas the EMPs provide specific requirements for the implementation of the various environmental requirements (e.g., outline the requirements of the wastewater and stormwater programs). The installation maintains a website that provides environmental information to JBLE–Eustis personnel and residents (http://www.jble.af.mil/Units/Army/Eustis-Enviromental/). In addition to this website, installation personnel can also obtain the EMPs and Instruction 32-101 at https://usaf.learningbuilder.com.

1.7.2 Program Modifications

The MS4 Program Plan presents a summary of how JBLE–Eustis will implement and demonstrate compliance with each of the six MCMs listed in Section I.E of General Permit No. VAR040035. Table 1-2 summarizes the changes included in this Plan update. This table also presents a schedule for planning for future updates in order to maintain compliance with MS4 Permit No. VAR040035. Program update requirements that are due throughout the permit term specified in this table. In addition, continuous review and updates for requirements that have already been addressed are also specified.

Table 1-2. MS4 Program Plan Update and Schedule Summary

Item	Page	Program Update Requirement	Permit Reference	Compliance Deadline	Activities	MS4 Program Plan Update Summary	MS4 Program Future Schedule Summary
General Requirements							
1	1	MS4 Program Plan	I.C.1	N/A	The MS4 Program Plan: 1. Roles and responsibilities for implementation of the requirements of the permit. 2. If the permittee uses another entity to implement portions of the MS4 Program, describe those roles and provide a copy of the written agreement. 3. Include specified information for each MCM (refer to the permit).	This MS4 Program Plan meets all requirements specified in the permit Part I.C.1	All annual MS4 Program Plan updates will continue to follow Part I.C.1
1	2	Update MS4 Program Plan	I.C.3	1 May 2019	1. Update the MS4 Program Plan within 6 months of 1 November 2019. 2. Implement the MS4 Program Plan in effect until the MS4 Program Plan is updated. 3. Post the updated MS4 Program Plan on the JBLE websites within 30 days of the completion of the plan update.	This updated MS4 Program Plan will be finalized prior to the 1 May 2019 deadline. Once finalized, the program plan will be posted to the JBLE–Eustis Environmental website within 30 days	Not Applicable
3	3	Annual Reporting Requirements	I.D	1 October 2019	Submit an annual report for the period of 1 July – 30 June. The annual report must include the following: 1. Permittee, system name, and permit number 2. Reporting period time frame 3. Signed certification (Part III.K) 4. Each annual reporting item specified for the MCMs in Part I.E 5. An evaluation of MS4 Program implementation	The annual report for PY5 (1 July 2017 – 30 June 2018) of the 2013-2018 permit cycle was finalized and posted to the JBLE–Eustis Environmental website in September 2018.	Annual Reports will be submitted to VDEQ no later than 1 October of each year covering the previous permit year of 1 July – 30 June.
MCM 1 – Public Education and Outreach							
4	4	Public Education and Outreach Program	I.E.1.a	On-going	Implement a public education and outreach program.	JBLE–Eustis utilizes a public education and outreach program that targets personnel, contractors and residents with the goal of increasing the public's knowledge of how to reduce stormwater pollution as well as the hazards of illegal discharges and improper waste disposal	Continue to implement the public education and outreach program throughout the permit cycle.
5	4	Identify at least 3 high-priority stormwater issues	I.E.1.b	On-going	Review the high-priority stormwater issues annually and update as needed.	High-priority stormwater issues were reviewed and updated during PY5 of the previous permit cycle (2013-2018). The high-priority issue of *Curb illegal fats, oils, and grease disposal at FSEs, including food trucks, to the stormwater drainage system* was a new high-priority issue in PY5 of the previous permit cycle.	Continue to review high-priority stormwater issues at least annually and update as needed.
6	4 – 5	Public Education and Outreach	I.E.1.d.	Annually[1]	Use two or more of the strategies listed in Table 1 of the permit (page 5) per year to communicate to the public the high-priority stormwater issues identified	The following strategies were utilized during PY5 of the previous permit cycle and will continue to be utilized: • Media materials • Traditional written materials • Curriculum materials • Training materials • Speaking engagements	Continue to assess the most effective strategies for public education and outreach. Strategies used will be updated annually in the MS4 Program Plan and Annual Report.

Table 1-2. MS4 Program Plan Update and Schedule Summary (Continued)

Item	Page	Program Update Requirement	Permit Reference	Compliance Deadline	Activities	MS4 Program Plan Update Summary	MS4 Program Future Schedule Summary
MCM 1 – Public Education and Outreach (Continued)							
7	5 – 6	MS4 Program Plan Required	I.E.1.f(1)-(5)	1 May 2019	Update the Plan to include: 1. A list of high-priority stormwater issues to be communicated to the public 2. Rationale for selection of the issues 3. Identification of the audience 4. Strategies from Table 1 to be utilized 5. Anticipated time periods for the message	Section 3.1.2 of this MS4 Program Plan outlines how items 1-5 were addressed during PY5 of the previous permit cycle (2013-2018).	The MS4 Program Plan will be updated annually and each high-priority stormwater issue will be evaluated and updated in accordance with the permit.
MCM 2 – Public Involvement and Participation							
8	6	Develop and implement procedures	I.E.2.a	On-going	Develop and implement procedures to: 1. Report potential illicit discharges, improper disposal, or spills to the MS4, land disturbing activities, or other stormwater pollution concerns 2. Allow for public input into the MS4 Program Plan 3. Receive public input or complaints 4. Respond to public input or complaints received 5. Maintain documentation after the permit effective date	The JBLE–Eustis Environmental website maintains contact information for reporting observations or environmental concerns as well as for public input and complaints regarding the MS4	Continue to provide mechanisms for public involvement and comment. Documentation will continue to be maintained on all calls received.
9	6	MS4 Website	I.E.2.b	1 February 2019	1. Maintain a webpage dedicated to the MS4 program and stormwater pollution prevention. 2. The following information shall be posted on this webpage: a. The effective MS4 permit and coverage letter b. The most current MS4 Program Plan or location where the MS4 program plan can be obtained c. The annual report for each year of the term covered by this permit [no later than 30 days after submittal to the department] d. A mechanism for the public to report potential illicit discharges, improper disposal, or spills to the MS4, complaints regarding land disturbing activities, or other potential stormwater pollution concerns in accordance with Part I.E.2.a(1) e. Methods for how the public can provide input on the permittee's MS4 Program Plan in accordance with Part I.E.2.a(2)	The 733d CED/CEIE Maintains a website that provides information to the public, including the MS4 Program Plan and the MS4 Annual Reports. The website is located here: https://www.jble.af.mil/Units/Army/Eustis-Enviromental/	Continue to maintain the JBLE–Eustis Environmental website and post educational and reference information for the installation population.
10	6 – 7	Perform four (4) activities per year from two (2) or more categories	I.E.2.c	Annually[1]	Implement no less than four (4) activities per year from two or more of the categories listed in Table 2 to provide an opportunity for public involvement to improve water quality and support local restoration and clean-up projects.	Implemented the following activities in PY5: • Earth Week – included BMP cleanup, nature trail cleanup, wildlife boat tours, box turtle survey, among others. • Clean the Bay Day – teamed with local boy scout troop to pick up trash at Eustis Lake. • Environmental Partnership – JBLE–Eustis participates in the Secretary of the Air Force P4 Partnership Program. Communication with installation personnel and residents regularly through multiple channels and regular interactions with various community groups.	• Continue to host Earth Week events to engage base personnel and residents. • Continue participating in Clean the Bay Day and other Earth Week events hosted by MFH and FSS. • Continue to look for P4 partnerships to share resources and increase program effectiveness. • Develop focused educational messages to be disseminated via internal and external websites (e.g. Facebook, Twitter), the Peninsula Warrior, community group emails and websites. The anticipated time period for activities and a metric for each activity to determine if it's beneficial to water quality.

Table 1-2. MS4 Program Plan Update and Schedule Summary (Continued)

Item	Page	Program Update Requirement	Permit Reference	Compliance Deadline	Activities	MS4 Program Plan Update Summary	MS4 Program Future Schedule Summary
MCM 2 – Public Involvement and Participation (Continued)							
11	7	MS4 Program Plan Required	I.E.2.e(1)-(3)	1 May 2019	Update the Plan to include: 1. Website address for public information regarding the MS4 program a. Mechanisms for the public to report (i) potential illicit discharges, improper disposal, or spills to the MS4; (ii) complaints regarding land disturbing activities; or (iii) other potential stormwater pollutant concerns b. Methods for how the public can provide input on the permittee's MS4 Program 2. A description of public involvement activities to be implemented by the permittee including the anticipated time period for activities and a metric for each activity to determine if it's beneficial to water quality.	JBLE–Eustis Environmental website address was provided. Public involvement activities can be found in section 3.2.2 of this MS4 Program Plan.	Continue to provide and promote the JBLE–Eustis website where mechanisms for public reporting of stormwater concerns can occur as well as instruction for how the public can provide input on the MS4 Program. All public involvement activities will be reported in the MS4 Program Plan.
MCM 3 – Illicit Discharge Detection and Elimination							
12	8	Develop and maintain an MS4 map	I.E.3.a(1)	On-going	Develop and maintain an accurate MS4 map and information table that includes a map of the storm sewer system owned or operated by the permittee within the census urbanized area identified by the 2010 decennial census and includes: 1. MS4 outfalls discharging to surface waters 2. A unique identifier of each mapped item 3. The name and location of receiving waters 4. MS4 regulated service area 5. Stormwater management facilities (SMF) owned and operated by the permittee	A MS4 map has been developed and is continually maintained and updated. Maps are provided in Appendix B of this program plan	The maps will continue to be reviewed and updated as necessary
13	8	Develop and maintain an information table associated with MS4 map	I.E.3.a(2)	On-going	Maintain an information table associated with the storm sewer system map that includes the following information for each outfall or point of discharge: 1. A unique identifier of each mapped item 2. Latitude and longitude of the outfall or point of discharge 3. Estimated regulated acreage draining to the outfall or point of discharge 4. Name of the receiving water 5. 6th order Hydrologic Unit Code (HUC) of the receiving water 6. An indication as to whether the receiving water is listed as impaired in the Virginia 2016 305(b)/303(d) Water Quality Assessment Integrated Report. 7. Predominant land use for each outfall discharging to an impaired water 8. Name of any EPA approved total maximum daily loads (TMDL) for which the permittee is assigned a wasteload allocation (WLA)	Tables in the MS4 Program Plan provide required information associated with the storm system map. These can be found as Tables 2-1 and 2-2 in the Program Plan.	Continue to update tables as any applicable changes occur.
14	9	Submit the permittee's MS4 map to VDEQ	I.E.3.a(3)	1 July 2019	Submit a GIS-compatible shapefile of the permittee's MS4 map to VDEQ. If GIS format is not available, the map may be provided as a PDF. The maps must meet the criteria specified in Part I.E.3.a.	A GIS shapefile will be provided to VDEQ by 1 July 2019.	Not Applicable
15	9	Update the storm sewer system and outfall information table	I.E.3.a(4)	Annually by 1 October	Update the map and information table to include any new outfalls constructed or TMDLs approved or both during the immediate preceding reporting period.	Maps and tables were updated accordingly.	Continue to update storm sewer system map and outfall information annually.
16	9	Notification of Interconnection	I.E.3.a(5)	On-going	Provide written notification to any downstream adjacent MS4 of any known physical interconnection established or discovered after the effective date of the permit (1 November 2018).	There are no known physical interconnections with other MS4s.	733d CED/CEIE will continue to monitor the MS4 area to ensure there are no interconnections with other MS4s
17	9	Prohibition of Illicit Discharges	I.E.3.b	On-going	Prohibit through ordinance, policy, standard operating procedures, or other legal mechanism, unauthorized non-stormwater discharges into the storm sewer system.	JBLE–Eustis has developed a draft installation level policy prohibiting illicit discharges. The policy has been routed through installation management and is awaiting signature by the installation commander.	Finalize the draft installation level policy prohibiting illicit discharges.

Table 1-2. MS4 Program Plan Update and Schedule Summary (Continued)

Item	Page	Program Update Requirement	Permit Reference	Compliance Deadline	Activities	MS4 Program Plan Update Summary	MS4 Program Future Schedule Summary
MCM 3 – Illicit Discharge Detection and Elimination (Continued)							
18	9 – 11	IDDE Written Procedures	I.E.3.c	On-going	The permittee shall maintain, implement, and enforce IDDE written procedures designed to detect, identify, and address unauthorized non-stormwater discharges, including illegal dumping, to the small MS4 to effectively eliminate the unauthorized discharge. Refer to I.E.3.c.(1)-(6) for details on information to be included in the IDDE Procedures.	Written procedures outlined in *IDDE Procedure Manual* developed in August 2016. *IDDE Procedure Manual* can be found in Appendix D of this program plan.	Continue to utilize the *IDDE Procedure Manual* and update as needed to effectively address the detection and identification of illicit discharges.
19	11	MS4 Program Plan Required	I.E.3.d(1)-(3)	1 May 2019	Update the Plan to include: 1. MS4 map and information table required in Part I.E.3.a 2. Copies of written notifications of new physical interconnections given by the permittee to other MS4s 3. IDDE Procedures described in Part I.E.3.c	MS4 program updates can be found in section 2.2 (MS4 information tables) and section 3.3 of this program plan.	Continue to update MS4 Program Plan including MS4 map and information tables, any new physical interconnections with other MS4s, and IDDE written procedures.
MCM 4 – Construction Site Stormwater Runoff Control							
20	11 – 12	Utilize Legal Authority to Address Discharges Entering the MS4 from Regulated Construction Site Stormwater Runoff	I.E.4.a(4)	On-going	Inspect all land disturbing activities as defined in 62.1-44, 15:51 of the Code of Virginia that result in the disturbance activities of 10,000 square feet or greater (or 2,500 square feet or greater) in accordance with areas designated under the Chesapeake Bay Preservation Act. 1. During or immediately following initial installation of E&SC 2. At least once every two weeks 3. Within 48 hours following any runoff producing storm event 4. At the completion of the project prior to the release of any performance bond	There were three (3) qualifying land disturbing activities requiring inspection. These included: • AIT Barracks Complex Phase 3 Benedict Ave Demolition • Mulberry Island Walking Trail Addition • Main Gate Barricade	Continue to monitor all land disturbing activities on the installation and Inspect all qualifying land disturbing activities in accordance with Part I.E.4.a(4).
21	13	Implement Appropriate Controls to Prevent Non-Stormwater Discharges	I.E.4.b	On-going	Implement appropriate controls to prevent non-stormwater discharges (e.g., wastewater, concrete washout, fuels and oils, and other illicit discharges identified during land disturbing inspections) from discharging to the MS4.	The installation will utilize its legal authority to address discharges entering the MS4 from regulated construction site stormwater runoff. The installation will also utilize inspections and a hotline for installation personnel and residents to report observations and complaints related to land-disturbing activities	The installation will work to further promote the use of the reporting hotline by installation personnel and residents
22	13	MS4 Program Plan Required	I.E.4.c(1)-(6)	1 May 2019	Update the Plan to include: 1. Description of legal authorities utilized to ensure compliance with Part I.E.4.a. 2. Written inspection procedures to ensure the E&SCs are properly implemented and all associated documents utilized during inspection (including the inspection schedule) 3. Written procedures for requiring compliance through corrective action or enforcement action to the extent allowable 4. Roles and responsibilities of each of the permittee's departments/divisions/subdivisions for implementing the controls	JBLE–Eustis will follow the policies and procedures described in the Virginia Erosion and Sediment Control Regulations and the *Virginia Erosion and Sediment Control Handbook* JBLE–Eustis will implement and abide by the *Standards and Specifications for Erosion and Sediment Control* dated May 2016 and provided in Appendix E of this MS4 Program Plan.	Continue to follow and implement the *Virginia Erosion Sediment Control Handbook* and *Standards and Specifications for Erosion and Sediment Control*

Table 1-2. MS4 Program Plan Update and Schedule Summary (Continued)

Item	Page	Program Update Requirement	Permit Reference	Compliance Deadline	Activities	MS4 Program Plan Update Summary	MS4 Program Future Schedule Summary
MCM 4 – Construction Site Stormwater Runoff Control (Continued)							
23	13	Annual Report Tracking Requirements	I.E.5.d(1)-(3)	Annually by 1 October	Ensure that the following information is tracked for inclusion in the annual report: 1. Total number of inspections conducted 2. Total number and type of enforcement actions implemented	For the three (3) qualifying land disturbing activities, inspections were conducted as follows: • AIT Barracks Complex Phase 3 Benedict Ave Demolition – 4 inspections • Mulberry Island Walking Trail Addition – 4 inspections • Main Gate Barricade – 2 inspections A full report on enforcement actions can be found in the PY5 Annual Report which can be found in Appendix C	The annual reports will include the number of inspections completed and the total number and type of enforcement actions implemented.
MCM 5 – Post-Construction Stormwater Management for New Development and Development on Prior Developed Lands							
24	14	Address Post-Construction Stormwater Runoff	I.E.5.a(4)	On-going	Implement a post-construction stormwater runoff control program through compliance with 9 VAC 25-870 and with implementation of a maintenance and inspection program consistent with Part I.E.5.b of the permit.	This MS4 Program Plan section 3.5 specifies the elements of a post-construction stormwater runoff control program that will be implemented throughout the permit cycle.	The installation will continue to implement the post-stormwater runoff control program as outlined in section 3/5 of this program plan
25	15	SMF Inspection Program	I.E.5.b(1)-(2)	On-going	1. Develop and maintain written inspection and maintenance procedures for SMFs owned and operated by the permittee. 2. Inspect SMFs owned and operated by the permittee at least annually. 3. Conduct maintenance on SMFs (if required based on inspections) in accordance with written procedures developed under Part I.E.5.b(1).	The inspection and maintenance program for SMFs owned and/or operated by the permittee that discharges to the MS4 utilizes the *Structural Stormwater Best Management Practices Inventory, Annual Inspection, and Management Plan,* which can be found in Appendix F of this plan.	The inspection and maintenance procedures will be evaluated throughout the permit cycle. Inspections of SMFs will be conducted at least annually and any necessary maintenance performed
26	15 – 16	Maintain an SMF Inventory Database	I.E.5.d	On-going	1. Maintain an electronic database or spreadsheet of all known permittee owned or permittee-operated and privately owned SMFs discharging into the MS4. 2. Include all BMPs implemented by the permittee to meet the Chesapeake Bay TMDL load reduction as required in Part II.A of the permit. 3. Ensure that the database includes the following: a. SMF or BMP type b. SMF or BMP location (latitude and longitude) c. Acres treated by the SMF or BMP (total, pervious, and impervious) d. Date the SMF was brought online (MM/YYYY) e. 6th Order HUC for location of SMF f. Owner of the SMF or BMP (permittee or private ownership) g. If privately owned, whether a maintenance agreement exists h. Whether or not the SMF is part of the permittee's Chesapeake Bay TMDL Action Plan, a local TMDL Action Plan, or both i. Date of the most recent inspection of the SMF	JBLE–Eustis' Post-Construction Stormwater Management Program includes an electronic database or spreadsheet of all SMFs owned and/or operated SMFs that discharge into the MS4. The database also includes all BMPs implemented to meet the Chesapeake Bay TMDL load reduction.	Continue to maintain an electronic database or spreadsheet of all known owned and/or operated SMFs discharging into the MS4 in accordance with the requirements of Part I.E.5.d of the permit
27	16	SMF Inventory Database	I.E.5.e	30-days following a new SMF being brought online	Update the spreadsheet/database no later than 30 days after: 1. A new SMF is brought online; 2. A new BMP is implemented to meet TMDL load reduction as required in Part II; or, 3. Discovered if it is an existing SMF.	There have not been any new SMFs brought online in PY5 of the last permit cycle or since.	JBLE–Eustis will report any new SMFs or BMPs no later than 30 days after they are brought online or discovered.

Table 1-2. MS4 Program Plan Update and Schedule Summary (Continued)

Item	Page	Program Update Requirement	Permit Reference	Compliance Deadline	Activities	MS4 Program Plan Update Summary	MS4 Program Future Schedule Summary
MCM 5 – Post-Construction Stormwater Management for New Development and Development on Prior Developed Lands (Continued)							
28	16	Construction Stormwater Database	I.E.5.f	On-going	Utilize the VDEQ Construction Stormwater Database (or other application as specified by the department) to report each SMF installed after 1 July 2014 for which the permittee is required to obtain a General VPDES Permit for Discharges of Stormwater Construction Activities.	The installation will begin reporting SMFs installed after 1 July 2014 and which require a General VPDES Permit for Discharges of Stormwater Construction Activities.	Continually report each SMF installed after 1 July 2014 for which the installation is required to obtain a General VPDES Permit for Discharges of Stormwater Construction Activities utilizing the VDEQ Construction Stormwater Database.
29	16	Update DEQ BMP Warehouse	I.E.5.g	Annually by 1 October	1. Electronically report the SMFs and BMPs implemented between 1 July and 30 June of each year using the DEQ BMP Warehouse and associated reporting template. 2. This inventory is for any SMFs and BMPs not reported in accordance with Part I.E.5.f of the permit, including SMFs installed to control post-development stormwater runoff disturbing less than one (1) acre per the Chesapeake Bay Preservation Act and for which a General VPDES Permit for Discharges of Stormwater from Construction activities was NOT required.	The installation will begin reporting SMFs	JBLE–Eustis will submit by 1 October of each year the SMFs and BMPs implemented between 1 July and 30 June using the DEQ BMP Warehouse.
30	16 – 17	MS4 Program Plan Required	I.E.5.h(1)-(6)	1 May 2019	Update the Plan to include: 1. A description of the legal authorities utilized to ensure compliance with Part I.E.5.a of the permit (e.g., ordinances, permits, orders, specific contract language, and interjurisdictional agreements 2. Written inspection procedures and all associated documents utilized during inspection of SMFs owned and/or operated by the permittee 3. Roles and responsibilities of each of the permittee's departments, divisions, etc. with regards to implementation of the post-construction program	The legal authorities, regulations, policies, and procedures utilized to ensure compliance with the permit as they apply to MCM 5 can be found in section 3.5.2 of this program plan Inspection procedures are referenced from ET: 14-1 and can be found in section 3.5.2 of this program plan The EMS CFT Water Quality Working Group roles and responsibilities outlined in Table 1-1 as well as in section 3.5.2 of the program plan.	The program plan will be updated annually to meet the requirements of Part I.E.5.h(1)-(6)
31	17 – 18	Annual Report Tracking Requirements	I.E.5.i(1)-(5)	Annually by 1 October	Ensure that the following information is tracked for inclusion in the annual report: 1. Total number of inspections conducted on SMFs owned or operated by the permittee 2. Description of significant maintenance, repair, or retrofit activities performed on the SMFs to ensure continued performance (exclude routine maintenance) 3. Confirmation statement that the permittee submitted SMF information through the Virginia Construction Stormwater General Permit database in accordance with Part I.E.5.g (or a statement saying no project requiring coverage were completed) 4. Confirmation statement that the permittee electronically reports BMPs using the VDEQ BMP Warehouse in accordance with Part I.E.5.g.	All applicable information will be included in the Annual Report. The Annual Reports for PY3-5 of the previous permit cycle are provided in Appendix C of this program plan.	Annual Reports will be submitted and posted to the JBLE–Eustis Environmental website no later than 1 October of each year.
MCM 6 – Pollution Prevention and Good Housekeeping for Facilities Owned and Operated by the Permittee within the MS4 Service Area							
32	18	Written Procedures	I.E.6.a(1)-(7)	On-going	Maintain and implement for the following activities: 1. Road, street, and parking lot maintenance 2. Equipment maintenance 3. Application, storage, transport, and disposal of pesticides, herbicides, and fertilizers	Written procedures for the activities described in Part I.E.6.a(1)-(7) are described in section 3.6 of this MS4 Program Plan.	Continue to review and update the written procedures as needed

Table 1-2. MS4 Program Plan Update and Schedule Summary (Continued)

Item	Page	Program Update Requirement	Permit Reference	Compliance Deadline	Activities	MS4 Program Plan Update Summary	MS4 Program Future Schedule Summary
MCM 6 – Pollution Prevention and Good Housekeeping for Facilities Owned and Operated by the Permittee within the MS4 Service Area (Continued)							
33	18	Training	I.E.6.b	On-going	Ensure that written procedures are utilized as part of the employee training program (refer to Part I.E.6.m of the permit).	Section 3.6.1 specifies that the installation will implement the employee training ensuring the utilization of the written procedures	Employee training will continue to be implemented by utilizing the written procedures
34	18	High Priority Facilities Requiring Stormwater Pollution Prevention Plans (SWPPP)	I.E.6.c	1 November 2019	1. Identify high priority facilities that have a high potential for discharging pollutants. 2. Maintain and implement site-specific SWPPPs for each facility identified.	JBLE–Eustis operates under a comprehensive SPPP, which is designed to satisfy the requirements of VPDES Individual Permit No. VA0025216. High-priority non-industrial facilities have been included in the comprehensive SPPP (i.e. the Pines Golf Course, AAFES gas station and associated facilities, Base Exchange, and FSS Sport Field Maintenance facility) to manage to the same standard as the base's industrial facilities. High-priority non-industrial facilities incorporated into the SPPP were inspected for compliance with the SPPP as part of the annual CSCE. There are no new SPPPs required based on the annual site compliance evaluation.	Continue to assess any facilities that may have a high potential for discharging pollutants. These may be new facilities or facilities with a new use
35	19	High Priority Facility SWPPPs	I.E.6.d	On-going	Ensure the high priority facility SWPPPs contain the required information specified in Part I.E.6.d(1)-(8).		Review the SPPPs to ensure they contain all required information
36	19 – 20	Review High Priority Facilities for SWPPP Development	I.E.6.e	Annually by 30 June (review)	1. Review any high priority facilities for which a SWPPP has not been developed to determine if the facility has a high potential to discharge pollutants.		Continually monitor and assess high priority facilities that do not have a SPPP to determine if the facility has a high potential to discharge.
				Annually by 31 December (SWPPP)	Develop a SWPPP per Part I.E.6.d.		If a new SPPP is needed, one will be developed by 31 December of each year
37	20	SWPPP Review	I.E.6.f	30 days from Unauthorized Discharge	Review any site-specific SWPPP within 30 days of any unauthorized discharge, release, or spill reported in accordance with Part III.G to determine if additional measures are needed to prevent further unauthorized discharges.	There were no unauthorized discharges, releases or spills reported. Therefore, reviews were not required	In the event of an unauthorized discharge, release or spill from a high priority facility, a review will be conducted within 30 days
				90 days from Unauthorized Discharge	Revise the SWPPP within 90 days of the unauthorized incident if necessary based on the review.	No reviews were required, so no revisions have been made	In the event of an unauthorized incident and pending review, necessary revisions to the SPPP will be made
38	20	Training	I.E.6.g	On-going	1. Maintain the SWPPPs at the respective high priority facilities. 2. Ensure that the SWPPPs are utilized as part of the employee training program (refer to Part I.E.6.m of the permit).	SPPPs are maintained at their respective facilities and can be found in Appendix G of this program plan	SPPPs will continue to be maintained at their respective high priority facilities
39	20	SWPPP Removal	I.E.6.h	On-going	If facility activities no longer meet the criteria for requiring a site-specific SWPPP (Part I.E.6.c), remove the facility from the list of high-priority facilities with a high potential to discharge pollutants.	Site-specific SWPPPs will be reviewed annually to determine if they still have a high potential to discharge pollutants	Annually assess site-specific SWPPPs to determine if they still meet the criteria as a facility with a high potential to discharge pollutants
40	20	Turf and Landscape Nutrient Management Plans (NMP)	I.E.6.i	On-going	Maintain and implement NMPs that have been developed by a certified turf and landscape nutrient management planner.	NMPs were previously developed for The Pines Golf Course, MFH, and Athletic Fields. An additional NMP was developed and is being implemented for the Youth Athletic Fields. A total of 193 acres are currently covered under a NMP	Continue to implement existing NMPs and monitor for sites that may require a NMP.
41	20	Deicing Application	I.E.6.k	On-going	Ensure that deicing agents applied to parking lots, roadways, and sidewalks (or other paved surfaces) do not contain the following: 1. Urea 2. Other forms of nitrogen or phosphorus	JBLE–Eustis explicitly prohibits the use of fertilizers or mixtures containing urea and other forms of nitrogen or phosphorus as deicing agents applied to paved surfaces.	Continue to prohibit the use of illegal deicing agents

Table 1-2. MS4 Program Plan Update and Schedule Summary (Continued)

Item	Page	Program Update Requirement	Permit Reference	Compliance Deadline	Activities	MS4 Program Plan Update Summary	MS4 Program Future Schedule Summary
MCM 6 – Pollution Prevention and Good Housekeeping for Facilities Owned and Operated by the Permittee within the MS4 Service Area (Continued)							
42	20	Contractor Management	I.E.6.l	On-going	1. Ensure that contractors employed by the permittee and engaging in activities with the potential to discharge pollutants use the appropriate control measures to minimize the discharge of pollutants. 2. Options include contract language, training, standard operating procedures, or other measures within the permittee's legal authority.	JBLE–Eustis requires that contractors who work on the installation in varying capacities have completed the necessary training. These include but are not limited to pesticide/herbicide applicators; plan reviewers, inspectors, administrators, and construction site operators; and contractors who may implement the stormwater program.	Continue to work with contractors to minimize the potential of discharge by using control measures. This can be done through inspections and ensuring they have received proper trainings or certifications.
43	20 – 21	Training Plan	I.E.6.m(1)-(7)	On-going	Develop a training plan (in writing) for applicable staff that ensures the training is performed as specified in Part I.E.6.m(1)-(7).	EMP 4.4.2, *Environmental Awareness and Competency Training* requires JBLE–Eustis personnel to take EMAC and AEM training as appropriate based on personnel assignments within 30 days of arrival at the installation. Refresher training is required on an annual basis.	Continue to train and refresh all personnel with EMAC and AEM.
44	21	Maintain Training Documentation	I.E.6.n	On-going	1. Maintain documentation of each training event conducted by the permittee to fulfill the requirements of Part I.E.6.m for at least three (3) years after the training event. 2. Documentation must include: a. Date of the training event b. Number of employees attending c. Objective of the training event	All training events are tracked, and records maintained for at least three (3) years	Continue to track training events as outlined in Part I.E.6.n of the permit
45	21 – 22	MS4 Program Plan Required	I.E.5.h(1)-(6)	1 May 2019	Update the Plan to include: 1. Written procedures as required in Part I.E.6.a. 2. A list of all high priority facilities owned or operated by the permittee and whether the facility has a high potential for discharge. 3. A list of lands where NMPs are required and include the following information: a. Total acreage on which nutrients are applied b. Date of most recent approved NMP c. Location of the NMP 4. Summary of mechanisms implemented by the permittee to ensure contractors employed by the permittee implement the necessary P2 and good housekeeping procedures and SWPPPs. 5. Written training plan	MS4 Program Plan updates for MCM 6 can be found in section 3.6	Continue to update the MS4 Program Plan by 1 May annually.
46	22	Annual Report Tracking Requirements	I.E.6.q(1)-(5)	Annually by 1 October	Ensure that the following information is tracked for inclusion in the annual report: 1. Summary of operational procedures developed or modified 2. Summary of any new SWPPPs developed 3. Summary of any modified SWPPPs, including the rationale of any high priority facilities delisted 4. Summary of any new NMPs, including: a. Location and total acreage b. Date of approved NMP 5. List of training events conducted, including the following information: a. Date of the training event b. Number of employees attending c. Objective of the training event	The PY5 Annual Report of the previous permit cycle noted the need for a NMP for the youth athletic fields. \ There were also revised training schedules and requirements based on updates to EMP 4.4.2 Tab, Environmental Training Programs of Instructions	The Annual Report Tracking Requiremnts will be updated no later than 1 October of each year in accordance with Part I.E.6.q(1)-(5)

Table 1-2. MS4 Program Plan Update and Schedule Summary (Continued)

Item	Page	Program Update Requirement	Permit Reference	Compliance Deadline	Activities	MS4 Program Plan Update Summary	MS4 Program Future Schedule Summary
Part II – Chesapeake Bay TMDL Special Condition							
47	1	Reduction Requirements	II.A.3	31 October 2023	1. Reduce the load of total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS) from existing developed lands served by the MS4 as of 30 June 2009 (within the 2010 census urbanized areas) by at least 40% of the Level 2 Scoping Run Reductions. 2. A reduction of at least 40% of the L2 Scoping Run for lands that were added by the 2010 expanded Census urbanized areas is required by 30 June 2023.	Section 4.1 of the Draft Chesapeake Bay TMDL Action Plan submitted May 2018 specifies how the installation will meet the required 40% cumulative reduction.	Continue to work towards the cumulative 40% reduction of TN, TP, and TSS by using the Action Plan by the end of the permit cycle in 2023.
48	6	Reduction Requirements for New Sources	II.A.4	31 October 2023	1. Offset increased loads from new sources initiating construction between 1 July 2009 and 30 June 2019 by 40% if the following conditions apply: a. Activity disturbed one acre or more b. Resulting TP load was greater than 0.45 lb/acre/year (i.e., average land cover condition of 16% impervious surface cover) 2. Develop equivalent pollutant loads for TN and TSS based on Table 4 (refer to Part II.A.5.b)	Section 4.2 of the Draft Chesapeake Bay TMDL Action Plan submitted May 2018 outlines the reduction requirements of new source loads to meet the 40% required reduction by the end of the current permit cycle (2023).	Use the Action Plan to achieve the reduction requirements by the end of the permit cycle in 2023
49	6	Reduction Requirements for Grandfathered Projects	II.A.5(a)-(b)	31 October 2023	1. Offset increased loads from grandfathered projects that begin construction after 1 July 2014 if the following conditions apply: a. Activity disturbs one acre or more b. Resulting TP load was greater than 0.45 lb/acre/year (i.e., average land cover condition of 16% impervious surface cover) 2. Develop equivalent pollutant loads for TN and TSS based on Table 4 (refer to Part II.A.5.b)	The Draft Chesapeake Bay TMDL Action Plan submitted May 2018 is still reviewing grandfathered projects. This portion of the Action Plan will be updated once the review is complete	Continue to assess reduction requirements for grandfathered projects. The Action Plan will be updated once the review is complete.
50	7	Loading and Reduction Value Reporting	II.A.8	On-going	1. Loading and reduction values greater than or equal to 10 lbs calculated per Part II.A.3, .4, and .5 are to be calculated and reported to the nearest pound. 2. Loading and reduction values less than 10 lbs are to be calculated and reported to two significant figures.	Loading and reduction values have been reported as required in Part II.A.8 of the permit.	Loading and reduction values will continue to be reported in accordance with Part II.A.8 of the permit.
51	7	Means to Achieve Reductions	II.A.9	On-going	Required reductions may be achieved through one or more of the following: 1. BMPs approved by the Chesapeake Bay Program 2. BMPs approved by the department 3. A trading program (refer to Part II.A.10)	The Draft Chesapeake Bay TMDL Action Plan specifies that BMPs are the sole method of reductions.	BMPs being the sole method of reduction will be applicable throughout the permit cycle
52	8	Submit updated Chesapeake Bay TMDL Action Plan	II.A.11(a)-(f)	1 November 2019	Revise and submit an updated Chesapeake Bay TMDL Action Plan within 12 months of the effective date of the permit. Updates must include: 1. Any new or modified legal authorities 2. Load and cumulative reduction calculations for each river basin 3. Total reductions achieved as of 1 July 2018 for each pollutant of concern 4. A list of BMPs implemented prior to 1 July 2018 to achieve reductions associated with the Chesapeake Bay TMDL (include date of implementation and reduction achieved) 5. BMPs to be implemented prior to the expiration of this permit to meet cumulative reductions (include type of BMP, project name, location, % removal efficiency, calculation of the expected reduction for each BMP) 6. A summary of any comments received via public participation as required by Part II.A.12 (including the permittee's response, identification of any public meetings, and any revisions made)	The Draft Chesapeake Bay TMDL Action Plan was submitted in May 2018. The Final Action Plan will be completed prior to the 1 November 2019 deadline	The Action Plan will be maintained as part of the Annual Report Tracking Requirements.
53	8	Public Participation	II.A.12	Prior to 1 November 2019	1. Provide an opportunity for public comment on the additional proposed BMPs to meet the reductions that were not approved by the department during the first phase of the action plan. 2. The comment period is to be no less than 15 days.	The Chesapeake Bay TMDL Action Plan will be made available for public comment for no less than 15 days.	Not Applicable

Table 1-2. MS4 Program Plan Update and Schedule Summary (Continued)

Item	Page	Program Update Requirement	Permit Reference	Compliance Deadline	Activities	MS4 Program Plan Update Summary	MS4 Program Future Schedule Summary
Part II – Chesapeake Bay TMDL Special Condition (Continued)							
54	8 – 9	Annual Report Tracking Requirements	II.A.13	Annually by 1 October	Ensure that the following information is tracked for inclusion in the annual report: 1. A list of BMPs implemented during the reporting period but not reported to the VDEQ BMP Warehouse and the estimated reduction of pollutants of concern (lbs/year) for each. 2. If credits were acquired, a statement of the credits. 3. Progress toward meeting the required cumulative reductions for TN, TP, and TSS. 4. A list of BMPs that are planned to be implemented during the next reporting period.	The Draft Chesapeake Bay TMDL was developed in PY5 of the previous permit cycle and submitted with the Registration Statement in May 2018. The Draft Action Plan presents a discussion of the compliance requirements as well as the status towards reaching those requirements	Continue to report on the Chesapeake Bay TMDL Action Plan progress towards the reduction goals and discussion of the new or planned BMPs
Part II – Local TMDL Special Condition							
55	9	Local TMDL Development / Implementation	II.B.1(a)-(b)	1 May 2020 (TMDLs prior to 1 July 2013) 1 May 2021 (TMDLs between 1 July 2013 and 30 June 2018)	Develop local TMDL Action Plan as follows: 1. For TMDLs approved by the EPA prior to 1 July 2013 and a WLA has been assigned to the permittee: Update the previously approved action plan to meet the permit conditions and continue implementation 2. For TMDLs approved by the EPA between 1 July 2013 and 30 June 2018 and a WLA has been assigned to the permittee: Develop and initiate implementation of action plans to meet permit conditions	The Bacteria TMDL Action Plan is scheduled to be developed in PY1. The Action Plan will follow Part II.B.3(a)-(h). This Action Plan will replace the TMDL Action Plan for Bacteria Impairment developed August 2016 during the previous permit cycle. Following development, the Action Plan will be implemented to reduce the bacteria load.	The TMDL Action Plan will be developed in PY1 and be implemented throughout the permit cycle
56	9	Local TMDL Implementation	II.B.2	On-going	1. Implement action plans as soon as possible. 2. Implementation may occur in multiple phases (and over multiple permit cycles) if progress is achieved per the permit.	Immediately following development, the Action Plan will be implemented. Until a new Bacteria TMDL Action Plan is developed, the installation will continue implementing the TMDL Action Plan for Bacteria Impairment developed in August 2016 during the previous permit cycle	Implementation of the TMDL Action Plan will be implemented throughout the permit cycle.
57	9 – 10	TMDL Action Plan	II.B.3(a)-(h)	On-going	Ensure that local TMDL Action Plans include the criteria specified in Part II.B.3(a)-(h).	The bacteria TMDL developed during PY1 will include all criteria specified in Part II.B.3(a)-(h) of the permit	The TMDL Action Plan will be maintained to meet all necessary criteria
58	10	Bacterial TMDLs	II B.4.b	On-going	Select and implement at least one strategy listed in Table 5 (page 10).	JBLE-Eustis is not an approved VSMP authority and therefore, must select at least one strategy listed in Table 5 in Part II.B.4.b	Once developed, the TMDL Action Plan will continue to use at least one strategy from Table 5 in part II.B.4.b

2.0 MS4 SERVICE AREA

2.1 Installation Description

JBLE–Eustis is located adjacent to the City of Newport News, Virginia which is part of the Norfolk, Hampton, and Newport News metropolitan area. The installation is located on Mulberry Island, a small peninsula bordered by the James River to the west, Warwick River to the east, and Skiffes Creek toward the north. Smaller waterbodies on or bordering the installation include Jail Creek, Morrison's Creek, Island Creek, Bailey Creek, and Eustis Lake. The installation occupies approximately 8,000 acres and houses a variety of military organizations and support activities. Most of the development is located at the northern end of the installation, while the southern portion of the peninsula remains largely undeveloped. A golf course and an airfield are located near the center of the installation. A site location map is presented at Figure 2-1.

The installation is the home of the Headquarters United States Army Training and Doctrine Command (TRADOC), the Army Training Support Center (ATSC), and the 7th Transportation Brigade (Expeditionary). TRADOC is responsible for developing, educating, and training soldiers and civilians; supporting unit training; and designing, building, and integrating capabilities, formations, and equipment. The ATSC is responsible for managing the Army Training Support Enterprise (TSE), which provides oversight for programs that enable development, delivery, and sustainment of training and education support capabilities. The 7th Transportation Brigade (Expeditionary) provides logistics support around the world for port, terminal, and watercraft units conducting expeditionary operations in support of land operations. Other units on the installation include the Army Aviation Logistics School, Non-commissioned Officer's (NCO) Academy, Aviation Applied Technology Directorate, and the James River Reserve Fleet (JRRF). The JRRF, a tenant managed by the Maritime Administration (MARAD), leases land on installation and maintains a number of vessels moored in the James River. The total population of the installation is approximately 12,900, comprised of approximately 6,200 military personnel and 2,800 dependents living on installation, as well as approximately 3,900 civilian non-residents who commute to the installation daily.

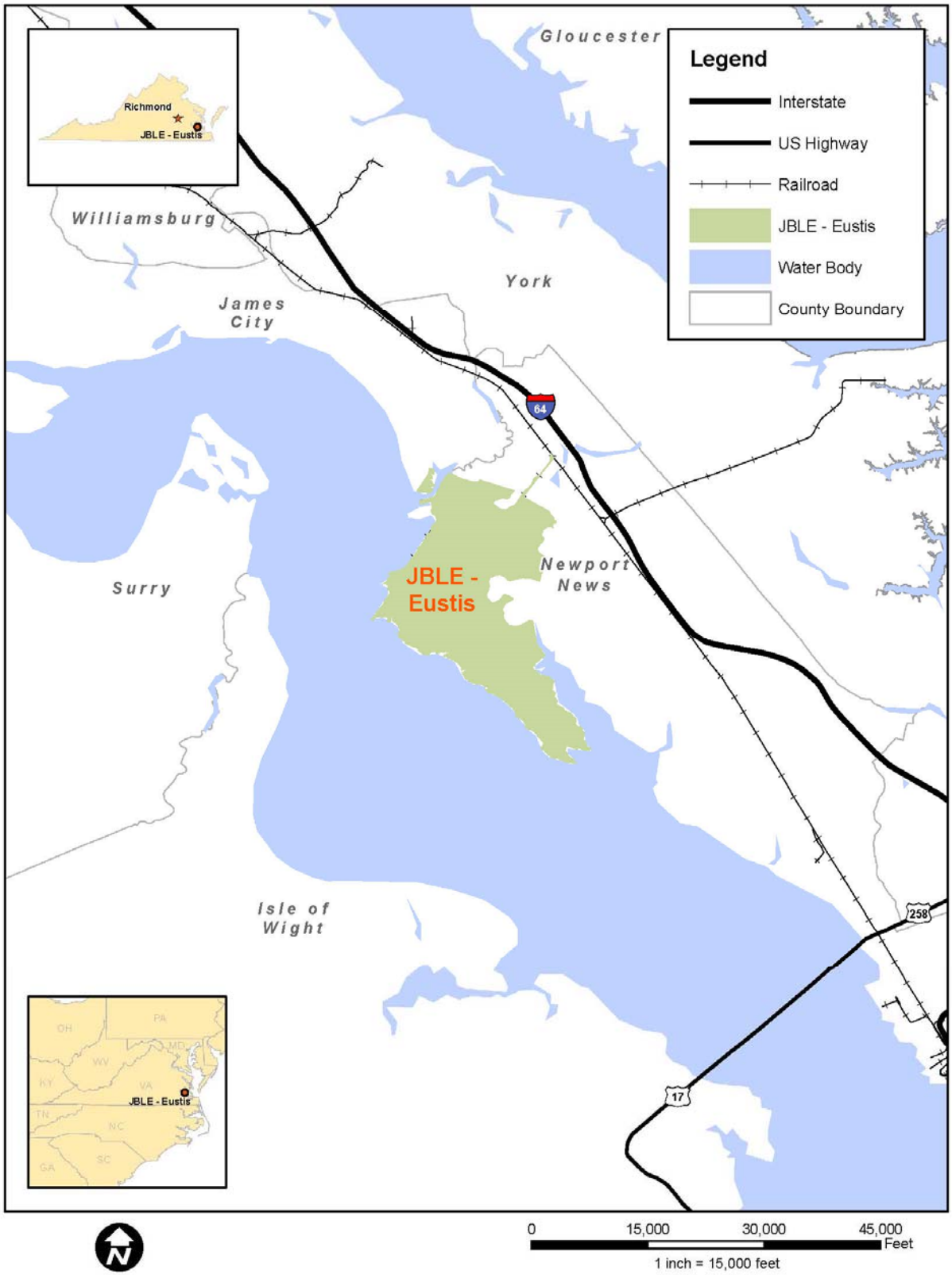

Figure 2-1. Site Location Map, JBLE–Eustis

2.2 Subwatershed Summary

There are three subwatersheds that include portions of JBLE–Eustis. These include: Morrison's Creek, Skiffes Creek, and the Warwick River. Table 2-1 presents each of these subwatersheds as well as the hydrologic unit code (HUC), length of the stream within the installation boundary, the drainage area, known impairments, as well as any TMDL waste load allocations (WLA) that have been developed for the installation. In addition, Table 2-2 presents each MS4 outfall located on JBLE–Eustis, the associated HUC code, and MS4 area as required by Section I.E.3.a (1) of the permit.

Section I.E.3.a (2) of Permit No. VAR040035 requires that JBLE–Eustis maintain a stormwater system drainage map that shows the location of all MS4 outfalls as well as the name and location of all waters receiving discharges from the MS4 outfalls and the associated HUC. Figure 2-2 illustrates the HUC codes and boundaries for the subwatersheds as presented in Table 2-1. It also includes the names of the receiving waters. Appendix B includes overview maps of the installation that show the locations of the MS4 outfalls.

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Table 2-1. Subwatersheds Located on JBLE–Eustis

Subwatershed	HUC	Waterbody Name	Waterbody ID[1]	Category[1]	Impairments[1]	TMDL Impairment	TMDL	TMDL Approval Year	JBLE–Eustis TMDL WLA	Is the WLA being met?
Morrison's Creek-James River	020802060804	Fort Creek	VAT-G11E_ZZZ01A00	4A[4]	Aquatic Plants (Macrophytes)	Fecal Coliform	Yes – Fecal Bacteria TMDL Development for Warwick River	2008	2.87E+07 cfu/day	Yes
		James River - Gravel Neck to Pagan River	VAT-G11E_JMS01A06	5D[3]	Chlorophyll-a, PCB in Fish Tissue, Aquatic Plants (Macrophytes)	N/A	No	N/A	N/A	N/A
		Morrison's Creek - Mulberry Island	VAT-G11E_MRS01A06	4A[4]	Aquatic Plants (Macrophytes)	N/A	No	N/A	N/A	N/A
Skiffes Creek-James River	020802060802	Bailey Creek	Unavailable[2]	Unavailable[2]	Unavailable[2]	N/A	No	N/A	N/A	N/A
		Blows Creek	VAT-G11E_ZZZ01A00	4A[4]	Aquatic Plants (Macrophytes)	Fecal Coliform	Yes – Fecal Bacteria TMDL Development for Warwick River	2008	2.87E+07 cfu/day	Yes
		Eustis Lake	Unavailable[2]	Unavailable[2]	Unavailable[2]	N/A	No	N/A	N/A	N/A
		James River - Gravel Neck to Pagan River	VAT-G11E_JMS01A06	5D[3]	Chlorophyll-a, PCB in Fish Tissue, Aquatic Plants (Macrophytes)	N/A	No	N/A	N/A	N/A
		Skiffes Creek System [Admin Cond]	VAT-G11E_SFF02A08	5D[3]	PCB in Fish Tissue, Aquatic Plants (Macrophytes)	Fecal Coliform	Yes – Fecal Bacteria TMDL Development for Warwick River	2008	2.87E+07 cfu/day	Yes
Warwick River	020802060901	Browns Lake	Unavailable[2]	Unavailable[2]	Unavailable[2]	N/A	No	N/A	N/A	N/A
		Jail Creek (Lower Tidal Portion)	Unavailable[2]	Unavailable[2]	Unavailable[2]	N/A	No	N/A	N/A	N/A
		Milstead Island Creek	Unavailable[2]	Unavailable[2]	Unavailable[2]	N/A	No	N/A	N/A	N/A
		Warwick River - Lower Tidal Portion	VAT-G11E_WWK03A08	4A[4]	Aquatic Plants (Macrophytes	Fecal Coliform	Yes – Fecal Bacteria TMDL Development for Warwick River	2008	6.91E+07 cfu/day	Yes
		Warwick River - Middle Tidal Portion	VAT-G11E_WWK02A08	4A[4]	Enterococcus, Aquatic Plants (Macrophytes)					
		Warwick River - Upper Tidal Portion	VAT-G11E_WWK01A08	4A[4]	Aquatic Plants (Macrophytes)					

Notes and Acronyms:

[1] The Waterbody ID, Category, and Impairments are from the 2016 VDEQ Integrated Report GIS layers (https://apps.deq.virginia.gov/mapper_ext/default.aspx?service=public/2016_adb_anyuse).
[2] Waterbody IDs, categories, and impairments were not included in the 2016 VDEQ Integrated Report.
[3] A category 5D designation for a waterbody indicates that the water quality standard has not been attained and that pollutants remain requiring TMDL development.
[4] A category 4A designation for a waterbody indicates that the waterbody is impaired or threatened for one or more designated uses but has an EPA approved TMDL.

cfu Colony-forming units
HUC Hydrologic unit code
N/A Not applicable
PCB Polychlorinated biphenyls
TMDL Total maximum daily load
WLA Waste load allocation

Table 2-2. Drainage Basin Location and Subwatershed Cross-Reference

Subwatershed	HUC	Drainage Basin IDs[1]	MS4 Area (Acres)	Outfall Receiving Water[3]	Latitude	Longitude	Land Use
Morrison's Creek-James River	020802060804	071	1.8	Morrison's Creek - Mulberry Island	37.13178635	-76.60305786	POV Parking Area
		131	6.1	Morrison's Creek - Mulberry Island	37.13132858	-76.60786438	Runway, Green Space
Skiffes Creek-James River	020802060802	011	0.4	Skiffes Creek System [Admin Cond]	37.16960907	-76.60157776	POV Parking Area Training Facility
		013	0.6	Skiffes Creek System [Admin Cond]	37.16855621	-76.60009003	Classrooms, Training Facility, Paved Surface Storage
		014	6.6	Skiffes Creek System [Admin Cond]	37.16733932	-76.59854889	Training Facility, Roads, Wooded
		015	2.0	Skiffes Creek System [Admin Cond]	37.16696167	-76.59674835	Roads
		016	1.6	Skiffes Creek System [Admin Cond]	37.17193985	-76.59276581	Roads, Wooded, Outdoor Training Area
		017	4.6	Skiffes Creek System [Admin Cond]	37.17250443	-76.58978271	Roads, Wooded
		018	22.3	Skiffes Creek System [Admin Cond]	37.16614151	-76.59182739	Roads, POV Parking Areas, Administrative Facilities, Dormitories, Clinic, Warehouse/Storage
		022	19.4	Skiffes Creek System [Admin Cond]	37.17024994	-76.58364105	Wooded, Wetlands, Outdoor Training Area
		023	2.5	James River - Gravel Neck to Pagan River	37.16663742	-76.60108948	POV Parking Area, Roads, Green Space
		027	3.3	James River - Gravel Neck to Pagan River	37.16262817	-76.59525299	POV Parking Areas, Administrative and Training Facilities (Classrooms)
		028	5.3	James River - Gravel Neck to Pagan River	37.16222763	-76.59397125	POV Parking Area, Administrative and Training Facility
		029	37.8	Skiffes Creek System [Admin Cond]	37.16258621	-76.58952332	POV Parking Areas, Dormitories, Dining Facility
		030	5.4	James River - Gravel Neck to Pagan River	37.16197586	-76.58930969	POV Parking Area, Administrative and Training Facility
		031	67.7	James River - Gravel Neck to Pagan River	37.15745926	-76.58904266	POV Parking Areas, Roads, Administrative Facilities, Dormitories, POV Auto Hobby Shop, POV Washrack, Green Space, Wetlands
		032	6.9	James River - Gravel Neck to Pagan River	37.15763474	-76.59096527	POV Parking Area, Training Facilities, Storage Facilities
		033	14.7	James River - Gravel Neck to Pagan River	37.15665054	-76.58963013	POV Parking Areas, Administrative Facilities, Chapel, Training Facility, Athletic Fields, Wetlands
		077	54.8	James River - Gravel Neck to Pagan River	37.16068649	-76.58811188	POV Parking Areas, Roads, Administrative Facilities, Theater, Dental Clinic, Bowling Center, Aquatic Center, Gymnasium, Dormitories, Dining Facility, Athletic Field
		084	57.4	Skiffes Creek System [Admin Cond]	37.16375351	-76.581604	POV Parking Areas, Administrative Facility, POV Fueling and AAFES Shopette, Athletic Fields
		085	34.5	Skiffes Creek System [Admin Cond]	37.16594315	-76.5774765	POV Parking Areas, Roads, Railroad, Transportation Museum, Family Housing, Green Space
		086	3.0	Skiffes Creek System [Admin Cond]	37.16520309	-76.58649445	Recreation Facility, Go-Cart Track, Green Space
		087	8.0	Skiffes Creek System [Admin Cond]	37.16491699	-76.58627319	POV Parking Areas, Administrative Facility, Dormitories
		089	2.8	James River - Gravel Neck to Pagan River	37.1612854	-76.59590912	RV Parking, Roads, Green Space
		092	0.5	James River - Gravel Neck to Pagan River	37.17093277	-76.60342407	Training Pier

Table 2-2. Drainage Basin Location and Subwatershed Cross-Reference (Continued)

Subwatershed	HUC	Drainage Basin IDs[1]	MS4 Area (Acres)	Outfall Receiving Water[3]	Latitude	Longitude	Land Use
Skiffes Creek-James River (Continued)	020802060802	093	1.2	Skiffes Creek System [Admin Cond]	37.16947937	-76.60094452	POV Parking Area, Administrative Facilities and Classrooms
		094	1.1	Skiffes Creek System [Admin Cond]	37.16878128	-76.60076141	Administrative Facilities and Classrooms, Green Space
		095	0.5	Skiffes Creek System [Admin Cond]	37.16865921	-76.60069275	Administrative Facilities and Classrooms, Roads
		096	5.4	Skiffes Creek System [Admin Cond]	37.16727829	-76.59364319	POV Parking Area, Administrative Facility, Paved Surface Storage
		097	0.2	Skiffes Creek System [Admin Cond]	37.16625214	-76.59163666	Storage Facility, Paved Surface Storage
		098	5.2	Skiffes Creek System [Admin Cond]	37.16711044	-76.59003448	POV Parking Area, Operations Facility, Green Space
		099	2.4	Skiffes Creek System [Admin Cond]	37.16672134	-76.58853912	Roads, Railroad, Green Space
		100	3.0	Skiffes Creek System [Admin Cond]	37.16691208	-76.58838654	Operations Facilities, Paved Surface Storage
		103	1.9	Skiffes Creek System [Admin Cond]	37.16403198	-76.58260345	Administrative Facilities, Wooded, Wetlands
		104	1.6	James River - Gravel Neck to Pagan River	37.1655159	-76.598526	POV Parking Area
		105	2.3	James River - Gravel Neck to Pagan River	37.16506195	-76.59763336	POV Parking Area, Administrative and Training Facilities, Road, GOV Wash Rack
		106	6.4	James River - Gravel Neck to Pagan River	37.1611557	-76.59217072	POV Parking Area, Administrative and Training Facilities, Road, Green Space
		107	1.4	James River - Gravel Neck to Pagan River	37.16223907	-76.58998871	POV Parking Area, Green Space
		115	0.6	James River - Gravel Neck to Pagan River	37.14769363	-76.60494232	Bulk Material Storage
		134	0.2	James River - Gravel Neck to Pagan River	37.16119766	-76.58826447	Training Facility (Classrooms), Paved Surface
		135	1.3	James River - Gravel Neck to Pagan River	37.16101456	-76.58914185	Fitness Center, Road, Green Space
		140	0.7	James River - Gravel Neck to Pagan River	37.16018677	-76.59631348	POV Parking Area, Dining Facility
		143	2.5	James River - Gravel Neck to Pagan River	37.15787888	-76.59226227	Warehouse, Classrooms, Track, Green Space
Warwick River	020802060901	038	5.6	Warwick River - Upper Tidal Portion	37.15278625	-76.59462738	Warehouse, Road, Paved Surface Storage, Bulk Storage Area
		039	3.7	Warwick River - Upper Tidal Portion	37.15376282	-76.59597778	POV Parking Area, Warehouse, Outdoor Storage Area
		041	4.8	Warwick River - Upper Tidal Portion	37.15550995	-76.59761047	POV Parking Area, Warehouses, Roads, Outdoor Storage Area
		042[2]	258.9	Warwick River - Upper Tidal Portion	37.14577484	-76.57956696	POV Parking Areas, Administrative and Training Facilities, Dormitories, Roads, Commissary, Base Exchange, Bank, Recreation Facilities, Tracks, Fast Food Restaurant, Family Housing, Wetlands, Green Space, Wooded
		043	11.3	Warwick River - Upper Tidal Portion	37.14498901	-76.57785797	Roads, Family Housing, Green Space, Wetlands
		044	3.1	Warwick River - Upper Tidal Portion	37.14504242	-76.57672882	Roads, Family Housing
		045	4.7	Warwick River - Upper Tidal Portion	37.14289474	-76.57798767	Roads, Family Housing
		046[2]	15.1	Warwick River - Upper Tidal Portion	37.1451149	-76.5860672	POV Parking Areas, Administrative Facilities, Maintenance Facilities, Roads, Wooded, Wetlands
		047	6.4	Warwick River - Upper Tidal Portion	37.14765549	-76.59005737	Railroad, Wooded, Wetlands

Table 2-2. Drainage Basin Location and Subwatershed Cross-Reference (Continued)

Subwatershed	HUC	Drainage Basin IDs[1]	MS4 Area (Acres)	Outfall Receiving Water[3]	Latitude	Longitude	Land Use
Warwick River (Continued)	020802060901	048	5.4	Warwick River - Upper Tidal Portion	37.14694595	-76.5908432	POV Parking Area, Roads, Training Warehouse, Storage Facility, Wetlands
		049	3.2	Warwick River - Upper Tidal Portion	37.14653015	-76.59090424	POV Parking Area, Training Facility, Green Space
		050	5.6	Warwick River - Upper Tidal Portion	37.14474869	-76.58979034	POV Parking Area, Operations and Support Facility
		052	7.0	Warwick River - Upper Tidal Portion	37.1450119	-76.57462311	Roads, Family Housing, Wetlands
		053	1.0	Warwick River - Upper Tidal Portion	37.14464569	-76.57275391	POV Parking Area
		054	1.6	Warwick River - Upper Tidal Portion	37.14359283	-76.57170105	POV Parking Area, Storage Facility, Recreation Pavilion, Green Space
		055	12.6	Warwick River - Upper Tidal Portion	37.14339447	-76.57105255	POV Parking Areas, Dormitories, Administrative Facilities, Green Space
		056	1.8	Warwick River - Upper Tidal Portion	37.14304733	-76.56913757	Dining/Entertaining Facility, Green Space, Pool
		057	6.3	Warwick River - Upper Tidal Portion	37.14578629	-76.56977081	Roads, Family Housing, Sanitary Pump Station, Water Pump Station, Green Space
		058	12.1	Warwick River - Upper Tidal Portion	37.14637375	-76.5691452	Roads, Family Housing, Green Space, Wetlands
		059	15.3	Warwick River - Upper Tidal Portion	37.14753723	-76.56886292	Roads, Family Housing, Green Space
		060	2.1	Warwick River - Upper Tidal Portion	37.14974594	-76.56934357	Roads, Family Housing, Green Space
		062	16.5	Warwick River - Upper Tidal Portion	37.15444183	-76.57055664	POV Parking Areas, Roads, Chapel, Child Development Centers, Green Space, Wetlands
		063	40.1	Warwick River - Upper Tidal Portion	37.15596771	-76.57079315	POV Parking Areas, Administrative Facility, Elementary School, Playground, Green Space, Retention Pond
		066	7.6	Warwick River - Upper Tidal Portion	37.15875626	-76.56923676	Roads, Family Housing, Green Space
		067	34.1	Warwick River - Upper Tidal Portion	37.16337585	-76.5683136	POV Parking Areas, Roads, Family Housing, Community Center, Park, Retention Pond
		068	71.0	Warwick River - Upper Tidal Portion	37.16006088	-76.56845093	POV Parking Areas, Hospital, Incinerator, Steam Heat Plant, Veterinary Clinic, Administrative Facilities, Family Housing, Green Space, Wooded
		078	5.1	Warwick River - Upper Tidal Portion	37.17108917	-76.57193756	Roads, Railroad
		090	2.1	Warwick River - Upper Tidal Portion	37.14400101	-76.58961487	Operations and Support Facilities, Green Space
		091	6.9	Warwick River - Upper Tidal Portion	37.16098785	-76.56871033	Roads, Family Housing, Green Space, Park
		113	1.4	Warwick River - Upper Tidal Portion	37.14345551	-76.57684326	Roads, Family Housing, Green Space
		117	0.5	Warwick River - Upper Tidal Portion	37.14500427	-76.56987762	Steam Heat Plant, Green Space
		118	2.0	Warwick River - Upper Tidal Portion	37.15359497	-76.57080841	POV Parking Area, Child Development Center, Green Space
		119	2.5	Warwick River - Upper Tidal Portion	37.15222549	-76.57025909	POV Parking Area, Child Development Center, Green Space
		120	9.6	Warwick River - Upper Tidal Portion	37.15124893	-76.57045746	POV Parking Areas, Hotel, Green Space
		121	0.6	Warwick River - Upper Tidal Portion	37.15068054	-76.57048035	Maintenance Facility, Storage, Green Space
		122	4.8	Warwick River - Upper Tidal Portion	37.15650558	-76.56932831	POV Parking Area, Bus Parking Area, Elementary School, Green Space
		124	2.3	Warwick River - Upper Tidal Portion	37.15834045	-76.57001495	Roads, Family Housing
		125	0.8	Warwick River - Upper Tidal Portion	37.1607132	-76.56634521	POV Parking Area, Maintenance Facility, Warehouse

Table 2-2. Drainage Basin Location and Subwatershed Cross-Reference (Continued)

Subwatershed	HUC	Drainage Basin IDs[1]	MS4 Area (Acres)	Outfall Receiving Water[3]	Latitude	Longitude	Land Use
Warwick River (Continued)	020802060901	126	0.5	Warwick River - Upper Tidal Portion	37.16010284	-76.56642151	Maintenance Facility, Warehouse, Green Space
		127	0.2	Warwick River - Upper Tidal Portion	37.1593895	-76.56871796	Roads
		128	0.5	Warwick River - Upper Tidal Portion	37.15926743	-76.56837463	Roads
		136	8.1	Warwick River - Upper Tidal Portion	37.17332458	-76.56993866	Roads, Railroad, Backflow Preventer, Green Space
		141	2.3	Warwick River - Upper Tidal Portion	37.14379501	-76.58958435	Green Space
		142	4.6	Warwick River - Upper Tidal Portion	37.14583588	-76.57875824	Roads, Family Housing, Wooded

Notes and acronyms:

[1] Drainage basins shown in this table only reflect the MS4 drainage basins and corresponding outfalls. Industrial outfalls are discussed in the JBLE–Eustis SPPP.
[2] Drainage basins 042 and 046 were determined to be comingled with industrial and non-industrial activities. Acreage included in this table only reflects non-industrial areas of those drainage basins.
[3] All receiving waters are listed as impaired in the 2016 VDEQ Integrated Report.

AAFES – Army Air Force Exchange Service
GOV – Government Owned Vehicle
POV – Privately Owned Vehicle

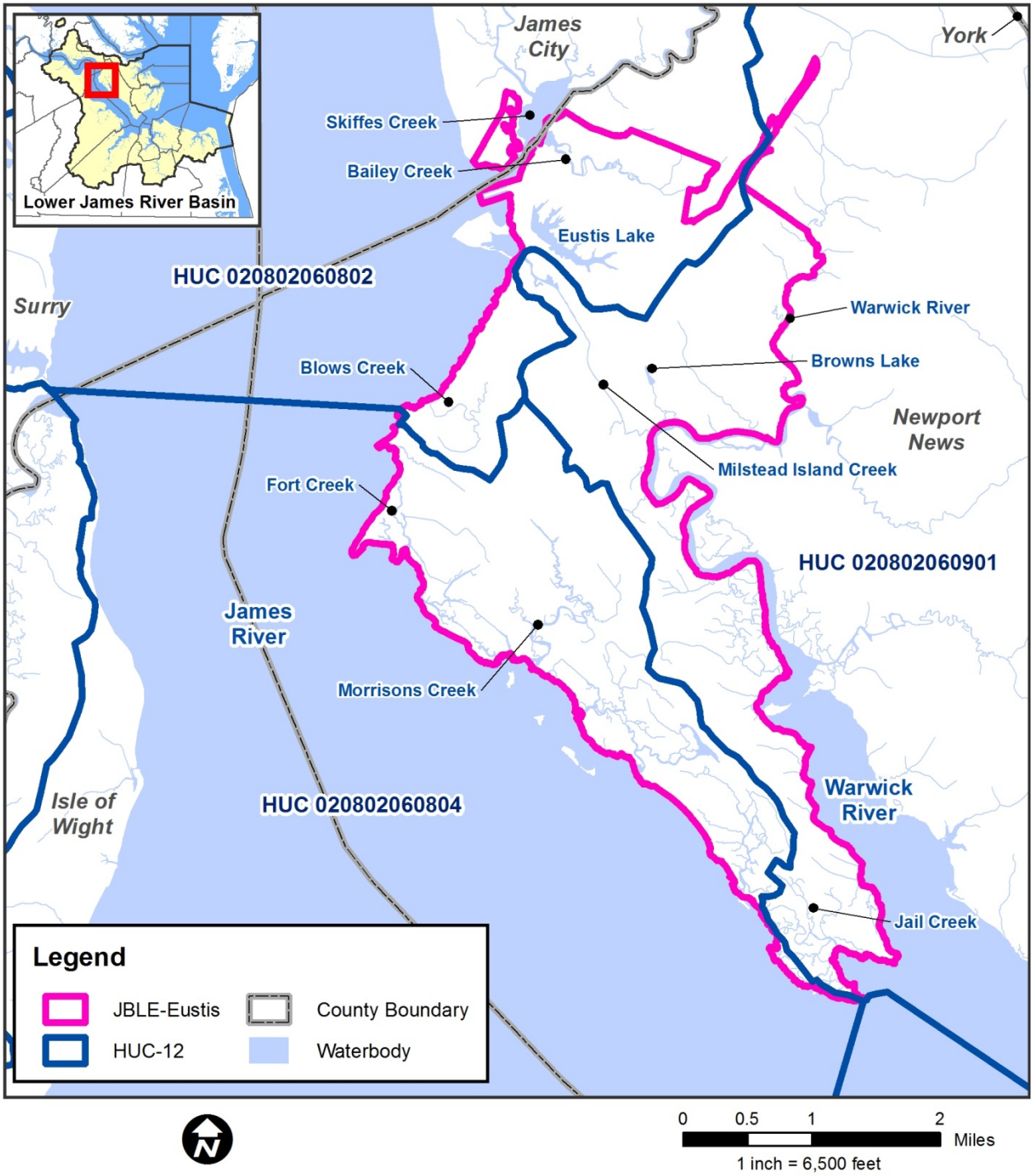

Figure 2-2. Subwatershed Locations, JBLE–Eustis

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3.0 MINIMUM CONTROL MEASURES

Section 3.0 of the Program Plan presents each of the six MCMs. Subsections will discuss requirements for each MCM, measurable goals and BMPs that JBLE–Eustis is planning to implement to meet the requirements, a discussion of how the program will be assessed and updated, and a list of requirements for the installation's annual report. MCMs are identified in the Stormwater Phase II Final Rule, which when implemented together, are intended to reduce pollutants discharged into receiving waterbodies.

The identified BMPs will establish the installation's compliance targets for each MCM and will be the tools that JBLE–Eustis utilizes to implement each MCM. BMPs have been identified by the 733d CED/CEIE Stormwater Program Manager and reviewed by other members of the installation EMS CFT Water Quality Working Group.

The subsections below summarize the MCM requirements, measurable goals and BMPs selected for implementation, process for assessing MCM program effectiveness, and annual reporting requirements.

3.1 MCM 1: Public Education and Outreach

3.1.1 Summary of Requirements

General Permit No. VAR040035 requires JBLE–Eustis to implement a public education and outreach program that targets personnel, contractors, and residents. The public education and outreach MCM should be designed to increase the public's knowledge of how to reduce stormwater pollution especially as it pertains to reducing impacts to impaired waters and other local water pollution issues. The implemented program should also work to increase the public's knowledge of hazards associated with illegal discharges and improper waste disposal. The education and outreach program should use diverse strategies that are targeted toward individuals or groups that are most likely to have significant stormwater impacts.

Part I.E.1.b-d outlines the requirements for the design of the MCM 1 program:

1. Identify no less than three high-priority water issues to meet the goal of educating the public in accordance with Part I.E.1.a. High-Priority Issues may include the following examples: Chesapeake Bay nutrients, pet wastes, local receiving water impairments, TMDLs, high-quality receiving waters, and illicit discharges from commercial sites.

2. The high-priority public education and outreach program will:

    a. Clearly identify the high-priority stormwater issues;

    b. Explain the importance of the high-priority stormwater issues;

    c. Include measures or actions the public can take to minimize the impact of the high-priority stormwater issues; and

d. Provide a contact name and telephone number or location where the public can find out more information.

3. Two or more strategies from Table 1 in Part I.E.1.d as presented in Table 3-1 below.

Table 3-1. Strategies for Public Education and Outreach

Strategies	Examples[1] (Provided as examples and are not meant to be all inclusive or limiting)
Traditional Written Materials	Informational brochures, newsletters, fact sheets, utility bill inserts, or recreational guides for targeted groups of citizens
Alternative Materials	Bumper stickers, refrigerator magnets, t-shirts, or drink koozies
Signage	Temporary or permanent signage in public places or facilities, vehicle signage, bill boards, or storm drain stenciling.
Media Materials	Information disseminated through electronic media, radio, televisions, movie theater, or newspaper
Speaking Engagements	Presentations to school, church, industry, trade, special interest, or community groups
Curriculum Materials	Materials developed for school-aged children, students at local colleges or universities, or extension classes offered to local citizens
Training Materials	Materials developed to disseminate during workshops offered to local citizens, trade organization, or industrial officials.

3.1.2 Measurable Goals and BMPs Selected for Implementation

The program plan under the previous permit selected three high-priority water quality issues to be the focus of the education and outreach under MCM 1. Due to a successful effort to address spill reduction education and outreach during the previous permit cycle, efforts have been shifted to high-priority water quality issue two, curbing illegal dumping within Military Family Housing (MFH) and the dormitories. Each of the high-priority water quality issues are discussed below.

1. Curb illegal fats, oils, and grease disposal at food service establishments (FSE), including food trucks, to the stormwater drainage system

Rationale – Improper Fats, Oils, and Grease (FOG) disposal can lead to sanitary sewer overflows (SSOs) by causing blockages from FOG build-up in pipes. This can lead to an illicit discharge of wastewater into the storm sewer system. The installation has a wastewater discharge permit with Hampton Roads Sanitation District (HRSD) which requires an identification of wastewater sources, flow rates and compliance with a FOG management plan. JBLE-Eustis has 20 FSEs ranging from food courts to mess facilities which serve meals to the majority of civilian and military personnel at the installation. The volume of meals served creates large amounts of FOG that need to be disposed of correctly.

In addition to FOG concerns at FSEs, MFH areas house large numbers of people. Generation of FOG within a household can be substantial and improper disposal can be a significant contributor to SSOs and other FOG related issues.

Scraping of pots and pans into the garbage can significantly reduce FOG in the wastewater stream. Cooking grease and byproduct grease should never be disposed down the drain and should be collected and thrown into the garbage or in the case of cooking oil, dumped into a grease bin for collection and recycling. Most FSEs have grease bins located on site for proper disposal.

There have been incidents and observations that have resulted in the addition of proper FOG management to the high-priority water quality issues. The first was an observation of a food truck employee discharging water from the truck into a storm drain during the previous permit cycle. The other was a SSO resulting in the discharge entering a drainage ditch in Permit Year (PY) 5. Although the SSO could not directly be attributed to FOG, it was the result of a worker violation as it relates to illicit items entering the sanitary sewer system. Corrective actions have been taken to reduce the risk of FOG related incidents, including the implementation of a FOG Management Plan during PY5 of the previous permit cycle. This plan will assist the base with preventing future SSOs. The FOG Management Plan also establishes guidelines that food trucks must follow to operate on the base. These guidelines focus on proper FOG disposal and prohibiting any discharge from the food truck unless permission is explicitly granted.

Target Audience – Dining facility managers and operators, FSE operators and employees, food truck operators, and MFH occupants.

Anticipated Time Periods for the Message – The efforts to curb illegal FOG disposal will be ongoing throughout the year. This includes trainings to kitchen staff through annual trainings such as HRFOG as well as distribution materials to MFH residents on proper FOG disposal.

2. Curbing illegal dumping within MFH and the dormitories

Rationale – The residents in MFH as well as soldiers living in the dormitories are fairly transient and there is frequent resident turnover. The frequency of resident turnover creates the potential for illegal dumping due to differing policies and procedures at different installations and short time periods between relocation notification and time of move. As such, there is a need to provide information related to illegal dumping (e.g., littering, car wash water, and disposal of household chemicals) and the proper ways to dispose of specific items.

In addition, fishing is allowed on installation in designated areas that can also result in excess debris, littering, and illegal dumping. There is a need to provide educational tools at boat docks or other recreational fishing areas regarding proper waste disposal, illegal dumping, as well as where to report observations of these activities.

Through education and outreach, base personnel and their families can reduce and/or eliminate illegal dumping around the dormitories and MFH areas by properly disposing of unwanted items. This includes proper disposal of unwanted items associated with Permanent Change of Station (PCS). This also includes

proper disposal of any byproducts of automotive maintenance such as motor oil, fluids and tires. Proper disposal of such items can be made more convenient by conducting vehicle maintenance at the auto hobby shop. Performing vehicle maintenance in any MFH area is prohibited by the Fort Eustis Residence Guide distributed by the privatization contractor to new residents.

Target Audience – The main target audience will be installation residents, including both MFH and the dormitories.

Anticipated Time Periods for the Message – Education and outreach efforts will be continuous throughout the year. As new residents arrive to either MFH or Main Base housing areas, they will be provided with information regarding illegal dumping and illicit discharges. This includes Environmental Management Awareness and Competency (EMAC) training, which is required to be completed on (The Environmental Awareness Course Hub (TEACH) within 30 days of arrival. Education and outreach efforts will also be conducted and Earth Day/Week and World Water Day events.

3. Address Training Area (TA) Erosion and Sediment Control

Rationale – A total of 29 military TAs comprise 3,519 acres of land at JBLE–Eustis, of which, the majority are forested. TA 1 is a shoreline TA adjacent to Skiffes Creek and has evidence of shoreline erosion. There is currently an on-going project to assess how to address the erosion.

In addition to TA 1, the Range Control Office has chosen a contractor to evaluate the drainage systems in TAs 17a, 17c, 22, 23, and 24. The contractor will utilize a field biologist along with additional supporting personnel who have expertise with wetlands delineation and Army training land analysis and management. A Sustainable Range Program (SRP) Geographic Information System (GIS) technician with a working knowledge of Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) and SRP GIS standards will also be a part of the contractor's team to perform the field work and analysis of the culverts and ditches within the specified TAs. The contractor will document current conditions and develop management recommendations to include costs to repair/remediate, environmental documentation required, and impact if not repaired.

Target Audience – JBLE Senior Leadership and Range Control personnel.

Anticipated Time Periods for the Message – TA E&SC issues are to be discussed at WG and CFT meetings as well as at ESOH Council briefings. Outreach materials will be distributed to Range Control, FSS and other users of the TA.

JBLE–Eustis plans to utilize a combination of relevant messages and outreach materials to educate target audiences for each of the three-high priority water quality issues. The following BMPs have been selected for implementation by the installation:

- **Utilization of websites and social media (media materials)** – The installation utilizes both internal and external websites as well as social media (i.e., Facebook) to provide training and awareness to installation personnel and residents. JBLE–Eustis plans to continue to maintain both

the internal and external websites and update them with current information about the three high-priority water quality issues that are discussed in Section 3.1.1. Links to the websites are available through the home page for JBLE–Eustis. In addition, 733d CED/CEIE personnel plan to continue to develop awareness messages related to the three high-priority water quality issues and distribute to Public Affairs Office (PAO) and MFH privatization contractor for publication on their respective installation specific Facebook pages. 733d CED/CEIE will also post these messages on the installation environmental Facebook page.

- **Publication of newspaper articles (traditional written materials)** – JBLE–Eustis publishes articles in the installation newspaper, *the Warrior*. These articles are prepared by 733d CED/CEIE personnel and are related to the installation operations, impacts of the operations to stormwater, as well as steps that installation personnel and residents can take to help minimize the amount of pollutants being discharged to the stormwater drainage system via stormwater runoff. In addition to publishing the articles in *the Warrior*, they are also posted on the JBLE–Eustis website and the installation's Facebook page.

- **Informational emails (media materials)** – 733d CED personnel also utilize mass emails, including installation-wide, select organizations on installation, and specific job groups (e.g., Activity Environmental Coordinator [AEC]) in order to communicate messages to large targeted groups of installation personnel. Mass email messages will be used to communicate guidance on stormwater related topics that apply to the target audience. In addition, the MFH privatization contractor will also send stormwater related informational emails provided by 733d CED/CEIE to residents.

- **Handouts/educational materials (curriculum/training materials)–** 733d CED/CEIE develops handouts and educational materials related to the three high-priority water quality conditions identified in this program plan and distributes them at locations where members of the target audience are anticipated to be (e.g., Earth Week/Day events, World Water Day, range control meetings, FSS sponsored events). Handouts can be pamphlets or other one-page informational sheets that present information and also provide a means to contact the Stormwater Program Manager with any questions or comments. Additional education materials include posters that can be utilized during events such as Earth Week/Day or MFH resident meetings.

- **Public events (speaking engagements/curriculum/training materials)** – 733d CED/CEIE participates is public events throughout the year, including Earth Week/Day. During Earth Week, the Stormwater Program Manager displays educational posters related to the high-priority water quality items at locations where events are being held and is available to answer questions.

- **Training programs (training materials) –** All JBLE–Eustis personnel are required to participate in annual training that includes stormwater pollution prevention training. Military and civilian personnel that handle municipal solid wastes, recycling materials, hazardous and non-hazardous wastes, universal wastes, and hazardous substances that have the potential to contaminate the

stormwater drainage system at JBLE–Eustis are also required to participate in specialized training developed and maintained by 733d CED/CEIE. Training activities are as follows:

- Environmental Management Awareness and Competency (EMAC)
- Advanced Environmental Management (AEM)

EMAC training is provided in an online format via TEACH website (https://usaf.learningbuilder.com). This training is required for all military and civilian personnel within 30 days of arrival and is to be repeated annually. In addition to the Level 1 training courses, AEM training is required for AECs, Unit Environmental Coordinators (UEC), and Hazardous Waste Coordinators. The AEM training includes an initial training course in a classroom setting followed by annual refresher training provided online through the TEACH website. 733d CED/CEIE also provides awareness training for the United States Army Transportation Corps (USATC) School Warrant Officers Advanced Course (WOAC) on an as needed basis.

The 733d CED/CEIE also conducts additional training on relevant information to implementing the installation's MS4 Program Plan during annual stormwater training, which is available to all personnel at JBLE–Eustis. Annual training is provided electronically via the TEACH website and geared toward installation personnel working throughout the base that have the potential to respond to spills, handle waste management activities or hazardous materials and hazardous waste. Topics include:

- Waste management
- Spill response
- Aboveground storage tank (AST) inspections
- Hazardous material and hazardous waste handling

A dedicated training program for MFH residents has not been developed. Training activities utilized to reach MFH includes development of handouts at sponsored events (e.g., Earth Week/Day, World Water Day), encouraging participation in sponsored events, Facebook posts, publication of information articles, and the Stormwater Program Manager attending MFH resident meetings periodically (e.g., semi-annually) to discuss stormwater related issues for JBLE–Eustis.

EMP 4.4.2, tab 2 provides a complete list of the JBLE–Eustis environmental management training programs. In order to continuously improve the available training, the Stormwater Program Manager completes facility environmental inspections as well as the implementation of the CFT as previously discussed in Section 1.6.1. A description of these activities is provided below.

- **Facility environmental inspections** – 733d CED/CEIE performs annual inspections of facilities in order to assess the industrial activities (i.e., CSCE) and high priority municipal facilities within the MS4 area (e.g., Base Exchange [BX], Commissary, privately owned vehicle [POV] car wash) that conduct activities that may contribute pollutants to the stormwater drainage system (e.g., car washing, loading docks, outdoor storage). AECs also conduct quarterly inspections of their

facilities. The inspections allow 733d CED/CEIE personnel to highlight implementation of the stormwater management program at specific locations throughout the installation by updating the training and tailoring it to show installation specific observations, both good and bad. The inspections will also be used to aid in supplemental education of the installation personnel regarding stormwater management practices, the JBLE–Eustis program and requirements, as well as any regulatory changes that affect the installation.

- **EMS CFT Water Quality Working Group implementation** – JBLE–Eustis operates a CFT that meets semiannually in February and August of each year. See Section 1.6.1 for details on this program.

JBLE–Eustis requests feedback from installation personnel and residents via the JBLE–Eustis intranet on stormwater related education and outreach initiatives on an annual basis. In addition, 733d CED/CEIE will also be sending annual surveys to residents on the installation via an online survey tool and with the help of the MFH contractor related to the education and outreach initiatives that JBLE–Eustis has under taken over the course of the permit year. This request for feedback enquires about pressing stormwater issues and how they feel that the 733d CED/CEIE should focus education and outreach efforts in the next year. Results are provided to the 733d CED/CEIE representative in order to help develop new opportunities that address comments and concerns received in the solicited feedback.

3.1.3 MS4 Annual Education and Outreach Program Effectiveness Review Plan

Review Process

JBLE–Eustis will review the education and outreach program effectiveness for MCM 1. Items to be reviewed include:

- Educational materials distributed during the current permit year
- Delivery mechanisms utilized during the current permit year
- Effectiveness at reaching the public for each high priority water quality issue identified in the MS4 Program Plan to be addressed during the permit year

These items will be reviewed to determine:

- The appropriateness of the high priority water quality issues, including the need to change them for the next permit year
- The appropriateness of the previously identified target audiences for each high priority water quality issue
- The effectiveness of the outreach messages as well as the method used to deliver the messages for each of the issues to the public

Program Assessment

An assessment of the program's effectiveness is documented in the Annual Report corresponding to each permit year. Annual reports are included with the Program Plan in Appendix C.

Program Plan Updates Based on the Program Assessment

An assessment of the MCM 1 Program (See PY5 Annual Report [for the 1 July 2013 – 30 June 2018 permit cycle] in Appendix C) noted the following items:

1. An assessment of the high priority water quality issues during PY4 indicated that control of pet wastes is no longer a high priority issue. The areas of concern for this water quality issue will continue to be monitored in PY5 for continued compliance by the target audience. A new high priority water quality issue has been selected to focus on during PY1: curb illegal fats, oils, and grease disposal at FSEs, including food trucks, to the stormwater drainage system. High priority water quality issues 2 and 3 remain unchanged for PY1.
2. In December 2017, Air Force Headquarters moved from the Environmental, Safety, and Occupational Health Training Network (ESOHTN) training platform to a new platform called TEACH. As a result, JBLE–Eustis' training numbers were down significantly from previous years. Stormwater pollution prevention (P2) training was provided to base personnel (active duty, civilian, and contractor) via EMAC and AEM. EMAC is provided online through TEACH and must be completed within 30 days of arrival on base and annually thereafter. AEM training is conducted in a classroom setting for the initial training with an annual online refresher through TEACH. The 733d CED/CEIE also provided environmental awareness training, including stormwater pollution prevention training, for the U.S. Army Transportation School, WOAC.
3. JBLE–Eustis 733d CED/CEIE participated in the Family Health and Awareness Fair on 19 April 2018 and utilized the interactive stormwater model to demonstrate how different activities affect stormwater runoff. This opportunity aided in reaching the target audience for the illegal dumping in MFH areas because many of the attendees were members of the JBLE–Eustis community and MFH residents attended this event.
4. JBLE–Eustis 733 CED/CEIE is currently pursuing an opportunity to partner with the Virginia Institute of Marine Science to obtain Legacy Department of Defense (DoD) funding to develop an oyster reef at TA 1 to help resolve erosion issues.
5. TA E&SC issues were discussed at WG and CFT meetings, as well as ESOH Council briefings.
6. An outreach plan for the TAs was developed.

3.1.4 MS4 Annual Reporting

JBLE–Eustis will include the following information in each annual report submitted to VDEQ:

1. A list of the high-priority stormwater issues the permittee addressed in the public education and outreach program.
2. A list of the strategies used to communicate each high-priority stormwater issue.

3. Documentation to confirm that each activity occurred as stated in the annual report will be maintained by the 733d CED/CEIE Stormwater Program Manager and will be provided with the MS4 Annual Report submitted to VDEQ. Annual reports will be submitted to VDEQ no later than 1 October of each year covering the previous year from 1 July – 30 June. Documentation will include the following:
    a. Date of the activity
    b. Location/event
    c. Target audience
    d. Message delivered as part of activity

3.2 MCM 2: Public Involvement / Participation

3.2.1 Summary of Requirements

General Permit No. VAR040035 Part I.E.2 requires JBLE–Eustis to:

1. Implement procedures for the public to report potential illicit discharges, improper disposal, or spills to the MS4, complaints regarding land disturbing activities, or other potential stormwater pollution concerns.
2. Implement procedures for the public to provide input on the installation's MS4 program, receiving and responding to public input or complaints and maintaining documentation.
3. Develop and maintain a webpage:
    a. Include an updated MS4 Program Plan. The plan is to be updated at least once per year to coincide with the development of the annual report.
    b. JBLE–Eustis must post the MS4 Program Plan on its website at least once per year and within 30 days of the submittal of the annual report to VDEQ.
    c. The installation is required to post copies of each annual report on its website within 30 days of submittal to VDEQ as well as retain copies of each annual report on the website for the duration of the permit.
4. The installation is required to implement a minimum of four public activities annually from Table 2 in Part I.E.2.c via either promotion, sponsorship, or other involvement as presented in Table 3-2.
5. Efforts in Public Involvement and Participation may be coordinated with other MS4 permittees; however, each permittee is individually responsible for meeting all of the permit requirements.

Table 3-2. Public Involvement Opportunities

Public Involvement Opportunities	Examples (Provided as examples and are not meant to be all inclusive or limiting)
Monitoring	Establish or support citizen monitoring groups
Restoration	Stream or watershed cleanup day, adopt-a-waterway program
Educational Events	Booth at community fair, demonstration of stormwater control projects, presentation of stormwater materials, to schools to meet applicable education Standards of Learning or curriculum requirements, watershed walks, participation on environmental advisory committees (e.g., CFT, ESOH Council)
Disposal or Collection Events	Household hazardous chemicals collection, vehicle fluids collection
Pollution Prevention	Adopt-a-storm drain program, implement a storm drain marking program, promote use of residential stormwater BMPs, implement pet waste stations in public areas, adopt-a-street program

3.2.2 Measurable Goals and BMPs Selected for Implementation

Maintaining and Updating the MS4 Program Plan – JBLE–Eustis plans to update the MS4 Program Plan on an annual basis. The updated MS4 Program Plan is posted on the 733d CED/CEIE website (https://www.jble.af.mil/Units/Army/Eustis-Enviromental/). 733d CED/CEIE personnel have designated a separate section of the webpage to highlight documents that are available for public comment. A mass email, as well as notification on the installation and environmental Facebook pages will be utilized to announce that the updated MS4 Program Plan has been posted to the website for public review and comment. The email will also provide a link to the website and a phone number to call with questions or comments regarding the MS4 Program Plan.

Developing and Posting the MS4 Program Annual Report – The installation will develop an MS4 Program Annual Report for each permit year of MS4 General Permit No. VAR040035. The annual report will be posted on the 733d CED/CEIE website (https://www.jble.af.mil/Units/Army/Eustis-Enviromental/) within 30 days of the submittal to VDEQ. A mass email, as well as notification on the installation and environmental Facebook pages, will be utilized to announce that the MS4 Program Annual Report has been posted to the website for public review. The email and posts will also provide a link to the website and a phone number to call with questions or comments regarding the annual report.

The submittal deadline each year for the annual report for the previous permit year (1 July – 30 June) is the following 1 October. In addition to posting copies of the annual report for public dissemination, the 733d CED/CEIE Stormwater Program Manager will maintain copies of the annual report on the installation-maintained website for the duration of the permit term.

Public Participation – JBLE–Eustis participates in at least four public outreach and participation activities throughout the year. These activities include:

1. Communication with installation personnel and residents via internal and external websites, the installation community cable channel, *the Warrior* newspaper, as well as regular interactions with various community groups (e.g., the Department of Game and Inland Fisheries, the York County Extension Office, and the Newport News Recycling office). (Education Events)

2. The installation will also be participating in local events through either promotion, sponsorship, or other involvement on an annual basis. The activities selected for participation will focus on the reduction of stormwater pollutants being discharged to the receiving water, improvement of water quality, and to support local restoration and clean-up initiatives. At a minimum, the installation will promote the following events during each permit year:

    a. Clean the Bay Day (Restoration)

    b. America Recycles Day (Disposal/Collection Events)

    c. Earth Day/Week (Education/Pollution Prevention/Restoration)

    d. Annual installation spring/fall clean-up (Disposal/Collection)

    e. Illicit discharge reporting hotline (Monitoring/Pollution Prevention)

    f. Stormwater pollution prevention education via social media applications (Education/Pollution Prevention)

    g. Pet waste stations at the dog park and MFH (Disposal/Collection/Pollution Prevention)

3. Participation in the Air Force's Community Partnership Initiative, or Public-Public; Public-Private (P4) Partnership Initiative. The P4 Partnership Initiative seeks to identify and develop opportunities to share resources, increase efficiency, and improve effectiveness of operational, educational, and recreational programs. The JBLE–Eustis P4 Partnership is currently focused on the Virginia peninsula and includes a partnership with the City of Newport News to pick up and dispose of yard waste from JBLE–Eustis.

These events will be promoted through posts on the installation and environmental Facebook pages, as well as with articles in the newspaper, MFH mass community emails, flyers, and announcements on marquees located on the installation.

3.2.3 MS4 Annual Public Involvement / Participation Program Effectiveness

Review Process

JBLE–Eustis will review the public participation program effectiveness for MCM 2. Items to be reviewed include:

- MS4 Program Plan and Annual Report development, including review of comments received from the public.
- Ability to post copies of the MS4 Program Plan and Annual Reports within 30 days of submittal to the VDEQ.
- Effectiveness of promotion and publication methods prompting for public review and comment.
- Effectiveness at promoting at least four local events/activities aimed at increasing public participation in the JBLE–Eustis Stormwater Program.

These items will be reviewed to determine:

- The appropriateness of the updated MS4 Program Plan and most recent annual report
- The appropriateness of the activities selected for promotion and participation
- The effectiveness of the activity promotion/participation at increasing public participation with the JBLE–Eustis Stormwater Program

Program Assessment

An assessment of the program's effectiveness is documented in the Annual Report corresponding to each permit year. Annual reports are included with the Program Plan in Appendix C.

Program Plan Updates Based on the Program Assessment

An assessment of the MCM 2 Program (See PY5 Annual Report [for the 1 July 2013–30 June 2018 permit cycle] in Appendix C) noted the following items:

1. JBLE–Eustis 733d CED/CEIE maintains a website that provides information to the public, including the MS4 Program Plan and the MS4 Annual Reports at https://www.jble.af.mil/Units/Army/Eustis-Enviromental/. Due to the unique security issues facing DoD installations, a dedicated website for the MS4 Program cannot be maintained and the JBLE–Eustis Environmental website will continue to be used with a specific section dedicated to the stormwater program.

2. The public involvement and participation activities included:

a. Earth Week (23 – 27 April 2018) – The 633d Air Base Wing PAO provided newspaper, Command TV Channel, and social media notification of events, as well as photography support. They also provided electronic marquee support at the base gates to advertise Earth Week and asked for volunteers.

   i. BMP cleanup – 8 volunteers

   ii. Nature Trail cleanup – 19 volunteers

   iii. Wildlife Boat Tours – 26 volunteers

   iv. Box Turtle Survey – 13 volunteers

   v. Family Health and Awareness Fair – Stormwater interactive display demonstrations – Approximately 210 attendees

   vi. Earth Day Community Awareness Fun Fair – Joint event hosted by 733d CED/CEIE and JBLE–Eustis Family Housing – Approximately 500 attendees.

b. Clean the Bay Day (2 June 2018) – Teamed up with a local Boy Scout Troop and local volunteers to pick up trash at Eustis Lake – Approximately 14 Boy Scouts, Troop Leaders, and volunteers.

c. Environmental Partnership –JBLE–Eustis participates in the Secretary of the Air Force Program to partner with our local public and private neighbors. The P4 Partnership Program seeks to identify and develop opportunities to share resources, increase efficiency, and improve effectiveness of operational, educational, and recreational programs. The JBLE P4 program is currently focused on the Virginia Peninsula. As the program matures, there may be opportunities for broader partnerships.

d. Communication with installation personnel and residents takes place on a regular basis through internal and external websites, the installation community cable channel, the Warrior newspaper, as well as regular interactions with various community groups (e.g., the Department of Game and Inland Fisheries, the York County Extension Office, and the Newport News Recycling Office).

3.2.4 MS4 Annual Reporting

JBLE–Eustis will include the following information in each annual report submitted to VDEQ:

1. A summary of any public input on the MS4 program received (including stormwater complaints) and how 733d CED/CEIE responded.

2. A webpage address to the MS4 program and stormwater website.

3. A description of the public involvement activities implemented.

4. A report of the metric as defined for each activity and an evaluation as to whether or not the activity is beneficial to improving water quality.

5. The name of other MS4 permittees with whom JBLE–Eustis collaborated in the public involvement opportunities.

3.3 MCM 3: Illicit Discharge Detection and Elimination

3.3.1 Summary of Requirements

General Permit No. VAR040035 Section I.E.3 requires JBLE–Eustis to implement and update written procedures to detect, identify, and address unauthorized non-stormwater discharges, including illegal dumping, to the small MS4. In order to facilitate the continued implementation of IDDE procedures, JBLE–Eustis is also required to:

- Maintain an accurate map of the stormwater drainage system within the census UA identified by the 2010 decennial census as well as an information table that shows, at a minimum, the following:
    - Location of all MS4 outfalls discharging to surface waters
    - A unique identifier for each mapped item
    - Name and location of receiving waters to which the MS4 outfall or point of discharge discharges
    - MS4 regulated service area
    - Stormwater management facilities (SMF) owned or operated by the permittee
- Maintain an information table associated with the map that includes:
    - A unique identifier as specified on the map
    - The latitude and longitude of the outfall or point of discharge
    - Estimated regulated acreage draining to the outfall or point of discharge
    - Name of the receiving surface water
    - 6th order HUC of receiving water
    - An indication of whether it is listed as impaired in the Virginia 2016 303(d)/305(b) Water Quality Assessment Integrated Report

  - The predominant land use for each outfall discharging to an impaired water
  - The name of any EPA approved TMDLs for which the permittee is assigned a WLA

- Submit a GIS-compatible shapefile of the MS4 map to DEQ no later than 1 July 2019. If GIS format is unavailable, the map may be provided to DEQ as a PDF document.
- The stormwater drainage system map and information table must be updated at least annually by 1 October. The updates should include any new outfalls constructed and/or TMDLs approved during the immediate preceding reporting period.
- Provide written notification to any downstream adjacent MS4 of any known physical interconnection established or discovered after 1 November 2018.
- Prohibit through ordinance or other legal mechanism, unauthorized non-stormwater discharges into the stormwater drainage system.
- Promote, publicize, and otherwise facilitate public reporting of illicit discharges into or from MS4s, including conducting inspections for incidents that have been reported, as well as follow-up inspections to ensure that corrective measures have been implemented effectively.
- Maintain, implement, and enforce IDDE written procedures designed to detect, identify, and address unauthorized non-stormwater discharges, including illegal dumping, to the small MS4 to effectively eliminate the unauthorized discharge.

3.3.2 Measurable Goals and BMPs Selected for Implementation

In order to achieve compliance with the requirements specified in Section I.E.3 of the permit, JBLE–Eustis plans to implement the following BMPs:

Continuous updates to the installation maps – The installation stormwater drainage system maps are maintained by 733rd Civil Engineer Division/GeoBase (733d CED/GIO) in GIS format. Updated stormwater drainage system data from contract projects are routed to 733d CED/GIO for inclusion in the installation's geodatabase. Hardcopy maps are available upon request and electronic versions of the stormwater drainage system map can be viewed by authorized personnel on the JBLE–Eustis server.

An initial update of the installation MS4 areas stormwater system GIS data has been completed by an outside contractor and has been incorporated into the GIS. The project included an inventory and location of stormwater system features within the MS4 area as well as an update of their attributes within the installation's geodatabase to improve the accuracy of the stormwater drainage system map. Updated maps will be included with the IDDE Procedure Manual (Appendix D) as they become available.

Maintain information tables with MS4 data – Section 2.2 of the MS4 Program Plan presents two subwatershed information tables that include items specified in Part I.E.3 of the permit and listed in Section

3.3.1. The installation will periodically review those tables, no less than annually during the MS4 Program Plan review and make any necessary changes.

Maintain an installation-wide policy signed by the JBLE Commander –Section I.E.3.b requires the installation to "prohibit, through ordinance, policy, standard operating procedures, or other legal mechanism, to the extent allowable under federal, state, or local law, regulations, or ordinances, unauthorized non-stormwater discharges into the storm sewer system." A policy statement signed by the installation commander acts as an enforceable ordinance for JBLE–Eustis. As such, JBLE–Eustis has developed a draft installation level policy prohibiting illicit discharges. The policy has been routed through installation management and is awaiting signature by the installation commander. Once finalized, it will be posted to the installation and environmental websites and distributed via a Facebook post and mass email to installation personnel and residents in order to remind people of the policy and how it will be enforced. The draft policy document is included with the IDDE Procedure Manual in Appendix D.

Maintain and enforce the IDDE EMP (EMP 4.4.6.2.2.3) – 733d CED/CEIE will maintain and update EMP 4.4.6.2.2.3, *IDDE Procedures*, which is used as an enforcement tool for the IDDE Procedure Manual. The EMP will be an additional tool to enforce the installation-wide policy signed by the JBLE Commander. The EMP will be posted to the installation environmental website and distributed via email to installation personnel.

Encourage illicit discharge reporting within the community – 733d CED/CEIE is encouraging installation personnel and residents to report illicit discharges and/or illegal dumping activities by working with the MFH privatization company in order to distribute information to residents about the IDDE program and how to report illicit discharges. Methods to be used include newspaper articles, Facebook posts, mass emails, and posts to the JBLE–Eustis Environmental website.

Maintain and implement IDDE procedures – JBLE–Eustis will continue to maintain and implement the *Illicit Discharge Detection and Elimination Procedure Manual* included as Appendix D of this Program Plan. Procedures outlined in Appendix D include:

- **Community reporting** – The installation currently utilizes the JBLE–Eustis Fire and Emergency Services telephone number (757-878-1008 or 4281; Defense Switched Network [DSN] 826; or 911) is used as the primary hotline for reporting illicit discharges. This hotline is manned 24 hours per day, seven days per week. This number will be advertised as part of the community outreach effort to educate the installation regarding illicit discharges. Additional numbers that will be presented for installation personnel and residents to contact include the 733d CED/CEIE staff (757-878-4123) and/or Housing Management staff (757-369-8344).

- **Dry weather field screening** – 733d CED/CEIE identified 83 MS4 outfalls and two (2) comingled (i.e., industrial and MS4 activities) outfalls that discharge to various receiving water bodies. See Tables 2-1 and 2-2 for a complete list of MS4 outfalls, associated subwatersheds, HUCs, and associated receiving streams. MS4 Permit No. VAR040035 requires a minimum of 50 outfalls be screened each year during dry weather. The IDDE Procedure has outlined the

dry weather screening process, including an inspection schedule for each permit year. JBLE–Eustis will use this process to implement required dry weather screening.

- **Illicit discharge investigation** – Illicit discharge investigations are the responsibility of 733d CED/CEIE staff. Investigations may be performed by installation personnel or by outside consultants hired by the installation; however, all investigation results will be reviewed by 733d CED/CEIE staff. The IDDE Procedure has outlined the illicit discharge investigation process. JBLE–Eustis will use this process to implement required illicit discharge investigation procedures.

- **Maintain information table associated with storm sewer system map –** An information table should be continually maintained with information regarding each outfall or point of discharge. The table should be maintained to include:

    - A unique identifier of each mapped item
    - Latitude and longitude of the outfall or point of discharge
    - Estimated regulated acreage draining to the outfall or point of discharge
    - Name of the receiving water
    - 6th order HUC of the receiving water
    - An indication as to whether the receiving water is listed as impaired in the Virginia 2016 305(b)/303(d) Water Quality Assessment Integrated Report
    - Predominant land use for each outfall discharging to an impaired water
    - Name of any EPA approved TMDLs for which the permittee is assigned a WLA

- **Illicit discharge elimination** – Illicit discharges are generally the result of either structural issues or operational deficiencies. The mechanism for eliminating a discharge will depend on the discharge type. Initiating and verifying the elimination of an illicit discharge is the responsibility of 733d CED/CEIE. 733d CED/CEIE staff will provide educational materials and advocate for funding when needed to eliminate illicit discharges. Depending on the location and type of discharges, specific elimination actions may be conducted by other organizations including AECs and UECs, Housing Management staff, the installation maintenance contractor (Global Management Services [GMS]), the installation wastewater privatization contractor (Old Dominion Utility Services [ODUS]), or other outside contractors hired by JBLE–Eustis. Regardless of the entities involved in eliminating an illicit discharge, 733d CED/CEIE will be responsible for following-up on the corrective actions to verify the illicit discharge has been resolved. JBLE–Eustis will use this process to implement required illicit discharge elimination procedures.

733d CED/CEIE personnel will refer to the IDDE procedures to continue to ensure compliance with the installation's MS4 permit.

3.3.3 MS4 IDDE Program Effectiveness

Review Process

JBLE–Eustis will review the IDDE program effectiveness for MCM 3. Items to be reviewed include:

- JBLE–Eustis stormwater mapping completeness and accuracy
- Information presented in Table 2-1 of the MS4 Program Plan. This table includes items specified in Section I.E.3.a.2 of the permit and listed in Section 3.3.1. The GIS and available records will be reviewed annually and updated as needed.
- Effectiveness of promotion and publication methods regarding illicit discharge detection and reporting
- Review any notices of new physical interconnections
- Knowledge and enforcement of the *IDDE Procedure Manual* included in Appendix D of this Program Plan
- The field collection/detection process, the inspection process, and enforcement actions for all priority areas

These items will be reviewed to determine:

- If GIS maps have been updated to reflect changes to the system, including changes due to new construction projects, renovations, and other investigations that resulted in a change to the stormwater system connectivity.
- The correctness of the information related to the MS4 outfalls, receiving watersheds, and other requirements as described in Section I.E.3 of the permit.
- The effectiveness of the promotion of the *IDDE Procedure Manual* to the public, advertising how to report suspected illicit discharges, and knowledge of the IDDE installation-wide ordinance. Effectiveness of promotion may include:
    - Reviewing logs for the IDDE reporting hotline, 733d CED/CEIE, or the MFH number
    - Assessing the methods utilized to promote the IDDE program (e.g., mass emails, Facebook posts, etc.)
    - Sending/posting a survey for installation personnel and residents to take regarding knowledge of the IDDE program
    - Integration of inspection resolution results into public outreach
- Completeness of the outfall inspection logs, as well as any documentation available for the upstream investigation for any suspected illicit discharges. Records review of these documents

for the past year will also include a review of the number of illicit discharge sources identified and confirmation that the sources have either been eliminated or, for larger issues that may require construction, are in the process of being eliminated with temporary measures in place while permanent elimination is underway. If the source of an illicit discharge is unable to be identified within six (6) months of beginning the investigation, it should be documented that the source remains unidentified.

- Identifications of new or reclassified (e.g., industrial to non-industrial) outfalls.
- If there is a need to seek coverage for non-stormwater discharges under separate VPDES permits.

Program Assessment

An assessment of the program's effectiveness is documented in the Annual Report corresponding to each permit year. Annual reports are included with the Program Plan in Appendix C.

Program Plan Updates Based on the Program Assessment

An assessment of the MCM 3 Program (See PY5 Annual Report [for the 1 July 2013–30 June 2018 permit cycle] in Appendix C) noted the following items:

1. It was observed that there are no known physical interconnections with other MS4s. 733d CED/CEIE will continue to monitor for interconnections with other MS4s.
2. While screening outfalls in PY5, 50 of the 83 non-industrial outfalls were inspected. Inspection findings are included on the outfall inspection forms which are maintained by 733d CED/CEIE and are available upon request.
3. During PY5, JBLE–Eustis utilized the IDDE Procedure Manual to investigate potential illicit discharges. Two possible illicit discharges were investigated. The details and investigation results of the possible illicit discharges are discussed in the PY5 Annual Report.
4. Promotion of an IDDE hotline has not been completely rolled out to installation personnel and residents. 733d CED/CEIE personnel will continue to work with the PAO to publish the IDDE hotline reporting information to installation personnel and residents. In addition, a means of tracking incoming reports and partnering with the MFH privatization contractor is needed to have a more complete list of illicit discharges reported across the installation.

3.3.4 MS4 Annual Reporting Requirements

JBLE–Eustis will include the following information in each annual report submitted to VDEQ:

1. A confirmation statement that the MS4 map and information table have been updated to reflect any changes to the MS4 occurring on or before 30 June of the reporting year.

2. The total number of outfalls that were screened during the reporting period (1 July – 30 June) as part of the dry weather screening program.

3. A list of illicit discharges, including spills that reach the MS4. The list will include the following:

    a. The source of the illicit discharge

    b. Date the suspected illicit discharge was observed, reported, or both

    c. Whether the discharge was discovered by the permittee during dry weather screening, reported by the public, or other method to be described

    d. How the investigation was determined to be resolved

    e. A description of follow-up actions

    f. The date the investigation was closed

3.4 MCM 4: Construction Site Stormwater Runoff Control

3.4.1 Summary of Requirements

General Permit No. VAR040035 Section I.E.4 discusses the requirements for the JBLE–Eustis Construction Site Stormwater Runoff Control Program as prescribed in MCM 4. The purpose of this MCM is to develop, implement, and enforce a program in order to reduce the pollutants (e.g., total suspended solids [TSS], total phosphorus [TP], and total nitrogen [TN]) related to land-disturbing activities including clearing, grading, or excavation that results in a land disturbance equal to or greater than 2,500 square feet and less than one acre in all areas of jurisdictions designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations (9VAC 25-830) adopted pursuant to the Chesapeake Bay Preservation Act.

The installation will utilize its legal authority, such as ordinances, permits, orders, specific contract language, and interjurisdictional agreements, to address discharges entering the MS4 from regulated construction site stormwater runoff. JBLE–Eustis falls under Section I.E.4.a.4 as a federal entity that has not developed standards and specifications in accordance with the Virginia Erosion and Sediment Control Law (§ 62. 1-44.15:51 et seq. of the Code of Virginia) and Virginia Erosion and Sediment Control Regulations (9VAC25-840).

JBLE–Eustis is subject to the Chesapeake Bay Preservation Area Designation and Management Regulations adopted pursuant to the Chesapeake Bay Preservation Act. Therefore, any land disturbing activities for areas of 2,500 square feet or greater must be regulated and inspected in a manner consistent with Part I.E.4.a.4.a-d.

JBLE–Eustis' Construction Site Stormwater Runoff Control Program must also include the following items:

- A description of the legal authorities utilized to ensure compliance with the MCM

- Written plan review procedures, including all documents required during plan review
- Written inspection procedures as well as all associated documents utilized during the inspection
- Roles and responsibilities for JBLE–Eustis implementing the MCM
- Written procedures for compliance and enforcement, including a progressive compliance and enforcement strategy (if needed)

The JBLE–Eustis *Standards and Specifications for Erosion and Sediment Control*, included in Appendix E of this Program Plan, outlines the installation erosion and sediment control program and addresses the items listed above.

3.4.2 Measurable Goals and BMPs Selected for Implementation

Measurable goals have been identified and are included below.

JBLE–Eustis will continue to follow the policies and procedures described in the Virginia Erosion and Sediment Control Regulations and the *Virginia Erosion and Sediment Control Handbook*, which can be found at the VDEQ Erosion and Sediment Control website: (http://www.deq.virginia.gov/Programs/Water/StormwaterManagement/Publications/ESCHandbook.aspx).

- 733d CED/CEIE and AFCEC ISS personnel will maintain the required certifications and trainings consistent with Virginia Erosion and Sediment Control Regulations (9VAC25-840) for plan review and inspection as part of the installation's E&SC Program.
- JBLE–Eustis will implement and abide by the *Standards and Specifications for Erosion and Sediment Control* dated May 2016 and provided in Appendix E of this MS4 Program Plan. This most recent version of the plan will be included with the Program Plan.
- 733d CED/CEIE will verify site-specific SPPPs are developed for land-disturbing activities that require them, including:
    - Land disturbance sites that disturb one (1) or more acres over the life of the project
    - Land disturbance sites that are part of a larger common plan of development or sale that will disturb one (1) or more acres over the life of the project;
- 733d CED/CEIE will utilize Engineering Technical Letter (ETL) 14-1, *Construction and Operation and Maintenance Guidance for Storm Water Systems*, published on 7 August 2014. ETL 14-1 can be found at the Whole Building Design Guide website (https://www.wbdg.org/ccb/browse_doc.php?d=9693) in the documents library under Air Force Criteria. The installation also maintains an electronic copy for reference. This ETL provides procedures and practices that can be implemented in order to minimize stormwater

pollution from Air Force construction activities, guidance for construction inspectors regarding temporary sediment and erosion controls, Operation and Maintenance (O&M) guidance for stormwater infrastructure, and permanent SMF. This document has been incorporated by reference into the MS4 Program Plan. See Section 5.1 for a complete list of documents incorporated by reference.

- 733d CED/CEIE will set up a hotline for installation personnel and residents to call and report observations and complaints related to land-disturbing activities.

In order to achieve compliance with the requirements specified in Section I.E.4 of the permit, JBLE–Eustis plans to implement the following BMPs:

- Implementation of installation-specific standards and specifications from *Standards and Specifications for Erosion and Sediment Control* dated May 2016 and provided in Appendix E.
- Maintaining a list of land-disturbing activities that includes tracking the progress of the projects and maintaining inspection records.
- Completing land-disturbing activity inspections immediately following the initial installation of E&SC measures, at least once during every two-week period, within 48-hours of any runoff-producing storm event, and upon completion of the project.
- Inclusion of E&SC issues in required training for installation personnel

3.4.3 MS4 Construction Site Stormwater Runoff Control Program Effectiveness

Review Process

JBLE–Eustis will review the Construction Stormwater Program effectiveness for MCM 4. Items to be reviewed include:

- Implementation of the *Standards and Specifications for Erosion and Sediment Control*
- Tracking of on-going land-disturbing activities at JBLE–Eustis
- Completion of land-disturbing activity E&SC inspections
- Maintaining required certifications for inspectors and plan reviewers
- Available training related to E&SC procedures on the installation

These items will be reviewed to determine:

- If the land-disturbing activities are being inspected according to the *Standards and Specifications for Erosion and Sediment Control*.

- The effectiveness of the promotion and utilization of the stormwater hotline, advertising how to report observations related to construction site stormwater control. Effectiveness of promotion may include:
    - Reviewing logs to the reporting hotline setup by the 733d CED/CEIE
    - Assessing the methods utilized to promote the hotline and encourage reporting (e.g., mass emails, Facebook posts, etc.)
    - Distribution of an online survey to installation personnel and residents regarding the availability of the stormwater reporting hotline; including how they heard about the hotline
- The completeness of the construction site inspection records. Records review of these documents for the past year will also include a review of the number of findings and the follow-up to ensure that issues had been resolved.

Program Assessment

An assessment of the program's effectiveness is documented in the Annual Report corresponding to each permit year. Annual reports are included with the Program Plan in Appendix C.

Program Plan Updates Based on the Program Assessment

An assessment of the MCM 4 Program (See PY5 Annual Report [for the 1 July 2013–30 June 2018 permit cycle] in Appendix C) noted the following items:

1. All regulated land disturbing activities continued to be tracked during PY5. Regulated land disturbing activities were assessed for the total number of acres that were disturbed and the number of inspections that were conducted.
2. There were a total of three (3) regulated land disturbing activities for PY5 of the 2013-2108 permit cycle. Tracking of these activities found the following:
    a. The three (3) regulated land disturbing activities included the AIT Barracks Complex Phase 3 Benedict Ave. Demolition, the Mulberry Island Walking Trail Addition, and the Main Gate Barricade.
    b. A total of 13.43 acres were disturbed. The AIT Barracks project disturbed 13.0 acres. The Mulberry Island Walking Trail disturbed 0.21 acres, and the Main Gate Barricade project disturbed 0.22 acres.
    c. There were a total of ten (10) inspections conducted across all three projects. The AIT Barracks project and the Mulberry Island Walking Trail each had four (4) inspections and the Main Gate Barricade project was inspected twice.

3.4.4 MS4 Annual Reporting Requirements

733d CED/CEIE will track regulated land-disturbing activities and include the following information in each annual report submitted to VDEQ:

1. A confirmation statement that land disturbing projects that occurred during the reporting period have been conducted in accordance with the current VDEQ approved standards and specifications for E&SC.

2. If one or more of the land disturbing projects were not conducted with the department approved standards and specifications, an explanation as to why the projects did not conform to the approved standards and specifications.

3. The total number of inspections conducted.

4. The total number and type of enforcement actions implemented and the type of enforcement actions.

3.5 MCM 5: Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands

3.5.1 Summary of Requirements

General Permit No. VAR040035 Section I.E.5 discusses the requirements for the JBLE–Eustis Post-Construction Stormwater Management Program as prescribed in MCM 5. The purpose of this MCM is to develop, implement, and enforce a program in new development and development on prior developed lands. Per Part I.E.5.a.4, as a federal entity that has not developed standards and specifications in accordance with the Virginia Stormwater Management Act (§ 62. 1-44.15:51 et seq. of the Code of Virginia) and VSMP Regulations (9VAC25-870), JBLE–Eustis will implement the most recent department approved standards and specifications and develop an inspection and maintenance program in accordance with Part I.E.5.b.

The inspection and maintenance program for SMFs owned and/or operated by the permittee that discharges to the MS4 utilizes the *Structural Stormwater Best Management Practices Inventory, Annual Inspection, and Management Plan,* which can be found in Appendix F of this plan. The inspection and maintenance program requirements include the following:

- Develop and maintain written inspection and maintenance procedures in order to ensure adequate long-term O&M of the SMF

- Inspect SMFs owned and/or operated by the installation no less than annually

- If, during the inspections, it is determined that maintenance is required, maintenance must be conducted in accordance with the written procedures outlined in *Structural Stormwater Best Management Practices Inventory, Annual Inspection, and Management Plan*

JBLE–Eustis' Post-Construction Stormwater Management Program also includes the following items:

- A description of the legal authorities utilized to ensure compliance with the MCM

- Written procedures for SMFs (e.g., wet detention pond, bioretention cell) design and installation
- Written inspection procedures as well as all associated documents utilized during the inspection, including inspection of privately owned SMFs (i.e., MFH)
- An outline of the roles and responsibilities for JBLE–Eustis personnel implementing the MCM
- An electronic database or spreadsheet of all SMFs owned and/or operated SMFs that discharge into the MS4. The database must also include all BMPs implemented to meet the Chesapeake Bay TMDL load reduction. The database must be updated within 30 days of a new SMF or BMP being brought online. No later than 1 October of each year, JBLE–Eustis must report via the DEQ BMP Warehouse, any SMFs or BMPs brought online between 1 July and 30 June of the previous year

3.5.2 Measurable Goals and BMPs Selected for Implementation

Measurable goals have been identified and BMPs to be implemented and are included below:

- Enforcement of installation policies or procedures that enable the installation to address post-construction runoff from new or re-development projects in compliance with the VSMA.
    - Legal authorities:
        - MS4 Permit No. VAR040035
        - JBLE–Eustis, 733d CED via regulations, policies, and procedures noted below
    - Regulations, Policies, and/or Procedures:
        - **4 VAC 50-60*, VDEQ Stormwater Management Permit Regulations*** – These stormwater regulations specify minimum technical criteria and administrative procedures for stormwater management programs that JBLE–Eustis has adopted in order to achieve the effective control of precipitation from land development projects.
        - **Air Force Policy Directive (AFPD) 32-10*, Installations and Facilities (4 March 2010)*** – AFPD 32-10 establishes policy for Air Force Installations and Facilities to employ a sustainable asset management approach.
        - **AFPD 32-70*, Environmental Quality* (20 July 1994)** – AFPD 32-70 applies to all Air Force personnel and is designed to help achieve and maintain environmental quality. Item 2 of the directive stipulates that the Air Force will conduct its activities according to national environmental policy. In addition, the directive says that "All Air Force employees, including military, civilian,

and contractor personnel, are accountable for the environmental consequences of their actions." The directive also establishes authorities and responsibilities for high level positions from the Assistant Secretary of the Air Force to Commanders for major commands.

- **AFI 32-1067, *Water and Fuel Systems* (4 February 2015)** – Air Force Instruction (AFI) 32-1067 implements AFPDs 32-10 and 32-70 and provides guidelines for managing water and wastewater systems at Air Force bases. Chapter 5 of AFI 32-1067 presents information and requirements for stormwater systems located in the United States. Section 5.2.3 describes how installation may be classified as MS4s.

- **JBLE–I 32-101, *Environmental Management* (28 January 2014)** – JBLE–I 32-101 applies to all personnel performing functions and conducting operations on JBLE–Eustis and is aimed at preserving, protecting, conserving, and restoring the quality of the installation environment. Section 4.4.6.2 requires the installation to comply with applicable federal, state and local stormwater regulations through execution of required stormwater permits. Section 4.4.6.2.2.2 requires all operations and actions be planned and executed in a manner to protect surface water. JBLE–I 32-101 can be viewed at:*http://www.jble.af.mil/About-Us/JBLE-Enviromental-Information.*

- **EMP 4.4.6.2.2, *Stormwater Management* (31 August 2017)** – This EMP establishes the procedures to implement JBLE–I 32-101 for the control and abatement of stormwater pollution.

- **EMP 4.4.6.16, *Contracting* (31 August 2017)** – This EMP establishes the procedures for managing environmental aspects of contracts for construction goods and services. The EMP outlines roles and responsibilities and procedures related to contractors, including those performing construction activities on the installation.

- Implementation of ETL 14-1, *Construction and Operations and Maintenance Guidance for Storm Water Systems*. This ETL provides procedures and practices that can be implemented in order to minimize stormwater pollution generated on Air Force bases by providing O&M guidance for stormwater infrastructure and permanent stormwater drainage and treatment infrastructure.

  - The ETL can be found here: http://www.wbdg.org/ffc/af-afcec/engineering-technical-letters-afetl

  - Attachments to the ETL include practical tools to aid in the O&M of individual SMFs and include checklists that the installation will implement to aid in documenting inspections and maintenance activities.

- Completion of SMF inspections in accordance with ETL 14-1 and the manufacturer's and/or engineer of record's recommendations, but no less than annually.
    - Records of the inspections are to be maintained and utilized for completion of required O&M for the SMFs. The 733rd Civil Engineer Division / Operations (733d CED/CEO) flight will amend the existing operations contract or award new contracts in order to perform required maintenance.
    - Privately owned/maintained SMFs located on JBLE–Eustis, specifically MFH, which is maintained by the MFH privatization contractor, will be inspected by the contractor. The contractor will conduct inspections no less than annually and provide records of inspection and maintenance to the 733d CED/CEIE Stormwater Program Manager for inclusion with the installation's SMF records.
- Track all installation and privately-owned SMFs that discharge to the MS4. The tracking document will be maintained by 733d CED/CEIE on the installation network server and include the following:
    - The SMF or BMP type
    - The SMF location as latitude and longitude
    - The acres treated by the SMF (i.e., total, pervious, and impervious)
    - The date the SMF was brought online (MM/YYYY). If the date is not known, a date of 30 June 2005 will be used as the date brought online for all previously existing SMFs.
    - The 6th order HUC for the watershed in which the SMF is located
    - If the SMF is part of the installation Chesapeake Bay TMDL action plan required in Part II A or local TMDL action plan required in Part II B, or both
    - Whether the SMF or BMP is operator-owned or privately-owned
    - Whether a maintenance agreement exists for the privately-owned SMF
    - The date of the most recent inspection for the privately-owned SMF. In addition, the installation will also track and report the total number of inspections completed and, when applicable, the number of enforcement actions taken to ensure long-term maintenance.
- Continuation of the use of the EMS CFT Water Quality Working Group in order to implement the MCM in accordance with Part I.E.5.h(5) of the permit.

- The EMS CFT Water Quality Working Group consists of 733d CED Engineering Flight, Operations Flight, Fire and Emergency Services Flight, Installation Management Flight, 733d CED/CEIE; AECs for high priority facilities, PAO, and the Judge Advocate Office. The team will meet at least once annually to discuss the MS4 program and review the goals outlined in the program plan.
- The EMS CFT Water Quality Working Group responsibilities are outlined in EMP 4.4.6.2.2, *Stormwater Management*. They will include:
  - Implementation of the MS4 Program Plan requirements
  - Defining and agreeing upon updated goals for the MS4 Program
  - Being aware of updates to the MS4 requirements and determining if changes must be made to maintain compliance
  - Maintaining a clear line of communication with installation leadership, including utilization of the CFTs

3.5.3 MS4 Post-Construction Stormwater Management Program Effectiveness

Review Process

JBLE–Eustis will review the Post-Construction Stormwater Management Program effectiveness for MCM 5. Items to be reviewed include:

- Implementation of ETL 14-1, *Construction and Operation and Maintenance Guidance for Storm Water Systems*
- Tracking of existing and planned SMFs
- Completion of SMF inspections

These items will be reviewed to determine:

- If the SMFs are being inspected as recommended by ETL 14-1, including a minimum of annual inspections for each SMF.
- Accuracy of the tracking document for the existing and planned SMFs, including:
  - Noting the last time the file was updated
  - Reviewing documents associated with construction projects to determine if planned SMFs are noted in the spreadsheet
- Completeness of inspections of existing SMFs based on manufacturer or the engineer of record recommendations, or ETL 14-1, including:
  - Reviewing inspection logs and forms maintained by 733d CED/CEIE and the MFH privatization contractor

- Reviewing the number of findings and the follow-up to ensure that issues were resolved.

Program Assessment

An assessment of the program's effectiveness is documented in the Annual Report corresponding to each permit year. Annual reports are included with the Program Plan in Appendix C.

Program Plan Updates Based on the Program Assessment

An assessment of the MCM 5 Program (See PY5 Annual Report [for the 1 July 2013–30 June 2018 permit cycle] in Appendix C) noted the following items:

1. There were no new SMFs brought online during PY5.
2. The SMF tracking spreadsheet is maintained on the installation network and maintained by the 733d CED/CEIE Stormwater Program Manager. The tracking spreadsheet will continue to be utilized and updated throughout the new permit cycle.
3. A draft report was delivered in May 2018 which evaluated all SMFs on the installation. Many additional SMFs were identified and several previously identified ones were removed as a result of the inspections and report. This effort included SMFs in the MS4 and industrial areas. Information collected as part of this effort was also shared with the Chesapeake Bay Action Team (CBAT) for updating the SMF clearinghouse information. The report will be finalized in January 2019.

3.5.4 MS4 Annual Reporting Requirements

JBLE–Eustis will track activities related to MCM 5 and include the following information in each annual report submitted to VDEQ:

1. The total number of inspections conducted on SMFs owned or operated by the installation.

2. A description of the significant maintenance, repair, or retrofit activities performed on the SMFs or BMPs owned or operated by the installation to ensure they continue to perform as designed. This excludes routine maintenance (e.g., mowing, trash collection).

3. A confirmation statement that the installation submitted SMF information through the Virginia Construction Stormwater General Permit database for those land disturbing activities the installation was required to obtain coverage in accordance with Part I.E.5.f. The installation may also submit a statement that no projects were completed requiring coverage.

4. A confirmation statement that the installation electronically reported SMFs using the DEQ BMP Warehouse in accordance with Part I.E5.g and the date on which the information was submitted.

5. For SMFs installed after 1 July 2014, use the DEQ Construction Stormwater Database or other application to report each SMF for which the installation is required to obtain a General VPDES Permit for Discharges of Stormwater from Construction Activities.

3.6 MCM 6: Pollution Prevention and Good Housekeeping for Facilities Owned or Operated by the Permittee within the MS4 Service Area

3.6.1 Summary of Requirements

General Permit No. VAR040035 Section I.E.6 requires JBLE–Eustis to implement a Pollution Prevention and Good Housekeeping Program. In order to facilitate the development and implementation of this program, JBLE–Eustis is also required to:

- Maintain and implement written procedures designed to minimize or prevent pollutant discharge from daily operations (e.g., road, street, and parking lot maintenance; equipment maintenance; and the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers). The written procedures must be designed to:
    - Prevent illicit discharges
    - Ensure the proper disposal of waste materials, including landscape wastes
    - Prevent the discharge of wastewater or vehicle wash water or both into the MS4 without authorization under a separate VPDES permit
    - Require implementation of BMPs when discharging water pumped from utility construction and maintenance activities
    - Minimize the pollutants in stormwater runoff from bulk storage areas (e.g., salt storage and topsoil stockpiles)
    - Prevent pollutant discharge into the MS4 from leaking POVs and equipment
    - Ensure that the application of materials, including fertilizers and pesticides, is conducted in accordance with the manufacturer's recommendations
- SPPP Development:
    - Identify all municipal high-priority facilities (i.e., composting facilities, equipment storage and maintenance facilities, materials storage yards, pesticide storage facilities, public work yards, recycling facilities, salt storage facilities, solid waste handling and transfer facilities, and vehicle storage and maintenance yards) with a high potential of discharging pollutants. Refer to Section I.E.6.c (1-9) of the General Permit for a list of applicable criteria and develop and implement a SPPP for each identified facility. Each SPPP is required to include:

- A site description that includes a map identifying all outfalls, direction of flows, existing source controls, and receiving water bodies
- A description and checklist of potential pollutants and pollutant sources
- A description of all potential non-stormwater discharge
- Written procedures designed to reduce and prevent pollutant discharge
- A description of the applicable training provided per part I.E.6.m of the permit
- An annual inspection frequency and maintenance requirements for site specific source controls. The date of each inspection and associated findings and follow-up must be logged in each SPPP.
- A log of each unauthorized discharge, release, or spill incident reported in accordance with Part III.G of the permit, including:
  - Date of incident
  - Material discharges, released or spilled
  - Estimated quantity discharged, released or spilled

- No later than 30 June of each year, all high-priority MS4 facilities without a SPPP that are owned or operated by JBLE–Eustis, will be evaluated to determine if the facility has a high potential to discharge pollutants to the MS4. If the facility is determined to be in need of a SPPP, one must be developed no later than 31 December of the same year.
- In the event of an unauthorized discharge, release or spill, the site-specific SPPP will be reviewed no later than 30 days after the event. The SPPP should be reviewed to determine if any additional measures are necessary to prevent future unauthorized discharges, releases or spills. If necessary, the SPPP should be updated no later than 90 days after the event.
- The site-specific SPPP is kept at the high-priority facility and utilized as part of staff training. The SPPP may be maintained on site as either a hard or electronic copy.
- If it is determined that the activities at a high-priority facility no longer meet the criteria as a facility with a high potential to discharge pollutants, the facility may be removed from the list of high-priority facilities with a high potential to discharge pollutants.

- Turf and landscape Nutrient Management Plan (NMP) implementation:

  - Implement a turf and landscape NMP developed by a certified turf and landscape nutrient management planner in accordance with §10.1-104.2 of the Code of Virginia for all lands owned or operated by the installation where nutrients are applied to a contiguous area greater than one acre.
  - Annually track the following:
    - The total acreage of lands where turf and landscape NMPs are required
    - The total acreage of lands upon which turf and landscape NMPs have been implemented

- The application of deicing agents containing urea or other forms of nitrogen or phosphorus to parking lots, roadways, sidewalks, or other paved surfaces is prohibited on the installation.
- JBLE–Eustis will implement the employee training ensuring utilization of the written procedures previously discussed as presented below:
  - Biennial training to applicable employees (e.g., military, civilian, and contractor personnel working in shops that perform maintenance activities or have the potential to handle Petroleum, Oil, and Lubricants [POL] or other materials) in good housekeeping and pollution prevention practices that are to be employed:
    - During road, street, and parking lot maintenance
    - In and around maintenance and public works facilities
    - In and around recreational facilities
    - Field personnel in the recognition and reporting of illicit discharges
  - Ensure that employees, including contractors, who apply pesticides and herbicides, are properly trained or certified in accordance with the Virginia Pesticides Control Act (§ 3.2-3900).
  - Ensure that employees, including contractors, serving as plan reviewers, inspectors, program administrators, and construction site operators obtain the appropriate certifications as required under the VESCL and its attendant regulations.
  - Ensure that emergency response employees shall have training in spill responses on an annual basis.
- Ensure that employees, including contractors, who implement the stormwater program obtain the appropriate certifications as required under the VSMA.

- Training requirements may be fulfilled in total or in part, through regional training programs involving two (2) or more MS4 permittees.

- The installation shall keep documentation of each training event including the date, number of employees in attendance, and the objective of the training event for a period of three years after each training event.

- JBLE–Eustis requires that municipal contractors use appropriate control measures and procedures for stormwater discharges to the MS4 system. Oversight procedures are included in Appendix E.

3.6.2 Measurable Goals and BMPs Selected for Implementation

Measurable goals have been identified and BMPs to be implemented are included below:

- Implement the following procedures in order to minimize the use of pollutants that may enter the stormwater drainage system:

    - **Cleanup of Paved Surfaces (Street Sweeping)** – Street sweepers are utilized by JBLE–Eustis to remove debris and solids accumulation from streets and parking lots throughout the installation. The installation operation contractor, GMS, performs street sweeping throughout the installation. The current street sweeping schedule includes regular sweeping once every one to two weeks based on the agreed upon schedule included in GMS' contract. Water is carried on the street sweeper and applied during street sweeping activities in order to control dust.

    - **Cleanup of Shops, Work Areas, and Storage Areas** – Routine cleanup is scheduled for shops, work areas, and storage areas in order to minimize hazardous conditions to the installation employees and/or environment. Work areas are maintained in accordance with the Air Force Occupation Safety and Health (AFOSH) requirements. Personnel are provided appropriate training related to good housekeeping and safety procedures.

    - **POV Washing** – JBLE–Eustis operates a POV car wash that residents are encouraged to use to wash vehicles. Balfour Beatty prohibits washing cars in roadways and resident's driveways and encourages reporting to their hotline *(757-369-8335)*. Government owned vehicle (GOV) washing are currently performed as designated areas and are covered under a separate industrial VPDES permit (Permit No. VA0025216) and will not be discussed further in the MS4 Program Plan.

    - **Internal Assessments** – EMP 4.5.2.3, *Internal Inspection Conducted by Activities*, requires that all activities (e.g., food service establishments, loading docks, golf course and other maintenance areas) conduct inspection of their facilities for compliance with all environmental media areas on a quarterly basis. In addition, it requires annual

assessments of facilities for good housekeeping and pollution prevention compliance. Internal assessments are required to be completed no later than 1 December of each year. Results from the assessments are compiled and used to brief senior installation management at semi-annual ESOH Council meetings.

- Update the list of high priority non-industrial facilities located in Appendix G and determine if they have a high potential for discharging pollutants and develop required SPPPs. SPPPs will be maintained by the 733d CED/CEIE Stormwater Program Manager and each facility will have copies available on-site.

- Implement turf and landscape NMPs for all lands owned or operated by the installation where nutrients are applied to a contiguous area greater than one acre. Areas that require and have NMPs being implemented are presented in Table 3-3. Associated NMPs are maintained by the 733d CED/CEIE Stormwater Program Manager and provided in Appendix H of this Program Plan.

Table 3-3. Turf and Landscape NMP Tracking

Location	Total Acreage Where NMP is Required and Being Implemented
Military Family Housing	75.1
Pines Golf Course	98.5
FSS Athletic Fields	11.2
FSS Youth Athletic Fields	8.2

Implement the annual training plan presented below:

- EMP 4.4.2, *Environmental Awareness and Competency Training* requires JBLE–Eustis personnel to take EMAC and AEM training as appropriate based on personnel assignments within 30 days of arrival at the installation. Refresher training is required on an annual basis.

- AEM training is provided to AECs, UECs, and Hazardous Waste Coordinators (HWC) by 733d CED/CEIE staff. Training occurs on a biennial basis, typically in March and October of each year.

- 733d CED/CEIE also provides training to the WOAC course on an as needed basis.

- The installation Integrated Contingency Plan (ICP) and Spill Prevention Control and Countermeasures (SPCC) Plan, incorporated into this plan by reference, are included in additional training that is available to installation personnel.

- JBLE–Eustis personnel that may be involved in spill response are required to maintain the required training specified in AFI 10-2501 and the installation ICP. Yearly refresher courses are provided by 733d CED/CEIE when required.
- Installation personnel that may be handling POL are required to be trained in the maintenance of equipment in order to prevent discharges. Training courses related to discharge procedure protocols, applicable pollution control regulations, general facility operations, and the contents of the installation SPCC Plan are maintained by 733d CED/CEIE and provided to personnel via the TEACH website.
- Training records (e.g., Air Force [AF] Form 55 – *Employee Safety and Health Record*) are used by 733d CED/CEIE to record participation in training courses.

- A summary of the mechanisms used to ensure contractors working on behalf of JBLE–Eustis implement the necessary good housekeeping and pollution prevention procedures and SPPPs.

3.6.3 MS4 Pollution Prevention / Good Housekeeping Program Effectiveness

Review Process

JBLE–Eustis will review the Pollution Prevention / Good Housekeeping Program effectiveness for MCM 6. Items to be reviewed include:

- Implementation of installation EMPs as well as procedures presented in Section 3.6.2
- Tracking of lands requiring NMPs
- Implementation of NMPs previously developed
- Adherence to the staff training schedule presented in Section 3.6.2
- Tracking of NMPs, required training, and SPPPs
- Completion of P2 BMP implementation inspections

These items will be reviewed to determine:

- If installation personnel are abiding by EMPs and procedures previously outlined in Section 3.6.2. This includes an assessment of street sweeping activities, POV washing enforcement, and completion of internal assessments by units.
- Accuracy of the tracking document for the lands that require NMPs, including:
  - A list of all lands owned or operated by the installation where nutrients are applied to a contiguous area greater than one acre;
  - The total acreage of each location where an NMP is required; and,
  - The total acreage of each location where an existing NMP is being implemented.
- Completion of the training plan discussed in Section 3.6.2.

- Review training logs (e.g., AF Form 55) and sign-in sheets and ensuring that documentation of training is being maintained as required in Section II.B.6.d.(9).

Program Assessment

An assessment of the program's effectiveness is documented in the Annual Report corresponding to each permit year. Annual reports are included with the Program Plan in Appendix C.

Program Plan Updates Based on the Program Assessment

An assessment of the MCM 6 Program (See PY5 Annual Report [for the 1 July 2013–30 June 2018 permit cycle] in Appendix C) noted the following items:

1. JBLE–Eustis utilizes the EMS that conforms to ISO 14001:2004, to manage environmental program requirements. All installation environmental and management requirements are codified in JBLE–I 32-101, *Environmental Management*. EMPs have been developed and are used to implement the environmental program. These EMPs are reviewed and updated on an annual basis. A full list of EMPs related to the Stormwater Management Program can be found in Appendix C under MCM 6 and are posted on the JBLE–Eustis Environmental website (https://www.jble.af.mil/Units/Army/Eustis-Enviromental/).

2. In addition to the three (3) NMPs that were already in place for the Pines Golf Course, MFH, and the Athletic Fields, an additional NMP was developed for the FSS Youth Athletic Fields. This was originally omitted due to there not being fertilizer application to this area; however, these fields were identified to start being treated and maintained. The NMP for the youth athletic fields was completed in June 2018. No additional NMP training is required at this time. Continuous review of the plans and meetings with 733d CED/CEIE and those subject to the NMP requirements need to be fostered throughout the next PY as the NMP implementation continues.

3. Street sweeping provides nutrient removal and has been effective for the installation. There are no plans to change this activity.

4. JBLE–Eustis operates under a comprehensive SPPP, which is designed to satisfy the requirements of VPDES Permit No. VA0025216. High-priority non-industrial facilities have been included in the comprehensive SPPP (i.e., Pines Golf Course, AAFES gas station and associated facilities, Base Exchange, and FSS Sport Field Maintenance facility) in order to manage to the same standard as the base's industrial facilities. High-priority non-industrial facilities incorporated into the SPPP were inspected for compliance with the SPPP as part of the annual CSCE. There are no new SPPPs required based on the annual site compliance evaluation.

3.6.4 MS4 Annual Reporting Requirements

JBLE–Eustis will track activities related to MCM 6 and include the following information in each annual report submitted to VDEQ:

1. A summary of any operation procedures developed or modified during the reporting period
2. A summary of any new SPPPs developed during the reporting period
3. A summary of any SPPPs modified or the rationale for the delisting of any high priority facilities during the reporting period
4. A summary of any new turf and landscape NMPs developed that includes:
    a. Location and the total acreage of each land area
    b. The date of the approved NMP
5. A list of the training events conducted during the reporting period, including the following information:
    a. Date of the training event
    b. Number of employees who attended the training event
    c. Objective of the training event.

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4.0 SPECIAL CONDITIONS

4.1 Chesapeake Bay TMDL Special Condition

In 2010 the EPA established the Chesapeake Bay TMDL to address excess nitrogen, phosphorus, and total suspended solids (pollutants of concern [POCs]) in the bay (EPA, 2010). The Chesapeake Bay watershed encompasses over 64,000 square miles across the District of Columbia and large sections of Delaware, Maryland, New York, Pennsylvania, West Virginia, and Virginia. JBLE–Eustis sits within the Chesapeake Bay Watershed.

In the Phase I and Phase II Chesapeake Bay Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL, the Commonwealth of Virginia committed to a phased approach to reducing nutrients and suspended solids discharging from MS4s. Party II.A of the General Permit No. VAR040035 requires the installation to update the Chesapeake Bay TMDL Action Plan that demonstrates future plans to meet the required nutrient and suspended solids reductions. JBLE–Eustis' Draft Phase II Chesapeake Bay TMDL Action Plan was submitted with the registration statement in PY5 of the 2009-2013 permit cycle. By 1 November 2019, the final updated Phase II TMDL Action Plan is to be submitted. The Action Plan presents a discussion of the compliance requirements for JBLE–Eustis and is included in Appendix I of this Program Plan.

The Action Plan is an annual report on the progress made by the installation to discuss its efforts to meet the Chesapeake Bay TMDL pollutant reduction requirements, specifically the Level 2 (L2) scoping run as specified in the 2010 Phase I WIP (VDEQ, 2010). The Action Plan presents the JBLE–Eustis estimated load contribution, required load reductions, and pollutant reduction credits. The plan also reports progress made toward meeting the cumulative 40% pollutant reduction requirement by the end of the second permit cycle (30 June 2023). The methodology used to calculate the pollutant loads and credits is based on VDEQ Guidance Memo No. 15-2005 (Guidance Document) (VDEQ, 2015). The updated Chesapeake Bay TMDL Action Plan must include:

- Any new or modified legal authorities
- Load and cumulative reduction calculations for each river basin
- Total reductions achieved as of 1 July 2018 for each pollutant of concern
- A list of BMPs implemented prior to 1 July 2018 to achieve reductions associated with the Chesapeake Bay TMDL (include date of implementation and reduction achieved)
- BMPs to be implemented prior to the expiration of this permit to meet cumulative reductions (include type of BMP, project name, location, % removal efficiency, calculation of the expected reduction for each BMP)
- A summary of any comments received via public participation as required by Part II.A.12 (including the permittee's response, identification of any public meetings, and any revisions made)

JBLE–Eustis must meet the reduction requirements for the end of this permit cycle (30 June 2023) for TN, TP, and TSS. The reduction requirements for new and grandfathered sources are as follows:

- Reduce the load of TN, TP, and TSS from existing developed lands served by the MS4 as of 30 June 2009 (within the 2010 census UA) by at least 40% of Level 2 Scoping Run Reductions
    - A reduction of at least 40% of the L2 Scoping Run for lands that were added by the 2010 expanded census UA is required by 30 June 2023
- Reduction Requirements for New Sources:
    - Offset increased loads from new sources initiating construction between 1 July 2009 and 30 June 2019 by 40% if the following conditions apply:
        - Activity disturbed one acre or more
        - Resulting TP load was greater than 0.45 lb./acre/year (i.e. average land cover condition of 16% impervious surface cover)
    - Develop equivalent pollutant loads for TN and TSS based on Table 4 in Part II.A.5.b of the General Permit
- Reduction Requirements for Grandfathered Projects:
    - Offset increased loads from grandfathered projects that began construction after 1 July 2014 if the following conditions apply:
        - Activity disturbs one acre or more
        - Resulting TP load was greater than 0.45 lbs./acre/year (i.e. average land cover condition of 16% impervious surface cover)
    - Develop equivalent pollutant loads for TN and TSS based on Table 4 in Part II.A.5.b
- Refer to Part II.A.3-5 for loading and reduction value reporting procedures.
- Required reductions may be achieved through one or more of the following methods:
    - BMPs approved by the Chesapeake Bay Program
    - BMPs approved by the department
    - A trading program as outlined in Part II.A.10

The installation must provide an opportunity for public comment on the additional proposed BMPs to meet the reductions that were not approved by the department during the first phase of the action plan (2013-2018). The comment period must be no less than 15 days.

JBLE–Eustis will track activities related to the Chesapeake Bay TMDL Action Plan and include the following information in each annual report submitted to VDEQ:

1. A list of BMPs implemented during the reporting period but not reported to the VDEQ BMP Warehouse and the estimated reduction of pollutants of concern (lbs./year) for each

2. If credits were acquired, a statement of the credits

3. Progress toward meeting the required cumulative reductions for TN, TP, and TSS

4. A list of BMPs that are planned to be implemented during the next reporting period

4.2 Local TMDL Special Condition

Section II.B of the JBLE–Eustis MS4 permit (VAR040035) requires the installation to maintain an updated MS4 Program Plan that includes a specific TMDL Action Plan for pollutants allocated to the MS4 in an approved TMDL. On 28 April 2009, the VDEQ State Water Control Board (SWCB) approved TMDLs to address fecal coliform bacteria impairment in the Warwick River (James River) and Skiffes Creek. The Warwick and James Rivers impaired segment (waterbody ID# VAT-G11E) and Skiffes Creek impaired segment (waterbody ID# VAT-G11E) are considered Condemned Shellfish Areas that do not support the Virginia Department of Health (VDH) fecal coliform standards for shellfish harvesting. These waterbodies receive runoff from JBLE–Eustis and the TMDLs for these waterbodies include WLA assignments to JBLE–Eustis.

On 30 November 2015, VDEQ notified JBLE-Eustis that, as part of maintaining its MS4 Program Plan, the installation is required to develop Action Plans for the James River, Warwick River, and Skiffes Creeks to address bacteria impairment in those waterbodies. Specifically, the installation must update the MS4 Program Plan to incorporate approvable TMDL Action Plans that identify the BMPs and other interim milestone activities for compliance with the WLAs. JBLE–Eustis finalized the *Warwick River and Skiffes Creek Bacteria Total Maximum Daily Load Action Plan* in August 2016 and began implementing the Action Plan during PY4 and PY5 of the previous permit cycle. The Fecal Coliform TMDL Action Plan is provided in Appendix J of this Program Plan.

The local TMDL Action Plan must include the following:

- The TMDL project name
- The EPA approval date of the TMDL
- The wasteload allocated to the permittee (individually or in aggregates), and the corresponding percent reduction
- Identification of the significant sources of the pollutants of concern discharging to the permittee's MS4 and that are not covered under a separate VPDES permit
- The BMPs designed to reduce the pollutants of concern in accordance with Parts II.B.4-6
- Any calculation required in accordance with Parts II.B.4-6
- For action plans developed in accordance with Part II.B.4 or Part II.B.5, an outreach strategy to enhance the public's education on methods to eliminate and reduce discharges of the pollutants
- A schedule of anticipated actions planned for implementation during the permit term

JBLE–Eustis is not an approved VSMP authority and therefore, must select at least one strategy listed in Table 5 in Part II.B.4 and must correspond to the sources identified in Part II.B.3.d.

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5.0 ADDITIONAL MS4 PROGAM REFERENCE MATERIALS

5.1 Documents Incorporated by Reference

Documents that are identified in Table 5-1 are considered a part of the JBLE–Eustis MS4 Program Plan. These documents provide policy, procedures, and guidance for implementation of BMPs required to meet measurable goals associated with specific MCMs.

Table 5-1. Documents Incorporated by Reference

Document Name	Date	Location
JBLE–Eustis EMPs	Updated Annually	733d CED/CEIE office and network drive
ETL 14-1	7 April 2014	733d CED/CEIE office and network drive
JBLE–Eustis SPCC Plan	July 2015	733d CED/CEIE office and network drive
JBLE–Eustis ICP	January 2016	733d CED/CEIE office and network drive
JBLE–Eustis MS4 Annual Reports	Annual	Appendix C
IDDE Procedure	19 August 2016	Appendix D
Standards and Specifications for Erosion and Sediment Control	23 May 2016	Appendix E
Structural Stormwater Best Management Practices Inventory, Annual Inspections, and Management Plan JBLE–Eustis	January 2019	Appendix F
MS4 High Priority Facility Determination and associated SPPPs	30 June 2016	Appendix G
NMPs (Golf Course, Athletic Fields, and MFH)	13 April 2016 (Pines Golf Course & Athletic Fields) 23 May 2016 (MFH) 27 June 2018 (FSS Youth Fields)	Appendix H; 733d CED/CEIE office and network drive
Draft Phase II Chesapeake Bay TMDL Action Plan	7 April 2016	Appendix I
Fecal Coliform TMDL Action Plan	1 August 2016	Appendix J
Training Plan and Records	Updated Annually	733d CED/CEIE office and network drive

Table 5-1. Documents Incorporated by Reference (Continued)

Document Name	Date	Location
SMF Inventory Tracking Spreadsheet	Updated as Needed (no less than annually)	733d CED/CEIE network drive
SMF Inspection Reports	Completed Annually	733d CED/CEIE office and network drive
EMAC/AEM training Materials	Updated Annually	733d CED/CEIE office, network drive, and TEACH website
JBLE–Eustis Environmental Website	Continuously Updated	http://www.jble.af.mil/About-Us/JBLE-Enviromental-Information

5.2 Additional MS4 Program Reference Materials

Additional reference materials that are available to JBLE–Eustis for implementation of the MS4 Program, but are not considered a part of the MS4 Program Plan include:

1. Virginia Stormwater Management Handbook
2. VESCL and Virginia Erosion and Sediment Control (VESC) Handbook

6.0 REFERENCES

Air Force Center for Environmental Excellence / Environmental Quality Directorate (AFCEE/EQ). 1997. *Installation Stormwater Program Management Guide: A Reference for Implementing and Managing U.S. Air Force Stormwater Programs*. Brooks Air Force Base (AFB), TX: Headquarters AFCEE/EQ.

EPA. 2005a. *EPA 833-F-00-001, Fact Sheet 1.0 - Stormwater Phase II Final Rule, An Overview*. Washington, DC: EPA.

EPA. 2005b. *EPA 833-F-00-002, Fact Sheet 2.0 – Stormwater Phase II Final Rule, Small MS4 Stormwater Program Overview*. Washington, DC: EPA.

EPA. 2010. *Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment.* Washington, DC: EPA.

EPA. 2012. *Stormwater Phase II Final Rule, Fact Sheet 2.1 – Who's Covered? Designation and Waivers of Regulated Small MS4s.* Washington, DC: EPA.

Headquarters Air Force Civil Engineer Support Agency / Community and Environment Scrutiny Committee (HQ AFCESA/CESC). 2003. Engineering Technical Letter (ETL) 03-1, *Stormwater Construction Standards*. Tyndall AFB, FL: HQ AFCESA.

JBLE–Eustis. 2018. *General Permit for Discharges to Stormwater from Small Municipal Separate Storm Sewer Systems General Permit No. VAR040035 Annual Update*. JBLE–Eustis, VA: 733d CED.

JBLE–Eustis. 2014. JBLE–I 32-101, *Environment Management*. JBLE–Eustis, VA: 733d CED.

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JBLE–Eustis. 2016b. *Stormwater Pollution Prevention Plan – Final*. Originally prepared by CURES, LLC for JBLE–Eustis, Virginia and U.S. Army Corps of Engineers.

Secretary of the Air Force. 1994. AFPD 32-70, *Environmental Quality*. Washington, DC: AFDPO.

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Secretary of the Air Force. 2018. AFI 10-2501, *Air Force Emergency Management (EM) Program Planning Operations*. Washington, DC: AFDPO.

Secretary of the Air Force. 2014. *ETL 14-1, Construction and Operation and Maintenance Guidance for Storm Water Systems.* Washington, DC: AFDPO.

Under Secretary of Defense for Acquisition and Technology. 1998. DoD Instruction 4715.4, *Pollution Prevention*, Administrative Reissuance Incorporating Change 1, July 6, 1998 (Original publication: 18 June 1996). Washington, DC: DoD.

U.S. Census. 2000. *TIGER Shapefiles, Urban Area Census 2000. Accessed 12 October 2015 from https://www.census.gov/geo/maps-data/data/tiger-line.html*.

VDEQ. 2010. *Chesapeake Bay TMDL Phase I Watershed Implementation Plan*. Richmond, VA: VDEQ.

VDEQ. 2012. *Chesapeake Bay TMDL Phase II Watershed Implementation Plan*. Richmond, VA: VDEQ.

VDEQ. 2015. Guidance Memo No. 15-2005, *Chesapeake Bay TMDL Action Plan Guidance*. Richmond, VA: VDEQ.

VDEQ. 2016. Guidance Memo No. GM-16-2006, *TMDL Action Planning for Local Total Maximum Daily Loads. Richmond*, VA: VDEQ

Virginia Code Commission. 2013. *State Water Control Law*. § 62.1-44.15:51-66. Richmond, VA: Virginia Code Commission. Amended 2017.

APPENDIX A
MS4 General Permit No. VAR040035

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

1111 E. Main Street, Suite 1400, Richmond, Virginia 23219
P.O. Box 1105, Richmond, Virginia 23218
(800) 592-5482
www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director
(804) 698-4000

October 29, 2018

Colonel Sean K. Tyler
633rd Air Base Wing Commander
125 Mabry Avenue
JBLE-Langley, VA 23665

Transmitted electronically: Colonel Sean K. Tyler via (sean.k.tyler.mil@mail.mil)

Re: General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems General Permit Number VAR040035, Joint Base Langley-Eustis - Eustis

Dear Permittee:

Department staff has reviewed your Registration Statement and determined that the referenced Municipal Storm Sewer System (MS4) is hereby covered under the General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems. The effective date of your coverage under this general permit is November 1, 2018, or the date of this letter, whichever is later. The enclosed copy of the general permit contains the applicable reporting requirements and other conditions of coverage.

Please submit future permit correspondence and your annual MS4 program reports to Matthew Fanghella of the DEQ Tidewater Regional Office at matthew.fanghella@deq.virginia.gov . The general permit will expire on October 31, 2023. The conditions of the permit require that you submit a new registration statement on or before August 3, 2023 if you wish to have continued coverage under the general permit.

If you have any questions about this letter or the general permit, please contact Matthew Fanghella at (757) 518-2013 or matthew.fanghella@deq.virginia.gov .

Sincerely,

Allan Brockenbrough II

Allan Brockenbrough II, P.E.
Manager, Office of VPDES Permits

Enc. General Permit VAR040035
Cc: Ronald Holcomb, JBLE-Eustis
Matthew Fanghella, DEQ

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

General Permit No.: VAR040035

Effective Date: November 1, 2018
Expiration Date: October 31, 2023

GENERAL VPDES PERMIT FOR DISCHARGES OF STORMWATER FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS

AUTHORIZATION TO DISCHARGE UNDER THE VIRGINIA STORMWATER MANAGEMENT PROGRAM REGULATIONS, VIRGINIA POLLUTANT DISCHARGE ELIMINATION SYSTEM REGULATIONS, AND THE VIRGINIA STATE WATER CONTROL LAW

In compliance with the provisions of the Clean Water Act, as amended and pursuant to the State Water Control Law and regulations adopted pursuant thereto, permittees of small municipal separate storm sewer systems are authorized to discharge to surface waters within the boundaries of the Commonwealth of Virginia, except those waters specifically named in State Water Control Board regulations which prohibit such discharges.

The authorized discharge shall be in accordance with the registration statement filed with the department, this cover page, Part I - Discharge Authorization and Special Conditions, Part II - TMDL Special Conditions, and Part III - Conditions Applicable to All State and VPDES Permits, as set forth in this general permit.

Part I
Discharge Authorization and Special Conditions

A. Coverage under this state permit. During the period beginning with the date of coverage under this general permit and lasting until the expiration and reissuance of this state permit, the permittee is authorized to discharge stormwater and those authorized nonstormwater discharges described in 9VAC25-890-20 D in accordance with this state permit from the small municipal separate storm sewer system identified in the registration statement into surface waters within the boundaries of the Commonwealth of Virginia and consistent with 9VAC25-890-30.

B. The permittee shall develop, implement, and enforce a MS4 program designed to reduce the discharge of pollutants from the small MS4 to the maximum extent practicable (MEP) in accordance with this permit, to protect water quality, and to satisfy the appropriate water quality requirements of the State Water Control Law and its attendant regulations. The permittee shall utilize the legal authority provided by the laws and regulations of the Commonwealth of Virginia to control discharges to and from the MS4. This legal authority may be a combination of statute, ordinance, permit, policy, specific contract language, order, or interjurisdictional agreements. The MS4 program shall include the minimum control measures (MCM) described in Part I E. For the purposes of this permit term, implementation of MCMs in Part I E and the Chesapeake Bay and local TMDL requirements in Part II (as applicable) consistent with the provisions of an iterative MS4 program required pursuant to this general permit constitutes compliance with the standard of reducing pollutants to the "maximum extent practicable," provides adequate progress in meeting water quality standards, and satisfies the appropriate water quality requirements of the State Water Control Law and its attendant regulations.

C. The MS4 program plan.

1. The MS4 program plan shall include, at a minimum, the following written items:

a. The roles and responsibilities of each of the permittee's divisions and departments in the implementation of the requirements of the permit tasked with ensuring that the permit requirements are met;

b. If the permittee utilizes another entity to implement portions of the MS4 program, a copy of the written agreement. The description of each party's roles and responsibilities, including any written agreements with third parties, shall be updated as necessary;

c. For each MCM in Part I E, the following information shall be included:

(1) Each specific requirement as listed in Part I E for each MCM;

(2) A description of the BMPs or strategies that the permittee anticipates will be implemented to demonstrate compliance with the permit conditions in Part I E;

(3) All standard operating procedures or policies necessary to implement the BMPs;

(4) The measurable goal by which each BMP or strategy will be evaluated; and

(5) The persons, positions, or departments responsible for implementing each BMP or strategy; and

d. A list of documents incorporated by reference including the version and date of the document being incorporated.

2. If the permittee is receiving initial coverage under this general VPDES permit for the discharge of stormwater, the permittee shall:

   a. No later than six months following the date of permit coverage, submit to the department a schedule for the development of each component of the MS4 program plan in accordance with Part I C 1 that does not exceed the expiration date of this permit; and

   b. Provide to the department a copy of the MS4 program plan upon completion of development.

3. If the permittee was previously covered under the General VPDES Permit for the Discharge of Stormwater from MS4 effective July 1, 2013, the permittee shall update the MS4 program plan to meet the requirements of this permit no later than six months after the effective date of this permit unless otherwise specified in another permit condition and shall post the most up-to-date version of MS4 program plan on the permittee's website or location where the MS4 program plan can be obtained as required by Part I E 2 within 30 days of updating the MS4 program plan. Until such time that the MS4 program plan is updated in accordance with Part I E, the permittee shall continue to implement the MS4 program plan in effect at the time that coverage is issued under this general permit.

4. Revisions to the MS4 program plan are expected throughout the life of this permit as part of the iterative process to reduce pollutant loading and protect water quality to the MEP. As such, revisions made in accordance with this permit as a result of the iterative process do not require modification of this permit. The permittee shall summarize revisions to the MS4 program plan as part of the annual report as described in Part I D 2.

5. The permittee may demonstrate compliance with one or more MCM in Part I E through implementation of separate statutory or regulatory programs provided that the permittee's MS4 program identifies and fully describes any program that will be used to satisfy one or more of the minimum control measures of Part I E. If the program that the permittee is using requires the approval of a third party, the program shall be fully approved by the third party, or the permittee shall be working toward getting full approval. Documentation of the program's approval status, or the progress toward achieving full approval, shall be included in the annual report required by

Part I D. The permittee shall remain responsible for compliance with the permit requirements if the other entity fails to implement one or more components of the control measures.

6. The permittee may rely on another entity to satisfy the permit requirements to implement a minimum control measure if:

   a. The other entity, in fact, implements the control measure;

   b. The particular control measure, or component thereof, is at least as stringent as the corresponding permit requirement;

   c. The other entity agrees to implement the control measure on behalf of the permittee; and

   d. The agreement between the parties is documented in writing and retained by the permittee with the MS4 program plan for as long as the agreement is active.

   The permittee shall remain responsible for compliance with requirements of the permit and shall document in the annual reports required in accordance with Part I D that another entity is being relied on to satisfy all or part of the state permit requirements. The permittee shall provide the information required in Part I D.

7. If the permittee relies on another governmental entity regulated under 9VAC25-870-380 to satisfy all of the state permit obligations, including the obligation to file periodic reports required by Part I D, the permittee must note that fact in the registration statement, but is not required to file the periodic reports. The permittee remains responsible for compliance with the state permit requirements if the other entity fails to implement the control measures or components thereof.

D. Annual reporting requirements.

1. The permittee shall submit an annual report to the department no later than October 1 of each year in a format as specified by the department. The report shall cover the previous year from July 1 to June 30.

2. The annual report shall include the following general information:

   a. The permittee, system name, and permit number;

   b. The reporting period for which the annual report is being submitted;

   c. A signed certification as per Part III K;

   d. Each annual reporting item as specified in an MCM in Part I E; and

   e. An evaluation of the MS4 program implementation, including a review of each MCM, to determine the MS4 program's effectiveness and whether or not changes to the MS4 program plan are necessary.

3. For permittees receiving initial coverage under this general VPDES permit for the discharge of stormwater, the annual report shall include a status update on each component of the MS4 program plan being developed. Once the MS4 program plan has been updated to include

implementation of a specific MCM in Part I E, the permittee shall follow the reporting requirements established in Part I D 2.

4. For those permittees with requirements established under Part II A, the annual report shall include a status report on the implementation of the Chesapeake Bay TMDL action plan in accordance with Part II A of this permit including any revisions to the plan.

5. For those permittees with requirements established under Part II B, the annual report shall include a status report on the implementation of the local TMDL action plans in accordance with Part II B including any revisions to the plan.

6. For the purposes of this permit, the MS4 program plan and annual report shall be maintained separately and submitted to the department as required by this permit as two separate documents.

E. Minimum control measures

1. Public education and outreach.

a. The permittee shall implement a public education and outreach program designed to:

(1) Increase the public's knowledge of how to reduce stormwater pollution, placing priority on reducing impacts to impaired waters and other local water pollution concerns;

(2) Increase the public's knowledge of hazards associated with illegal discharges and improper disposal of waste, including pertinent legal implications; and

(3) Implement a diverse program with strategies that are targeted toward individuals or groups most likely to have significant stormwater impacts.

b. The permittee shall identify no less than three high-priority stormwater issues to meet the goal of educating the public in accordance with Part I E 1 a. High-priority issues may include the following examples: Chesapeake Bay nutrients, pet wastes, local receiving water impairments, TMDLs, high-quality receiving waters, and illicit discharges from commercial sites.

c. The high-priority public education and outreach program, as a whole, shall:

(1) Clearly identify the high-priority stormwater issues;

(2) Explain the importance of the high-priority stormwater issues;

(3) Include measures or actions the public can take to minimize the impact of the high-priority stormwater issues; and

(4) Provide a contact and telephone number, website, or location where the public can find out more information.

d. The permittee shall use two or more of the strategies listed in Table 1 below per year to communicate to the public the high-priority stormwater issues identified in accordance with Part I E 1 b including how to reduce stormwater pollution.

Table 1 Strategies for Public Education and Outreach	
Strategies	Examples (provided as examples and are not meant to be all inclusive or limiting)
Traditional written materials	Informational brochures, newsletters, fact sheets, utility bill inserts, or recreational guides for targeted groups of citizens
Alternative materials	Bumper stickers, refrigerator magnets, t-shirts, or drink koozies
Signage	Temporary or permanent signage in public places or facilities, vehicle signage, bill boards, or storm drain stenciling
Media Materials	Information disseminated through electronic media, radio, televisions, movie theater, or newspaper
Speaking engagements	Presentations to school, church, industry, trade, special interest, or community groups
Curriculum materials	Materials developed for school-aged children, students at local colleges or universities, or extension classes offered to local citizens
Training materials	Materials developed to disseminate during workshops offered to local citizens, trade organization, or industrial officials

e. The permittee may coordinate its public education and outreach efforts with other MS4 permittees; however, each permittee shall be individually responsible for meeting all of its state permit requirements.

f. The MS4 program plan shall include:

(1) A list of the high-priority stormwater issues the permittee will communicate to the public as part of the public education and outreach program;

(2) The rationale for selection of each high-priority stormwater issue and an explanation of how each education or outreach strategy is intended to have a positive impact on stormwater discharges;

(3) Identification of the public audience to receive each high-priority stormwater message;

(4) The strategies from Table 1 of Part I E 1 d to be used to communicate each high-priority stormwater message; and

(5) The anticipated time periods the messages will be communicated or made available to the public.

g. The annual report shall include the following information:

(1) A list of the high-priority stormwater issues the permittee addressed in the public education and outreach program; and

(2) A list of the strategies used to communicate each high-priority stormwater issue.

2. Public involvement and participation.

a. The permittee shall develop and implement procedures for the following:

(1) The public to report potential illicit discharges, improper disposal, or spills to the MS4, complaints regarding land disturbing activities, or other potential stormwater pollution concerns;

(2) The public to provide input on the permittee's MS4 program plan;

(3) Receiving public input or complaints;

(4) Responding to public input received on the MS4 program plan or complaints; and

(5) Maintaining documentation of public input received on the MS4 program and associated MS4 program plan and the permittee's response.

b. No later than three months after this permit's effective date, the permittee shall develop and maintain a webpage dedicated to the MS4 program and stormwater pollution prevention. The following information shall be posted on this webpage:

(1) The effective MS4 permit and coverage letter;

(2) The most current MS4 program plan or location where the MS4 program plan can be obtained;

(3) The annual report for each year of the term covered by this permit no later than 30 days after submittal to the department;

(4) A mechanism for the public to report potential illicit discharges, improper disposal, or spills to the MS4, complaints regarding land disturbing activities, or other potential stormwater pollution concerns in accordance with Part I E 2 a (1); and

(5) (5) Methods for how the public can provide input on the permittee's MS4 program plan in accordance with Part I E 2 a (2).

c. The permittee shall implement no less than four activities per year from two or more of the categories listed in Table 2 below to provide an opportunity for public involvement to improve water quality and support local restoration and clean-up projects.

Table 2 Public Involvement Opportunities	
Public involvement opportunities	Examples (provided as example and are not meant to be all inclusive or limiting)
Monitoring	Establish or support citizen monitoring group
Restoration	Stream or watershed clean-up day, adopt-a-water way program,
Educational events	Booth at community fair, demonstration of stormwater control projects, presentation of stormwater materials to schools to meet applicable education Standards of Learning or curriculum requirements, watershed walks, participation on environmental advisory committees
Disposal or collection events	Household hazardous chemicals collection, vehicle fluids collection
Pollution prevention	Adopt-a-storm drain program, implement a storm drain marking program, promote use of residential stormwater BMPs, implement pet waste stations in public areas, adopt-a-street program.

d. The permittee may coordinate the public involvement opportunities listed in Table 2 with other MS4 permittees; however, each permittee shall be individually responsible for meeting all of the permit requirements.

e. The MS4 program plan shall include:

(1) The webpage address where mechanisms for the public to report (i) potential illicit discharges, improper disposal, or spills to the MS4, (ii) complaints regarding land disturbing activities, or (iii) other potential stormwater pollution concerns;

(2) The webpage address that contains the methods for how the public can provide input on the permittee's MS4 program; and

(3) A description of the public involvement activities to be implemented by the permittee, the anticipated time period the activities will occur, and a metric for each activity to determine if the activity is beneficial to water quality. An example of metrics may include the weight of trash collected from a stream cleanup, the number of participants in a hazardous waste collection event, etc.

f. The annual report shall include the following information:

(1) A summary of any public input on the MS4 program received (including stormwater complaints) and how the permittee responded;

(2) A webpage address to the permittee's MS4 program and stormwater website;

(3) A description of the public involvement activities implemented by the permittee;

(4) A report of the metric as defined for each activity and an evaluation as to whether or not the activity is beneficial to improving water quality; and

(5) The name of other MS4 permittees with whom the permittee collaborated in the public involvement opportunities.

3. Illicit discharge detection and elimination.

a. The permittee shall develop and maintain an accurate MS4 map and information table as follows:

(1) A map of the storm sewer system owned or operated by the permittee within the census urbanized area identified by the 2010 decennial census that includes, at a minimum:

(a) MS4 outfalls discharging to surface waters, except as follows:

(i) In cases where the outfall is located outside of the MS4 permittee's legal responsibility, the permittee may elect to map the known point of discharge location closest to the actual outfall; and

(ii) In cases where the MS4 outfall discharges to receiving water channelized underground, the permittee may elect to map the point downstream at which the receiving water emerges above ground as an outfall discharge location. If there are multiple outfalls discharging to an underground channelized receiving water, the map shall identify that an outfall discharge location represents more than one outfall. This is an option a permittee may choose to use and recognizes the difficulties in accessing outfalls to underground channelized stream conveyances for purposes of mapping, screening, or monitoring.

(b) A unique identifier for each mapped item required in Part I E 3;

(c) The name and location of receiving waters to which the MS4 outfall or point of discharge discharges;

(d) MS4 regulated service area; and

(e) stormwater management facilities owned or operated by the permittee.

(2) The permittee shall maintain an information table associated with the storm sewer system map that includes the following information for each outfall or point of discharge for those cases in which the permittee elects to map the known point of discharge in accordance with Part I E 3 a (1) (a):

(a) A unique identifier as specified on the storm sewer system map;

(b) The latitude and longitude of the outfall or point of discharge;

(c) The estimated regulated acreage draining to the outfall or point of discharge;

(d) The name of the receiving water;

(e) The 6th Order Hydrologic Unit Code of the receiving water;

(f) An indication as to whether the receiving water is listed as impaired in the Virginia 2016 305(b)/303(d) Water Quality Assessment Integrated Report;

(g) The predominant land use for each outfall discharging to an impaired water; and

(h) The name of any EPA approved TMDLs for which the permittee is assigned a wasteload allocation.

(3) No later than July 1, 2019, the permittee shall submit to DEQ a GIS-compatible shapefile of the permittee's MS4 map as described in Part I E 3 a. If the permittee does not have an MS4 map in a GIS format, the permittee shall provide the map as a PDF document.

(4) No later than October 1 of each year, the permittee shall update the storm sewer system map and outfall information table to include any new outfalls constructed or TMDLs approved or both during the immediate preceding reporting period.

(5) The permittee shall provide written notification to any downstream adjacent MS4 of any known physical interconnection established or discovered after the effective date of this permit.

b. The permittee shall prohibit, through ordinance, policy, standard operating procedures, or other legal mechanism, to the extent allowable under federal, state, or local law, regulations, or ordinances, unauthorized nonstormwater discharges into the storm sewer system. Nonstormwater discharges or flows identified in 9VAC25-890-20 D 3 shall only be addressed if they are identified by the permittee as a significant contributor of pollutants discharging to the MS4. Flows that have been identified by the department as de minimis discharges are not significant sources of pollutants to surface water.

c. The permittee shall maintain, implement, and enforce illicit discharge detection and elimination (IDDE) written procedures designed to detect, identify, and address unauthorized nonstormwater discharges, including illegal dumping, to the small MS4 to effectively eliminate the unauthorized discharge. Written procedures shall include:

(1) A description of the legal authorities, policies, standard operating procedures or other legal mechanisms available to the permittee to eliminate identified sources of ongoing illicit discharges including procedures for using legal enforcement authorities.

(2) Dry weather field screening protocols to detect, identify, and eliminate illicit discharges to the MS4. The protocol shall include:

(a) A prioritized schedule of field screening activities and rationale for prioritization determined by the permittee based on such criteria as age of the infrastructure, land use, historical illegal discharges, dumping or cross connections;

(b) If the total number of MS4 outfalls is equal to or less than 50, a schedule to screen all outfalls annually;

(c) If the total number of MS4 outfalls is greater than 50, a schedule to screen a minimum of 50 outfalls annually such that no more than 50% are screened in the previous 12-month period. The 50% criteria is not applicable if all outfalls have been screened in the previous three years; and

(d) A mechanism to track the following information:

(i) The unique outfall identifier;

(ii) Time since the last precipitation event;

(iii) The estimated quantity of the last precipitation event;

(iv) Site descriptions (e.g., conveyance type and dominant watershed land uses);

(v) Whether or not a discharge was observed; and

(vi) If a discharge was observed, the estimated discharge rate (e.g., width and depth of discharge flow rate) and visual characteristics of the discharge (e.g., odor, color, clarity, floatables, deposits or stains, vegetation condition, structural condition, and biology).

(3) A timeframe upon which to conduct an investigation to identify and locate the source of any observed unauthorized nonstormwater discharge. Priority of investigations shall be given to discharges of sanitary sewage and those believed to be a risk to human health and public safety. Discharges authorized under a separate VPDES or state permit require no further action under this permit.

(4) Methodologies to determine the source of all illicit discharges. If the permittee is unable to identify the source of an illicit discharge within six months of beginning the investigation then the permittee shall document that the source remains unidentified. If the observed discharge is intermittent, the permittee shall document that attempts to observe the discharge flowing were unsuccessful.

(5) Methodologies for conducting a follow-up investigation for illicit discharges that are continuous or that permittees expect to occur more frequently than a one-time discharge to verify that the discharge has been eliminated except as provided for in Part I E 3 c (4);

(6) A mechanism to track all illicit discharge investigations to document the following:

(a) The dates that the illicit discharge was initially observed, reported, or both;

(b) The results of the investigation, including the source, if identified;

(c) Any follow-up to the investigation;

(d) Resolution of the investigation; and

(e) The date that the investigation was closed.

d. The MS4 program plan shall include:

(1) The MS4 map and information table required by Part I E 3 a. The map and information table may be incorporated into the MS4 program plan by reference. The map shall be made available to the department within 14 days upon request;

(2) Copies of written notifications of new physical interconnections given by the permittee to other MS4s; and

(3) The IDDE procedures described in Part I E 3 c.

e. The annual report shall include:

(1) A confirmation statement that the MS4 map and information table have been updated to reflect any changes to the MS4 occurring on or before June 30 of the reporting year;

(2) The total number of outfalls screened during the reporting period as part of the dry weather screening program; and

(3) A list of illicit discharges to the MS4 including spills reaching the MS4 with information as follows:

(a) The source of illicit discharge;

(b) The dates that the discharge was observed, reported, or both;

(c) Whether the discharge was discovered by the permittee during dry weather screening, reported by the public, or other method (describe);

(d) How the investigation was resolved;

(e) A description of any follow-up activities; and

(f) The date the investigation was closed.

4. Construction site stormwater runoff control.

a. The permittee shall utilize its legal authority, such as ordinances, permits, orders, specific contract language, and interjurisdictional agreements, to address discharges entering the MS4 from regulated construction site stormwater runoff. The permittee shall control construction site stormwater runoff as follows:

(1) If the permittee is a city, county, or town that has adopted a Virginia Erosion and Sediment Control Program (VESCP), the permittee shall implement the VESCP consistent with the Virginia Erosion and Sediment Control Law (§ 62.1-44.15:51 et seq.

of the Code of Virginia) and Virginia Erosion and Sediment Control Regulations (9VAC25-840);

(2) If the permittee is a town that has not adopted a VESCP, implementation of a VESCP consistent with the Virginia Erosion and Sediment Control Law (§ 62.1-44:15:51 et seq. of the Code of Virginia) and Virginia Erosion and Sediment Control Regulations (9VAC25-840) by the surrounding county shall constitute compliance with Part I E 4 a; such town shall notify the surrounding county of erosion, sedimentation or other construction stormwater runoff problems;

(3) If the permittee is a state agency; public institution of higher education including community colleges, colleges, and universities; or federal entity and has developed standards and specifications in accordance with the Virginia Erosion and Sediment Control Law (§ 62.1-44.15:51 et seq. of the Code of Virginia) and Virginia Erosion and Sediment Control Regulations (9VAC25-840), the permittee shall implement the most recent department approved standards and specifications; or

(4) If the permittee is a state agency; public institution of higher education including community colleges, colleges, and universities; or federal entity and has not developed standards and specifications in accordance with the Virginia Erosion and Sediment Control Law (§ 62.1-44.15:51 et seq. of the Code of Virginia) and Virginia Erosion and Sediment Control Regulations (9VAC25-840), the permittee shall inspect all land disturbing activities as defined in § 62.1-44.15:51 of the Code of Virginia that result in the disturbance activities of 10,000 square feet or greater, or 2,500 square feet or greater in accordance with areas designated under the Chesapeake Bay Preservation Act, as follows:

(a) During or immediately following initial installation of erosion and sediment controls;

(b) At least once per every two-week period;

(c) Within 48 hours following any runoff producing storm event; and

(d) At the completion of the project prior to the release of any performance bond.

(5) If the permittee is a subdivision of a local government such as a school board or other local government body, the permittee shall inspect those projects resulting in a land disturbance as defined in § 62.1-44.15.51 of the Code of Virginia occurring on lands owned or operated by the permittee that result in the disturbance of 10,000 square feet or greater, 2,500 square feet or greater in accordance with areas designated under the Chesapeake Bay Preservation Act, or in accordance with more stringent thresholds established by the local government, as follows:

(a) During or immediately following initial installation of erosion and sediment controls;

(b) At least once per every two-week period;

(c) Within 48 hours following any runoff producing storm event; and

(d) At the completion of the project prior to the release of any performance bond.

b. The permittee shall require implementation of appropriate controls to prevent nonstormwater discharges to the MS4, such as wastewater, concrete washout, fuels and oils, and other illicit discharges identified during land disturbing activity inspections of the MS4. The discharge of nonstormwater discharges other than those identified in 9VAC25-890-20 D through the MS4 is not authorized by this state permit.

c. The permittee's MS4 program plan shall include:

(1) If the permittee implements a construction site stormwater runoff control program in accordance with Part I E 4 a (1), the local ordinance citations for the VESCP program;

(2) If the permittee implements a construction site stormwater runoff control program in accordance with Part I E 4 a (3):

(a) The most recently approved standards and specifications or if incorporated by reference, the location where the standards and specifications can be viewed; and

(b) A copy of the most recent standards and specifications approval letter from the department;

(3) A description of the legal authorities utilized to ensure compliance with Part I E 4 a to control construction site stormwater runoff control such as ordinances, permits, orders, specific contract language, policies, and interjurisdictional agreements;

(4) Written inspection procedures to ensure the erosion and sediment controls are properly implemented and all associated documents utilized during inspection including the inspection schedule;

(5) Written procedures for requiring compliance through corrective action or enforcement action to the extent allowable under federal, state, or local law, regulation, ordinance, or other legal mechanisms; and

(6) The roles and responsibilities of each of the permittee's departments, divisions, or subdivisions in implementing the construction site stormwater runoff control requirements in Part I E 4.

d. The annual report shall include the following:

(1) If the permittee implements a construction site stormwater runoff program in accordance with Part I E 4 a (3):

(a) A confirmation statement that land disturbing projects that occurred during the reporting period have been conducted in accordance with the current department approved standards and specifications for erosion and sediment control; and

(b) If one or more of the land disturbing projects were not conducted with the department approved standards and specifications, an explanation as to why the projects did not conform to the approved standards and specifications.

(2) Total number of inspections conducted; and

(3) The total number and type of enforcement actions implemented and the type of enforcement actions.

5. Post-construction stormwater management for new development and development on prior developed lands.

a. The permittee shall address post-construction stormwater runoff that enters the MS4 from the following land disturbing activities by implementing a post-construction stormwater runoff management program as follows:

(1) If the permittee is a city, county, or town, with an approved Virginia Stormwater Management Program (VSMP), the permittee shall implement the VSMP consistent with the Virginia Stormwater Management Act (§ 62.1-44.15:24 et seq. of the Code of Virginia) and VSMP Regulations (9VAC25-870) as well as develop an inspection and maintenance program in accordance with Parts I E 5 b and c;

(2) If the permittee is a town that has not adopted a VSMP, implementation of a VSMP consistent with the Virginia Stormwater Management Act (§ 62.1-44.15:24 et seq. of the Code of Virginia) and VSMP Regulations (9VAC25-870) by the surrounding county shall constitute compliance with Part I E 5 a; such town shall notify the surrounding county of erosion, sedimentation, or other post-construction stormwater runoff problems and develop an inspection and maintenance program in accordance with Part I E 5 b and c;

(3) If the permittee is a state agency; public institution of higher education including community colleges, colleges, and universities; or federal entity and has developed standards and specifications in accordance with the Virginia Stormwater Management Act (§ 62.1-44.15:24 et seq. of the Code of Virginia) and VSMP Regulations (9VAC25-870), the permittee shall implement the most recent department approved standards and specifications and develop an inspection and maintenance program in accordance with Part I E 5 b;

(4) If the permittee is a state agency; public institution of higher education including community colleges, colleges, and universities; or federal entity and has not developed standards and specifications in accordance with the Virginia Stormwater Management Act (§ 62.1-44.15:24 et seq. of the Code of Virginia) and Virginia Stormwater Management Regulations (9VAC25-870) the permittee shall implement a post-construction stormwater runoff control program through compliance with 9VAC25-870 and with the implementation of a maintenance and inspection program consistent with Part I E 5 b; or

(5) If the permittee is a subdivision of a local government such as a school board or other local government body, the permittee shall implement a post-construction stormwater runoff control program through compliance with 9VAC25-870 or in accordance with more stringent local requirements, if applicable, and with the implementation of a maintenance and inspection program consistent with Part I E 5 b.

b. The permittee shall implement an inspection and maintenance program for those stormwater management facilities owned or operated by the permittee that discharges to the MS4 as follows:

(1) The permittee shall develop and maintain written inspection and maintenance procedures in order to ensure adequate long-term operation and maintenance of its stormwater management facilities;

(2) The permittee shall inspect stormwater management facilities owned or operated by the permittee no less than once per year. The permittee may choose to implement an alternative schedule to inspect these stormwater management facilities based on facility type and expected maintenance needs provided that the alternative schedule and rationale is included in the MS4 program plan. The alternative inspection frequency shall be no less than once per five years; and

(3) If during the inspection of the stormwater management facility conducted in accordance with Part I E 5 b (2), it is determined that maintenance is required, the permittee shall conduct the maintenance in accordance with the written procedures developed under Part I E 5 b (1).

c. For those permittees described in Part I E 5 a (1) or (2), the permittee shall:

(1) Implement an inspection and enforcement program for stormwater management facilities not owned by the permittee (i.e., privately owned) that includes:

(a) An inspection frequency of no less than once per five years for all privately owned stormwater management facilities that discharge into the MS4; and

(b) Adequate long-term operation and maintenance by the owner of the stormwater management facility by requiring the owner to develop and record a maintenance agreement, including an inspection schedule to the extent allowable under state or local law or other legal mechanism;

(2) Utilize its legal authority for enforcement of the maintenance responsibilities if maintenance is neglected by the owner; and

(3) The permittee may develop and implement a progressive compliance and enforcement strategy provided that the strategy is included in the MS4 program plan.

d. The permittee shall maintain an electronic database or spreadsheet of all known permittee-owned or permittee-operated and privately owned stormwater management facilities that discharge into the MS4. The database shall also include all BMPs implemented by the permittee to meet the Chesapeake Bay TMDL load reduction as required in Part II A. A database shall include the following information as applicable:

(1) The stormwater management facility or BMP type;

(2) The stormwater management facility or BMPs location as latitude and longitude;

(3) The acres treated by the stormwater management facility or BMP, including total acres, pervious acres, and impervious acres;

(4) The date the facility was brought online (MM/YYYY). If the date brought online is not known, the permittee shall use June 30, 2005;

(5) The 6th Order Hydrologic Unit Code in which the stormwater management facility is located;

(6) Whether the stormwater management facility or BMP is owned or operated by the permittee or privately owned;

(7) Whether or not the stormwater management facility or BMP is part of the permittee's Chesapeake Bay TMDL action plan required in Part II A or local TMDL action plan required in Part II B, or both;

(8) If the stormwater management facility or BMP is privately owned, whether a maintenance agreement exists; and

(9) The date of the permittee's most recent inspection of the stormwater management facility or BMP.

e. The electronic database or spreadsheet shall be updated no later than 30 days after a new stormwater management facility is brought online, a new BMP is implemented to meet a TMDL load reduction as required in Part II, or discovered if it is an existing stormwater management facility.

f. The permittee shall use the DEQ Construction Stormwater Database or other application as specified by the department to report each stormwater management facility installed after July 1, 2014, to address the control of post-construction runoff from land disturbing activities for which the permittee is required to obtain a General VPDES Permit for Discharges of Stormwater from Construction Activities.

g. No later than October 1 of each year, the permittee shall electronically report the stormwater management facilities and BMPs implemented between July 1 and June 30 of each year using the DEQ BMP Warehouse and associated reporting template for any practices not reported in accordance with Part I E 5 f including stormwater management facilities installed to control post-development stormwater runoff from land disturbing activities less than one acre in accordance with the Chesapeake Bay Preservation Act regulations (9VAC25-830) and for which a General VPDES Permit for Discharges of Stormwater from Construction Activities was not required.

h. The MS4 program plan shall include:

(1) If the permittee implements a VSMP in accordance with Part I E 5 a (1) and (2):

(a) A copy of the VSMP approval letter issued by the department;

(b) Written inspection procedures and all associated documents utilized in the inspection of privately owned stormwater management facilities; and

(c) Written procedures for compliance and enforcement of inspection and maintenance requirements for privately owned BMPs.

(2) If the permittee implements a post-development stormwater runoff control program in accordance with Part I E 5 a (3):

(a) The most recently approved standards and specifications or if incorporated by reference, the location where the standards and specifications can be viewed; and

(b) A copy of the most recent standards and specifications approval letter from the department.

(3) A description of the legal authorities utilized to ensure compliance with Part I E 5 a for post-construction stormwater runoff control such as ordinances (provide citation as appropriate), permits, orders, specific contract language, and interjurisdictional agreements;

(4) Written inspection procedures and all associated documents utilized during inspection of stormwater management facilities owned or operated by the permittee;

(5) The roles and responsibilities of each of the permittee's departments, divisions, or subdivisions in implementing the post-construction stormwater runoff control program; and

(6) The stormwater management facility spreadsheet or database incorporated by reference and the location or webpage address where the spreadsheet or database can be reviewed.

i. The annual report shall include the following information:

(1) If the permittee implements a Virginia Stormwater Management Program in accordance with Part I E 5 a (1) and (2):

(a) The number of privately owned stormwater management facility inspections conducted; and

(b) The number of enforcement actions initiated by the permittee to ensure long-term maintenance of privately owned stormwater management facilities including the type of enforcement action;

(2) Total number of inspections conducted on stormwater management facilities owned or operated by the permittee;

(3) A description of the significant maintenance, repair, or retrofit activities performed on the stormwater management facilities owned or operated by the permittee to ensure it continues to perform as designed. This does not include routine activities such as grass mowing or trash collection;

(4) A confirmation statement that the permittee submitted stormwater management facility information through the Virginia Construction Stormwater General Permit database for

those land disturbing activities for which the permittee was required to obtain coverage under the General VPDES Permit for Discharges of Stormwater from Construction Activities in accordance with Part I E 5 f or a statement that the permittee did not complete any projects requiring coverage under the General VPDES Permit for Discharges of Stormwater from Construction Activities; and

(5) A confirmation statement that the permittee electronically reported BMPs using the DEQ BMP Warehouse in accordance with Part I E 5 g and the date on which the information was submitted.

6. Pollution prevention and good housekeeping for facilities owned or operated by the permittee within the MS4 service area.

a. The permittee shall maintain and implement written procedures for those activities at facilities owned or operated by the permittee, such as road, street, and parking lot maintenance; equipment maintenance; and the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers designed to:

(1) Prevent illicit discharges;

(2) Ensure the proper disposal of waste materials, including landscape wastes;

(3) Prevent the discharge of wastewater or permittee vehicle wash water or both into the MS4 without authorization under a separate VPDES permit;

(4) Require implementation of best management practices when discharging water pumped from utility construction and maintenance activities;

(5) Minimize the pollutants in stormwater runoff from bulk storage areas (e.g., salt storage, topsoil stockpiles) through the use of best management practices;

(6) Prevent pollutant discharge into the MS4 from leaking municipal automobiles and equipment; and

(7) Ensure that the application of materials, including fertilizers and pesticides, is conducted in accordance with the manufacturer's recommendations.

b. The written procedures established in accordance with Part I E 6 a shall be utilized as part of the employee training program at Part I E 6 m.

c. Within 12 months of state permit coverage, the permittee shall identify which of the high-priority facilities have a high potential of discharging pollutants. The permittee shall maintain and implement a site specific stormwater pollution prevention plan (SWPPP) for each facility identified. High priority facilities that have a high potential for discharging pollutants are those facilities that are not covered under a separate VPDES permit and which any of the following materials or activities occur and are expected to have exposure to stormwater resulting from rain, snow, snowmelt or runoff:

(1) Areas where residuals from using, storing or cleaning machinery or equipment remain and are exposed to stormwater;

(2) Materials or residuals on the ground or in stormwater inlets from spills or leaks;

(3) Material handling equipment;

(4) Materials or products that would be expected to be mobilized in stormwater runoff during loading or unloading or transporting activities (e.g., rock, salt, fill dirt);

(5) Materials or products stored outdoors (except final products intended for outside use where exposure to stormwater does not result in the discharge of pollutants);

(6) Materials or products that would be expected to be mobilized in stormwater runoff contained in open, deteriorated or leaking storage drums, barrels, tanks, and similar containers;

(7) Waste material except waste in covered, nonleaking containers (e.g., dumpsters);

(8) Application or disposal of process wastewater (unless otherwise permitted); or

(9) Particulate matter or visible deposits of residuals from roof stacks, vents or both not otherwise regulated (i.e., under an air quality control permit) and evident in the stormwater runoff.

d. Each SWPPP as required in Part I E 6 c shall include the following:

(1) A site description that includes a site map identifying all outfalls, direction of stormwater flows, existing source controls, and receiving water bodies;

(2) A description and checklist of the potential pollutants and pollutant sources;

(3) A description of all potential nonstormwater discharges;

(4) Written procedures designed to reduce and prevent pollutant discharge;

(5) A description of the applicable training as required in Part I E 6 m;

(6) Procedures to conduct an annual comprehensive site compliance evaluation;

(7) An inspection frequency of no less than once per year and maintenance requirements for site specific source controls. The date of each inspection and associated findings and follow-up shall be logged in each SWPPP; and

(8) A log of each unauthorized discharge, release, or spill incident reported in accordance with Part III G including the following information:

(a) Date of incident;

(b) Material discharged, released, or spilled; and

(c) Estimated quantity discharged, released or spilled .

e. No later than June 30 of each year, the permittee shall annually review any high-priority facility owned or operated by the permittee for which a SWPPP has not been developed to determine if the facility has a high potential to discharge pollutants as described in Part I E 6

c. If the facility is determined to be a high-priority facility with a high potential to discharge pollutants, the permittee shall develop a SWPPP meeting the requirements of Part I E 6 d no later than December 31 of that same year.

f. The permittee shall review the contents of any site specific SWPPP no later than 30 days after any unauthorized discharge, release, or spill reported in accordance with Part III G to determine if additional measures are necessary to prevent future unauthorized discharges, releases, or spills. If necessary, the SWPPP shall be updated no later than 90 days after the unauthorized discharge.

g. The SWPPP shall be kept at the high-priority facility with a high potential to discharge and utilized as part of staff training required in Part I E 6 m. The SWPPP and associated documents may be maintained as a hard copy or electronically as long as the documents are available to employees at the applicable site.

h. If activities change at a facility such that the facility no longer meets the criteria of a high-priority facility with a high potential to discharge pollutants as described in Part I E 6 c, the permittee may remove the facility from the list of high-priority facilities with a high potential to discharge pollutants.

i. The permittee shall maintain and implement turf and landscape nutrient management plans that have been developed by a certified turf and landscape nutrient management planner in accordance with § 10.1-104.2 of the Code of Virginia on all lands owned or operated by the permittee where nutrients are applied to a contiguous area greater than one acre. If nutrients are being applied to achieve final stabilization of a land disturbance project, application shall follow the manufacturer's recommendations.

j. Permittees with lands regulated under § 10.1-104.4 of the Code of Virginia, including state agencies, state colleges and universities, and other state government entities, shall continue to implement turf and landscape nutrient management plans in accordance with this statutory requirement.

k. The permittee shall not apply any deicing agent containing urea or other forms of nitrogen or phosphorus to parking lots, roadways, and sidewalks, or other paved surfaces.

l. The permittee shall require through the use of contract language, training, standard operating procedures, or other measures within the permittee's legal authority that contractors employed by the permittee and engaging in activities with the potential to discharge pollutants use appropriate control measures to minimize the discharge of pollutants to the MS4.

m. The permittee shall develop a training plan in writing for applicable staff that ensures the following:

(1) Field personnel receive training in the recognition and reporting of illicit discharges no less than once per 24 months;

(2) Employees performing road, street, and parking lot maintenance receive training in pollution prevention and good housekeeping associated with those activities no less than once per 24 months;

(3) Employees working in and around maintenance, public works, or recreational facilities receive training in good housekeeping and pollution prevention practices associated with those facilities no less than once per 24 months;

(4) Employees and contractors hired by the permittee who apply pesticides and herbicides are trained or certified in accordance with the Virginia Pesticide Control Act (§ 3.2-3900 et seq. of the Code of Virginia). Certification by the Virginia Department of Agriculture and Consumer Services (VCACS) Pesticide and Herbicide Applicator program shall constitute compliance with this requirement;

(5) Employees and contractors serving as plan reviewers, inspectors, program administrators, and construction site operators obtain the appropriate certifications as required under the Virginia Erosion and Sediment Control Law and its attendant regulations;

(6) Employees and contractors implementing the stormwater program obtain the appropriate certifications as required under the Virginia Stormwater Management Act and its attendant regulations; and

(7) Employees whose duties include emergency response have been trained in spill response. Training of emergency responders such as firefighters and law-enforcement officers on the handling of spill releases as part of a larger emergency response training shall satisfy this training requirement and be documented in the training plan.

n. The permittee shall maintain documentation of each training event conducted by the permittee to fulfill the requirements of Part I E 6 m for a minimum of three years after the training event. The documentation shall include the following information:

(1) The date of the training event;

(2) The number of employees attending the training event; and

(3) The objective of the training event.

o. The permittee may fulfill the training requirements in Part I E 6 m, in total or in part, through regional training programs involving two or more MS4 permittees; however, the permittee shall remain responsible for ensuring compliance with the training requirements.

p. The MS4 program plan shall include:

(1) The written procedures for the operations and maintenance activities as required by Part I E 6 a;

(2) A list of all high-priority facilities owned or operated by the permittee required in accordance with Part I E 6 c, and whether or not the facility has a high potential to discharge;

(3) A list of lands for which turf and landscape nutrient management plans are required in accordance with Part I E 6 i and j, including the following information:

(a) The total acreage on which nutrients are applied;

(b) The date of the most recently approved nutrient management plan for the property; and

(c) The location in which the individual turf and landscape nutrient management plan is located;

(4) A summary of mechanisms the permittee uses to ensure contractors working on behalf of the permittees implement the necessary good housekeeping and pollution prevention procedures, and stormwater pollution plans as appropriate; and

(5) The written training plan as required in Part I E 6 m.

q. The annual report shall include the following:

(1) A summary of any operational procedures developed or modified in accordance with Part I E 6 a during the reporting period;

(2) A summary of any new SWPPPs developed in accordance Part I E 6 c during the reporting period;

(3) A summary of any SWPPPs modified in accordance with Part I E 6 f or the rationale of any high priority facilities delisted in accordance with Part I E 6 h during the reporting period;

(4) A summary of any new turf and landscape nutrient management plans developed that includes:

(a) Location and the total acreage of each land area; and

(b) The date of the approved nutrient management plan; and

(5) A list of the training events conducted in accordance with Part I E 6 m, including the following information:

(a) The date of the training event;

(b) The number of employees who attended the training event; and

(c) The objective of the training event.

Part II
TMDL Special Conditions

A. Chesapeake Bay TMDL special condition.

1. The Commonwealth in its Phase I and Phase II Chesapeake Bay TMDL Watershed Implementation Plans (WIPs) committed to a phased approach for MS4s, affording MS4 permittees up to three full five-year permit cycles to implement necessary reductions. This permit is consistent with the Chesapeake Bay TMDL and the Virginia Phase I and Phase II WIPs to meet the Level 2 (L2) scoping run for existing developed lands as it represents an implementation of an additional 35% of L2 as specified in the 2010 Phase I and Phase II WIPs. In combination with the 5.0% reduction of L2 that has already been achieved, a total reduction at the end of this permit term of 40% of L2 will be achieved. Conditions of future permits will be consistent with the TMDL or WIP conditions in place at the time of permit issuance.

2. The following definitions apply to Part II of this state permit for the purpose of the Chesapeake Bay TMDL special condition for discharges in the Chesapeake Bay Watershed:

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

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

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

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

3. Reduction requirements. No later than the expiration date of this permit, the permittee shall reduce the load of total nitrogen, total phosphorus, and total suspended solids from existing developed lands served by the MS4 as of June 30, 2009, within the 2010 Census urbanized areas by at least 40% of the Level 2 (L2) Scoping Run Reductions. The 40% reduction is the sum of (i) the first phase reduction of 5.0% of the L2 Scoping Run Reductions based on the lands located within the 2000 Census urbanized areas required by June 30, 2018; (ii) the second phase reduction of at least 35% of the L2 Scoping Run based on lands within the 2000 Census urbanized areas required by June 30, 2023; and (iii) the reduction of at least 40% of the L2 Scoping Run , which shall only apply to the additional lands that were added by the 2010 expanded Census urbanized areas required by June 30, 2023. The required reduction shall be calculated using Tables 3a, 3b, 3c, and 3d below as applicable:

Table 3a
Calculation Sheet for Estimating Existing Source Loads and Reduction Requirements for the James River, Lynnhaven, and Little Creek Basins

		A	B	C	D	E	F	G
Pollutant	Subsource	Loading rate (lbs/ac/yr)[1]	Existing developed lands as of 6/30/09 served by the MS4 within the 2010 CUA (acres)[2]	Load(lbs/yr)[3]	Percentage of MS4 required Chesapeake Bay total L2 loading	Percentage of L2 required reduction by 6/30/2023	40% cumulative reduction Required by 6/30/2023 (lbs/yr)[4]	Sum of 40% cumulative reduction (lb/yr)[5]
Nitrogen	Regulated urban impervious	9.39			9%	40%		
	Regulated urban pervious	6.99			6%	40%		
Phosphorus	Regulated urban impervious	1.76			16%	40%		
	Regulated urban pervious	0.5			7.25%	40%		
Total suspended solids	Regulated urban impervious	676.94			20%	40%		
	Regulated urban pervious	101.08			8.75%	40%		

[1]Edge of stream loading rate based on the Chesapeake Bay Watershed Model Progress Run 5.3.2.

[2]To determine the existing developed acres required in Column B, permittees should first determine the extent of their regulated service area based on the 2010 Census urbanized area (CUA). Next, permittees will need to delineate the lands within the 2010 CUA served by the MS4 as pervious or impervious as of the baseline date of June 30, 2009.

[3]Column C = Column A x Column B.

[4]Column F = Column C x Column D x Column E.

[5]Column G = The sum of the subsource cumulative reduction required by 6/30/23 (lbs/yr) as calculated in Column F.

Table 3b
Calculation Sheet for Estimating Existing Source Loads and Reduction Requirements for the Potomac River Basin

		A	B	C	D	E	F	G
Pollutant	Subsource	Loading rate (lbs/ac/yr)[1]	Existing developed lands as of 6/30/09 served by the MS4 within the 2010 CUA (acres)[2]	Load (lbs/yr)[3]	Percentage of MS4 required Chesapeake Bay total L2 loading reduction	Percentage of L2 required reduction by	40% cumulative reduction required by 6/30/2023 (lbs/yr)[4]	Sum of 40% cumulative reduction (lb/yr)[5]
Nitrogen	Regulated urban impervious	16.86			9%	40%		
	Regulated urban pervious	10.07			6%	40%		
Phosphorus	Regulated Urban Impervious	1.62			16%	40%		
	Regulated urban pervious	0.41			7.25%	40%		
Total suspended solids	Regulated urban impervious	1171.32			20%	40%		
	Regulated urban pervious	175.8			8.75%	40%		

[1]Edge of stream loading rate based on the Chesapeake Bay Watershed Model Progress Run 5.3.2

[2]To determine the existing developed acres required in Column B, permittees should first determine the extent of their regulated service area based on the 2010 Census urbanized area (CUA). Next, permittees will need to delineate the lands within the 2010 CUA served by the MS4 as pervious or impervious as of the baseline date of June 30, 2009.

[3]Column C = Column A x Column B.

[4]Column F = Column C x Column D x Column E.

[5]Column G = The sum of the subsource cumulative reduction required by 6/30/23 (lbs/yr) as calculated in Column F.

Table 3c
Calculation Sheet for Estimating Existing Source Loads and Reduction Requirements for the Rappahannock River Basin

		A	B	C	D	E	F	G
Pollutant	Subsource	Loading rate (lbs/ac/yr)[1]	Existing developed lands as of 6/30/09 served by the MS4 within the 2010 CUA (acres)[2]	Load (lbs/yr)[3]	Percentage of MS4 required Chesapeake Bay total L2 loading reduction	Percentage of L2 required reduction by 6/30/2023	40% cumulative reduction Required by 6/30/2023 (lbs/yr)[4]	Sum of 40% cumulative reduction (lb/yr)[5]
Nitrogen	Regulated urban impervious	9.38			9%	40%		
	Regulated urban pervious	5.34			6%	40%		
Phosphorus	Regulated urban impervious	1.41			16%	40%		
	Regulated urban pervious	0.38			7.25%	40%		
Total suspended solids	Regulated urban impervious	423.97			20%	40%		
	Regulated urban pervious	56.01			8.75%	40%		

[1]Edge of stream loading rate based on the Chesapeake Bay Watershed Model Progress Run 5.3.2.

[2]To determine the existing developed acres required in Column B, permittees should first determine the extent of their regulated service area based on the 2010 Census urbanized area (CUA). Next, permittees will need to delineate the lands within the 2010 CUA served by the MS4 as pervious or impervious as of the baseline date of June 30, 2009.

[3]Column C = Column A x Column B.

[4]Column F = Column C x Column D x Column E.

[5]Column G = The sum of the subsource cumulative reduction required by 6/30/23 (lbs/yr) as calculated in Column F.

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

		A	B	C	D	E	F	G
Pollutant	Subsource	Loading rate (lbs/ac/yr)[1]	Existing developed lands as of 6/30/09 served by the MS4 within the 2010 CUA (acres)[2]	Load (lbs/yr)[3]	Percentage of MS4 required Chesapeake Bay total L2 loading reduction	Percentage of L2 required reduction by 6/30/2023	40% cumulative reduction required by 6/30/2023 (lbs/yr)[4]	Sum of 40% cumulative reduction (lb/yr)[5]
Nitrogen	Regulated urban impervious	7.31			9%	40%		
	Regulated urban pervious	7.65			6%	40%		
Phosphorus	Regulated urban impervious	1.51			16%	40%		
	Regulated urban pervious	0.51			7.25%	40%		
Total suspended solids	Regulated urban impervious	456.68			20%	40%		
	Regulated urban pervious	72.78			8.75%	40%		

[1]Edge of stream loading rate based on the Chesapeake Bay Watershed Model Progress Run 5.3.2.

[2]To determine the existing developed acres required in Column B, permittees should first determine the extent of their regulated service area based on the 2010 Census urbanized area (CUA). Next, permittees will need to delineate the lands within the 2010 CUA served by the MS4 as pervious or impervious as of the baseline date of June 30, 2009.

[3]Column C = Column A x Column B.

[4]Column F = Column C x Column D x Column E.

[5]Column G = The sum of the subsource cumulative reduction required by 6/30/23 (lbs/yr) as calculated in Column F.

4. No later than the expiration date of this permit, the permittee shall offset 40% of the increased loads from new sources initiating construction between July 1, 2009, and June 30, 2019, and designed in accordance with 9VAC25-870 Part II C (9VAC25-870-93 et seq.) if the following conditions apply:

   a. The activity disturbed one acre or greater; and

   b. The resulting total phosphorous load was greater than 0.45 lb/acre/year, which is equivalent to an average land cover condition of 16% impervious cover.

   The permittee shall utilize Table 4 of Part II A 5 to develop the equivalent pollutant load for nitrogen and total suspended solids for new sources meeting the requirements of this condition.

5. No later than the expiration date of this permit, the permittee shall offset the increased loads from projects grandfathered in accordance with 9VAC25-870-48 that begin construction after July 1, 2014, if the following conditions apply:

   a. The activity disturbs one acre or greater; and

   b. The resulting total phosphorous load was greater than 0.45 lb/acre/year, which is equivalent to an average land cover condition of 16% impervious cover.

   The permittee shall utilize Table 4 below to develop the equivalent pollutant load for nitrogen and total suspended solids for grandfathered sources meeting the requirements of this condition.

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

Ratio of Phosphorus to Other POCs (Based on All Land Uses 2009 Progress Run)	Phosphorus Loading Rate (lbs/acre)	Nitrogen Loading Rate (lbs/acre)	Total Suspended Solids Loading Rate (lbs/acre)
James River Basin, Lynnhaven, and Little Creek Basins	1.0	5.2	420.9
Potomac River Basin	1.0	6.9	469.2
Rappahannock River Basin	1.0	6.7	320.9
York River Basin (including Poquoson Coastal Basin)	1.0	9.5	531.6

6. Reductions achieved in accordance with the General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems effective July 1, 2013, shall be applied toward the total reduction requirements to demonstrate compliance with Part II A 3, A 4, and A 5.

7. Reductions shall be achieved in each river basin as calculated in Part II A 3 or for reductions in accordance with Part II A 4 and A 5 in the basin in which the new source or grandfathered project occurred.

8. Loading and reduction values greater than or equal to 10 pounds calculated in accordance with Part II A 3, A 4, and A 5 shall be calculated and reported to the nearest pound without regard to mathematical rules of precision. Loading and reduction values of less than 10 pounds reported in accordance with Part II A 3, A 4, and A 5 shall be calculated and reported to two significant digits.

9. Reductions required in Part II A 3, A 4, and A 5 shall be achieved through one or more of the following:

   a. BMPs approved by the Chesapeake Bay Program;

   b. BMPs approved by the department; or

   c. A trading program described in Part II A 10.

10. The permittee may acquire and use total nitrogen and total phosphorus credits in accordance with § 62.1-44.19:21 of the Code of Virginia and total suspended solids in accordance with § 62.1-44.19:21.1 of the Code of Virginia for purposes of compliance with the required reductions in Table 3a, Table 3b,Table c, Table 3d of Part II A 3; Part II A 4; and Part II A 5, provided the use of credits has been approved by the department. The exchange of credits is subject to the following requirements:

    a. The credits are generated and applied to a compliance obligation in the same calendar year;

    b. The credits are generated and applied to a compliance obligation in the same tributary;

    c. The credits are acquired no later than June 1 immediately following the calendar year in which the credits are applied;

    d. No later than June 1 immediately following the calendar year in which the credits are applied, the permittee certifies on an MS4 Nutrient Credit Acquisition Form that the permittee has acquired the credits;

    e. Total nitrogen and total phosphorus credits shall be either point source credits generated by point sources covered by the Watershed Permit for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed general permit issued pursuant to § 62.1-44.19:14 of the Code of Virginia, or nonpoint source credits certified pursuant to § 62.1-44.19:20 of the Code of Virginia;

    f. Sediment credits shall be derived from one of the following:

       (1) Implementation of BMP in a defined area outside of an MS4 service area, in which case the necessary baseline sediment reduction for such defined area shall be achieved prior to the permittee's use of additional reductions as credit; or

       (2) A point source wasteload allocation established by the Chesapeake Bay total maximum daily load, in which case the credit is the difference between the wasteload allocation specified as an annual mass load and any lower monitored annual mass load that is discharged as certified on an MS4 Sediment Credit Acquisition Form.

g. Sediment credits shall not be associated with phosphorus credits used for compliance with the stormwater nonpoint nutrient runoff water quality criteria established pursuant to § 62.1-44.15:28 of the Code of Virginia.

11. No later than 12 months after the permit effective date, the permittee shall submit an updated Chesapeake Bay TMDL action plan for the reductions required in Part II A 3, A 4, and A 5 that includes the following information:

    a. Any new or modified legal authorities, such as ordinances, permits, policy, specific contract language, orders, and interjurisdictional agreements, implemented or needing to be implemented to meet the requirements of Part II A 3, A 4, and A 5.

    b. The load and cumulative reduction calculations for each river basin calculated in accordance with Part II A 3, A 4, and A 5.

    c. The total reductions achieved as of July 1, 2018, for each pollutant of concern in each river basin.

    d. A list of BMPs implemented prior to July 1, 2018, to achieve reductions associated with the Chesapeake Bay TMDL including:

        (1) The date of implementation; and

        (2) The reductions achieved.

    e. The BMPs to be implemented by the permittee prior to the expiration of this permit to meet the cumulative reductions calculated in Part II A 3, A 4, and A 5, including as applicable:

        (1) Type of BMP;

        (2) Project name;

        (3) Location;

        (4) Percent removal efficiency for each pollutant of concern; and

        (5) Calculation of the reduction expected to be achieved by the BMP calculated and reported in accordance with the methodologies established in Part II A 8 for each pollutant of concern; and

    f. A summary of any comments received as a result of public participation required in Part II A 12, the permittee's response, identification of any public meetings to address public concerns, and any revisions made to Chesapeake Bay TMDL action plan as a result of public participation.

12. Prior to submittal of the action plan required in Part II A 11, the permittee shall provide an opportunity for public comment on the additional BMPs proposed to meet the reductions not previously approved by the department in the first phase Chesapeake Bay TMDL action plan for no less than 15 days.

13. For each reporting period, the corresponding annual report shall include the following information:

    a. A list of BMPs implemented during the reporting period but not reported to the DEQ BMP Warehouse in accordance with Part I E 5 g and the estimated reduction of pollutants of concern achieved by each and reported in pounds per year;

    b. If the permittee acquired credits during the reporting period to meet all or a portion of the required reductions in Part II A 3, A 4, or A 5, a statement that credits were acquired;

c. The progress, using the final design efficiency of the BMPs, toward meeting the required cumulative reductions for total nitrogen, total phosphorus, and total suspended solids; and

d. A list of BMPs that are planned to be implemented during the next reporting period.

B. Local TMDL special condition.

1. The permittee shall develop a local TMDL action plan designed to reduce loadings for pollutants of concern if the permittee discharges the pollutants of concern to an impaired water for which a TMDL has been approved by the U.S. Environmental Protection Agency (EPA) as described in Part II B 1 a and 1 b:

   a. For TMDLs approved by the EPA prior to July 1, 2013, and in which an individual or aggregate wasteload has been allocated to the permittee, the permittee shall update the previously approved local TMDL action plans to meet the conditions of Part II B 3, B 4, B 5, B 6, and B 7 as applicable, no later than 18 months after the permit effective date and continue implementation of the action plan; and

   b. For TMDLs approved by EPA on or after July 1, 2013, and prior to June 30, 2018, and in which an individual or aggregate wasteload has been allocated to the permittee, the permittee shall develop and initiate implementation of action plans to meet the conditions of Part II B 3, B 4, B 5, B 6, and B 7 as applicable for each pollutant for which wasteloads have been allocated to the permittee's MS4 no later than 30 months after the permit effective date.

2. The permittee shall complete implementation of the TMDL action plans as soon as practicable. TMDL action plans may be implemented in multiple phases over more than one permit cycle using the adaptive iterative approach provided adequate progress is achieved in the implementation of BMPs designed to reduce pollutant discharges in a manner that is consistent with the assumptions and requirements of the applicable TMDL.

3. Each local TMDL action plan developed by the permittee shall include the following:

   a. The TMDL project name;

   b. The EPA approval date of the TMDL;

   c. The wasteload allocated to the permittee (individually or in aggregate), and the corresponding percent reduction, if applicable;

   d. Identification of the significant sources of the pollutants of concern discharging to the permittee's MS4 and that are not covered under a separate VPDES permit. For the purposes of this requirement, a significant source of pollutants means a discharge where the expected pollutant loading is greater than the average pollutant loading for the land use identified in the TMDL;

   e. The BMPs designed to reduce the pollutants of concern in accordance with Parts II B 4, B 5, and B 6;

   f. Any calculations required in accordance with Part II B 4, B 5, or B 6;

   g. For action plans developed in accordance with Part II B 4 and B 5, an outreach strategy to enhance the public's education (including employees) on methods to eliminate and reduce discharges of the pollutants; and

h. A schedule of anticipated actions planned for implementation during this permit term.

4. Bacterial TMDLs.

a. If the permittee is an approved VSMP authority, the permittee shall select and implement at least three of the strategies listed in Table 5 below designed to reduce the load of bacteria to the MS4. Selection of the strategies shall correspond to sources identified in Part II B 3 d.

b. If the permittee is not an approved VSMP authority, the permittee shall select at least one strategy listed in Table 5 below designed to reduce the load of bacteria to the MS4 relevant to sources of bacteria applicable within the MS4 regulated service area. Selection of the strategies shall correspond to sources identified in Part II B 3 d.

Table 5
Strategies for Bacteria Reduction Stormwater Control/Management Strategy

Source	Strategies (provided as an example and not meant to be all inclusive or limiting)
Domestic pets (dogs and cats)	Provide signage to pick up dog waste, providing pet waste bags and disposal containers. Adopt and enforce pet waste ordinances or policies, or leash laws or policies. Place dog parks away from environmentally sensitive areas. Maintain dog parks by removing disposed of pet waste bags and cleaning up other sources of bacteria. Protect riparian buffers and provide unmanicured vegetative buffers along streams to dissuade stream access.
Urban wildlife	Educate the public on how to reduce food sources accessible to urban wildlife (e.g., manage restaurant dumpsters and grease traps, residential garbage, feed pets indoors). Install storm drain inlet or outlet controls. Clean out storm drains to remove waste from wildlife. Implement and enforce urban trash management practices. Implement rooftop disconnection programs or site designs that minimize connections to reduce bacteria from rooftops Implement a program for removing animal carcasses from roadways and properly disposing of the same (either through proper storage or through transport to a licensed facility).

Illicit connections or illicit discharges to the MS4	Implement an enhanced dry weather screening and illicit discharge, detection, and elimination program beyond the requirements of Part I E 3 to identify and remove illicit connections and identify leaking sanitary sewer lines infiltrating to the MS4 and implement repairs. Implement a program to identify potentially failing septic systems. Educate the public on how to determine whether their septic system is failing. Implement septic tank inspection and maintenance program. Implement an educational program beyond any requirements in Part I E 1 though E 6 to explain to citizens why they should not dump materials into the MS4.
Dry weather urban flows (irrigations, carwashing,	Implement public education programs to reduce dry weather flows from storm sewers related to lawn and park irrigation practices, carwashing, powerwashing and other nonstormwater flows. Provide irrigation controller rebates.
powerwashing,	Implement and enforce ordinances or policies related to outdoor (etc.) water waste. Inspect commercial trash areas, grease traps, washdown practices, and enforce corresponding ordinances or policies.
Birds (Canadian geese, gulls, pigeons, etc.)	Identify areas with high bird populations and evaluate deterrents, population controls, habitat modifications and other measures that may reduce bird-associated bacteria loading. Prohibit feeding of birds.
Other sources	Enhance maintenance of stormwater management facilities owned or operated by the permittee. Enhance requirements for third parties to maintain stormwater management facilities. Develop BMPs for locating, transporting, and maintaining portable toilets used on permittee-owned sites. Educate third parties that use portable toilets on BMPs for use. Provide public education on appropriate recreational vehicle dumping practices.

5. Local sediment, phosphorus, and nitrogen TMDLs.

   a. The permittee shall reduce the loads associated with sediment, phosphorus, or nitrogen through implementation of one or more of the following:

      (1) One or more of the BMPs from the Virginia Stormwater BMP Clearinghouse listed in 9VAC25-870-65 or other approved BMPs found on the Virginia Stormwater BMP Clearinghouse website;

      (2) One or more BMPs approved by the Chesapeake Bay Program; or

(3) Land disturbance thresholds lower than Virginia's regulatory requirements for erosion and sediment control and post development stormwater management.

b. The permittee may meet the local TMDL requirements for sediment, phosphorus, or nitrogen through BMPs implemented to meet the requirements of the Chesapeake Bay TMDL in Part II A as long as the BMPs are implemented in the watershed for which local water quality is impaired.

c. The permittee shall calculate the anticipated load reduction achieved from each BMP and include the calculations in the action plan required in Part II B 3 f.

d. No later than 36 months after the effective date of this permit, the permittee shall submit to the department the anticipated end dates by which the permittee will meet each WLA for sediment, phosphorus, or nitrogen. The proposed end date may be developed in accordance with Part II B 2.

6. Polychlorinated biphenyl (PCB) TMDLs.

a. For each PCB TMDL action plan, the permittee shall include an inventory of potentially significant sources of PCBs owned or operated by the permittee that drains to the MS4 that includes the following information:

(1) Location of the potential source;

(2) Whether or not the potential source is from current site activities or activities previously conducted at the site that have been terminated (i.e. legacy activities); and

(3) A description of any measures being implemented or to be implemented to prevent exposure to stormwater and the discharge of PCBs from the site.

b. If at any time during the term of this permit, the permittee discovers a previously unidentified significant source of PCBs within the permittee's MS4 regulated service area, the permittee shall notify DEQ in writing within 30 days of discovery.

7. Prior to submittal of the action plan required in Part II B 1, the permittee shall provide an opportunity for public comment proposed to meet the local TMDL action plan requirements for no less than 15 days.

8. The MS4 program plan as required by Part I B of this permit shall incorporate each local TMDL action plan. Local TMDL action plans may be incorporated by reference into the MS4 program plan provided that the program plan includes the date of the most recent local TMDL action plan and identification of the location where a copy of the local TMDL action plan may be obtained.

9. For each reporting period, each annual report shall include a summary of actions conducted to implement each local TMDL action plan.

Part III
Conditions Applicable to All State and VPDES Permits

NOTE: Discharge monitoring is not required for compliance purposes by this general permit. If the operator chooses to monitor stormwater discharges for informational or screening purposes, the operator does not need to comply with the requirements of Parts III A, B, or C.

A. Monitoring.

1. Samples and measurements taken for the purpose of monitoring shall be representative of the monitoring activity.

2. Monitoring shall be conducted according to procedures approved under 40 CFR Part 136 or alternative methods approved by the U.S. Environmental Protection Agency, unless other procedures have been specified in this state permit. Analyses performed according to test procedures approved under 40 CFR Part 136 shall be performed by an environmental laboratory certified under regulations adopted by the Department of General Services (1VAC30-45 or 1VAC30-46).

3. The operator shall periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals that will ensure accuracy of measurements.

B. Records.

1. Monitoring records and reports shall include:

   a. The date, exact place, and time of sampling or measurements;

   b. The individuals who performed the sampling or measurements;

   c. The dates and times analyses were performed;

   d. The individuals who performed the analyses;

   e. The analytical techniques or methods used; and

   f. The results of such analyses.

2. The operator shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this state permit, and records of all data used to complete the registration statement for this state permit, for a period of at least three years from the date of the sample, measurement, report or request for coverage. This period of retention shall be extended automatically during the course of any unresolved litigation regarding the regulated activity or regarding control standards applicable to the operator, or as requested by the board.

C. Reporting monitoring results.

1. The operator shall submit the results of the monitoring as may be performed in accordance with this state permit with the annual report unless another reporting schedule is specified elsewhere in this state permit.

2. Monitoring results shall be reported on a discharge monitoring report (DMR); on forms provided, approved or specified by the department; or in any format provided that the date, location, parameter, method, and result of the monitoring activity are included.

3. If the operator monitors any pollutant specifically addressed by this state permit more frequently than required by this state permit using test procedures approved under 40 CFR Part 136 or using other test procedures approved by the U.S. Environmental Protection Agency or using procedures specified in this state permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or reporting form specified by the department.

4. Calculations for all limitations that require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this state permit.

D. Duty to provide information. The operator shall furnish within a reasonable time, any information that the board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this state permit or to determine compliance with this state permit. The board, department, or EPA may require the operator to furnish, upon request, such plans, specifications, and other pertinent information as may be necessary to determine the effect of the wastes from his discharge on the quality of surface waters, or such other information as may be necessary to accomplish the purposes of the CWA and Virginia Stormwater Management Act. The operator shall also furnish to the board, department, or EPA upon request, copies of records required to be kept by this state permit.

E. Compliance schedule reports. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this state permit shall be submitted no later than 14 days following each schedule date.

F. Unauthorized stormwater discharges. Pursuant to § 62.1-44.5 of the Code of Virginia, except in compliance with a state permit issued by the department, it shall be unlawful to cause a stormwater discharge from a MS4.

G. Reports of unauthorized discharges. Any operator of a small MS4 who discharges or causes or allows a discharge of sewage, industrial waste, other wastes or any noxious or deleterious substance or a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117, 40 CFR Part 302, or § 62.1-44.34:19 of the Code of Virginia that occurs during a 24-hour period into or upon surface waters or who discharges or causes or allows a discharge that may reasonably be expected to enter surface waters shall notify the department of the discharge immediately upon discovery of the discharge, but in no case later than within 24 hours after said discovery. A written report of the unauthorized discharge shall be submitted to the department within five days of discovery of the discharge. The written report shall contain:

1. A description of the nature and location of the discharge;

2. The cause of the discharge;

3. The date on which the discharge occurred;

4. The length of time that the discharge continued;

5. The volume of the discharge;

6. If the discharge is continuing, how long it is expected to continue;
7. If the discharge is continuing, what the expected total volume of the discharge will be; and
8. Any steps planned or taken to reduce, eliminate and prevent a recurrence of the present discharge or any future discharges not authorized by this state permit.

Discharges reportable to the department under the immediate reporting requirements of other regulations are exempted from this requirement.

H. Reports of unusual or extraordinary discharges. If any unusual or extraordinary discharge including a "bypass" (Part III U) or "upset," (Part III V), should occur from a facility and the discharge enters or could be expected to enter surface waters, the operator shall promptly notify, in no case later than within 24 hours, the department by telephone after the discovery of the discharge. This notification shall provide all available details of the incident, including any adverse effects on aquatic life and the known number of fish killed. The operator shall reduce the report to writing and shall submit it to the department within five days of discovery of the discharge in accordance with Part III I 2. Unusual and extraordinary discharges include any discharge resulting from:

1. Unusual spillage of materials resulting directly or indirectly from processing operations;
2. Breakdown of processing or accessory equipment;
3. Failure or taking out of service some or all of the facilities; and
4. Flooding or other acts of nature.

I. Reports of noncompliance. The operator shall report any noncompliance which may adversely affect surface waters or may endanger public health.

1. An oral report to the department shall be provided within 24 hours from the time the operator becomes aware of the circumstances. The following shall be included as information that shall be reported within 24 hours under this subdivision:
   a. Any unanticipated bypass; and
   b. Any upset that causes a discharge to surface waters.
2. A written report shall be submitted within five days and shall contain:
   a. A description of the noncompliance and its cause;
   b. The period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and
   c. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The department may waive the written report on a case-by-case basis for reports of noncompliance under Part III I if the oral report has been received within 24 hours and no adverse impact on surface waters has been reported.

3. The operator shall report all instances of noncompliance not reported under Part III I 1 or 2, in writing, as part of the annual reports that are submitted. The reports shall contain the information listed in Part III I 2.

   NOTE: The reports required in Part III G, H, and I shall be made to the department. Reports may be made by telephone, email, or fax. For reports outside normal working hours, leaving a recorded message shall fulfill the immediate reporting requirement. For emergencies, the Virginia Department of Emergency Management maintains a 24-hour telephone service at 1-800-468-8892.

4. Where the operator becomes aware of a failure to submit any relevant facts, or submittal of incorrect information in any report, including a registrations statement, to the department, the operator shall promptly submit such facts or correct information.

J. Notice of planned changes.

1. The operator shall give notice to the department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

   a. The operator plans an alteration or addition to any building, structure, facility, or installation that may meet one of the criteria for determining whether a facility is a new source in 9VAC25-870-420:

   b. The operator plans an alteration or addition that would significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in this state permit; or

2. The operator shall give advance notice to the department of any planned changes in the permitted facility or activity that may result in noncompliance with state permit requirements.

K. Signatory requirements.

1. Registration statement. All registration statements shall be signed as follows:

   a. For a corporation: by a responsible corporate officer. For the purpose of this chapter, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy-making or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions that govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for state permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

   b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

   c. For a municipality, state, federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this chapter, a principal executive officer of a public agency includes:

(1) The chief executive officer of the agency, or

(2) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

2. Reports and other information. All reports required by state permits, including annual reports, and other information requested by the board or department shall be signed by a person described in Part III K 1, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described in Part III K 1;

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the operator. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

   c. The signed and dated written authorization is submitted to the department.

3. Changes to authorization. If an authorization under Part III K 2 is no longer accurate because a different individual or position has responsibility for the overall operation of the MS4, a new authorization satisfying the requirements of Part III K 2 shall be submitted to the department prior to or together with any reports, or information to be signed by an authorized representative.

4. Certification. Any person signing a document under Part III K 1 or 2 shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

L. Duty to comply. The operator shall comply with all conditions of this state permit. Any state permit noncompliance constitutes a violation of the Virginia Stormwater Management Act and the Clean Water Act, except that noncompliance with certain provisions of this state permit may constitute a violation of the Virginia Stormwater Management Act but not the Clean Water Act. Permit noncompliance is grounds for enforcement action; for state permit termination, revocation and reissuance, or modification; or denial of a state permit renewal application.

   The operator shall comply with effluent standards or prohibitions established under § 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if this state permit has not yet been modified to incorporate the requirement.

M. Duty to reapply. If the operator wishes to continue an activity regulated by this state permit after the expiration date of this state permit, the operator shall submit a new registration statement at least 90 days before the expiration date of the existing state permit, unless permission for a later date has been granted by the board. The board shall not grant permission for registration statements to be submitted later than the expiration date of the existing state permit.

N. Effect of a state permit. This state permit does not convey any property rights in either real or personal property or any exclusive privileges, nor does it authorize any injury to private property or invasion of personal rights, or any infringement of federal, state or local law or regulations.

O. State law. Nothing in this state permit shall be construed to preclude the institution of any legal action under, or relieve the operator from any responsibilities, liabilities, or penalties established pursuant to any other state law or regulation or under authority preserved by § 510 of the Clean Water Act. Except as provided in state permit conditions on "bypassing" (Part III U), and "upset" (Part III V) nothing in this state permit shall be construed to relieve the operator from civil and criminal penalties for noncompliance.

P. Oil and hazardous substance liability. Nothing in this state permit shall be construed to preclude the institution of any legal action or relieve the operator from any responsibilities, liabilities, or penalties to which the operator is or may be subject under §§ 62.1-44.34:14 through 62.1-44.34:23 of the State Water Control Law or § 311 of the Clean Water Act.

Q. Proper operation and maintenance. The operator shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances), which are installed or used by the operator to achieve compliance with the conditions of this state permit. Proper operation and maintenance also includes effective plant performance, adequate funding, adequate staffing, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by the operator only when the operation is necessary to achieve compliance with the conditions of this state permit.

R. Disposal of solids or sludges. Solids, sludges or other pollutants removed in the course of treatment or management of pollutants shall be disposed of in a manner so as to prevent any pollutant from such materials from entering surface waters and in compliance with all applicable state and federal laws and regulations.

S. Duty to mitigate. The operator shall take all reasonable steps to minimize or prevent any discharge in violation of this state permit that has a reasonable likelihood of adversely affecting human health or the environment.

T. Need to halt or reduce activity not a defense. It shall not be a defense for an operator in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this state permit.

U. Bypass.

1. "Bypass," as defined in 9VAC25-870-10, means the intentional diversion of waste streams from any portion of a treatment facility. The operator may allow any bypass to occur that does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to ensure efficient operation. These bypasses are not subject to the provisions of Part III U 2 and U 3.

2. Notice.

   a. Anticipated bypass. If the operator knows in advance of the need for a bypass, the operator shall submit prior notice to the department, if possible at least 10 days before the date of the bypass.

   b. Unanticipated bypass. The operator shall submit notice of an unanticipated bypass as required in Part III I.

3. Prohibition of bypass.

   a. Except as provided in Part III U 1, bypass is prohibited, and the board or department may take enforcement action against an operator for bypass, unless:

      (1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

      (2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance; and

      (3) The operator submitted notices as required under Part III U 2.

   b. The department may approve an anticipated bypass, after considering its adverse effects, if the department determines that it will meet the three conditions listed in Part III U 3 a.

V. Upset.

1. An "upset," as defined in 9VAC25-870-10, means an exceptional incident in which there is unintentional and temporary noncompliance with technology based state permit effluent limitations because of factors beyond the reasonable control of the operator. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

2. An upset constitutes an affirmative defense to an action brought for noncompliance with technology-based state permit effluent limitations if the requirements of Part III V 4 are met. A determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is not a final administrative action subject to judicial review.

3. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

4. An operator who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

   a. An upset occurred and that the operator can identify the causes of the upset;

   b. The permitted facility was at the time being properly operated;

   c. The operator submitted notice of the upset as required in Part III I; and

d. The operator complied with any remedial measures required under Part III S.

5. In any enforcement proceeding the operator seeking to establish the occurrence of an upset has the burden of proof.

W. Inspection and entry. The operator shall allow the department as the board's designee, EPA, or an authorized representative (including an authorized contractor), upon presentation of credentials and other documents as may be required by law, to:

1. Enter upon the operator's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this state permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this state permit;

3. Inspect and photograph at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this state permit; and

4. Sample or monitor at reasonable times, for the purposes of ensuring permit compliance or as otherwise authorized by the Clean Water Act and the Virginia Stormwater Management Act, any substances or parameters at any location.

For purposes of this subsection, the time for inspection shall be deemed reasonable during regular business hours, and whenever the facility is discharging. Nothing contained herein shall make an inspection unreasonable during an emergency.

X. State permit actions. State permits may be modified, revoked and reissued, or terminated for cause. The filing of a request by the operator for a state permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any state permit condition.

Y. Transfer of state permits.

1. State permits are not transferable to any person except after notice to the department. Except as provided in Part III Y 2, a state permit may be transferred by the operator to a new operator only if the state permit has been modified or revoked and reissued, or a minor modification made, to identify the new operator and incorporate such other requirements as may be necessary under the Virginia Stormwater Management Act and the Clean Water Act.

2. As an alternative to transfers under Part III Y 1, this state permit may be automatically transferred to a new operator if:

a. The current operator notifies the department at least 30 days in advance of the proposed transfer of the title to the facility or property;

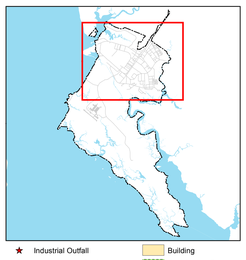
b. The notice includes a written agreement between the existing and new operators containing a specific date for transfer of state permit responsibility, coverage, and liability between them; and

c. The department does not notify the existing operator and the proposed new operator of its intent to modify or revoke and reissue the state permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in Part III Y 2 b.

Z. Severability. The provisions of this state permit are severable, and if any provision of this state permit or the application of any provision of this state permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this state permit, shall not be affected thereby.

APPENDIX B
Overview Maps

Figure B-1 - MS4 Area Overview Map
JBLE-Eustis, VA (1 of 2)



- Industrial Outfall
- Non-Industrial Outfall
- Stormwater Line
- Industrial Drainage Basin*
- Non-Industrial Drainage Basin*
- Building
- Golf Course Fairway
- Installation Boundary
- Water
- Wetland

*Drainage basins with hash marks indicate basins that have yet to be specifically delineated.

0 400 800 1,600
Feet

1 inch = 400 feet
(When printed on ANSI E-size paper)

This map was developed using 2018 GIS data provided by JBLE-Eustis. Locations of stormwater outfalls and drainage basins were collected by AECOM during field surveys conducted in 2013 and 2014. AECOM assumes no responsibility for the accuracy of or omissions in the original data provided by the base.

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AECOM

Subwatershed	Hydrologic Unit Code
Morrison's Creek-James River	020802060804
Skiffes Creek-James River	020802060802
Warwick River	020802060901

Notes:
1. Areas not located in a delineated drainage basin sheet flow to nearby storm sewer system appurtenances or surface waters. Additional non-industrial areas that do not have a distinct outfall are called out on the map.

2. A GIS mapping update was completed in 2018 for portions of the JBLE-Eustis stormwater drainage system. Updates to stormwater drainage system infrastructure are shown on this map.

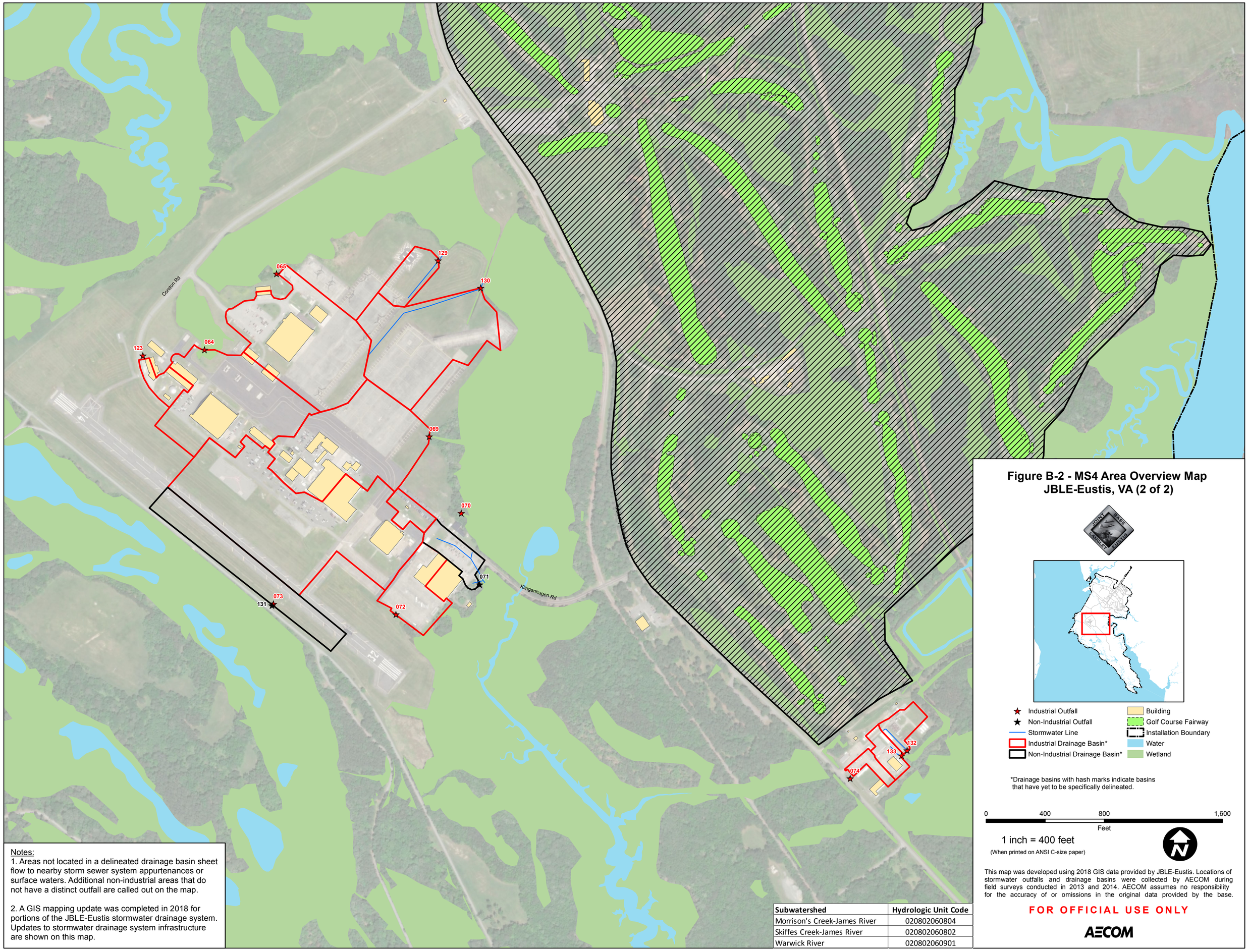


Figure B-2 - MS4 Area Overview Map
JBLE-Eustis, VA (2 of 2)

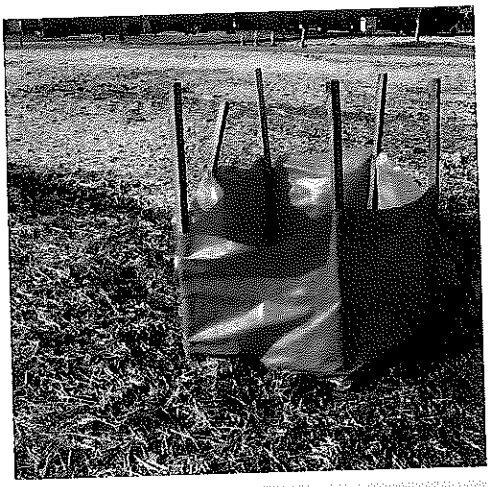
Notes:
1. Areas not located in a delineated drainage basin sheet flow to nearby storm sewer system appurtenances or surface waters. Additional non-industrial areas that do not have a distinct outfall are called out on the map.

2. A GIS mapping update was completed in 2018 for portions of the JBLE-Eustis stormwater drainage system. Updates to stormwater drainage system infrastructure are shown on this map.

Subwatershed	Hydrologic Unit Code
Morrison's Creek-James River	020802060804
Skiffes Creek-James River	020802060802
Warwick River	020802060901

APPENDIX C
MS4 Program Annual Reports

PY5 Annual Report (Permit Cycle 1)
(1 July 2017 – 30 June 2018)



Municipal Separate Storm Sewer System (MS4) Annual Report

JBLE–Eustis, Virginia

Permit Year 5
(1 July 2017 - 30 June 2018)

Permit No.: VAR040035

733 CED
JBLE–Eustis
1407 Washington Blvd
Fort Eustis, VA 23604

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Attachment 2. Public Involvement / Participation Documentation
Attachment 3. Illicit Discharge Investigation Details

List of Acronyms and Abbreviations

733 CED/EE	733d Civil Engineer Division/Environmental Element
AEM	Advanced Environmental Management
AAFES	Army Air Force Exchange Service
CFT	Cross-Functional Team
E&SC	Erosion and Sediment Control
EMP	Environmental Management Procedure
EMS	Emergency Management System
EPA	Environmental Protection Agency
ESOH	Environmental Safety and Occupational Health
FOG	Fats, Oils and Grease
FSS	Force Support Squadron
FSE	Food service establishment
HUC	Hydrologic unit code
IDDE	Illicit discharge detection and elimination
ISO	Industrial Organization of Standardization
JBLE–Eustis	Joint Base Langley-Eustis – Fort Eustis
MCM	Minimum control measure
MFH	Military family housing
MS4	Municipal separate storm sewer system
N/A	Not applicable
ODUS	Old Dominion Utility Services
P4	Public-Public; Public-Private
POC	Pollutants of concern
POV	Privately owned vehicle
PY	Permit year
SC	Special condition
SCM	Stormwater Control Measure
SSO	Sanitary sewer overflow
SWCB	State Water Control Board
SWM	Stormwater management
SWPPP	Stormwater Pollution Prevention Plan
TA	Training Area
TMDL	Total maximum daily load
TN	Total nitrogen

List of Acronyms and Abbreviations (Continued)

TP	Total phosphorus
TSS	Total suspended solids
VDEQ	Virginia Department of Environmental Quality
VDH	Virginia Department of Health
VSMP	Virginia Stormwater Management Program
WIP	Watershed Implementation Plan
WG	Wing
WOAC	Advanced Marine Warrant Officer Course

Municipal Separate Storm Sewer System Program Plan Certification

As required by Section III.K.2 of General Permit No. VAR040035, all reports required by state permits, and other information requested by the board shall be signed by a principal executive office or ranking elected official as described in 9 VAC 25-870-370(A), or a duly authorized representative.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Type or Print the following information:

Name: MARK J. SCIACCHITANO

Area Code and Telephone No.: 757-878-3642

Official Title: DIRECTOR, 733d CIVIL ENGINEER DIVISION

Signature: Mark J. Sciacchitano

Date Signed: 27 Sep 18

Permit Number: VAR040035

MS4 Name: JBLE–Eustis

Section 1: Introduction

Joint Base Langley-Eustis – Fort Eustis (JBLE–Eustis), Virginia, holds a General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4), General Permit No. VAR040035, issued by the Commonwealth of Virginia Department of Environmental Quality (VDEQ) on 1 July 2013. In accordance with provisions outlined in this permit, JBLE–Eustis has developed and implemented a comprehensive stormwater management program designed to prevent or reduce the discharge of sediment and other pollutants into the installation's stormwater conveyance system. General Permit No. VAR040035 Section II.E.1 requires JBLE–Eustis to evaluate the MS4 program on an annual basis to assess program compliance, the appropriateness of the identified BMPs, and progress towards achieving the identified measurable goals.

This report describes the progress and status of JBLE–Eustis' MS4 Program during Permit Year (PY) 5 from 1 July 2017 to 30 June 2018.

The remainder of this annual report is presented as follows:

- Section 2 – Provides an overview of the MS4 including its physical characteristics
- Section 3 – Presents a listing of the base's stormwater program guidance
- Section 4 – Discusses the minimum control measures (MCM) JBLE–Eustis is implementing under the permit
- Section 5 – Reviews the special conditions (SC) JBLE–Eustis is implementing under this permit

These sections are supported by the following attachments:

- Attachment 1 – Stormwater Management Educational Brochures
- Attachment 2 – Public Involvement / Participation Documentation
- Attachment 3 – Illicit Discharge Investigation Details

Section 2: Storm Sewer System Information

Permit Holder

Commanding Officer
JBLE–Eustis
Fort Eustis, Virginia

Facility Information

JBLE–Eustis
Newport News City County, Virginia
MS4 General Permit No. VAR040035

Mailing Address

Commanding Officer
733 CED
1407 Washington Blvd
Fort Eustis, VA 23604

Population Served

The total population of the installation is approximately 13,000, comprised of approximately 6,300 military personnel and 2,800 dependents living on installation, as well as approximately 3,900 civilian non-residents who commute to the installation daily.

MS4 Service Area

JBLE–Eustis, formerly Fort Eustis, is located adjacent to the City of Newport News, Virginia which is part of the Norfolk, Hampton, and Newport News metropolitan area. The installation is located on Mulberry Island, a small peninsula bordered by the James River to the west, Warwick River to the east, and Skiffes Creek toward the north. Smaller waterbodies on or bordering the installation include Jail Creek, Morrison's Creek, Island Creek, Bailey Creek, and Eustis Lake. The installation occupies approximately 8,000 acres and houses a variety of military organizations and support activities. Most of the development is located at the northern end of the installation, while the southern portion of the peninsula remains largely undeveloped. A golf course and an airfield are located near the center of the installation.

The base does not rely on another government entity to satisfy permit obligations. In addition, no program approvals are required as specified in Section II.C of the permit.

MS4 Conveyance System

JBLE–Eustis' stormwater conveyance system consists of sheet flow areas, swales, ditches, and pipes. In addition, the base has mapped the stormwater system for JBLE–Eustis as well as the stormwater control measures (SCM).

There are three subwatersheds that include portions of JBLE–Eustis. These include: Morrison's Creek, Skiffes Creek, and the Warwick River. River basins, streams, or other bodies of water into which the stormwater from the MS4 discharges are shown in Table 1. The table lists the subwatershed and waterbody that receive stormwater runoff from the MS4 jurisdictional area.

Table 1. Subwatersheds

Subwatershed (HUC)	Waterbody Name	Waterbody ID[1]
Morrison's Creek – James River (020802060804)	Fort Creek	VAT-G11E_ZZZ01A00
	James River - Gravel Neck to Pagan River	VAT-G11E_JMS01A06
	Morrison's Creek - Mulberry Island	VAT-G11E_MRS01A06
Skiffes Creek – James River (020802060802)	Bailey Creek	Unavailable[2]
	Blows Creek	VAT-G11E_ZZZ01A00
	Eustis Lake	Unavailable[2]
	James River - Gravel Neck to Pagan River	VAT-G11E_JMS01A06
	Skiffes Creek System	VAT-G11E_SFF01A08
	Skiffes Creek System [Admin Cond]	VAT-G11E_SFF02A08
Warwick River (020802060901)	Browns Lake	Unavailable[2]
	Jail Creek	Unavailable[2]
	Milstead Island Creek	Unavailable[2]
	Warwick River - Lower Tidal Portion	VAT-G11E_WWK03A08
	Warwick River - Middle Tidal Portion	VAT-G11E_WWK02A08
	Warwick River - Upper Tidal Portion	VAT-G11E_WWK01A08

Notes and Acronyms:
[1] The Waterbody ID is from the 2014 Integrated Report GIS layers (http://www.deq.virginia.gov/mapper_ext/).
[2] Waterbody IDs were not included in the 2014 VDEQ Integrated Report.

Section II.B.3.a (1) of Permit No. VAR040035 requires that JBLE–Eustis maintain a stormwater drainage system map that shows the location of all MS4 outfalls as well as the name and location of all waters receiving discharges from the MS4 outfalls and the associated hydrologic unit code (HUC). No new outfalls were identified during the MS4 stormwater drainage system mapping update by 733d CED/EE staff.

Total Maximum Daily Load and Impaired Stream Identification

TMDLs Other than the Chesapeake Bay TMDL

The U.S. Environmental Protection Agency (EPA) or VDEQ has the authority to establish and issue a Total Maximum Daily Load (TMDL) allocation on a body of water or receiving stream. The Warwick River and Skiffes Creek subwatersheds are subject to a TMDL for fecal bacteria. On 28 April 2009, the VDEQ State Water Control Board (SWCB) approved TMDLs to address fecal coliform bacteria impairment in the Warwick River (James River) and Skiffes Creek. Both the Warwick and James Rivers impaired segment (waterbody ID# VAT-G11E) and Skiffes Creek impaired segment (waterbody ID# VAT-G11E) are considered Condemned Shellfish Areas that do not support the Virginia Department of Health (VDH) fecal coliform standards for shellfish harvesting. These waterbodies receive runoff from JBLE–Eustis and the TMDLs for these waterbodies include WLA assignments to JBLE–Eustis.

Chesapeake Bay TMDL

In 2010 the EPA established the Chesapeake Bay TMDL to address excess nitrogen, phosphorus, and total suspended solids (pollutants of concern or POCs) in the bay. The Chesapeake Bay watershed encompasses over 64,000 square miles across the District of Columbia and large sections of Delaware, Maryland, New York, Pennsylvania, West Virginia, and Virginia. JBLE–Eustis sits within the Chesapeake Bay Watershed.

In the Phase I and Phase II Chesapeake Bay Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL, the Commonwealth of Virginia committed to a phased approach to reducing nutrients and suspended solids discharging from MS4s. Section I.C of the JBLE–Eustis MS4 Permit No. VAR040035 requires the installation to prepare a Chesapeake Bay TMDL Action Plan that demonstrates future plans to meet the required nutrient and suspended solids reductions.

Section 3: Water Quality Programs and Guidance

This section discusses the local and state water quality programs that are implemented by JBLE–Eustis or the state, respectively, within the installation boundaries.

Local Programs and Guidance

- JBLE–Eustis Environmental Policy Statement (24 August 2017)
- JBLE–Eustis Instruction 32-101 – Environment Management (28 January 2014)
- JBLE–Eustis EMPs (updated annually)
- JBLE–Eustis Illicit Discharge Elimination Procedure Manual
- JBLE–Eustis Erosion and Sediment Control Standards and Specifications

State Programs

In addition to the local programs that the installation is implementing, there are state programs established by VDEQ, which are also being implemented. These programs are listed below.

- **Erosion and Sedimentation Program** – The Virginia Erosion and Sediment Control Law (VESCL) delegates the authority to administer a Virginia Erosion and Sediment Control Program (VESCP) to local municipalities. Local municipal VESCPs must be approved by the State Water Control Board; however, this is an optional requirement for JBLE–Eustis per the VESCL. JBLE–Eustis has not developed a specific erosion and sediment control program for the base; however, erosion and sediment control standards and specifications were developed and implemented in 2016 for small projects (land disturbance between 2,500 and 10,000 square feet). The base utilizes EMP 4.4.6.2.2, *Stormwater Management*, to outline roles and responsibilities, as well as procedures related to erosion and sediment control.
- **Stormwater Permitting Program** – The VDEQ Water Division implements the stormwater permitting program to develop, plan, and implement statewide stormwater control policies, strategies, and rules designed to protect the state surface waters from the impacts of stormwater pollutants and runoff.

Section 4: Minimum Control Measures

This section discusses the MCMs that JBLE–Eustis is implementing under Permit No. VAR040035. MCMs include:

- MCM 1: Public Education and Outreach
- MCM 2: Public Involvement/Participation
- MCM 3: IDDE
- MCM 4: Construction Site Stormwater Runoff Control
- MCM 5: Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands
- MCM 6: Pollution Prevention / Good Housekeeping for Municipal Operations

Details regarding program requirements, achievements, and planned initiatives are discussed on the following pages.

MCM 1: Public Education and Outreach

The base is required to develop and implement a public education and outreach program with the objective to comply with State and local requirements to educate the installation community regarding the impacts of stormwater discharges on the receiving waters as well as measures that the community can take to reduce the introduction of pollutants to the stormwater drainage system. JBLE–Eustis has taken steps to implement the program BMPs as specified in Section II.B.1.c of the permit.

JBLE–Eustis plans to utilize a combination of relevant messages and outreach materials to educate target audiences for each of the three high priority water quality issues, as well as other stormwater topics of interest to the public. The table below outlines planned education and outreach activities under MCM 1, Public Education and Outreach on Stormwater Impacts, for PY5 in accordance with Section II.B.1.g (2) of the General Permit. Additional details are included in Section 3.1 of the JBLE-Eustis MS4 Program Plan for PY5. Examples of the stormwater management informational brochures that are intended for distribution are included in Attachment 1. Distribution of these materials will continue in PY5.

MCM 1: Public Education and Outreach		
Management Practices & Techniques	**Program Achievements (1 July 2017 – 30 June 2018)**	**Initiatives Planned for Coming Year (1 July 2018 – 30 June 2019)**
Identify three high priority water quality issues	Continued to monitor previously identified high priority water quality issues, which include: 1. Curb illegal fats, oils, and grease disposal at food service establishments, (FSE), including food trucks, to the stormwater drainage system 2. Curb illegal dumping within MFH and the dormitories. 3. Training Area (TA) erosion and sediment control.	• Use the newly developed FOG management plan for FSEs to better manage FOG on the installation. This will help to alleviate sanitary sewer overflows that enter the storm sewer system • High priority water quality issues will all be assessed when the new MS4 permit is issued by the VDEQ.

MCM 1: Public Education and Outreach		
Management Practices & Techniques	**Program Achievements (1 July 2017 – 30 June 2018)**	**Initiatives Planned for Coming Year (1 July 2018 – 30 June 2019)**
Curb illegal fats, oils, and grease disposal at food service establishments, (FSE), including food trucks, to the stormwater drainage system. ***Target Audience:*** *JBLE–Eustis FSE workers, food truck vendors. (approximately,200 people)*	• The FSE Inventory identified which FSEs had trained workers in FOG management and which did not. It also identified the procedures AAFES has in place for food trucks doing business on the installation. • FSEs must have two taken workers trained in FOG management using the free training at www.hrfog.com • Food trucks may workers may take either the HRFOG training or must have ServSafe training before entering into a contract with AAFES. • Recommendations have been provided to activities which perform food preparation. Most common issue is training and posting of signage. • **Target Audience:** *100 people (20%) reached*	• An assessment of new water quality issues will be completed and when the new MS4 permit is received. • The areas of concern for this water quality issue will continue to be monitored for continued compliance by the target audience.

Curb illegal dumping within MFH and the dormitories.
 	
Target Audience: *JBLE–Eustis MFH residents and dormitory residents (approximately 5,000 people)*
 	
Goal: *Reach 20% (1,000 people) of the target audience*
	• In late 2017, Air Force Headquarters decided to move from the ESOHTN training platform to a new platform called The Environmental Awareness Course Hub (TEACH). As a result of this decision, JBLE-Eustis's training numbers were down significantly from previous years. JBLE-Eustis expects training numbers to recover within the next CY. Stormwater pollution prevention training was provided to base personnel (active duty, civilian, and contractor). Training activities include Environmental Management Awareness and Competency (EMAC) and Advanced Environmental Management (AEM).
	  ○ The EMAC course is provided in an online format through the TEACH website (https:\\usaf.learningbuilder.com) and is required for all base personnel within 30 days of arrival and annually thereafter.
	  ○ The AEM training is conducted in a classroom setting for initial training with annual refresher training provided via TEACH.
	• The Environmental Element also provided environmental awareness training, including stormwater pollution prevention training, for the US Army Transportation School, Advanced Marine Warrant Officers Course (WOAC).
	• 733 CE/EE Participated in the Family Health and Awareness Fair on 19 April 2018 and utilized the interactive model to demonstrate how different activities affect stormwater runoff.
	• Target Audience:
	  ○ EMAC – 794
	  ○ AEM – 131
	  ○ WOAC – 10
	  ○ Family Health and Awareness Fair – 210
	  ○ Environmental Community Awareness Fun Fair – 500
	  ○ **Total – 1645**
		• Publish articles in the Warrior newspaper related to illegal dumping (e.g., privately owned vehicle [POV] car washing in undesignated areas, littering, and disposal of household chemicals) on a semi-annual basis during the PY.
		• Develop and post information to the JBLE–Eustis and JBLE–Eustis MFH Facebook pages at least semi-annually during the PY.
		• Send a mass email to MFH residents regarding illegal dumping at least semi-annually during the PY.
		• Continue to conduct EMAC, AEM, and WOAC training.

MCM 1: Public Education and Outreach		
Management Practices & Techniques	**Program Achievements (1 July 2017 – 30 June 2018)**	**Initiatives Planned for Coming Year (1 July 2018 – 30 June 2019)**
Address Training Area (TA) erosion and sediment control ***Target Audience:*** *JBLE-Eustis senior leadership, 733 CED, Range Control personnel, and FSD personnel (approximately 30 people)* ***Goal:*** *Reach 20% (6 people) of the target audience*	• 733 CED/EE is still pursuing an opportunity to partner with the Virginia Institute of Marine Science to obtain Legacy Department of Defense funding to develop an oyster reef at TA 1 to resolve erosion issues. • Discussed at Wing (WG) and Cross-Functional Team (CFT) meetings, as well as Environmental Safety and Occupational Health (ESOH) Council briefings. • Developed an outreach plan for the TAs • **Target Audience:** *10 people (33%) reached*	• Continue to meet with Range Control personnel to discuss erosion and sediment control issues at the TA • Discuss at WG and CFT meetings, as well as at ESOH Council briefings • Distribute TA E&SC outreach materials to Range Control, FSD, and other users.

MCM 2: Public Involvement/Participation

The installation is required to cultivate a public involvement and participation program with the objective to comply with State and local public notice requirements. JBLE–Eustis has taken steps to implement the program BMPs as specified in Section II.B.2 of the permit.

MCM 2: Public Involvement/Participation		
Management Practices & Techniques	**Program Achievements (1 July 2017 – 30 June 2018)**	**Initiatives Planned for Coming Year (1 July 2018 – 30 June 2019)**
JBLE-Eustis Environmental Website	• The 733 CED/EE maintains a website that provides information to the public, including the MS4 Program Plan and the MS4 Annual Reports. • The website is located here: http://www.jble.af.mil/Units/Army/Eustis-Enviromental/	Continue to maintain the JBLE–Eustis Environmental website and post educational and reference information for the base population.
Public Involvement / Participation	• Public involvement and participation activities include: ○ Earth Week (23 – 27 April 2018) - The 633d Air Base Wing Public Affairs Office provided newspaper, Command TV Channel, and social media notification of events, as well as photography support. They also provided electronic marquee support at the base gates to advertise Earth Week and asked for volunteers. ▪ BMP cleanup – 8 volunteers ▪ Nature Trail cleanup – 19 volunteers ▪ Wildlife Boat Tours – 26 volunteers ▪ Box Turtle Survey – 13 volunteers ▪ Family Health and Awareness Fair – Stormwater interactive display demonstrations at the elementary school (approximately 210 attendees) ▪ Earth Day Community Awareness Fun Fair – Joint event hosted by 733 CED/EE and JBLE–Eustis Family Housing (approximately 500 attendees) ○ Clean the Bay Day (2 June 2018) – Teamed with a local Boy Scout Troop and local volunteers to pick up trash at Eustis Lake (approximately 14 Boy Scouts, Troop Leaders and volunteers).	• Continue to host events during Earth Week to engage base personnel and residents. • Continue participating in Clean the Bay Day and other Earth Week events hosted by MFH and FSS.

MCM 2: Public Involvement/Participation		
Management Practices & Techniques	**Program Achievements (1 July 2017 – 30 June 2018)**	**Initiatives Planned for Coming Year (1 July 2018 – 30 June 2019)**
Public Involvement / Participation *(Continued)*	○ Environmental Partnership – JBLE-Eustis participates in the Secretary of the Air Force Program to partner with our local public and private neighbors. The Public-Public; Public-Private (P4) Partnership Program seeks to identify and develop opportunities to share resources, increase efficiency and improve effectiveness of operational, educational, and recreational programs. The JBLE P4 program is currently focused on the Virginia Peninsula. As the program matures, there may be opportunities for broader partnerships. ○ Communication with installation personnel and residents takes place on a regular basis through internal and external websites, the installation community cable channel, the Warrior newspaper, as well as regular interactions with various community groups (e.g., the Department of Game and Inland Fisheries, the York County Extension Office, and the Newport News Recycling office). An example of this type of communication and other Public Participation documentation is provided in Attachment 2.	• Continue to look for P4 partnerships to share resources and increase program effectiveness. • Develop focused educational messages to be disseminated via internal and external websites (e.g., Facebook, Twitter), the Peninsula Warrior, community group emails and websites.

MCM 3: Illicit Discharge Detection and Elimination

The installation is required to develop, implement, and enforce a program to detect and eliminate illicit discharges into the MS4. JBLE–Eustis has taken steps to implement the IDDE program BMPs as specified in Section II.B.3 of the permit.

MCM 3: IDDE		
Management Practices & Techniques	**Program Achievements (1 July 2017 – 30 June 2018)**	**Initiatives Planned for Coming Year (1 July 2018 – 30 June 2019)**
List any written notifications of physical interconnection given by the operator to other MS4s.	There are no known physical interconnections with other MS4s.	733 CED/EE will continue to monitor the MS4 area to ensure there are no interconnections with other MS4s.
Outfall screenings	• Fifty (50) of the 83 non-industrial outfalls were inspected during PY 5. Details regarding the inspection findings are included on the outfall inspection forms. • Copies of the outfall inspection forms are maintained by 733 CED/EE and will be made available upon request.	Inspect non-industrial outfalls as required when new MS4 permit is issued and document the inspection utilizing the outfall inspection forms.
Investigations of suspected illicit discharges	• JBLE-Eustis personnel utilized the IDDE procedures to investigate potential illicit discharges. • Investigations into potential illicit discharges include: o **22 January 2018** – Sanitary sewer overflow (SSO) to stormwater conveyance ditch o **19 March 2018** – Brownish foam seen at outfall 031 o Detailed descriptions of each of the illicit discharge investigations are included in Attachment 3.	• JBLE-Eustis personnel will continue to utilize IDDE procedures to investigate potential illicit discharges. • Continue to report all spills or unauthorized releases, whether it enters the MS4 or not, in accordance with JBLE-Eustis EMP 4.7.7, Spill Prevention and Response, and log the incident in the spill database maintained by the 733 CED/EE Spill Program Manager.

MCM 4: Construction Site Stormwater Runoff Control

The installation is required to comply with the Virginia Stormwater Management Program (VSMP) in order to maintain compliance with the Construction Site Runoff Controls. These controls are designed to assist with the development, implementation, and enforcement of an E&SC Program to reduce the pollutants (e.g., total suspended solids [TSS], total phosphorus [TP], and total nitrogen [TN]) related to "land-disturbing activities including clearing, grading, or excavation that results in a land disturbance equal to or greater than 2,500 square feet and less than one acre in all areas of jurisdictions designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations (9VAC25-830) adopted pursuant to the Chesapeake Bay Preservation Act." The base has taken steps to implement the program BMPs as specified in Section II.B.4 of the permit.

MCM 4: Construction Site Stormwater Control		
Management Practices & Techniques	**Program Achievements (1 July 2017 – 30 June 2018)**	**Initiatives Planned for Coming Year (1 July 2018 – 30 June 2019)**
Track regulated land-disturbing activities	• Continued to track all regulated land disturbing activities o Total number of land disturbing activities – 3 ▪ AIT Barracks Complex Phase 3 Benedict Place Demo ▪ Mulberry Island walking trail addition ▪ Main Gate Barricade o Total number of acres disturbed – 13.43 acres ▪ AIT Barracks Complex Phase 3 Benedict Place Demo – 13 acres ▪ Mulberry Island Road walking trail addition – 0.21 acres ▪ Main Gate Barricade – 0.22	• Continue to track regulated land-disturbing activities, including: o Number of on-going land disturbing activities o Number of acres disturbed o Number of inspections conducted
Track regulated land-disturbing activities *(Continued)*	o Total number of inspections conducted – 10 ▪ AIT Barracks Complex Phase 3 Benedict Place Demo - 4 ▪ Mulberry Island Road walking trail addition – 4 ▪ Main Gate Barricade - 2	See above.

MCM 4: Construction Site Stormwater Control		
Management Practices & Techniques	**Program Achievements (1 July 2017 – 30 June 2018)**	**Initiatives Planned for Coming Year (1 July 2018 – 30 June 2019)**
Land-disturbing activity enforcement actions	• *AIT Barracks Complex Phase 3 Benedict Place Demo* – An initial site visit was conducted on 20 November 2017 at 1040 by VDEQ and JBLE–Eustis 733 CED personnel. There were no observations made during this inspection. A subsequent inspection 23 January 2018 at 0900 indicated there was runoff from the site into outfall 031. The contractor was notified and an investigation revealed the sediment was entering the storm sewer system form a drop inlet outside of the projects boundaries. The contractor took action and placed silt fencing around the inlet to stop the sediment from entering the storm sewer system. A 24 April 2018 and a 19 June 2018 site visit and inspection resulted in no deficiencies. Finalize soil stabilization and establishment of a permanent vegetative cover is in progress.	Not applicable (N/A)

MCM 4: Construction Site Stormwater Control		
Management Practices & Techniques	**Program Achievements (1 July 2017 – 30 June 2018)**	**Initiatives Planned for Coming Year (1 July 2018 – 30 June 2019)**
Land-disturbing activity enforcement actions *(Continued)*	• *Main Gate Vehicle Barrier* - A Force Protection project to install vehicle barricades at the JBLE-Eustis main entry control point began in April 2018. The total LDA was approximately 9,645 sq. ft. and consisted of several small areas of disturbance for installation of the barricades. The contractor submitted the required E &SC plan for projects where there is an LDA of greater 2,500 sq. ft. but less than 10,000 square feet. for CED Environmental Element staff approval. During the project inspections were completed on 22 May 2018 and on 26 June 2018. No deficiencies were found during either inspection. Project has been completed.	N/A

MCM 4: Construction Site Stormwater Control		
Management Practices & Techniques	**Program Achievements (1 July 2017 – 30 June 2018)**	**Initiatives Planned for Coming Year (1 July 2018 – 30 June 2019)**
Land-disturbing activity enforcement actions *(Continued)*	• *Mulberry Island Walking Trail Extension* – A project to extend the asphalt walking trail along Mulberry Island Road began in late April 2018. The extension added approximately 1500 feet of asphalt, six feet wide for a total of approximately 9000 square feet. The contractor submitted the required E &SC plan for projects where there is an LDA of greater 2,500 sq. ft. but less than 10,000 square feet for CED Environmental Element staff approval. During the project inspections were completed on 22 May 2018 and on 26 June 2018. During the 26 June inspection it was noted several sections of silt fencing had fallen down. The contractor corrected the problem on the spot and no deficiency was written. Project has been completed.	N/A

MCM 5: Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands

The base is required to develop, implement, and enforce a program to address stormwater runoff related to new development and redevelopment projects throughout the service area, including a combination of structural and non-structural BMPs. In addition, JBLE–Eustis is required to ensure that the structural BMPs are functional through long term operation and maintenance (O&M) practices. The base has taken steps to implement the program BMPs as specified in Section II.B.5 of the permit.

MCM 5: Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands		
Management Practices & Techniques	**Program Achievements (1 July 2016 – 30 June 2017)**	**Initiatives Planned for Coming Year (1 July 2017 – 30 June 2018)**
Maintain an updated electronic database of all known operator-owned and privately-owned stormwater management (SWM) facilities that discharge into the MS4	JBLE–Eustis utilized an excel spreadsheet to track SWM facilities. The spreadsheet is provided to the Chesapeake Bay Action Team, Naval Base Norfolk for entry into the BMP clearinghouse data base. The Navy is the DoD lead for the Bay program and will work with the VDEQ, EPA and Chesapeake Bay Organization to ensure SWM facilities are reported for JBLE-Eustis.	Continue to maintain a SWM facilities inventory via an Excel spreadsheet.
Identify new SWM facilities brought online during the PY	There were no new storm water management facilities brought online during PY 5.	• Track construction projects and planned SWM facilities and include in the inventory as they are brought online. • Work closely with 733 CED planning and engineering departments to review plans and specifications associated with upcoming construction projects
SWM facility O&M management	AFCEC developed a project for evaluation all SWM facilities on the installation. The draft report was delivered 25 May 2018 for CED Environmental staff review. Many additional SWM facilities were identified and several previously identified SWMs were removed because they could not be verified. This effort also provide and inspection of the SWMFs in the MS4 regulated area as well as the industrial sectors. This new information was provided to the CBAT for updating the BMP clearinghouse information. The SWMF inventory and verification is in final review. An additional project was funded to prepare a SWMF rehabilitation plan to address the issues found during the verification survey.	• Use the SWMF inventory assessment to develop a SWMF rehab plan for use in obtaining funding for repairs and improvements of SWMFs.

MCM 6: Pollution Prevention / Good Housekeeping for Municipal Operations

The base is required to develop and implement a program to address pollution prevention and good housekeeping procedures, including a training program for installation personnel and the community. JBLE–Eustis has taken steps to implement the program BMPs as specified in Section II.B.6 of the permit.

MCM 6: Pollution Prevention / Good Housekeeping for Municipal Operations		
Management Practices & Techniques	**Program Achievements (1 July 2016 – 30 June 2017)**	**Initiatives Planned for Coming Year (1 July 2017 – 30 June 2018)**

Develop and implement daily operational procedures	• JBLE-Eustis utilizes an environmental management system (EMS) that conforms to International Organization of Standardization (ISO) 14001:2004, to manage environmental program requirements.
	• All base environmental and management requirements are codified in Joint Base Langley-Eustis Instruction (JBLE-I) 32-101, *Environmental Management*.
	  ○ EMPs have been developed and are used to implement the environmental program. These EMPs are reviewed and updated (as required) on an annual basis. EMPs that are related to the Stormwater Management Program include:
	  ▪ EMP 4.4.2, Environmental Awareness & Competency Training
	  ▪ EMP 4.4.2 Tab 2, Environmental Management Training Programs of Instructions
	  ▪ EMP 4.4.6.2, Wastewater-Stormwater Management
	  ▪ EMP 4.4.6.2.2, Stormwater Management
	  ▪ EMP 4.4.6.6, Hazardous Materials Management
	  ▪ EMP 4.4.6.7, Solid Waste and Recycling Management
	  ▪ EMP 4.4.6.8, Hazardous Waste Management
	  ▪ EMP 4.4.6.12, Integrated Pest Management
	  ▪ EMP 4.4.6.14.1, Aboveground Storage Tanks Management
	  ▪ EMP 4.4.6.14.2, Underground Storage Tanks Management
	  ▪ EMP 4.4.7, Spill Prevention and Response
	  ▪ EMP 4.5.2.1, Activity Assessments Conducted by CED/EE
	  ▪ EMP 4.5.2.3, Internal Inspections Conducted by Activities
	  ▪ EMP 4.5.2.3.1, Activity Corrective Action Plans
	  ▪ EMP 4.4.6.16, Tab 1, Assessment Management Special Conditions and Affirmative Procurement
	• Copies of the above EMPs are available upon request
	• EMPs are posted on the JBLE–Eustis Environmental website.
		• Continue to implement an EMS that conforms to ISO 14001:2004.
		• Post EMPs on the JBLE-Eustis Environmental website and advertise them on the JBLE–Eustis Facebook pages.

MCM 6: Pollution Prevention / Good Housekeeping for Municipal Operations		
Management Practices & Techniques	**Program Achievements (1 July 2016 – 30 June 2017)**	**Initiatives Planned for Coming Year (1 July 2017 – 30 June 2018)**
Develop and implement daily operational procedures *(Continued)*	Revised training schedules and requirements based on updates to EMP 4.4.2 Tab 2, Environmental Management Training Programs of Instructions	Review EMP 4.4.2 Tab 2 and interview installation personnel that manage the training program and update as needed.
Develop and implement required SWPPPs	• JBLE-Eustis operated under a comprehensive SWPPP, which is designed to satisfy requirements of VPDES Individual Permit No. VA0025216. • High priority non-industrial facilities have included in the comprehensive SWPPP (the Pines Golf Course, AAFES gas station and associated facilities, Base Exchange, and FSS Sport Field Maintenance facility) in order to manage to the same standard as the base's industrial facilities. • High priority non-industrial facilities incorporated in the SWPPP were inspected for compliance with the SWPPP as part of the annual CSCE. • Annual site compliance evaluation was completed and no new SWPPs are currently required.	• Conduct the annual site compliance evaluation of the high-priority non-industrial areas. • Continue to review and update the list of municipal/non-industrial high priority facilities and determine if they require a SWPPP under the new MS4 permit when issued.
Develop and implement turf and landscape nutrient management plans (NMP)	• The FSS youth athletic fields were previously excluded from NMP development because no nutrients were being applied. However, due to the proximity of this area to the TRADOC and Mission Support Group Command buildings, FSS was asked to begin adding nutrients to these fields for better aesthetics. A NMP was completed in June 2018 and is being implemented. • Each of the activities with NMPs have been visited to ensure compliance with the NMP requirements. No additional training is need at this time.	• Continue to implement the NMPs at each of the three locations. • Review previously developed training materials and conduct follow-up training with each of the locations subject to an NMP.

MCM 6: Pollution Prevention / Good Housekeeping for Municipal Operations		
Management Practices & Techniques	**Program Achievements (1 July 2016 – 30 June 2017)**	**Initiatives Planned for Coming Year (1 July 2017 – 30 June 2018)**

Required training	• In late 2017, Air Force Headquarters decided to move from the ESOHTN training platform to a new platform called The Environmental Awareness Course Hub (TEACH). As a result of this decision, JBLE-Eustis's training numbers were down significantly from previous years. JBLE-Eustis expects training numbers to recover within the next CY. Stormwater pollution prevention training was provided to base personnel (active duty, civilian, and contractor). Training activities include Environmental Management Awareness and Competency (EMAC) and Advanced Environmental Management (AEM).
	  o The EMAC course is provided in an online format through the TEACH website (https:\\usaf.learningbuilder.com) and is required for all base personnel within 30 days of arrival and annually thereafter.
	  o The AEM training is conducted in a classroom setting for initial training with annual refresher training provided via TEACH.
	• The Environmental Element also provided environmental awareness training, including stormwater pollution prevention training, for the US Army Transportation School, Advanced Marine Warrant Officers Course (WOAC).
	• 733 CE/EE Participated in the Family Health and Awareness Fair on 19 April 2018 and utilized the interactive model to demonstrate how different activities affect stormwater runoff.
	• Target Audience:
	  o EMAC – 794
	  o AEM – 131
	  o WOAC – 10
		Conduct stormwater pollution prevention training and continue to track base personnel that have received training.

Section 5: Special Conditions

SC1: TMDL Special Conditions Compliance other than the Chesapeake Bay TMDL

Section I.B.1 of the JBLE–Eustis MS4 permit, Permit No. VAR040035 requires the installation to maintain an updated MS4 Program Plan that includes a specific TMDL Action Plan for pollutants allocated to the MS4 in an approved TMDL.

On 30 November 2015, VDEQ notified JBLE-Eustis that, as part of maintaining its MS4 Program Plan, the installation is required to develop Action Plans for the James River, Warwick River, and Skiffes Creeks to address bacteria impairment in those waterbodies. Specifically, the MS4 operator must update the MS4 Program Plan to incorporate approvable TMDL Action Plans that identify the BMPs and other interim milestone activities. Based on the 28 April 2009 SWCB approval date, the TMDL Action Plans for James River, Warwick River and Skiffes Creek were to be completed by the end of PY3 (30 June 2016).

JBLE–Eustis is required to implement an approved TMDL Action Plan for bacteria impairment that was developed during PY3. Implementation began in PY4 and will continue in PY5.

SC2: TMDL Special Conditions Compliance for the Chesapeake Bay TMDL

JBLE–Eustis' Chesapeake Bay TMDL Action Plan was developed during PY5 and submitted with the MS4 Permit Registration Statement. The Action Plan presents a discussion of the compliance requirements for JBLE–Eustis.

The Action Plan presents the JBLE-Eustis estimated load contribution, required load reductions and pollutant reduction credits. The plan also reports progress made toward meeting the 40% cumulative pollutant reduction requirement for the first and second permit cycles. The methodology used to calculate the pollutant loads and credits is based on VDEQ Guidance Memo No. 15-2005 (Guidance Document).

The Action Plan was developed and submitted with the registration statement in PY5. Implementation of the Action Plan will be finalized, and the installation will begin implementation in PY1 of the new permit cycle.

Attachment 1: Stormwater Management Educational Brochures

Attachment 2: Public Involvement / Participation Documentation

Attachment 3: Illicit Discharge Investigation Details

Attachment 3. Illicit Discharge Investigation Details

1. **Sanitary Sewer Overflow (SSO) to Stormwater Conveyance Ditch** – On 22 January 2018 at approximately 1622 hrs. a crew from Old Dominion Utility Services (ODUS) responded to a spill in the vicinity of Building 2951 (Summerall Circle and Wilson Ave). Upon arrival, ODUS determined that the lift station malfunctioned causing a release of sewage in excess of 2000 gallons. Fort Eustis Fire and Emergency Services arrived on site at 1642 hrs. 733 Environmental Element on call Spill Responder was also notified and arrived onsite at 1715 hrs. ODUS was able to recover approximately 200 gallons and limed the area as part of the cleanup effort. The sewage was released to the Warwick River. ODUS will continue to investigate cause of the equipment failure and repair as needed.

2. **Brown foam in outfall 031 discharge** - During recon of Ft. Eustis Nature Trail for Earth Week activities on 19 March 2018, a brown foam was seen pooling in several areas of a creek from Outfall 031. There was no odor, or other evidence (POL feel) to suggest it is anything other than organic foam from leaves. Last rain event was 17 March 2018. Investigation upstream from this outfall also did not show any evidence of the brown foam.

PY1 Annual Report
(1 July 2018 – 30 June 2019)

PY2 Annual Report
(1 July 2019 – 30 June 2020)

PY3 Annual Report
(1 July 2020 – 30 June 2021)

PY4 Annual Report
(1 July 2021 – 30 June 2022)

PY4 Annual Report
(1 July 2022 – 30 June 2023)

APPENDIX D
IDDE Procedure Manual

Provided electronically on CD

FINAL
ILLICIT DISCHARGE DETECTION AND ELIMINATION PROCEDURE MANUAL

FOR

JOINT BASE LANGLEY EUSTIS–FORT EUSTIS, VIRGINIA

Prepared For:

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Task Order No. 0311

Statement of Limitations

This manual was prepared in accordance with the customary thoroughness and competence of environmental science and engineering consulting professionals and in accordance with the standard for professional services for a national consulting firm at the time these services were provided. The analysis, conclusions, and recommendations expressed in this report were developed based upon a limited scope of services and the information made available to AECOM at the time this work was conducted.

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LIST OF ABBREVIATIONS AND ACRONYMS

733d CED/CEIE	733rd Civil Engineer Division / Environmental Element
733d CED/GIO	733rd Civil Engineer Division / GeoBase
733d CED/CEO	733rd Civil Engineer Division / Operations
AEC	Activity Environmental Coordinator
AF	Air Force
AFDPO	Air Force Departmental Publishing Office
ASA	Army Support Activity
BOS	Base Operations Services
CFR	Code of Federal Regulations
COR	Contracting Officer's Representative
CWA	Clean Water Act
EPA	Environmental Protection Agency
ESOHTN	Environmental Safety and Occupational Health Training Network
GIS	Geographical Information System
GMS	Global Management Services
gpm	Gallons per Minute
HUC	Hydrologic Unit Code
IDDE	Illicit Discharge Detection and Elimination
JBLE–Eustis	Joint Base Langley-Eustis – Fort Eustis
MS4	Municipal Separate Storm Sewer System
NCDEQ	North Carolina Department of Environmental Quality
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
ODUS	Old Dominion Utility Services
OWS	Oil/Water Separator
POL	Petroleum, Oils, and Lubricants
RCI	Residential Community Initiatives
SDO	Stormwater Discharge Outfall
TMDL	Total Maximum Daily Load
UEC	Unit Environmental Coordinator
U.S.	United States
USDA	United States Department of Agriculture
VAC	Virginia Administrative Code
VDEQ	Virginia Department of Environmental Quality
VPDES	Virginia Pollutant Discharge Elimination System

1.0 INTRODUCTION

1.1 Background and Purpose

Stormwater runoff from developed land can harm surface water resources by changing natural hydrologic patterns and elevating pollutant concentrations and loadings. Stormwater runoff may contain or mobilize high levels of contaminants, such as sediment, suspended solids, nutrients, heavy metals, and pathogens. To address this problem, the U.S. Environmental Protection Agency (EPA) established stormwater regulations as part of the National Pollutant Discharge Elimination System (NPDES) permits program under the Clean Water Act (CWA), which are implemented through NPDES permits.

In the State of Virginia, the EPA has delegated administration of the NPDES program to the Virginia Department of Environmental Quality (VDEQ). On 1 July 2013, the VDEQ authorized coverage to Joint Base Langley-Eustis – Fort Eustis (JBLE–Eustis) under the General Permit for Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4) – General Permit No. VAR040035. This manual has been prepared to support compliance with Section II.B.3.c of the MS4 permit, which requires JBLE–Eustis to *"develop, implement, and update, when appropriate, written procedures to detect, identify and address unauthorized non-stormwater discharges, including illegal dumping, to the small MS4"*. To ensure compliance with the Illicit Discharge Detection and Elimination (IDDE) requirements of the MS4 Permit, JBLE–Eustis will follow the procedures outlined in this manual.

The JBLE–Eustis MS4 program is managed by the 733d Civil Engineer Division / Environmental Element (733d CED/CEIE). For any questions regarding the MS4 program or illicit discharges please contact:

Stormwater Program Manager
733d Civil Engineer Division
1407 Washington Blvd.
Fort Eustis, VA 23604
Telephone: (757) 878-4123

1.2 Manual Organization

This IDDE Procedures Manual is organized into the following sections:

- Section 1 includes this introduction, which discusses the regulatory background and purpose of the manual, the MS4 program oversight authority, and manual organization
- Section 2 describes the JBLE–Eustis storm sewer system map
- Section 3 outlines the JBLE–Eustis IDDE policy
- Section 4 presents procedures to detect unauthorized non-stormwater discharges to the JBLE–Eustis MS4
- Section 5 outlines methods for investigating potential illicit discharges to the storm system

- Section 6 describes mechanisms for eliminating confirmed illicit discharges, methods for conducting follow-up investigations to confirm the illicit discharges are resolved, and the implementation of enforcement actions as needed
- Section 7 provides a list of references used in developing this manual
- Appendix A contains a copy of the JBLE–Eustis storm sewer maps
- Appendix B presents the draft Stormwater Illicit Discharge Prohibition Policy Statement and EMP 4.4.6.2.2.3, MCM 3 – Illicit Discharge Detection and Elimination
- Appendix C provides an example Illicit Discharge Tracking Record, Dry-Weather Outfall Screen Form, Dry-Weather Outfall Screening Record, and Air Force (AF) Form 332

2.0 STORMWATER DRAINAGE SYSTEM MAP

A critical component of the JBLE–Eustis IDDE program is the stormwater drainage system map. Maintaining an accurate map of the stormwater system allows the base to trace and locate the source of suspected illicit discharges. The JBLE–Eustis storm sewer system maps are maintained by 733rd Civil Engineer Division / GeoBase (733d CED/GIO) in Geographical Information System (GIS) format. Updated stormwater drainage system data from contract projects on base are routed to 733d CED/GIO for inclusion in the installation's geodatabase. Hardcopy maps are available upon request and electronic versions of the stormwater drainage system map can be viewed by authorized personnel on the JBLE–Eustis server. As of June 2016, JBLE–Eustis has identified 85 non-industrial (also known as MS4 stormwater outfalls or discharge locations), two (2) comingled (i.e., industrial and MS4 activities) outfalls, and 39 industrial outfalls[1]. Stormwater drainage system maps showing each identified MS4 outfall, the associated receiving water body and hydrologic unit code (HUC), and the drainage basin boundary are provided in Appendix A.

JBLE–Eustis is in the process of conducting a comprehensive update of the stormwater system GIS data. The project includes inventory and location of stormwater system features as well as an update of its attributes within the installation's geodatabase. The mapping update is scheduled to be completed in December 2017 and will improve the accuracy of the stormwater drainage system map. Updated storm sewer system maps, including the addition of new or reclassified (e.g., industrial to non-industrial) outfalls, will be included in this manual as they are developed.

[1] Stormwater discharges to the industrial outfalls are regulated under a separate permit, Virginia Pollutant Discharge Elimination System (VPDES) Permit No. VA0025216, and are not covered under the MS4 permit.

3.0 IDDE POLICY

JBLE–Eustis is dedicated to detecting and eliminating illicit discharges to the stormwater drainage system. This section defines illicit discharges and outlines the JBLE–Eustis policy prohibiting illicit discharges.

3.1 Illicit Discharge Definition

Title 9 of the Virginia Administrative Code (VAC) defines an illicit discharge as,"*…any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except discharges pursuant to a separate VPDES or state permit (other than the state permit for discharges from the municipal separate storm sewer), discharges resulting from firefighting activities, and discharges identified by and in compliance with 9VAC25-870-400 D 2 c (3)*". Essentially, an illicit discharge is any non-stormwater discharge to the storm sewer that is not specifically authorized under a separate permit or the VAC.

Illicit discharges to the JBLE–Eustis MS4 are typically the result of aging infrastructure; industrial, commercial and/or residential practices; or a specific spill event. Examples of illicit discharges are illustrated in Figure 3-1 and include (but are not limited to) the following:

- Runoff from improperly stored materials
- Improper disposal of vehicle maintenance fluids or household chemicals into a storm drain inlet
- Leaking dumpsters flowing into a storm drain inlet
- Old or damaged sanitary sewer line leaking fluids into a cracked or damaged storm sewer line
- Allowing wash water with soaps or detergents to discharge to a storm drain inlet
- Washing silt, sediment, concrete, cement or gravel into a storm drain inlet
- Spills resulting from vehicle accidents
- Foam solutions from firefighting testing and training exercises

Examples of authorized non-stormwater discharges that are not significant contributors of pollutants and are not considered illicit discharges at JBLE–Eustis include the following:

- Water line flushing
- Uncontaminated groundwater infiltration
- Landscape and lawn irrigation
- Air conditioning condensate[2]
- Street wash water
- Groundwater from footing drains and crawl spaces
- Flows from firefighting activities
- Discharges from potable sources

[2] Condensate and blow down from large cooling towers located throughout JBLE–Eustis are regulated under a separate permit, VPDES Permit No. VA0025216, and a not covered under the MS4 permit.

- Flows from riparian habitats and wetlands
- Dechlorinated swimming pool discharges

Sewer Pipe Leaking into a Storm Pipe

Oil Dumped at Storm Drain Inlet

Rinsing Dumpster Residue to Storm Drain Inlet

Discharge from a Vehicle Accident

Source: *Illicit Discharge Detection and Elimination - A Guidance Manual for Program Development and Technical Assessments (CWP, 2004)*

Figure 3-1. Examples of Illicit Discharges

Illicit connections to the stormwater drainage system can also generate illicit discharges. Illicit connections are any manmade conveyance that is connected to the MS4 without a permit, excluding roof drains and other similar connections. Examples of illicit connections include, but are not limited to, the following:

- Sanitary sewer piping that is connected directly from a building to the stormwater drainage system
- A cross connection between the sanitary sewer and the stormwater drainage system
- A shop floor drain that is connected to the stormwater drainage system

The frequency of illicit discharges typically occurs within the following three classifications as defined by the EPA (CWP, 2004):

- ***Continuous*** discharges occur most or all of the time, are usually easier to detect, and typically produce the greatest pollutant load.
- ***Intermittent*** discharges occur over a shorter period of time (e.g., a few hours per day or a few days per year). Because they are infrequent, intermittent discharges are hard to detect, but can still represent a serious water quality problem, depending on their flow type.
- ***Transitory*** discharges occur rarely, usually in response to a singular event such as an industrial spill, ruptured tank, sewer break, transport accident or illegal dumping episode. These discharges are extremely hard to detect with routine monitoring, but under the right conditions, can exert severe water quality problems on downstream receiving waters.

Understanding the frequency classifications can help in detecting and eliminating illicit discharges by allowing inspectors to determine if dry weather flows may need additional examination to determine if they should be classified as illicit discharges.

3.2 JBLE–Eustis Illicit Discharge Prohibition Policy

Illicit discharges to the stormwater drainage system at JBLE–Eustis are prohibited via multiple base-level policies, instructions and guidelines.

JBLE Memorandum, *Stormwater Illicit Discharge Prohibition Policy Statement:* This draft memorandum communicates JBLE–Eustis commitment to water quality protection and conservation. The document identifies the stormwater discharge permits in effect at JBLE–Eustis, prohibits illicit discharges to the stormwater system, and provides information on how to report illicit discharge to the proper authorities. The memorandum is applicable to all JBLE military personnel, civilian employees and support contractors. This draft policy statement is provided in Appendix B. A copy of the Stormwater Illicit Discharge Prohibition Policy Statement signed by the Commander will be posted at:
https://www.jble.af.mil/About-Us/JBLE-Enviromental-Information

JBLE–Eustis Environmental Management Procedure (EMP) 4.4.6.2.2.3, *MCM 3 - Illicit Discharge Detection and Elimination:* EMP 4.4.6.2.2.3 presents the scope, base personnel roles and responsibilities, and procedures, and references the IDDE Procedure Manual. The EMP acts as an enforcement tool for the Illicit Discharge Prohibition Policy Statement and this IDDE Procedure Manual. A copy the EMP is provided in Appendix B.

JBLE–Eustis MS4 Program Plan: JBLE–Eustis maintains an MS4 Program Plan per the requirements of Permit No. VAR040035. The Program Plan outlines the requirements of the permit, including the six MCMs and two special conditions. The subsection on MCM 3 presents the base's IDDE program, including referring to this IDDE Procedure Manual for details of the program, as well as plans to remain in compliance with the permit.

JBLE–Eustis Instruction 32-101, *Environmental Management:* JBLE–Eustis Instruction 32-101 applies to all personnel performing functions and conducting operations on JBLE–Eustis and is aimed at preserving, protecting, conserving, and restoring the quality of the Fort Eustis environment. Section 4.4.6.2 requires the installation to comply with applicable federal, state and local stormwater regulations through execution of required stormwater permits. Section 4.4.6.2.2.2 requires all operations and actions be planned and executed in a manner to protect surface water, which would include prohibiting illicit discharges to the stormwater system. JBLE–Eustis Instruction 32-101 can be viewed at: *https://www.jble.af.mil/About-Us/JBLE-Enviromental-Information*

Balfour Beatty Communities, *Resident Guide:* The Resident Guide outlines policies and procedures for all residents at JBLE–Eustis and includes stormwater pollution prevention requirements. Section 25 of the Resident Guide prohibits the disposal of household waste to the ground and in storm drains. Section 40 prohibits the discharge of petroleum oil and lubricants (POL) and antifreeze to the ground and in storm drains. Section 57 prohibits vehicle washing in residential areas. Vehicle washing must be conducted at authorized car wash stations that discharge the wash water to the sanitary sewer. The Resident Guide can be viewed at: *http://www.forteustisfamilyhomes.com/media/1563329/Eustis-and-Story-RES-GUIDE-Apr-2015.pdf*

4.0 ILLICIT DISCHARGE DETECTION PROCEDURES

Illicit discharges and connections at JBLE–Eustis are typically identified through community reporting and dry-weather field screening activities. Detecting potential problem areas quickly allows issues to be addressed before they cause significant water quality degradation. This section outlines procedures for IDDE incident reporting and dry-weather field screening at the JBLE–Eustis MS4 outfalls.

4.1 Community Reporting

All JBLE–Eustis personnel and residents are encouraged to report illicit discharge and/or illegal dumping activities. 733d CED/CEIE and the family housing management company (Balfour Beatty) plan to periodically distribute information about the IDDE program and how to report via newspaper articles, Facebook postings, mass emails, and postings to the JBLE–Eustis Environmental public website. The aforementioned websites can be viewed at the following addresses:

- JBLE–Eustis Environmental public website:
  https://www.jble.af.mil/About-Us/JBLE-Enviromental-Information
- JBLE–Eustis Environmental Facebook site:
  https://www.facebook.com/forteustisenvironment
- Housing Management Facebook site:
  https://www.facebook.com/FortEustisHomes

The JBLE–Eustis Fire and Emergency Services personnel are the installation's First Responders and their telephone number (757-878-1008 or 4281 or 911) is used as the primary hotline for reporting illicit discharges. The hotline is manned 24 hours per day, 7 days per week. JBLE–Eustis personnel can also call Environmental staff (757-878-4123) or Housing Management staff (757-369-8344) with concerns regarding potential illicit discharges.

When a potential illicit discharge incident is reported, the incident information will be referred to 733d CED/CEIE, staff for documentation using the Illicit Discharge Tracking Record (see Appendix C) and follow-up. The responding staff will either follow the investigation procedures in Section 5.0 of this manual to identify the source of the problem or, if the source is known, the discharge elimination procedures outlined in Section 6.0 will apply.

4.2 Community Outreach

Effective promotion and publication of the base IDDE prohibition policy and methods for illicit discharge detection are an integral part of the IDDE Program for JBLE–Eustis. Outreach initiatives that JBLE–Eustis conducts include:

- Operation and publication of an illicit discharge hotline. 733d CED/CEIE is working with PAO to publicize the hotline number.
- Storm drain marking activities which include volunteers from the base residents and personnel.

- Educational signs are posted at various facilities (e.g., industrial facilities) regarding illegal dumping.
- Facebook posts related to educating the general public regarding illicit discharges and how to report them.

4.3 Dry-Weather Field Screening

Dry-weather field screening of stormwater outfalls is an effective method of detecting illicit discharges to the stormwater system. JBLE–Eustis has 85 MS4 outfalls that discharge to various receiving water bodies including Bailey Creek, Eustis Lake, Milstead Island Creek, Warwick River, Morrision's Creek, James River and Skiffes Creek. The MS4 Permit requires a minimum of 50 outfalls to be screened each year during dry weather to detect potential illicit discharges to the stormwater system.[3] Maps showing the location of each known outfall and the receiving waters are provided in Appendix A. It should be noted that a mapping update project is underway in 2016 and expected to be complete by June 2017. Updated maps will be included in this manual as they are developed.

4.3.1 Responsibility

Outfall screenings are the responsibility of 733d CED/CEIE staff. Inspections may be performed by other base personnel or by outside consultants hired by the base; however, all field reports will be reviewed and maintained by 733d CED/CEIE staff.

4.3.2 Outfall Prioritization and Schedule

As required by Section II.B.3c (1) (a) of the MS4 Permit, the stormwater outfalls have been prioritized for screening. Each of the 85 MS4 outfalls will be screened at least every two years, with 15 "high priority" outfalls being screened each year. The "high priority" outfalls were identified based on land use (Personally owned vehicle [POV] washing, POV gas stations, POV maintenance [Auto Hobby Shop], dog park, hospital, etc.) and historical data regarding previous suspected illicit discharges. Table 4-1 presents a list of each known MS4 outfall, its receiving water body, and the year scheduled for screening. The inspection schedule will be updated as necessary to accommodate additional outfalls that may be created as part of future development or identified as part of system mapping updates.

[3] JBLE-Eustis has 39 industrial outfalls and two (2) comingled outfalls that are regulated under VPDES Industrial Permit No. VA0025216. Industrial outfalls are inspected under the requirements of the VPDES program.

Table 4-1. MS4 Outfall Inspection Schedule, JBLE–Eustis

High Priority Outfalls to be Inspected Each Permit Year		Outfalls to be Inspected in Permit Year 4 (1 Jul 2016 – 30 Jun 2017)		Outfalls to be Inspected in Permit Year 5 (1 Jul 2017 – 30 Jun 2018)	
013	Bailey Creek	023	Eustis Lake	011	Bailey Creek
031	Eustis Lake	027	Eustis Lake	014	Bailey Creek
043	Warwick River	029	Eustis Lake	015	Bailey Creek
052	Warwick River	030	Eustis Lake	018	Bailey Creek
057	Warwick River	032	Eustis Lake	016	Bailey Creek
067	Warwick River	038	Milstead Island Creek	017	Bailey Creek
068	Warwick River	039	Milstead Island Creek	022	Bailey Creek
077	Eustis Lake	041	Milstead Island Creek	028	Eustis Lake
078	Warwick River	044	Warwick River	033	Eustis Lake
084	Bailey Creek	048	Milstead Island Creek	045	Warwick River
091	Warwick River	049	Milstead Island Creek	047	Milstead Island Creek
092	Skiffes Creek	050	Milstead Island Creek	056	Warwick River
115	James River	053	Warwick River	058	Warwick River
117	Warwick River	054	Warwick River	059	Warwick River
121	Warwick River	055	Warwick River	071	Morrison's Creek
		060	Warwick River	086	Bailey Creek
		062	Warwick River	087	Bailey Creek
		063	Warwick River	089	Eustis Lake
		066	Warwick River	094	Bailey Creek
		085	Bailey Creek	098	Bailey Creek
		090	Island Creek	099	Bailey Creek
		093	Bailey Creek	100	Bailey Creek
		095	Bailey Creek	104	Eustis Lake
		096	Bailey Creek	105	Eustis Lake
		097	Bailey Creek	107	Eustis Lake
		103	Bailey Creek	118	Warwick River
		106	Eustis Lake	119	Warwick River
		113	Warwick River	120	Warwick River
		126	Warwick River	122	Warwick River
		127	Warwick River	124	Warwick River
		128	Warwick River	125	Warwick River
		131	Morrison's Creek	134	Eustis Lake
		136	Warwick River	135	Eustis Lake
		141	Milstead Island Creek	140	Eustis Lake
		142	Warwick River	32A	Eustis Lake

4.3.3 Timing

Timing is important when conducting dry-weather outfall screenings to detect dry-weather flows during time periods when potential pollutants are not diluted by stormwater. The following guidelines should be considered when scheduling screenings:

- Conduct screenings at least 48 hours after a runoff producing rain event
- Tidally influenced outfalls should be screened during low tide

- Remote outfalls may be more accessible during times of low vegetation (late fall to early spring)
- Conduct screening during times of low groundwater levels (e.g., avoid time periods when the ground is saturated by extended rainfall or snowmelt)

4.3.4 Screening Activities

During outfall screening, field crews will visually inspect each outfall and the immediate surrounding area, photograph the current conditions, and complete a Dry-Weather Outfall Screening Form provided in Appendix C. Special attention will be paid to outfalls that are flowing when no rain has occurred within the last 48 hours and/or outfalls where foul odors or discolored water is noted. When the screening of an outfall indicates a potential illicit discharge, the JBLE–Eustis Stormwater Program Manager will be notified within one business day so an investigation, as described in Section 5.0, can be performed. Any identified spills or conditions that represent a serious threat to personnel safety or equipment damage will be immediately reported to JBLE–Eustis Fire and Emergency Services.

The Dry-Weather Outfall Screening Form includes the following seven sections to be completed with each outfall screening:

Section 1: Background Data – This section requires general information regarding when and where the screening was performed, historical rainfall data, reference to photographs taken, and a description of drainage basin land uses. Tips for completing Section 1 include:

- The Outfall ID can be found in Table 4-1 and the stormwater drainage system maps in Appendix A of this manual.
- Historical daily rainfall totals can be found at: *http://www.wunderground.com/q/zmw:23628.3.99999* by selecting "Felker Army Air Field, VA" → "History" → "Custom" and entering the desired time period. The data will be formatted in a table as shown in Figure 4-1.
    - Total rainfall in a 24 hour period is shown with the blue callout in Figure 4-1.
    - Total rainfall in a 48 hour period will need to be calculated by the inspector by summing the values indicated by the red callout in Figure 4-1.
    - Hourly data can also be used to determine the total rainfall utilizing the same website and selecting "Felker Army Airfield, VA" → "History" → "Daily".
- Take at least one photograph of the outfall for documentation purposes. Note the Camera ID and Photo IDs on the form.
- Drainage basin categorization (i.e., industrial/non-industrial) can be identified through operator knowledge or by reviewing the stormwater drainage system maps in Appendix A.

Weather History & Observations

2015	Temp. (°F)			Dew Point (°F)			Humidity (%)			Precip. (in)	Events
Dec	high	avg	low	high	avg	low	high	avg	low	sum	
1	55	50	46	55	53	48	100	100	100	0.13	Rain
2	62	58	53	63	58	54	100	100	100	0.03	Fog , Rain

Figure 4-1. Example Rainfall Data Output, JBLE–Eustis

<u>Section 2: Outfall Description</u> – This section requires a description and dimensions of the outfall and a determination if flow is present during the inspection. Tips for completing Section 2 include:

- The cross-sectional shape of the outfall structure will determine the dimensions required. If the shape is abnormal, provide a sketch in the available area of the dimension column and label the measured dimensions.
- If the outfall is submerged with sediment, photograph the submergence and attempt to measure the depth of sediment.
- The identification of flow is important as flow during dry weather would indicate a non-stormwater discharge. If a pipe is partially submerged in water, and it is difficult to identify dry-weather flow, a nearby leaf or blade of grass can be dropped onto the water surface near the outfall. Travel of the object on the surface can help indicate if flow is discharging from the outfall.
- Dimensions that cannot be safely measured should be estimated.
- Upon completion of this section, if flow is present, continue to Section 3 of the form. However, if no flow is present, skip to Section 5 of the form.

<u>Section 3: Estimated Discharge Rate</u> – This section requires the inspector to estimate the quantity of discharge from the outfall at the time of inspection using one of two techniques. The first technique simply records the time it takes to fill a container of a known volume. In the second technique, the inspector measures the velocity of flow, and multiplies it by the estimated cross-sectional area of the flow. Tips for completing Section 3 include:

- **Flow Method #1**: This technique is preferred for relatively low flows that can effectively be captured in a container. It may be helpful to use a "homemade" container, such as a cut out plastic milk container that is marked to show a one quart volume. The shape and flexibility of plastic containers allows the capture of relatively flat and shallow flow. The discharge rate in gallons per minute (gpm) is then estimated using the following equation with measured data from the form shown in bold.

$$\text{Discharge Rate (gpm)} = \frac{\#\,\boldsymbol{quarts}}{\#\,\boldsymbol{seconds}} \times \frac{1\text{ gallon}}{4\text{ quarts}} \times \frac{60\text{ seconds}}{1\text{ minute}}$$

- **Flow Method #2**: The second technique is preferred for open channels and larger discharges where containers are too small to effectively capture the flow. The inspector measures and marks off a fixed flow length (usually about five feet); crumbles leaves or other light material; drops them into the discharge; and measures the time it takes the material to travel across the pre-measured length. The velocity of flow in feet per second (fps) is estimated using the following equation with measured data from the form shown in bold.

$$\text{Velocity (fps)} = \frac{\boldsymbol{measured\ length\ (ft)}}{\boldsymbol{time\ of\ travel\ (sec)}}$$

Next, the cross-sectional flow area is estimated by measuring the water depth and the width of the water surface and bottom of the channel. The cross-sectional flow area in cubic feet (ft^3) and discharge rate in gpm are then estimated using the following equations with measured data from the form shown in bold.

$$\text{Area (ft}^2) = \left[\left(\frac{\boldsymbol{surface\ \ width\ (in) + bottom\ width\ (in)}}{2}\right) \times \boldsymbol{depth\ (in)}\right] \times \frac{1\ \text{ft}^2}{144\ \text{in}^2}$$

$$\text{Discharge Rate (gpm)} = \text{Area (ft}^2) \times \text{Velocity (fps)} \times \frac{7.48\ \text{gallons}}{1\ \text{ft}^3} \times \frac{60\ \text{seconds}}{1\ \text{minute}}$$

<u>Section 4: Physical Indicators for Flowing Outfalls</u> – This section requires documentation of four indicators for flowing outfalls – odor, color, clarity, and floatables. These indicators are important in detecting the most severe or obvious discharges. The severity of each indicator is rated on a scale from zero to three. Tips for completing Section 4 include:

- **Odor**: A severity score of 0 means that no odor is present; a score of 1 means the odor is faint or it is unclear if the odor is coming from the stream or other object in the area; a score of 2 indicates a moderate odor within the pipe; and a score of 3 is assigned if the odor is so strong that it is detected at a considerable distance from the outfall.
- **Color and Clarity**: Color and clarity are best evaluated by collecting the discharge in a clear bottle and holding it up to the light. Color is rated by the tint or intensity of the color observed and clarity is rated based on how easily light can penetrate through the collected sample. The severity scale is further defined on the inspection form. Examples of the different levels of clarity is illustrated in Figure 4-2.

Figure 4-2. Examples of Levels of Clarity at Outfalls

- **Floatables**: Sewage, oil sheens, and suds are all examples of floatable indicators. Floatables that appear to be ***sewage*** are assigned a severity score of 3. Surface ***oil sheens*** are ranked based on their thickness and coverage. Note that natural sheens created by in-stream biological processes often form a sheet-like film that cracks if disturbed and are not indicators of illicit discharges. ***Suds*** are rated based on their foaminess and staying power. A severity score of 3 is designated for thick foam that travels many feet before breaking up. Suds that break up quickly may simply reflect water turbulence, and do not necessarily have an illicit origin. Suds that are accompanied by a strong organic or sewage-like odor may indicate a sanitary sewer leak or connection, whereas suds with a fragrant odor may indicate the presence of wash waters. Note that trash and debris are generally not considered illicit discharge concerns and should not be documented as floatables. Trash should be noted in Section 7 of the form. An example of floating solids is provided as Figure 4-3.

Figure 4-3. Floating Solids

- Photographs should be taken of all visible indicators.

<u>Section 5: Observations for Flowing and Non-Flowing Outfalls</u> – This section requires documentation of five indicators that may reveal past intermittent or transitory discharges. Indicators documented in this section include outfall damage, outfall deposits or stains, abnormal vegetation growth, poor pool quality,

and benthic growth on pipe surfaces. Indicator descriptions are provided on the inspection form. Tips for completing Section 5 include:

- Surface damage at the outfall may be an indicator of high strength / corrosive discharges or associated gases
- Inhibited vegetation growth immediately downstream of the outfall may be an indicator of industrial discharges, whereas excessive vegetation may be an indicator of a nutrient rich discharge (e.g., sewage, fertilizers, etc.).
- Benthic growth on the pipe includes algae, bacteria, and slime on outfall surfaces may be an indicator of a nutrient rich discharge (e.g., sewage, fertilizers, etc.).
- Photographs should be taken of all visible indicators.

Section 6: Overall Preliminary Illicit Discharge Rating – This section requires an overall illicit discharge rating of unlikely, potential, suspect, or obvious for the outfall based on the discharge indicators identified in the preceding sections. This is only an initial assessment of the *likelihood* of an illicit discharge and will be used to determine if additional investigation is warranted. The outfall characterization rating is best judged by the inspector. Rating guidance is provided on the form to provide consistency; however, the intuition of the inspector should take precedence. Tips for completing Section 6 include:

- **Unlikely**: A rating of *Unlikely* is generally assigned to non-flowing outfalls with no physical indicators of an illicit discharge in Section 5.
- **Potential**: A rating of *Potential* is generally assigned to flowing or non-flowing outfalls with presence of one or more physical indicators in Sections 4 or 5.
- **Suspect**: A rating of *Suspect* is generally assigned to flowing outfalls with high severity, typically a 3 on the 0 to 3 scale, on one or more physical indicators in Section 4.
- **Obvious**: A rating of *Obvious* is generally assigned where there is an illicit discharge that can be confirmed without sampling or upstream investigation.

Section 7: Other Non-Illicit Discharge Concerns – This section is used to document other concerns observed at the outfall that are not associated with illicit discharges and may include: accumulated trash, erosion, sink holes, pipe failure, overgrowing vegetation, and required infrastructure repairs.

4.3.5 Documentation

Outfall screenings can generate a significant amount of data which requires proper management and record keeping. 733d CED/CEIE staff will complete the following tasks within five working days of completing a dry-weather outfall screening:

- Store the field reports in a properly labeled three-ring binder. The binder will be tabbed by inspection year, and the outfall reports will be organized by Outfall ID from lowest to highest.

- Download digital inspection photographs to an appropriately titled folder on the JBLE–Eustis shared server. The photographs will be grouped by inspection year and renamed based on the Outfall ID. If multiple photographs are taken at the same outfall, "-#" will be appended to the end of the Outfall ID (e.g., 001-1, 001-2, 001-3)
- Enter inspection data into the Dry-Weather Outfall Screening Record spreadsheet. The spreadsheet should be tabbed by inspection year with outfalls listed by Outfall ID from lowest to highest and saved to the JBLE–Eustis shared server. An example outfall screening record spreadsheet is provided in Appendix C, and an electronic version is provided on the CD-ROM included with this manual.
- Complete Section 1 of the Illicit Discharge Tracking Record for each discharge identified as Potential, Suspected, or Obvious. Completion of the tracking sheet will document the discharge for future investigation and annual reporting as required by Section 2.B.3.f of the MS4 permit. An example Illicit Discharge Tracking Record is provided in Appendix C, and an electronic version is provided on the CD-ROM included with this manual.
- A service order request will be submitted via email to the 733d Civil Engineer Division / Operations (CED/CEO) Service Order Desk to address any maintenance issues identified during the outfall screenings. 733d CED/CEO will determine whether the issue can be addressed with a service order or whether an AF Form 332, *Base Civil Engineer Work Request*, will be required. A blank AF Form 332 is provided in Appendix C.

Note that any identified spills or conditions that represent a serious threat to personnel or equipment safety should be immediately reported to JBLE–Eustis Fire and Emergency Services. Additional reporting to DEQ will be completed as necessary per Section III.G-I of the MS4 permit.

5.0 ILLICIT DISCHARGE INVESTIGATION

Potential illicit discharges can be detected through community reporting or outfall inspections as described in Section 4.0. Once a potential illicit discharge has been detected, it becomes necessary to conduct an investigation to identify and eliminate the source of the discharge. The investigation may result in the source being easily identified or it may require a more in-depth inspection as outlined in this section.

5.1 Responsibility

Illicit discharge investigations are the responsibility of 733d CED/CEIE staff. Investigations may be performed by other base personnel staff or by outside consultants hired by the base; however, all investigation results will be reviewed and maintained by 733d CED/CEIE staff.

5.2 Time Frame for Investigation

After a potential, suspected, or obvious illicit discharge has been detected, follow-up investigations should be prioritized and initiated according to the following guidance:

- **Priority Level 1** – Initiate investigations within three working days for discharges suspected of being sanitary sewage, significantly contaminated (e.g., degreasers, solvents, pesticides, petroleum), or unknown based on the initial observation
- **Priority Level 2** – Initiate investigations within seven working days for discharges suspected of being less hazardous to human health and safety (e.g., non-contact cooling water, wash water, yard waste)

Note that any discharges that represent a serious threat to human health or the environment should immediately be reported to JBLE–Eustis Fire and Emergency Services.

5.3 Investigation Methodology

When the source of a suspected illicit discharge cannot be readily identified, additional action is required.

The source of some illicit connections or discharges can be located by systematically isolating the area from which the polluted discharge originates. This process involves progressive investigation at manholes and catch basins in the storm drain network to narrow down the location where the illegal discharge is entering the drainage system. This method is best used to identify constant or frequent discharge sources such as an illicit connection with the sanitary sewer system.

Field crews should work progressively upstream from the outfall and inspect stormwater structures (e.g., manholes, catch basins, junctions) looking for the presence of flow during dry weather, foul odors, colors or stained deposits, oily sheen, floatable materials, and/or other indicators of an illicit discharge. The observations are continued at each upstream structure until a structure is found with no evidence of discharge. This indicates the discharge source is likely located between the structure with no evidence of discharge and the next downstream structure.

Once the discharge source has been isolated to a specific segment of stormwater drainage system, the field crew should inspect the drainage area near the point of entry to identify the source. The drainage area inspection should include interviewing personnel at nearby facilities or residents within the vicinity of the drainage area to understand activities and materials used that may be generating discharges. Special attention should be paid to facilities that use materials similar to those noted in the discharge or residential locations that show evidence of illegal dumping (e.g., residences with moves scheduled or a history of MFH policy violations). For example, if a discharge is detected with an oil sheen and a gasoline odor, vehicle maintenance facilities would be of more interest than a food service facility. The stormwater drainage system map should also be cross referenced against the sanitary sewer map and/or historical as-built drawings of nearby facilities to identify illicit connections with the sanitary sewer, discharges from industrial processes, or drain inlets located within wash areas. Figure 5-1 illustrates the observation steps used to trace the source of a potential illicit discharge. The source of all confirmed illicit discharges should be photographed and documented as described in Section 5.4 for future correction.

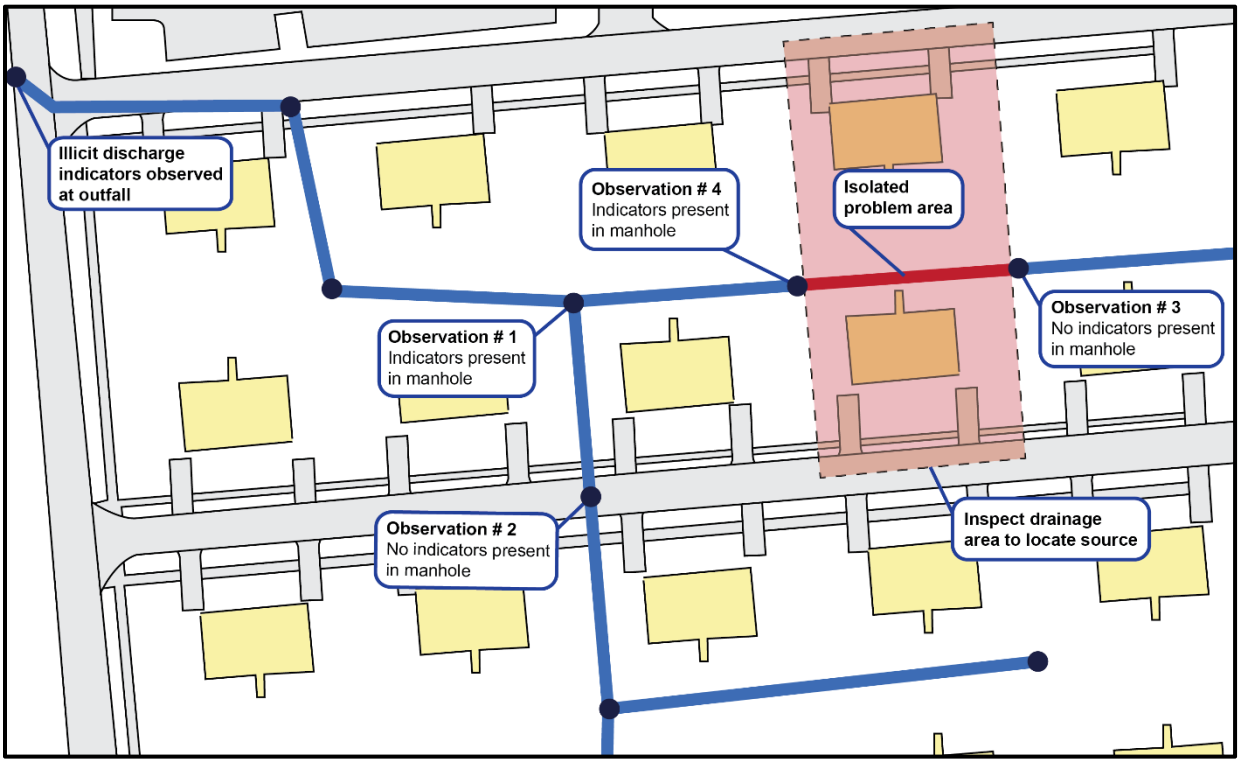

Figure 5-1. Illicit Discharge Isolation Observation Steps, JBLE–Eustis

JBLE–Eustis relies primarily on physical indicators, facility personnel interviews, and historical records to identify the source of potential illicit discharges; however, there are several additional field tests that can be performed as necessary. Additional field tests include:

- Dye testing
- Smoke testing

- Video inspection
- Discharge sample and analysis

Use of the additional field tests will likely require contract of an outside party to complete the investigation. Permitting needs (i.e., dye testing) and sample methods to be used (i.e., 40 CFR 136 compliant methods) must be verified prior to conducting field tests. The Center for Watershed Protection's *Illicit Discharge Detection and Elimination: A Guidance Manual* (CWP 2004) provides instructions for employing these techniques and can be downloaded from the EPA website.

Note that the MS4 permit requires at least three separate attempts be made to identify the source of an intermittent, non-stormwater discharge. If three attempts have been made and the non-stormwater discharge has not been detected again within six months of the first investigation, then the discharge should be documented as "Source not found – discharge has not reoccurred" in the Illicit Discharge Tracking Form and no further action is required. Non-stormwater flows that are found to be the result of discharges allowable under the VPDES or other state permits require no further action and should be documented as "Allowable discharge".

5.4 Documentation

Recording keeping is an important component of the illicit discharge investigation process. 733d CED/CEIE staff will complete the following tasks after initiating an investigation:

- Enter investigation data into Section 2 of the Illicit Discharge Tracking Form for each investigative task completed. If multiple attempts and methods are conducted to investigate a discharge, ensure each attempt is documented with the date. Completion of the tracking form will document the discharge for elimination and annual reporting as required by Section 2.B.3.f of the MS4 permit. An example Illicit Discharge Tracking Form is provided in Appendix C, and an electronic version is provided on the CD-ROM included with this manual. The tracking form will be maintained by 733d CED/CEIE staff and kept electronically on the JBLE–Eustis network drive.
- Download digital investigation photographs to an appropriately titled folder on the JBLE–Eustis shared server. The photographs will be grouped by permit year and renamed based on the corresponding Discharge ID in the Illicit Discharge Tracking Form. If multiple photographs are taken as part of the investigation(s), "-#" will be appended to the end of the Discharge ID (e.g., 100-1, 100-2, 100-3).

6.0 ILLICIT DISCHARGE ELIMINATION

JBLE–Eustis is committed to eliminating illicit discharges to the stormwater drainage system. This section outlines mechanisms for eliminating confirmed illicit discharges, procedures for conducting follow-up investigations to verify the discharges have been eliminated, and enforcement actions that may be enacted to achieve compliance.

6.1 Responsibility

Initiating and verifying the elimination of an illicit discharge is the responsibility of 733d CED/CEIE. 733d CED/CEIE staff will provide educational materials and advocate for funding when needed to eliminate illicit discharges. Depending on the location and type of discharges, specific elimination actions may be conducted by other organizations including Activity/Unit Environmental Coordinators (AEC/UEC), Housing Management staff (Balfour Beatty), the Base Operations Services (BOS) contractor (Global Management Services [GMS]), the base wastewater privatization contractor (Old Dominion Utility Services [ODUS]), or other outside contractors hired by the base. Regardless of the entities involved in eliminating an illicit discharge, 733d CED/CEIE is responsible for following-up on the corrective actions to verify the illicit discharge has been resolved.

6.2 Eliminating Illicit Discharges

Illicit discharges are generally the result of either structural issues or operational deficiencies. The mechanism for eliminating a discharge will depend on the discharge type.

6.2.1 Structural Issues

Examples of structural issues that may result in illicit discharges include:

- Illicit connections with the sanitary sewer
- Oil/water separators (OWS) pretreating industrial wastewater discharging to the stormwater drainage system
- Leaking concrete containment berms and/or valves
- High level bypass pipes at sanitary sewer lift stations

Structural issues will generally require a construction action to eliminate the illicit discharge. Repair projects for structural issues should be initiated through completion of a service order request to the 733d CED/CEO Service Order Desk. 733d CED/CEO will determine whether the issue can be addressed with a service order or whether an AF Form 332, *Base Civil Engineer Work Request*, will be required. A blank AF Form 332 is provided in Appendix C. Funding for the repair will be determined once the work request has been submitted and reviewed by JBLE–Eustis 733d CED/CEO.

6.2.2 Operational Deficiencies

Examples of operational deficiencies that may result in illicit discharges include:

- Washing activities in areas that discharge to a storm drain inlet
- Runoff from improperly stored material
- Illegal dumping
- Dumpster leachate
- Improperly managed secondary containment valves

Operational deficiencies can typically be addressed through BMPs such as education, modification of processes, and/or relocation of the discharge generating activities. 733d CED/CEIE staff will work with facility occupants as needed to promote compliance.

6.3 Follow-up Investigations

After a confirmed illicit discharge has been eliminated, 733d CED/CEIE staff must conduct a follow-up investigation to verify that the discharge has been eliminated. If the discharge was due to a structural issue, the field crew should inspect and photograph the location of the repair to confirm the source has been eliminated. If the discharge was due to an operational deficiency, the field crew should revisit the entry point of the previous illicit discharge and verify that there are no indicators of further discharges. JBLE–Eustis staff should also interview personnel at the facility associated with the previous discharges to ensure they have proper procedures in place to prevent future discharges.

6.4 Enforcement Actions

As discussed in Section 3.2 of this manual, illicit discharges to the stormwater system are prohibited by various JBLE–Eustis policies and instructions. Prohibition is also addressed through contract language with contractors performing work on base. Corrective actions focus first on education to promote voluntary compliance and escalate to increasingly severe enforcement actions if voluntary compliance is not obtained. The JBLE–Eustis community is comprised of military and civilian personnel and residents and enforcement actions associated with illicit discharges will depend on the organization of the responsible party or parties. JBLE–Eustis will generally follow a three step enforcement action policy for confirmed illicit discharges; however, more serious violations or continued, egregious non-compliance may warrant a more aggressive approach. Actions conducted under each enforcement step include the following:

- **Step 1: Initial Actions** – 733d CED/CEIE will provide a “summary letter” describing the location and nature of the illicit discharge, the date it was confirmed, the required elimination action, and a reasonable timeframe for compliance. If the source of the illicit discharge is due to a structural issue, the letter will also include a reference to the Service Order Number or a copy of the AF Form 332 initiated to correct the issue. For military organizations and tenants, the letter will be sent to the AEC or equivalent. For contractor organizations, the letter will be sent to the Contracting Officer’s Representative (COR) overseeing the responsible party. Letters for illicit discharges occurring in housing areas will be sent to the Residential Community Initiatives (RCI). ***Step 1 is not meant to be punitive. It is an opportunity to inform and educate the responsible parties and to encourage voluntary compliance.***

- **Step 2: Intermediate Actions** – If the confirmed illicit discharge has not been eliminated by the required compliance date or if the illicit discharge is detected a second time at the facility under the responsibility of the same organization at a later date, 733 CED/CEIE will send a "notice of violation" letter regarding the unresolved issues with a second compliance date. For military organizations and tenants, the letter will be sent to the AEC or equivalent. For contractor organizations, the letter will be sent to the COR overseeing the responsible party. Letters for illicit discharges occurring in housing areas will be sent to the RCI. ***To the extent possible, Step 2 is meant to bring about an immediate stop to activities generating the illicit discharge until such time that procedures are put in place to prevent future discharges. For contractor activities, Step 2 may result in a stop work order from the COR.***
- **Step 3: Final Actions** – If the confirmed illicit discharge has not been eliminated by the second compliance date or if the illicit discharge reoccurs at the facility a third time under the responsibility of the same organization at a later date, 733 CED/CEIE will send a second "notice of violation" letter regarding the unresolved issues. For military organizations and tenants, the letter will be sent to the Unit Commander or equivalent. For contractor organizations, the letter will be sent to the COR overseeing the responsible party. Letters for illicit discharges occurring in housing areas will be sent to the Army Support Activity (ASA). ***Step 3 may result in disciplinary action for military organizations and tenants; loss of contract and/or removal from base for contractors; and loss of housing lease for residents in base housing.***

6.5 Documentation

Record keeping is an important component of the illicit discharge elimination process. JBLE–Eustis 733d CED/CEIE will complete the following tasks as part of the elimination and verification process:

- Enter information into Section 3 and 4 of the Illicit Discharge Tracking Record for each elimination and follow-up task completed. Completion of the tracking form will document the closure of the investigation for annual reporting as required by Section 2.B.3.f of the MS4 permit. An example Illicit Discharge Tracking Record is provided in Appendix C, and an electronic version is provided on the CD-ROM included with this manual.
- Download digital photographs of the follow-up investigation to an appropriately titled folder on the JBLE–Eustis shared server. The photographs will be grouped by permit year and renamed based on the corresponding Discharge ID in the Illicit Discharge Tracking Record. If multiple photographs are taken for the same record, "-#" will be appended to the end of the Discharge ID (e.g. 100-1, 100-2, 100-3).
- Save digital copies of all enforcement letters provided on the JBLE–Eustis shared server. Document the submittal date of enforcement letters in the "Corrective Action to be Taken" field in Section 2 of the Illicit Discharge Tracking Record. Save correspondence between all parties regarding the resolution of the illicit discharge to the JBLE–Eustis shared server.

6.6 Manual Review

Regular review of the IDDE Procedures Manual is important in order JBLE–Eustis to have an up to date standard to use for assessing the overall effectiveness of the IDDE Program for compliance with General Permit No. VAR040035. The JBLE–Eustis MS4 Program Plan outlines the procedures for the IDDE program evaluation and assessment. Refer to the MS4 Program Plan for guidance for performing the annual evaluation.

7.0 REFERENCES

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APPENDIX A

STORMWATER DRAINAGE SYSTEM MAPS

APPENDIX A

STORMWATER DRAINAGE SYSTEM MAPS

APPENDIX B

STORMWATER ILLICIT DISCHARGE PROHIBITION POLICY STATEMENT AND EMP

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 633D AIR BASE WING
JOINT BASE LANGLEY- EUSTIS VA

OFFICE OF THE COMMANDER
125 Mabry Avenue
Joint Base Langley-Eustis VA 23665-2522

MEMORANDUM FOR ALL JOINT BASE LANGLEY-EUSTIS PERSONNEL

SUBJECT: Stormwater Illicit Discharge Prohibition Policy Statement

1. Joint Base Langley–Eustis (JBLE) is committed to water quality protection and meeting the goals of Executive Order 13508: *Chesapeake Bay Protection and Restoration.* Stormwater runoff from developed land can harm surface water resources by changing natural hydrologic patterns and elevating pollutant levels.

2. Discharges to surface water from JBLE are authorized by the Virginia Department of Environmental Quality (DEQ) under two separate permitting programs. The discharge permits limit the types and quantities of allowable discharges and establish monitoring and record keeping requirements in compliance with provisions of the Clean Water Act.

PERMIT TITLE	PERMIT NUMBER	PERMIT PURPOSE
Virginia Pollutant Discharge Elimination System (VPDES)	Langely Permit No. XXXXX	The VPDES permits allow JBLE to discharge stormwater runoff from industrial areas to the stormwater outfalls specified in the permit.
	Eustis Permit No. VA0025216	
General Permit for Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4)	Langley Permit No. TBD	The MS4 permits allow JBLE to discharge stormwater runoff from urbanized areas in accordance with conditions set forth in the permit.
	Eustis Permit No.VAR040035	

3. The MS4 permit requires JBLE to effectively prohibit illicit discharges into the storm sewer system. An illicit discharge can be any discharge to the storm sewer that is not composed entirely of stormwater, unless otherwise allowed under JBLE's discharge permits. **Illicit discharges to the stormwater system are prohibited at JBLE.**

4. It is the responsibility of all military personnel, civilian employees and support contractors to perform their duties in a manner that prevents surface water pollution and protects this important natural resource. Suspected illicit discharges should be reported to JBLE Fire and Emergency Services (Langley: XXX-XXX-XXXX / Eustis: 757-878-1008). Questions regarding allowable stormwater discharges should be directed to JBLE Environmental staff (Langley: XXX-XXX-XXXX / Eustis: 757-878-4123).

DRAFT

Environmental Management Procedure (EMP) 4.4.6.2.2.3

Subject: Illicit Discharge Detection and Elimination (IDDE) Program

1. Purpose and Policy:

   A. Purpose: This EMP establishes the procedures to implement policy for the IDDE Program.

   B. Policy: The installation will comply with applicable Federal, State, and local storm water regulations through execution of the following:

      (1). General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4), General Permit No. VAR040035
      (2). MS4 Program Plan
      (3). IDDE Procedure Manual

2. Document Control: This is a controlled document. Controlled documents are updated as required, reviewed at least annually, and re-dated if changed. Any documents to include blank forms appearing in paper form are not controlled and should be checked against the file version prior to use on the:

   A. Environmental, Safety, and Occupational Health Training Network's (ESOHTN) website (http://esohtn.com/) or;

   B. eDASH website (https://cs1.eis.af.mil/sites/edash-ins1/jble/Shared%20Documents/Forms/AllItems.aspx?RootFolder=%2Fsites%2Fedash%2Dins1%2Fjble%2FShared%20Documents%2FEustis%2FEMPs).

3. References:

   A. JBLE-I 32-101, Environmental Management

   B. EMP Dictionary

   C. EMP 4.4.6.6, Hazardous Material Management

   D. General Permit No. VAR040035

   E. MS4 Program Plan

   F. 40 CFR 112, Oil Pollution Prevention

   G. JBLE–Eustis Integrated Contingency Plan (ICP) and Spill Prevention Control and Countermeasures (SPCC) Plan

   H. IDDE Procedure Manual

4. Scope: This EMP applies to all Activities and personnel, including military, civilians, vendors, suppliers, and contractor personnel who enter JBLE-Eustis. The definition of an Activity can be found in JBLE I 32-101.

5. Roles and Responsibilities:

   A. The CED Operations Flight (CEO) will:

      (1). Manage the infrastructure in compliance with all federal, state and local regulations.

(2). Inspect and maintain all storm water management facilities.

B.The CED Environmental Element (CEIE) will:

(1). Review base maps for completeness and changes that impact the IDDE program (e.g., addition or repurposing of outfalls to the MS4 area).

(2). Conduct storm water outfall screenings as specified on the schedule included in Table 4-1 of the *IDDE Procedure Manual*.
(a). Each of the 85 MS4 outfalls will be screened at least every two years, with 15 "high priority" outfalls being screened each year.[1]
(b). Dry-weather outfall screenings to detect dry-weather flows during time periods when potential pollutants are not diluted by storm water should be conducted based on guidelines in the *IDDE Procedure Manual.*

(3). Update the outfall inspection schedule as necessary to accommodate additional outfalls that may be created as part of future development or identified as part of system mapping updates.

(4). Complete the Dry-Weather Outfall Screening Form and maintain the Dry-Weather Outfall Screening Record for each inspection year that summarizes the observations from the inspections. See Appendix C of the *IDDE Procedure Manual* for template inspection forms and the record to be used for tracking this information.

(5). Conduct illicit discharge investigations as presented in Section 5.0 of the *IDDE Procedure Manual*.

(6). Initiate and verify the elimination of an illicit discharge. See Section 6.0 of the *IDDE Procedure Manual* for guidance.

(7). Maintain all documentation as specified in the *IDDE Procedure Manual* and the *MS4 Program Plan*. Documentation should be submitted with the base's MS4 Annual Report as specified in the *MS4 Program Plan*.

(8). Refer to the base *MS4 Program Plan* for additional guidance and regulations applicable to maintaining the base IDDE Program.

C. The CED Programs Flight (CEP) will:

(1). Maintain inventories and drawings of the storm water drainage system. Refer to General Permit No. VAR040035, the *MS4 Program Plan*, and the *IDDE Procedure Manual* for requirements for maintaining up to date inventories for the storm water drainage system

(2). Coordinate with CEIE for proposed storm water projects to allow notification of federal and state regulatory agencies if required.

(3). Contact CEIE (878-4123) for guidance when any proposed action or project has the potential (or if there is a question as to the potential) to affect a water resource.

6. IDDE Procedures:

[1] There are two (2) additional comingled outfalls, Outfalls 042 and 046, which are covered under the installation industrial VPDES permit, VPDES Permit No. VA0025216. These outfalls are inspected annually as part of the compliance efforts for that permit.

A. Maintain an accurate storm sewer system map and information table that shows, at a minimum, the following:
   (1). Location of all MS4 outfalls;
   (2). Name and location of all waters receiving discharges from the MS4 outfalls and the associated hydrologic unit code (HUC);
   (3). A table that includes:
      (a). The unique identifier;
      (b). Estimated MS4 acreage served;
      (c). Name of the receiving surface water and indication of whether it is listed as impaired in the *Virginia 2010 303(d)/305(b) Water Quality Assessment Integrated Report*; and,
      (d). The name of any applicable TMDL(s).
B. Within 48 months of permit coverage (by 1 July 2017), complete an updated storm sewer system map and information table and shall submit as an appendix to the MS4 Annual Report.
C. Prohibit non-storm water discharges into the storm water drainage system through locally enforced environmental policies in compliance with JBLE-Eustis storm water permits VAR040035 and VA0025216.
D. Promote, publicize, and otherwise facilitate public reporting of illicit discharges into or from the storm sewer system, including conducting inspections to incidents that have been reported, as well as follow-up inspections to ensure that corrective measures have been implemented effectively; and,
E. Include all procedures developed for implementation of the IDDE program with the MS4 Program Plan.

APPENDIX C

ILLICIT DISCHARGE DETECTION AND ELIMINATION FORMS

This appendix includes the following forms to be used to detect, document, and eliminate illicit discharges:

- Illicit Discharge Tracking Record
- Dry-Weather Outfall Screening Form
- Dry-Weather Outfall Screening Record
- AF Form 332

Electronic versions of these forms are provided on the CD-ROM accompanying this manual

Illicit Discharge Tracking Record, JBLE - Eustis

	Section 1. Detection					Section 2. Investigation				Section 3. Elimination		Section 4. Follow-Up	
Discharge ID No.	Date Reported or Identified	Reported / Identified by:	Location of Discharge	Description of Discharge	Additional Investigation Required?	Date(s) of Investigation	Results of Investigation	Corrective Action to be Taken	Scheduled Date of Corrective Action	Description of Corrective Action Taken	Date Corrected	Date of Verification	Additional Notes
	Enter date discharge was reported or identified	Provide name and contact number of reporting personnel	Provide address, Outfall ID, nearby landmark, etc.	Provide description of the potential illicit discharge (e.g. dumping, wash water, suds, oil, etc.). Include characterization from Section 6 of the outfall inspection form if applicable.	(Yes/No)	Enter date of investigation	Describe investigation results. Was the source found? Was this an illicit discharge? What is the source? What is the frequency of the discharge (continuous, intermittent, or transitory)?	Specify what will be done to eliminate the illicit discharge and by whom	Enter the estimated date for completion of corrective actions	How was the illicit discharge resolved?	Enter date of resolution	Enter date of follow-up investigation to verify illicit discharge has been eliminated	

DRY-WEATHER OUTFALL SCREENING FORM
JBLE-EUSTIS

Section 1: Background Data

Installation:	Outfall ID:
Today's Date:	Time (Military):
Form Completed by:	
Rainfall (in.): Last 24 hours: Last 48 hours:	
Camera ID:	Photo IDs:
Land Use in Drainage Area (Check all that apply): ☐ Industrial ☐ Training ☐ Residential ☐ Commercial	☐ Open Space ☐ Institutional (e.g., school, hospital) Other: _____

Section 2: Outfall Description

STRUCTURE TYPE	MATERIAL	SHAPE		DIMENSIONS (INCHES)	SUBMERGED
☐ **Pipe**	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	**Geometry:** ☐ Circular ☐ Elliptical ☐ Box ☐ Other: _____	**Number of Barrels:** ☐ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: _____	In water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open Drainage**	☐ Concrete ☐ Earthen ☐ Rip-Rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
Flow Present?	☐ Yes ☐ No ***If No, Skip to Section 5***				
Flow Description (if present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Estimated Discharge Rate

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐ Flow Method #1	Volume		quart	Bottle
	Time to fill		sec	Stop watch
☐ Flow Method #2	Measured length		ft	Tape measure
	Time of travel		sec	Stop watch
	Flow depth		in	Tape measure
	Flow width	_____" surface _____" bottom	in	Tape measure
	Velocity		fps	N/A (calculated)
	Area		ft^2	N/A (calculated)
Estimated Discharge Rate[1]			gpm	N/A (calculated)

[1] See IDDE Procedures Manual Section 3 for formulas.

DRY-WEATHER OUTFALL SCREENING FORM
JBLE-EUSTIS

Section 4: Physical Indicators for Flowing Outfalls

INDICATOR	DESCRIPTION	RELATIVE SEVERITY INDEX (0-3)			
Odor	☐ Sewage ☐Rancid/Sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 0 - None	☐ 1 – Faint; origin not obvious	☐ 2 - Easily detected	☐ 3 - Noticeable from a distance
Color	☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other: _____	☐ 0 - Clear	☐ 1 - Faint colors in sample bottle	☐ 2 - Clearly visible in sample bottle	☐ 3 - Clearly visible in outfall flow
Clarity	See severity index	☐ 0 - Clear	☐ 1 - Slight cloudiness	☐ 2 - Cloudy	☐ 3 - Opaque
Floatables[1] (Does not include trash)	☐ Sewage (e.g., toilet paper) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other: _____	☐ 0 - None	☐ 1 - Few/slight; origin not obvious	☐ 2 - Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds or floating sanitary materials)

[1] See IDDE Procedure Manual for guidance on determining the severity of the floatables.

Section 5: Physical Indicators for both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☐ No *(If no, skip to Section 6)* Photographs of physical indicators taken? ☐ Yes ☐ No

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking, or Chipping ☐ Peeling Paint ☐ Corrosion ☐ Other:	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor Pool Quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe Benthic Growth (Organic slime)	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Preliminary Illicit Discharge Rating

☐ **Unlikely:** Non-flowing outfalls with no indicators in Section 5.

☐ **Potential:** Flowing or non-flowing outfalls with one or more indicators in Sections 4 or 5.

☐ **Suspect:** Flowing outfalls with one or more high severity indicators in Section 4.

☐ **Obvious:** Illicit discharge can be confirmed without sampling or upstream investigation

Section 7: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

Dry-Weather Outfall Screening Record, JBLE - Eustis

Section 1. Background Data								Section 2. Outfall Description											
Outfall ID	Date	Time (Military)	Form Completed By	Rainfall (inches)		Land Use in Drainage Area		Structure Type	Material		Shape			Dimensions (inches)			Submerged	Flow Present? *If No, Skip to Section 5*	Flow Description
				Last 24 hours	Last 48 hours	Select all that apply	Describe Other		Type	Describe Other	Geometry	Number of Barrels	Describe Other	Depth or Diameter	Top Width (if applicable)	Bottom Width (if applicable)			
						☐ Industrial ☐ Commercial ☐ Training ☐ Open Space ☐ Residential ☐ Institutional													
						☐ Industrial ☐ Commercial ☐ Training ☐ Open Space ☐ Residential ☐ Institutional													
						☐ Industrial ☐ Commercial ☐ Training ☐ Open Space ☐ Residential ☐ Institutional													
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Dry-Weather Outfall Screening Record, JBLE - Eustis

Section 3. Estimated Discharge Rate											Section 4: Physical Indicators for Flowing Outfalls Data									
Flow Method #1			Flow Method #2								Odor			Color			Clarity	Floatables		
Volume (quart)	Time to Fill (sec)	Est. Discharge Rate (gpm)	Measured Length (ft)	Time of Travel (sec)	Flow Depth (in)	Flow Width Surface (in)	Flow Width Bottom (in)	Velocity (fps)	Area (ft^2)	Est. Discharge Rate (gpm)	Description	Describe Other	Relative Severity Index	Description	Describe Other	Relative Severity Index	Relative Severity Index	Description	Describe Other	Relative Severity Index
		Check Values Entered						Check Values Entered	0.00	Check Values Entered										
		Check Values Entered						Check Values Entered	0.00	Check Values Entered										
		Check Values Entered						Check Values Entered	0.00	Check Values Entered										
		Check Values Entered						Check Values Entered	0.00	Check Values Entered										
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		Check Values Entered						Check Values Entered	0.00	Check Values Entered										

Dry-Weather Outfall Screening Record, JBLE - Eustis

Section 5: Physical Indicators for both Flowing and Non-Flowing Outfalls											Section 6: Overall Preliminary Illicit Discharge Rating	Section 7: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?
Physical indicators not related to flow present? *If No, Skip to Section 6*	Outfall Damage		Deposits/Stains		Abnormal Vegetation		Poor Pool Quality		Pipe Benthic Growth			
	Description	Comments	Description	Comments	Description	Comments	Description	Comments	Description	Comments		

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BASE CIVIL ENGINEER WORK REQUEST

(See Reverse for Instructions)

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average .3 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project 0704-0188, Washington DC 20503. Please DO NOT RETURN your form to either of these addresses. Send your completed form to HQ AFESC/DEMG.

SECTION I - TO BE COMPLETED BY REQUESTER

1. FROM (Organization)	2. OFFICE SYMBOL	3. DATE OF REQUEST	4. WORK REQUEST NO. (For BCE Use)

5. NAME AND PHONE NO. OF REQUESTER	6. REQUIRED COMPLETION DATE	7. BUILDING, FACILITY OR STREET ADDRESS WHERE WORK IS TO BE ACCOMPLISHED

8. DESCRIPTION OF WORK TO BE ACCOMPLISHED (Include Sketch or Plan, when appropriate)

9. BRIEF JUSTIFICATION FOR WORK TO BE ACCOMPLISHED (Not required for maintenance and repair)

10. DONATED RESOURCES

	FUNDS		LABOR		MATERIAL		CONTRACT BY REQUESTER		NONE

11. NAME OF REQUESTER	12. GRADE OF REQUESTER	13. SIGNATURE OF REQUESTER (See Reverse of Form)

14. COORDINATION

SECTION II - FOR BASE CIVIL ENGINEER USE

15. WORK ORDER (Place an "X" in the appropriate box.)

	IN-SERVICE		SELF-HELP		CONTRACT		SABER

16. DIRECT SCHEDULED WORK (Place an "X" in the appropriate box.)

	EMERGENCY		URGENT		ROUTINE		SELF-HELP		M/C

17. SELF-HELP (Place an "X" in the appropriate box.)

	BRIEFING REQUIRED		ADEQUATE COORDINATION		INSPECTION REQUIRED

SECTION III - COMPLETE ONLY IF WORK IS TO BE ACCOMPLISHED BY WORK ORDER

18. WORK CLASS	19. PRIORITY	20. ESTIMATED HOURS	21. ESTIMATED FUNDED COST	22. ESTIMATED TOTAL COST

	23. THERE IS NO NEED FOR AN ENVIRONMENTAL ASSESSMENT (AFR 19-2)		24. A WRITTEN ASSESSMENT IS BEING/HAS BEEN PROCESSED		25. APPROVED		26. DISAPPROVED

27. REMARKS

SECTION IV - APPROVING AUTHORITY

28. NAME AND GRADE (Please Type or Print)	29. SIGNATURE	30. DATE

APPENDIX E
Standards and Specifications for Erosion and Sediment Control

Provided electronically on CD

FINAL

STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL

FOR

JOINT BASE LANGLEY EUSTIS – EUSTIS

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May 2016

Contract No. FA8903-08-D-8770
Task Order No. 0311

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Statement of Limitations

This plan was prepared in accordance with the customary thoroughness and competence of environmental science and engineering consulting professionals and in accordance with the standard for professional services for a national consulting firm at the time these services were provided. The analysis, conclusions, and recommendations expressed in this report were developed based upon a limited scope of services and the information made available at the time this work was conducted.

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Appendix E General Erosion and Sediment Control Notes

LIST OF ABBREVIATIONS AND ACRONYMS

CED-EE	Civil Engineer Division, Environmental Element
cfs	Cubic Feet Per Second
cu.yds.	Cubic Yards
EPA	Environmental Protection Agency
ESC	Erosion and Sediment Control
ft.	Feet
H:V	Slope; Horizontal:Vertical
JBLE–Eustis	Joint Base Langley-Eustis – Eustis
lbs.	Pounds
MCM	Minimum Control Measures
MS4	Municipal Separate Storm Sewer System
VAC	Virginia Administrative Code
VCIA	Virginia Crop Improvement Association
VDOT	Virginia Department of Transportation
VDEQ	Virginia Department of Environmental Quality
VESCL&R	Virginia Erosion and Sediment Control Law and Regulations
VESCP	Virginia Erosion and Sediment Control Program

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1.0 INTRODUCTION

1.1 Purpose and Objective

This *Standards and Specifications for Erosion and Sediment Control* provides guidance on compliance with erosion and sediment control requirements found in the Joint Base Langley-Eustis (JBLE) – Eustis Municipal Separate Storm Sewer (MS4) Permit, Permit No. VAR040035, the Virginia Erosion and Sediment Control Law (§62.1-44 et. seq.), the Virginia Erosion Control Regulations (9VAC25-840 et. seq.), and the Virginia Erosion and Sediment Control Certification Regulations (9VAC25-850 et. seq.). The objective of this document is to provide guidance to assist design professionals, project managers, and contractors with land disturbing and stormwater management activities at JBLE – Eustis that result in the disturbance of less than 10,000 square feet but more than 2,500 square feet in order to satisfy requirements for *Minimum Control Measure (MCM) #4: Construction Site Storm Water Runoff Control* prescribed by the JBLE – Eustis MS4 permit.

1.2 Administrative Compliance

The *Standards and Specifications for Erosion and Sediment Control* shall be administered by the JBLE – Eustis Civil Engineer Division, Environmental Element (CED-EE) and shall apply to all design, construction and maintenance activities undertaken by the JBLE – Eustis internal workforce or by contracted external entities where such activities are regulated by the Virginia Erosion and Sediment Control Law and Regulations (VESCL&R). Compliance with the *Standards and Specifications for Erosion and Sediment Control* and the VESCL&R will be expected during any inspections by the Virginia Department of Environmental Quality (VDEQ), the U.S. Environmental Protection Agency (EPA) or other such regulatory agencies.

1.3 Limitations

The *Standards and Specifications for Erosion and Sediment Control* do not cover every aspect of design necessary for project construction. The design professional, project manager, or contractor is responsible for the design of a properly functioning project that meets requirements within the VESCL&R. It is the responsibility of the designer to insure that the techniques utilized are appropriate for the conditions of an individual site. Where it is determined that conformance with this document is not appropriate, alternative design, materials, and methodologies may be considered on a case-by-case basis for approval by the CED-EE.

1.4 Organization

This document is organized into the following sections and appendices:

- Section 1.0 presents the purpose and objective of the *Standards and Specifications for Erosion and Sediment Control* as well as administrative compliance information, limitations, and organizational structure of the document.

- Section 2.0 describes general administrative guidelines for land disturbing activities greater than 10,000 square feet and less than 10,000 square feet but greater than 2,500 square feet.

- Section 3.0 discusses the implementation of the *Standards and Specifications for Erosion and Sediment Control*.

- Section 4.0 presents the requirements for site specific ESC plans.

- Section 5.0 describes the general guidelines for structural and vegetative ESC measures used on small projects (less than 10,000 square feet).

- Section 6.0 contains a list of references used during preparation of this document.

- Appendix A contains a flow chart to determine ESC requirements for land disturbing activities at JBLE – Eustis.

- Appendix B contains the minimum standards identified in 9VAC25-840-40 of the Virginia Erosion and Sediment Control Regulations.

- Appendix C contains the ESC plan review checklist.

- Appendix D contains the ESC inspection report.

- Appendix E contains the general ESC notes to be included on all site specific ESC plans.

2.0 ADMINISTRATIVE GUIDELINES

JBLE – Eustis follows the policies and procedures described in the Virginia Erosion and Sediment Control Regulations and the *Virginia Erosion and Sediment Control Handbook* as amended. The applicant shall use the standards contained within these documents when making a submittal and in preparation of an erosion and sediment control (ESC) plan. The plan-approving authority shall be guided by the same standards, regulations, and guidelines in considering the adequacy of a submitted plan.

General administrative guidelines for land disturbing activities at JBLE – Eustis are described below in Section 2.1. For additional guidance refer to *Appendix A: Flow-Chart to Determine Erosion and Sediment Control Requirements for Land Disturbing Activities at Joint Base Langley-Eustis – Eustis*.

2.1 General Guidelines for Land Disturbing Activities Greater than 10,000 Square Feet

The VDEQ administers the state Erosion and Sediment Control program in accordance with the VESCL&R. The ESC program regulates only construction activities that constitute "land-disturbing activities," as defined in §62.1-44 that result in the disturbance of 10,000 square feet or greater.

Prior to commencement of the land disturbing activity, projects at JBLE – Eustis that meet this criteria must have a site specific ESC plan approved by a Virginia Erosion and Sediment Control Program (VESCP) authority in accordance with the Virginia ESC Law (§62.1-44 et. seq.). The plan shall be compliant with the minimum standards identified in 9VAC25-840 et. seq. of the Virginia Erosion and Sediment Control Regulations (*Appendix B: 9VAC25-840-40. Minimum Standards*) and shall be governed by the criteria standards, and specifications established in Chapter 6, *Preparing an Erosion and Sediment Control Plan*, of the *Virginia Erosion and Sediment Control Handbook* as amended.

2.2 General Guidelines for Land Disturbing Activities 2,500-10,000 Square Feet

CED-EE shall be the plan approving authority for construction activities at JBLE – Eustis that constitute "land-disturbing activities" as defined in §62.1-44, that result in the disturbance of less than 10,000 square feet but more than 2,500 square feet.

A site specific ESC plan must be developed by the design professional, project manager, or contractor and approved by the CED-EE prior to commencement of the land disturbing activity. ESC plans shall comply with the *Standards and Specifications for Erosion and Sediment Control* for JBLE – Eustis and the Virginia Erosion and Sediment Control Law (§62.1-44 et. seq.). The plan shall be compliant with the minimum standards identified in 9VAC25-840 et. seq. of the Virginia Erosion and Sediment Control Regulations (*Appendix B: 9VAC25-840-40. Minimum Standards*) and shall be governed by the criteria standards, and specifications established in *Chapter 6, Preparing an Erosion and Sediment Control Plan*, of the *Virginia Erosion and Sediment Control Handbook* as amended.

The following sections provide specific guidance for construction activities that require CED-EE approval.

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3.0 STANDARDS AND SPECIFICATIONS IMPLEMENTATION

3.1 Submittals

Submittals to CED-EE shall include two complete sets of the site specific ESC plans, a narrative describing the nature and purpose of the land disturbing activity, stormwater calculations (if applicable), the completed ESC plan review checklist (See *Appendix C: Checklist for Erosion and Sediment Control Plans*), and any other supporting documentation.

3.2 Plan Reviews

Plan reviews shall be conducted by qualified CED-EE personnel who hold a certificate of competence from the Virginia Soil and Water Conservation Board in the area of plan review as defined in 9VAC25-850 et. seq.

3.3 Pre-Construction Conference

A pre-construction conference shall be held prior to commencement of a land disturbance in order to clarify roles, responsibilities, and obligations of all parties involved with the land disturbing activity. At a minimum, the pre-construction conference shall be attended by the project manager, construction contractor, and a CED-EE representative.

3.4 Inspections

Site inspections shall be conducted by qualified CED-EE personnel who hold a certificate of competence from the Virginia Soil and Water Conservation Board in the area of project inspection as defined in 9VAC25-850 et. seq.

Land disturbing activities shall be inspected immediately following the initial installation of ESC measures prior to the land disturbace, at least once during every two-week period, within 48 hours of any runoff-producing storm event, and upon completion of the project.

The ESC Inspection Report provided in Appendix D shall be used to record each inspection visit. All ESC measures shown on the plan shall be inspected, and any problems or violations shall be documented in the report. Required or recommended corrective actions for each problem or violation shall be noted on the report along with a date by which all corrective actions must be completed. A signed and dated copy of the report shall be provided to all parties involved with the land disturbing activity within 24 hours of the inspection. The inspection report will not be considered complete unless it includes all names, signatures and dates.

3.5 Enforcement

The project manager or construction contractor shall be responsible for ensuring that corrective action is taken in response to problems and violations listed on the inspection report. If the listed violation(s) constitute non-compliance and/or required corrective actions are not completed by the deadline noted on the report, a Notice to Comply, Stop Work Order, and/or other enforcement actions may be issued.

3.6 Changes and Amendments to Approved Plans

Amendments to approved ESC plans must be reviewed and approved by the CED-EE and shall not be considered approved until written notice is provided.

3.7 Variances and Exceptions

A variance or exception may be granted if any requirements are deemed inappropriate or too restrictive for site conditions. An applicant may request a variance or exception at the time of plan submission or during construction.

The applicant shall submit a written request to CED-EE for a variance or exception with an explanation and description of the specific condition necessitating the request. The request must also include a detailed description of the alternative practice and justification that the practice meets the intent of the regulation for which the variance is sought.

CED-EE shall respond in writing either approving or disapproving the variance or exception request. All requests shall be considered unapproved until written approval from the CED-EE has been received. Furthermore, all approved variances or exceptions shall be documented in the ESC plan.

4.0 EROSION AND SEDIMENT CONTROL PLAN REQUIREMENTS

A description of items to be included in the ESC plan is listed in the sub-sections below. Detailed requirements of specific items to be included in the ESC plan are located in *Appendix: C Checklist for Erosion and Sediment Control Plans* and *Appendix: E General Erosion and Sediment Control Notes*.

4.1 Minimum Standards

Plans shall address all applicable minimum standards identified in 9VAC25-840 et. seq. of the Virginia ESC Regulations.

4.2 Narrative

The narrative shall include a description of the nature and purpose of the land-disturbing activity and a description of the existing site conditions, including environmentally sensitive areas, soils information, and adjacent areas such as streams, lakes, residential areas, and roads. The narrative shall also include a description of the temporary and permanent ESC measures to be used on the site as well as supporting stormwater calculations (if applicable).

4.3 Site Plan

The site plan shall include the following items:

- North Arrow and Scale – Plans shall indicate the direction of north in relation to the site as well as the scale of the drawing.
- Existing and Proposed Site Features – Plans shall include existing and proposed contours, existing and proposed site features or structures, existing vegetation, environmentally sensitive areas, adjacent streams, lakes, residential areas, and roads.
- Limits of Disturbance – Plans shall identify the limits of disturbed area and provide the total amount of disturbed area for the project as well as the amount of disturbed area for each phase.
- Construction Sequence – The construction sequence related to ESC shall be provided on the plans. The construction sequence shall include the installation of critical measures prior to the initiation of the land-disturbing activity and removal of measures after the areas they serve are permanently stabilized.
- Off-Site Areas – Stockpile/lay-down areas or any off-site land disturbing activities (e.g., borrow sites, waste areas) shall be identified on the plans with appropriate ESC measures.

- Location of ESC Measures – The location of temporary and permanent ESC measures for each phase shall be clearly identified on the plans.

- Vegetative Stabilization – The temporary and permanent seeding schedule shall be provided on the plans including the areas to be stabilized with vegetation, seed type and rates, method of soil preparation, fertilizer and lime type withrates, and mulch type withrates.

- General ESC Notes – Plans shall include the general ESC notes provided in *Appendix E: General Erosion and Sediment Control Notes*.

- Maintenance Requirements – Plans shall include the maintenance requirements of temporary and permanent ESC measures as well as the contact person responsible for maintenance. Air Force Engineering Technical Letter (ETL) 14-1, *Construction and Operation and Maintenance Guidance for Storm Water Systems*, provides guidance on maintenance of ESC measures.

- Detail Drawings – Construction drawings and details for temporary and permanent ESC measures shall be included in the plans.

5.0 EROSION AND SEDIMENT CONTROL MEASURES

The following section provides general guidelines for structural and vegetative ESC measures used on small projects (less than 10,000 square feet) under typical site conditions. Exceptions to these guidelines may be made for sites with unusual site conditions based on professional judgement. Additional guidelines on the design and use of ESC measures can be found in *Chapter 3, State Minimum Standards and Specifications*, of the *Virginia Erosion and Sediment Control Handbook* as amended.

The ESC measures described below are not intended to stand alone. Rather, they should be employed as a system to effectively control erosion and sedimentation throughout all phases of the land disturbing activities. Changing site conditions and requirements should be considered when selecting the appropriate ESC measures as well as when determining the sequence of which measures are to be implemented.

5.1 Temporary Construction Entrance

A temporary construction entrance is a stabilized stone pad located at points where vehicles enter and leave construction sites. Its purpose is to provide a buffer area where vehicles can remove tire mud and sediment to reduce the amount of sediment transported onto public roads by motor vehicles or runoff.

Aggregate size Virginia Department of Transportation (VDOT) #1 Coarse Aggregate (2- to 3-inch stone) should be used. The aggregate layer must be at least 6 inches thick and extend the full width of the vehicular ingress and egress area and have a minimum 12-foot width. The length of the entrance must be at least 70 feet.

Additional guidelines can be found in Standard and Specification 3.02 of the *Virginia Erosion and Sediment Control Handbook* as amended.

5.2 Silt Fence

Silt fence is a temporary sediment barrier consisting of a synthetic geotextileburied at the bottom, stretched, and attached to supporting posts. Its purpose is to intercept and retain sediment from small disturbed areas by reducing velocity of sheet flows to allow sediment deposition.

Locate silt fence where the drainage area is no more than one-quarter acre per 100 feet of silt fence length. The maximum slope length behind the barrier should be 100 feet and the maximum gradient behind the barrier should be 50 percent or 2:1 (Horizontal:Vertical). Silt fence should be located at least 5 to 7 feet beyond the base of disturbed slopes with grades greater than 7 percent.

Provide a non-erosive outlet for any point where flow may overtop the silt fence, such as natural depressions or swales.

Additional guidelines can be found in Standard and Specification 3.05 of the *Virginia Erosion and Sediment Control Handbook* as amended.

5.3 Storm Drain Inlet Protection

Storm drain inlet protection is a sediment filter or an excavated area in the approach to a storm drain drop inlet or curb inlet to prevent sediment from entering permanent storm drainage systems.

There are several types of storm drain inlet protection devices that may be used to prevent sediment from entering storm drainage systems. Design criteria specific to each particular inlet protection device can be found on Plates 3.07-1 through 3.07-8 of the *Virginia Erosion and Sediment Control Handbook* as amended. The inlet protection devices include, but are not limited to:

- Silt Fence Drop Inlet Protection
- Gravel and Wire Mesh Drop Inlet Sediment Filter
- Block and Gravel Drop Inlet Sediment Filter
- Excavated Drop Inlet Sediment Trap
- Sod Drop Inlet Sediment Filter
- Gravel Curb Inlet Sediment Filter
- Block and Gravel Curb Inlet Sediment Filter

For the inlet protection devices which utilize stone as the main ponding/filtering medium, VDOT #3, #357, or #5 Coarse Aggregate should be used.

For the inlet protection devices which utilize a wire mesh support as the filtering mechanism, the stone should be completely wrapped with the wire mesh to improve stability and provide easier cleaning.

Additional guidelines can be found in Standard and Specification 3.07 of the *Virginia Erosion and Sediment Control Handbook* as amended.

5.4 Temporary Diversions

A temporary diversion is an excavated channel with a supporting ridge constructed across and down grade of sloping land. Its purpose is to reduce slope length and to intercept and divert sediment-laden water to traps or stabilized outlets.

The cross section of the diversion channel may be parabolic, trapezoidal, or vee-shaped and shall have a minimum capacity to carry the runoff expected from a 10-year frequency storm with a freeboard of at least 0.3 feet. The channel side slopes should be 2:1 (H:V) or flatter. The ridge shall have side slopes no steeper than 2:1 (H:V) and the width at the design water elevation shall be a minimum of 4 feet.

The ridge and channel shall be seeded and mulched or seeded and stabilized through the use of soil stabilization blankets and matting immediately following their construction.

A uniform or gradually increasing grade is preferred, and the outlet should be designed to accept flow from the diversion and any other contributing areas.

Additional guidelines can be found in Standard and Specification 3.12 of the *Virginia Erosion and Sediment Control Handbook* as amended.

5.5 Outlet protection

Outlet protection is a structurally lined apron or energy dissipating device placed at the outlet of a channel or conduit to prevent erosion and scour by reducing flow velocity and dissipating energy.

The design capacity of the outlet protection device should be the 10-year, peak runoff or the design discharge of the water conveyance structure, whichever is greater.

The apron length and width should be determined according to the ratio of the tail-water condition immediately below the outlet pipe to the diameter of the pipe using Plate 3.18-3 (tail-water depth is less than half the pipe diameter) and Plate 3.18-4 (tail-water depth is greater than half the pipe diameter) of the *Virginia Erosion and Sediment Control Handbook* as amended. When the conveyance structure discharges into a well-defined channel, the apron shall extend across the channel bottom and up the channel banks to an elevation of 0.5 foot above the maximum tail-water depth or to the top of the bank, whichever is less.

The median sized stone for riprap shall be determined from the curves in Plates 3.1-3 and 3.18-4 of the *Virginia Erosion and Sediment Control Handbook*. A filter cloth shall be placed between the riprap and the underlying soil to prevent soil movement through the openings in the riprap.

Additional guidelines can be found in Standard and Specification 3.18 of the *Virginia Erosion and Sediment Control Handbook* as amended.

5.6 Rock Check Dams

A rock check dam is a stone dam constructed across a swale or drainage ditch to reduce channel grade. Its purpose is to reduce the velocity of stormwater flows and prevent erosion of a channel that results from excessive grade.

The maximum dam height shall be 3.0 feet and the stone should extend to the top of the channel banks. The center of the dam must be at least 6 inches lower than the outer edges.

The maximum spacing between dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.

For drainage areas less than 2 acres, use VDOT #1 Coarse Aggregate stone. A geotextile may be used under the stone to provide a stable foundation.

Additional guidelines can be found in Standard and Specification 3.20 of the *Virginia Erosion and Sediment Control Handbook* as amended.

5.7 Wattles

Wattles are tubular products consisting of excelsior fibers encased in natural or synthetic netting. Wattles can be used to reduce the velocity of stormwater flows on slopes and channels and prevent erosion that results from excessive grade.

Wattles shall consist of 100 percent curled wood (excelsior) fibers with a minimum density of 2.5 lb./ft.^{3} ± 10 percent and minimum weight of 20 lbs. ± 10 percent per 10 ft. length. The net openings should be 1 in. x 1 in. and should totally encase the excelsior fibers.

Wattles should be secured to the soil by wire staples every 2 linear feet and wood stakes installed on the downstream (minimum of 4) and upstream side (minimum of 2).

Additional guidelines for wattle specifications and installation can be found at the following web pages: http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/soil_water/pdf/Wattle.pdf, http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/soil_water/pdf/Wattledetail.pdf

5.8 Level Spreader

A level spreader is a non-erosive outlet for concentrated flows from diversion channels to disperse flow uniformly across a slope. Its purpose is to convert concentrated flow to sheet flow and release it evenly onto stabilized areas.

Design capacity of the level spreader should be based on the peak flow expected from a 10-year storm. For design flows less than 10 cfs, the spreader should have a minimum depth of 0.5 ft., a width of 6 ft., and a length of 10 ft. For design flows greater than 10 cfs, the spreader should have a minimum depth of 0.6 ft., a width of 6 ft., and a length of 20 ft.

The grade of the level spreader shall be 0 percent and the stormwater should be released over the level lip onto an undisturbed well-vegetated area with maximum slope of 10 percent. The grade of the diversion channel for the last 20 feet should be less than or equal to 1 percent.

Additional guidelines can be found in Standard and Specification 3.21 of the *Virginia Erosion and Sediment Control Handbook* as amended.

5.9 Temporary Seeding

Temporary seeding is the establishment of vegetative cover by planting rapid growing annual grasses, small grains, or legumes to temporarily stabilize disturbed areas that will not be brought to final grade for a period of more than 14 days. Temporary seeding controls runoff and erosion, and provides protection to bare soils until permanent vegetation or other erosion and sediment control measures can be established.

Plant selection should be appropriate to the season as listed below:

- September 1 – February 15
  - Plant 50/50 mix of Annual Ryegrass and Winter Rye at a rate of 50-100 lbs./acre.
- February 16 – April 30
  - Plant Annual Ryegrass at a rate of 60-100 lbs./acre.
- May 1 – August 31
  - Plant German Millet at a rate of 50 lbs./acre.

Seedbed preparation is essential for plant germination and establishment. The seedbed should be well-pulverized, loose, and uniform before planting.

In most cases, liming a temporary site is not necessary. If it is determined that lime should be applied for temporary seeding, agricultural limestone should be applied according to soil test recommendation. If the pH of the soil is not known, agricultural limestone should be applied at a rate of 1-1.5 tons/acre on course textured soils and at a rate of 2-3 tons/acre on fine-textured soils.

Fertilizer should be applied according to soil test recommendations. When this information is not available apply fertilizer at 600 lbs./acre of 10-20-10 or equivalent nutrients. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil.

Additional guidelines can be found in Standard and Specification 3.31 of the *Virginia Erosion and Sediment Control Handbook* as amended.

5.10 Permanent Seeding

Permanent seeding is the establishment of permanent vegetative cover by planting perennial seed to reduce erosion and decrease sediment yield from disturbed areas and to permanently stabilize disturbed areas.

Plant selection should be based on climate, topography, soils, land use, and planting season. Site specific seeding mixtures and application rates for the coastal plain area are listed below:

- Minimum Care Lawn, select one
  - Kentucky 31 or Turf-Type Tall Fescue: 175-200 lbs./acre,
  - Common Bermudagrass: 75 lbs./acre
    - May through October, use hulled seed. All other seeding periods, used un-hulled seed.
- High-Maintenance Lawn, select one
  - Kentucky 31 or Turf-Type Tall Fescue: 200-250 lbs./acre,

- Hybrid Bermudagrass (seed): 40 lbs./acre (un-hulled) or 30 lbs./acre (hulled).
  - May through October, use hulled seed. All other seeding periods, used un-hulled seed.

- General Slope
  - Kentucky 31 Tall Fescue: 93-108 lbs./acre
  - Red Top Grass: 2 lbs./acre
  - Seasonal Nurse Crop*: 20 lbs./acre
- Low Maintenance Slope (Steeper than 3:1 (H:V))
  - Kentucky 31 Tall Fescue: 93-108 lbs./acre
  - Common Bermudagrass: 0-15 lbs./acre
  - Red Top Grass: 2 lbs./acre
  - Seasonal Nurse Crop*: 20 lbs./acre
  - Sericea Lespedeza: 20 lbs./acre

*Seasonal nurse crops should be used in accordance with the seeding dates below:

- February through April
  - Annual Rye
- May through August
  - Foxtail Millet
- September through November 15th
  - Annual Rye
- November 16th through January
  - Winter Rye

Seedbed preparation is essential for plant germination and establishment. The seedbed should be well-pulverized, loose, and uniform before planting.

Lime and fertilizer needs should be determined by soil tests. When this information is not available apply fertilizer as 10-20-10 (or equivalent nutrients) at a rate of 1000 lbs./acre and agricultural limestone at a rate of 2 tons/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil.

All permanent seeding must be mulched or have a soil stabilization blanket installed immediately upon completion of seed application.

Additional guidelines can be found in Standard and Specification 3.32 of the *Virginia Erosion and Sediment Control Handbook* as amended.

5.11 Sodding

Sodding is permanently stabilizing disturbed areas with established grass stands to prevent erosion and damage from sediment and runoff.

Sod shall be inspected and certified by the Virginia Crop Improvement Association or the certifying agency in other states. Sod selection should be based on the adaptability of the plants to the region. Guidance for selection of sod best suited for the area and use can be found in Table 3.33-A of the *Virginia Erosion and Sediment Control Handbook*.

Prior to sod installation, soil tests should be made to determine the exact requirements for lime and fertilizer. When this information is not available apply fertilizer at 10-10-10 (or equivalent nutrients) in the fall or 5-10-10 (or equivalent nutrients) in the spring at a rate of 1000 lbs./acre and agricultural limestone at a rate of 2 tons/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil.

Additional guidelines can be found in Standard and Specification 3.33 of the *Virginia Erosion and Sediment Control Handbook* as amended.

5.12 Mulching

Mulching is the application of plant residues or other suitable material to the soil surface as a protective blanket to protect the soil surface from the raindrop impact and overland flow and to foster growth of vegetation by increasing water holding capacity, providing insulation, and weed control.

Organic mulches should be applied according to the following rates and restrictions:

- Straw or hay
  - 1.5-2 tons/acre
  - Free from weeds, dry, un-chopped, and un-weathered
  - Spread by hand or with mulch blower
- Fiber mulch
  - 1,500 lbs./acre
  - Do not use in hot, dry weather
  - Apply as slurry
- Corn stalks
  - 4-6 tons./acre
  - Cut or shredded in 4-6” lengths, air-dried
  - Apply by hand or with mulch blower
- Wood chips

    - 4-6 tons/acre
    - Free of coarse matter, air-dried, treat with 12 lbs. nitrogen per ton
    - Apply by hand or with mulch blower
  - Bark chips or shredded bark
    - 50-70 cu.yds./acre
    - Free of coarse matter, air dried
    - Apply by hand or with mulch blower

Straw, hay, and corn stalk mulch must be anchored immediately after spreading to prevent displacement. The following mulch anchoring methods may be used:

  - Straw mulch crimping
    - Limit to slopes 3:1 (H:V) or flatter
  - Fiber Mulch
    - Apply at a rate of 500-750 lbs./acre over top of straw much or hay
  - Synthetic mulch binders
    - Use as recommended by the manufacturer to anchor mulch

Additional guidelines can be found in Standard and Specification 3.35 of the *Virginia Erosion and Sediment Control Handbook* as amended.

5.13 Soil Stabilization Blankets and Matting

Soil stabilization blankets and matting are protective coverings or soil stabilization mats designed to reduce soil erosion and assist in the growth, establishment, and protection of vegetation. Soil stabilization blankets and mats are designed to protect soil and hold seed and mulch in place on slopes and in channels to promote vegetation establishment.

The *Virginia Erosion and Sediment Control Handbook* describes two general types of blankets and mats. However, a variety of soil stabilization products are available on the market today. The design professional should have a thorough understanding of the manufacturer's instructions and recommendations to determine the appropriateness of a product to meet specific site requirements.

Treatment-1 (also referred to as EC-2 in the VDOT Drainage Manual) is a degradable soil stabilization blanket which consists of a plastic netting intertwined with a natural organic man-made mulch. The Treatment-1 matting can also be a jute mesh which is homogeneous in design and can act alone as a soil stabilization blanket. Treatment-1 matting should be used to help establish vegetation and on problem slopes of 3:1 (H:V) or flatter and should not be used where concentrated flow velocities may exceed 4 ft./s.

Treatment-2 (also referred to as EC-3 in the VDOT Drainage Manual) is a non-degradable soil stabilization matting with a three-dimensional plastic structure which can be filled with soil prior to planting. Treatment-2 matting can be used on problem slopes of 3:1 (H:V) or steeper, in permanent conveyance channels, and can withstand concentrated flow velocities up to 10 ft./s.

Prior to selection of a blanket or matting, consult the VDOT "Approved Products List" for products approved for a certain range of flow velocities. The "Approved Products List" can be found at the following web page: http://www.vdot.virginia.gov/business/resources/Materials/Approved_Lists.pdf

Additional guidelines can be found in Standard and Specification 3.36 of the *Virginia Erosion and Sediment Control Handbook* as amended.

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6.0 REFERENCES

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APPENDIX A:

Flow-Chart to Determine Erosion and Sediment Control Requirements for Land-Disturbing Activities at JBLE – Eustis

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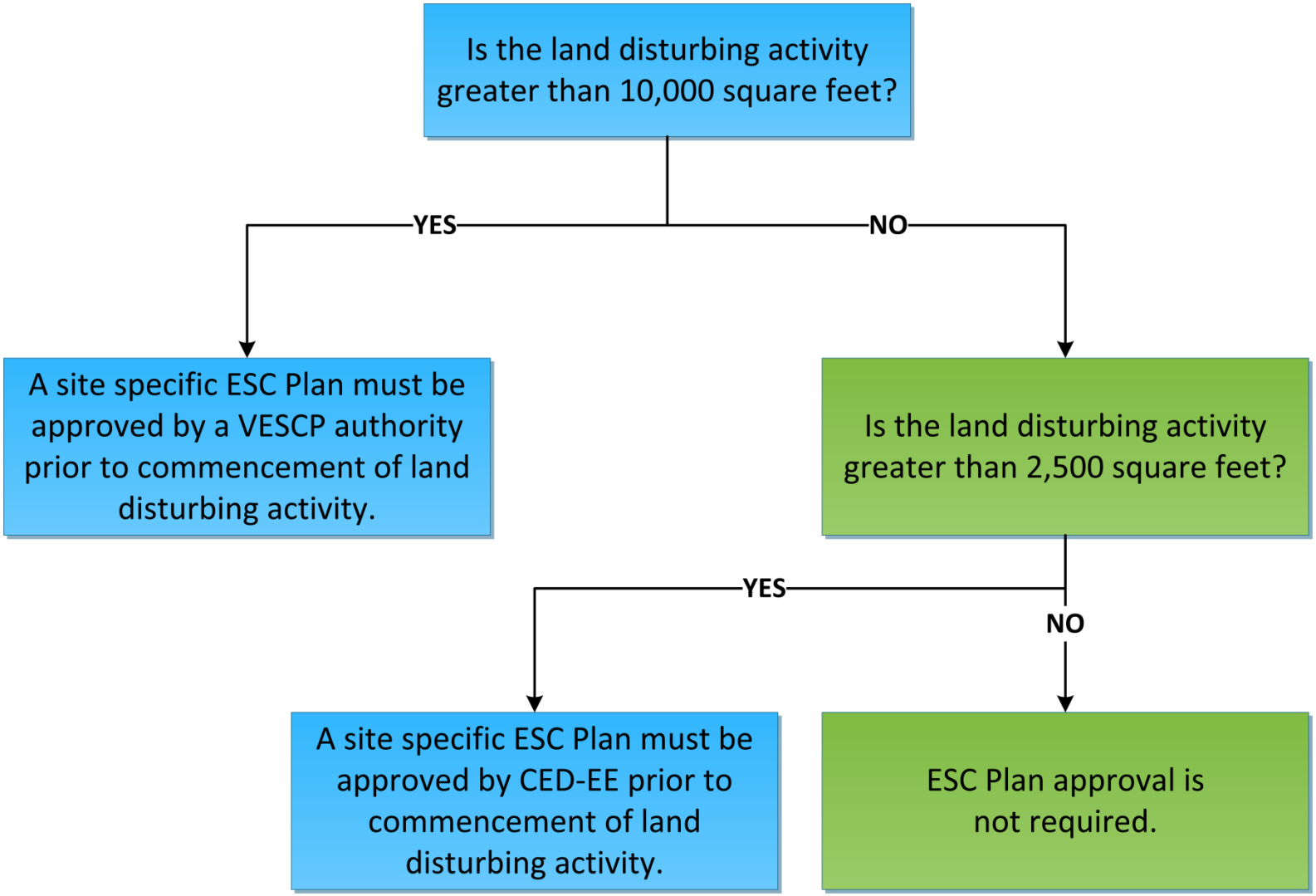

Figure 1. Flow-chart to Determine Erosion and Sediment Control Requirements for Land-disturbing Activities at JBLE – Eustis

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APPENDIX B:

9VAC25-840-40. Minimum Standards

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9VAC25-840-40. Minimum Standards.

A VESCP must be consistent with the following criteria, techniques and methods:

1. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.

2. During construction of the project, soil stock piles and borrow areas shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as borrow areas and soil intentionally transported from the project site.

3. A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.

4. Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place.

5. Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.

6. Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin.

a. The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage area and the trap shall only control drainage areas less than three acres.

b. Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The minimum storage capacity of a sediment basin shall be 134 cubic yards per acre of drainage area. The outfall system shall, at a minimum, maintain the structural integrity of the basin during a 25-year storm of 24-hour duration. Runoff coefficients used in runoff calculations shall correspond to a bare earth condition or those conditions expected to exist while the sediment basin is utilized.

7. Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.

8. Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.

9. Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.

10. All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

11. Before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel.

12. When work in a live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.

13. When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided.

14. All applicable federal, state and local requirements pertaining to working in or crossing live watercourses shall be met.

15. The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.

16. Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:

a. No more than 500 linear feet of trench may be opened at one time.

b. Excavated material shall be placed on the uphill side of trenches.

c. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site property.

d. Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization.

e. Restabilization shall be accomplished in accordance with this chapter.

f. Applicable safety requirements shall be complied with.

17. Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual development lots as well as to larger land-disturbing activities.

18. All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the VESCP authority. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.

19. Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff for the stated frequency storm of 24-hour duration in accordance with the following standards and criteria. Stream restoration and relocation projects that incorporate natural channel design concepts are not man-made channels and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels:

a. Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. For those sites where runoff is discharged into a pipe or pipe system, downstream stability analyses at the outfall of the pipe or pipe system shall be performed.

b. Adequacy of all channels and pipes shall be verified in the following manner:

(1) The applicant shall demonstrate that the total drainage area to the point of analysis within the channel is one hundred times greater than the contributing drainage area of the project in question; or

(2) (a) Natural channels shall be analyzed by the use of a two-year storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks.

(b) All previously constructed man-made channels shall be analyzed by the use of a 10-year storm to verify that stormwater will not overtop its banks and by the use of a two-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and

(c) Pipes and storm sewer systems shall be analyzed by the use of a 10-year storm to verify that stormwater will be contained within the pipe or system.

c. If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, the applicant shall:

(1) Improve the channels to a condition where a 10-year storm will not overtop the banks and a two-year storm will not cause erosion to the channel, the bed, or the banks; or

(2) Improve the pipe or pipe system to a condition where the 10-year storm is contained within the appurtenances;

(3) Develop a site design that will not cause the pre-development peak runoff rate from a two-year storm to increase when runoff outfalls into a natural channel or will not cause the pre-development peak runoff rate from a 10-year storm to increase when runoff outfalls into a man-made channel; or

(4) Provide a combination of channel improvement, stormwater detention or other measures which is satisfactory to the VESCP authority to prevent downstream erosion.

d. The applicant shall provide evidence of permission to make the improvements.

e. All hydrologic analyses shall be based on the existing watershed characteristics and the ultimate development condition of the subject project.

f. If the applicant chooses an option that includes stormwater detention, he shall obtain approval from the VESCP of a plan for maintenance of the detention facilities. The plan shall set forth the maintenance requirements of the facility and the person responsible for performing the maintenance.

g. Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipators shall be placed at the outfall of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel.

h. All on-site channels must be verified to be adequate.

i. Increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property shall be diverted to a stable outlet, adequate channel, pipe or pipe system, or to a detention facility.

j. In applying these stormwater management criteria, individual lots or parcels in a residential, commercial or industrial development shall not be considered to be separate development projects. Instead, the development, as a whole, shall be considered to be a single development project. Hydrologic parameters that reflect the ultimate development condition shall be used in all engineering calculations.

k. All measures used to protect properties and waterways shall be employed in a manner which minimizes impacts on the physical, chemical and biological integrity of rivers, streams and other waters of the state.

l. Any plan approved prior to July 1, 2014, that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or man-made channels

shall satisfy the flow rate capacity and velocity requirements for natural or man-made channels if the practices are designed to (i) detain the water quality volume and to release it over 48 hours; (ii) detain and release over a 24-hour period the expected rainfall resulting from the one year, 24-hour storm; and (iii) reduce the allowable peak flow rate resulting from the 1.5, 2, and 10-year, 24-hour storms to a level that is less than or equal to the peak flow rate from the site assuming it was in a good forested condition, achieved through multiplication of the forested peak flow rate by a reduction factor that is equal to the runoff volume from the site when it was in a good forested condition divided by the runoff volume from the site in its proposed condition, and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels as defined in any regulations promulgated pursuant to § 62.1-44.15:54 or 62.1-44.15:65 of the Act.

m. For plans approved on and after July 1, 2014, the flow rate capacity and velocity requirements of § 62.1-44.15:52 A of the Act and this subsection shall be satisfied by compliance with water quantity requirements in the Stormwater Management Act (§ 62.1-44.15:24 et seq. of the Code of Virginia) and attendant regulations, unless such land-disturbing activities are in accordance with 9VAC25-870-48 of the Virginia Stormwater Management Program (VSMP) Regulation or are exempt pursuant to subdivision C 7 of § 62.1-44.15:34 of the Act.

n. Compliance with the water quantity minimum standards set out in 9VAC25-870-66 of the Virginia Stormwater Management Program (VSMP) Regulation shall be deemed to satisfy the requirements of this subdivision 19.

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APPENDIX C:

Checklist for Erosion and Sediment Control Plans

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Checklists for Erosion and Sediment Control Plans

Minimum Standards

- ☐ Minimum Standards – Plans shall address all applicable minimum standards identified in 9VAC25-840 et. seq. of the Virginia ESC Regulations.

Narrative

- ☐ Project Description – A description of the nature and purpose of the land-disturbing activity.
- ☐ Area of Disturbance – The total area (acres) to be disturbed.
- ☐ Existing Site Conditions – A description of the existing topography, vegetation, drainage patterns, environmentally sensitive areas, soils information, and adjacent areas such as streams, lakes, residential areas, and roads.

Site Plan

- ☐ North Arrow and Scale – Plans shall indicate the direction of north in relation to the site as well as the scale of the drawing.
- ☐ Existing and Proposed Site Features – Plans shall include existing and proposed contours, existing and proposed site features or structures, existing vegetation, environmentally sensitive areas, adjacent streams, lakes, residential areas, and roads.
- ☐ Limits of Disturbance - Plans shall identify the limits of disturbed area and provide the total amount of disturbed area for the project as well as the amount of disturbed area for each phase.
- ☐ Construction Sequence - The construction sequence related to ESC shall be provided on the plans. The construction sequence shall include the installation of critical measures prior to the initiation of the land-disturbing activity and removal of measures after the areas they serve are permanently stabilized.
- ☐ Off-Site Areas - Stockpile/lay-down areas or any off-site land disturbing activities (e.g., borrow sites, waste areas) shall be identified on the plans with appropriate ESC measures.
- ☐ Location of ESC Measures - The location of temporary and permanent ESC measures for each phase shall be clearly identified on the plans.
- ☐ Vegetative Stabilization - The temporary and permanent seeding schedule shall be provided on the plans including the areas to be stabilized with vegetation, seed type and rates, method of soil preparation, fertilizer and lime type with rates, and mulch type and rates.

- General ESC Notes - Plans shall include the general ESC notes provided in *Appendix E: General Erosion and Sediment Control Notes*.

- Maintenance Requirements - Plans shall include the maintenance requirements of temporary and permanent ESC measures as well as the contact person responsible for maintenance.

- Detail Drawings - Construction drawings and details for temporary and permanent ESC measures shall be included in the plans.

APPENDIX D:

Erosion and Sediment Control Inspection Report

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS, 733D MISSION SUPPORT GROUP
JOINT BASE LANGLEY-EUSTIS
FORT EUSTIS, VIRGINIA

Reply To:
Ronald Holcomb
CED-EE
1407 Washington Blvd.
Joint Base Langley Eustis 23604-5332
Phone: (757) 878-5218
Fax: (757) 878-4589/DSN: 826-4589

INSPECTION REPORT

Project Name:_____ Authority:_____

RLD Name:_____ RLD No. _____

Project Location:_____ Project No:_____

Inspector Name:_____ Inspection Date:_____ Time: _____

STAGE OF CONSTRUCTION

Pre-Construction Conference ☐ *Building Construction* ☐ *Construction of SWM Facilities* ☐
Clearing & Grubbing ☐ *Finish Grading* ☐ *Maintenance of SWM Facilities* ☐
Rough Grading ☐ *Final Stabilization* ☐ *Other*_____ ☐

Item #	*State/Local Regulation*[1]	*Violation*		*Description and Location of Problem/Violation*[2]*, Required or Recommended Corrective Actions, and Other Comments/Notes*
		Initial	*Repeat*	

(1) Refers to applicable regulation found in the most recent publication of the *Virginia Erosion and Sediment Control Regulations* (9VAC25-840), *Stormwater Management Regulations* (9VAC25-870), *Standards and Specifications for Erosion and Sediment Control for JBLE – Eustis, Virginia*, or local ESC/SWM ordinance.
(2) Note whether or not off-site sediment damage resulting from the problem/violation was evident during the inspection.

REQUIRED CORRECTIVE ACTION DEADLINE DATE: _____ **Re-inspection Date:**_____
(DD/MM/YY) **(DD/MM/YY)**

The required corrective action deadline date applies to all problems/violations noted on this report. If listed violation(s) currently constitute non-compliance and/or required corrective actions are not completed by the deadline, a **NOTICE TO COMPLY**, **STOP WORK ORDER**, and/or other enforcement actions may be issued to the entity responsible for ensuring compliance on the above project.

Inspector:_____ _____
Signature Date

*Acknowledgement of on site report receipt:*_____ _____ _____
Print Name *Signature* *Date*

This report will be provided to the following parties via mail, fax, or e-mail within 24 hours of inspection:

_____

_____

INSPECTION REPORT

Project Name:_____ Inspection Date:_____

Item #	*State/Local Regulation*[1]	*Violation*		*Description and Location of Problem/Violation*[2]*, Required or Recommended Corrective Actions, and Other Comments/Notes*
		Initial	*Repeat*	

(1) Refers to applicable regulation found in the most recent publication of the *Virginia Erosion and Sediment Control Regulations* (9VAC25-840), *Stormwater Management Regulations* (9VAC25-870), *Standards and Specifications for Erosion and Sediment Control for JBLE – Eustis, Virginia*, or local ESC/SWM ordinance.

(2) Note whether or not off-site sediment damage resulting from the problem/violation was evident during the inspection.

Sheet ____ of ____

APPENDIX E:

General Erosion and Sediment Control Notes

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General Erosion and Sediment Control Notes to be Included on All Site Specific ESC Plans (VDEQ, 1992)

ES-1. Unless otherwise indicated, all vegetative and structural erosion and sediment control practices will be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and Virginia Erosion and Sediment Control Regulations.

ES-2. The plan approving authority must be notified one week prior to the pre-construction conference, one week prior to the commencement of land disturbing activity, and one week prior to the final inspection.

ES-3. All erosion and sediment control measures are to be placed prior to or as the first step in clearing.

ES-4. A copy of the approved erosion and sediment control plan shall be maintained on the site at all times.

ES-5. Prior to commencing land disturbing activities in areas other than indicated on these plans (including, but not limited to, off-site borrow or waste areas), the contractor shall submit a supplementary erosion control plan to the owner for review and approval by the plan approving authority.

ES-6. The contractor is responsible for installation of any additional erosion control measures necessary to prevent erosion and sedimentation as determined by the plan approving authority.

ES-7. All disturbed areas are to drain to approved sediment control measures at all times during land disturbing activities and during site development until final stabilization is achieved.

ES-8. During dewatering operations, water will be pumped into an approved filtering device.

ES-9. The contractor shall inspect all erosion and sediment control measures periodically and after each runoff-producing rainfall event. Any necessary repairs or cleanup to maintain effectiveness of the erosion and control devices shall be made immediately.

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APPENDIX F
Structural Stormwater Best Management Practices Inventory, Annual Inspection, and Management Plan

Provided electronically on CD

APPENDIX G
High Priority Facility Stormwater Pollution Prevention Plans

Table G-1. High-Priority Non-Industrial Facilities

Building Number	Building Name	Drainage Basin / Outfall	Receiving Waters	High Potential to Discharge Pollutants[1]	Permit Year for SWP3 Development	SWPPP Developed (Yes / No)
576	McDonald Army Health Clinic	068	Warwick River	No	N/A	No
659	POV Car Wash	031	Eustis Lake	Yes	PY1	No
660	Auto Hobby Shop	031	Eustis Lake	Yes	PY1	No
703	AAFES Car Wash	084	Bailey Creek	Yes	N/A	Yes[2]
704	AAFES Gas Station / Shopette	084	Bailey Creek	Yes	N/A	Yes[2]
1386	BX	042	Warwick River	Yes	PY1	No
1382	Commissary	042	Warwick River	Yes	PY1	No
2009 2010	Horse Stables	051	James River	Yes	PY1	No
3503 3510 3515 3525 3534 3535 3537	Golf Cart Maintenance, Wash Rack, and Irrigation Pump House	Sheet Flow	Warwick River	Yes	N/A	Yes[2]

Notes:

[1] High priority non-industrial facilities were selected based on the activity being conducted at the facility, including a review of activities similar to locations that are classified as industrial. Facilities were then further examined to determined if the activities being conducted could result in the high potential for the discharge of pollutants to the outfalls.

[2] SPPPs that have been developed for non-industrial facilities are included in Appendix F of the MS4 Program Plan. SPPPs for facilities that have activities that could be identified as industrial via SIC code and observation have also been included in the installation's SPPP for VPDES Permit No. VA0025216.

Facility Inspection Summary

Building Number(s)	**703 and 704**
Facility Name	**Shoppette and Car Wash**
Organization	**Army & Air Force Exchange Service (AAFES)**
POC	**CIV Roy Punzalan**
Discharge Receiving System(s)	**Outfall 084 / Bailey Creek**

Facility Activities

Buildings 703 and 704 are the AAFES Shoppette, including a privately owned vehicle (POV) gas station and automatic car wash (Building 703). The Shoppette is open Monday through Friday from 0500 to 2400 as well as Saturday and Sunday from 0700 to 2400. The fueling portion of the facility is equipped with 20 self-service fuel pumps with regular, mid-grade, and super unleaded gasoline. There are three 12,000-gallon USTs on site that are equipped with an indoor/outdoor alarm system and emergency shutoff. Personnel indicated that they check the UST level three times each day. The POV car wash is located behind the Shoppette and also has two vacuum stations.

Inventory of Materials Potentially Exposed to Storm Water[1]

Significant Materials Exposed to Storm Water				
Observation[a]	**Potential Pollutant[b]**	**Quantity**	**Storage Type**	**Secondary Containment**
Equipment and material storage including, but not limited to, an ice chests, a Redbox machine, and propane tanks	Varies	Varies	Not applicable	None; not required
Assorted wood storage including, but not limited to, pallets	Wood	Varies	Not applicable	None; not required

[a] Observations of significant materials potentially exposed to storm water are considered to be stored outside and uncovered if not otherwise stated.
[b] Potential pollutants reflect what was observed between on 11 April 2014.

Description of Storm Water Entry Points and Ultimate Outfall Point

- Storm water runoff including any spills occurring in front of the Shoppette, but not under the fueling station awning, will flow away from the building to nearby swales and ultimately flow to Bailey Creek.
- Storm water runoff including any spills occurring behind the Shoppette will flow south to nearby storm drains and ultimately flow to Bailey Creek.
- The facility is located in Drainage Basin 084.

Current BMPs

- Spill kits maintained at the facility.

[1] Description included in inventory of materials reflect typical on-site inventories; however, inventories may change and the facility has developed methods to handle varying inventories.

Facility Inspection Summary

Building Number(s)	**703 and 704**
Facility Name	**AAFES Shoppette and Car Wash**

- P2 BMP Implementation: Clam shell unit.
- Fueling operations are conducted under the awning with pavement sloped to prevent run-on.
- Vehicle wash water goes to an OWS that discharges to the sanitary sewer system.
- Bulk fuel ports for fuel offloading at the USTs are kept locked to restrict access.
- Fuel transfer is a manual operation.
- Fuel levels are checked prior to receiving fuel and three times a day to prevent overflows.
- High level alarms on USTs notify staff of problems.
- Emergency shutoffs for manual pumps are located inside and outside of the facility.
- The hazardous waste satellite accumulation site (SAS) clamshell is kept locked to restrict access.

Facility Inspection Summary

Building Number(s)	**703 and 704**
Facility Name	**AAFES Shoppette and Car Wash**

AAFES Shoppette and Car Wash Photographs[2]

Photo 703-1. Automatic Car Wash Area

Photo 703-2. Interior of Car Wash

Photo 704-1. Fuel USTs

Photo 704-2. POV Fueling Station

[2] Photographs included are only accurate for the survey period and include materials and equipment that may potentially be exposed to storm water due to the storage location. Not all photographs represent a potential pollutant.

Facility Inspection Summary

Building Number(s)	**703 and 704**
Facility Name	**AAFES Shoppette and Car Wash**

AAFES Shoppette and Car Wash Photographs[3]

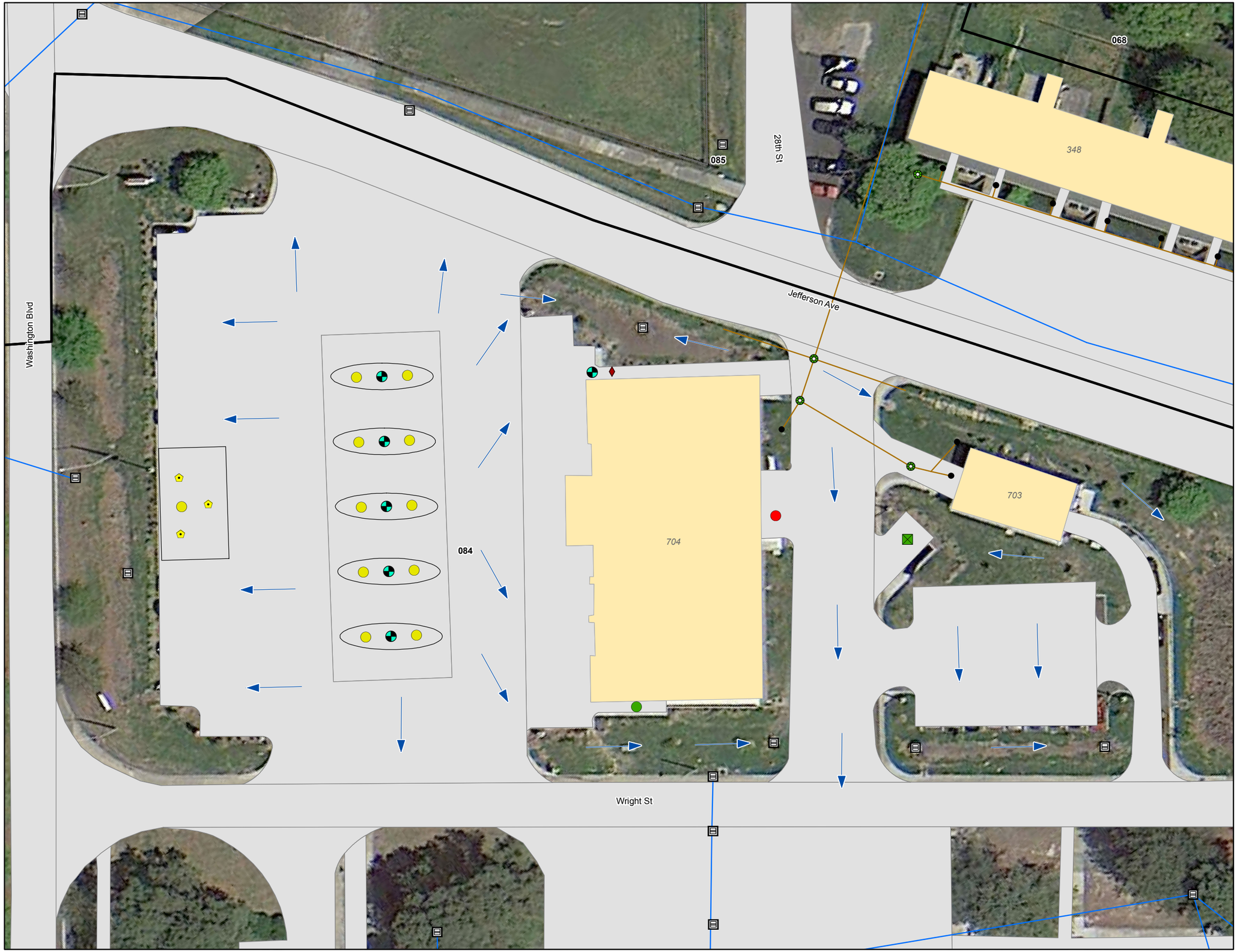
Photo 704-3. Emergency Shut Off for Pumps

Photo 704-4. Spill Kit

Photo 704-5. Solid Waste Dumpster

Photo 704-6. Propane Tank Storage

[3] Photographs included are only accurate for the survey period and include materials and equipment that may potentially be exposed to storm water due to the storage location. Not all photographs represent a potential pollutant.



JBLE - Eustis

Industrial Building(s): 703, 704

Facility Name: Shoppette and Car Wash

Legend

- Underground Storage Tank
- Equipment & Material Storage
- Loading Area
- POL/Fuel Transfer Area
- HAZWASTE Storage
- Solid Waste Dumpster
- Spill Response Materials
- Storm Water Inlet Point
- Clean Out
- Wastewater Manhole
- Fence
- Surface Flow Direction
- Storm Water Pipe
- Wastewater Sewer Pipe
- Building
- Pavement
- Non-Industrial Drainage Basin

0 20 40 80

Feet

This map was developed using 2013 GIS data provided by JBLE-Eustis. CURES assumes no responsibility for the accuracy of or omissions in the original data provided by the base. Aerial photography provided by Google Earth. Locations of materials are accurate as of June 2014. Material storage locations are subject to change

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Facility Inspection Summary

Building Number(s)	**3503, 3510, 3515, 3525, 3534, 3535, and 3537**
Facility Name	**Golf Course Maintenance**
Organization	**Morale, Welfare, and Recreation (MWR)**
POC	**CIV Chad Adcock**
Discharge Receiving System(s)	**Sheet Flow – Not in a Drainage Basin**

Facility Activities

Buildings 3503, 3510, 3515, 3525, 3534, 3535, and 3537 comprise the Golf Course Maintenance Compound. See the table below for a list of buildings within the compound and a description of the facility activities for each building. Minor maintenance on golf carts, such as oil changes, is performed outside of Building 3503. The pesticide mixing area, Building 3515, has an inoperable recycling system. Personnel have indicated that overfills have occurred while handling pesticides in the past, which were contained in the bermed area.

There is an irrigation pump house, Building 3537, located north of the main compound. The pump house has an approximately 10,000-gallon AST that is used to store ground water to be used during drier months (i.e., June and July) for golf course irrigation purposes. Personnel indicated that either city water or groundwater can be used.

The entire facility is slated to be demolished in the future, but a date has not been determined.

Building Number	Facility Use and/or Activities
3503	Office/maintenance garage (condemned)
3510	Dry storage (tires, truck, pallets) – large storage container with piping
3515	Pesticide storage/mixing
3525	Wash rack and wash water recycling system
3534	Lawn mower storage
3535	Lawn equipment storage (lawn mowers, grass seed, tools)
3537	Irrigation pump house, including a 10,000-gallon AST

Facility Inspection Summary

Building Number(s) **3503, 3510, 3515, 3525, 3534, 3535, and 3537**
Facility Name **Golf Course Maintenance**

Inventory of Materials Potentially Exposed to Storm Water[1]

Significant Materials Exposed to Storm Water				
Observation[a]	**Potential Pollutant[b]**	**Quantity**	**Storage Type**	**Secondary Containment**
Building 3503				
AST (3503-2) containing fuel oil	Fuel oil	500 gallons	AST	Double-walled tank
Lawn maintenance equipment storage including, but not limited to, leaf blowers, weed eaters, lawn mowers, trailers, tractors, mower attachments, lawn mower tires, hoses, and other miscellaneous lawn equipment	Diesel fuel, hydraulic fluid, or oil	Varies	Not applicable	None; not required
Golf cart storage behind Building 3503	Gasoline	Varies	Not applicable	None; not required
Assorted wood storage including, but not limited to, pallets and scrap pieces of wood	Wood	Varies	Not applicable	None; not required
Miscellaneous scrap metal storage	Metals	Varies	Not applicable	None; not required
Building 3510				
Lawn maintenance equipment storage including, but not limited to, lawn mower tires and tractor attachments	Hydraulic fluid or oil	Varies	Not applicable	None; not required
Assorted wood storage including, but not limited to, pallets	Wood	Varies	Not applicable	None; not required
Material storage including, but not limited to, cement blocks	Cement	Varies	Not applicable	None; not required
Buildings 3515 and 3525				
Equipment storage including, but not limited to, forklifts	Diesel fuel, hydraulic fluid, or oil	Varies	Not applicable	None; not required
Miscellaneous metal storage including, but not limited to, pallets	Metals	Varies	Not applicable	None; not required
Material storage including, but not limited to, PVC piping	PVC piping	Varies	Not applicable	None; not required

[1] Description included in inventory of materials reflect typical on-site inventories; however, inventories may change and the facility has developed methods to handle varying inventories.

Facility Inspection Summary

Building Number(s) **3503, 3510, 3515, 3525, 3534, 3535, and 3537**
Facility Name **Golf Course Maintenance**

Significant Materials Exposed to Storm Water				
Observation[a]	**Potential Pollutant[b]**	**Quantity**	**Storage Type**	**Secondary Containment**
Building 3534				
AST (3534-1) containing diesel fuel and gasoline	Diesel fuel and gasoline	500 gallons of diesel fuel 500 gallons of gasoline	AST	Double-walled tank
Lawn maintenance equipment storage including, but not limited to, tractors, mowers, and mower attachments	Diesel fuel, hydraulic fluid, or oil	Varies	Not applicable	None; not required
Building 3535				
Lawn maintenance equipment storage including, but not limited to, tractors, mowers, and mower attachments	Diesel fuel, hydraulic fluid, or oil	Varies	Not applicable	None; not required
Equipment storage including, but not limited to, forklifts	Diesel fuel, hydraulic fluid, or oil	Varies	Not applicable	None; not required
Gravel pile south of Building 3535	Gravel	Varies	Pile	None
Building 3537				
Steel AST containing irrigation water	Irrigation water	10,000 gallons	AST	None
Equipment storage including, but not limited to, trailers	Hydraulic fluid or oil	Varies	Not applicable	None; not required
Assorted wood storage including, but not limited to, railroad ties and pallets	Wood	Varies	Not applicable	None; not required
Miscellaneous scrap metal storage	Metals	Varies	Not applicable	None; not required

[a] Observations of significant materials potentially exposed to storm water are considered to be stored outside and uncovered if not otherwise stated.
[b] Potential pollutants reflect what was observed on 18 November 2013.

Description of Storm Water Entry Points and Ultimate Outfall Point

- Storm water runoff including any spills occurring north of Buildings 3503, 3515, and 3525 will flow north via sheet flow and infiltrate into the ground.
- Storm water runoff including any spills occurring east and south of Buildings 3503, 3515, and 3525 will flow southeast via sheet flow and infiltrate into the ground.
- Storm water runoff including any spills occurring around Buildings 3510 and 3534 will flow southeast via sheet flow and infiltrate into the ground.

Facility Inspection Summary

Building Number(s)	**3503, 3510, 3515, 3525, 3534, 3535, and 3537**
Facility Name	**Golf Course Maintenance**

- Storm water runoff including any spills occurring around Building 3535 will flow north and east via sheet flow and infiltrate into the ground.
- Storm water runoff including any spills occurring around Building 3537 will flow south through the woods and infiltrate into the ground.
- Sheet flow – not in a drainage basin.

Current BMPs

- Spill kits are located in Buildings 3503 and 3515.
- Secondary containment for Tanks 3503-2 and 3534-1 is provided by a double walled tank.
- Building 3515 has posted an SOP for pesticide mixing.
- Drip pans are utilized under equipment.
- The solid waste dumpster is kept closed.
- Facility personnel perform regular inspections of the facility.
- Facility personnel are trained annually in good housekeeping, pollution prevention, material management, and spill prevention and response.

Facility Inspection Summary

Building Number(s)	**3503, 3510, 3515, 3525, 3534, 3535, and 3537**
Facility Name	**Golf Course Maintenance**

Golf Course Maintenance Photographs[2]

Photo 3503-1. Equipment Storage and Solid Waste Dumpster

Photo 3503-2. Equipment Storage (1)

Photo 3503-3. Equipment Storage (2)

Photo 3503-4. Equipment Storage (3)

Photo 3503-5. Fuel Oil AST (3503-2)

Photo 3503-6. Used Oil Storage

[2] Photographs included are only accurate for the survey period and include materials and equipment that may potentially be exposed to storm water due to the storage location. Not all photographs represent a potential pollutant.

Facility Inspection Summary

Building Number(s)	**3503, 3510, 3515, 3525, 3534, 3535, and 3537**
Facility Name	**Golf Course Maintenance**

Golf Course Maintenance Photographs[2]

Photo 3515-1. Pesticide Storage Area

Photo 3515-2. Spill Kit

Photo 3534-1. Diesel and Gasoline AST (3534-1)

Photo 3535-1. Used Oil Storage

Photo 3535-2. Gravel Pile South of Building 3535

Photo 3537-1. Irrigation Pump House AST (1)

Facility Inspection Summary

Building Number(s)	**3503, 3510, 3515, 3525, 3534, 3535, and 3537**
Facility Name	**Golf Course Maintenance**

Golf Course Maintenance Photographs[2]

Photo 3537-2. Irrigation Pump House AST (2)

Photo 3537-3. Railroad Ties

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Industrial Building(s): 3503, 3510, 3515, 3525, 3534, 3535

Facility Name: Golf Course Maintenance

Legend

- Aboveground Storage Tank
- Drum Storage
- Equipment & Material Storage
- GOV Parking
- POL/Fuel Transfer Area
- Maintenance Area
- Solid Waste Dumpster
- Spill Response Materials
- Fence
- Surface Flow Direction
- Building

0 20 40 80

Feet

This map was developed using 2013 GIS data provided by JBLE-Eustis. CURES assumes no responsibility for the accuracy of or omissions in the original data provided by the base. Aerial photography provided by JBLE-Eustis. Locations of materials are accurate as of June 2014. Material storage locations are subject to change

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APPENDIX H
Nutrient Management Plans

Provided electronically on CD

Nutrient Management Plan

The Pines Golf Course

Prepared For:

Joint Base Langley-Eustis – Eustis
3518 Mulberry Island Rd.
JBLE – Eustis, VA 23604
757-878-2252

Prepared By:

Chris Oliver, CNMP (AECOM)
1600 Perimeter Park Drive, Suite 400
Morrisville, NC 27560
919-461-1100

Certification Code: #811

Total Acreage: 98.5

The purpose of this Nutrient Management Plan is to ensure minimum movement of nitrogen and phosphorus from the specified area of application to surface and groundwaters where they can potentially have a detrimental effect on water quality as well as ensuring that plants have optimum soil nutrient availability for good productivity and quailty. By following this soil test based plan you are helping to protect local waters and the Chesapeake Bay.

If you have questions, please contact your plan writer, local Virginia Cooperative Extension Agent or the Department of Conservation and Recreation Nutrient Mangement Program.

DCR
Virginia Department of Conservation & Recreation

JOINT BASE LANGLEY EUSTIS

Nutrient Management Plan for:
The Pines Golf Course

Landowner Information	
Company Name	*The Pines Golf Course*
Customer Name	*Joint Base Langley-Eustis – Eustis*
Mailing Address	*3518 Mulberry Island Rd.*
City State Zip	*JBLE – Eustis, VA 23604*
Phone	*757-878-2252*
Email	g.weissinger@us.af.mil

Planners Informaiton	
Planner Name	*Chris Oliver, CNMP (AECOM)*
Mailing Address	*1600 Perimeter Park Drive, Suite 400*
City State Zip	*Morrisville, NC 27560*
Phone	*919-461-1100*
Fax	*919-461-1415*
Email	chris.oliver@aecom.com
Certification Code	*#811*

Location Information	
Physical Address	*3518 Mulberry Island Rd.*
City State Zip	*JBLE – Eustis, VA 23604*
Coordinates	*37° 8' 21.5988"*
Please Use NAD 83 Deg Min Sec	*-76° 36' 7.2396"*
VAHU6 Watershed Code	*Shortleaf Pines and Virginia Pines: JL38; Clubhouse Grounds and Ponderosa Pines: JL37*

Acreage	
Total	*98.5*
Fairways/Rough	*90.0*
Tees (including driving range tees)	*3.7*
Greens	*3.5*
Clubhouse Grounds	*1.3*

Plan Start Date	*13 Apr 2016*
Plan End Date	*13 Apr 2021*

Planner Signature	

Narrative

1. Site Description and Supporting Information

This nutrient management plan has been prepared by AECOM Technical Services, Inc.

The Pines Golf Course is a 27-hole, 450 acre facility located on JBLE-Eustis. The Ponderosa Pines and the Shortleaf Pines were the original courses built in 1952 and 1954 respectively. The Virginia Pines course was added in 1997. In 2011, all greens were rebuilt to USGA Specifications and seeded with A1A4 Bentgrass. The course is comprised of 3.5 acres of bentgrass greens and zoysia bunker areas, 3.7 acres of bermudagrass tee boxes, and 90 acres of bermudagrass fairways and rough. The clubhouse grounds account for approximately 1.3 acres of bermudagrass which is overseeded in the fall with perennial rye grass. The facility also includes 12 acres of a bermudagrass driving range with approximately 1 acre of bermudagrass tees boxes overseeded with perennial rye grass in the fall. The primary irrigation source for the golf course is an on-course pond and a deep well used as a secondary source.

The golf course is relatively flat with maximum slopes less than 3%. Environmentally sensitive sites on the property, as indicated in the Site Maps section of this plan, are the 100-year floodplain of Island Creek and the Warwick River and wetlands to the north and east of the clubhouse. To decrease the chance of nutrient loss to the environment, fertilizer applications to the golf course should only be made when heavy rain events are not expected and as outlined in the Virginia Nutrient Management Standards and Criteria, Revised July 2014.

This plan is effective for five years (until 13 April 2021) or until major course renovation or major changes to maintenance practices occur. Applications of inorganic fertilizers should not occur on frozen or snow-covered ground. Any fertilizer that makes its way onto impervious surfaces should be swept or blown back into pervious turfgrass-covered areas. Do not use fertilizers as ice melt.

Every fertilizer application should be recorded in the record sheet provided. Any questions or concerns with fertilizer products or record keeping should be brought to the plan writer's attention.

Killing Frost Dates for Newport News, Virginia are March 30th (Spring) and November 15th (Fall).

Applications to the fairways, tee boxes, and clubhouse grounds areas should occur within the "Warm Season Application Period "of March 30th to October 15th, with the exception of the Feb-Mar and Oct-Nov applications for the clubhouse grounds areas and driving range tee boxes. The Feb-Mar and Oct-Nov applications, identified in the nutrient management worksheets for the clubhouse grounds and driving range tee boxes, are additional applications that are permitted due to overseeding with cool season grasses.

Applications to all greens should occur within the "Cool Season Application Period" of February 17th to December 27th.

Maps

2. Site Maps

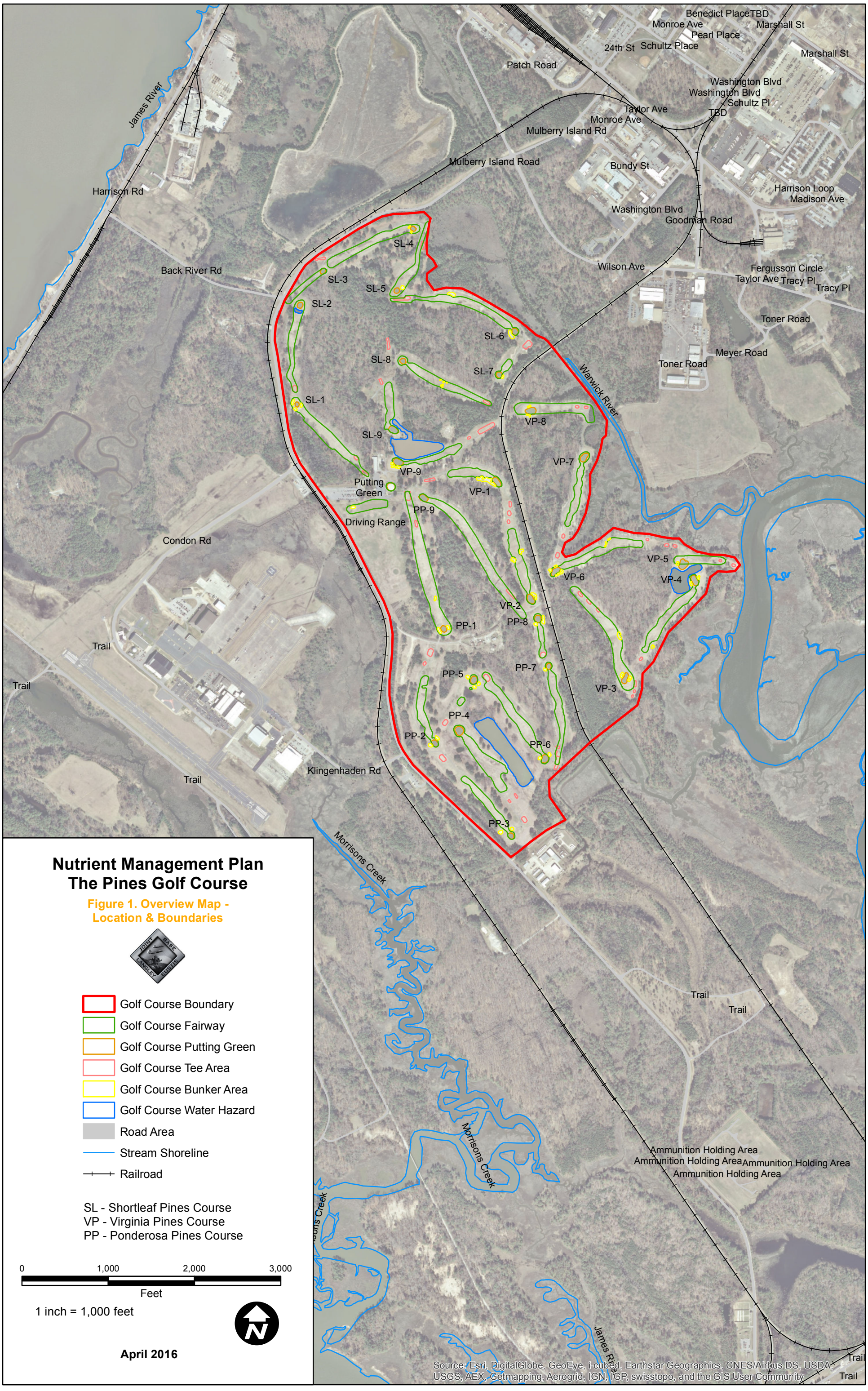
A) Figure 1. Overview Map - Location & Boundaries

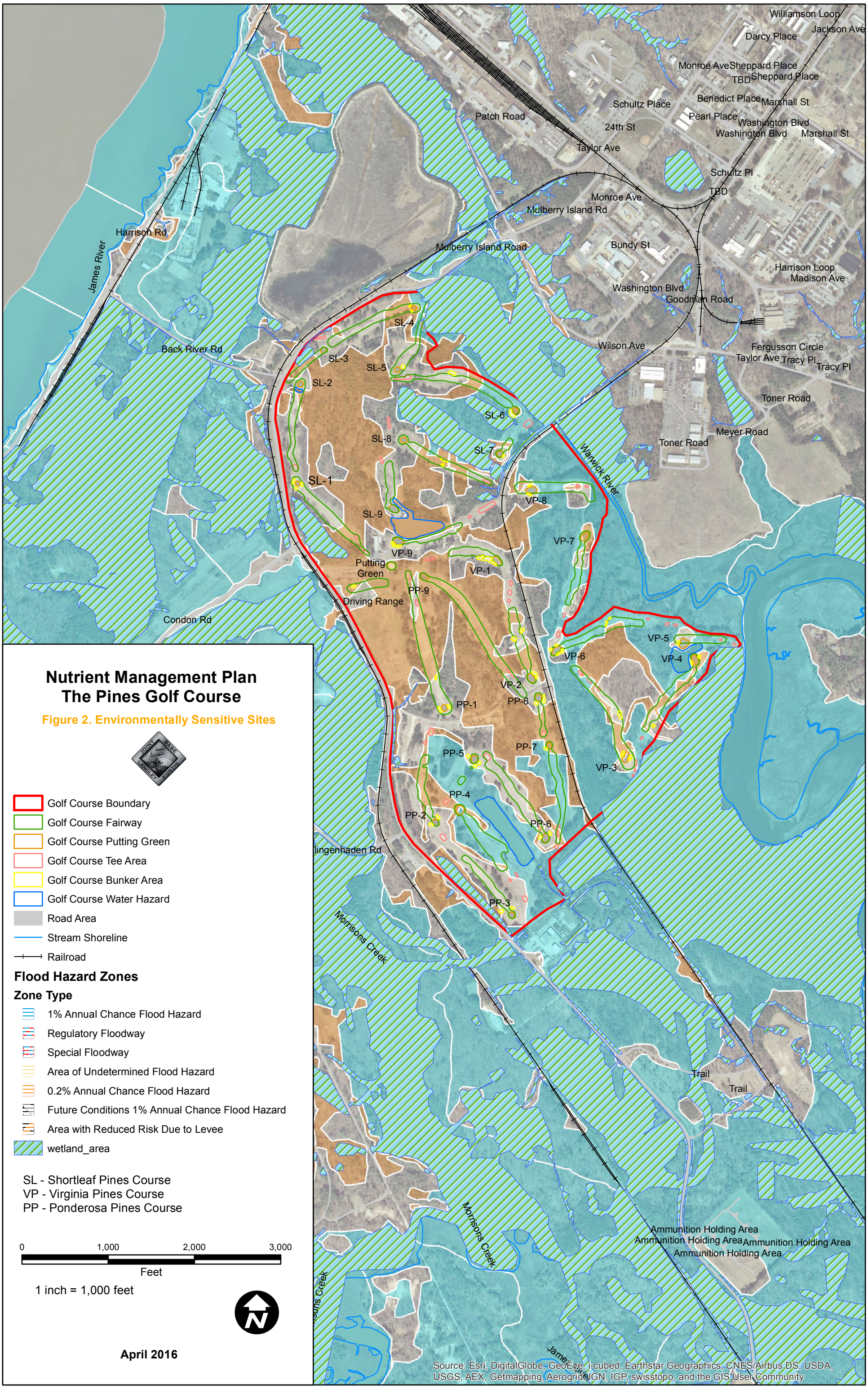
B) Figure 2. Environmentally Sensitive Sites

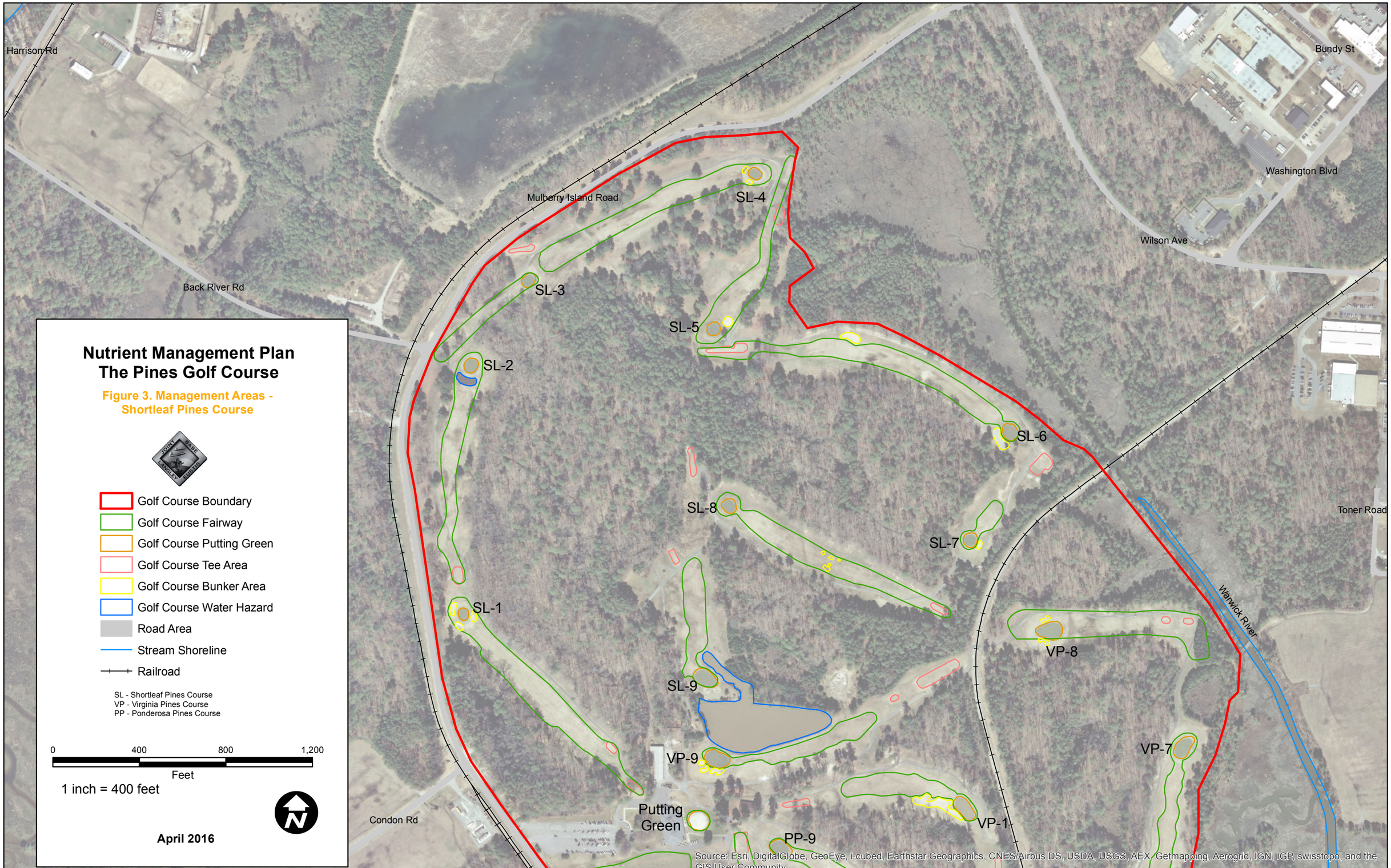
C) Figure 3. Management Areas - Shortleaf Pines Course

D) Figure 4. Management Areas - Virginia Pines & Ponderosa Courses

E) Figure 5. Management Areas - Clubhouse Grounds, Putting Green, & Driving Range Tee Boxes


Nutrient Management Plan
The Pines Golf Course
Figure 1. Overview Map - Location & Boundaries
Golf Course Boundary
Golf Course Fairway
Golf Course Putting Green
Golf Course Tee Area
Golf Course Bunker Area
Golf Course Water Hazard
Road Area
Stream Shoreline
Railroad
SL - Shortleaf Pines Course
VP - Virginia Pines Course
PP - Ponderosa Pines Course
0
1,000
2,000
3,000
Feet
1 inch = 1,000 feet
April 2016
James River
Harrison Rd
Back River Rd
Condon Rd
Trail
Patch Road
Mulberry Island Road
Mulberry Island Rd
Bundy St
Monroe Ave
Taylor Ave
Washington Blvd
Schultz Pl
TBD
Benedict Place
Marshall St
Pearl Place
24th St
Schultz Place
Harrison Loop
Madison Ave
Goodman Road
Wilson Ave
Fergusson Circle
Tracy Pl
Toner Road
Meyer Road
Warwick River
Putting Green
Driving Range
Klingenhaden Rd
Morrisons Creek
Ammunition Holding Area
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community


Nutrient Management Plan
The Pines Golf Course
Figure 2. Environmentally Sensitive Sites
Golf Course Boundary
Golf Course Fairway
Golf Course Putting Green
Golf Course Tee Area
Golf Course Bunker Area
Golf Course Water Hazard
Road Area
Stream Shoreline
Railroad
Flood Hazard Zones
Zone Type
1% Annual Chance Flood Hazard
Regulatory Floodway
Special Floodway
Area of Undetermined Flood Hazard
0.2% Annual Chance Flood Hazard
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Risk Due to Levee
wetland_area
SL - Shortleaf Pines Course
VP - Virginia Pines Course
PP - Ponderosa Pines Course
0
1,000
2,000
3,000
Feet
1 inch = 1,000 feet
April 2016
James River
Harrison Rd
Back River Rd
Condon Rd
Patch Road
Mulberry Island Road
Mulberry Island Rd
Monroe Ave
Taylor Ave
24th St
Schultz Place
Schultz Pl
Bundy St
Washington Blvd
Goodman Road
Wilson Ave
Harrison Loop
Madison Ave
Fergusson Circle
Tracy Pl
Toner Road
Meyer Road
Warwick River
Williamson Loop
Jackson Ave
Darcy Place
Sheppard Place
Benedict Place
Marshall St
Pearl Place
Washington Blvd
Putting Green
Driving Range
Morrisons Creek
Trail
Ammunition Holding Area
SL-1
SL-2
SL-3
SL-4
SL-5
SL-6
SL-7
SL-8
SL-9
VP-1
VP-2
VP-3
VP-4
VP-5
VP-6
VP-7
VP-8
VP-9
PP-1
PP-2
PP-3
PP-4
PP-5
PP-6
PP-7
PP-8
PP-9
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community


Harrison Rd
Bundy St
Washington Blvd
Mulberry Island Road
Wilson Ave
Back River Rd
Toner Road
Warwick River
Condon Rd
SL-1
SL-2
SL-3
SL-4
SL-5
SL-6
SL-7
SL-8
SL-9
VP-1
VP-7
VP-8
VP-9
PP-9
Putting Green
Nutrient Management Plan
The Pines Golf Course
Figure 3. Management Areas - Shortleaf Pines Course
Golf Course Boundary
Golf Course Fairway
Golf Course Putting Green
Golf Course Tee Area
Golf Course Bunker Area
Golf Course Water Hazard
Road Area
Stream Shoreline
Railroad
SL - Shortleaf Pines Course
VP - Virginia Pines Course
PP - Ponderosa Pines Course
0
400
800
1,200
Feet
1 inch = 400 feet
April 2016
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Toner Road
Warwick River
SL-9
VP-9
Putting Green
PP-9
VP-8
VP-7
VP-1
VP-5
VP-4
VP-6
VP-2
PP-8
PP-1
PP-7
PP-5
VP-3
PP-4
PP-2
PP-6
PP-3
Klingenhaden Rd
Mulberry Island Road
Morrisons Creek
Nutrient Management Plan
The Pines Golf Course
Figure 4. Management Areas - Viginia Pines & Ponderosa Pines Courses
Golf Course Boundary
Golf Course Fairway
Golf Course Putting Green
Golf Course Tee Area
Golf Course Bunker Area
Golf Course Water Hazard
Road Area
Stream Shoreline
Railroad
SL - Shortleaf Pines Course
VP - Virginia Pines Course
PP - Ponderosa Pines Course
0
400
800
1,200
Feet
1 inch = 400 feet
April 2016
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Condon Rd
VP-9
Clubhouse Grounds
Putting Green
PP-9
Driving Range Tees
Nutrient Management Plan
The Pines Golf Course
Figure 5. Management Areas - Clubhouse Grounds, Putting Green, & Driving Range Tee Boxes
Golf Course Boundary
Golf Course Fairway
Golf Course Putting Green
Golf Course Tee Area
Golf Course Bunker Area
Golf Course Water Hazard
Road Area
Stream Shoreline
Railroad
SL - Shortleaf Pines Course
VP - Virginia Pines Course
PP - Ponderosa Pines Course
0
100
200
300
Feet
1 inch = 100 feet
April 2016
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Nutrient Application Worksheet

NAME:	The Pines Golf Course, Joint Base Langley-Eustis – Eustis		Management Area:	Greens
	13 Apr 2016	Area:	151,674	Species: Bentgrass, Cool Season
Expires:	13 Apr 2021			

Total Nutrient Needs	Application Month/Day	Analysis			# of Apps	Application Interval	Fertilizer Type	Fertilizer Description	Rate per 1000ft^2	lbs or oz	Wt. per Gal.	%Slow Release N	Total NPK lbs/1000ft^2			Gypsum	Lime	Total Product (lbs per Area)
Nitrogen		N	P	K									N	P_2O_5	K_2O			
3-6 lbs/1000 ft^2	Mar. 1	10	2	5	2	Monthly	Granular	Replenish	5.00	lbs	-	46%	1.00	0.20	0.50			758
Phosphorus	Mar. 15	0.5	0.25	0.5	1	-	Granular	Renovate/Plus	20.00	lbs	-	100%	0.10	0.05	0.10			3,033
2 lbs P_2O_5/1000 ft^2	May. 1	14	2	5	10	2 Weeks	Liquid	Protein Plus	10.00	oz	9.20	0%	1.01	0.14	0.36			1,517
Potassium	May 15	1	5	5	4	2 Weeks	Liquid	Trilogy	12.00	oz	9.20	0%	0.03	0.17	0.17			1,820
2.5 lbs K_2O/1000 ft^2	Jul. 15	6	0	0	4	2 Weeks	Liquid	Cal-Vantage	8.00	oz	11.20	0%	0.17	0.00	0.00			1,213
	Oct. 1	5	4	5	2	Monthly	Granular	Replenish	10.00	lbs	-	54%	1.00	0.80	1.00			1,517
	Nov. 15	0.5	0.25	0.5	1	-	Granular	Renovate/Plus	20.00	lbs	-	100%	0.10	0.05	0.10			3,033
	Dec. 1	10	2	5	1	-	Granular	Replenish	5.00	lbs	-	46%	0.50	0.10	0.25			758
	Nov-Dec				1	-	-	Dolomitic Lime	10.00	lbs	-	-	0.00	0.00	0.00		10.00	1,517
								Total				69%	3.91	1.52	2.48			
								N Recommendation Range and Soil Test Ratings					3-6	2	2.5			

Notes:

1. The recommended 3-6 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 6 lbs of N per 1,000 sq. ft.

2. Maximum water soluble (WSN) rate per application is 0.7 lbs N/1,000 sq.ft. A rate of 0.9 lbs/1,000 sq.ft. per application may be applied using a material containing slowly available forms of nitrogen.

3. Applications should fall within the "Cool Season Application" window of February 17th to December 27th, and applications should be spaced at least 30 days apart if the full rate or the highest rate of the recommendation range for a monthly application is applied in a single application (see Note 2).

4. Monthly applications of 10-2-5 should occur on March 1st, and April 1st.

5. Bi-weekly applications of 14-2-5 should occur on May 1st &15th, June 1st & 15th, July 1st & 15th, August 1st & 15th, and September 1st & 15th.

6. Bi-weekly applications of 1-5-5 should occur on May 15th, June 1st & 15th, and July 1st.

7. Bi-weekly applications of 6-0-0 should occur on July 15th, August 1st & 15th, and September 1st.

8. Monthly applications of 5-4-5 should occur on October 1st and November 1st.

9. Apply 15 lbs of dolomitic lime per 1,000 sq.ft. to the Ponderosa Pines course greens.

10. Lime is not recommended for the Virginia Pines course greens. Apply 2.3 lbs of magnesium oxide per 1,000 sq.ft.

Nutrient Application Worksheet

NAME:	**The Pines Golf Course, Joint Base Langley-Eustis – Eustis**													**Management Area:**			Ponderosa Pines and Shortleaf Pines, Fairways/Tees					
	13 Apr 2016										**Acres:**	**63**			**Species:**			**Bermuda, Warm Season**				
Expires:	**13 Apr 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
3.5-4.5 lbs/1000 ft^2	Apr. 1	12	-	0	-	12	1	-	Granular	Organic-Based	4.20	lbs	-	75%	0.50	-	0.00	-	0.50			11,581
Phosphorus	May 1	14	-	0	-	2	2	Monthly	Granular	Organic-Based	3.56	lbs	-	43%	1.00	-	0.00	-	0.14			9,816
0 lbs P_2O_5/1000 ft^2	July 1	40	-	0	-	0	1	-	Granular		1.87	lbs	-	84%	0.75	-	0.00	-	0.00			5,156
Potassium	Aug. 1	14	-	0	-	2	2	Monthly	Granular	Organic-Based	3.56	lbs	-	43%	1.00	-	0.00	-	0.14			9,816
1 lbs K_2O/1000 ft^2	Oct. 1	15	-	0	-	8	1	-	Granular	Organic-Based	3.30	lbs	-	70%	0.50	-	0.00	-	0.26			9,099
	Nov-Dec						1	-		Lime	36.00	lbs	-	-	0.00	-	0.00	-	0.00		36.00	99,265
											Total			**63%**	3.74	-	0.00	-	1.05			
										N Recommendation Range and Soil Test Ratings					3.5-4.5		0		1			

Notes:

1. The recommended 3.5-4.5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 4.5 lbs of N per 1,000 sq. ft.

2. Maximum water soluble (WSN) rate per application is 0.5 lbs N/1,000 sq.ft. with a minimum of 15 days between applications. A rate of 1.0 lbs/1,000 sq.ft. per application may be applied using a material containing slowly available forms of nitrogen with a minimum 30 days between applications.

3. Applications should fall within the "Warm Season Application" window of March 30th to October 15th.

4. Monthly applications of 14-0-2 should occur on May 1st, June 1st, August 1st, and September 1st.

5. Apply lime to the Ponderosa Pines and Shortleaf Pines fairways & tees at a rate of 36 lbs/1,000 sq.ft.

Nutrient Application Worksheet

NAME:	**The Pines Golf Course, Joint Base Langley-Eustis – Eustis**											**Management Area:**				Virgina Pines, Fairways/Tees						
	13 Apr 2016											**Acres:**	**32**			**Species:**			**Bermuda, Warm Season**			
Expires:	**13 Apr 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
3.5-4.5 lbs/1000 ft^2	Apr. 1	12	-	0	-	12	1	-	Granular	Organic-Based	4.20	lbs	-	75%	0.50	-	0.00	-	0.50			5,794
Phosphorus	May 1	14	-	0	-	2	2	Monthly	Granular	Organic-Based	3.56	lbs	-	43%	1.00	-	0.00	-	0.14			4,911
2.5 lbs P_2O_5/1000 ft^2	July 1	18	-	46	-	0	2	Monthly	Granular	DAP	2.77	lbs	-	0%	1.00	-	2.55	-	0.00			3,821
Potassium	Sept. 1	14	-	0	-	2	1	-	Granular	Organic-Based	3.54	lbs	-	43%	0.50	-	0.00	-	0.07			4,884
1 lbs K_2O/1000 ft^2	Oct. 1	15	-	0	-	8	1	-	Granular	Organic-Based	3.30	lbs	-	70%	0.50	-	0.00	-	0.26			4,552
	Nov-Dec						1	-		Lime	24.00	lbs	-	-	0.00	-	0.00	-	0.00		24.00	33,109
											Total			**58%**	3.49	-	2.55	-	0.98			
								N Recommendation Range and Soil Test Ratings							3.5-4.5		2.5		1			

Notes:

1. The recommended 3.5-4.5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 4.5 lbs of N per 1,000 sq. ft.

2. Maximum water soluble (WSN) rate per application is 0.5 lbs N/1,000 sq.ft. with a minimum of 15 days between applications. A rate of 1.0 lbs/1,000 sq.ft. per application may be applied using a material containing slowly available forms of nitrogen with a minimum 30 days between applications.

3. Applications should fall within the "Warm Season Application" window of March 30th to October 15th.

4. Monthly applications of 14-0-2 should occur on May 1st and June 1st.

5. Monthly applications of 18-46-0 should occur on July 1st and August 1st.

6. Apply lime to the Virginia Pines fairways and tees at a rate of 24 lbs/1,000 sq.ft.

Nutrient Application Worksheet

NAME:	**The Pines Golf Course, Joint Base Langley-Eustis – Eustis**											**Management Area:**				Clubhouse Grounds & Driving Range Tees						
	13 Apr 2016										**Acres:**	**2.30**				**Species:**				**Bermuda, Warm Season**		
Expires:	**13 Apr 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
2-5 lbs/1000 ft^2	Feb-Mar	21	-	0	-	0	2	Weekly	Granular		1.20	lbs	-	0%	0.50	-	0.00	-	0.00			120
Phosphorus	Apr. 1	12	-	0	-	12	1	-	Granular	Organic-Based	3.30	lbs	-	75%	0.40	-	0.00	-	0.40			331
0 lbs P_2O_5/1000 ft^2	May 1	14	-	0	-	2	2	Monthly	Granular	Organic-Based	3.56	lbs	-	43%	1.00	-	0.00	-	0.14			357
Potassium	July 1	40	-	0	-	0	1	-	Granular		1.87	lbs	-	84%	0.75	-	0.00	-	0.00			187
1 lbs K_2O/1000 ft^2	Aug. 1	14	-	0	-	2	2	Monthly	Granular	Organic-Based	3.56	lbs	-	43%	1.00	-	0.00	-	0.14			357
	Oct-Nov	24		0		11	2	Weekly	Granular	Organic-Based	1.05	lbs	-	50%	0.50	-	0.00	-	0.23			105
	Nov-Dec						1	-		Lime	36.00	lbs	-	-	0.00	-	0.00	-	0.00		36.00	3,607
											Total			**59%**	4.15	-	0.00	-	0.91			
								N Recommendation Range and Soil Test Ratings							2-5		0		1			

Notes:

1. The recommended 2-5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 5 lbs of N per 1,000 sq. ft.

2. Maximum water soluble (WSN) rate per application is 0.7 lbs N/1,000 sq.ft. A rate of 1.0 lbs/1,000 sq.ft. per application may be applied using a material containing slowly available forms of nitrogen.

3. Applications should fall within the "Warm Season Application" window of March 30th to October 15th with the exception of the Feb-Mar and Oct-Nov applications permitted due to overseeding with perennial ryegrass. Applications should be spaced at least 30 days apart if the full rate or the highest rate of the recommendation range for a monthly application is applied in a single application (see Note 2).

4. Monthly applications of 14-0-2 should occur on May 1st, June 1st, August 1st, and September 1st.

5. Apply lime to the clubhouse grounds and driving range tees at a rate of 36 lbs/1,000 sq.ft.

Soil Test Summary

Customer Name:	Joint Base Langley-Eustis – Eustis
Testing Lab:	Waypoint Analytical (Formerly A&L Eastern Laboratories)
Sample Date:	12 Mar 2015
Planner Name	Chris Oliver, CNMP (AECOM)
Certification Number	#811

Managed Area ID	AREA (sq ft)	Soil pH	Buffer pH	Lab Test P (ppm)	VT (H/M/L)	Lab Test K (ppm)	VT (H/M/L)	Species
SL5		6.0	6.90	21	L+	41	L	Bentgrass
SL8		6.0	6.90	21	L+	51	L	Bentgrass
PP10		5.9	6.90	22	L+	72	M	Bentgrass
PP15		5.8	6.90	12	L	37	L	Bentgrass
VP9		6.5	N/A	25	L+	41	L	Bentgrass
VP4		6.4	N/A	24	L+	27	L-	Bentgrass
Recommendation	2.0	lbs P_2O_5/1000 ft^2			2.5	lbs K_2O/1000 ft^2		

Notes:	

Soil Test Summary

Customer Name:	Joint Base Langley-Eustis – Eustis
Testing Lab:	Waypoint Analytical (Formerly A&L Eastern Laboratories)
Sample Date:	07 Jan 2016
Planner Name	Chris Oliver, CNMP (AECOM)
Certification Number	#811

Managed Area ID	AREA (sq ft)	Soil pH	Buffer pH	Lab Test P (ppm)	VT (H/M/L)	Lab Test K (ppm)	VT (H/M/L)	Species
SL1		4.9	6.67	108	H+	122	M+	Bermuda
SL8		4.5	6.52	122	VH	51	L	Bermuda
PP11		4.4	6.49	131	VH	130	M+	Bermuda
PP16		5.3	6.58	138	VH	134	M+	Bermuda
VP1		5.7	6.67	22	L+	135	M+	Bermuda
VP6		5.5	6.73	11	L-	115	M+	Bermuda
Recommendation (Shortleaf Pines, Ponderosa Pines)	0	lbs P_2O_5/1000 ft^2			1	lbs K_2O/1000 ft^2		
Recommendation (Virginia Pines)	2.5	lbs P_2O_5/1000 ft^2			1	lbs K_2O/1000 ft^2		

Notes:	

Soil Test Reports

Soil samples were taken from greens, tees, and fairways. Sub-samples from the tees and fairways were combined and submitted as one sample becase of similar soil and fertility conditions seen in both management areas. The clubhouse grounds exhibit similar soil and fertility conditions seen in the fairways and tees and will follow the corresponding nutrient recommendations.

Soil samples were analyzed by Waypoint Analytical (formerly A&L Eastern Laboratories). Standard soil test results provide values for pH, cation exchange capacity, phosphorus, calcium, magnesium, potassium, and organic matter. The soil samples collected are valid for the life of this plan (five years) or upon a major renovation or redesign of the golf course, whichever occurs sooner.

A. Greens (Ponderosa Pines, Shortleaf Pines, and Virginia Pines), Putting Green; 151,674 sq ft (3.5 acres)
Soil pH measured 6.5 for the Virginia Pines course. No lime is recommended. Soil pH measured 5.9 for the Ponderosa Pines course. Dolomitic lime is recommended and should be applied at a rate of 15 lbs/1,000 sq ft. Soil pH measured 6.0 for the Shortleaf Pines course. Dolomitic lime is recommended and should be applied at a rate of 10 lbs/1,000 sq ft. Soil Phosphorus levels averaged in the L+ range. Phosphorus applications are recommended, not to exceed 2.0 lbs/1,000 sq ft annually. Potassium levels averaged in the L range. Applications of potassium are recommended, not to exceed 2.5 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 6 lbs/1,000 sq ft annually.

B. Fairways & Tees (Ponderosa Pines, Shortleaf Pines, and Virginia Pines), Clubhouse grounds; 4,138,200 sq ft (95 acres)
Soi pH measured 4.8 for the Ponderosa Pines and Shortleaf Pines courses. Lime is recommended and should be applied at a rate of 36 lbs/1,000 sq ft. Soil pH measured 5.6 for the Virginia Pines course. Lime is recommended and should be applied at a rate of 24 lbs/1,000 sq ft. Phosphorus levels averaged in the VH range for the Ponderosa and Shortleaf Pines courses. Applications of phosphorus are not recommended. Phosphorus levels averaged in the L range for the Virginia Pines course. Applications of phosphorus are recommended, not to exceed 2.5 lbs/1,000 sq ft annually. Potassium levels averaged in the M+ range for all fairways and tees. Applications of potassium are recommended, not to exceed 1 lb/1,000 sq ft annual. Nitrogen applications may not exceed 4.5 lbs/1,000 sq ft annually.

Other Turf Management Considerations for Golf Courses, Athletic fields, and Home Lawns

Lime Recommendations

Lime should be recommended based on a soil test to maintain soil pH within an agronomic range for turfgrass. For new seedings where lime is recommended, incorporate the lime into the topsoil for best results.

Returning Grass Clippings

Recycling of clippings on turf should be encouraged as an effective means of recycling nitrogen, phosphorus, and potassium. Proper mowing practices that ensure no more than 1/3 of the leaf blade is removed in any cutting event will enhance turf appearance and performance when clippings are returned. Return all leaf clippings from mowing events to the turf rather than discharging them onto sidewalks or streets. Rotary mulching mowers can further enhance clipping recycling by reducing the size of clippings being returned to the turfgrass canopy.

Management of Collected Clippings

If clippings are collected they should be disposed of properly. They may be composted or spread uniformly as a thin layer over other turf areas or areas where the nutrient content of the clippings can be recycled through actively growing plants. They should not be blown onto
impervious surfaces or surface waters, dumped down stormwater drains, or piled outside where rainwater will leach out the nutrients creating the potential for nutrient loss to the environment.

Use of Iron

Iron applications (particularly foliar applications) may periodically be used for enhanced greening as an alternative to nitrogen. These applications are most beneficial if applied in late spring through summer for cool season grasses and in late summer/fall applications for warm-season grasses.

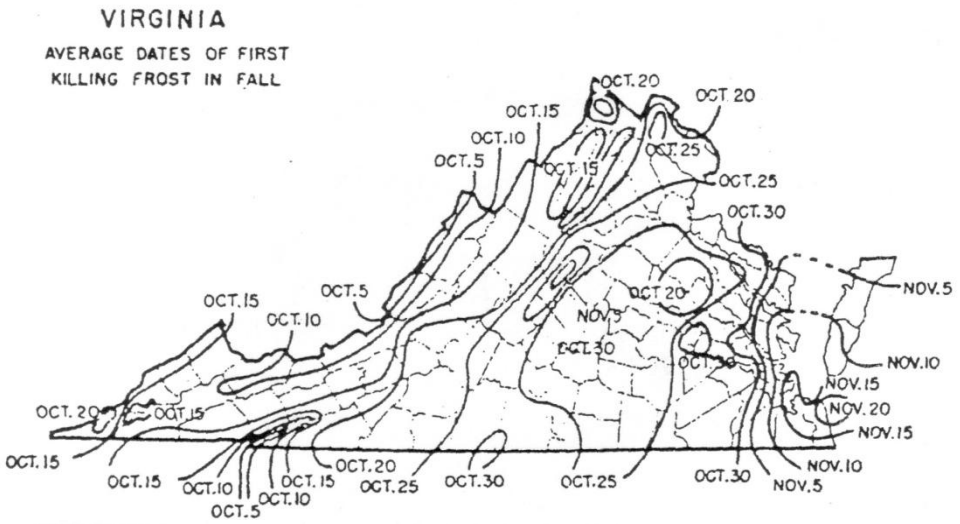
Impervious Surfaces

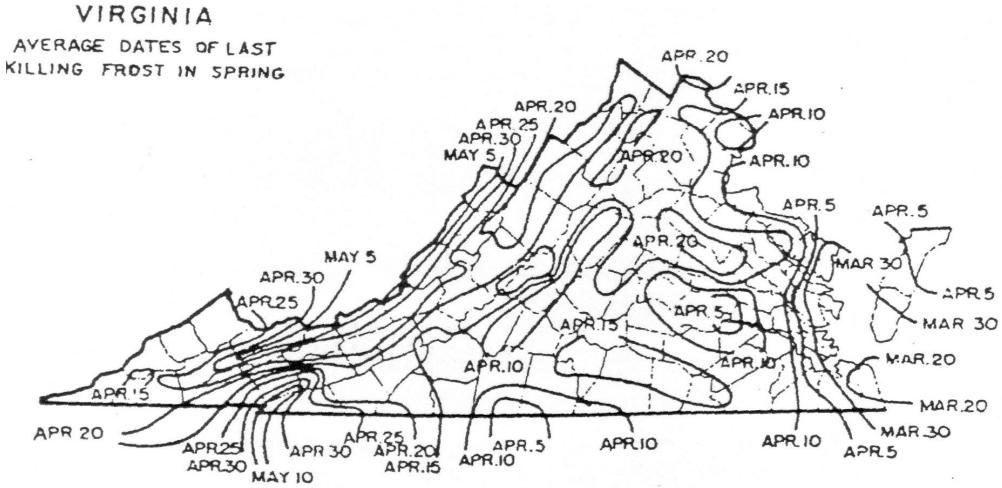
Do not apply fertilizers containing nitrogen or phosphorus to impervious surfaces (sidewalks, streets, etc.). Remove any granular materials that land on impervious surfaces by sweeping and collecting, and either put the collected material back in the bag, or spread it onto the turf and /or using a leaf blower etc. to return the fertilizer back to the turfgrass canopy.

Recommended Season of Application For Nitrogen Fertilizers - Applies to all Turf

A nitrogen fertilization schedule weighted toward fall application is recommended and preferred for agronomic quality and persistence of cool season turfgrass; however, the acceptable window of applications is much wider than this for nutrient management. The nutrient management recommended application season for nitrogen fertilizers to cool season turfgrasses begins six weeks prior to the last spring average killing frost date and ends six weeks past the first fall average killing frost date (see Figures 6-1 & 6-2). Applications of nitrogen during the intervening late fall and winter period should be avoided due to higher potential leaching or runoff risk, but where necessary, apply no more than 0.5 pounds per 1,000 ft2 of water soluble nitrogen. Higher application rates may be used during this late fall and winter period by using materials containing slowly available sources of nitrogen, if the water soluble nitrogen contained in the fertilizer does not exceed the recommended maximum of 0.5 pounds per 1,000 ft2 rate. Do not apply nitrogen or phosphorus fertilizers when the ground is frozen.

The acceptable nitrogen fertilizer application season for non-overseeded warm season turfgrass begins no earlier than the last spring average killing frost date and ends no later than one month prior to the first fall average killing frost date (see Figures 6-1 & 6-2)





Per Application Rates
Do not apply more than one (1) pound of water soluble nitrogen per 1,000 ft2 within a 30 day period. For applications of materials containing slowly available sources of nitrogen, higher application rates are acceptable if the water soluble nitrogen contained in the fertilizer does not exceed the maximum recommended rate for a 30 day period. Lower per application rates of water soluble nitrogen sources or use of slowly available nitrogen sources should be utilized on very permeable sandy soils, shallow soils over fractured bedrock, or areas near water wells.

Annual Application Rates for Home Lawns and Commercial Turf
Up to 3.5 pounds per 1,000 ft2 of nitrogen may be applied annually to cool season grass species or up to 4 pounds per 1,000 ft2 may be applied annually to warm season grass species using 100 percent water soluble nitrogen sources. Lower rates of nitrogen application may be desirable on those mature stands of grasses that require less nitrogen for long-term quality. As a result, lower application rates will probably be more suited to the fine leaf fescues (hard fescue, chewings fescue, creeping red fescue, and sheep fescue) and non-overseeded zoysiagrass. Lower rates should also be used on less intensively managed areas.

Use of Slowly Available Forms of Nitrogen
For applications of materials containing Water Insoluble Nitrogen (WIN) sources, total annual nitrogen application rates may be adjusted incrementally from Water Soluble Nitrogen (WSN) rates by referring to the following figure (maximum annual N rates when using 50% or greater Water Insoluble Nitrogen are 5.0 lbs/1000 ft2 for cool season grasses, and 5.5 lbs/1,000 ft2 for warm season grasses):
Rates already stated as WIN should be applied as stated without adjustment.

Phosphorus and Potassium Nutrient Needs (Established Turf)
Apply phosphorus (P2O5) and potassium (K2O) fertilizers as indicated necessary by a soil test using the following guidelines:

Soil Test Level	Nutrient Needs (lbs /1000 ft$^{2)}$ *	
	P_2O_5	K_2O
L	2-3	2-3
M	1-2	1-2
H	0.5-1	0.5-1
VH	0	0

* For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range. (For example the recommendation for a P2O5 soil test level of L- would be 3 lbs/ 1,000 ft2.)

Do not use high phosphorus ratio fertilizers such as 10-10-10 or 5-10-10, unless soil tests indicate phosphorus availability below the M+ level.

Recommendations for Establishment of Turf

These recommendations are for timely planted turfgrass, that is, the seed or vegetative material (sod, plugs, and /or sprigs), are planted at a time of the year when temperatures and moisture are adequate to maximize turfgrass establishment. These recommended establishment periods would be late summer to early fall for cool-season turfgrasses and late spring through mid-summer for warm-season turfgrasses.

Nitrogen Applications

No more than 1 lb/1,000 ft2 at planting, followed by one or two applications beginning 30 days after planting, not to exceed a total of 2 lbs/1,000 ft2 total for the establishment period.

Phosphorus and Potassium Recommendations for Establishment

Soil Test Level	Nutrient Needs (lbs /1000 $ft^{2)}$ *	
	P_2O_5	K_2O
L	3-4	2-3
M	2-3	1-2
H	2-1	0.5-1
VH	0	0

* For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range.

Nutrient Recommendations for Golf Courses

Nitrogen Timing

The beginning and ending dates for application of nitrogen shall be determined using guidance and frost date maps contained in the Season of Application for Nitrogen section, Figures 6-1 and 6-2.

If the full rate or the highest rate of the recommendation range for a monthly application is applied in a single application, then the interval of application for nitrogen shall be at least 30 days to allow turf to utilize previous nitrogen applications. If several applications are to be made for the monthly nitrogen rate, then the timing of the applications shall be at approximately even intervals, with the rate per application to be evenly divided between each application with the total nitrogen applied not to exceed the maximum monthly rate. Use of Water Insoluble Nitrogen forms of Nitrogen is encouraged.

Nitrogen Rates

	Grass Type	Maximum N Rate Per Application lbs/1,000 ft^2	Total Annual N Rate lbs/1,000 ft^2 [a]
Greens		.75	3-6
Tees		.75	2-5
Fairways	Cool Season	1[b]	2-3
	Warm Season	1[b]	3-4
Fairways - Intensive Management	Cool Season	0.5[c]	3-4
	Warm Season	0.5[c]	3.5-4.5
Overseeding Warm Season Fairways		.5	1.25
Roughs		1	1-3

Fairways-Overseeding Warm Season Fairways

• For warm season grasses, 0.50-0.75 lb/1,000 ft^2 of Nitrogen may be applied in the Fall after perennial ryegrass overseeding is well established. An additional N application of 0.50 lb/1,000ft^2 may be made in February-March to overseeded perennial ryegrass if growth and color indicate need.

• Soluble N rates of ¼ lb/1,000 ft^2 or less which may be a component of a pesticide or minor element application, may be applied any time during the application windows described in Recommended Season of Application for Nitrogen Fertilizers of this section, but must be considered with the total annual N application rate.

(a) Use higher rates for intensively used turf where accelerated growth and/or rapid recovery are required, use lower rates for maintenance of lesser used areas; do not exceed total annual N levels as stated above.

(b) Fairways-Normal Management (Non-Irrigated or Irrigated) - Per Application timing mustbe a minimum of 30 days between applications.

(c) Fairways-Intensive Management (Irrigated)- Per Application timing must be a minimum of 15 days between applications. This option requires optimized timing of more frequent applications of nitrogen with lesser rates per application. Alternatively, a maximum application rate of 1 lb N/1,000 ft^2 of a material with 50% or greater WIN may be applied a minimum of 30 days between applications.

(d) Foliar fertilizer may be applied to warm season grasses within 30 days prior to the first killing frost in the fall, at a rate not to exceed 0.1 lb/1,000ft^2 of nitrogen per application. This application must be accounted for in the total annual nitrogen rate.

Phosphorus and Potassium Recommendations for Established Golf Courses
Apply phosphorus (P2O5) and potassium (K2O) fertilizers as indicated by a soil test using the following guidelines:
The acceptable nitrogen fertilizer application season for non-overseeded warm season turfgrass begins no earlier than the last spring average killing frost date and ends no later than one month prior to the first fall average killing frost date (see Figures 6-1 & 6-2)

Soil Test Level	Nutrient Needs (lbs /1000 ft^2)*	
	P_2O_5	K_2O
L	2-3	2-3
M	1-2	1-2
H	0.5-1	0.5-1
VH	0	0

* For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range.

. For irrigated turf grown on Naturally Occurring and Modified Sand Based soils only, up to 0.5 lb of P2O5 /1,000 ft^2 may be applied, if needed, to aid in recovery of damaged turf during times of extreme use. No phosphorus applications shall be made when the soil phosphorus test level is above 65% saturation, based on the soil test phosphorus values and region as listed in Table 4-1 of Section IV.

. Avoid the general use of high phosphorus ratio fertilizers such as 10-10-10 or 5-10-10, unless soil tests indicate phosphorus availability below the M+ level.

Establishment/Grow-In Recommendations for Golf Courses, Athletic Fields, and Sod Production

(These rates replace normal maintenance fertilizer applications that would have occurred during these time periods.)

Warm Season Grasses:

Predominantly Silt/Clay Soils
♦ Plant Date - late May -June for sprigs, plugs, sod, or seeding. ♦ *Apply P2O5 and K2O as needed based on soil test recommendations, incorporate into the top 2 inches if possible.*
♦ At Planting - Up to 1 lb N/1,000 ft^2 of WIN 50% or greater may be applied as one application or lesser amounts applied at regular intervals, through the first 4 weeks, not to exceed a total of 1 lb N/1,000ft^2.
♦ Four weeks after planting - ¼ - ½ lb. of WSN/1,000 ft^2 per week for the next 4 weeks.

Naturally Occurring or Modified Sand Based Soils
♦ Plant Date - late May -June for sprigs, plugs, sod, or seeding. ♦ Apply P2O5 and K2O as needed based on soil test recommendations, incorporate into
the top 2 inches if possible. ♦ Pre-plant - 1lb/N 1,000 ft^2 of WIN 50% or greater. ♦ Four weeks after planting - ¼ - ½ lb. of WSN/1,000 ft^2 per week for the next 4 weeks.

Cool Season Grasses:

Predominantly Silt/Clay Soils
♦ Plant Date - August - September (preferred)
♦ Apply P2O5 and K2O as needed based on soil test recommendations, incorporate into the top 2 inches if possible.
♦ At Planting - up to 1 lb N/1,000 ft^2 using a slowly available N source; 30 days after planting, apply up to 0.5 lb N/1,000 ft^2 every week for the next 4 weeks.

Naturally Occurring or Modified Sand Based Soils
♦ Plant Date - August -September (preferred)
♦ Apply P_2O_5 and K_2O as needed based on soil test recommendations, incorporate into the top 2 inches if possible.
♦ At Planting - up to 1 lb N/1,000 ft^2 using a WIN 50% or greater N source.
♦ Apply up to ¼ lb N/1,000 ft^2 per week after germination is complete, for the next 8 weeks. If material is 50% or greater WIN, then apply up to ½ lb N/1,000 ft^2 every two weeks aftergermination is complete for the next 8 weeks.

Sod Installations:

Site preparation should include a soil test, which can be done several months before the project begins in order to have time to get test results back. Phosphorus, potassium and lime applications should be based on soil test analysis to increase the likelihood of a successful installation. Shallow incorporation of material into the top 2 inches of the soil is preferred prior to sod installation, especially if lime is required.

No more than 0.5 lb of N/1,000 ft^2 as water soluble Nitrogen or 1 lb N/1,000 ft^2 as at least 50% WIN should be applied before sod is installed.

After installation apply adequate amounts of water to maintain sufficient soil moisture (i.e. to prevent visible wilt symptoms). Excessive water will limit initial root development. After roots begin to establish (as verified by lightly tugging on the sod pieces), shift irrigation strategy to a deep and infrequent program in order to encourage deep root growth. Apply approximately 1 inch of water per week (either by rainfall or irrigation), making sure that the water is being accepted by the soil profile without running off. This will insure thorough wetting of the soil profile.

After sod has completed rooting and is well established, initiate the normal nitrogen management program as described for the appropriate use shall be recommended.

Phosphorus and Potassium Recommendations for Establishment/Grow-In/Installation

Soil Test Level	Nutrient Needs (lbs /1000 ft^2) *	
	P_2O_5	K_2O
L	3-4	2-3
M	2-3	1-2
H	2-1	0.5-1
VH	0	0

* For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range.

Reference Materials and Notes

A) Virginia Nutrient Management Standards and Criteria, Revised July 2014, Department of Conservation and Recreation, Division of Soil and Water Conservation

B) ESRI Aerial Photography

C) Geospatial data provided by Joint Base Langley-Eustis for parcel boundaries, golf course boundaries, roads, streams, and wetlands.

D) Flood plain data obtained from FEMA National Flood Hazard Layer digital database (https://www.fema.gov/national-flood-hazard-layer-nfhl)

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Greens
Address:	The Pines Golf Course	Management Area Size:	151,674 sq ft
	3518 Mulberry Island Rd.	Plant Species:	Bentgrass, Cool Season
	JBLE – Eustis, VA 23604	Notes:	
Phone #:	757-878-2252		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Ponderosa Pines and Shortleaf Pines, Fairways/Tees
Address:	The Pines Golf Course	Management Area Size:	63 acres
	3518 Mulberry Island Rd.	Plant Species:	Bermudagrass, Warm Season
	JBLE – Eustis, VA 23604	Notes:	
Phone #:	757-878-2252		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Virginia Pines, Fairways/Tees
Address:	The Pines Golf Course	Management Area Size:	32 acres
	3518 Mulberry Island Rd.	Plant Species:	Bermudagrass, Warm Season
	JBLE – Eustis, VA 23604	Notes:	
Phone #:	757-878-2252		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Clubhouse Grounds & Driving Range Tees
Address:	The Pines Golf Course	Management Area Size:	2.3 acres
	3518 Mulberry Island Rd.	Plant Species:	Bermudagrass (overseeded with Perennial Rye)
	JBLE – Eustis, VA 23604	Notes:	
Phone #:	757-878-2252		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Nutrient Management Plan

Force Support Division – Athletic Fields

Prepared For:

Joint Base Langley-Eustis – Eustis
643 Dickman St.
JBLE – Eustis, VA 23604
757-878-2097

Prepared By:

Chris Oliver, CNMP (AECOM)
1600 Perimeter Park Drive, Suite 400
Morrisville, NC. 27560
919-461-1100
Certification Code: #811
Total Acreage: 11.2

The purpose of this Nutrient Management Plan is to ensure minimum movement of nitrogen and phosphorus from the specified area of application to surface and groundwaters where they can potentially have a detrimental effect on water quality as well as ensuring that plants have optimum soil nutrient availability for good productivity and quailty. By following this soil test based plan you are helping to protect local waters and the Chesapeake Bay.

If you have questions, please contact your plan writer, local Virginia Cooperative Extension Agent or the Department of Conservation and Recreation Nutrient Mangement Program.

Nutrient Management Plan for:
Force Support Division – Athletic Fields

Landowner Information	
Company Name	*Force Support Division – Athletic Fields*
Customer Name	*Joint Base Langley-Eustis – Eustis*
Mailing Address	*643 Dickman St.*
City State Zip	*JBLE – Eustis, VA 23604*
Phone	*757-878-2097*
Email	kellie.m.jorgensen.naf@mail.mil

Planners Informaiton	
Planner Name	*Chris Oliver, CNMP (AECOM)*
Mailing Address	*1600 Perimeter Park Drive, Suite 400*
City State Zip	*Morrisville, NC. 27560*
Phone	*919-461-1100*
Fax	*919-461-1415*
Email	chris.oliver@aecom.com
Certification Code	*#811*

Location Information	
Physical Address	*643 Dickman St.*
City State Zip	*JBLE – Eustis, VA 23604*
Coordinates	*37° 9' 37.5732"*
Please Use NAD 83 Deg Min Sec	*-76° 34' 35.1114"*
VAHU6 Watershed Code	*Kilpatrick Field, Field #3 & 4: JL35* *Murphy Field: JL38*

Acreage	
Total	*11.2*
Kilpatrick Field	*3.7*
Softball Field #3	*2.1*
Soccer Field #4	*2.6*
Murphy Field	*2.8*

Plan Start Date	*13 Apr 2016*
Plan End Date	*13 Apr 2021*

Planner Signature	

Narrative

1. Site Description and Supporting Information

This nutrient management plan has been prepared by AECOM Technical Services, Inc.

Force Support Division (FSD) currently applies fertilizer to four athletic fields at JBLE-Eustis. The four fields are identified as Kilpatrick Field near the Anderson Field House, Softball Field #3 and Soccer Field #4 near the Army Reserve Center and Murphy Field behind the Army & Air Force Exchange Service (AAFES) Shoppette/Class Six/Gas Station. The total acreage of these fields is about 11 acres. Managed turf at each of the four athletic fields is comprised of Bermuda grass (a warm-season grass) overseeded with perennial ryegrass (a cool-season grass).

The sites are relatively flat with maximum slopes less than 2%. Environmentally sensitive sites are limited to wetlands to the southeast of Softball Field # 3 and Soccer Field #4. Fertilizer applications to the fields should only be made when heavy rain events are not expected.

This plan is effective for five years (until 13 April 2021) or until major field renovation or major changes to maintenance practices occur. Applications of inorganic fertilizers should not occur on frozen or snow-covered ground. Any fertilizer that makes its way onto impervious surfaces should be swept or blown back into pervious turfgrass-covered areas. Do not use fertilizers as ice melt.

Every fertilizer application should be recorded in the record sheet provided. Any questions or concerns with fertilizer products or record keeping should be brought to the plan writer's attention.

Killing Frost Dates for Newport News, Virginia are March 30th (Spring) and November 15th (Fall).

Applications to the athletic fields should occur within the "Warm Season Application Period" of March 30th to October 15th, with the exception of the Feb-Mar and Oct-Nov applications. The Feb-Mar and Oct-Nov applications, identified in the nutrient management worksheets for each field of this plan, are additional applications that are permitted due to overseeding the field with cool season grasses.

Maps

2. Site Maps

A) Figure 1. Overview Map - Location & Boundaries

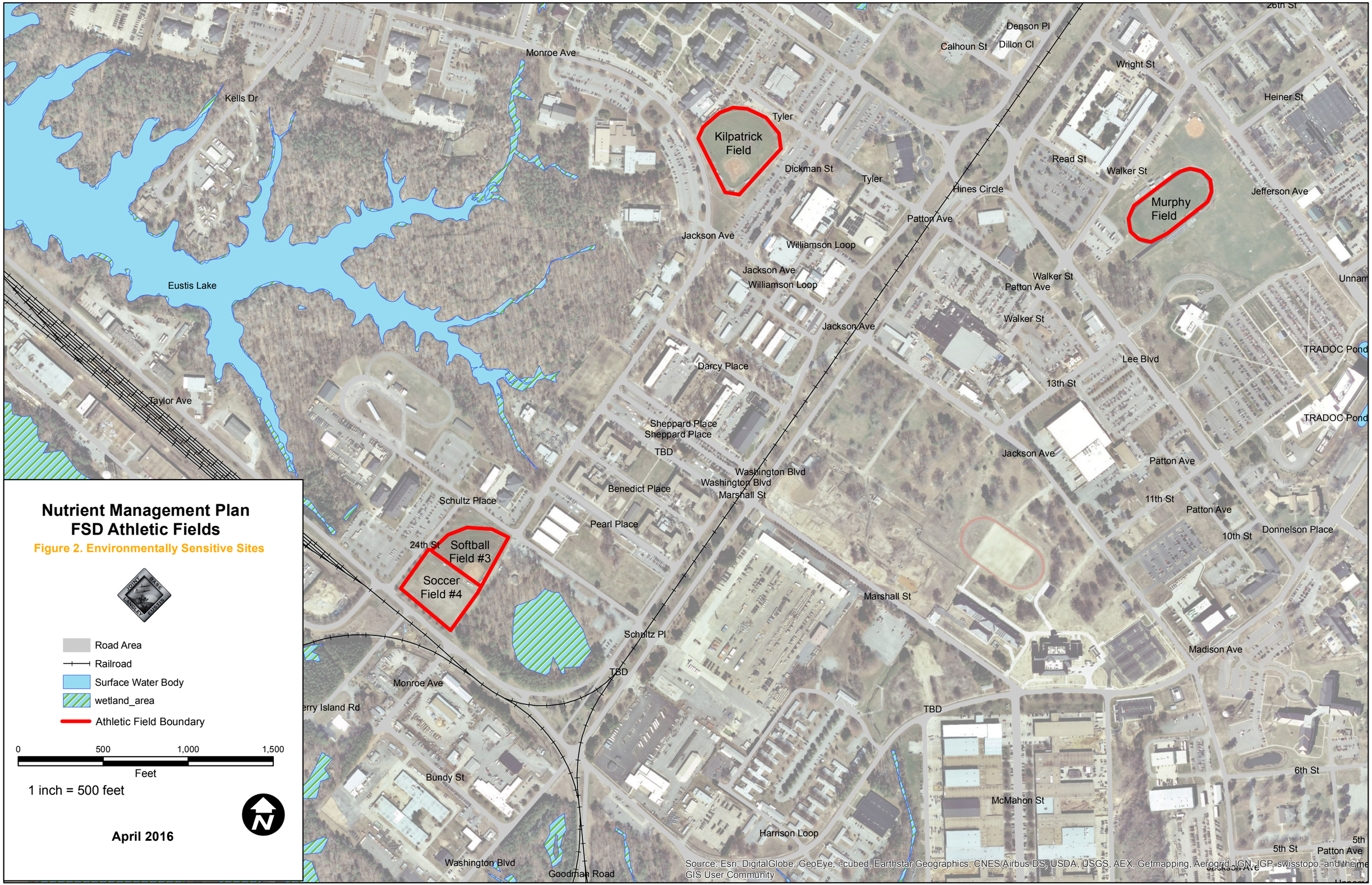
B) Figure 2. Environmentally Sensitive Sites

C) Figure 3. Management Areas - Kilpatrick Field

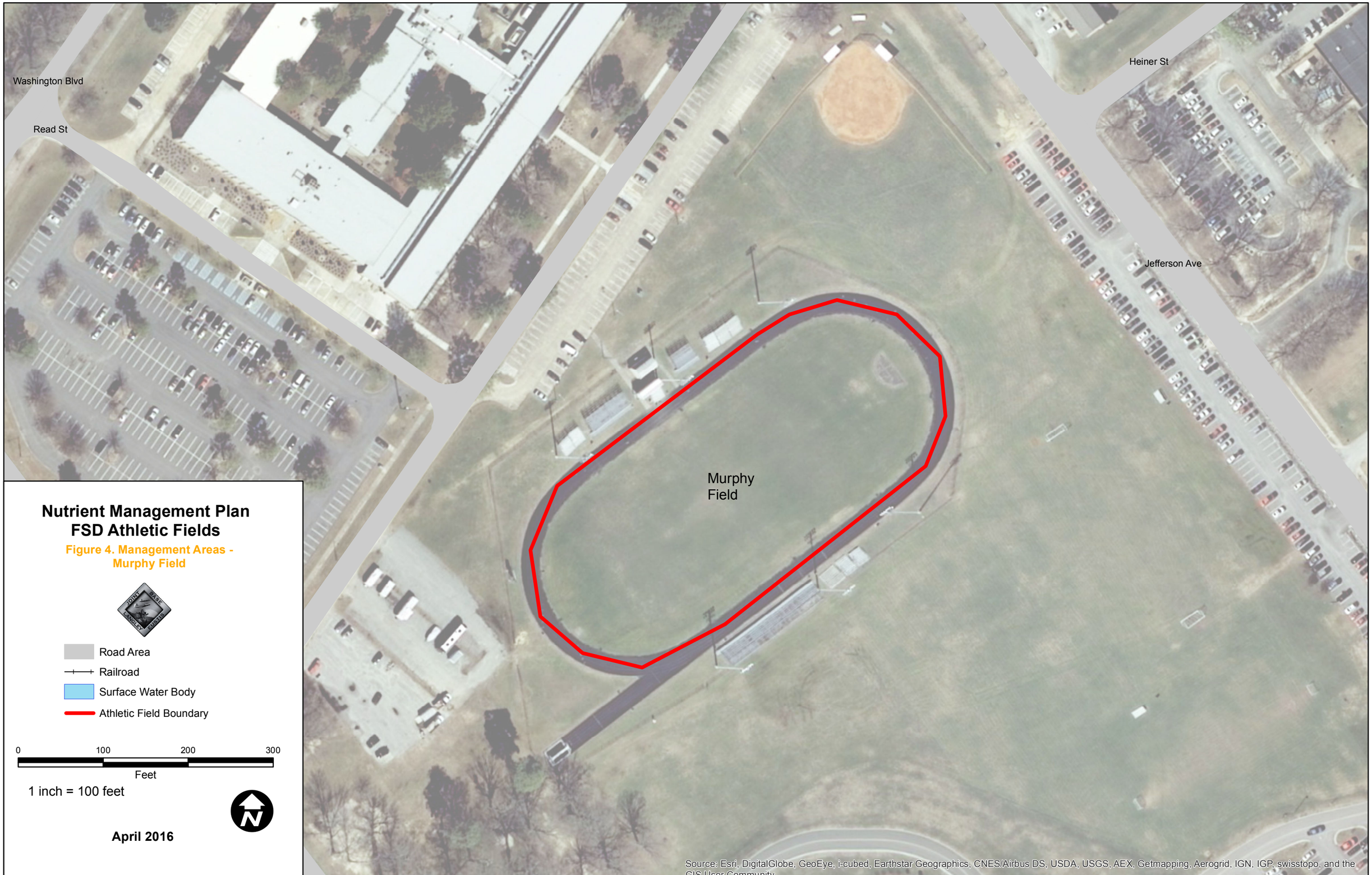
D) Figure 4. Management Areas - Murphy Field

E) Figure 5. Management Areas - Softball Field #3 & Soccer Field #4

Nutrient Management Plan
FSD Athletic Fields
Figure 1. Overview Map - Location & Boundaries
Road Area
Railroad
Surface Water Body
Athletic Field Boundary
0
500
1,000
1,500
Feet
1 inch = 500 feet
April 2016
Kilpatrick Field
Murphy Field
Softball Field #3
Soccer Field #4
Eustis Lake
Monroe Ave
Kells Dr
Tyler
Dickman St
Jackson Ave
Williamson Loop
Patton Ave
Hines Circle
Calhoun St
Denson Pl
Dillon Cl
Wright St
Read St
Walker St
Heiner St
Jefferson Ave
26th St
Unnam
TRADOC Pond
Lee Blvd
13th St
Darcy Place
Sheppard Place
TBD
Washington Blvd
Marshall St
Benedict Place
Pearl Place
Schultz Place
24th St
Schultz Pl
Taylor Ave
Monroe Ave
Bundy St
Washington Blvd
Goodman Road
Harrison Loop
McMahon St
TBD
Madison Ave
Marshall St
11th St
10th St
Donnelson Place
6th St
5th St
5th
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community


Nutrient Management Plan
FSD Athletic Fields
Figure 2. Environmentally Sensitive Sites
Road Area
Railroad
Surface Water Body
wetland_area
Athletic Field Boundary
0
500
1,000
1,500
Feet
1 inch = 500 feet
April 2016
Kilpatrick Field
Murphy Field
Softball Field #3
Soccer Field #4
Eustis Lake
Monroe Ave
Kells Dr
Tyler
Dickman St
Jackson Ave
Williamson Loop
Patton Ave
Hines Circle
Read St
Walker St
Wright St
Heiner St
Jefferson Ave
Denson Pl
Dillon Cl
Calhoun St
26th St
Unnam
TRADOC Pond
Lee Blvd
13th St
Darcy Place
Sheppard Place
TBD
Washington Blvd
Marshall St
Benedict Place
Pearl Place
Schultz Place
24th St
Schultz Pl
Taylor Ave
Bundy St
Goodman Road
Harrison Loop
McMahon St
Madison Ave
6th St
5th St
5th
11th St
10th St
Donnelson Place
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Calhoun St
Lee Blvd
Monroe Ave
Kilpatrick Field
Tyler
Dickman St
Tyler
Jackson Ave
Jackson Ave
Williamson Loop
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Nutrient Management Plan
FSD Athletic Fields
Figure 3. Management Areas - Kilpatrick Field
Road Area
Railroad
Surface Water Body
Athletic Field Boundary
0
100
200
300
Feet
1 inch = 100 feet
April 2016


Washington Blvd
Read St
Heiner St
Jefferson Ave
Murphy
Field
Nutrient Management Plan
FSD Athletic Fields
Figure 4. Management Areas -
Murphy Field
Road Area
Railroad
Surface Water Body
Athletic Field Boundary
0
100
200
300
Feet
1 inch = 100 feet
N
April 2016
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Pearl Place
Monroe Ave
Schultz Place
Softball
Field #3
Soccer
Field #4
24th St
Taylor Ave
Mulberry Island Rd
Monroe Ave
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Nutrient Management Plan
FSD Athletic Fields
Figure 5. Management Areas -
Softball field #3 & Soccer Field #4
Road Area
Railroad
Surface Water Body
Athletic Field Boundary
0
100
200
300
Feet
1 inch = 100 feet
April 2016

Nutrient Application Worksheet

NAME:	**FSD Athletic Fields, Joint Base Langley-Eustis – Eustis**													**Management Area:**					Kilpatrick Field			
	13 Apr 2016													**Acres:**		**3.70**			**Species:**		**Bermudagrass (overseeded)**	
Expires:	**13 Apr 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
5 lbs/1000 ft^2	Feb-Mar	21	-	0	-	0	1	-	Granular	Ammonium Sulphate	2.40	lbs	-	0%	0.50	-	0.00	-	0.00			387
Phosphorus	April 15	14	-	0	-	2	2	Monthly	Granular	Organic-Based	3.58	lbs	-	43%	1.00	-	0.00	-	0.14			577
0.75 lbs P_2O_5/1000 ft^2	June 15	24	-	0	-	11	4	Monthly	Granular	Organic-Based	2.08	lbs	-	50%	2.00	-	0.00	-	0.92			335
Potassium	Oct-Nov	16	-	25	-	12	1	-	Granular		3.00	lbs	-	21%	0.48	-	0.75	-	0.36			484
1.5 lbs K_2O/1000 ft^2																						
											Total			**38%**	3.98	-	0.75	-	1.42			
								N Recommendation Range and Soil Test Ratings							5		0.75		1.5			

Notes:

1. The recommended 5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 5 lbs of N per 1,000 sq. ft.

2. Water soluble nitrogen (WSN) shall not exceed 0.7 lbs N/1,000 sq.ft. within a 30 day period (except for April, May, and September applications where WSN must be applied as two applications not to exceed 0.35 lbs N/1,000 sq.ft. each with a minimum of 15 days between applications). A rate of 1.0 lbs/1,000 sq.ft. per application may be applied using a material containing at least 15% slowly available forms of nitrogen with a minimum of 30 days between applications.

3. Applications should fall within the "Warm Season Application" window of March 30th to November 15th with the exception of the Feb-Mar and Oct-Nov applications permitted due to overseeding with perennial ryegrass.

4. Monthly applications of 14-0-2 should occur on April 15th and May 15th.

5. Monthly applications of 24-0-11 should occur on June 15th, July 15th, August 15th, and September 15th (may also be applied at a rate of 4.16 lbs per 1,000 sq.ft. on June 15th and July 15th to reduce the total number of applications).

6. Lime is not recommended.

Nutrient Application Worksheet

NAME:	**FSD Athletic Fields, Joint Base Langley-Eustis – Eustis**														**Management Area:**				Softball Field #3			
	13 Apr 2016														**Acres:**		**2.10**		**Species:**		**Bermudagrass (overseeded)**	
Expires:	**13 Apr 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
5 lbs/1000 ft^2	Feb-Mar	21	-	0	-	0	1	-	Granular	Ammonium Sulphate	2.40	lbs	-	0%	0.50	-	0.00	-	0.00			220
Phosphorus	April 15	14	-	0	-	2	2	Monthly	Granular	Organic-Based	3.58	lbs	-	43%	1.00	-	0.00	-	0.14			327
1.5 lbs P_2O_5/1000 ft^2	June 1	18	-	46	-	0	1	-	Granular	DAP	1.62	lbs	-	0%	0.29	-	0.75	-	0.00			
Potassium	June 15	24	-	0	-	11	4	Monthly	Granular	Organic-Based	2.08	lbs	-	50%	2.00	-	0.00	-	0.92			190
1.5 lbs K_2O/1000 ft^2	Oct-Nov	16	-	25	-	12	1	-	Granular		3.00	lbs	-	21%	0.48	-	0.75	-	0.36			274
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
															0.00	-	0.00	-	0.00			0
											Total			**38%**	4.27	-	1.50	-	1.42			
								N Recommendation Range and Soil Test Ratings							5		1.5		1.5			

Notes:

1. The recommended 5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 5 lbs of N per 1,000 sq. ft.

2. Water soluble nitrogen (WSN) shall not exceed 0.7 lbs N/1,000 sq.ft. within a 30 day period (except for April, May, and September applications where WSN must be applied as two applications not to exceed 0.35 lbs N/1,000 sq.ft. each with a minimum of 15 days between applications). A rate of 1.0 lbs/1,000 sq.ft. per application may be applied using a material containing at least 15% slowly available forms of nitrogen with a minimum of 30 days between applications.

3. Applications should fall within the "Warm Season Application" window of March 30th to November 15th with the exception of the Feb-Mar and Oct-Nov applications permitted due to overseeding with perennial ryegrass.

4. Monthly applications of 14-0-2 should occur on April 15th and May 15th.

5. Monthly applications of 24-0-11 should occur on June 15th, July 15th, August 15th, and September 15th (may also be applied at a rate of 4.16 lbs per 1,000 sq.ft. on June 15th and July 15th to reduce the total number of applications).

6. Lime is not recommended.

Nutrient Application Worksheet

NAME:	**FSD Athletic Fields, Joint Base Langley-Eustis – Eustis**													**Management Area:**					Soccer Field #4			
	13 Apr 2016													**Acres:**		**2.60**			**Species:**		**Bermudagrass (overseeded)**	
Expires:	**13 Apr 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
5 lbs/1000 ft^2	Feb-Mar	21	-	0	-	0	1	-	Granular	Ammonium Sulphate	2.40	lbs	-	0%	0.50	-	0.00	-	0.00			272
Phosphorus	April 15	14	-	0	-	2	2	Monthly	Granular	Organic-Based	3.58	lbs	-	43%	1.00	-	0.00	-	0.14			405
2.0 lbs P_2O_5/1000 ft^2	June 1	18	-	46	-	0	1	-	Granular	DAP	2.72	lbs	-	0%	0.49	-	1.25	-	0.00			308
Potassium	June 15	24	-	0	-	11	4	Monthly	Granular	Organic-Based	2.08	lbs	-	58%	2.00	-	0.00	-	0.92			236
1.5 lbs K_2O/1000 ft^2	Oct-Nov	16	-	25	-	12	1	-	Granular		3.00	lbs	-	21%	0.48	-	0.75	-	0.36			340
											Total			**41%**	4.47	-	2.00	-	1.42			
								N Recommendation Range and Soil Test Ratings							5		2		1.5			

Notes:

1. The recommended 5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 5 lbs of N per 1,000 sq. ft.

2. Water soluble nitrogen (WSN) shall not exceed 0.7 lbs N/1,000 sq.ft. within a 30 day period (except for April, May, and September applications where WSN must be applied as two applications not to exceed 0.35 lbs N/1,000 sq.ft. each with a minimum of 15 days between applications). A rate of 1.0 lbs/1,000 sq.ft. per application may be applied using a material containing at least 15% slowly available forms of nitrogen with a minimum of 30 days between applications.

3. Applications should fall within the "Warm Season Application" window of March 30th to November 15th with the exception of the Feb-Mar and Oct-Nov applications permitted due to overseeding with perennial ryegrass.

4. Monthly applications of 14-0-2 should occur on April 15th and May 15th.

5. Monthly applications of 24-0-11 should occur on June 15th, July 15th, August 15th, and September 15th (may also be applied at a rate of 4.16 lbs per 1,000 sq.ft. on June 15th and July 15th to reduce the total number of applications).

6. Lime is not recommended.

Nutrient Application Worksheet

NAME:	**FSD Athletic Fields, Joint Base Langley-Eustis – Eustis**													**Management Area:**				Murphy Field				
	13 Apr 2016													**Acres:**	**2.80**			**Species:**	**Bermudagrass (overseeded)**			
Expires:	**13 Apr 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**				**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
5 lbs/1000 ft^2	Feb-Mar	21	-	0	-	0	1	-	Granular	Ammonium Sulphate	2.40	lbs	-	0%	0.50	-	0.00	-	0.00			293
Phosphorus	April 15	12	-	0	-	12	2	Monthly	Granular	Organic-Based	4.18	lbs	-	75%	1.00	-	0.00	-	1.00			510
0 lbs P_2O_5/1000 ft^2	June 15	24	-	0	-	11	4	Monthly	Granular	Organic-Based	2.08	lbs	-	58%	2.00	-	0.00	-	0.92			254
Potassium	Oct-Nov	24	-	0	-	11	1	-	Granular	Organic-Based	2.00	lbs	-	50%	0.48	-	0.00	-	0.22			244
2.5 lbs K_2O/1000 ft^2																						
											Total			**61%**	3.98	-	0.00	-	2.14			
								N Recommendation Range and Soil Test Ratings							5		0		2.5			

Notes:

1. The recommended 5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 5 lbs of N per 1,000 sq. ft.

2. Water soluble nitrogen (WSN) shall not exceed 0.7 lbs N/1,000 sq.ft. within a 30 day period (except for April, May, and September applications where WSN must be applied as two applications not to exceed 0.35 lbs N/1,000 sq.ft. each with a minimum of 15 days between applications). A rate of 1.0 lbs/1,000 sq.ft. per application may be applied using a material containing at least 15% slowly available forms of nitrogen with a minimum of 30 days between applications.

3. Applications should fall within the "Warm Season Application" window of March 30th to November 15th with the exception of the Feb-Mar and Oct-Nov applications permitted due to overseeding with perennial ryegrass.

4. Monthly applications of 12-0-12 should occur on April 15th and May 15th.

5. Monthly applications of 24-0-11 should occur on June 15th, July 15th, August 15th, and September 15th (may also be applied at a rate of 4.16 lbs per 1,000 sq.ft. on June 15th and July 15th to reduce the total number of applications).

6. Lime is not recommended.

Soil Test Summary

Customer Name:	Joint Base Langley-Eustis – Eustis
Testing Lab:	Waypoint Analytical (Formerly A&L Eastern Laboratories)
Sample Date:	21 Jan 2016
Planner Name	Chris Oliver, CNMP (AECOM)
Certification Number	#811

Managed Area ID	AREA (sq ft)	Soil pH	Buffer pH	Lab Test P (ppm)	VT (H/M/L)	Lab Test K (ppm)	VT (H/M/L)	Species
3 (Softball Field)	91,476	6.9	-	35	M	94	M	Bermudagrass (overseeded)
4 (Soccer Field)	113,256	6.4	-	24	L+	115	M	Bermudagrass (overseeded)
18 (Murphy Field)	121,968	7.1	-	171	VH	232	L	Bermudagrass (overseeded)
KP (Kilpatrick Field)	161,172	6.8	-	87	H	236	M	Bermudagrass (overseeded)
Recommendation - Softball Field #3	1.5	lbs P_2O_5/1000 sq ft			1.5	lbs K_2O/1000 sq ft		
Recommendation - Soccer Field #4	2	lbs P_2O_5/1000 sq ft			1.5	lbs K_2O/1000 sq ft		
Recommendation - Murphy Field	0	lbs P_2O_5/1000 sq ft			2.5	lbs K_2O/1000 sq ft		
Recommendation - Kilpatrick Field	0.75	lbs P_2O_5/1000 sq ft			1.5	lbs K_2O/1000 sq ft		

Notes:	

Soil Test Reports

Soil samples were taken from the managed turfgrass of Kilpatrick Field, Softball Field #3, Soccer Field #4, and Murphy Field. Soil samples were analyzed by Waypoint Analytical (formerly A&L Eastern Laboratories). Standard soil test results provide values for pH, cation exchange capacity, phosphorus, calcium, magnesium, potassium, and organic matter. The soil samples collected are valid for the life of this plan (five years) or upon a major renovation or redesign of the golf course, whichever occurs sooner.

A. Kilpatrick Field; 161,172 sq ft (3.7 acres)
Soil pH measured 6.8 for Kilpatrick Field. No lime is recommended. Soil Phosphorus levels measured in the H range. Phosphorus applications are recommended, not to exceed 0.75 lbs/1,000 sq ft annually. Potassium levels measured in the M range. Applications of potassium are recommended, not to exceed 1.5 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 5 lbs/1,000 sq ft annually.

B. Softball Field #3; 91,476 sq ft (2.1 acres)
Soil pH measured 6.9 for Softball Field #3. No lime is recommended. Soil Phosphorus levels measured in the M range. Phosphorus applications are recommended, not to exceed 1.5 lbs/1,000 sq ft annually. Potassium levels measured in the M range. Applications of potassium are recommended, not to exceed 1.5 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 5 lbs/1,000 sq ft annually.

C. Soccer Field #4; 113,256 sq ft (2.6 acres)
Soil pH measured 6.4 for Soccer Field #4. No lime is recommended. Soil Phosphorus levels measured in the L+ range. Phosphorus applications are recommended, not to exceed 2.0 lbs/1,000 sq ft annually. Potassium levels measured in the M range. Applications of potassium are recommended, not to exceed 1.5 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 5 lbs/1,000 sq ft annually.

D. Murphy Field; 121,968 sq ft (2.8 acres)
Soil pH measured 7.1 for Murphy Field. No lime is recommended. Soil Phosphorus levels measured in the VH range. Phosphorus applications are not recommended. Potassium levels measured in the L range. Applications of potassium are recommended, not to exceed 2.5 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 5 lbs/1,000 sq ft annually.

Section VI. Turfgrass Nutrient Recommendations for Home Lawns, Office Parks, Public Lands and Other Similar Residential/Commercial Grounds

Definitions

For the purposes of this section, the following definitions, as presented by the Association of American Plant Food Control Officials (AAPFCO), apply:

"Enhanced efficiency fertilizer" describes fertilizer products with characteristics that allow increased plant nutrient availability and reduce the potential of nutrient losses to the environment when compared to an appropriate reference product.

"Slow or controlled release fertilizer" means a fertilizer containing a plant nutrient in a form which delays its availability for plant uptake and use after application, or which extends its availability to the plant significantly longer than a reference "rapidly available nutrient fertilizer" such as ammonium nitrate, urea, ammonium phosphate or potassium chloride. A slow or controlled release fertilizer must contain a minimum of 15 percent slowly available forms of nitrogen.

"Water soluble nitrogen", "WSN" and "readily available nitrogen" means: Water soluble nitrogen in either ammonical, urea, or nitrate form that does not have a controlled release, or slow response.

Recommended Season of Application For Nitrogen Fertilizers - Applies to all Turf

A nitrogen fertilization schedule weighted toward fall application is recommended and preferred for agronomic quality and persistence of cool season turfgrass; however, the acceptable window of applications is much wider than this for nutrient management. The nutrient management recommended application season for nitrogen fertilizers to cool season turfgrasses begins six weeks prior to the last spring average killing frost date and ends six weeks past the first fall average killing frost date (see Figures 6-1 and 6-2). Applications of nitrogen during the intervening late fall and winter period should be avoided due to higher potential leaching or runoff risk, but where necessary, apply no more than 0.5 pounds per 1,000 ft^2 of water soluble nitrogen within a 30 day period. Higher application rates may be used during this late fall and winter period by using materials containing slowly available sources of nitrogen, if the water soluble nitrogen contained in the fertilizer does not exceed the recommended maximum of 0.5 pounds per 1,000 ft^2 rate. Do not apply nitrogen or phosphorus fertilizers when the ground is frozen.

The acceptable nitrogen fertilizer application season for non-overseeded warm season turfgrass begins no earlier than the last spring average killing frost date and ends no later than one month prior to the first fall average killing frost date (see Figures on next sheet).

Figure 6.1

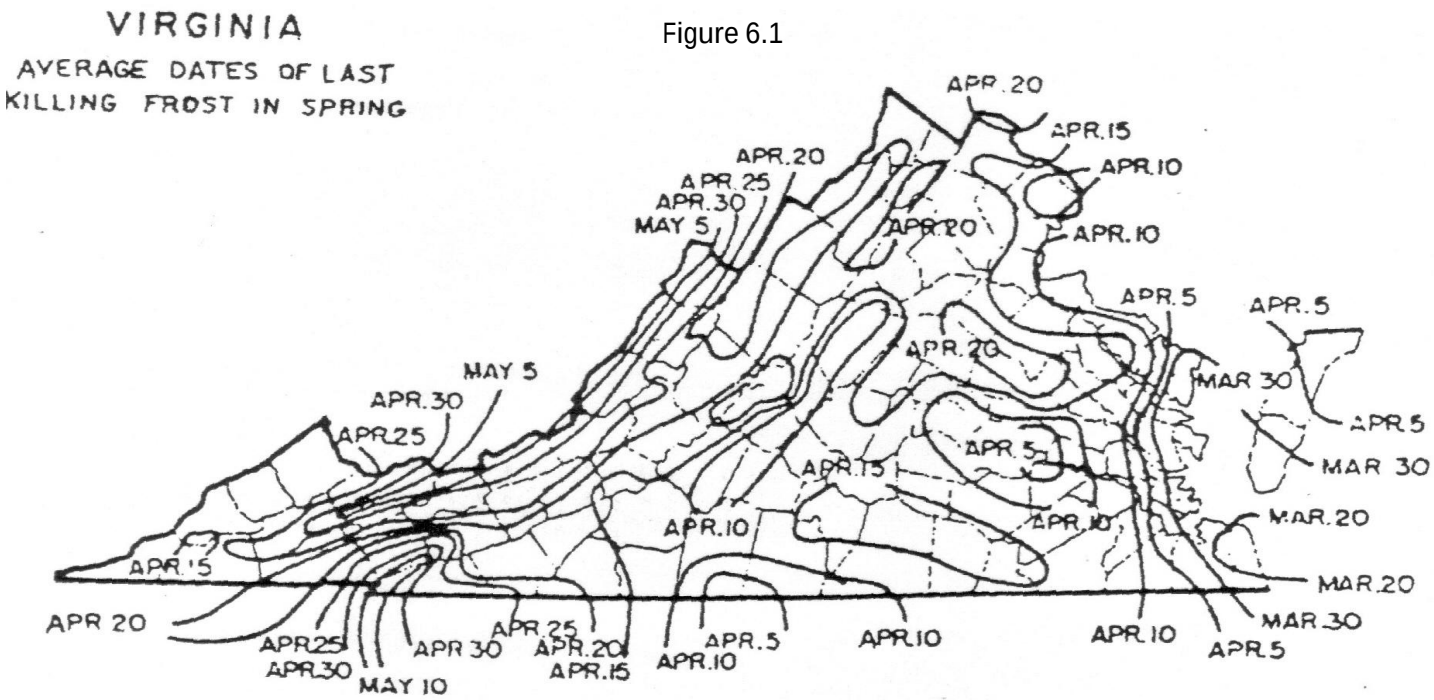
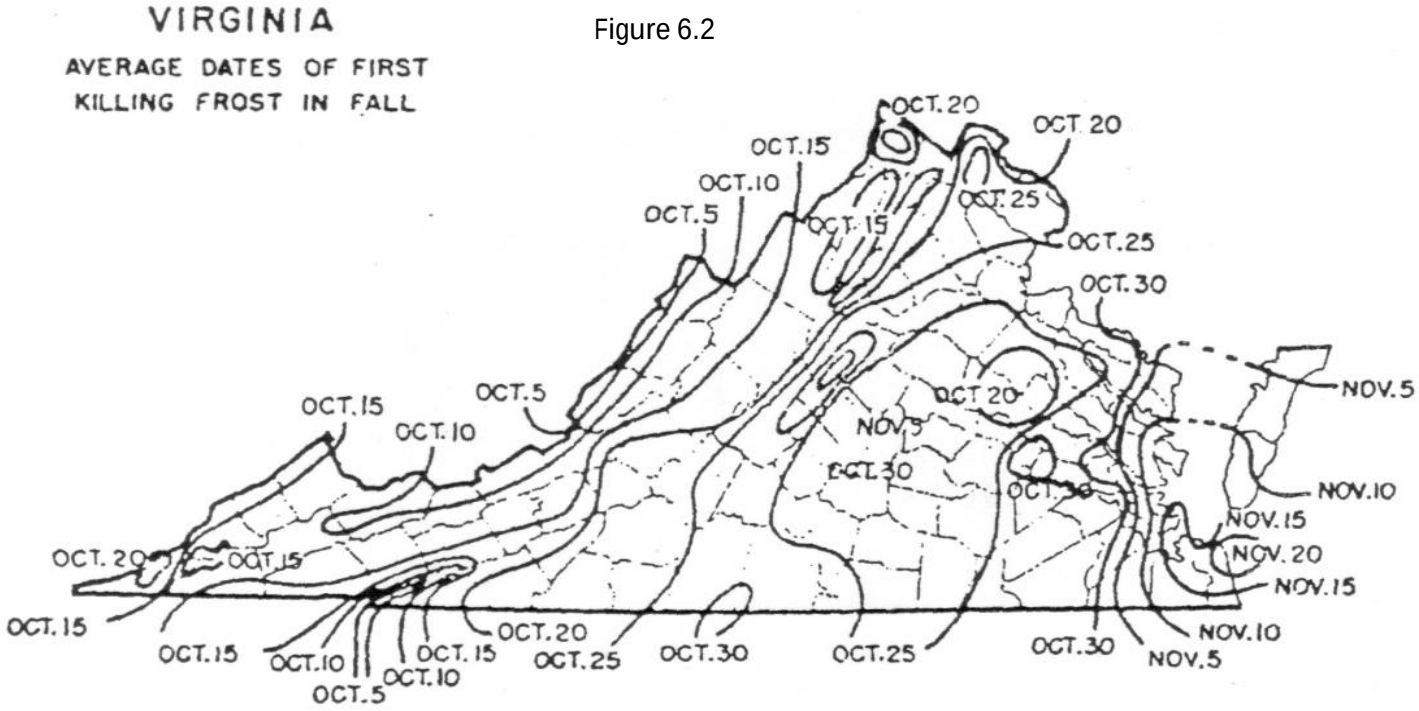


Figure 6.2



Per Application Rates

Do not apply more than 0.7 pounds of water soluble nitrogen per 1,000 ft^2 within a 30 day period. For cool season grasses, do not apply more than 0.9 pounds of total nitrogen per 1,000 ft^2 within a 30 day period. For warm season grasses, do not apply more than 1.0 pounds of total nitrogen per 1,000 ft^2 within a 30 day period. Lower per application rates of water soluble nitrogen sources or use of slowly available nitrogen sources should be utilized on very permeable sandy soils, shallow soils over fractured bedrock, or areas near water wells.

Use of Slowly Available Forms of Nitrogen

For slow or controlled release fertilizer sources, or enhanced efficiency fertilizer sources, no more than 0.9 pounds of nitrogen per 1,000 ft^2 may be applied to cool season grasses within a 30 day period and no more than 1.0 pounds of nitrogen per 1,000 ft^2 may be applied to warm season grasses within a 30 day period. Provided the fertilizer label guarantees that the product can be used in such a way that it will not release more than 0.7 pounds of nitrogen per 1,000 ft^2 in a 30 day period, no more than 2.5 pounds of nitrogen per 1,000 ft^2 may be applied in a single application. Additionally, total annual applications shall not exceed 80 percent of the annual nitrogen rates for cool or warm season grasses.

Phosphorus and Potassium Nutrient Needs (Established Turf)

Apply phosphorus (P_2O_5) and potassium (K_2O) fertilizers as indicated necessary by a soil test using the following guidelines:

Soil Test Level	Nutrient Needs (lbs /1000 ft^2) *	
	P_2O_5	K_2O
L	2-3	2-3
M	1-2	1-2
H	0.5-1	0.5-1
VH	0	0

* For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range. (For example the recommendation for a P_2O_5 soil test level of L- would be 3 pounds per 1,000 ft^2.)

Do not use high phosphorus ratio fertilizers such as 10-10-10 or 5-10-10, unless soil tests indicate phosphorus availability below the M+ level.

Recommendations for Establishment of Turf

These recommendations are for timely planted turfgrass, that is, the seed or vegetative material (sod, plugs, and /or sprigs), are planted at a time of the year when temperatures and moisture are adequate to maximize turfgrass establishment. These recommended establishment periods would be late summer to early fall for cool-season turfgrasses and late spring through mid-summer for warm-season turfgrasses.

Nitrogen Applications

At the time of establishment, apply no more than 0.9 pounds per 1,000 ft^2 of total nitrogen for cool season grasses or 1.0 pounds per 1,000 ft^2 of total nitrogen for warm season grasses, using a material containing slowly available forms of nitrogen, followed by one or two applications beginning 30 days after planting, not to exceed a total of 1.8 pounds per 1,000 ft^2 total for cool season grasses and 2.0 pounds per 1,000 ft^2 for warm

Phosphorus and Potassium Recommendations for Establishment

Soil Test Level	Nutrient Needs (lbs /1000 ft$^{2)}$ *	
	P_2O_5	K_2O
L	3-4	2-3
M	2-3	1-2
H	2-1	0.5-1
VH	0	0

* For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range.

Nitrogen Management on Athletic Fields - Cool Season Grasses

• This program is intended for those fields which are under heavy use.

• Nitrogen recommendations are based on the assumption that there is adequate soil moisture to promote good turf growth at the time of application. If no rainfall has occurred since the last application, further applications should be delayed until significant soil moisture is available.

Notes:

• Soluble nitrogen rates of 0.25 pounds per 1,000 ft^2 or less which may be a component of a pesticide or minor element application may be applied any time the turf is actively growing, but must be considered with the total annual nitrogen application rate.

• WSN = water soluble nitrogen; WIN = water insoluble nitrogen

(a) Intensive managed areas must be irrigated.

(b) The beginning and ending dates for application of nitrogen shall be determined using guidance and frost date maps contained in the preceding Season of Application for Nitrogen section, using Figures 6-1 and 6-2.

(c) Rates up to 0.9 pounds per 1,000 ft^2 of total nitrogen can be applied using a material containing slowly available forms of nitrogen, with a minimum of 30 days between applications.

(d) Make this application only if turf use warrants additional nitrogen for sustaining desirable growth and /or color.

Cool Season Grasses	Maintenance Program[a]	
	Normal	Intensive
When to Apply[b]	Pounds per 1,000 ft^2 Nitrogen	
After August 15	------	0.5
September	0.7	0.7[c]
October	0.7[c]	0.7[c]
November	0.5	0.7[c]
April 15 - May 15	0.5	0.5
June 1 - June 15	----	0.5

Reference Materials and Notes

A) Virginia Nutrient Management Standards and Criteria, Revised July 2014, Department of Conservation and Recreation, Division of Soil and Water Conservation

B) ESRI Aerial Photography

C) Geospatial data provided by Joint Base Langley-Eustis – Eustis for parcel boundaries, roads, streams, and wetlands.

D) Flood plain data obtained from FEMA National Flood Hazard Layer digital database (https://www.fema.gov/national-flood-hazard-layer-nfhl)

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Kilpatrick Field
Address:	Force Support Division – Athletic Fields	Management Area Size:	161,172 sq ft
	643 Dickman St.	Plant Species:	Bermudagrass (overseeded with Perennial Rye)
	JBLE – Eustis, VA 23604	Notes:	
Phone #:	757-878-2097		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Murphy Field
Address:	Force Support Division – Athletic Fields	Management Area Size:	121,968 sq ft
	643 Dickman St.	Plant Species:	Bermudagrass (overseeded with Perennial Rye)
	JBLE – Eustis, VA 23604	Notes:	
Phone #:	757-878-2097		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Softball Field #3
Address:	Force Support Division – Athletic Fields	Management Area Size:	91,476 sq ft
	643 Dickman St.	Plant Species:	Bermudagrass (overseeded with Perennial Rye)
	JBLE – Eustis, VA 23604	Notes:	
Phone #:	757-878-2097		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Soccerl Field #4
Address:	Force Support Division – Athletic Fields	Management Area Size:	113,256 sq ft
	643 Dickman St.	Plant Species:	Bermudagrass (overseeded with Perennial Rye)
	JBLE – Eustis, VA 23604	Notes:	
Phone #:	757-878-2097		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Nutrient Management Plan

Military Family Housing - Balfour Beatty Communities

Prepared For:

Joint Base Langley-Eustis – Eustis
167 Stillwell St.
JBLE – Eustis, VA 23604
757-369-8341

Prepared By:

Chris Oliver, CNMP (AECOM)
1600 Perimeter Park Drive, Suite 400
Morrisville, NC 27560
919-461-1100
Certification Code: #811
Total Acreage: 75.1

The purpose of this Nutrient Management Plan is to ensure minimum movement of nitrogen and phosphorus from the specified area of application to surface and groundwaters where they can potentially have a detrimental effect on water quality as well as ensuring that plants have optimum soil nutrient availability for good productivity and quality. By following this soil test based plan you are helping to protect local waters and the Chesapeake Bay.

If you have questions, please contact your plan writer, local Virginia Cooperative Extension Agent or the Department of Conservation and Recreation Nutrient Mangement Program.

DCR
Virginia Department of Conservation & Recreation

JOINT BASE LANGLEY EUSTIS

Nutrient Management Plan for:
Military Family Housing - Balfour Beatty Communities

Landowner Information	
Company Name	*Military Family Housing - Balfour Beatty Communities*
Customer Name	*Joint Base Langley-Eustis – Eustis*
Mailing Address	*167 Stillwell St.*
City State Zip	*JBLE – Eustis, VA 23604*
Phone	*757-369-8341*
Email	meitutis@bbcgrp.com

Planners Informaiton	
Planner Name	*Chris Oliver, CNMP (AECOM)*
Mailing Address	*1600 Perimeter Park Drive, Suite 400*
City State Zip	*Morrisville, NC 27560*
Phone	*919-461-1100*
Fax	*919-461-1415*
Email	chris.oliver@aecom.com
Certification Code	*#811*

Location Information	
Physical Address	*167 Stillwell St.*
City State Zip	*JBLE-Eustis, VA 23604*
Coordinates	*37° 9' 35.8374"*
Please Use NAD 83 Deg Min Sec	*-76° 34' 0.5478"*
VAHU6 Watershed Code	*JL-I*

Acreage	
Total	*75.1*
North Village	*10.7*
North Village East	*6.3*
Inchon Village	*10.9*
South Village East	*10.0*
LeHavre Village	*10.1*
St. Nazaire Village	*5.8*
Marseilles Village	*8.7*
Newport Village	*7.1*
Antwerp Village	*5.5*

Plan Start Date	*23 May 2016*
Plan End Date	*23 May 2021*
Planner Signature	

Narrative

1. Site Description and Supporting Information

This nutrient management plan has been prepared by AECOM Technical Services, Inc.

All landscaping services for Balfour Beatty Communities at JBLE - Eustis are managed by BrightView (formerly The Brickman Group). BrightView currently applies fertilizer to nine (9) military family housing areas. The management areas are identified as North Village (10.7 acres), North Village East (6.3 acres), Inchon Village (10.9 acres), South Village (10.0 acres), LeHavre Village (10.1 acres), St. Nazaire Village (5.8 acres), Marseilles Village (8.7 acres), Newport Village (7.1 acres), and Antwerp Village (5.5 acres). The total acreage of these properties is 75.1 acres. Managed turf, as indicated in the Site Maps section of this plan, is comprised of Bermudagrass (a warm-season grass) and/or Tall Fescue (a cool-season grass) depending on the location.

The sites are relatively flat with maximum slopes less than 2 percent, except for Antwerp Village, which has slopes ranging from 2 to 6 percent. Environmentally sensitive sites include wetlands to the northeast of Antwerp Village and southwest of St. Nazaire Village, wetlands and the 100-year floodplain of the Warwick River to the south of Antwerp Village, wetlands to the northeast of Newport Village, and wetlands and the 100-year floodplain of the Warwick River to the east of South Village East. Fertilizer applications to these sites should only be made when heavy rain events are not expected.

This plan is effective for five years (until 23 May 2021) or until major renovation or major changes to maintenance practices occur. Applications of inorganic fertilizers should not occur on frozen or snow-covered ground. Any fertilizer that makes its way onto impervious surfaces should be swept or blown back into pervious turfgrass-covered areas. Do not use fertilizers as ice melt.

Every fertilizer application should be recorded in the record sheet provided. Any questions or concerns with fertilizer products or record keeping should be brought to the plan writer's attention.

Killing Frost Dates for Newport News, Virginia are March 30th (Spring) and November 15th (Fall).

Applications to the housing areas comprised of Bermudagrass should occur within the "Warm Season Application Period" of March 30th to October 15th.

Applications to the housing areas comprised of Tall Fescue should occur within the "Cool Season Application Period" of February 17th to December 27th.

Maps

2. Site Maps

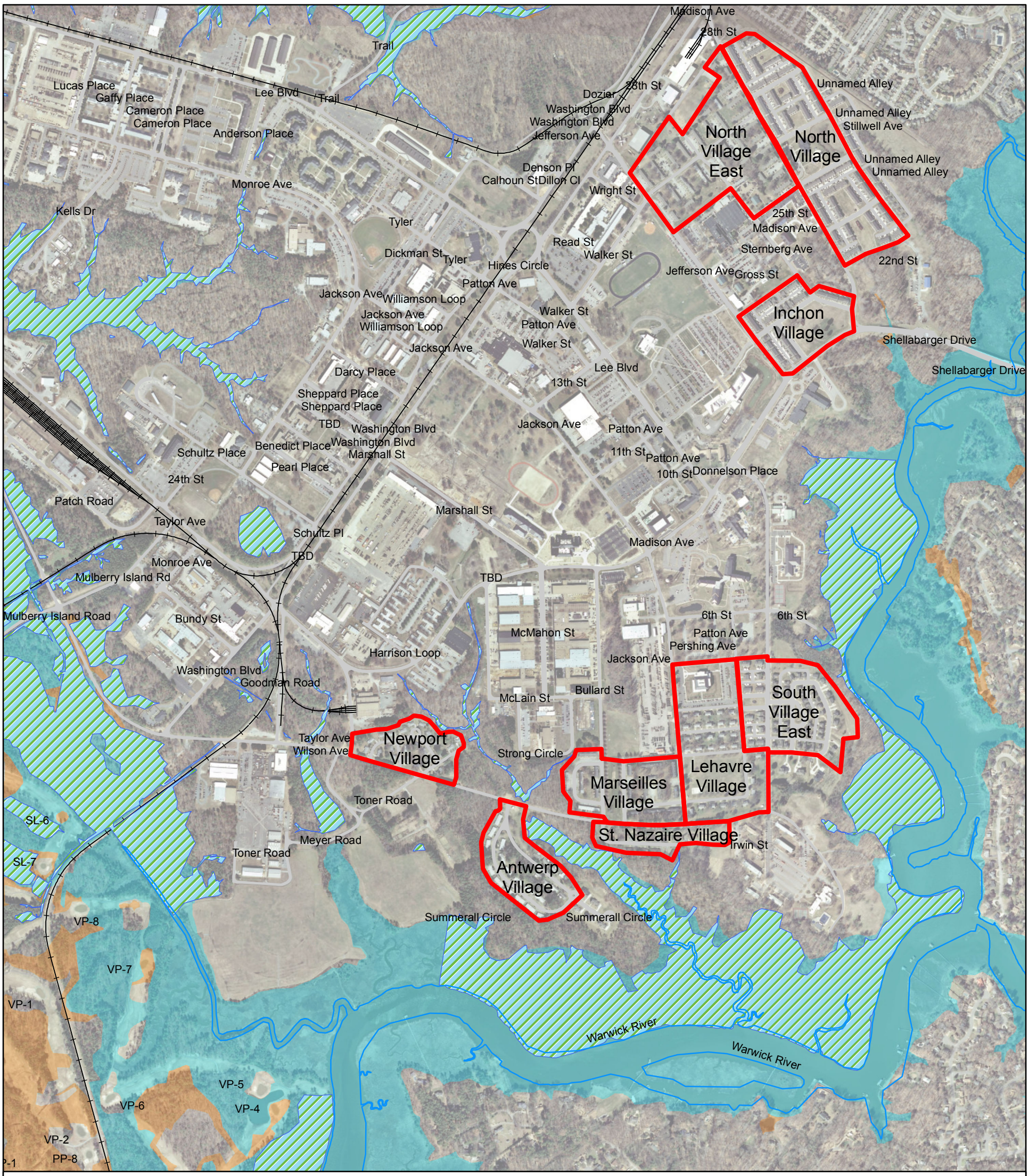
A) Figure 1. Overview Map - Location & Boundaries

B) Figure 2. Environmentally Sensitive Sites

C) Figure 3. Management Areas - North

D) Figure 4. Management Areas - South

Nutrient Management Plan
Military Family Housing
Figure 1. Overview Map-
Location & Boundaries
Road Area
Railroad
Stream Shoreline
Balfour Beatty Property Boundary
0
1,000
2,000
3,000
Feet
1 inch = 1,000 feet
May 2016
North Village East
North Village
Inchon Village
South Village East
Lehavre Village
Marseilles Village
St. Nazaire Village
Newport Village
Antwerp Village
James River
Warwick River
Jefferson Blvd
Fort Eustis BLVD
Unnamed Alley
Dozier
Madison Ave
Washington Blvd
Trail
Lucas Place
Gaffy Place
Cameron Place
Anderson Place
Lee Blvd
Jefferson Ave
Denson Pl
Calhoun St
Dillon Cl
Wright St
Monroe Ave
Kells Dr
Tyler
Dickman St
Read St
Walker St
Hines Circle
Patton Ave
Jackson Ave
Williamson Loop
Darcy Place
Sheppard Place
TBD
Schultz Place
Benedict Place
Marshall St
Pearl Place
24th St
Patch Road
Taylor Ave
Schultz Pl
Mulberry Island Rd
Mulberry Island Road
Bundy St
Harrison Loop
Goodman Road
Wilson Ave
Toner Road
Meyer Road
SL-6
L-7
VP-8
Summerall Circle
McMahon St
McLain St
Bullard St
Strong Circle
Pershing Ave
6th St
Madison Ave
Lee Blvd
13th St
11th St
10th St
Donnelson Place
Irwin St
Shellabarger Drive
Stillwell Ave
25th St
Sternberg Ave
22nd St
Gross St
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Nutrient Management Plan
Military Family Housing

Figure 2. Environmentally Sensitive Sites

Road Area
Railroad
Stream Shoreline
Wetlands
Balfour Beatty Property Boundary

Flood Hazard Zones

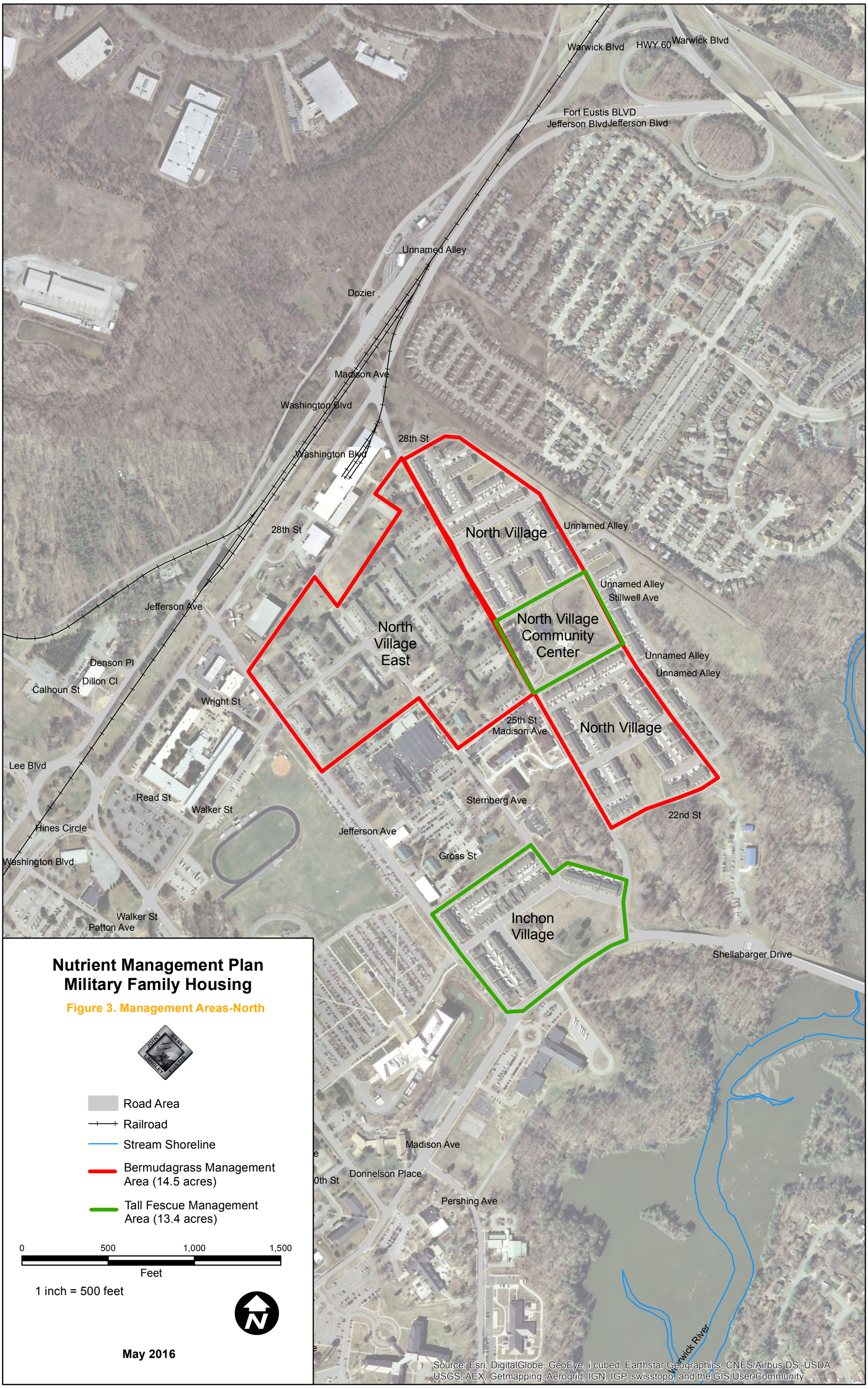
Zone Type

1% Annual Chance Flood Hazard
Regulatory Floodway
Special Floodway
Area of Undetermined Flood Hazard
0.2% Annual Chance Flood Hazard
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Risk Due to Levee

0 1,000 2,000 3,000
Feet

1 inch = 1,000 feet

May 2016



Nutrient Management Plan
Military Family Housing

Figure 3. Management Areas-North

Road Area
Railroad
Stream Shoreline
Bermudagrass Management Area (14.5 acres)
Tall Fescue Management Area (13.4 acres)

0 500 1,000 1,500
Feet

1 inch = 500 feet

May 2016

Nutrient Management Plan
Military Family Housing

Figure 4. Management Areas- South

Road Area
Railroad
Stream Shoreline
Bermudagrass Management Area (21.0 acres)
Tall Fescue Management Area (26.2 acres)

0 500 1,000 1,500
Feet

1 inch = 500 feet

May 2016

Nutrient Application Worksheet

NAME:	**MFH - Balfour Beatty Communities, Joint Base Langley-Eustis – Eustis**													**Management Area:**				North Village				
	23 May 2016										**Acres:**		**8.20**				**Species:**		**Bermudagrass**			
Expires:	**23 May 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**				**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
4 lbs/1000 ft^2	April 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			1,125
Phosphorus	June 15	28	-	0	-	3	1	-	Granular		3.56	lbs	-	20-80%	1.00	-	0.00	-	0.11			1,272
2 lbs P_2O_5/1000 ft^2	Aug. 15	28	-	0	-	3	1	-	Granular		3.56	lbs	-	20-80%	1.00	-	0.00	-	0.11			1,272
Potassium	Oct. 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			1,125
1 lbs K_2O/1000 ft^2																						
											Total			**20-80%**	3.00	-	1.58	-	0.97			
								N Recommendation Range and Soil Test Ratings							4.0		2.0		1.0			

Notes:

1. The recommended 4 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 4 lbs of N per 1,000 sq. ft. The total annual application of water soluble nitrogen (WSN) shall not exceed 80 percent of the total annual N application.

2. Maximum WSN rate per application is 0.7 lbs N/1,000 sq.ft within a 30 day period. Do no apply more than 1.0 lbs total N/1,000 sq.ft within a 30 day period.

3. Applications should fall within the "Warm Season Application" window of March 30th to October 15th

4. Lime is not recommended.

Nutrient Application Worksheet

NAME:	**MFH - Balfour Beatty Communities, Joint Base Langley-Eustis – Eustis**													**Management Area:**				North Village Community Center				
	23 May 2016													**Acres:**		**2.10**		**Species:**		**Tall Fescue**		
Expires:	**23 May 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
3.5 lbs/1000 ft^2	Mar. 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			288
Phosphorus	May 15	28	-	0	-	3	1	-	Granular		1.77	lbs	-	20-80%	0.50	-	0.00	-	0.05			162
2.5 lbs P_2O_5/1000 ft^2	July 15	28	-	0	-	3	1	-	Granular		0.88	lbs	-	20-80%	0.25	-	0.00	-	0.03			80
Potassium	Sept. 15	16	-	25	-	12	1	-	Granular		6.22	lbs	-	20-80%	1.00	-	1.56	-	0.75			569
2.0 lbs K_2O/1000 ft^2	Nov. 15	32	-	0	-	8	1	-	Granular		3.13	lbs	-	20-80%	1.00	-	0.00	-	0.25			286
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
											Total			**20-80%**	3.24	-	2.34	-	1.45			
								N Recommendation Range and Soil Test Ratings							3.5		2.5		2			

Notes:

1. The recommended 3.5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 3.5 lbs of N per 1,000 sq. ft. The total annual application of water soluble nitrogen (WSN) shall not exceed 80 percent of the total annual N application.

2. Maximum WSN rate per application is 0.7 lbs N/1,000 sq.ft within a 30 day period. Do no apply more than 0.9 lbs total N/1,000 sq.ft within a 30 day period.

3. Applications should fall within the "Cool Season Application" window of February 17th to December 27th, and applications should be spaced at least 30 days apart if the full rate or the highest rate of the recommendation range for a monthly application is applied in a single application.

4. Lime is not recommended.

Nutrient Application Worksheet

NAME:	**MFH - Balfour Beatty Communities, Joint Base Langley-Eustis – Eustis**	**Management Area:**	North Village East
	23 May 2016	**Acres:** **6.30**	**Species:** **Bermudagrass**
Expires:	**23 May 2021**		

Total Nutrient Needs	Application Month/Day	Analysis					# of Apps	Application Interval	Fertilizer Type	Fertilizer Description	Rate per 1000ft^2	lbs or oz	Wt. per Gal.	%Slow Release N	Total NPK lbs/1000ft^2					Gypsum	Lime	Total Product (lbs per Area)
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
4 lbs/1000 ft^2	April 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			864
Phosphorus	June 15	28	-	0	-	3	1	-	Granular		3.56	lbs	-	20-80%	1.00	-	0.00	-	0.11			977
2 lbs P_2O_5/1000 ft^2	Aug. 15	28	-	0	-	3	1	-	Granular		3.56	lbs	-	20-80%	1.00	-	0.00	-	0.11			977
Potassium	Oct. 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			864
1 lbs K_2O/1000 ft^2																						
											Total			20-80%	3.00	-	1.58	-	0.97			
								N Recommendation Range and Soil Test Ratings							4.0		2.0		1.0			

Notes:

1. The recommended 4 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 4 lbs of N per 1,000 sq. ft. The total annual application of water soluble nitrogen (WSN) shall not exceed 80 percent of the total annual N application.

2. Maximum WSN rate per application is 0.7 lbs N/1,000 sq.ft within a 30 day period. Do no apply more than 1.0 lbs total N/1,000 sq.ft within a 30 day period.

3. Applications should fall within the "Warm Season Application" window of March 30th to October 15th

4. Lime is not recommended.

Nutrient Application Worksheet

NAME:	**MFH - Balfour Beatty Communities, Joint Base Langley-Eustis – Eustis**														**Management Area:**					Inchon Village		
	23 May 2016										**Acres:**	**10.90**			**Species:**					**Tall Fescue**		
Expires:	**23 May 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
3.5 lbs/1000 ft^2	Mar. 15	28	-	0	-	3	1	-	Granular		1.77	lbs	-	20-80%	0.50	-	0.00	-	0.05			840
Phosphorus	May 15	28	-	0	-	3	1	-	Granular		1.77	lbs	-	20-80%	0.50	-	0.00	-	0.05			840
2.5 lbs P_2O_5/1000 ft^2	July 15	28	-	0	-	3	1	-	Granular		0.88	lbs	-	20-80%	0.25	-	0.00	-	0.03			418
Potassium	Sept. 15	16	-	25	-	12	1	-	Granular		6.22	lbs	-	20-80%	1.00	-	1.56	-	0.75			2,953
1.0 lbs K_2O/1000 ft^2	Nov. 15	28	-	0	-	3	1	-	Granular		3.56	lbs	-	20-80%	1.00	-	0.00	-	0.11			1,690
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
											Total			20-80%	3.23	-	1.56	-	0.99			
								N Recommendation Range and Soil Test Ratings							3.5		2.5		1			

Notes:

1. The recommended 3.5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 3.5 lbs of N per 1,000 sq. ft. The total annual application of water soluble nitrogen (WSN) shall not exceed 80 percent of the total annual N application.

2. Maximum WSN rate per application is 0.7 lbs N/1,000 sq.ft within a 30 day period. Do no apply more than 0.9 lbs total N/1,000 sq.ft within a 30 day period.

3. Applications should fall within the "Cool Season Application" window of February 17th to December 27th, and applications should be spaced at least 30 days apart if the full rate or the highest rate of the recommendation range for a monthly application is applied in a single application.

4. Lime is not recommended.

Nutrient Application Worksheet

NAME:	**MFH - Balfour Beatty Communities, Joint Base Langley-Eustis – Eustis**										**Management Area:**				South Village East							
	23 May 2016										**Acres:**	**10.00**			**Species:**				**Bermudagrass**			
Expires:	**23 May 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**				**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
4 lbs/1000 ft^2	April 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			1,372
Phosphorus	June 15	28	-	0	-	3	1	-	Granular		3.56	lbs	-	20-80%	1.00	-	0.00	-	0.11			1,551
2 lbs P_2O_5/1000 ft^2	Aug. 15	28	-	0	-	3	1	-	Granular		3.56	lbs	-	20-80%	1.00	-	0.00	-	0.11			1,551
Potassium	Oct. 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			1,372
1 lbs K_2O/1000 ft^2																						
											Total			**20-80%**	3.00	-	1.58	-	0.97			
								N Recommendation Range and Soil Test Ratings							4.0		2.0		1.0			

Notes:

1. The recommended 4 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 4 lbs of N per 1,000 sq. ft. The total annual application of water soluble nitrogen (WSN) shall not exceed 80 percent of the total annual N application.

2. Maximum WSN rate per application is 0.7 lbs N/1,000 sq.ft within a 30 day period. Do no apply more than 1.0 lbs total N/1,000 sq.ft within a 30 day period.

3. Applications should fall within the "Warm Season Application" window of March 30th to October 15th

4. Lime is not recommended.

Nutrient Application Worksheet

NAME:	**MFH - Balfour Beatty Communities, Joint Base Langley-Eustis – Eustis**										**Management Area:**				Lahavre Village							
	23 May 2016										**Acres:**	**4.60**			**Species:**			**Bermudagrass**				
Expires:	**23 May 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**				**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
4 lbs/1000 ft^2	April 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			631
Phosphorus	June 15	28	-	0	-	3	1	-	Granular		3.56	lbs	-	20-80%	1.00	-	0.00	-	0.11			713
2 lbs P_2O_5/1000 ft^2	Aug. 15	28	-	0	-	3	1	-	Granular		3.56	lbs	-	20-80%	1.00	-	0.00	-	0.11			713
Potassium	Oct. 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			631
1.5 lbs K_2O/1000 ft^2	Nov-Dec						1	-	-	Dolomitic Lime	25.00	lbs	-	-	0.00	-	0.00		0.00		25.00	5,009
											Total			20-80%	3.00	-	1.58	-	0.97			
								N Recommendation Range and Soil Test Ratings							4.0		2.0		1.5			

Notes:

1. The recommended 4 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 4 lbs of N per 1,000 sq. ft. The total annual application of water soluble nitrogen (WSN) shall not exceed 80 percent of the total annual N application.

2. Maximum water soluble WSN rate per application is 0.7 lbs N/1,000 sq.ft within a 30 day period. Do no apply more than 1.0 lbs total N/1,000 sq.ft within a 30 day period.

3. Applications should fall within the "Warm Season Application" window of March 30th to October 15th

4. Dolomitic lime is recommended at a rate of 25 lbs/1,000 sq ft annually.

Nutrient Application Worksheet

NAME:	**MFH - Balfour Beatty Communities, Joint Base Langley-Eustis – Eustis**													**Management Area:**					Lahavre Village			
	23 May 2016										**Acres:**		**5.50**				**Species:**			**Tall Fescue**		
Expires:	**23 May 2021**																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
3.5 lbs/1000 ft^2	Mar. 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			755
Phosphorus	May 15	28	-	0	-	3	1	-	Granular		1.77	lbs	-	20-80%	0.50	-	0.00	-	0.05			424
2 lbs P_2O_5/1000 ft^2	July 15	28	-	0	-	3	1	-	Granular		0.88	lbs	-	20-80%	0.25	-	0.00	-	0.03			211
Potassium	Sept. 15	16	-	25	-	12	1	-	Granular		6.22	lbs	-	20-80%	1.00	-	1.56	-	0.75			1,490
1.5 lbs K_2O/1000 ft^2	Nov. 15	32	-	0	-	8	1	-	Granular		3.13	lbs	-	20-80%	1.00	-	0.00	-	0.25			750
	Nov-Dec						1	-	-	Dolomitic Lime	25.00	lbs	-	-							25.00	5,990
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
											Total			20-80%	3.24	-	2.34	-	1.45			
								N Recommendation Range and Soil Test Ratings							3.5		2.5		1.5			

Notes:

1. The recommended 3.5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 3.5 lbs of N per 1,000 sq. ft. The total annual application of water soluble nitrogen (WSN) shall not exceed 80 percent of the total annual N application.

2. Maximum WSN rate per application is 0.7 lbs N/1,000 sq.ft within a 30 day period. Do no apply more than 0.9 lbs total N/1,000 sq.ft within a 30 day period.

3. Applications should fall within the "Cool Season Application" window of February 17th to December 27th, and applications should be spaced at least 30 days apart if the full rate or the highest rate of the recommendation range for a monthly application is applied in a single application.

4. Dolomitic lime is recommended at a rate of 25 lbs/1,000 sq ft annually.

Nutrient Application Worksheet

NAME:	**MFH - Balfour Beatty Communities, Joint Base Langley-Eustis – Eustis**	**Management Area:**	Marseilles Village
	23 May 2016	**Acres:** **6.40**	**Species:** **Bermudagrass**
Expires:	**23 May 2021**		

Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
4 lbs/1000 ft^2	April 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			878
Phosphorus	June 15	28	-	0	-	3	1	-	Granular		3.56	lbs	-	20-80%	1.00	-	0.00	-	0.11			992
2 lbs P_2O_5/1000 ft^2	Aug. 15	28	-	0	-	3	1	-	Granular		3.56	lbs	-	20-80%	1.00	-	0.00	-	0.11			992
Potassium	Oct. 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			878
1.5 lbs K_2O/1000 ft^2																						
											Total			20-80%	3.00	-	1.58	-	0.97			
								N Recommendation Range and Soil Test Ratings							4.0		2.0		1.5			

Notes:

1. The recommended 4 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 4 lbs of N per 1,000 sq. ft. The total annual application of water soluble nitrogen (WSN) shall not exceed 80 percent of the total annual N application.

2. Maximum WSN rate per application is 0.7 lbs N/1,000 sq.ft within a 30 day period. Do no apply more than 1.0 lbs total N/1,000 sq.ft within a 30 day period.

3. Applications should fall within the "Warm Season Application" window of March 30th to October 15th

4. Lime is not recommended.

Nutrient Application Worksheet

NAME:	MFH - Balfour Beatty Communities, Joint Base Langley-Eustis – Eustis																					
	23 May 2016																					
Expires:	23 May 2021																					
Management Area:	Marseilles Village																					
Acres:	2.30																					
Species:	Tall Fescue																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
3.5 lbs/1000 ft^2	Mar. 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			316
Phosphorus	May 15	28	-	0	-	3	1	-	Granular		1.77	lbs	-	20-80%	0.50	-	0.00	-	0.05			177
2 lbs P_2O_5/1000 ft^2	July 15	28	-	0	-	3	1	-	Granular		0.88	lbs	-	20-80%	0.25	-	0.00	-	0.03			88
Potassium	Sept. 15	16	-	25	-	12	1	-	Granular		6.22	lbs	-	20-80%	1.00	-	1.56	-	0.75			623
1.5 lbs K_2O/1000 ft^2	Nov. 15	32	-	0	-	8	1	-	Granular		3.13	lbs	-	20-80%	1.00	-	0.00	-	0.25			314
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
											Total			20-80%	3.24	-	2.34	-	1.45			
								N Recommendation Range and Soil Test Ratings							3.5		2.5		1.5			

Notes:

1. The recommended 3.5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 3.5 lbs of N per 1,000 sq. ft. The total annual application of water soluble nitrogen (WSN) shall not exceed 80 percent of the total annual N application.

2. Maximum WSN rate per application is 0.7 lbs N/1,000 sq.ft within a 30 day period. Do no apply more than 0.9 lbs total N/1,000 sq.ft within a 30 day period.

3. Applications should fall within the "Cool Season Application" window of February 17th to December 27th, and applications should be spaced at least 30 days apart if the full rate or the highest rate of the recommendation range for a monthly application is applied in a single application.

4. Lime is not recommended.

Nutrient Application Worksheet

NAME:	MFH - Balfour Beatty Communities, Joint Base Langley-Eustis – Eustis																					
	23 May 2016																					
Expires:	23 May 2021																					
Management Area:	Antwerp Village																					
Acres:	5.50																					
Species:	Tall Fescue																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
3.5 lbs/1000 ft^2	Mar. 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			755
Phosphorus	May 15	28	-	0	-	3	1	-	Granular		1.77	lbs	-	20-80%	0.50	-	0.00	-	0.05			424
2.5 lbs P_2O_5/1000 ft^2	July 15	28	-	0	-	3	1	-	Granular		0.88	lbs	-	20-80%	0.25	-	0.00	-	0.03			211
Potassium	Sept. 15	16	-	25	-	12	1	-	Granular		6.22	lbs	-	20-80%	1.00	-	1.56	-	0.75			1,490
1.5 lbs K_2O/1000 ft^2	Nov. 15	32	-	0	-	8	1	-	Granular		3.13	lbs	-	20-80%	1.00	-	0.00	-	0.25			750
	Nov-Dec						1	-		Lime	15.00	lbs	-	-							15.00	3,594
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
											Total			20-80%	3.24	-	2.34	-	1.45			
										N Recommendation Range and Soil Test Ratings					3.5		2.5		1.5			

Notes:

1. The recommended 3.5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 3.5 lbs of N per 1,000 sq. ft. The total annual application of water soluble nitrogen (WSN) shall not exceed 80 percent of the total annual N application.

2. Maximum WSN rate per application is 0.7 lbs N/1,000 sq.ft within a 30 day period. Do no apply more than 0.9 lbs total N/1,000 sq.ft within a 30 day period.

3. Applications should fall within the "Cool Season Application" window of February 17th to December 27th, and applications should be spaced at least 30 days apart if the full rate or the highest rate of the recommendation range for a monthly application is applied in a single application.

4. Lime is recommended at a rate of 15 lbs/1,000 sq ft.

Nutrient Application Worksheet

NAME:	MFH - Balfour Beatty Communities, Joint Base Langley-Eustis – Eustis			Management Area:	Newport Village
	23 May 2016		Acres:	7.10	Species: Tall Fescue
Expires:	23 May 2021				

Total Nutrient Needs	Application Month/Day	Analysis	# of Apps	Application Interval	Fertilizer Type	Fertilizer Description	Rate per 1000ft^2	lbs or oz	Wt. per Gal.	%Slow Release N	Total NPK lbs/1000ft^2	Gypsum	Lime	Total Product (lbs per Area)
Nitrogen		N - P - K									N - P_2O_5 - K_2O			
3.5 lbs/1000 ft^2	Mar. 15	16 - 25 - 12	1	-	Granular		3.15	lbs	-	20-80%	0.50 - 0.79 - 0.38			974
Phosphorus	May 15	28 - 0 - 3	1	-	Granular		1.77	lbs	-	20-80%	0.50 - 0.00 - 0.05			547
3 lbs P_2O_5/1000 ft^2	July 15	28 - 0 - 3	1	-	Granular		0.88	lbs	-	20-80%	0.25 - 0.00 - 0.03			272
Potassium	Sept. 15	16 - 25 - 12	1	-	Granular		6.22	lbs	-	20-80%	1.00 - 1.56 - 0.75			1,924
1.5 lbs K_2O/1000 ft^2	Nov. 15	32 - 0 - 8	1	-	Granular		3.13	lbs	-	20-80%	1.00 - 0.00 - 0.25			968
	Nov-Dec		1	-		Lime	25.00	lbs	-	-			25.00	7,732
														0
														0
														0
														0
														0
														0
														0
														0
														0
														0
														0
														0
														0
							Total			20-80%	3.24 - 2.34 - 1.45			
				N Recommendation Range and Soil Test Ratings							3.5 3 1.5			

Notes:

1. The recommended 3.5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 3.5 lbs of N per 1,000 sq. ft. The total annual application of water soluble nitrogen (WSN) shall not exceed 80 percent of the total annual N application.

2. Maximum WSN rate per application is 0.7 lbs N/1,000 sq.ft within a 30 day period. Do no apply more than 0.9 lbs total N/1,000 sq.ft within a 30 day period.

3. Applications should fall within the "Cool Season Application" window of February 17th to December 27th, and applications should be spaced at least 30 days apart if the full rate or the highest rate of the recommendation range for a monthly application is applied in a single application.

4. Lime is recommended at a rate of 25 lbs/1,000 sq ft.

Nutrient Application Worksheet

NAME:	MFH - Balfour Beatty Communities, Joint Base Langley-Eustis – Eustis																					
	23 May 2016																					
Expires:	23 May 2021																					
Management Area:	St. Nazaire Village																					
Acres:	5.80																					
Species:	Tall Fescue																					
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**					**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
3.5 lbs/1000 ft^2	Mar. 15	16	-	25	-	12	1	-	Granular		3.15	lbs	-	20-80%	0.50	-	0.79	-	0.38			796
Phosphorus	May 15	28	-	0	-	3	1	-	Granular		1.77	lbs	-	20-80%	0.50	-	0.00	-	0.05			447
3 lbs P_2O_5/1000 ft^2	July 15	28	-	0	-	3	1	-	Granular		0.88	lbs	-	20-80%	0.25	-	0.00	-	0.03			222
Potassium	Sept. 15	16	-	25	-	12	1	-	Granular		6.22	lbs	-	20-80%	1.00	-	1.56	-	0.75			1,571
1.5 lbs K_2O/1000 ft^2	Nov. 15	32	-	0	-	8	1	-	Granular		3.13	lbs	-	20-80%	1.00	-	0.00	-	0.25			791
	Nov-Dec						1	-	-	Lime	15.00	lbs	-	-							15.00	3,790
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
																						0
											Total			20-80%	3.24	-	2.34	-	1.45			
									N Recommendation Range and Soil Test Ratings						3.5		3		1.5			

Notes:

1. The recommended 3.5 lbs of nitrogen per 1,000 sq.ft. annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 3.5 lbs of N per 1,000 sq. ft. The total annual application of water soluble nitrogen (WSN) shall not exceed 80 percent of the total annual N application.

2. Maximum WSN rate per application is 0.7 lbs N/1,000 sq.ft within a 30 day period. Do no apply more than 0.9 lbs total N/1,000 sq.ft within a 30 day period.

3. Applications should fall within the "Cool Season Application" window of February 17th to December 27th, and applications should be spaced at least 30 days apart if the full rate or the highest rate of the recommendation range for a monthly application is applied in a single application.

4. Lime is recommended at a rate of 15 lbs/1,000 sq ft.

Soil Test Summary

Customer Name:	Joint Base Langley-Eustis – Eustis
Testing Lab:	CLC Labs
Sample Date:	03 Mar 2016
Planner Name	Chris Oliver, CNMP (AECOM)
Certification Number	#811

Managed Area ID	AREA (acres)	Soil pH	Buffer pH	Lab Test P (lbs/acre)	VT (H/M/L)	Lab Test K (lbs/acre)	VT (H/M/L)	Species
North Village-Right	10.7 (Total)	6.8	-	33	L	216	M	Bermudagrass
North Village-Left	10.7 (Total)	7.0	-	55	L+	271	H-	Bermudagrass
Community Center (North Village)	2.5	6.7		41	L	188	M-	Tall Fescue
North Village East	6.3	6.1	7.0	79	M-	269	H-	Tall Fescue
Inchon Village	10.9	6.7	-	23	L	258	H-	Tall Fescue
South Village East	10.0	6.6	-	50	L+	276	H-	Bermudagrass
Lehavre Village	10.1	6.0	6.83	53	L+	22	M	Tall Fescue
Marseilles Village	8.1	7.2	-	52	L+	239	M	Bermudagrass
Antwerp Village	5.5	5.7	6.9	31	L	204	M	Tall Fescue
Newport Village	7.1	5.7	6.83	11	L-	207	M	Tall Fescue
Recommendation - North Village	2	lbs P_2O_5/1000 sq ft			1	lbs K_2O/1000 sq ft		
Recommendation - Community Center (North Village)	2.5	lbs P_2O_5/1000 sq ft			2	lbs K_2O/1000 sq ft		
Recommendation - North Village East	2	lbs P_2O_5/1000 sq ft			1.0	lbs K_2O/1000 sq ft		
Recommendation - Inchon Village	2.5	lbs P_2O_5/1000 sq ft			1.0	lbs K_2O/1000 sq ft		

Soil Test Summary

Customer Name:	Joint Base Langley-Eustis – Eustis
Testing Lab:	CLC Labs
Sample Date:	03 Mar 2016
Planner Name	Chris Oliver, CNMP (AECOM)
Certification Number	#811

Recommendation - South Village East	2	lbs P_2O_5/1000 sq ft		1.0	lbs K_2O/1000 sq ft	
Recommendation - Lehavre Village	2	lbs P_2O_5/1000 sq ft		1.5	lbs K_2O/1000 sq ft	
Recommendation - Marseilles Village	2	lbs P_2O_5/1000 sq ft		1.5	lbs K_2O/1000 sq ft	
Recommendation - Antwerp Village	2.5	lbs P_2O_5/1000 sq ft		1.5	lbs K_2O/1000 sq ft	
Recommendation - Newport Village	3	lbs P_2O_5/1000 sq ft		1.5	lbs K_2O/1000 sq ft	

Notes:

Lab test P listed in the table above was determined using the Bray P1 procedure by CLC Labs. The Bray P1 value was converted to Mehlich III P using the following formula: Bray P1 value = -8.08 + 0.832(Mehlich-III P value)
Source: http://agcrops.osu.edu/sites/agcrops/files/imce/fertility/Soil_Tests_Plant_Avail.pdf

Lab test K listed in the table above was determined using the Ammoniumacetate K procedure. The Ammoniumacetate K procedure was converted to Mehlich III K using the following formula: Ammoniumacetate K value = -13 + 0.96(Mehlich-III K value)
Source: http://soils.rs.uky.edu/pdf%20files/CEC_calculation.pdf

Recommendations for P and K were based on Mehlich I values, which were converted from the Mehlich III values using the conversions provided in the VA Standards and Criteria, Revised July, 2014.

All subsequent soil testing shall be performed by an approved soil test lab as listed in the VA Standards and Criteria, Revised July, 2014.

Soil Test Reports

Soil samples were taken from the managed turfgrass of North Village, North Village East, Inchon Village, South Village East, Lahavre Village, Marseilles Village, Antwerp Village and Newport Village. St. Nazaire Village was assumed to exhibit similar soil and fertility conditions seen in Marseilles Village and Lahavre Village and will follow the correspondeing nutrient recommendations.

Soil samples were analyzed by CLC Labs, which is not an approved soil testing lab as listed in the *VA Nutrient Management Standards and Criteria, Revised 2014*. The soil samples collected are valid for the life of this plan (five years) or upon a major renovation or redesign of the housing areas,whichever occurs sooner. All subsequent soil testing shall be performed by an approved soil testing lab as listed in the *VA Nutrient Management Standards and Criteria, Revised July, 2014*. Standard soil test results provide values for pH, cation exchange capacity, phosphorus, calcium, magnesium, potassium, and organic matter.

Lab test phosphorus was determined using the Bray-P1 procedure and was converted to Mehlich III phosphorous using the folllowing formula: Bray P1 value = -8.08 + 0.832(Mehlich-III P value). To provide phosphorous recommendations, the Mehlich III phosphorous values were converted to Mehlich I phosphorous using the conversions provided in the VA Standards and Criteria, Revised July 2014.
Source: http://agcrops.osu.edu/sites/agcrops/files/imce/fertility/Soil_Tests_Plant_Avail.pdf).

Lab test potassium was determined using the Ammoniumacetate - K procedure and was converted to Mehlich III potassium using the follwoing formula: Ammoniumacetate K value = -13 + 0.96(Mehlich-III K value) . To provide potassium recommendations, the Mehlich III potassium values were converted to Mehlich I potassium using the conversions provided in the VA Standards and Criteria, Revised July 2014.
Source: http://soils.rs.uky.edu/pdf%20files/CEC_calculation.pdf)

A. North Village (not including the community center area) ; 8.2 acres; Bermudagrass
Soil pH measured 6.9 for North Village (not including the Community Center Tall Fescue management area). No lime is recommended. Soil Phosphorus levels measured in the L to L+ range. Phosphorus applications are recommended, not to exceed 2.0 lbs/1,000 sq ft annually. Potassium levels measured in the M to H- range. Applications of potassium are recommended, not to exceed 1.0 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 4 lbs/1,000 sq ft annually.

B. North Village - Community Center Area; 2.5 acres; Tall Fescue
Soil pH measured 6.7 for the North Village Community Center area. No lime is recommended. Soil Phosphorus levels measured in the L range. Phosphorus applications are recommended, not to exceed 2.0 lbs/1,000 sq ft annually. Potassium levels measured in the M- range. Applications of potassium are recommended, not to exceed 2.0 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 3.5 lbs/1,000 sq ft annually.

C. North Village East; 6.3 acres; Bermudagrass
Soil pH measured 6.1 for North Village East. No lime is recommended. Soil Phosphorus levels measured in the M-range. Phosphorus applications are recommended, not to exceed 2.0 lbs/1,000 sq ft annually. Potassium levels measured in the H- range. Applications of potassium are recommended, not to exceed 1.0 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 4 lbs/1,000 sq ft annually.

D. Inchon Village ; 10.9 acres; Tall Fescue
Soil pH measured 6.7 for the Inchon Village. No lime is recommended. Soil Phosphorus levels measured in the L range. Phosphorus applications are recommended, not to exceed 2.5 lbs/1,000 sq ft annually. Potassium levels measured in the H- range. Applications of potassium are recommended, not to exceed 1.0 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 3.5 lbs/1,000 sq ft annually.

Soil Test Reports

E. South Village East; 10.0 acres; Bermudagrass
Soil pH measured 6.6 for South Village East. No lime is recommended. Soil Phosphorus levels measured in the L+ range. Phosphorus applications are recommended, not to exceed 2.0 lbs/1,000 sq ft annually. Potassium levels measured in the H- range. Applications of potassium are recommended, not to exceed 1.0 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 4 lbs/1,000 sq ft annually.

F. Lahavre Village; 10.1 acres; 4.6 acres Bermudagrass, 5.5 acres Tall Fescue
Soil pH measured 6.0 for the Lahavre Village. Dolomitic lime is recommended at a rate of 25 lbs/1,000 sq ft annually. Soil Phosphorus levels measured in the L+ range. Phosphorus applications are recommended, not to exceed 2.0 lbs/1,000 sq ft annually. Potassium levels measured in the M range. Applications of potassium are recommended, not to exceed 1.5 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 3.5 lbs/1,000 sq ft annually for Tall Fescue management areas and 4 lbs/1,000 sq ft for Bermudagrass management areas.

G. Marseilles Village; 8.7 acres; 6.4 acres Bermudagrass, 2.3 acres Tall Fescue
Soil pH measured 7.2 for the Marseilles Village. No lime is recommended. Soil Phosphorus levels measured in the L+ range. Phosphorus applications are recommended, not to exceed 2.0 lbs/1,000 sq ft annually. Potassium levels measured in the M range. Applications of potassium are recommended, not to exceed 1.5 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 3.5 lbs/1,000 sq ft annually for Tall Fescue management areas and 4 lbs/1,000 sq ft for Bermudagrass management areas.

H. Antwerp Village; 5.5 acres; Tall Fescue
Soil pH measured 5.7 for Antwerp Village. Lime is recommended at a rate of 15 lbs/1,000 sq ft. Soil Phosphorus levels measured in the L range. Phosphorus applications are recommended, not to exceed 2.5 lbs/1,000 sq ft annually. Potassium levels measured in the M range. Applications of potassium are recommended, not to exceed 1.5 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 3.5 lbs/1,000 sq ft annually.

I. Newport Village; 7.1 acres; Tall Fescue
Soil pH measured 5.7 for Antwerp Village. Lime is recommended at a rate of 25 lbs/1,000 sq ft. Soil Phosphorus levels measured in the L- range. Phosphorus applications are recommended, not to exceed 3.0 lbs/1,000 sq ft annually. Potassium levels measured in the M range. Applications of potassium are recommended, not to exceed 1.5 lbs/1,000 sq ft annually. Nitrogen applications may not exceed 3.5 lbs/1,000 sq ft annually.

Section VI. Turfgrass Nutrient Recommendations for Home Lawns, Office Parks, Public Lands and Other Similar Residential/Commercial Grounds

Definitions

For the purposes of this section, the following definitions, as presented by the Association of American Plant Food Control Officials (AAPFCO), apply:

"Enhanced efficiency fertilizer" describes fertilizer products with characteristics that allow increased plant nutrient availability and reduce the potential of nutrient losses to the environment when compared to an appropriate reference product.

"Slow or controlled release fertilizer" means a fertilizer containing a plant nutrient in a form which delays its availability for plant uptake and use after application, or which extends its availability to the plant significantly longer than a reference "rapidly available nutrient fertilizer" such as ammonium nitrate, urea, ammonium phosphate or potassium chloride. A slow or controlled release fertilizer must contain a minimum of 15 percent slowly available forms of nitrogen.

"Water soluble nitrogen", "WSN" and "readily available nitrogen" means: Water soluble nitrogen in either ammonical, urea, or nitrate form that does not have a controlled release, or slow response.

Recommended Season of Application For Nitrogen Fertilizers - Applies to all Turf

A nitrogen fertilization schedule weighted toward fall application is recommended and preferred for agronomic quality and persistence of cool season turfgrass; however, the acceptable window of applications is much wider than this for nutrient management. The nutrient management recommended application season for nitrogen fertilizers to cool season turfgrasses begins six weeks prior to the last spring average killing frost date and ends six weeks past the first fall average killing frost date (see Figures 6-1 and 6-2). Applications of nitrogen during the intervening late fall and winter period should be avoided due to higher potential leaching or runoff risk, but where necessary, apply no more than 0.5 pounds per 1,000 ft^2 of water soluble nitrogen within a 30 day period. Higher application rates may be used during this late fall and winter period by using materials containing slowly available sources of nitrogen, if the water soluble nitrogen contained in the fertilizer does not exceed the recommended maximum of 0.5 pounds per 1,000 ft^2 rate. Do not apply nitrogen or phosphorus fertilizers when the ground is frozen.

The acceptable nitrogen fertilizer application season for non-overseeded warm season turfgrass begins no earlier than the last spring average killing frost date and ends no later than one month prior to the first fall average killing frost date (see Figures on next sheet).

Figure 6.1

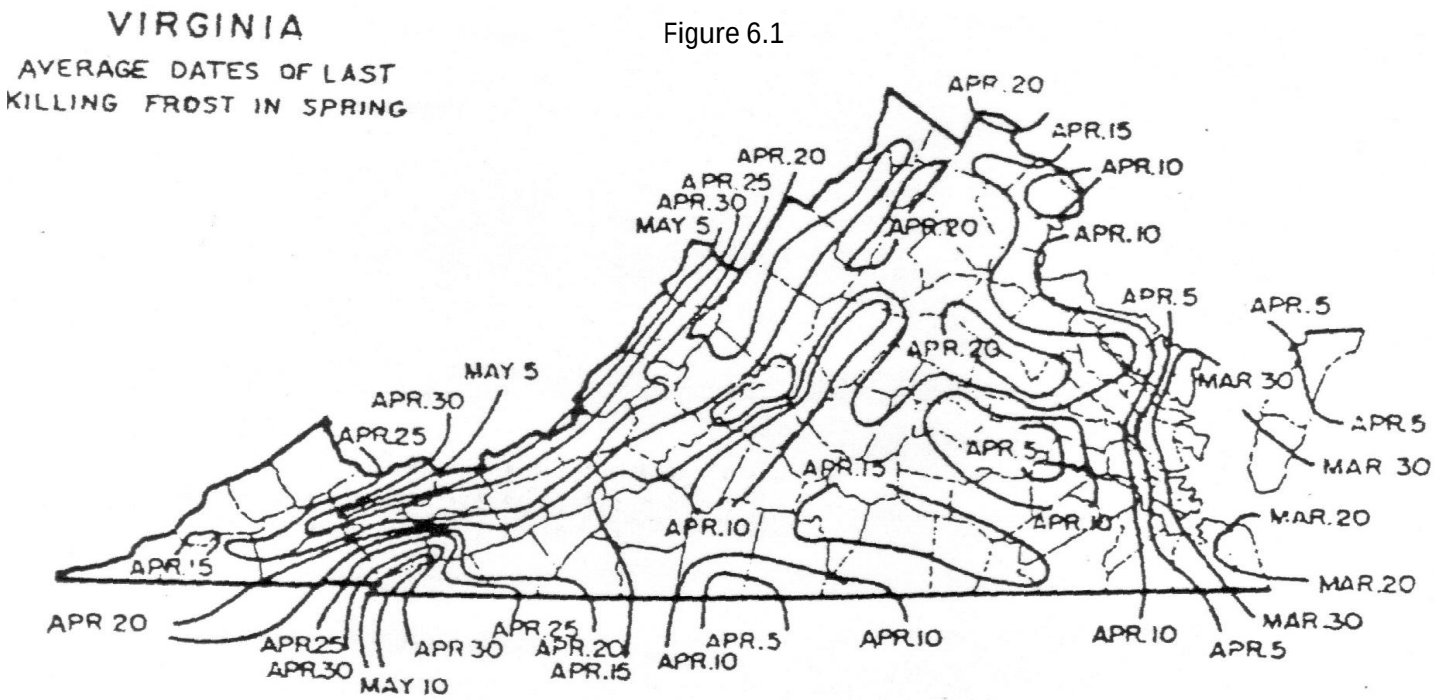
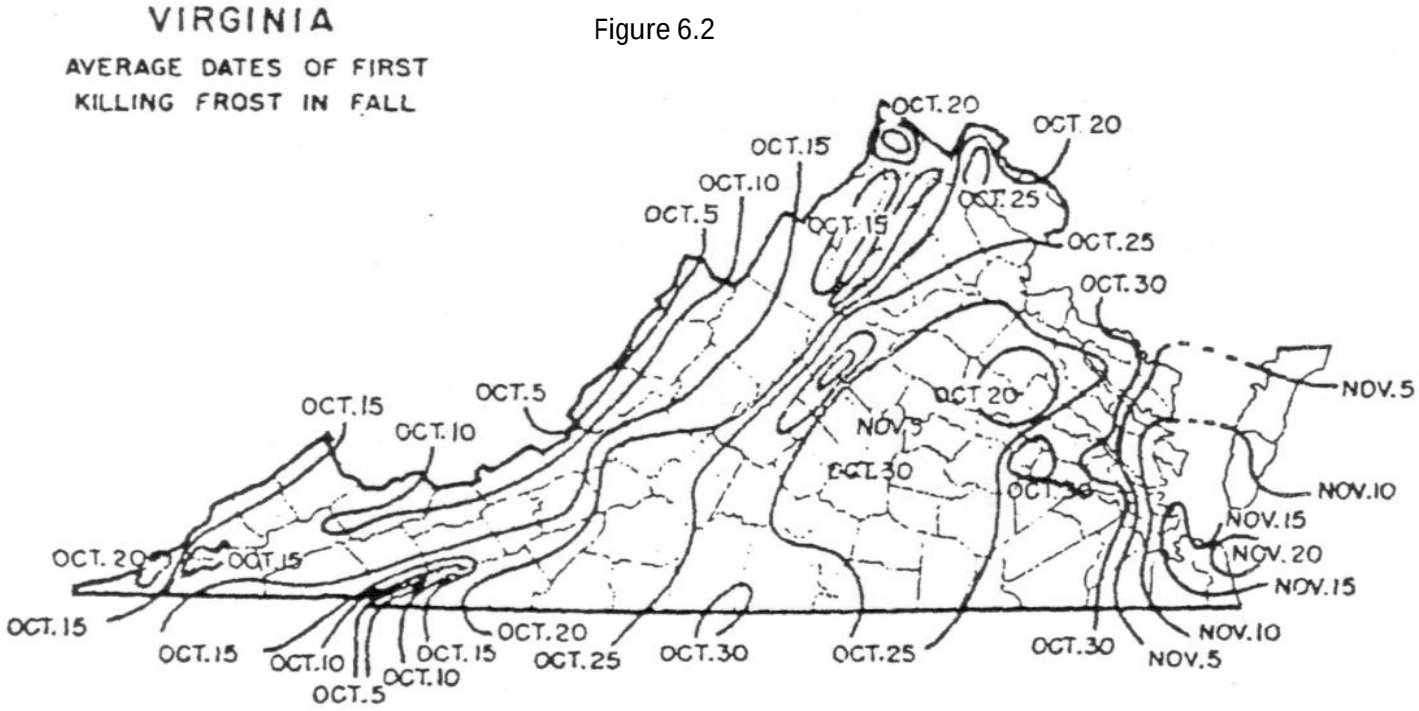


Figure 6.2



Per Application Rates

Do not apply more than 0.7 pounds of water soluble nitrogen per 1,000 ft^2 within a 30 day period. For cool season grasses, do not apply more than 0.9 pounds of total nitrogen per 1,000 ft^2 within a 30 day period. For warm season grasses, do not apply more than 1.0 pounds of total nitrogen per 1,000 ft^2 within a 30 day period. Lower per application rates of water soluble nitrogen sources or use of slowly available nitrogen sources should be utilized on very permeable sandy soils, shallow soils over fractured bedrock, or areas near water wells.

Use of Slowly Available Forms of Nitrogen

For slow or controlled release fertilizer sources, or enhanced efficiency fertilizer sources, no more than 0.9 pounds of nitrogen per 1,000 ft^2 may be applied to cool season grasses within a 30 day period and no more than 1.0 pounds of nitrogen per 1,000 ft^2 may be applied to warm season grasses within a 30 day period. Provided the fertilizer label guarantees that the product can be used in such a way that it will not release more than 0.7 pounds of nitrogen per 1,000 ft^2 in a 30 day period, no more than 2.5 pounds of nitrogen per 1,000 ft^2 may be applied in a single application. Additionally, total annual applications shall not exceed 80 percent of the annual nitrogen rates for cool or warm season grasses.

Phosphorus and Potassium Nutrient Needs (Established Turf)

Apply phosphorus (P_2O_5) and potassium (K_2O) fertilizers as indicated necessary by a soil test using the following guidelines:

Soil Test Level	Nutrient Needs (lbs /1000 ft^2) *	
	P_2O_5	K_2O
L	2-3	2-3
M	1-2	1-2
H	0.5-1	0.5-1
VH	0	0

* For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range. (For example the recommendation for a P_2O_5 soil test level of L- would be 3 pounds per 1,000 ft^2.)

Do not use high phosphorus ratio fertilizers such as 10-10-10 or 5-10-10, unless soil tests indicate phosphorus availability below the M+ level.

Recommendations for Establishment of Turf

These recommendations are for timely planted turfgrass, that is, the seed or vegetative material (sod, plugs, and /or sprigs), are planted at a time of the year when temperatures and moisture are adequate to maximize turfgrass establishment. These recommended establishment periods would be late summer to early fall for cool-season turfgrasses and late spring through mid-summer for warm-season turfgrasses.

Nitrogen Applications

At the time of establishment, apply no more than 0.9 pounds per 1,000 ft^2 of total nitrogen for cool season grasses or 1.0 pounds per 1,000 ft^2 of total nitrogen for warm season grasses, using a material containing slowly available forms of nitrogen, followed by one or two applications beginning 30 days after planting, not to exceed a total of 1.8 pounds per 1,000 ft^2 total for cool season grasses and 2.0 pounds per 1,000 ft^2 for warm season grasses for the establishment period. Applications of WSN cannot exceed more than 0.7 pounds per 1,000 ft^2 within a 30 day period.

Phosphorus and Potassium Recommendations for Establishment

Soil Test Level	Nutrient Needs (lbs /1000 $ft^{2)}$ *	
	P_2O_5	K_2O
L	3-4	2-3
M	2-3	1-2
H	2-1	0.5-1
VH	0	0

* For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range.

Reference Materials and Notes

A) Virginia Nutrient Management Standards and Criteria, Revised July 2014, Department of Conservation and Recreation, Division of Soil and Water Conservation

B) ESRI Aerial Photography

C) Geospatial data provided by Joint Base Langley-Eustis – Eustis for parcel boundaries, roads, streams, and wetlands.

D) Flood plain data obtained from FEMA National Flood Hazard Layer digital database (https://www.fema.gov/national-flood-hazard-layer-nfhl)

E) The Ohio State University Fact Sheet: Understanding Soil Tests for Plant Available Phosphorus. Watson, M and Mullen, R. The Ohio State University Extension. 2007. Available at http://agcrops.osu.edu/sites/agcrops/files/imce/fertility/Soil_Tests_Plant_Avail.pdf

F) Estimating CEC from Mehlich III Bases and SMP Buffer pH. Sikora, F. The Soil-Plant Analyst. 2000. Available at http://soils.rs.uky.edu/pdf%20files/CEC_calculation.pdf

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	North Village
Address:	Military Family Housing - Balfour Beatty Communities	Management Area Size:	8.2 acres
	167 Stillwell St.	Plant Species:	Bermudagrass
	JBLE-Eustis, VA 23604	Notes:	
Phone #:	757-369-8341		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	North Village Community Center
Address:	Military Family Housing - Balfour Beatty Communities	Management Area Size:	2.5 acres
	167 Stillwell St.	Plant Species:	Tall Fescue
	JBLE-Eustis, VA 23604	Notes:	
Phone #:	757-369-8341		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	North Village East
Address:	Military Family Housing - Balfour Beatty Communities	Management Area Size:	6.3 acres
	167 Stillwell St.	Plant Species:	Bermudagrass
	JBLE-Eustis, VA 23604	Notes:	
Phone #:	757-369-8341		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
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Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Inchon Village
Address:	Military Family Housing - Balfour Beatty Communities	Management Area Size:	10.9 acres
	167 Stillwell St.	Plant Species:	Tall Fescue
	JBLE-Eustis, VA 23604	Notes:	
Phone #:	757-369-8341		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
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Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	South Village East
Address:	Military Family Housing - Balfour Beatty Communities	Management Area Size:	10.0 acres
	167 Stillwell St.	Plant Species:	Bermudagrass
	JBLE-Eustis, VA 23604	Notes:	
Phone #:	757-369-8341		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
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Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Lahavre Village
Address:	Military Family Housing - Balfour Beatty Communities	Management Area Size:	10.1 acres
	167 Stillwell St.	Plant Species:	Bermudagrass/Tall Fescue
	JBLE-Eustis, VA 23604	Notes:	
Phone #:	757-369-8341		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
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Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Marseilles Village
Address:	Military Family Housing - Balfour Beatty Communities	Management Area Size:	8.7 acres
	167 Stillwell St.	Plant Species:	Bermudagrass/Tall Fescue
	JBLE-Eustis, VA 23604	Notes:	
Phone #:	757-369-8341		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Antwerp Village
Address:	Military Family Housing - Balfour Beatty Communities	Management Area Size:	5.5 acres
	167 Stillwell St.	Plant Species:	Tall Fescue
	JBLE-Eustis, VA 23604	Notes:	
Phone #:	757-369-8341		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	Newport Village
Address:	Military Family Housing - Balfour Beatty Communities	Management Area Size:	7.1 acres
	167 Stillwell St.	Plant Species:	Tall Fescue
	JBLE-Eustis, VA 23604	Notes:	
Phone #:	757-369-8341		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley-Eustis – Eustis	Management Area ID:	St. Nazaire Village
Address:	Military Family Housing - Balfour Beatty Communities	Management Area Size:	5.8 acres
	167 Stillwell St.	Plant Species:	Tall Fescue
	JBLE-Eustis, VA 23604	Notes:	
Phone #:	757-369-8341		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

Nutrient Management Plan

Force Support Division – Murphy Youth Athletic Fields

Prepared For:

Joint Base Langley Eustis – Eustis
1407 Washington Blvd
JBLE–Eustis, VA 23604
757-878-0833

Prepared By:
Ben Lingley
Under the Direction of:
Jennifer Solakian, CNMP
AECOM Technical Services, Inc.
1600 Perimeter Park Dr
Morrisville, NC 27560
919-461-1450

Certification Code: 758

Total Acreage: 8.2

The purpose of this Nutrient Management Plan is to ensure minimum movement of nitrogen and phosphorus from the specified area of application to surface and groundwaters where they can potentially have a detrimental effect on water quality as well as ensuring that plants have optimum soil nutrient availability for good productivity and quailty. By following this soil test based plan you are helping to protect local waters and the Chesapeake Bay.

If you have questions, please contact your plan writer, local Virginia Cooperative Extension Agent or the Department of Conservation and Recreation Nutrient Mangement Program.

DCR
Virginia Department of Conservation & Recreation

JOINT BASE LANGLEY EUSTIS

Nutrient Management Plan for:
Force Support Division – Murphy Youth Athletic Fields

Landowner Information	
Company Name	*Force Support Division – Murphy Youth Athletic Fields*
Customer Name	*Joint Base Langley Eustis – Eustis*
Mailing Address	*1407 Washington Blvd*
City State Zip	*JBLE –Eustis, VA 23604*
Phone	*757-878-0833*
Email	michell.jones2.civ@mail.mil

Planners Informaiton	
Planner Name	*Ben Lingley Under the Direction of Jennifer Solakian, CNMP (AECOM)*
Mailing Address	*1600 Perimeter Park Dr.*
City State Zip	*Morrisville, NC 27560*
Phone	*919-461-1450*
Fax	*919-461-1415*
Email	benjamin.lingley@aecom.com
Certification Code	*758*

Location Information	
Physical Address	*1407 Washington Blvd*
City State Zip	*JBLE –Eustis, VA 23604*
Coordinates	*37° 9' 40.9752"*
Please Use NAD 83 Deg Min Sec	*-76° 34' 32.6994"*
VAHU6 Watershed Code	*JL38*

Acreage	
Total	*8.2*

Plan Start Date	*27 Jun 2018*
Plan End Date	*27 Jun 2023*

Planner Signature	

Narrative

1. Site Description and Supporting Information

This Nutrient Management Plan (NMP) has been prepared by AECOM Technical Services, Inc. This NMP was prepared by Benjamin Lingley under the direction of Jennifer Solakian, a Virginia Certified Nutrient Management Planner, certification code #758.

The Murphy Youth Athletic Fields are used exclusively for Youth Athletic programs at JBLE - Eustis under the supervision of Force Support Division (FSD). The fields are located behind the Army & Air Force Exchange Service (AAFES) Shoppette/Class Six/Gas Station (Bldg. 704). The total acreage of these fields is 8.2 acres. There is currently no turf management other than mowing performed by the Youth Sports Program staff. The fields will be managed for Bermudagrass (a warm-season grass) overseeded with perennial ryegrass (a cool-season grass).

The site is relatively flat with maximum slopes less than two (2) %. There are no environmentally sensitive sites within the immediate vicinity of the Youth Athletic Fields. Even though there are not any environmentally sensitive sites, fertilizer applications to the fields should only be made when heavy rain events are not expected.

This plan is effective for five years (until 27 June 2023) or until major field renovations or major changes to maintenance practices occur. Applications of inorganic fertilizers should not occur on frozen or snow-covered ground. Any fertilizer that makes its way onto impervious surfaces should be swept or blown back into turfgrass-covered areas. Do not use fertilizers as ice melt.

Every fertilizer application should be recorded in the record sheet provided. Any questions or concerns with fertilizer products or record keeping should be brought to the plan writer’s attention.

Killing frost dates for Newport News, Virginia are March 30th (Spring) and November 15th (Fall).

Applications to the athletic fields should occur within the "Warm Season Application Period" of March 30th to October 15th. Additional fertilizer applications made outside of this window are permissible as specified in the NMP Nutrient Application Worksheet as long as the field is overseeded with cool season grasses such as Ryegrass.

Maps

2. Site Maps

A) Figure 1. Overview Map

B) Figure 2. Environmentally Sensitive Areas

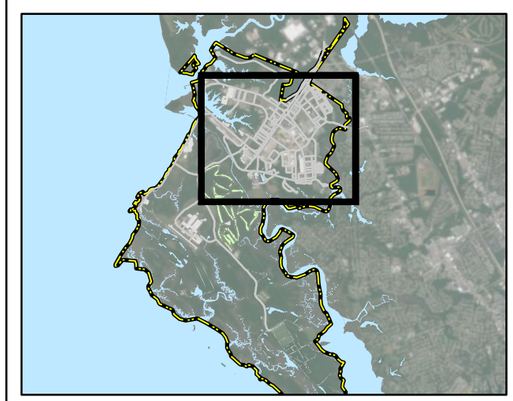
C) Figure 3. Management Area - Murphy Youth Athletic Fields

JBLE-Eustis

Nutrient Management Plan
Murphy Youth Athletic Fields

Figure 1. Overview

- Youth Athletic Fields
- Currently Managed - 2015 Athletic Fields NMP
- Water Body
- Buildings
- Road
- Golf Course
- Fence
- Installation Boundary



N

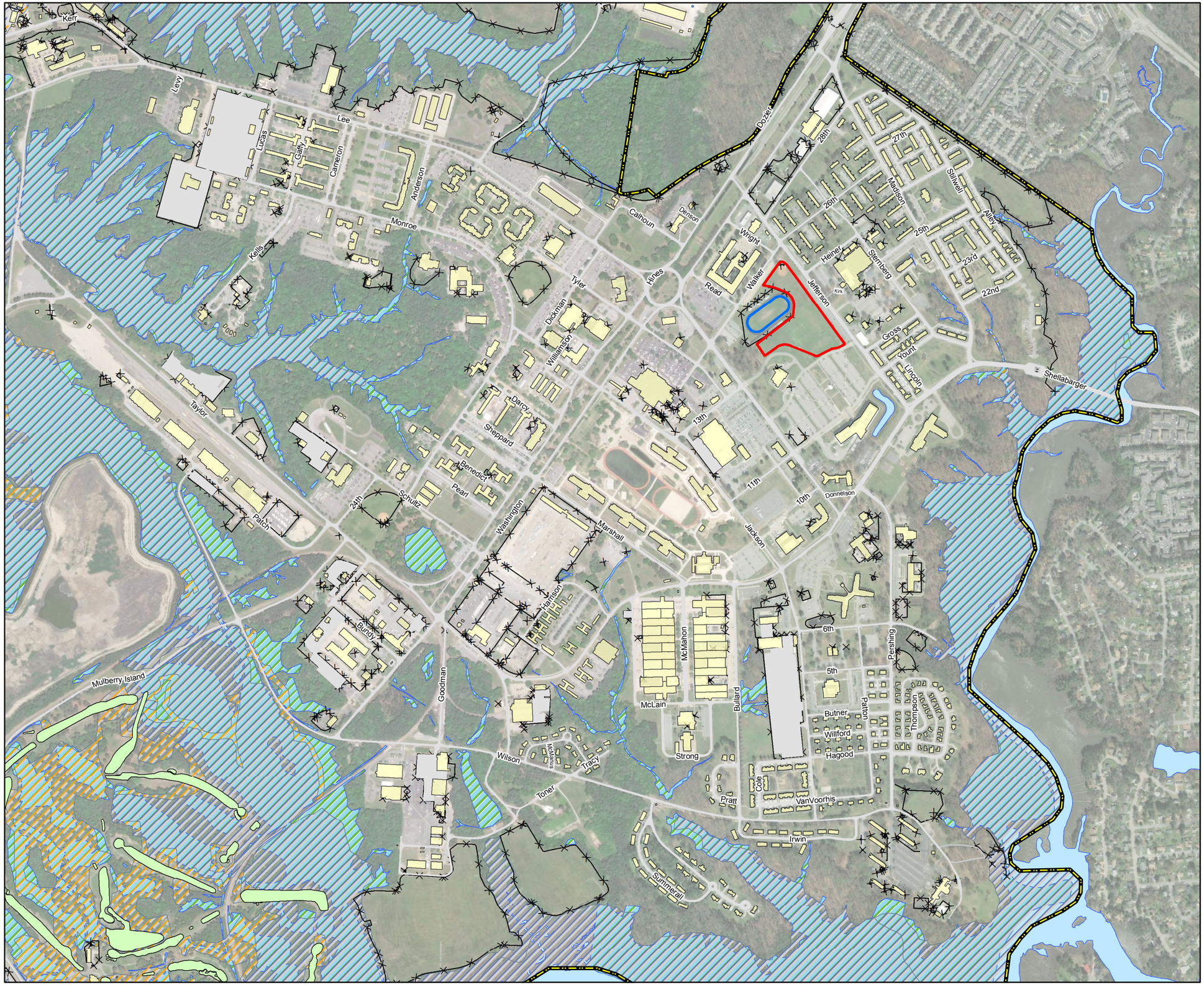
1 inch = 1,000 feet

0 500 1,000 2,000 Feet

AECOM

This map was developed using 2017 GIS data provided by JBLE-Eustis and updated by AECOM. AECOM assumes no responsibility for the accuracy of or omissions in the original data provided by the base.

FOR OFFICIAL USE ONLY



JBLE-Eustis

Nutrient Management Plan
Murphy Youth Athletic Fields

Figure 2. Environmentally Sensitive Areas

Youth Athletic Fields

Currently Managed - 2015 Athletic Fields NMP

Flood Hazard Zones

1% Chance

0.2% Chance

Wetland

Water Body

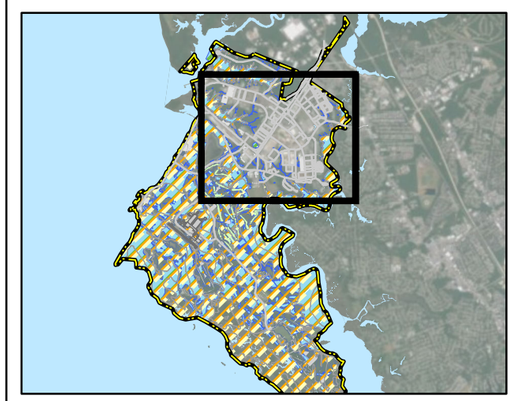
Buildings

Road

Golf Course

Fence

Installation Boundary



N

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

AECOM

This map was developed using 2017 GIS data provided by JBLE-Eustis and updated by AECOM. AECOM assumes no responsibility for the accuracy of or omissions in the original data provided by the base.

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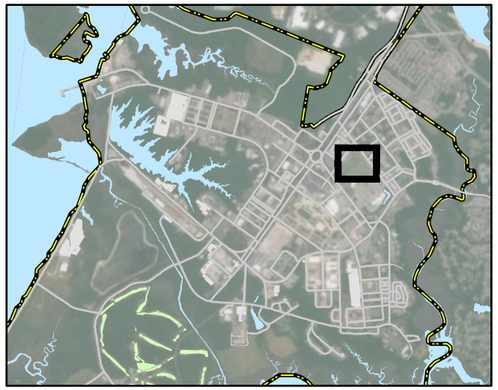
JBLE-Eustis

Nutrient Management Plan
Murphy Youth Athletic Fields

Figure 3. Management Area - Murphy Youth Athletic Fields

Sample Points
Youth Athletic Fields
Currently Managed - 2015 Athletic Fields NMP
Water Body
Buildings
Road
Golf Course
Fence
Installation Boundary



N

1 inch = 100 feet

0 50 100 200 Feet

AECOM

This map was developed using 2017 GIS data provided by JBLE-Eustis and updated by AECOM. AECOM assumes no responsibility for the accuracy of or omissions in the original data provided by the base.

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Nutrient Application Worksheet

NAME:	**Murphy Youth Athletic Fields, Joint Base Langley Eustis – Eustis**														**Management Area:**				Murphy Youth Athletic Fields				
	27 Jun 2018														**Acres:**	**8.2**			**Species:**	**Bermudagrass**			
Expires:	**27 Jun 2023**																						
Total Nutrient Needs	**Application Month/Day**	**Analysis**					**# of Apps**	**Application Interval**	**Fertilizer Type**	**Fertilizer Description**	**Rate per 1000ft^2**	**lbs or oz**	**Wt. per Gal.**	**%Slow Release N**	**Total NPK lbs/1000ft^2**				**Gypsum**	**Lime**	**Total Product (lbs per Area)**
Nitrogen		N	-	P	-	K									N	-	P_2O_5	-	K_2O			
3.5 lbs/1000 ft^2	March 1	0	-	0	-	7	1	N/A	Granular	Pre-Emergent	4.00	lbs	-	N/A	0.00	-	0.00	-	0.28			1,429
Phosphorus	April 15	0	-	0	-	60	1	N/A	Granular	Potash	2.75	lbs	-	N/A	0.00	-	0.00	-	1.65			982
1.5 lbs P_2O_5/1000 ft^2	April 15	0	-	0	-	0	4	4 Months	Granular	Pelletized Lime	40.00	lbs	-	N/A	0.00	-	0.00	-	0.00		X	14,288
Potassium	May 1	21	-	0	-	3	2	12 Weeks	Granular	Weed and Feed	3.00	lbs	-	25%	1.26	-	0.00	-	0.18			1,072
5 lbs K_2O/1000 ft^2	June 15	16	-	4	-	8	2	10 Weeks	Granular	Total Lawn Food	4.00	lbs	-	25%	1.28	-	0.32	-	0.64			1,429
	October 15	0		0		60	1	N/A	Granular	Potash	2.75	lbs	-	N/A	0.00		0.00		1.65			982
	October 15	16		4		8	2	8 Weeks	Granular	Total Lawn Food	2.20	lbs	-	25%	0.70		0.18		0.35			786
											Total			20-80%	3.24	-	0.50	-	4.75			
								N Recommendation Range and Soil Test Ratings							3.5		1.5		5.0			

Notes:

1. The recommended 3.5 lbs of nitrogen (N)/1,000 ft² annual application is based on recommendations given in the Virginia Nutrient Management Standards and Criteria (July 2014). The annual application of N may be greater than the recommendation in this plan if required to maintain good turf conditions, but the total may not exceed 3.5 lbs of N/1,000 ft². The total annual application of water soluble nitrogen (WSN) shall not exceed 80 % of the total annual N application.

2. The maximum WSN rate per application is 0.7 lbs N/1,000 ft² within a 30 day period. Do no apply more than 1.0 lb total N/1,000 ft² within a 30 day period.

3. Applications should fall within the "Warm Season Application" window of March 30th to October 15th.

4. Lime is recommended at a rate of 164 lbs/1,000 ft². Lime applications for established turf should not exceed 50 lbs/1,000 ft² and should be applied at an interval of every 4 to 6 months. Once the recommended amount of lime has been applied, the soil should be re-tested and lime applications adjusted accordingly based on results.

Soil Test Summary

Customer Name:	Joint Base Langley Eustis – Eustis Youth Athletic Fields
Testing Lab:	Waypoint Analytical
Sample Date:	09 Mar 2018
Planner Name	Ben Lingley Under the Direction of Jennifer Solakian, CNMP (AECOM)
Certification Number	758

Managed Area ID	AREA (sq ft)	Soil pH	Buffer pH	Lab Test P (ppm)	VT (H/M/L)	Lab Test K (ppm)	VT (H/M/L)	Species
Youth Fields Composite	308,444	4.6	6.33	38	M	91	L	Bermudagrass
Recommendation - Youth Fields Composite	1.5	lbs P_2O_5/1000 ft²			5	lbs K_2O/1000 ft²		

Notes:

Soil Test Level	Nutrient Needs (pounds per 1,000 ft²)* P_2O_5	K_2O
L	2-3	2-3
M	1-2	1-2
H	0.5-1	0.5-1
VH	0	0

Soil Test Reports

Soil samples were taken from the areas used as athletic fields for youth sports at JBLE-Eustis. This includes a baseball field as well as a large field segmented for use as soccer fields. Samples were taken at four intermittent points and combined into a composite sample. This was done for consistent managemnt practices. It was determined that the field will be managed for Bermudagrass with winter overseeding with Ryegrass. Soil samples were analyzed by Waypoint Analytical (formerly A&L Eastern laboratories). Standard soil test results provide values for pH, cation exchange capacity, phosphorus, calcium, magnesium, potassium, and organic matter. The soil samples collected are valid for the life of this plan (five years) or until a major renovation or redesign of the athletic fields, whichever occurs first.

A. Youth Athletic Fields Composite; 357,192 ft² (8.2 acres)

Soil pH measured 4.6 for the Youth Athletic Fields Composite sample. It is recommended that 164 lbs/1,000 ft² of lime be applied annually to reach the target pH of 6.2. Lime applications should not exceed 50 lbs/1,000 ft² per application. Applications should occur every 4 to 6 months until the recommended amount is reached. Soil Phosphorous levels measured in the M range. Phosphorous applications are recommended, not to exceed 1.5 lbs/1,000 ft² annually. Potassium levels measured in the L range. Applications of Potassium are recommended, not to exceed 5.0 lbs/1,000 ft² annually. Nitrogen applications may not exceed 3.5 lbs/1,000 ft² annually.

Standards and Criteria

Section VI. Turfgrass Nutrient Recommendations for Home Lawns, Office Parks, Public Lands and Other Similar Residential/Commercial Grounds

Definitions

For the purposes of this section, the following definitions, as presented by the Association of American Plant Food Control Officials (AAPFCO), apply:

"Enhanced efficiency fertilizer" describes fertilizer products with characteristics that allow increased plant nutrient availability and reduce the potential of nutrient losses to the environment when compared to an appropriate reference product.

"Slow or controlled release fertilizer" means a fertilizer containing a plant nutrient in a form which delays its availability for plant uptake and use after application, or which extends its availability to the plant significantly longer than a reference "rapidly available nutrient fertilizer" such as ammonium nitrate, urea, ammonium phosphate or potassium chloride. A slow or controlled release fertilizer must contain a minimum of 15 percent slowly available forms of nitrogen.

"Water soluble nitrogen", "WSN" and "readily available nitrogen" means: Water soluble nitrogen in either ammonical, urea, or nitrate form that does not have a controlled release, or slow response.

Recommended Season of Application For Nitrogen Fertilizers - Applies to all Turf

A nitrogen fertilization schedule weighted toward fall application is recommended and preferred for agronomic quality and persistence of cool season turfgrass; however, the acceptable window of applications is much wider than this for nutrient management. The nutrient management recommended application season for nitrogen fertilizers to cool season turfgrasses begins six weeks prior to the last spring average killing frost date and ends six weeks past the first fall average killing frost date (see Figures 6-1 and 6-2). Applications of nitrogen during the intervening late fall and winter period should be avoided due to higher potential leaching or runoff risk, but where necessary, apply no more than 0.5 pounds per 1,000 ft^2 of water soluble nitrogen within a 30 day period. Higher application rates may be used during this late fall and winter period by using materials containing slowly available sources of nitrogen, if the water soluble nitrogen contained in the fertilizer does not exceed the recommended maximum of 0.5 pounds per 1,000 ft^2 rate. Do not apply nitrogen or phosphorus fertilizers when the ground is frozen.

The acceptable nitrogen fertilizer application season for non-overseeded warm season turfgrass begins no earlier than the last spring average killing frost date and ends no later than one month prior to the first fall average killing frost date (see Figures on next sheet).

Figure 6.1

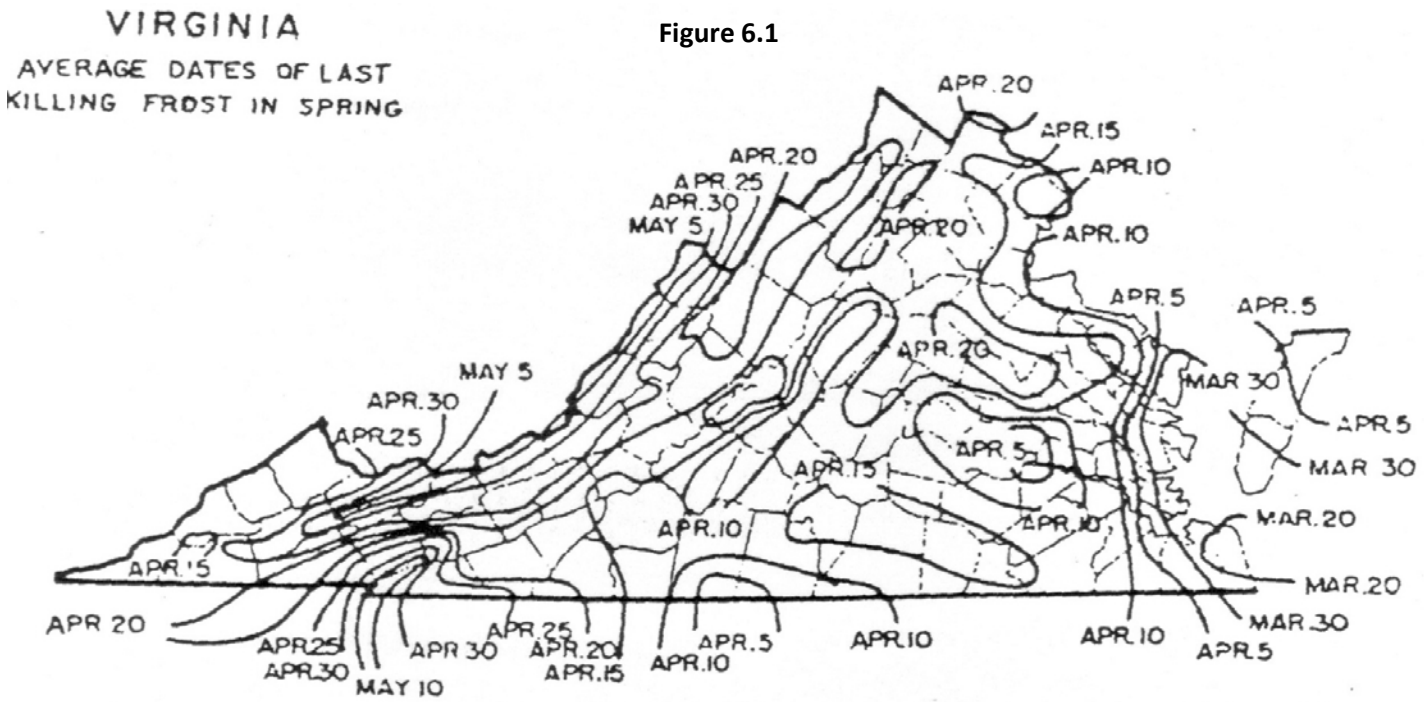
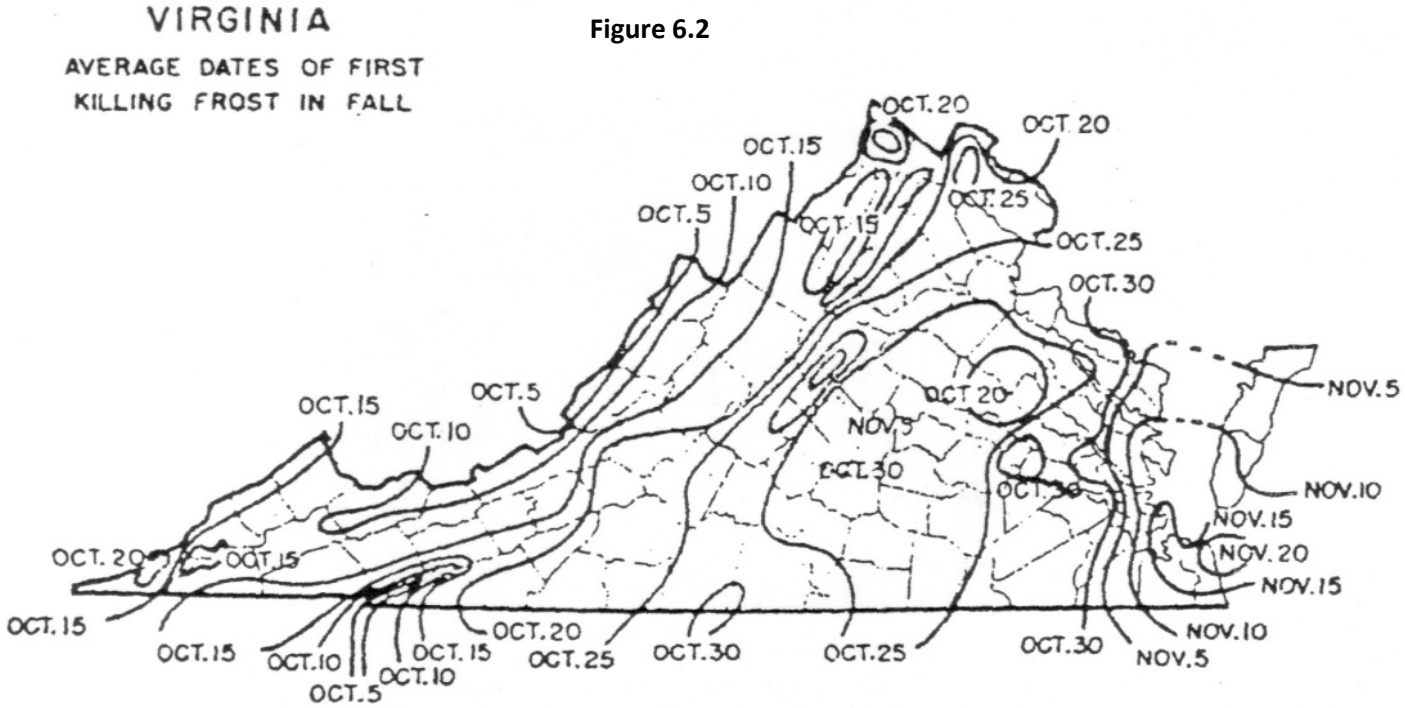


Figure 6.2



Per Application Rates
Do not apply more than 0.7 pounds of water soluble nitrogen/1,000 ft^2 within a 30 day period. For cool season grasses, do not apply more than 0.9 pounds of total nitrogen/1,000 ft^2 within a 30 day period. For warm season grasses, do not apply more than 1.0 pounds of total nitrogen/1,000 ft^2 within a 30 day period. Lower per application rates of water soluble nitrogen sources or use of slowly available nitrogen sources should be utilized on very permeable sandy soils, shallow soils over fractured bedrock, or areas near water wells.

Use of Slowly Available Forms of Nitrogen
For slow or controlled release fertilizer sources, or enhanced efficiency fertilizer sources, no more than 0.9 pounds of nitrogen/1,000 ft^2 may be applied to cool season grasses within a 30 day period and no more than 1.0 pounds of nitrogen/1,000 ft^2 may be applied to warm season grasses within a 30 day period.
Provided the fertilizer label guarantees that the product can be used in such a way that it will not release more than 0.7 pounds of nitrogen/1,000 ft^2 in a 30 day period, no more than 2.5 pounds of nitrogen/1,000 ft^2 may be applied in a single application. Additionally, total annual applications shall not exceed 80 percent of the annual nitrogen rates for cool or warm season grasses.

Phosphorus and Potassium Nutrient Needs (Established Turf)
Apply phosphorus (P_2O_5) and potassium (K_2O) fertilizers as indicated necessary by a soil test using the following guidelines:

Soil Test Level	Nutrient Needs (lbs /1000 ft^2) *	
	P_2O_5	K_2O
L	2-3	2-3
M	1-2	1-2
H	0.5-1	0.5-1
VH	0	0

* For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range. (For example the recommendation for a P_2O_5 soil test level of L- would be 3 pounds per 1,000 ft^2.)

Do not use high phosphorus ratio fertilizers such as 10-10-10 or 5-10-10, unless soil tests indicate phosphorus availability below the M+ level.

Nitrogen Management on Athletic Fields - Warm Season Grasses

The following comments apply to both naturally occurring or modified sand based fields and predominantly silt/clay soil fields:

- Annual nitrogen rates for warm season grasses shall not exceed **4 pounds** in areas which have the average first killing frost on or before October 20, and shall not exceed **5 pounds** in areas which have the average first killing frost after October 20 as shown in Figure 6-1. Nitrogen rates and timings for overseeding warm season grasses are not included in these rates.
- April 15 - May 15 applications should not be made until after complete green-up of turf.
- Nitrogen applications June through August should be coordinated with anticipated rainfall if irrigation is not available.

*Use the lower end of the ranges for non-irrigated fields and the higher end of the ranges should be used on fields with irrigation.
*Nitrogen rates towards the higher end of the ranges may be applied on heavily used fields to accelerate recovery, however, per application and annual rates cannot be exceeded.

Bermudagrass - Predominantly Silt/Clay Soil Fields [a]		
When to Apply[b]	Pounds per 1,000 ft^2 Nitrogen[e]	First Fall Killing Frost Date[b]
April 15 - May 15	0.5- 0.7[(c)]	Before Oct. 20
June	0.7	
July	0.5 – 0.7 [(d)]	
August	0.5 - 0.7 [(d)]	
Sept 1 - Sept 15	0.5 -0.7 [(c)]	After Oct. 20
If overseeded with perennial ryegrass		
Oct - Nov	0.5 [(e)]	
Feb-Mar	0.5 [(e)]	

Bermudagrass - Naturally Occurring or Modified Sand based Fields [a]		
When to Apply[b]	Pounds per 1,000 ft^2 Nitrogen	First Fall Killing Frost Date[b]
April 15 - May 15	0.5 -0.7[(c)]	Before Oct. 20
June1	0.7[(c)]	
July	0.7[(c)]	
August	0.7[(c))]	
Sept 1 - Sept 15	0.7[c]	After Oct. 20
If overseeded with perennial ryegrass		
Oct - Nov	0.5 [(e)]	
Feb - Mar	0.5 [(e)]	

The following notes apply to both of the Bermudagrass tables above:

(a)In the Piedmont and the Ridge and Valley areas of Virginia, the existing native soil will normally be comprised predominantly of clay and/or silt and these soils have inherently lower water infiltration and percolation rates and greater nutrient holding capacity. However, most areas of the Coastal Plain have existing native soils that are predominantly sandy textured soils and other facilities throughout the state may choose to install modified soil root zones that are predominantly sand (>50%) in order to maximize drainage and reduce compaction tendency. If subsurface drain tile surrounded by sand and/or gravel has been installed under the playing surface of any of these fields, their nitrogen programs should be managed as predominantly sand-based systems to minimize nutrient leaching.

(b) The beginning and ending dates for application of nitrogen shall be determined using guidance and frost date maps contained in the Season of Application for Nitrogen section, Figures 6-1 and 6-2.

(c) WSN must be applied as two applications not to exceed 0.35 lbs/1,000 ft² each with a minimum of 15 days between applications. Alternatively, using a material that contains slowly available nitrogen sources, split applications of 0.5 lbs/1,000 ft² may be applied with a minimum of 15 days between applications.

(d) If a material containing slowly available forms of nitrogen is used, rates up to 1.0 lbs of nitrogen/1,000 ft² may be applied in a single application with a minimum of 30 days between applications.

(e) For overseeded warm season grasses, an additional 0.7 lbs/1,000 ft² of WSN may be applied in the Fall after the perennial ryegrass overseeding is well established. The WSN must be applied as two applications not to exceed 0.35 lbs/1,000 ft² of nitrogen each, with a minimum of 15 days between applications. Additional WSN application of 0.5 lbs/1,000 ft² may be made in February-March to overseeded perennial ryegrass if growth and color indicate need. Alternatively, split applications of 0.5 lbs of N/1,000 ft² each with a minimum of 15 days between applications may be applied using a material containing slowly available nitrogen sources.

Phosphorus and Potassium Recommendations Athletic Fields Apply phosphorus (P_2O_5) and potassium (K_2O) fertilizers as indicated by a soil test using the following guidelines:

Soil Test Level	Nutrient Needs (pounds per 1,000 ft²)*	
	P_2O_5	K_2O
L	2-3	2-3
M	1-2	1-2
H	0.5-1	0.5-1
VH	0	0

***** For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range.

* For irrigated turf grown on naturally occurring and modified sand based soils only, up to 0.5 lbs of P_2O_5 /1,000 ft² may be applied, if needed, to aid in recovery of damaged turf during times of extreme use. No phosphorus applications shall be made when the soil phosphorus test level is above 65% saturation, based on the soil test phosphorus values and region as listed in Table 4-1 of Section IV.

* Avoid the general use of high phosphorus ratio fertilizers such as 10-10-10 or 5-10-10, unless soil tests indicate phosphorus availability below the M+ level.

Other Turf Management Considerations for Golf Courses, Athletic fields, and Home Lawns

Lime Recommendations

Lime should be recommended based on a soil test to maintain soil pH within an agronomic range for turfgrass. For new seedings where lime is recommended, incorporate the lime into the topsoil for best results.

Returning Grass Clippings

Recycling of clippings on turf should be encouraged as an effective means of recycling nitrogen, phosphorus, and potassium. Proper mowing practices that ensure no more than 1/3 of the leaf blade is removed in any cutting event will enhance turf appearance and performance when clippings are returned. Return all leaf clippings from mowing events to the turf rather than discharging them onto sidewalks or streets. Rotary mulching mowers can further enhance clipping recycling by reducing the size of clippings being returned to the turfgrass canopy.

Management of Collected Clippings

If clippings are collected they should be disposed of properly. They may be composted or spread uniformly as a thin layer over other turf areas or areas where the nutrient content of the clippings can be recycled through actively growing plants. They should not be blown onto impervious surfaces or surface waters, dumped down stormwater drains, or piled outside where rainwater will leach out the nutrients creating the potential for nutrient loss to the environment.

Use of Iron

Iron applications (particularly foliar applications) may periodically be used for enhanced greening as an alternative to nitrogen. These applications are most beneficial if applied in late spring through summer for cool season grasses and in late summer/fall applications for warm-season grasses.

Impervious Surfaces

Do not apply fertilizers containing nitrogen or phosphorus to impervious surfaces (sidewalks, streets, etc.). Remove any granular materials that land on impervious surfaces by sweeping and collecting, and either put the collected material back in the bag, or spread it onto the turf and /or using a leaf blower etc. to return the fertilizer back to the turfgrass canopy.

Reference Materials and Notes

A) Virginia Nutrient Management Standards and Criteria, Revised July 2014, Department of Conservation and Recreation, Division of Soil and Water Conservation

B) ESRI Aerial Photography

C) Geospatial data provided by Joint Base Langley Eustis – Eustis for parcel boundaries, roads, streams, and wetlands.

D) Flood plain data obtained from FEMA National Flood Hazard Layer digital database (https://www.fema.gov/national-flood-hazard-layer-nfhl)

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Joint Base Langley Eustis – Eustis	Management Area ID:	Murphy Youth Athletic Fields
Address:	Force Support Division – Murphy Youth Athletic Fields	Management Area Size:	357,192 ft²
	1407 Washington Blvd	Plant Species:	Bermudagrass (overseeded)
	JBLE–Eustis, VA 23604	Notes:	
Phone #:	757-878-0833		

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

APPENDIX I
Draft Phase II Chesapeake Bay TMDL Action Plan

Provided electronically on CD

DRAFT

CHESAPEAKE BAY PHASE II
TOTAL MAXIMUM DAILY LOAD ACTION PLAN

FOR

JOINT BASE LANGLEY EUSTIS – EUSTIS

Prepared For:

Air Force Civil Engineer Center (AFCEC)
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May 2018

Contract No. FA3002-07-D-0115
Task Order No. FA8903-17-F-0192

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LIST OF ABBREVIATIONS AND ACRONYMS

AIT	Advanced Individual Training
ATSC	Army Training Support Center
BMP	Best Management Practice
CED	Civil Engineering Division
DBH	Diameter at breast height
VDEQ	Virginia Department of Environmental Quality
EOS	Edge of Stream
EPA	Environmental Protection Agency
GIS	Geographic information system
HSG	Hydrologic soil group
JBLE-Eustis	Joint Base Langley Eustis – Eustis
JRRF	James River Reserve Fleet
MARAD	Maritime Administration
MCM	Minimum Control Measures
MS4	Municipal Separate Storm Sewer System
NCO	Non-commissioned Officer
POC	Pollutant of concern
SWP3	Stormwater Pollution Prevention Plan
TBD	To Be Determined
TMDL	Total Maximum Daily Load
TRADOC	Training and Doctrine Command
TSE	Training Support Enterprise
VPDES	Virginia Pollutant Discharge Elimination System
VSMP	Virginia Stormwater Management Program
WIP	Watershed Implementation Plan

Statement of Limitations

This plan was prepared in accordance with the customary thoroughness and competence of environmental science and engineering consulting professionals and in accordance with the standard for professional services for a national consulting firm at the time these services were provided. The analysis, conclusions, and recommendations expressed in this report were developed based upon a limited scope of services and the information made available at the time this work was conducted.

Chesapeake Bay TMDL Action Plan Requirements Cross-Reference Table		
Guidance Memo 15-2005 Chesapeake Bay TMDL Special Condition Guidance (18 May 2015)		**JBLE-Eustis TMDL Action Plan Section**
1	Current program and existing legal authority	2.0
2	New or modified legal authority	2.0
3	Means and methods to address discharges from new sources	5.0
4	Estimated existing source loads and calculated total pollutant of concern (POC) required reductions	4.0
5	Means and methods to meet the required reductions and schedule	5.0
6	Means and methods to offset increased loads from new sources initiating construction between 1 July 2009 and 30 June 2014	5.1
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8	A list of future projects, and associated acreage that qualify as grandfathered	4.4
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10b	Public comments on draft Action Plan (Phase I Permit Requirements)	7.0

1.0 INTRODUCTION

1.1 Purpose and Objective

In 2010 the United States Environmental Protection Agency (EPA) established the Chesapeake Bay Total Maximum Daily Load (TMDL) to address excess nitrogen, phosphorus, and total suspended solids (pollutants of concern or POCs) in the bay (EPA, 2010). A TMDL is the maximum amount of a pollutant that a waterbody can assimilate and still support its designated use. The Chesapeake Bay watershed encompasses over 64,000 square miles across the District of Columbia and large sections of Delaware, Maryland, New York, Pennsylvania, West Virginia, and Virginia.

In the Phase I and Phase II Chesapeake Bay Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL, the Commonwealth of Virginia committed to a phased approach to reducing nutrients and suspended solids discharging from Municipal Separate Storm Sewer System (MS4s). Section I.C of the Joint Base Langley Eustis – Eustis (JBLE-Eustis) MS4 permit (VAR040035, effective 1 July 2013) requires the base to prepare a Chesapeake Bay TMDL Action Plan that demonstrates future plans to meet the required nutrient and suspended solids reductions. The plan must be submitted to the Virginia Department of Environmental Quality (VDEQ) for review and approval.

The Action Plan is an annual report on the progress made by the base in meeting the Chesapeake Bay TMDL pollutant reduction requirements, specifically the Level 2 (L2) scoping run as specified in the 2010 Phase I WIP (VDEQ, 2010). The L2 reductions are to be met in phases corresponding to the permit cycles, as outlined in Table 1-1.

Table 1-1. Pollutant Percent Reduction Requirements by Permit Cycle

Permit Cycle	Timeframe	Cycle Percent Reduction	Cumulative Percent Reduction
1	2013-2018	5%	5%
2	2018-2023	35%	40%
3	2023-2028	60%	100%

The Action Plan presents the JBLE-Eustis estimated load contribution, required load reductions, and pollutant reduction credits. The plan also reports progress made toward meeting the additional 35% pollutant reduction requirement (cumulative 40% percent reduction) for the second permit cycle. The methodology used to calculate the pollutant loads and credits is based on VDEQ Guidance Memo No. 15-2005 (Guidance Document) (VDEQ, 2015).

The Chesapeake Bay TMDL Action Plan to address the first permit cycle was prepared in 2016 by AECOM Technical Services, Inc. (AECOM) for JBLE–Eustis under Air Force Civil Engineer Center (AFCEC) Contract No. FA8903-08-D-8770, Task Order No. 0311. This update, documenting requirements and credits associated with the second permit cycle, was prepared by AECOM under Contract No. FA3002-07-D-0015, Task Order No. FA8903-17-F-0192.

1.2 Installation Description

JBLE–Eustis, formerly Fort Eustis, is located adjacent to the City of Newport News, Virginia which is part of the Norfolk, Hampton, and Newport News metropolitan area. The base is located on Mulberry Island, a small peninsula bordered by the James River to the west, Warwick River to the east, and Skiffes Creek toward the north. Smaller waterbodies on or bordering the base include Jail Creek, Morrisons Creek, Island Creek, Bailey Creek, and Eustis Lake. The base occupies approximately 8,000 acres and houses a variety of military organizations and support activities on the installation. Most of the development is located at the northern end of the base, while the southern portion of the peninsula remains largely undeveloped. A golf course and an airfield are located near the center of the base. A site location map is presented at Figure 1-1.

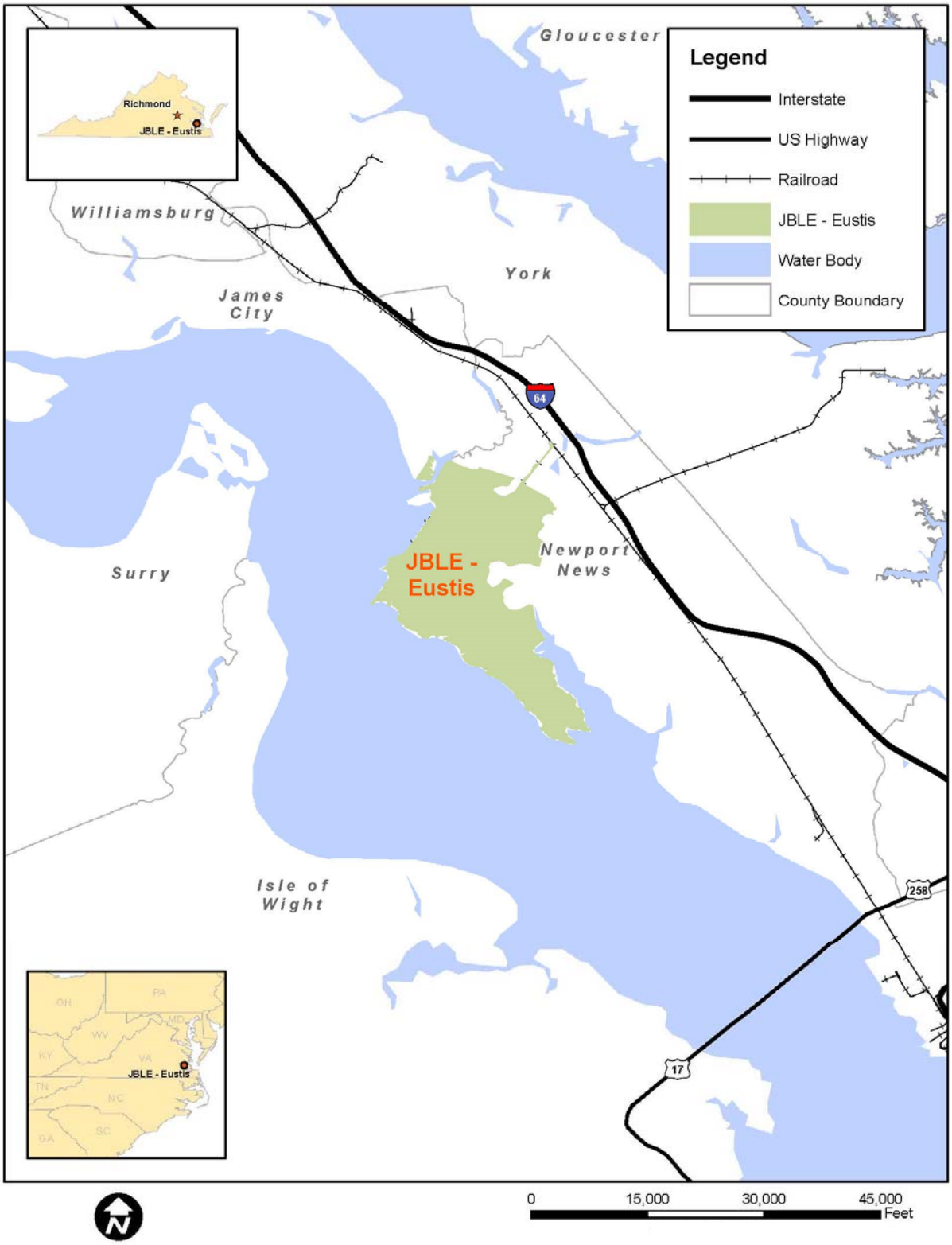

Figure 1-1. Site Location Map, JBLE–Eustis

The base is the home of the Headquarters United States Army Training and Doctrine Command (TRADOC), the Army Training Support Center (ATSC), and the 7th Transportation Brigade (Expeditionary). TRADOC is responsible for developing, educating, and training soldiers and civilians; supporting unit training; and designing, building, and integrating capabilities, formations, and equipment. The ATSC is responsible for managing the Army Training Support Enterprise (TSE), which provides oversight for programs that enable development, delivery, and sustainment of training and education support capabilities. The 7th Transportation Brigade (Expeditionary) provides logistics support around the world for port, terminal, and watercraft units conducting expeditionary operations in support of land operations. Other units on the base include the Army Aviation Logistics School, Non-commissioned Officer's (NCO) Academy, Aviation Applied Technology Directorate, and the James River Reserve Fleet (JRRF). The JRRF, a tenant managed by the Maritime Administration (MARAD), leases land on base and maintains a number of vessels moored in the James River. The total population of the base is approximately 14,550, comprised of approximately 6,800 military personnel and 2,800 dependents living on base, as well as approximately 4,950 civilian non-residents who commute to the base daily.

1.3 Plan Organization

This TMDL Action Plan is organized into the following sections:

- Section 1.0 presents an overview of the plan purpose and objective, installation description, and plan organization.
- Section 2.0 describes the JBLE-Eustis industrial and MS4 stormwater programs.
- Section 3.0 discusses the JBLE-Eustis MS4 service area.
- Section 4.0 provides the load reduction calculations.
- Section 5.0 discusses the pollutant credit calculcations.
- Section 6.0 provides a summary of load reductions and credits for the second permit cycle.
- Section 7.0 discusses the public notice and received comments.
- Section 8.0 contains a list of references used during preparation of this plan.

2.0 STORMWATER PROGRAM OVERVIEW

JBLE-Eustis is authorized to discharge stormwater from the installation in accordance with two permits issued by the VDEQ as discussed in the subsections below.

2.1 Industrial Stormwater Program Overview

In November 1990, federal stormwater discharge requirements (known as the Phase I National Pollutant Discharge Elimination System [NPDES] Program) were promulgated as part of the NPDES under the Clean Water Act (55 Federal Register 48062-48901). These regulations, as stated in Title 40 of the Code of Federal Regulations (CFR) Parts 122, 123, and 124, require the owners of "facilities that discharge storm water associated with industrial activity" to apply for a stormwater permit if storm water is discharged to (1) waters of the United States or (2) MS4s.

NPDES permits are issued either by a United States (U.S.) Environmental Protection Agency (EPA) Regional office or by states that have been granted NPDES permitting authority. JBLE–Eustis is located in the Commonwealth of Virginia, which has NPDES permitting authority. VDEQ administers the commonwealth's NPDES program and issues Virginia Pollutant Discharge Elimination System (VPDES) permits. The VDEQ requirements for stormwater permitting, are located in the Virginia Administrative Code (VAC), 9 VAC 25, and are not substantially different from the federal guidelines contained in 40 CFR 122.

A facility is subject to the regulations only if its activities fit the definition of "industrial" as specified by the 11 categories in 40 CFR 122.26(b)(14)(i)-(xi). The industrial stormwater VPDES permit issued to JBLE–Eustis, Permit No. VA0025216 incorporates the definition of industrial activity from 40 CFR 122.26. The primary industrial activities of JBLE–Eustis fall within three sectors: water transportation, land transportation, and air transportation. VPDES Permit No. VA0025216, issued to JBLE–Eustis, includes specific stormwater management requirements for each of these three sectors.

2.2 MS4 Program Overview

Discharges from MS4s are regulated under the Virginia Stormwater Management Act, the Virginia Stormwater Management Program (VSMP) Permit regulations, and the Clean Water Act as point source discharges. MS4 regulations were developed and implemented in two phases. Implementation of the first phase began in the early 1990s and required that operators of MS4s serving populations of greater than 100,000 people (per the 1990 decennial census) apply for and obtain a permit to discharge stormwater from their outfalls. The second phase of MS4 regulations became effective 23 March 2003, and required that operators of small MS4s in "urbanized areas" (as defined by the latest census) obtain a permit to discharge stormwater from their outfalls.

VDEQ issued MS4 Permit No. VAR040035 to JBLE-Eustis which became effective on 1 July 2013. The reissuance of the permit for the second permitting cycle is scheduled to become effective on 1 July 2018. The permit requires JBLE-Eustis to develop, implement, and enforce an MS4 Program designed to reduce

the discharge of polluants from the MS4 to the maximum extent practicable, to protect water quality. The permit requires the base to implement six minimum control measures (MCMs) or best management practices (BMPs) as follows:

- MCM 1: Public education and outreach on stormwater impacts
- MCM 2: Public involvement/participation
- MCM 3: Illicit discharge detection and elimination
- MCM 4: Construction site stormwater runoff control
- MCM 5: Post-construction stormwater management in new development and development on prior developed lands
- MCM 6: Pollution prevention/good housekeeping for municipal operations

In addition to implementing these MCMs, Section I.C, *Special Condition for the Chesapeake Bay TMDL*, of the MS4 permit VAR040035 requires JBLE-Eustis to prepare a Chesapeake Bay TMDL Action Plan that demonstrates future plans to meet the required nutrient and suspended solids reductions.

Each year the base submits to VDEQ an MS4 Annual Report documenting progress toward implementing the MCMs and special conditions identified in the installation MS4 Program Plan.

3.0 MS4 SERVICE AREA

A determination of the base pollutant load requires an estimate of the area served by the permittee's MS4 as of 30 June 2009. This was accomplished by creating a geographic information system (GIS) land cover shapefile based on 2009 aerial imagery obtained from the Virginia GIS Clearinghouse, http://vgin.maps.arcgis.com. The following land cover types were manually delineated across the entire base: impervious, pervious, forest, agriculture (a six acre horse pasture), natural areas (mostly tidal wetlands and marshes), and open water. Impervious area included buildings, roads, parking lots, sidewalks, railroads, and airport runways. Pervious area included turf and landscaped areas. Forested lands included trees with a minimum diameter at breast height (DBH) and a minimum contiguous area of 30 x 30 meters, as specified in the Guidance Document. Land cover features in a shapefile created by Concurrent Technologies Corporation in 2013 were used as a starting point in the land cover delineation process for the Action Plan.

The MS4 service area was conservatively classified as impervious (regulated urban impervious) or pervious (regulated urban pervious). The base is fully covered by the 2000 US Census urban area, so no adjustment to the MS4 service area due to non-overlapping US Census urban area was required to meet the first permit cycle (2018) reductions. A desktop review of the base topography revealed no receiving/exporting sheetflow runoff from/to an adjacent permittee, so no adjustment to the MS4 service area was necessary. A review of the 2010 US Census urban area revealed that there was no expansion of urban area that would otherwise require an additional L2 Scoping Run requirements under the second permit term (2023).

The Guidance Document allows for land covered under another VPDES permit to be excluded from the MS4 service area. Portions of the base were covered under industrial permit VA0025216 on 30 June 2009. The industrial drainage areas covered under permit VA0025216 were delineated to account for this area. The industrial drainage area shapefile was then combined with the 2009 land cover shapefile using the ArcGIS Union tool to produce the final 2009 land cover shapefile. The industrial areas were not included in the MS4 service area.

The land cover delineation process outlined above was repeated using 2014 aerial imagery commissioned by the base. This aerial imagery was selected as it has a greater spatial resolution than the 2013 imagery available on the Virginia GIS Clearinghouse website. The 2014 land cover layer was then combined with the industrial layer to identify "unregulated areas." The final 2014 land cover layer was used to help calculate loads due to New Sources (see section 4.2) and BMP credits (see section 5). A summary of the base's land cover is presented in Table 3-1.

Table 3-1. Land Cover Summary for the 2009 and 2014 Timeframes

Land Use	Acres (2009)	Acres (2014)
Regulated Urban Impervious	559.2	608.6
Regulated Urban Pervious	1,201.9	1,312.6
Forest	2,487.2	2,258.0
Pasture	6.1	6.1
Natural Area	2,869.3	2,838.3
Water	431.5	522.3
Unregulated Impervious	227.8	244.5
Unregulated Pervious	119.4	129.3
Unregulated Forest	36.2	16.8
Unregulated Pasture	12.6	12.6
Unregulated Natural Area	1.2	3.0
Unregulated Water	1.2	1.4
Total	**7,953.6**	**7,953.6**

Maps of the industrial permitted areas, 2009 land cover, MS4 service area, and 2014 land cover are presented as Figures 3-1 through 3-4, respectively.

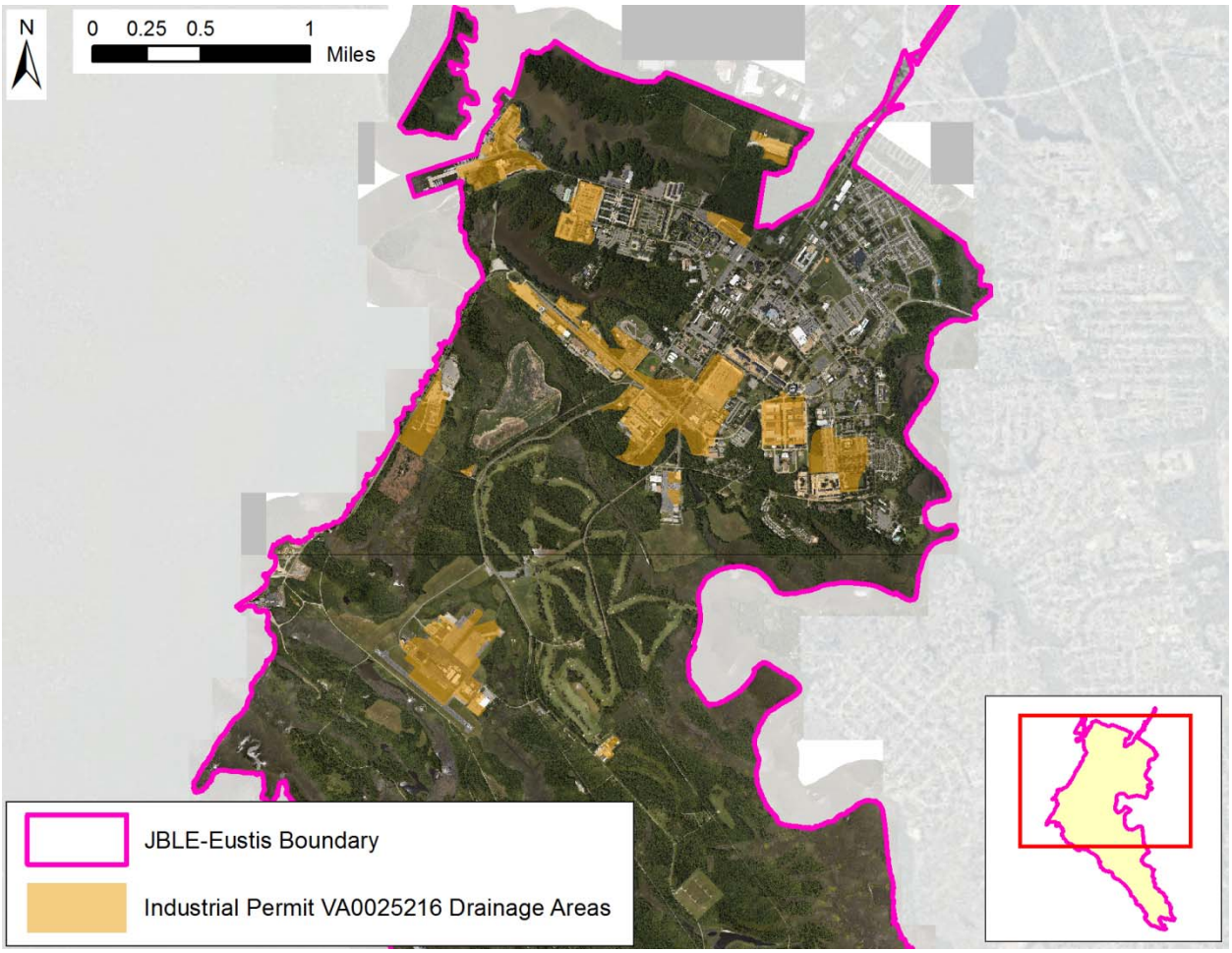

Figure 3-1. JBLE-Eustis Industrial Permit VA0025216 Drainage Areas

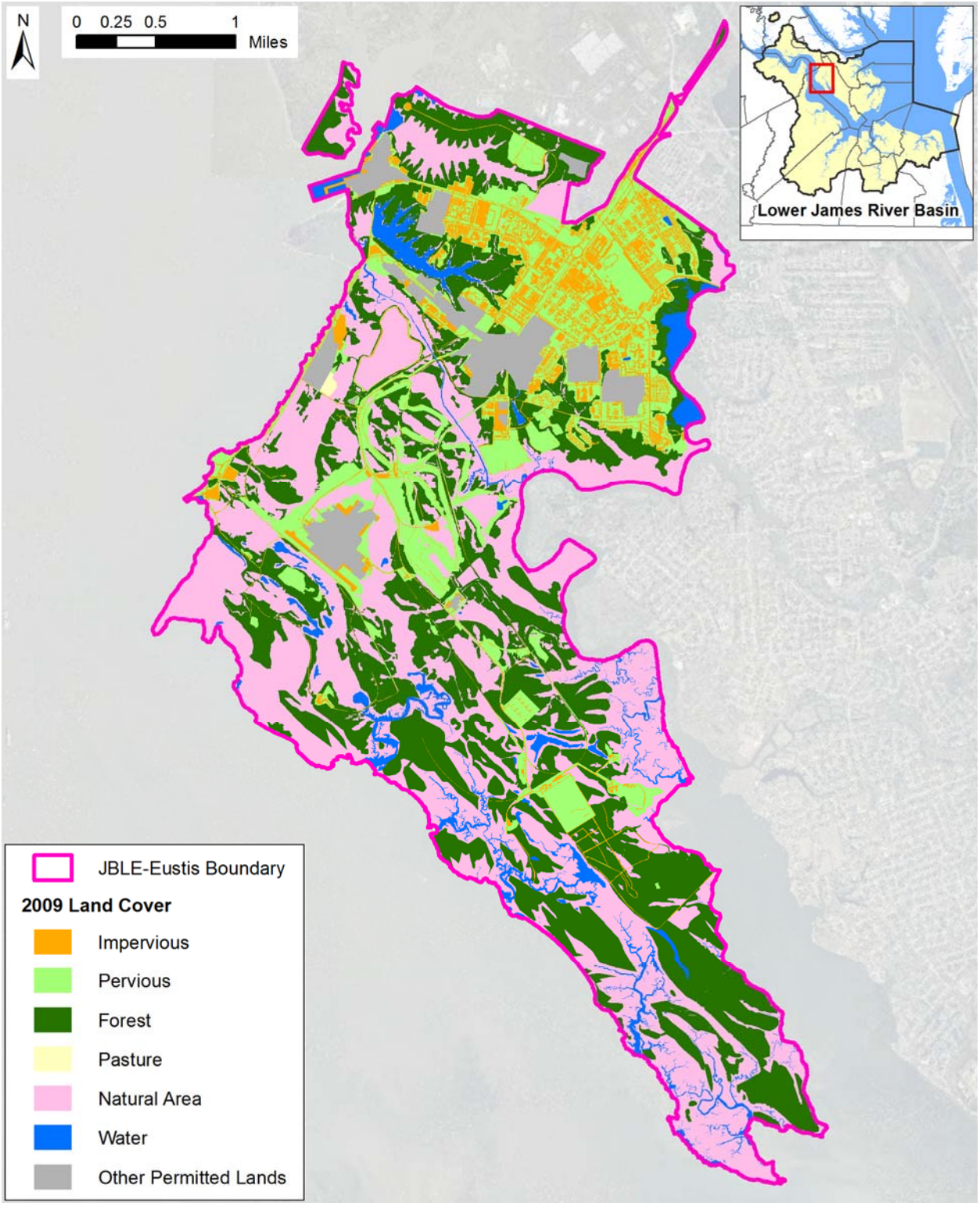

Figure 3-2. JBLE–Eustis Land Cover Present During 2009

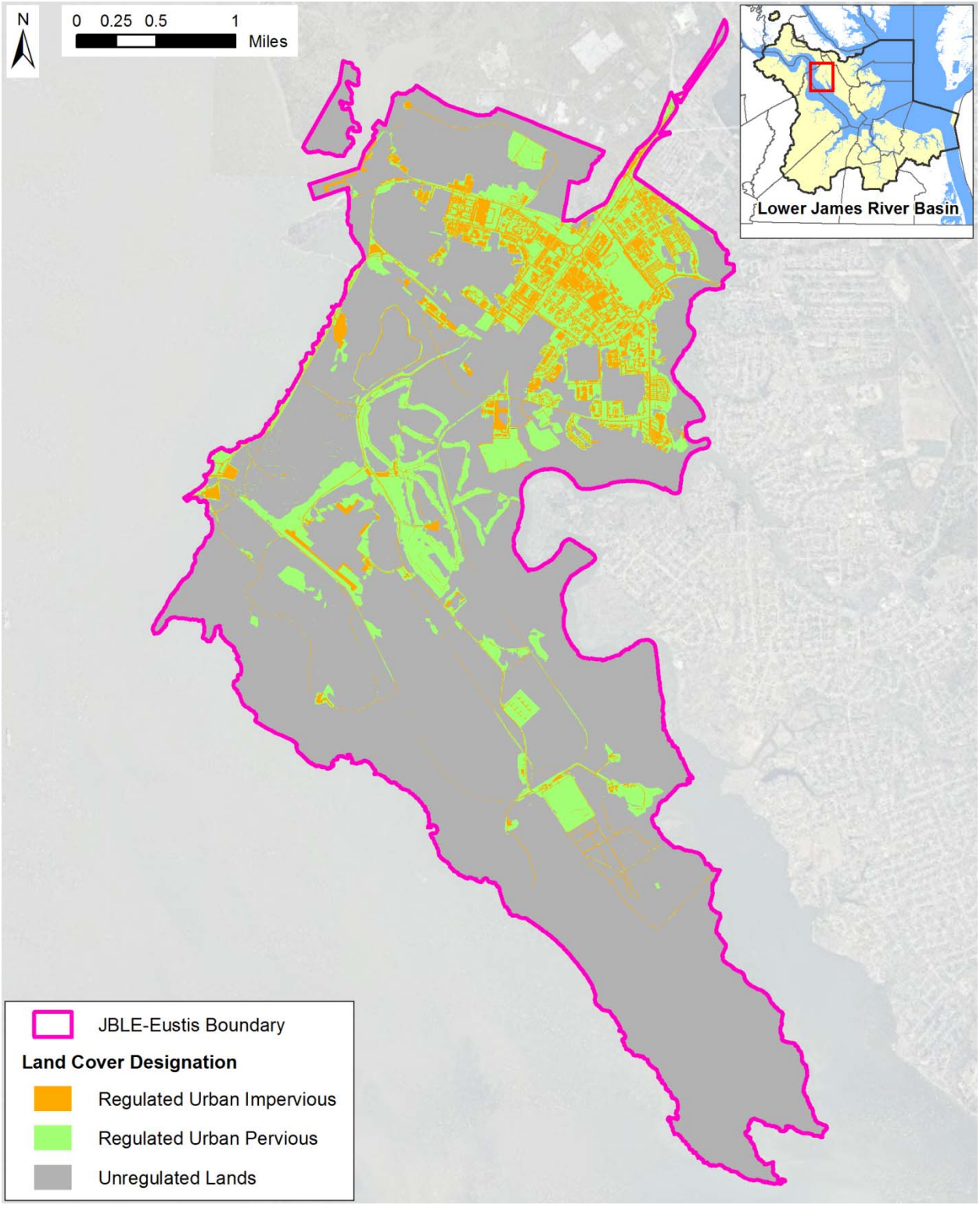

Figure 3-3. JBLE–Eustis MS4 Service Area

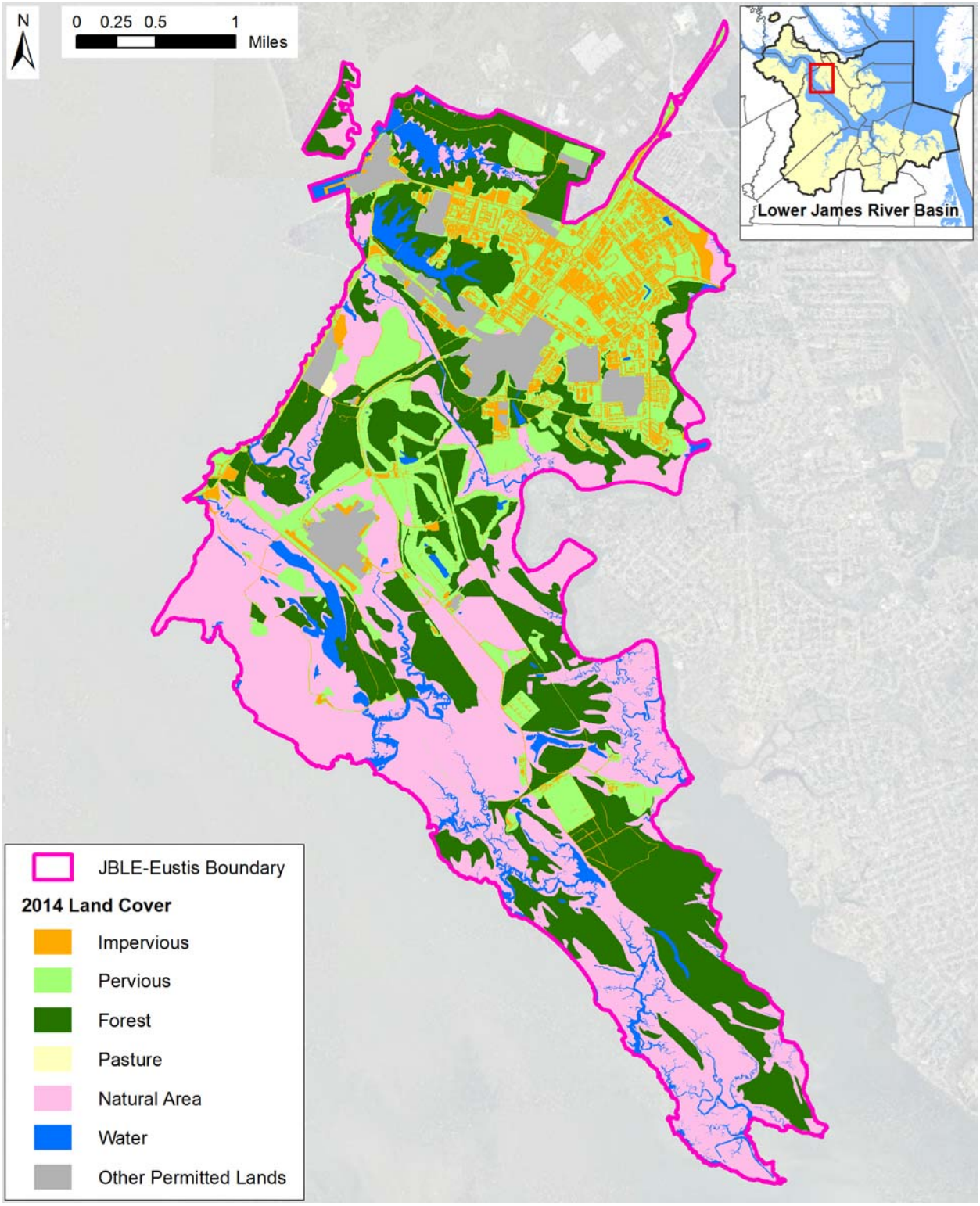

Figure 3-4. JBLE–Eustis Land Cover Present During 2014

4.0 LOAD REDUCTION CALCULATIONS

Pollutant load reductions for existing sources (contributed by the base as of 30 June 2009), new sources (contributed by the base between 1 July 2009 and 30 June 2014), and grandfathered projects are discussed in the subsections below.

4.1 Existing Source Loads

The Existing Source loads for the base (i.e., the pollutant loads contributed by the base as of 30 June 2009) were calculated using the land cover loading rates from Table 2a (James River Basin) and the Table 2b template of the Guidance Document, as presented in Table 4-1.

Table 4-1. Existing Source Loads [Table 2a]

Land Cover (Subsource)	Pollutant	Total Existing Acres Served by MS4 (30 June 2009)	2009 EOS Loading Rate (lb/ac/yr)	Estimated Total POC Load Based on 2009 Progress Run (lb/yr)	
Regulated Urban Impervious	Nitrogen	559.2	9.39	5,251.3	13,652.4
Regulated Urban Pervious		1,201.9	6.99	8,401.2	
Regulated Urban Impervious	Phosphorus	559.2	1.76	984.3	1,585.2
Regulated Urban Pervious		1,201.9	0.50	600.9	
Regulated Urban Impervious	Total Suspended Solids	559.2	676.94	378,571.0	500,057.5
Regulated Urban Pervious		1,201.9	101.08	121,486.5	

Notes:
Minor calculation discrepancies are accounted for in rounding.
EOS – Edge of Stream

The required existing source load reductions for the second permit cycle, the cumulative 40% of the L2 scoping reduction, are presented in Table 4-2.

Table 4-2. Second Permit Cycle Required Load Reductions From Existing Source Loads

Land Cover (Subsource)	Pollutant	Estimated Total POC Load Based on 2009 Progress Run (lb/yr)	L2 Scoping Reduction (%)	Reductions Required by the End of the Second Permit Cycle (lb/yr)	
Regulated Urban Impervious	Nitrogen	5,251.3	9.00	189.0	390.7
Regulated Urban Pervious		8,401.2	6.00	201.6	
Regulated Urban Impervious	Phosphorus	984.3	16.00	63.0	80.4
Regulated Urban Pervious		600.9	7.25	17.4	
Regulated Urban Impervious	Total Suspended Solids	378,571.0	20.00	30,285.7	34,537.7
Regulated Urban Pervious		121,486.5	8.75	4,252.0	

Note:
Minor calculation discrepancies are accounted for in rounding.

4.2 New Source Loads

In addition to the Existing Source loads, the base is required to offset any additional New Source loads from development that was initiated between 1 July 2009 and 30 June 2014. The New Source loads for the base were calculated using the aggregate accounting method presented in Appendix II of the Guidance Document. As the first step, the 2014 pollutant loads were calculated using Table II.3 in the Guidance Document, as presented in Table 4-3.

Table 4-3. New Sources Loads [Table II.3]

Land Cover (Subsource)	Pollutant	Total Existing Acres Served by MS4 (1 July 2014)	2009 EOS Loading Rate (lb/ac/yr)	Estimated Total POC Load as of 1 July 2014 (lb/yr)	
Regulated Urban Impervious	Nitrogen	608.6	9.39	5,714.9	14,889.9
Regulated Urban Pervious		1,312.6	6.99	9,175.0	
Regulated Urban Impervious	Phosphorus	608.6	1.76	1,071.2	1,727.5
Regulated Urban Pervious		1,312.6	0.50	656.3	
Regulated Urban Impervious	Total Suspended Solids	608.6	676.94	411,996.4	544,672.7
Regulated Urban Pervious		1,312.6	101.08	132,676.4	

Note and Acronym:
Minor calculation discrepancies are accounted for in rounding.
EOS – Edge of Stream

The difference or Total Load Change between 2009 (refer back to Table 4-1) and 2014 was calculated using Table II.4 in the Guidance Document, as presented in Table 4-4.

Table 4-4. Load Changes From New Sources Using the Aggregate Accounting Method [Table II.4]

Land Cover (Subsource)	Pollutant	Estimated Total POC Load as of 1 July 2014 (lb/yr)	Estimated Total POC Load as of 30 June 2009 (lb/yr)	Total Load Change (lb/yr)	
Regulated Urban Impervious	Nitrogen	5,714.9	5,251.3	463.7	1,237.5
Regulated Urban Pervious		9,175.0	8,401.2	773.8	
Regulated Urban Impervious	Phosphorus	1,071.2	984.3	86.9	142.3
Regulated Urban Pervious		656.3	600.9	55.4	
Regulated Urban Impervious	Total Suspended Solids	411,996.4	378,571.0	33,425.4	44,615.2
Regulated Urban Pervious		132,676.4	121,486.5	463.7	

Notes:
Minor calculation discrepancies are accounted for in rounding.

Using Table II.5 in the Guidance Document, the Total Load Change from Table 4-4 is adjusted by any credits earned from BMPs implemented during the 2009–2014 timeframe to arrive at the Net Load Change. BMPs installed after 1 July 2009 were included in this analysis when they were implemented under conditions of redevelopment, as described in Appendix V.E of the Guidance Document. Please refer to section 5.2 for additional information concerning credits from existing BMPs earned during the 2009–2014 timeframe. The base is required to offset 40% of the Net Load Change by the end of the second permit cycle, as shown in Table 4-5.

Table 4-5. Net Load Changes From New Sources [Table II.5]

Pollutant	Total Load Change (lb/yr)	Reductions from BMPs Installed between 1 July 2009 and 30 June 2014 (lb/yr)	Net Load Change (lb/yr)	Required Reduction during Second Permit Cycle	Reductions Required by the End of the Second Permit Cycle (lb/yr)
Nitrogen	1,237.5	109.4	1,128.0	40%	451.2
Phosphorus	142.3	27.0	115.3	40%	46.1
Total Suspended Solids	44,615.2	16,906.7	27,708.6	40%	11,083.4

Notes:
Minor calculation discrepancies are accounted for in rounding.

4.3 Grandfathered Project Loads

Grandfathered Projects are those in accordance with 9VAC25-870-48 (https://lis.virginia.gov/cgi-bin/legp604.exe?000+reg+9VAC25-870-48) (previously numbered 4VAC50-60-48) with a state permit issued after 1 July 2014, land disturbance activities commencing after 1 July 2014 that disturb one acre or greater, where the project utilizes an average land cover condition greater than 16% impervious cover in

the design of post-development stormwater management facilities, and that result in an increased pollutant load. The base is required to offset any additional pollutant loads due to Grandfathered Projects. The base has no Grandfathered Projects.

4.4 Future Grandfathered Project Loads

A list of future planned Grandfathered Projects and associated estimated total acreages is presented below in Table 4-6.

Table 4-6. Future Grandfathered Projects

Grandfathered Project Name	Total Acreage
Under Review	Under Review

4.5 Summary of Load Reduction Requirements

A summary of the JBLE-Eustis required load reductions is presented in Table 4-7. The values presented in this table represent the 40% reduction requirement to be achieved by the end of the second permit cycle (30 June 2023).

Table 4-7. Summary of the Second Permit Cycle Required Load Reductions

Pollutant	Second Permit Cycle Required Reductions (lb/yr)			
	Existing Sources	New Sources*	Grandfathered Projects	Total
Nitrogen	390.7	451.2	0.0	841.9
Phosphorus	80.4	46.1	0.0	126.5
Total Suspended Solids	34,537.7	11,083.4	0.0	45,621.1

Note:
*Credits from BMPs installed during the New Sources timeframe have already been accounted for in this column

5.0 CREDIT CALCULATIONS (MEANS AND METHODS)

The Guidance Document outlines multiple options available to permittee's to meet the Chesapeake Bay TMDL pollutant reduction requirements. These options include post-construction BMPs, enhancement of existing BMPs, land use change BMPs, street sweeping programs, stream restoration and riparian buffers, and nutrient management plans. The base's current pollutant credit portfolio includes post-construction BMPs, street sweeping, and land use change to meet the 40% pollutant reduction requirement for the second permit cycle as noted in the subsections below. The load reduction credits were calculated using the methods presented in the Guidance Document.

5.1 Existing BMPs (Post-2006)

A GIS inventory of existing post-construction BMPs present at JBLE-Eustis and their drainage areas previously developed by Concurrent Technologies Corporation in 2013 was used to help calculate existing credits for the Action Plan. BMPs installed between 1 January 2006 and 30 June 2009 were included in this analysis. BMPs installed prior to 1 January 2006 are not eligible for credit and were thus excluded from consideration for this Action Plan. BMPs installed after 30 June 2009 were tracked separately to facilitate the calculation of New Source loads.

A two-step process using GIS and Excel was used to determine the pollutant credit for each BMP. Drainage areas for BMPs were delineated in ArcGIS and the layer was used to intersect the 2014 land cover layer. The 2014 land cover layer was selected as it better reflected current ground conditions. This produced a table denoting the land cover acreages within each BMP drainage area. The land cover acreages were multiplied by the land cover loading rates provided in Table 2a (for impervious and pervious lands) and Table III.1 (for forested lands) and then summed to determine the pollutant load attributed to the drainage area. The load was then multiplied by the pollutant removal efficiency for each BMP type to determine the load removed (i.e., credit). BMP efficiencies provided in Table V.C.1 of the Guidance Document were used for this analysis. The efficiency of some BMP types depends on the underlying hydrologic soil group (HSG). GIS data from the Web Soil Survey website (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm) was used to determine the soil group for each BMP. The above process was repeated for all three pollutants of concern.

The effect of BMP treatment trains (BMPs in series, where the effluent from an upstream BMP enters the drainage area of a downstream BMP) was also accounted for. The cumulative effect of BMPs in series will be less for a given pollutant than the sum of individual BMPs not in series. This is because the removal efficiency of a downstream BMP is applied to runoff that is cleaner.

One benefit of treatment trains is the potential to maximize the load removal efficiency across multiple pollutants of concern. For example, pairing an upstream BMP with a high sediment removal rate with a downstream BMP that carries a high nutrient removal rate may be an excellent use of available space in a developed area.

Credits for BMPs implemented on unregulated lands may be awarded, provided any necessary baseline is first met (see page 10 and Example V.E.1 of the Guidance Document). No credits are claimed for BMPs implemented on unregulated lands because the criteria for receiving credits were not achieved.

Part III.3 of the Guidance Document describes that permittees may not receive credit for BMPs that were installed after 1 July 2009 and that were implemented to meet the minimum VSMP technical criteria phosphorous removal requirement for new development or other minimum regulatory requirements. However, permittees may receive credit for those BMPs under circumstances of redevelopment, stricter development requirements, or oversized BMPs. BMPs installed after 1 July 2009 were included in this analysis when they were implemented under conditions of redevelopment, as described in Appendix V.E of the Guidance Document. Credits from BMPs implemented after 30 June 2009 were calculated separately in order to track net load change due to new source loads (refer back to Table 4-5). The effects of BMP treatment trains and unregulated land were also accounted for BMPs implemented during 2009-2014. Summaries of post-construction BMP types and credits are presented in Table 5-1 and Table 5-2, respectively.

Table 5-1. Summary of Existing BMP Types

BMP Type	Timeframe Implemented		Total
	1 Jan 2006 to 30 June 2009	1 July 2009 to 30 June 2014	
Bioretention	3	7	10
Dry Detention Pond	1	5	6
Dry Extended Detention Pond	1	10	11
Permeable Pavement	–	7	7
Swale	2	9	11
Wet Pond or Wetland	1	1	2
Total	**8**	**39**	**47**

Table 5-2. Summary of Credits From Existing Post-Construction BMPs

BMP Timeframe	Number of BMPs	Credits (lb/yr)		
		Nitrogen	Phosphorus	Total Suspended Solids
2006–2009	8	66.4	21.1	10,782.7
2009–2014	39	109.4	27.0	16,906.7

A map of existing post-construction BMP locations is presented as Figure 5-1.

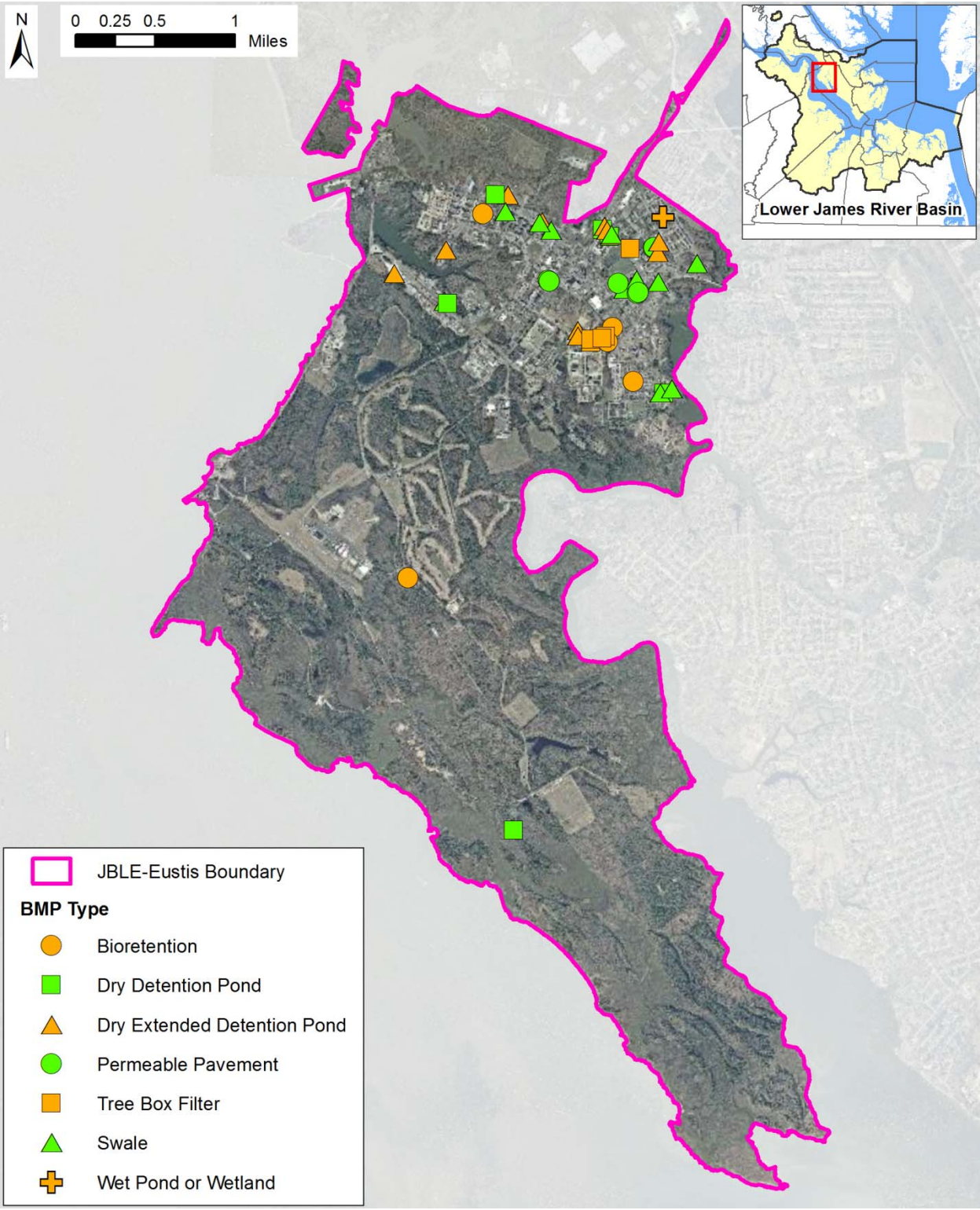

Figure 5-1. Map of Existing Post-Construction BMPs

5.2 Street Sweeping

The base uses a third-party contractor to sweep identified streets and parking lots on a regular basis. The base used the qualifying street lanes method (mechanical technology) described in Appendix V.G of the Guidance Document to calculate street sweeping credits. A summary of street sweeping credits is presented in Table 5-3.

Table 5-3. Summary of Annual Street Sweeping Credits

Lane-Miles Swept	Acres Swept	Credits (lb/yr)		
		Nitrogen	Phosphorus	Total Suspended Solids
1,147.5	1,390.9	856.8	111.3	180,821.5

A map of the streets serviced as part of the base's street sweeping program is presented as Figure 5-2.

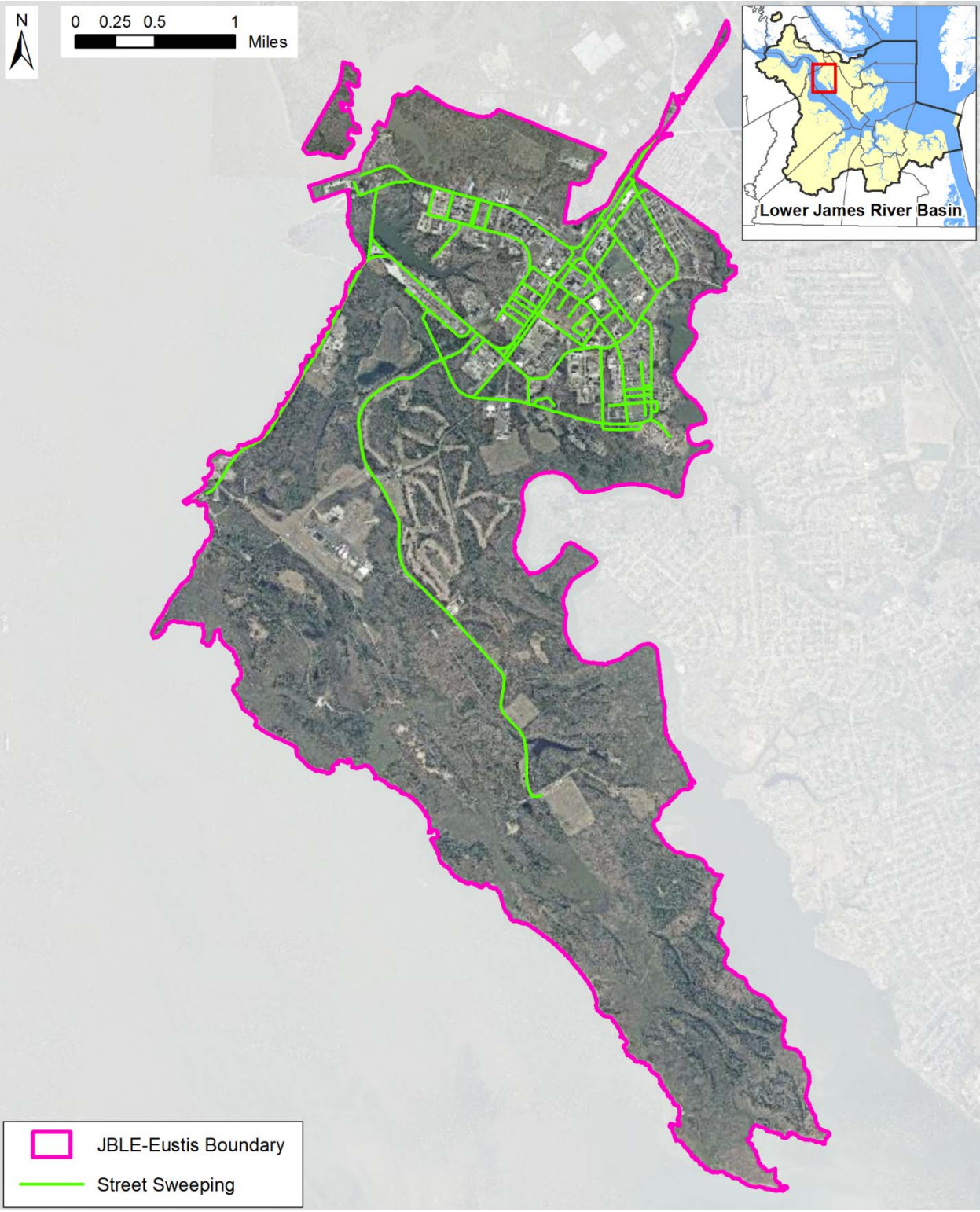

Figure 5-2. Map of Streets Swept

5.3 Land Use Change

The base has one land use change BMP, where trees have been planted on an existing pervious parcel. Currently the parcel does not meet the forested lands criteria outlined in the Guidance Document. Therefore, credit for "pervious to grass" land use change will be used for this parcel until the forested lands criteria is met. The base used the methods described in Appendix V.H of the Guidance Document to calculate land use change credits. A summary of land use change credits is presented in Table 5-4.

Table 5-4. Summary of Land Use Change Credits

Number of BMPs	Credits (lb/yr)		
	Nitrogen	Phosphorus	Total Suspended Solids
1	14.8	0.0	0.0

A map of the land use change BMP is presented as Figure 5-3.

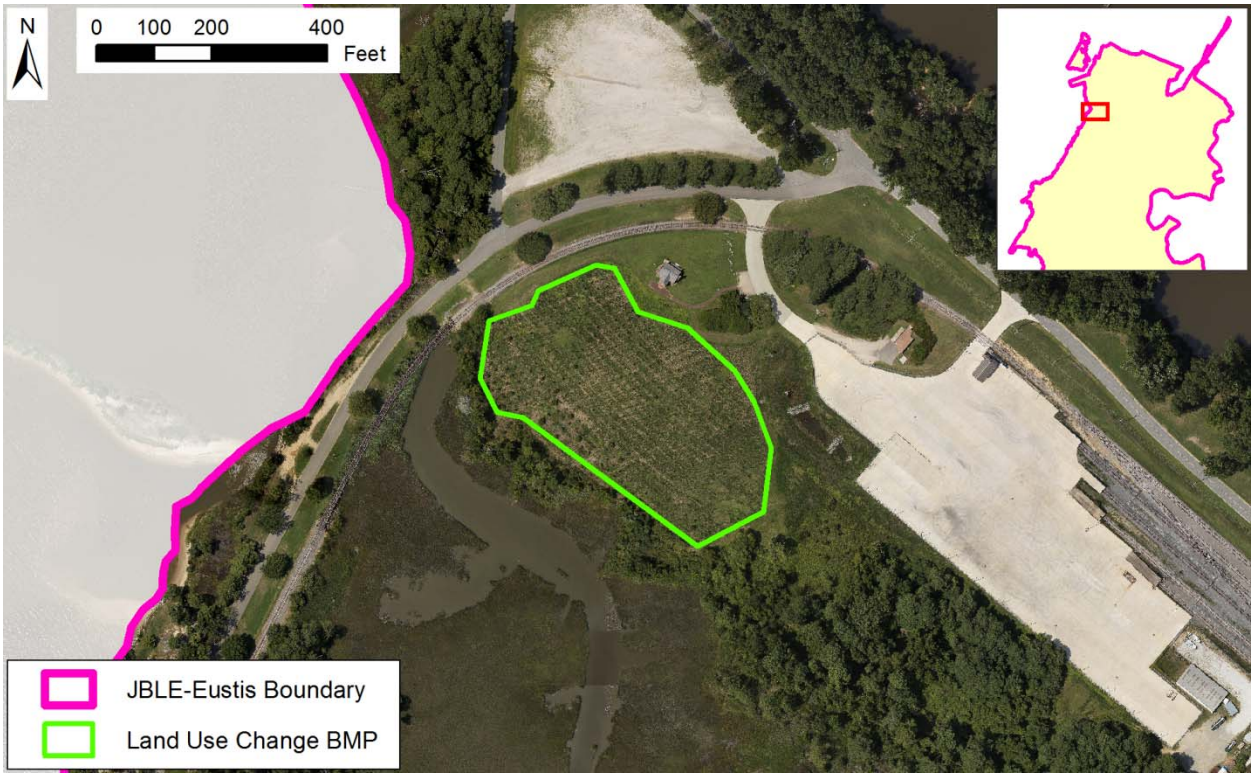

Figure 5-3. Map of Land Use Change BMPs

5.4 Future BMPs

The base will continue to investigate the applicability and feasibility of additional BMPs and BMP types in order to meet the pollutant load reduction requirements of the Chesapeake Bay TMDL. Opportunities for effective retrofit options will be explored and prioritized to make the best use of available resources.

5.5 BMP Costs

The current JBLE-Eustis pollutant credit portfolio includes post-construction BMPs, street sweeping, and land use change. The implementation cost for the structural BMPs and land use change is zero, as these BMPs are existing. The base uses a third-party contractor to sweep identified streets and parking lots on a regular basis. A summary of BMP implementation costs is presented in Table 5-5.

Table 5-5. Summary of BMP Implementation Costs

BMP Strategy	Implementation Costs
Post-construction BMPs	$0
Land Use Change BMPs	$0
Street Sweeping	TBD

5.6 Summary of Load Reduction Credits

A summary of pollutant credits by BMP strategy is presented in Table 5-6.

Table 5-6. Summary of Load Reduction Credits by BMP Strategy

Pollutant	Post-construction BMPs		Street Sweeping	Land Use Change
	Completed between 1 Jan 2006 and 30 June 2009	Completed after 1 July 2009		
Nitrogen	66.4	109.4	856.8	14.8
Phosphorus	21.1	27.0	111.3	0.0
Total Suspended Solids	10,782.7	16,906.7	180,821.5	0.0

6.0 PROGRESS SUMMARY

Section I.C of the MS4 Permit requires the base to meet the Chesapeake Bay TMDL requirements by reducing nitrogen, phosphorus, and total suspended solid loads by 40% of the Chesapeake Bay L2 scoping reductions by the end of the second permit cycle (30 June 2023). The base's load contribution, required load reductions, and pollutant credits outlined in this Action Plan were calculated using the methodology described in VDEQ's Guidance Document. A summary of the required load reduction is presented in Table 6-1 and second permit cycle pollutant credits is presented in Table 6-2.

Table 6-1. Summary of Permit Cycles 1, 2 and 3 Reduction Requirements

Pollutant	Required Load Reduction by 2018 (lb/yr)	Required Load Reduction by 2023 (lb/yr)	Required Load Reduction by 2028 (lb/yr)
Nitrogen	105.2	841.9	2,104.7
Phosphorus	15.8	126.5	316.3
Total Suspended Solids	5,702.6	45,621.1	114,052.8

Table 6-2. Summary of Second Permit Cycle Reduction Requirements and Credits

Pollutant	Second Permit Cycle Cumulative Percent Reduction Requirement	Required Load Reduction by 2023 (lb/yr)	Credits from Existing BMPs (lb/yr)*	Second Permit Cycle Target Met?
Nitrogen	40%	841.9	938.1	Yes
Phosphorus	40%	126.5	132.3	Yes
Total Suspended Solids	40%	45,621.1	191,604.2	Yes

* Does not include credits related to New Sources that were previously accounted for in Table 4-5 [Table II.5]

Assuming that the BMPs considered in this analysis are maintained and fully functional to provide the design performance, it is the conclusion of this analysis that the base currently meets their second permit cycle reduction requirement goals for all of the pollutants of concern. The base will continue to investigate the applicability and feasibility of additional BMPs and BMP types in order to meet the future milestone pollutant load reduction requirements of the Chesapeake Bay TMDL.

7.0 PUBLIC COMMENTS

The base encourages the public's participation in the development and implementation of this Chesapeake Bay TMDL Action Plan. In keeping with this objective, the base has uploaded this Action Plan to its website, http://www.jble.af.mil/Units/Army/Eustis-Enviromental. Comments received will be taken into consideration when finalizing the Action Plan with VDEQ.

8.0 REFERENCES

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APPENDIX J
Fecal Coliform TMDL Action Plan

Provided electronically on CD

FINAL

WARWICK RIVER AND SKIFFES CREEK BACTERIA TOTAL MAXIMUM DAILY LOAD ACTION PLAN

FOR

JOINT BASE LANGLEY EUSTIS – EUSTIS

Prepared For:

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August 2016

Contract No. FA8903-08-D-8770
Task Order No. 0311

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LIST OF ABBREVIATIONS AND ACRONYMS

ATSC	Army Training Support Center
BMP	Best Management Practice
CED	Civil Engineer Division
cfu/yr	Colony Forming Units per Year
EPA	Environmental Protection Agency
GIS	Geographic Information System
JBLE–Eustis	Joint Base Langley-Eustis – Eustis
JRRF	James River Reserve Fleet
MARAD	Maritime Administration
MCM	Minimum Control Measure
MFH	Military Family Housing
MS4	Municipal Separate Storm Sewer System
NCO	Non-Commissioned Officer
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TRADOC	Training and Doctrine Command
TSE	Training Support Enterprise
VDEQ	Virginia Department of Environmental Quality
VESCP	Virginia Erosion and Sediment Control Plan
VPDES	Virginia Pollutant Discharge Elimination System
VSMP	Virginia Stormwater Management Program

Statement of Limitations

This plan was prepared in accordance with the customary thoroughness and competence of environmental science and engineering consulting professionals, and in accordance with the standard for professional services for a national consulting firm at the time these services were provided. The analysis, conclusions, and recommendations expressed in this report were developed based upon a limited scope of services and the information made available at the time this work was conducted.

1.0 INTRODUCTION

1.1 Background

The Virginia Department of Environmental Quality (VDEQ) *1998 303(d) Total Maximum Daily Load Priority List and Report* listed Warwick River and Skiffes Creek as not supporting their designated use for shellfish harvesting due to fecal coliform bacteria standards violations. In 2008, the United States Environmental Protection Agency (EPA) approved Total Maximum Daily Loads (TMDLs) for Warwick River and Skiffes Creek to address excess fecal coliform bacteria in these waterbodies (VDEQ, 2007). The TMDL report assigned individual wasteload allocations (WLA) for bacteria to the city of Newport News, York County, and Joint Base Langley-Eustis – Eustis (JBLE–Eustis). A TMDL is the maximum amount of a pollutant that a waterbody can assimilate and still support its designated use(s). A TMDL WLA is a portion of the TMDL load, and represents the allowable load a permittee may discharge to the TMDL waterbody and still meet water quality standards. The WLA includes that portion of the TMDL that is assigned to permitted point sources such as Municipal Separate Storm Sewer Systems (MS4s).

JBLE–Eustis is authorized to discharge stormwater from the installation in accordance with an industrial stormwater permit (VA0025216) and an MS4 permit (VAR040035), both issued by the VDEQ. The MS4 permit identifies minimum control measures (MCM) and special condition requirements, measureable goals and best management practices (BMPs) selected for implementation at JBLE–Eustis. Special Condition 1 found in Section I.B.1 of the JBLE–Eustis MS4 permit requires the installation to maintain a specific TMDL Action Plan for pollutants allocated to the MS4 in an approved TMDL. On 30 November 2015, VDEQ notified JBLE–Eustis that, as part of maintaining its MS4 Program Plan, the installation is required to develop TMDL Action Plans for the Warwick River, and Skiffes Creeks to address bacteria impairment in those waterbodies. Specifically, JBLE–Eustis (MS4 operator) must update the MS4 Program Plan to incorporate approvable TMDL Action Plans that identify the BMPs and other interim milestone activities. The TMDL Action Plans for the Warwick River, and Skiffes Creek must be completed by the end of Permit Year 3 (30 June 2016) and implemented in Permit Year 4.

1.2 Purpose and Objectives

The purpose of this Bacteria TMDL Action Plan is to demonstrate future plans to reduce fecal bacteria sources and loadings at JBLE–Eustis. The objective of the Action Plan is to describe the following:

1. Permittee's legal authority applicable to reducing the pollutant,
2. Management practices (control measures) to address the TMDL pollutant, including control measures beyond the MS4 minimum control measures (MCMs),
3. Enhanced public education, outreach, and employee training programs,
4. An assessment of significant sources of pollutants, and
5. A method to assess the Action Plan for its effectiveness in reducing the pollutant.

1.3 Action Plan Organization

This Bacteria TMDL Action Plan is organized into the following sections:

- Section 1.0 presents the background and objectives of the Bacteria TMDL Action Plan.
- Section 2.0 describes the TMDL waterbodies.
- Section 3.0 discusses the JBLE–Eustis installation.
- Section 4.0 describes the bacterial control measures that are applicable to the MS4 permit MCMs.
- Section 5.0 describes the additional bacterial control measures beyond the MCMs.
- Section 6.0 discusses the BMP implementation schedule and assessment.
- Section 7.0 contains a list of references associated with this Action Plan.

2.0 TMDL WATERBODIES

Warwick River and Skiffes Creek are located in the Lower James River Basin as illustrated in Figure 2-1. These two waterbodies are listed as impaired for fecal coliform bacteria, in violation of the Virginia Administrative Code (VAC) 9VAC25-260-160 water quality standard. The WLAs assigned to JBLE–Eustis for the impaired waterbodies are presented in Table 2-1.

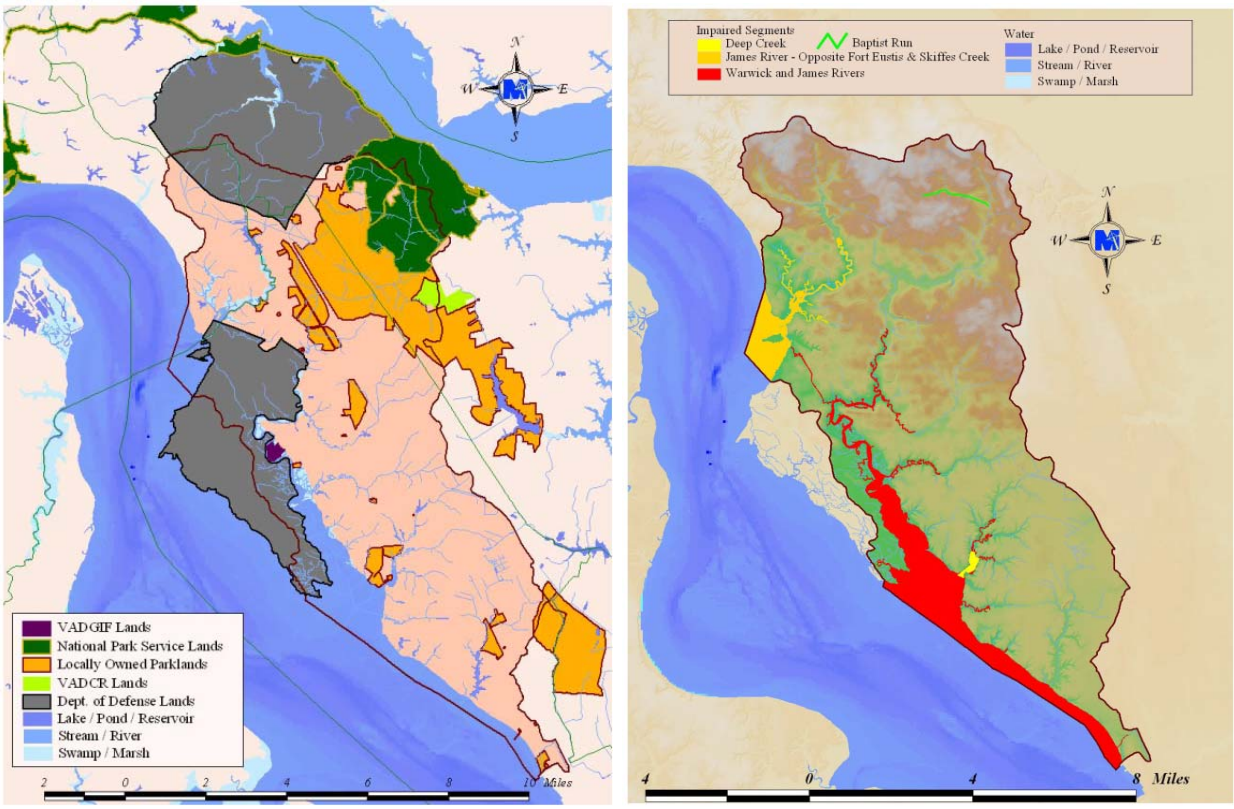

Figure 2-1. TMDL Watersheds and JBLE–Eustis Boundary (Source: VDEQ 2007, Figure 1.2 and Figure 1.3)

Table 2-1. JBLE–Eustis Fecal Bacteria WLAs and Assigned Percent Reductions

Waterbody Name	Wasteload Allocation (cfu/yr)	Percent Reduction Assigned to Permitted Sources (%)
Warwick River	2.52E+10	0%
Skiffes Creek	1.05E+10	0%

Notes and acronyms:

cfu/yr – Colony forming units per year

The 2008 TMDL report used permittee impervious area among other factors to determine the WLA. Table 2-2 modified from the TMDL report lists the imperious area for the base, in relation to the total area of the base and the TMDL watershed areas.

Table 2-2. Distribution of JBLE–Eustis Impervious Area within the TMDL Watersheds (Modified from VDEQ 2007, Table 5.1)

Waterbody Name	Watershed Acres	JBLE–Eustis Impervious Acres	Impervious Area (% of Base Area)	Impervious Area (% of Watershed Area)
Warwick River	38,211	155.7	2.0%	0.4%
Skiffes Creek	8,540	21.9	0.3%	0.3%

Notes:
Watershed Acres and JBLE–Eustis Impervious Acres were obtained from VDEQ 2007, Table 5.1.
Impervious area (% of Base Area and % of Watershed Area) were calculated using a total JBLE–Eustis area of 7,954 acres.

3.0 JBLE–EUSTIS INSTALLATION

JBLE–Eustis, formerly Fort Eustis, is located adjacent to the City of Newport News, Virginia, which is part of the Norfolk, Hampton, and Newport News metropolitan area. The base is located on Mulberry Island, a small peninsula bordered by the James River to the west, Warwick River to the east, and Skiffes Creek toward the north. The base occupies approximately 8,000 acres, and houses a variety of military organizations and support activities on the installation. Most of the development is located at the northern end of the base, while the southern portion of the peninsula remains largely undeveloped. A site location map is presented as Figure 3-1, and a summary of the base's land use is presented in Table 3-1 (JBLE–Eustis, 2016a).

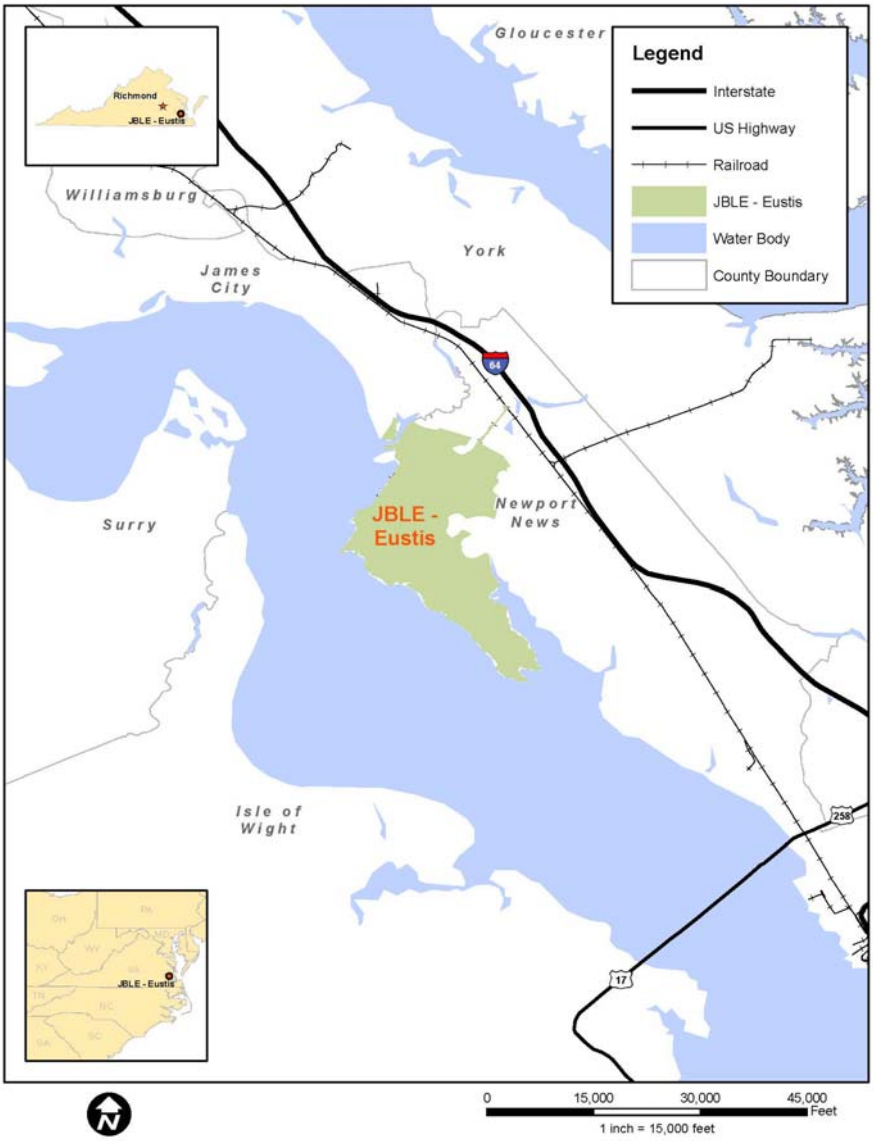

Figure 3-1. Site Location Map, JBLE–Eustis

Table 3-1. JBLE–Eustis Land Use Summary (JBLE–Eustis, 2016a)

Land Use	Acres
Impervious	853.1
Pervious	1,441.9
Forest	2,274.8
Pasture	18.7
Natural Area	2,841.3
Water	523.7
Total	**7,953.5**

The base is the home of the Headquarters United States Army Training and Doctrine Command (TRADOC), the Army Training Support Center (ATSC), and the 7th Transportation Brigade (Expeditionary). TRADOC is responsible for developing, educating, and training soldiers and civilians; supporting unit training; and designing, building, and integrating capabilities, formations, and equipment. The ATSC is responsible for managing the Army Training Support Enterprise (TSE), which provides oversight for programs that enable development, delivery, and sustainment of training and education support capabilities. The 7th Transportation Brigade (Expeditionary) provides logistics support around the world for port, terminal, and watercraft units conducting expeditionary operations in support of land operations. Other units on the base include the Army Aviation Logistics School, Non-commissioned Officer's (NCO) Academy, Aviation Applied Technology Directorate, and the James River Reserve Fleet (JRRF). The JRRF, a tenant managed by the Maritime Administration (MARAD), leases land on base and maintains a number of vessels moored in the James River. The total population of the base is approximately 14,550, comprised of approximately 6,800 military personnel and 2,800 dependents living on base, as well as approximately 4,950 civilian non-residents who commute to the base daily.

4.0 BACTERIA CONTROL MEASURES – MCMs

Discharges from MS4s are regulated under the Virginia Stormwater Management Act, the Virginia Stormwater Management Program (VSMP) Permit regulations, and the Clean Water Act as point source discharges. VDEQ issued MS4 Permit No. VAR040035 to JBLE–Eustis which became effective on 1 July 2013. The MS4 permit requires JBLE–Eustis to develop, implement, and enforce an MS4 Program designed to reduce the discharge of pollutants from the MS4 to the maximum extent practicable in order to protect water quality. The MS4 permit serves as the base's legal authority to implement measures aimed at reducing bacteria loads. The permit also requires the base to implement six minimum control measures (MCMs) or best management practices (BMPs). A summary of the base's MCMs and how they can address the bacteria TMDLs is described below.

4.1 Public Education and Outreach

JBLE–Eustis develops handouts and educational materials related to high-priority water quality conditions identified in this program plan, including fecal bacteria, and distributes them at locations where members of the target audience are anticipated to be (e.g., Earth Week/Day events, dog parks, military family housing [MFH]). Handouts include pamphlets or other one page informational sheets that present information and also provide a means to contact the Stormwater Program Manager with any questions or comments. Additional education materials include posters that can be utilized during events such as Earth Week/Day or MFH resident meetings. Education and outreach information is also conveyed through the base's website (http://www.jble.af.mil/library/jbleenviromentalinformation.asp). Examples of stormwater pollution prevention educational material that are distributed at local events are presented in Figure 4-1 and Figure 4-2. Strategies for public education and outreach are summarized in the JBLE–Eustis MS4 Program Plan (JBLE–Eustis, 2016a).

Figure 4-1. JBLE–Eustis Dog Park Announcement Flyer

Figure 4-2. JBLE–Eustis Stormwater Pollution Prevention Educational Flyer

4.2 Public Involvement/Participation

JBLE–Eustis interacts with the public through its website and social media presence across Facebook and Twitter. Locally, the base has hosted many events to raise awareness and facilitate public involvement with a host of environmental topics.

Each year, the base holds a series of events throughout the week of Earth Day. These events help mobilize volunteers to participate in various clean-up efforts across the base. Activities such as storm drain marking, Filterra BMP tree box maintenance, and community involvement (Figure 4-3) can help reduce the levels of pollutants such as fecal bacteria before they enter the storm drains and flow to the receiving stream. Strategies for public involvement and participation is summarized in the JBLE–Eustis MS4 Program Plan (JBLE–Eustis, 2016a).

Figure 4-3. Pollution Prevention and Reduction Activities Conducted by the Public at JBLE–Eustis

4.3 Illicit Discharge Detection and Elimination (IDDE)

The JBLE–Eustis IDDE program is designed to help detect, identify, and address non-stormwater discharges to the stormwater network. Non-stormwater discharges include untreated sewage that contain fecal bacteria. To help detect and identify illicit discharges, the base regularly screens outfalls to determine if any non-runoff related discharges are occurring (see Figure 4-4). Additionally, any sanitary sewer overflows that occur are tracked and immediately addressed. Additional detail on the IDDE program is provided in the JBLE–Eustis IDDE Procedures Manual (JBLE–Eustis, 2016b).

Figure 4-4. Non-Stormwater Discharge Monitoring at JBLE–Eustis

4.4 Construction Site Stormwater Runoff Controls

The JBLE–Eustis construction site stormwater runoff program is designed to verify that a Virginia Erosion and Sediment Control Plan (VESCP) can meet the applicable erosion prevention criteria (see 9VAC25-840-40, renumbered from 4VAC50-30-40). Reducing sediment in runoff from construction sites can help reduce bacteria levels, since bacteria are often bound to sediment. JBLE–Eustis has developed *Standards and Specifications for Erosion and Sedimentation Control* that provide guidance on compliance with Virginia erosion and sediment control requirements (JBLE–Eustis, 2016d).

4.5 Post-Construction Stormwater Management

The JBLE–Eustis post-construction BMP program helps construct and maintain stormwater BMPs across the base. Many stormwater BMPs such as bioretention and dry extended detention ponds can reduce the level of pollution for multiple pollutants, including nutrients, sediment, and fecal bacteria. The installation continues to build upon this program, and has projects currently programmed for post-construction stormwater BMP inspection and maintenance.

4.6 Pollution Prevention and Good Housekeeping

The JBLE–Eustis MS4 Program Plan outlines the requirements for MCM 6, Pollution Prevention/Good housekeeping for Municipal Operations, in Section 3.6.1. Requirements include:

- Development and implementation of written procedures to prevent pollutant discharge from daily operations
- High priority MS4 facility stormwater pollution prevention plan (SWPPP) development
- Turf and Landscape Nutrient Management Plan (NMP) development and implementation
- Provision of employee training
- Development and implementation of Erosion and Sediment Control Standards and Specifications

As part of the base's pollution prevention and good housekeeping program, JBLE–Eustis develops and implements SWPPPs for high priority MS4 facilities and provides pollution prevention training for staff. Training on topics such as municipal solid wastes, recycling materials, hazardous materials, hazardous wastes, non-hazardous wastes, universal wastes, hazardous substances, and spill response is also provided to JBLE–Eustis personnel. Training on proper handling and disposal of waste streams that may contain fecal bacteria can help reduce the levels of bacteria delivered to receiving stream. Strategies for public education and outreach are summarized in the JBLE–Eustis MS4 Program Plan (JBLE–Eustis, 2016a).

5.0 BACTERIA CONTROL MEASURES – BEYOND MCMs

In addition to the MS4 permit MCMs, JBLE–Eustis will evaluate and implement additional control measures designed to reduce fecal bacteria loads within the Warwick River and Skiffes Creek watersheds. The following sections summarize the base's plan to identify and prioritize bacteria "hot spots" and implement targeted BMPs to reduce sources of bacteria.

5.1 Pollutant Source Assessment

Fecal bacteria can originate from multiple sources. Table 5-1 referenced from the VDEQ TMDL report allocated the bacteria loads across both natural and anthropogenic sources for the Warwick River and Skiffes Creek watersheds.

Table 5-1. Fecal Bacteria Source Allocations (%) in the TMDL Watersheds (Source: VDEQ 2007, Table 2.8)

Watershed	Wildlife	Human	Livestock	Pet
Warwick River	18	35	23	24
Skiffes Creek	3	21	36	40

The values presented in Table 5-1 are watershed averages across multiple MS4s. To build on this information, JBLE–Eustis will conduct a local fecal bacteria source assessment with the goal of identifying potential pollutant "hot spots" across the base. This information will be used to better identify potential sources of bacteria within the areas of the base located within the TMDL watersheds.

5.2 Additional Control Measures

A community dog park was opened at JBLE–Eustis in May 2015. Access to the dog park is restricted, and residents must submit an application, register pets, pay a registration fee, and sign a receipt acknowledging the rules of the dog park. The area is fenced and equipped with a cypher lock. The rules include a requirement for owners to clean-up after their dogs. Signs are posted inside the dog park, and a large trash can is provided for pet waste disposal.

The installation also operates horse stables for authorized personnel to utilize. Stable bedding and horse manure are collected by patrons and stored in a roll-off bin located on site, and then disposed of by a contractor off-site. During periods of good weather, horses are allowed to utilize the areas designated as pasture lands and categorized as agricultural land use. Manure generated in these areas is not collected.

In addition to these areas, residents of MFH are allowed to have pets, and it is reasonable to assume that residents with dogs periodically walk their dogs around nearby neighborhoods. Residents are required to clean up after their dogs; however, pet waste disposal receptacles are not available along the walking paths, and this is noted for possible future implementation.

Controlling fecal bacteria loads from wildlife can be challenging. The southern portion of the base (located in the Warwick River watershed) is largely undeveloped and therefore is prime wildlife habitat. The TMDL report noted that prime raccoon habitat covers a large portion of the base that lies within the Warwick River watershed (Figure 5-1). In developed areas in the northern part of the base, implementing "No Mow" buffer zones around natural and constructed ponds can deter geese from landing, foraging, and contributing to the bacteria problem.

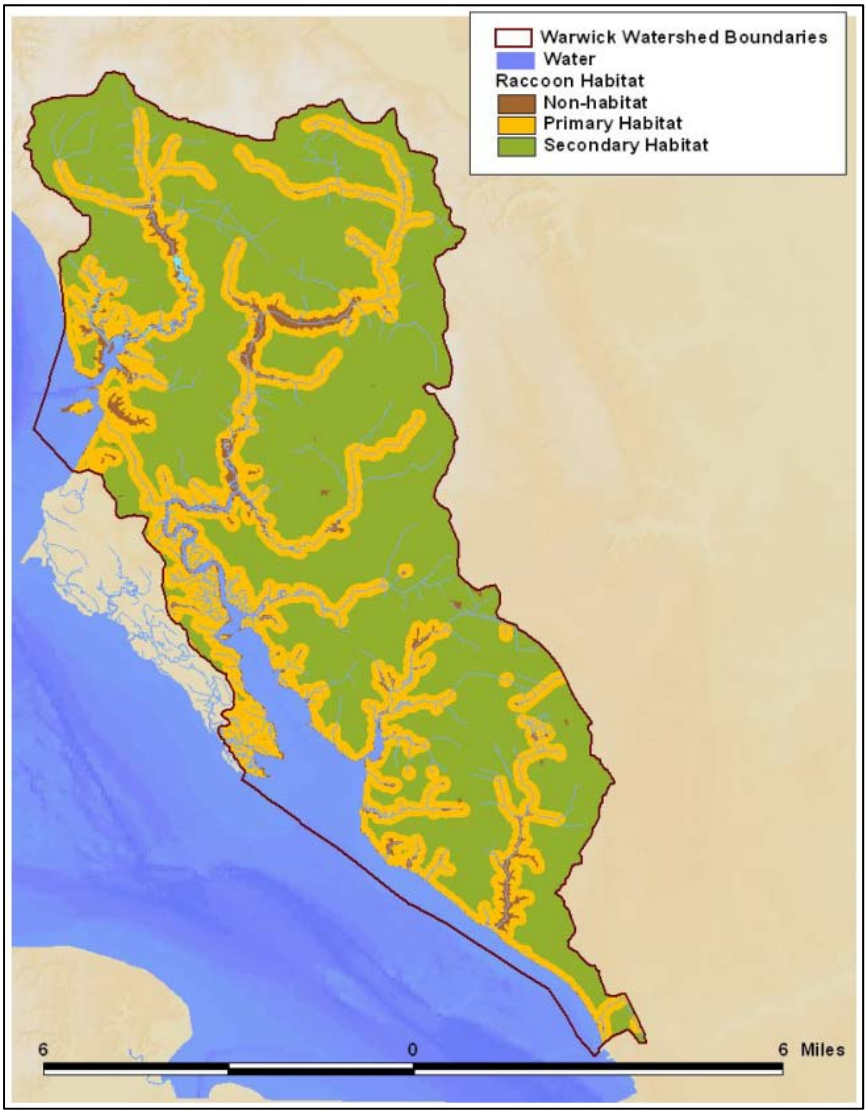

Figure 5-1. Map of Raccoon Habitat within the TMDL Watersheds (Source: VDEQ 2007, Figure 4.7)

Public education content with an emphasis on fecal bacteria pollution awareness will be developed and distributed through various channels. Education will continue to be an important component of future strategies to reduce bacteria loading. Opportunities for improvements and preventative maintenance to the sanitary sewers and storm sewers will be evaluated. Additionally, JBLE–Eustis will use the results from the fecal bacteria source assessment to guide future BMP site selection and prioritization.

6.0 BMP IMPLEMENTATION SCHEDULE AND ASSESSMENT

6.1 Implementation Schedule

The base will implement the fecal bacteria load reducing components described in Sections 4.0 and 5.0 of this Action Plan. The base is currently in year 3 (2015-16) of its MS4 permit. In subsequent years the base plans to refine its initial assessments of potential sources and control measures, with the goal of improving resource allocation across the installation. Table 6-1 outlines the base's long-term implementation plan for bacteria controls for the rest of its permit cycle.

Table 6-1. Implementation Schedule for Addressing Bacteria Impairments

Permit Year	Actions
Permit Year 3 (2015-16)	• Develop the Bacteria TMDL Action Plan and implementation schedule (this document).
Permit Year 4 (2016-17)	• Identify and maintain a list of existing source controls and management practices that are applicable to reducing fecal coliform bacteria.
	• Identify opportunities for enhancing education and outreach programs to address bacteria impairment.
	• Assess significant sources of bacteria using desktop evaluations, field investigations and collaboration with key base staff.
	• Determine if additional source controls are needed. If additional controls are needed, prepare a summary of potential controls, and identify programs and activities to support their implementation.
	• Evaluate new bacteria-related datasets for the watersheds collected by other agencies (e.g., VDEQ) as available.
	• Update the Bacteria TMDL Action Plan to reflect activities performed during the reporting year. Adjust the implementation schedule as needed to reflect the findings from the field and desktop assessments, and report on progress annually.
Permit Year 5 (2017-18)	• As funding permits, implement activities identified in the implementation schedule (from previous years) as appropriate.
	• Evaluate new bacteria-related datasets for the watersheds collected by other agencies (e.g., VDEQ) as available.
	• Identify any modified or additional activities to be performed during the subsequent permit cycle.
	• Submit an estimated end date for achieving the bacteria WLAs.
	• Update the Bacteria TMDL Action Plan to reflect activities performed during the year, and report on progress annually.

6.2 BMP Effectiveness Assessment

The base will implement the fecal bacteria load reducing components described in Sections 4.0 and 5.0 of this Action Plan. As bacteria load reducing measures are implemented and evaluated, opportunities for improving or enhancing their effectiveness will be evaluated on an annual basis. An assessment of the bacteria control measures will be conducted through the MS4 Annual Report, which documents progress toward implementing the MCMs and the TMDL special conditions identified in the MS4 permit.

7.0 REFERENCES

JBLE–Eustis. 2016a. Final MS4 Program Plan for Joint Base Langley Eustis – Eustis. Prepared by AECOM Technical Services, Inc. August 2016.

JBLE–Eustis. 2016b. Final Illicit Discharge Detection and Elimination Procedure Manual for Joint Base Langley Eustis – Eustis. Prepared by AECOM Technical Services, Inc. August 2016.

JBLE–Eustis. 2016c. Final Chesapeake Bay Total Maximum Daily Load Action Plan for Joint Base Langley Eustis – Eustis. Prepared by AECOM Technical Services, Inc. April 2016.

JBLE–Eustis. 2016d. Final Standards and Specifications Erosion and Sedimentation Control for Joint Base Langley Eustis – Eustis. Prepared by AECOM Technical Services, Inc. May 2016.

JBLE–Eustis. 2015. Joint Base Langley Eustis – Eustis (JBLE–Eustis) Municipal Separate Storm Sewer System (MS4) Program Plan Annual Report, Year 2.

VDEQ. 2007. Fecal Bacteria Total Maximum Daily Load Development for Warwick River. Final Submission December 13, 2007.