Virginia Stormwater Management Program
Municipal Separate Storm Sewer System (MS4)
General Permit
Annual Report

Fort Monroe Authority
Permit Number: **VAR040130**
July 1, 2019 through June 30, 2020
October 1, 2020

Fort Monroe Authority
20 Ingalls Road
Fort Monroe, Virginia 23651
(757) 251-2756

CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction of 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 and 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."

Signature	Date 9/24/2020
VAR040130	Fort Monroe Authority
Permit Number	MS4 Name

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Appendices

1. INTRODUCTION

Commonwealth of Virginia owned property at Fort Monroe, managed by the Fort Monroe Authority (FMA), was designated a Phase II regulated small Municipal Separate Storm Sewer System (MS4) and was issued a Virginia Stormwater Management Program (VSMP) MS4 General Permit #VAR040130 on August 23, 2013, by the Virginia Department of Environmental Quality. The permit was issued on August 12, 2014. The permit was renewed for an additional five years on November 1, 2018 and remains valid until October 31st, 2023.

Fort Monroe consists of approximately 565 acres of which 108 are submerged and 85 are wetlands. Fort Monroe is located at the southeastern tip of the Virginia Lower peninsula between Hampton Roads to the southwest and the Chesapeake Bay to the east. Fort Monroe formerly served as U.S. Army Garrison Fort Monroe, a largely administrative post with few troop and industrial activities. In September 2011, the Army decommissioned Fort Monroe as an active Army base and transferred by quitclaim deed a portion of the lands at Fort Monroe to the Commonwealth of Virginia in June 2013 (~312.75 acres).

Land ownership and boundaries as they currently exist, are depicted on the Property Ownership map in **Appendix A**.

As required by the permit, the Fort Monroe Authority has prepared this Annual Report for the reporting period of July 1, 2019 through June 30, 2020. This represents year one of the FMA permit coverage. The report includes updates to the MS4 Program Plan, the status of compliance with permit conditions, progress towards achieving the identified measurable goals for each minimum control measure, and a summary of stormwater activities FMA plans to undertake in the next permit year.

2. PROGRAM PLAN UPDATES

The following updates have been made to the FMA MS4 Program Plan:

- The MS4 Program Plan was revised and updated on April 30, 2019 and posted to the FMA Environmental Webpage as required. No further Program Plan updates were done this fiscal year. No additional revisions were required this Permit Year.

3. ADDITIONAL REPORTING REQUIREMENTS

The permit requires that the annual report address the situation of another government entity being held responsible for the permittee satisfying some of the state permit requirements. The City of Hampton manages portions of the FMA's MS4 including the beaches and boardwalk area of Fort Monroe as well as the Fort Monroe Community Center. The City of Hampton is responsible for beach cleaning and other requested activities in these areas. As a tax paying organization (via a pilot fee) within the City of Hampton, Fort Monroe Authority relies upon education outreach programs organized by the Hampton Roads District Planning Commission (HRPDC) of which the City of Hampton is a member locality.

4. COMPLIANCE STATUS ON MEASUREABLE GOALS

4.1 PUBLIC EDUCATION AND OUTREACH ON STORMWATER IMPACTS

Part I.E.1.g requires the permittee to include the following in this annual report:

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

FMA identified the following three (3) High-Priority Stormwater Issues during the latest update of the MS4 Program Plan:

- Disconnection of basement sump pumps from sanitary sewer and conversion to stormwater discharge
- Pet Waste / Bacteria
- Floatable Reduction

4.1.1 DISCONNECTION OF BASEMENT SUMP PUMPS FROM SANITARY SEWER

Design for Phase I of this program, the Inner Fort Sump Pump Disconnect Project, has been completed and it is currently undergoing cultural resources review. Phase II design is ongoing and will include areas along Tidball Road. The Residents impacted by the sump pump disconnection process will be provided with education materials on keeping areas of their homes/basements drained by the sump pumps free from pollutants that may negatively impact the stormwater system.

Status on this program will be updated in the next permit cycle.

4.1.2 PET WASTE / BACTERIA

FMA has sent out several flyers to residents with information on the importance of pet waste removal for clean waterways. An example titled *"Down the Drain"* is included in **Appendix B** and was distributed on January 30, 2020. FMA continues to install and maintain additional pet waste station on public space as needed to allow visitors and residents a place to properly dispose of these items. The FMA Environmental Website directs visitors to the HR Green website for additional information.

4.1.3 FLOATABLE REDUCTION

FMA has sent out several flyers to residents with information on the importance of not littering. An example titled *"Down the Drain"* is included in **Appendix B** and was distributed on January 30, 2020. FMA also maintains signage and trash cans for the use of visitors and residents. The FMA Environmental Website directs visitors to the HR Green website for additional information.

4.2 PUBLIC INVOLVEMENT AND PARTICIPATION

Part I.E.2.f requires the permittee to include the following in this annual report:

4.2.1 SUMMARY OF PUBLIC INPUT RECEIVED ON MS4 PROGRAM

FMA has received no comments, complaints, and/or public input on the MS4 Program as of the writing of this report.

4.2.2 WEBSITE AND/OR FACEBOOK PAGE

FMA continues to update the website with copies of MS4 annual reports and additional educational information as needed.

Link to website: http://www.fmauthority.com/about/the-fort-monroe-authority/environmental-remediation/

4.2.3 PUBLIC INVOLVEMENT EVENTS

4.2.3.1 Storm Drain Marking Events

Fort Monroe Authority has identified target areas for the storm drain marking program at Fort Monroe. These areas were selected based on frequency of pedestrian traffic and potential for illicit discharges. The target areas include: Continental Park, in the Inner Fort around the Casemate Museum, along Ingalls Road, and along Fenwick Road.

Per the MS4 Program Plan, FMA planned to do storm drain marking events in the warmer months of April 2020 through June 2020, however the COVID pandemic limitations implemented in March 2020 mandated the cancellation of these events. FMA will hold these events in Permit Year 3 as noted in the current Program Plan.

4.2.3.2 Environmental Awareness Events

Fort Monroe Authority holds public events focused around water quality on an annual basis. During this permit year the FMA held one (1) environmental awareness events in the form of beach cleanups. During these events volunteers picked up trash and debris from the shorelines and property of Fort Monroe. Table 1 lists the events, number of participants, and type of activity completed. Beach cleanups improve water quality by limiting the amount of debris flowing into local waterways and are directly related to the high-priority issue of floatables. Additional planned beach cleanups and group environmental awareness events were cancelled due to COVID pandemic gathering restrictions.

Date	Group	Area	#
8/18/2019	USS Gerald R Ford Sailors	Outlook Beach	16
TOTAL:			**16**

TABLE 1: ENVIRONMENTAL AWARENESS EVENTS AT FORT MONROE, MS4 PERMIT YEAR ONE

4.3 ILLICIT DISCHARGE DETECTION AND ELIMINATION

4.3.1 STORMWATER MAP

A map of the stormwater system, including outfalls, at Fort Monroe is included as **Appendix C**. This map represents the current best available data on the stormwater system at Fort Monroe and was updated to reflect changes and additions as of June 30, 2020 in accordance with Part I.E.3.a. of the permit.

An updated summary table of Outfalls with all required information is located in **Appendix D**.

FMA and Veolia Water will continue to update the stormwater maps as new data are gathered or portions of the system change.

4.3.2 ILLICIT DISCHARGE SURVEY AND REMOVAL

Fort Monroe Authority has contracted with Veolia Water to perform certain tasks associated with compliance in the identification of illicit discharges. The Veolia Project Manager has developed procedures for illicit discharge surveys, included in a previous year Annual Report. During the permit year, FMA inspected a total of 55 outfalls (or downstream inlets of submerged outfalls) in the permitted system and reported no illicit discharges observed at the time of inspection. A summary table of the results is included in **Appendix E**. Additionally, Veolia cleared all outfalls and drop inlets of debris as needed this year.

FMA and Veolia Water will continue to assess the effectiveness of the survey procedures and make changes as necessary. Veolia Water will continue to survey FMA outfalls annually for illicit discharges.

4.4 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

FMA did not have any activities during this permit year that required construction site inspections.

4.5 POST-CONSTRUCTION STORMWATER MANAGEMENT

FMA does not have any BMPs.

4.6 POLLUTION PREVENTION AND GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

4.6.1 POLLUTION PREVENTION AND GOOD HOUSEKEEPING PROCEDURES

FMA continues to implement all good housekeeping procedures per its Operations and Maintenance Program manuals. No procedures were developed or modified during this permit year.

4.6.2 IDENTIFICATION OF HIGH PRIOIRTY FACILITIES AND SWPPP DEVELOPMENT

FMA conducted an annual review of these facilities prior to June 30, 2020 and identified the facilities in Table 2 as “high priority facilities”.

TABLE 2: HIGH PRIORITY FACILITIES

Location	Use	Reason for SWPPP
North Gate Road (no address)	Landscaping maintenance laydown yard	Under evaluation; large equipment/machinery storage, fueling activities
100 McNair Road (Building 207)	Marina	Under evaluation to be decided upon at final land transfers; Fuel activities, boat repair
57 Patch Road (Building 57)	Veolia Maintenance Shop	Large machinery and equipment storage and maintenance.

High priority locations for SWPPPs may change as property transfers to and from Commonwealth of Virginia ownership.

No additional SWPPPs were developed or modified during this permit year. The SWPPP for the Veolia Maintenance Shop has not been revised as it is still an accurate representation. Veolia conducts their own training of staff to comply with regulations.

4.6.3 NUTRIENT MANAGEMENT PLAN

FMA contracts landscape management of public lands at Fort Monroe to James River Grounds who are responsible for nutrient application. Table 6-3. provides summary information of the nutrients applied by James River Grounds at Fort Monroe.

Appendix F provides a map of lands at Fort Monroe on which nutrients are applied, the plan, and approval letter.

4.6.4 ENVIRONMENTAL AWARENESS TRAINING

FMA continues to be committed to keeping their employees trained on the latest environmental regulations as they pertain to MS4 related matters. Trainings planned during the spring and summer of 2020 were cancelled and/or postponed due to the COVID pandemic and will resume as soon as practicable.

5. CHESAPEAKE BAY TMDL ACTION PLAN

The FMA updated the Chesapeake Bay Phase II Action Plan in October 2019 to include plans to meet the 40% reduction goals for the current permit cycle. FMA is finalizing a Memorandum of Agreement (MOA) with the Hampton Roads Sanitation District (HRSD) for joining the Sustainable Water Initiative for Tomorrow (SWIFT) program to obtain the remaining credits. This MOA will allow the FMA to meet their 40% reduction goal with significantly less cost than traditional nutrient credit trading programs. FMA expects the MOA to become effective in November 2020.

6. LOCAL TMDL REQIREMENTS

The FMA is not subject to any local TMDLs.

Appendices

APPENDIX A: FORT MONROE PROPERTY OWNERSHIP

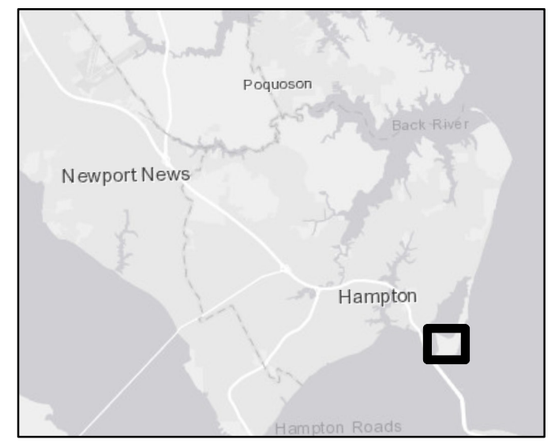
Property Ownership

Fort Monroe, VA

NPS Easement Boundary

Ownership

- Commonwealth of Virginia
- Army - Delayed Reversion
- U.S. Coast Gaurd
- National Park Service



1 inch = 500 Feet (@11"x17")

0 250 500 1,000 Feet

Prepared For:

FORT MONROE
Where Freedom Lives

Prepared By:

Kimley»Horn

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

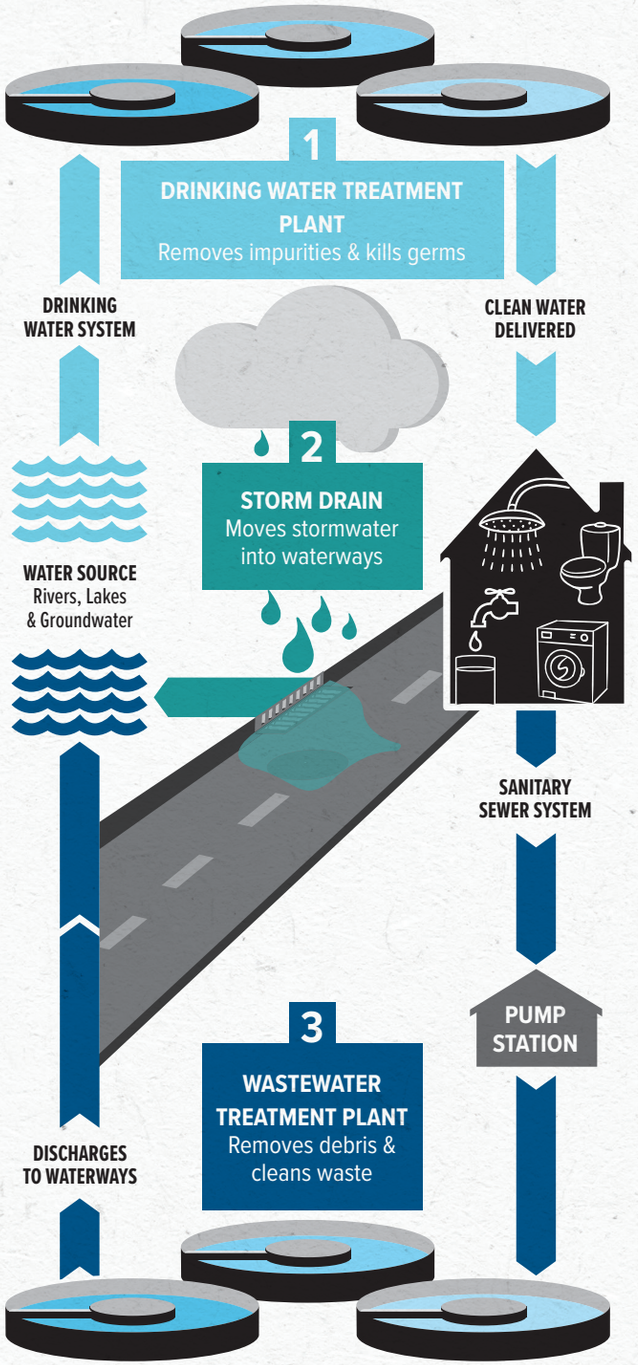
Data source: Fort Monroe Authority

Date: 9/18/2019

APPENDIX B: EDUCATIONAL OUTREACH MATERIALS

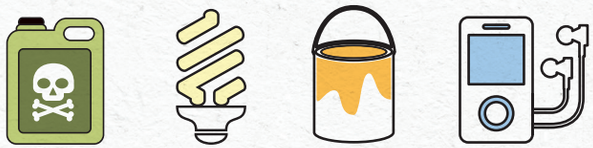
GOOD TO **KNOW**

THE **URBAN WATER CYCLE**



GOOD TO **DO**

PLEASE DISPOSE OF **HAZARDOUS WASTE RESPONSIBLY**



Household hazardous waste (HHW) such as paint, chemicals, CFL lightbulbs, pesticides, electronics etc., cannot be poured down the drain, on the ground, into a storm drain or put out with the trash. Dispose of these appropriately according to their type.

DON'T THROW THEM IN THE TRASH.

SHARE OR DONATE LEFTOVERS.

BRING UNUSED MATERIALS TO A HHW COLLECTION SITE OR EVENT.

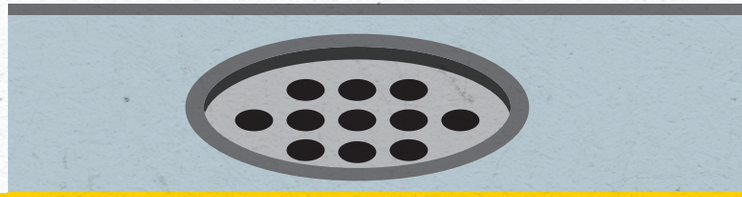
HRSD
Cleaning wastewater every day for a better Bay.

For more information about wastewater treatment: **HRSD.com**

askHRgreen.org askHRgreen

DOWN the DRAIN

Learn how **water finds your tap,** and what is **safe to send down the drain.**



FOR A CLEANER, GREENER HAMPTON ROADS

askHRgreen.org

GOOD TO KNOW

You've flushed a toilet, let the faucet flow and watched water rush down the street during a rainstorm.

But do you really understand where water comes from—and where it goes? In Hampton Roads, three very important water systems make up our regional infrastructure.

Each system has a separate and specific purpose from the others. Knowing how each of these separate water systems work is key to understanding how your actions affect them and what you can do to protect them.

1 DRINKING WATER SYSTEM

Brings clean, safe water to our homes.

2 STORMWATER SYSTEM

Takes rain water away from homes and streets through the stormwater openings you see on your neighborhood curb or the grates on public streets.

3 WASTEWATER SYSTEM

Takes water away from our homes when we flush the commode, take a shower or otherwise run water down our drains. This water is known as wastewater.

GOOD TO DO

PLEASE

FLUSH RESPONSIBLY

Flushing your trash may block sewer pipes causing untreated wastewater to back up into your home and nearby waterways. It's not just a messy situation; it's a dangerous one for you and our waterways.

DON'T FLUSH THESE FREQUENT OFFENDERS

WIPES

Wipes clog pipes! Never flush disposable wipes down the commode.

PERSONAL HYGIENE PRODUCTS

Make sure your trash makes it into your wastebasket, not your wastewater. Dental floss, cotton balls/swabs and feminine hygiene products should always go in the trash.

MEDICATION

Once medication is dissolved in the water, there's no getting it out. Look for medication drop-off locations or destroy the medication and place it in the garbage.

CAT LITTER

Human waste belongs in the toilet, kitty's litter belongs in the garbage can.

PAPER TOWELS

Sturdy paper towels may be tough enough for cleaning, but they are too tough for our pipes. Toss them in the garbage, don't flush them.

GOOD TO DO

PLEASE

COOK RESPONSIBLY

Be mindful of what you wash down the drain while cooking and cleaning up in the kitchen. When leftover food scraps, fats, oils and grease go down the drain, they cause buildup on pipe walls. Over time, blockages form resulting in sewer overflows into our streets, storm drains and waterways. It's not just a messy situation; it's a dangerous one for you and our waterways.

PREVENT SEWER OVERFLOWS BY FOLLOWING THESE "GOOD TO DO" STEPS

CATCH THE SCRAPS

Mealtime scraps don't belong in the drain so ditch the disposal. Catch food scraps in your sink with a strainer and toss them into the garbage or compost bin.

CAN THE GREASE

Pour used cooking grease into an empty, heat-safe container, such as a soup can, and allow it to cool. Once solidified, toss the can into the garbage.

SCRAPE THE PLATE

Before washing, wipe all pots, pans, dishes and cooking utensils with a paper towel to absorb grease and scrape food scraps into the garbage or compost bin.

APPENDIX C: STORMWATER SYSTEM MAP

Fort Monroe, VA Stormwater System Map

MS4 Outfall

Stormwater Pipe

MS4 Area

0 2 4 8 Miles

Data Sources: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, Fort Monroe Authority

APPENDIX D: OUTFALL INFORMATION TABLE

MS4 Outfall Informatin Table

Asset ID	Approximate Drainage Area (Acres)	Longitude (X)	Latitude (Y)	HUC	Receiving Water	TMDL	Predominant Land Use
SSOF_002	0.58	-76.311769	37.000238	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_003	5.7	-76.309019	37.006171	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_004	23.24	-76.309533	37.004043	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_006	5.39	-76.313752	37.003184	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_007	9.45	-76.310682	37.002386	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_008	9.61	-76.313890	37.005915	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_009	14.15	-76.304006	37.004247	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_010	32.88	-76.304674	37.010090	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_011	16.26	-76.309174	37.009370	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_013	12.12	-76.312140	37.010680	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_014	13.91	-76.314192	37.007458	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_015	4.64	-76.304682	37.002870	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_016	0.76	-76.306314	37.002270	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_017	3.09	-76.306797	37.002000	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_018	8.02	-76.308316	37.006306	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_019	0.96	-76.312777	37.010957	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_020	1.27	-76.314354	37.011573	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_021	0.45	-76.313579	37.004362	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_022	0.93	-76.305710	37.002561	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_023	0.69	-76.313971	37.006505	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_024	0.47	-76.313861	37.005821	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_025	0.75	-76.314674	37.001671	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_026	1.01	-76.314335	37.002923	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_027	1.16	-76.314744	37.010446	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_028	1.09	-76.313718	37.011327	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_029	0.25	-76.314011	37.006661	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_030	1.57	-76.307699	37.001802	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_031	0.11	-76.307328	37.001883	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_032	0.31	-76.310439	37.003431	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_033	0.23	-76.309820	37.001966	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_034	0.93	-76.315196	37.011210	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_041	2.06	-76.306189	37.001095	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_042	0.57	-76.308448	37.000929	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_043	3.82	-76.310806	37.000480	JL58	Hampton Roads Bay	Chesapeake Bay TMDL	Public
SSOF_044	4.76	-76.310318	37.003876	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_045	1.05	-76.310336	37.004549	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_046	3.41	-76.310425	37.005583	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_047	4.5	-76.310276	37.005897	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_049	0.02	-76.310676	37.002352	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_050	4.03	-76.309457	37.001803	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_051	5	-76.306351	37.002644	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_055	13.48	-76.305548	37.006254	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_056	0	-76.305526	37.006245	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_057	0	-76.305508	37.006232	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_058	5.57	-76.304822	37.003743	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_059	0.04	-76.304824	37.003741	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_060	0.56	-76.305408	37.002822	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_061	0.06	-76.307025	37.001951	JL58	Mill Creek	Chesapeake Bay TMDL	Public
SSOF_062	0.1	-76.304079	37.004180	JL58	Mill Creek	Chesapeake Bay TMDL	Public

APPENDIX E: OUTFALL INSPECTION RESULTS

2020 Outfall Inspection Report

Outfall ID	Receiving Water	Date	Time	Investigator & Form Completed By:	Temp.	Rainfall 24 Hrs	Rainfall 72 Hrs	Tide Elevation (+/- ft)	Land Use in Drainage Area	Material & Diameter	Shape & Configuration	Submerged %	Illicit Discharge	Flow	Prioritization	Growth	Notes
SSOF_001	Mill Creek	6/8/2020	1640	Pawlowski	77°F	0.01"	0.51"	0.30 ft	Open Space / Commercial	CMP 32"	Circular & Single	20	Unlikely	Tidal	Low	Mollusk	Pipe end corrosion
SSOF_002	Hampton Roads	6/10/2020	1020	Pawlowski	8°F	0.02"	0.02"	1.06 ft	Open Space / Commercial	Cast Iron 40"	Circular & Single w/ Check Valve	5%	Unlikely	None	Low	None	Corrosion
SSOF_003	Moat	6/11/2020	1056	Pawlowski	80°F	0.61"	0.63"	0.96 ft	Commercial/ Rersidential	CMP 26"	Circular & Single	5%	Unlikely	Tidal & Negligible	Medium	None	Bottom of Pipe corroded away. Moat wall interior void around pipe end.
SSOF_004	Moat	6/29/2020	1454	Pawlowski	88°F	0.12"	0.12"	2.2 ft	Residential, Commercial, Open space	CMP 36"	Circular & Single	50%	Unlikely	None	Medium	None	Sediment of silt and rubble accumulating at pipe discharge end. Bottom portion of Inner Fort wall shows signs of erosion.
SSOF_005	Mill Creek	6/8/2020	1705	Pawlowski	77°F	0.01"	0.51"	0.14 ft	Open Space, Residential, & Commercial	CMP 32"	Circular & Single	80%	Unlikely	None	Low	Mollusk & Algae	Heavy Pipe End Corrision w/ linear crack
SSOF_006	Hampton Roads	6/10/2020	1138	Pawlowski	82°F	0.02"	0.02"	1.78 ft	Residential & Commercial	RCP 30"	Circular & Single w/ Check Valve	90%	Unlikely	None	Low	Mollusk / Algae	
SSOF_007	Moat	6/29/2020	1443	Pawlowski	88°F	0.12"	0.12"	2.0 ft	Residential	PVC 20"	Circular & Single	15%	Unlikely	Tidal & Negligible	Low	None	
SSOF_008	Hampton Roads	6/10/2020	1151	Pawlowski	82°F	0.02"	0.02"	1.89 ft	Open Space & Commercial	RCP 32"	Circular & Single w/ Check Valve	5%	Unlikely	None	Low	Mollusk	Mollusk leaving check valve slightly agape
SSOF_009	Moat	6/29/2020	1345	Pawlowski	88°F	0.12"	0.12"	1.37 ft	Open Space & Industrial	HDPE 24"	Circular & Single	>5%	Unlikely	Tidal & Negligible	Low	None	Mortar Missing around moat wall
SSOF_010	Mill Creek	6/8/2020	1725	Pawlowski	77°F	0.01"	0.51"	0.25 ft	Open Space & Commercial	CMP 32"	Circular & Single	5%	Unlikely	Tidal & Negligible	Medium	None	Pipe corrosion creating jagged deformities
SSOF_011	Mill Creek	6/9/2020	1300	Pawlowski	85°F	0"	0.01"	2.30 ft	Commercial	CMP 24"	Circular & Single	5%	Unlikely	Tidal & Negligible	Low	Mollusk	Aprox. 2' in pipe bulge inward
SSOF_012	Hampton Roads	6/10/2020	1012	Pawlowski	81°F	0.02"	0.02"	0.97 ft	Open Space & Commercial	HDPE 34"	Circular & Single w/ Check Valve	0	Unlikely	None	Low	Algae	Check Valve End Collapsed
SSOF_013	Mill Creek	6/9/2020	1339	Pawlowski	85°F	0"	0.01"	2.29 ft	Open Space & Commercial	CMP 24"	Circular & Single	0	Unlikely	None	Medium	None	Pipe End Caved-In From Riprap
SSOF_014	Hampton Roads	6/10/2020	1320	Pawlowski	84°F	0.02"	0.02"	2.32 ft	Residential & Open Space	RCP 30"	Circular & Single w/ Check Valve	60%	Unlikely	Tidal & Moderate	Low	Mollusk	
SSOF_015	Moat	6/29/2020	1356	Pawlowski	88°F	0.12"	0.12"	1.55 ft	Open Space	CMP 20"	Circular & Single	0%	Unlikely	None	Medium	None	Bottom end corroded away causing wall damage
SSOF_016	Moat	6/29/2020	1419	Pawlowski	88°F	0.12"	0.12"	1.8 ft	Residential	PVC 12"	Circular & Single w/ Check Valve	0%	Unlikely	None	Low	None	
SSOF_017	Moat	6/29/2020	1426	Pawlowski	88°F	0.12"	0.12"	1.9 ft	Residential & Open Space	CMP 21"	Circular & Single	0%	Unlikely	None	Medium	None	Wall collapsing on and deforming pipe. Heavy Corrosion
SSOF_018	Moat	6/11/2020	1052	Pawlowski	80°F	0.61"	0.63"	0.92 ft	Open Space & Commercial	CMP 18"	Circular & Single	10%	Unlikely	Tidal & Negligible	Low	None	Pipe End Corrosion
SSOF_019	Mill Creek	6/9/2020	1330	Pawlowski	85°F	0"	0.01"	2.31 ft	Open Space	RCP 15"	Circular & Single	0	Unlikely	None	Low	None	Pipe Material in Invert
SSOF_020	Mill Creek	6/9/2020	1315	Pawlowski	85°F	0"	0.01"	2.37	Open Space	RCP 15"	Circular & Single	0	Unlikely	None	Low	None	End Broken Off
SSOF_021	Hampton Roads	6/10/2020	1143	Pawlowski	82°F	0.02"	0.02"	1.82 ft	Open Space & Commercial	RCP 15"	Circular & Single	0%	Unlikely	Tidal & Moderate	Low	None	End Broken Off
SSOF_022	Moat	6/29/2020	1407	Pawlowski	88°F	0.12"	0.12"	1.7 ft	Open Space & Commercial	PVC 12"	Circular & Single w/ Check Valve	0	Unlikely	None	Low	None	Tree growth between pipe and wall causing damage
SSOF_023	Hampton Roads	6/10/20200	1315	Pawlowski	85°F	0.02"	0.02"	2.32"	Open Space & Commercial	RCP 15"	Circular & Single	0	Unlikely	None	Low	None	Cracking and Chipping
SSOF_024	Hampton Roads	6/10/2020	1145	Pawlowski	82°F	0.02"	0.02"	1.80 ft	Open Space & Commercial	RCP 15"	Circular & Single	0	Unlikely	None	Low	None	Cracking and Chipping
SSOF_025	Hampton Roads	6/10/2020	1105	Pawlowski	82°F	0.02"	0.02"	1.49 ft	Open Space & Commercial	HDPE 15"	Circular & Singlew w/ Check Valve	0	Unlikely	None	Low	Algae	
SSOF_026	Hampton Roads	6/10/2020	1119	Pawlowski	82°F	0.02"	0.02"	1.61 ft	Commercial	PVC 12"	Circular & Single w/ Check Valve	5%	Unlikely	None	Low	None	
SSOF_027	Hampton Roads	6/9/2020	1438	Pawlowski	85°F	0"	0.01"	1.92 ft	Open Space & Commercial	RCP 15"	Circular & Single	0	Unlikely	None	Low	None	spider cracking and rebar rusted
SSOF_030	Moat	6/29/2020	1430	Pawlowski	88°F	0.12"	0.12"		Residential	VCP 6"	Circular & Single	0	Unlikely	Tidal & Negligible	Low	None	
SSOF_031	Moat	6/29/2020	1424	Pawlowski	88°F	0.12"	0.12"	1.8 ft	Residential	VCP 6"	Circular & Single	0	Unlikely	None	Low	None	
SSOF_032	Moat	6/29/2020	1447	Pawlowski	88°F	0.12"	0.12"	2.01 ft	Commercial	PVC 6"	Circular & Single	0	Unlikely	Yes & Negligible	Low	None	Air Conditioner Condensation Discharge Pipe
SSOF_033	Moat	6/29/2020	1439	Pawlowski	88°F	0.12'	0.12"	2.0ft	Residential	CMP 21"	Circular & Single	0	Unlikely	Tidal & Negligible	Medium	None	Pipe end stops ≈3' short of extending beyond moat wall for storm water to discharge into moat; causing erosion behind moat wall & wall failure.
SSOF_034	Hampton Roads	6/9/20208	1445	Pawlowski	85°F			1.86 ft	Open Space	PVC 8"	Circular / Double	0	Unlikely	None	Low	None	
SSOF_041	Hampton Roads	6/10/2020	1050	Pawlowski	82°F	0.02"	0.02"	1.35 ft	Open Space & Commercial	HDPE 15"	Circular & Single w/ Check Valve	0	Unlikely	None	Low	None	
SSOF_042	Hampton Roads	6/10/2020	1040	Pawlowski	81°F	0.02"	0.02"	1.24 ft	Open Space	HDPE 15"	Circular & Single	0	Unlikely	None	Low	Algae	
SSOF_043	Hampton Roads	6/10/2020	1035	Pawlowski	81°F	0.02"	0.02"	1.18 ft	Open Space	HDPE 15"	Circular & Single w/ Check Valve	0	Unlikely	None	Low	None	Check Valve Bracket Loose
SSOF_044	Moat	6/26/2020	1450	Pawlowski	88°F	0.12'	0.12'	2.2 ft	Open Space & Commercial	HDPE 18"	Circular & Single w/ Check Valve	5%	Unlikely	None	Low	None	Pipe penetration through wall needs sealing
SSOF_045	Moat	6/29/2020	1455	Pawlowski	8°F	0.12"	0.12"	2.24 ft	Open Space & Commercial	Cast Iron 6"	Circular & Single	0%	Unlikely	Trickle	None	None	Flow from Building AC Condensation.
SSOF_046	Moat	6/29/2020	1500	Pawlowski	88°F	0.12"	0.12"	2.28 ft	Residential & Commercial	HDPE 15"	Circular & Single w/ Check Valve	50%	Unlikely	None	Low	None	
SSOF_047	Moat	6/11/2020	1101	Pawlowski	80°F	0.61"	0.63"	1 ft	Residential	PVC 18"	Circular & Single w/ Check Valve	10%	Unlikely	None	Low	None	

SSOF_049	Moat	6/29/2020	1442	Pawlowski	88°F	0.12"	0.12"	2.0 ft	Commercial & Residential	PVC 12"	Circular & Single	100%	Unlikely	None	Medium	None	Broken Pipe End. Gap between pipe and wall
SSOF_050	Moat	6/29/2020	1434	Pawlowski	88°F	0.12"	0.12"	1.92 FT	Residential	VCP 8"	Circular & Single	0	Unlikely	None	Medium	None	Erosion around Pipe Seal & Heavy Erosion Above and Behind Wall
SSOF_051	Moat	6/29/2020	1411	Pawlowski	88°F	0.12"	0.12'	1.76 ft	Residential, Commercial & Open Space	Cast Iron 24" x 24"	Square / Single	90%	Unlikely	None	Low	None	Minor Corrosion
SSOF_055	Moat	6/11/2020	913	Pawlowski	79°F	0.61"	0.63"	0.26 ft	Open Space & Commercial	CMP 28"	Circular & Single	50%	Unlikely	Tidal & Moderate	Medium	None	Heavy corrosion since last year's inspection
SSOF_056	Moat	6/11/2020	910	Pawlowski	79°F	0.61"	0.63"	0.25 ft	Open Space & Commercial	RCP 10"	Circular & Single	70%	Unlikely	Tidal & Moderate	Low	None	Cracked Top
SSOF_057	Moat	6/11/2020	912	Pawlowski	79°F	0.61"	0.63"	0.26 ft	Open Space & Commercial	PVC 12"	Circular & Single	0	Unlikely	None	Low	None	PVC Extends for approx. 2' then Connects to 10" Cast Iron Pipe. Leaf Litter Build Up In Pipe
SSOF_058	Moat	6/29/2020	1353	Pawlowski	88°F	0.12"	0.12"	1.53 ft	Residential & Open Space	CMP 26"	Circular & Single	10%	Unlikely	Tidal	Medium	None	Pipe End Corroding & Cracking Away from Moat Wall; requires sealing. Discharge from pipe accumulating in moat.
SSOF_060	Moat	6/29/2020	1358	Pawlowski	88°F	0.12"	0.12"	1..57 FT	Commercial	VCP 12"	Circular & Single	100%	Unlikely	None	Low	None	
SSOF_061	Moat	6/29/2020	1423	Pawlowski	88°F	0.12"	0.12"	1.93 ft	Open Space & Commercial	VCP 6"	Circular & Single	0	Unlikely	None	Low	None	Appears to be Abandoned.
SSOF_062	Moat	6/29/2020	1347	Pawlowski	88°F	0.12"	0.12"	1.39 ft	Open Space	VCP 6"	Circular & Single	0	Unlikely	None	Low	None	Appears to be Abandoned.
SSOF-066	MILL CREEK	6/8/2020	1650	Pawlowski	77°F	0.01"	0.51"	0.24 ft	open space	Cast Iron 10"	Circular & Double	0%	Unlikely	None	Low	None	
SSOF-067	HAMPTON HARBOR	6/10/2020	950	Pawlowski	79°F	0.02"	0.02"	0.76 ft	open space	VCP 10"	Circular & Single	0%	Unlikely	None	Low	None	
SSOF-068	Hampton roads	6/10/2020	1124	Pawlowski	82°F	0.02"	0.02"	1.65 ft	Commercial	Cast Iron 8"	Circular & Single	0%	Unlikely	None	Low	None	
SSOF-069	HAMPTON ROADS	6/10/2020	1128	Pawlowski	82°F	0.02"	0.02"	1.69 ft	Commercial	Cast Iron 4"	Circular & Single	0%	Unlikely	None	Low	None	

APPENDIX F: FORT MONROE NUTRIENT MANAGEMENT PLAN AND MAP


Fort Monroe, VA
Turf Applications Area Map
Legend
Areas of Application
Google Earth
N
1000 ft

Matthew J. Strickler
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Rochelle Altholz
Deputy Director of Administration and Finance

Russell W. Baxter
Deputy Director of Dam Safety & Floodplain Management and Soil & Water Conservation

Thomas L. Smith
Deputy Director of Operations

Samantha Henderson
Fort Monroe Authority
20 Ingalls Road
Fort Monroe, VA 23651

3/1/2018

Subject: Fort Monroe Authority Nutrient Management Plan Approval

The following nutrient management plan has been reviewed by Chantel Wilson and approved by the Virginia Department of Conservation & Recreation as compliant with the provisions of the Code of Virginia 10.1-104.4. Please note that this plan has not been reviewed for compliance with more restrictive requirements from other specific legislative, regulatory or incentive programs.

Plan Name	Planner	Acres	Start Date	Expiration Date
Fort Monroe Authority	Angela C. Whitehead	46	2/7/2018	2/7/2021

A copy of this letter should be kept with your nutrient management plan. Initiation of plan revision is recommended by the Department to occur at least six months prior to the expiration date. If you have any questions concerning this letter or approvals, please contact me via phone or email.

Sincerely,

Chantel Wilson
Urban Nutrient Management Specialist
Department of Conservation and Recreation
600 East Main St., 24th Floor
Richmond, Virginia 23219
(804) 887-8917
chantel.wilson@dcr.virginia.gov

Nutrient Management Plan

Prepared For:

Fort Monroe Authority
Building 83
20 Ingalls Rd.
Fort Monroe, VA 23651

Prepared By:
Angela C. Whitehead
Soil Horizons, LLC
300 Buford Rd.
Williamsburg, VA 23188
804-892-6678
soilmapper@yahoo.com
Certification Code: # 386

Acreage: 46

County: City of Hampton
Watershed: JL58

Plan Written: 2/7/18
Plan Expires: 2/7/21

Planner Signature

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 groundwater 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 Management Program.

DCR
Virginia Department of Conservation & Recreation

Nutrient Management Plan for:

Fort Monroe Authority

Superintendent Information	
Project Name	*Fort Monroe Authority*
Project Contact	*Samantha Henderson*
Mailing Address	*20 Ingalls Rd.*
City State Zip	*Fort Monroe, VA 23651*
Phone	*757-637-7778*
Fax	
Email	shenderson@fmauthority.com
Planner Information	
Planner Name	*Angela C. Whitehead*
Mailing Address	*Soil Horizons LLC, 300 Buford Rd.*
City State Zip	*Williamsburg, VA 23188*
Phone	*804-892-6678*
Fax	
Email	*soilmapper@yahoo.com*
Certification Code	*386*
Location Information	
Physical Address	*20 Ingalls Rd.*
City State Zip	*Fort Monroe, VA 23651*
VAHU6 Watershed Code	*JL58*
County	*City of Hampton*
Acreage	
Total	*46*
Plan Start Date	*2/7/18*
Plan End Date	*2/7/21*

Table of Contents

The Fort Monroe Authority Department agrees to comply with all requirements set forth in the Nutrient Management Training and Certification Regulations, 4 VAC 50-85 et seq., and to follow recommendations for turf fertilization and management as described in the Virginia Nutrient Management Standards and Criteria, Revised July 2014. This includes implementing the Department of Conservation and Recreation's approved Nutrient Management Plan and maintaining fertilization records. All nutrient applications performed by Fort Monroe Authority staff shall comply with the provisions of this Nutrient Management Plan as of February 7, 2018.

1. Site Description and Supporting Information

Fort Monroe's current boundaries encompass approximately 565 acres, including 110 acres of submerged lands and 85 acres of wetlands. The namesake stone fort was begun in 1818 and presently there are approximately 150 buildings, sites, structures, and objects contributing to the Fort Monroe National Historic Landmark (NHL) District. Fort Monroe served as the headquarters for the US Army Training and Doctrine Command. In 2011, Fort Monroe was deactivated as an active military base. The Fort Monroe Authority (FMA) was created to preserve, protect, and manage Fort Monroe and Old Point Comfort after the base closure. Approximately half of Fort Monroe was designated a National Monument on November 1, 2011 and is to be managed by the National Park Service (NPS). In 2013, the US Army quitclaimed a majority of the property to the Commonwealth of Virginia.

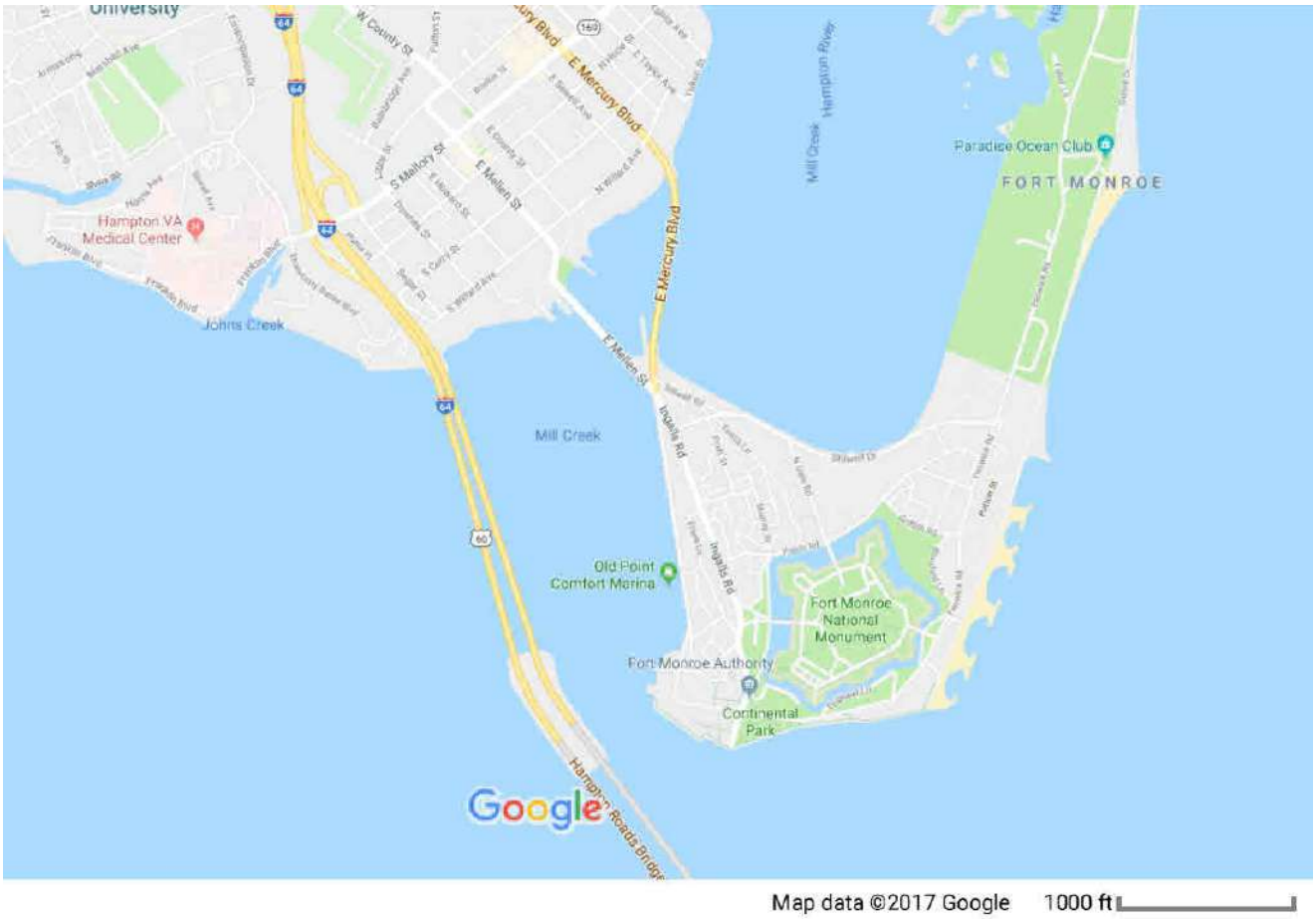
A. Management Area Description

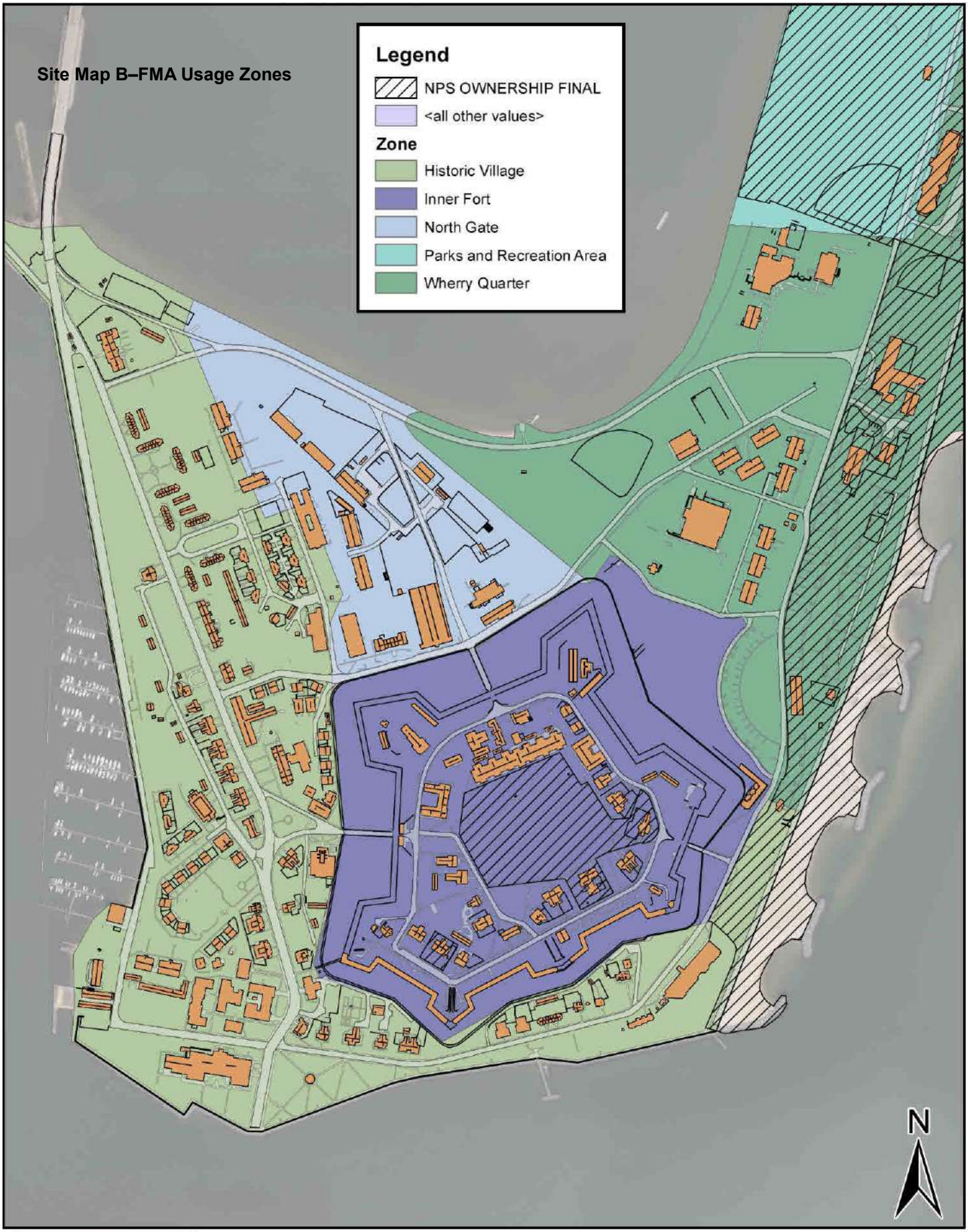
Fort Monroe is located in Hampton, Virginia—at Old Point Comfort, the southern tip of the Virginia Peninsula. From Interstate 64 (exit 268) access to Fort Monroe is gained via E. Mellen Street or E. Mercury Boulevard. Fort Monroe is bound by the Chesapeake Bay to the east and Mill Creek/Hampton River to the west. Fort Monroe is located within the Hampton Roads/Hampton River watershed. (Site Map A)

Fort Monroe is divided into five usage zones: Historic Village, Inner Fort, North Gate, Wherry Quarter, and the Park and Recreation Area (Site Map B). A commercial lawncare company uniformly maintains 46 acres of predominately warm season turfgrass within the non-residential portions of the Historic Village (20 acres), Inner Fort (9.5 acres), North Gate (7.5 acres), and Wherry Quarter (9 acres). (Site Map C) Small areas of cool season turf are included in the management area acreage, typically occurring in shaded locations, but are managed to encourage warm season establishment and growth. Landscape beds are located throughout each zone. These landscape beds do not receive any additional nutrients aside from what is applied to the adjacent turf. The Fort Monroe grounds are less intensively managed, receiving only one annual fertilization application. Within the boundaries of Ft. Monroe, turf areas are maintained that do not receive fertilization or irrigation. The unfertilized portions of Ft. Monroe are not included in this plan. Additionally, areas owned by NPS and the Parks and Recreation zone are excluded from this plan.

Municipal water provides the primary source of irrigation water for turfgrass irrigated around Buildings 138, 83, 119, and Continental Park down to the fishing pier. All additional turgrass areas are non-irrigated.

Site Map A–Location Map





FORT MONROE
Where Freedom Lives

1 inch = 600 feet

600 300 0 600 Feet

FORT MONROE
Where Freedom Lives

1 inch = 650 feet

0 300 600 1,200 Feet

B. Fertilization Season

The recommended nutrient management 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. 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.

	Killing Frost Dates	**Cool Season Applications**	**Warm Season Applications**
Spring	April 4	February 21	April 4
Fall	November 6	December 18	October 9

C. Environmentally Sensitive Sites

An environmentally sensitive site is any area which is particularly susceptible to nutrient loss to groundwater or surface water since it contains or drains to areas which contain sinkholes, or where at least 33% of the area in a specific management area contains one or any combination of the following features:

1. Soils with high potential for leaching based on soil texture or excessive drainage;
2. Shallow soils less than 41 inches deep likely to be located over fractured or limestone bedrock;
3. Subsurface tile drains;
4. Soils with high potential for subsurface lateral flow based on soil texture and poor drainage;
5. Floodplains as identified by soils prone to frequent flooding in county soil surveys; or
6. Lands with slopes greater than 15%

The majority of the grounds is mapped as Seabrook – Urban Land complex (20) or Urban Land (27). Soils of the Seabrook series are very deep and moderately well drained with rapidly permeable subsoils. They formed in materials weathered from sandy marine and fluvial sediments. Special attention should be given to the timing of fertilizer applications prior to heavy rainfall to avoid nutrient loss due to leaching.

2. Soil Test Summary and Results

Soil samples were taken from fertilized turf areas. Each composite sample consisted of several sub-samples from the upper 4 inches of soil. These sub-samples were taken in a random manner to minimize the variability that is present in the sampling area. Sub-samples were thoroughly mixed, breaking apart clumps and removing all foreign matter such as roots, stalks, rocks, etc.

Soil samples were analyzed by Waypoint Analytical. Standard soil test results provide values for pH, Calculated Cation Exchange Capacity, Phosphorous, Calcium, Magnesium, Potassium, Copper, Iron, Boron, Manganese, and Calculated Cation Saturation. The soil samples collected are valid for the life of this plan (three years) or upon a major renovation or redesign of the campus grounds, whichever occurs sooner.

A. Fort Monroe Authority Turf, 46.0 acres

Customer Name: **Fort Monroe Authority**
Testing Lab: **Waypoint Analytical**
Sample Date: **12/6/17**
Planner Name, Cert. #: **Angela C. Whitehead, #386**

Area	Soil pH	Buffer pH	Lab P (ppm)	VT P (ppm)	VT (H/M/L)	P_2O_5 Needs (lbs/1000ft^2)	Lab K (ppm)	VT K (ppm)	VT (H/M/L)	K_2O Needs (lbs/1000ft^2)
1 Inner Fort	5.8	6.82	108	46	H+		60	43	M-	
2 North Gate	7.0		68	28	H		67	48	M-	
3 Wherry Qtr.	6.3		77	32	H		77	55	M	
4 Historic Village	6.6		105	45	H+		67	48	M-	
REC:			**90**	**38**	**H**	**0.75**	**68**	**48**	**M-**	**2.0**

- Soil pH measured between 5.8 – 7.0. Additions of limestone are recommended at a rate of 45 lbs/1000ft^2 for Inner Fort turfgrass.
- Potassium levels averaged in the moderate - range. **Potash applications are recommended at a rate of 2.0 lbs/1000ft^2 annually.**
- Phosphorus levels averaged in the high range. **Phosphorous applications are recommended at a rate of 0.75 lbs/1000ft^2 annually.**
- **Nitrogen applications may not exceed 3.5 lbs/1000ft^2 annually to all less intensively managed turf areas.**

3. Summary of Recommended Annual Nitrogen, Phosphorous, and Potassium Application

The following tables provide nutrient recommendations that allow managers flexibility in selecting fertilizer products that best fit their management program. Fertilizer products and/or analysis are not specified and doing so may constrain the manager. Monthly fertilization programs are included to demonstrate the frequency and timing of nutrient applications that comply with Virginia Nutrient Management Standards and Criteria, Revised July 2014. If Class B Biosolids or raw manure is applied, the plan must be revised to meet the conditions of the Virginia Department of Environmental Quality permit.

A. Fertilizer Recommendations Summary: Fort Monroe Authority Turf, 46.0 acres

Area	Annual Lime Needs ($lbs/1000ft^2$)	Annual N Needs ($lbs/1000ft^2$)[a]	Max. Total N Rate per application ($lbs/1000ft^2$)[b, c]	Annual P_2O_5 Needs ($lbs/1000ft^2$)	Annual K_2O Needs ($lbs/1000ft^2$)
Fort Monroe fertilized turf	45 (Inner Fort)	3.5	0.70 (min. 30 days)	0.75	2.0

[a] Cool Season: Do not apply N between December 19 and February 20 or when the ground is frozen. Warm Season: Do not apply N between October 10 and April 3 or during periods of drought.
[b] 100% Water Soluble N (WSN) Fertilizer
[c] A maximum application rate of 0.9 lb/1000 ft^2 of total N (cool season) or 1.0 lb/1,000 ft^2 of total N (warm season) may be applied using slowly available forms of N with a minimum of 30 days between applications.

B. Recommended Monthly Fertilizer Application: Fort Monroe Authority Turf, 46.0 acres

	$N^{a,b,c}$ – P_2O_5 – K_2O ($lbs/1000ft^2$) 2017-2020											
Area	Feb 21-Mar	April	May	June	July	August	Sept	Oct	Nov-Dec 18	Annual Need[d]		
										$N^{a,b}$	P	K
Fort Monroe fertilized turf			0.7 – 0.75 – 2.0							0.7	0.75	2.0

[a] See Table 4A and Section 6 for N Rate Guidelines
[b] A maximum application rate of 0.9 lb/1000 ft^2 of total N (cool season) or 1.0 lb/1,000 ft^2 of total N (warm season) may be applied using slowly available forms of N with a minimum of 30 days between applications.
[c] **Do not apply more than 0.7 pounds of water soluble nitrogen per 1000 ft^2 within a 30 day period.**
[d] N and P_2O_5 applications may not exceed the Annual Need. Additional K_2O may be made annually to increase plant vigor and relieve traffic stress on damaged turf during times of extreme use.

4. Fertilizer Application Record

Customer Information		Management Area Information
Name:	Fort Monroe Authority	Management Area ID:
Address:	20 Ingalls Rd.	Management Area Size:
	Fort Monroe, VA 23651	Plant Species:
		Notes:
Phone #:	757-637-7778	

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions: Temp/Wind/Precip			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used

5. Virginia Nutrient Management Standards and Criteria, Revised July 2014

VI. Turfgrass Nutrient Recommendations

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", or "readily available nitrogen" means: Water soluble nitrogen in either ammonical, urea, or nitrate form that does not have a controlled release or slow response.

Nitrogen Application Guidelines

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.*** 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.

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.

Annual Application Rates for Home Lawns and Commercial Turf

Up to 3.5 pounds per 1,000 ft^2 of nitrogen may be applied annually to cool season grass species or up to 4 pounds per 1,000 ft^2 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.

For warm season grasses, up to 0.7 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 0.5 lb/1,000ft^2 may be made in February-March to overseeded perennial ryegrass if growth and color indicate need. Applications using WSN many not exceed 0.7 lb/1,000ft^2 within a 30 day period.

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.

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 (pg 96).

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.

Phosphorus and Potassium Recommendations for <u>Established</u> Turf
Apply phosphorus (P_2O_5) and potassium (K_2O) fertilizers as indicated by a soil test using the following guidelines:

Soil Test (VT) Rating	P_2O_5 lb/1000 ft^2	K_2O lb/1000 ft^2
L-	3	3
L	2.5	2.5
L+	2	2
M-	2	2
M	1.5	1.5
M+	1	1
H-	1	1
H	0.75	0.75
H+	0.5	0.5
VH	0	0

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.

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 Application for Establishment of Turf
At the time of establishment, apply no more than 0.9 pounds per 1,000 ft2 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.

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 0.7 lb of WSN/1,000 ft^2 should be applied before sod is installed. Alternatively, using a slowly available forms of nitrogen, 0.9 lb N/1000 ft^2 for cool season grasses or 1 lb of N/1000 ft^2 for warm season grasses may be applied before sod installation.

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 of Turf

Soil Test (VT) Rating	P_2O_5 lb/1000 ft^2	K_2O lb/1000 ft^2
L-	4	3
L	3.5	2.5
L+	3	2
M-	3	2
M	2.5	1.5
M+	2	1
H-	2	1
H	1.5	0.75
H+	1	0.5
VH	0	0

Other Turf Management Considerations for State-owned Lands

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
Foliar iron supplements may be used to stimulate a greening effect on the turfgrass as an alternative to additional applications of nitrogen. These applications are most beneficial if applied in late spring through summer for cool season grasses and in late summer through fall for warm-season grasses.

Impervious Surfaces
Do not apply fertilizers containing nitrogen or phosphorus to impervious surfaces (sidewalks, streets, etc.). DO NOT use urea as an ice melting substance in cold weather. 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 use a leaf blower etc., to return the fertilizer back to the turfgrass canopy.

Environmentally Sensitive Areas
Avoid fertilizer applications within 15 feet of waterways. This setback is reduced to 10 feet if a drop spreader, rotary spreader with deflector or targeted spray liquid is used to apply the fertilizer. The use of fertilizers with slow release nitrogen is greatly encouraged, especially where there is any reason to suspect environmental concerns.

Recordkeeping requirements and reporting for the application of fertilizer (2VAC5-405-100)
State-owned lands subject to this regulation shall maintain records of each application of fertilizer to non-agricultural land for at least three years following the application. These records shall be available for inspection. Each record shall contain the:

1. Name, mailing address of the application site;
2. Name of the person making or supervising the application;
3. Day, month, and year of application;
4. Weather conditions at the start of the application;
5. Acreage, area, square footage, or plants treated;
6. Analysis of fertilizer applied;
7. Amount of fertilizer used, by weight or volume; and
8. Type of application equipment used.

Spreader Calibration
Spreaders and boom sprayers must be properly calibrated if they are to deliver fertilizers and pesticides to turf at correct rates. If calibration is done incorrectly, the product may be misapplied and either too much or too little of the product will reach the turf. Sprayers and spreaders should be calibrated at first use and every fourth application. Spreaders and sprayers be calibrated in several ways. Refer to the following publication for detailed instructions:

www.turfgrass.ncsu.edu/Articles/admin/2008/Calibration_of_Turfgrass_Boom_Sprayers_and_Spreaders_(AG-628).pdf

6. Soil Reports

Report Number: 17-339-0548
Account Number: 06736

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WILLIAMSBURG VA 23188

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20 Ingalls Rd
Ft. Monroe, Va 23651

SOIL ANALYSIS REPORT

Analytical Method(s): SMP Buffer pH Mehlich 3 Loss On Ignition Water pH

Date Received: 12/05/2017 **Date Of Analysis:** 12/06/2017 **Date Of Report:** 12/06/2017

Sample ID Field ID	Lab Number	OM	W/V	ENR	Phosphorus			Potassium	Magnesium	Calcium	Sodium	pH		Acidity	C.E.C
		% Rate	Soil Class	lbs/A	M3 ppm Rate	ppm Rate	ppm Rate	K ppm Rate	Mg ppm Rate	Ca ppm Rate	Na ppm Rate	Soil pH	Buffer Index	H meq/100g	meq/100g
1 InnerFt	11532	4.1 M		124	108 VH			60 L	107 H	738 M		5.8	6.82	1.1	5.8
2 NGate	11533	3.6 M		111	68 H			67 L	94 L	1372 VH		7.0		0.0	7.8
3 WherryQtr	11534	3.4 M		109	77 H			77 L	108 M	928 H		6.3		0.7	6.4
4 HistVilliage	11535	4.2 M		124	105 VH			67 L	121 M	1135 H		6.6		0.4	7.3

Sample ID Field ID	Percent Base Saturation					Nitrate	Sulfur	Zinc	Manganese	Iron	Copper	Boron	Soluble Salts		
	K %	Mg %	Ca %	Na %	H %	NO_3 N ppm Rate	S ppm Rate	Zn ppm Rate	Mn ppm Rate	Fe ppm Rate	Cu ppm Rate	B ppm Rate	SS ms/cm Rate		
1 InnerFt	2.7	15.4	63.6		19.0										
2 NGate	2.2	10.0	87.9		0.0										
3 WherryQtr	3.1	14.1	72.5		10.9										
4 HistVilliage	2.4	13.8	77.7		5.5										

Values on this report represent the plant available nutrients in the soil. Rating after each value: VL (Very Low), L (Low), M (Medium), H (High), VH (Very High). ENR - Estimated Nitrogen Release. C.E.C. - Cation Exchange Capacity.

Explanation of symbols: % (percent), ppm (parts per million), lbs/A (pounds per acre), ms/cm (milli-mhos per centimeter), meq/100g (milli-equivalent per 100 grams). Conversions: ppm x 2 = lbs/A, Soluble Salts ms/cm x 640 = ppm.

This report applies to sample(s) tested. Samples are retained a maximum of thirty days after testing.

Analysis prepared by: Waypoint Analytical Virginia, Inc.

by: Pauric McGroary

Pauric McGroary