

Chesapeake Bay TMDL

Action Plan

Phase 2

DRAFT

Prepared for Fort Monroe Authority, Virginia

5/30/2018

FORT MONROE

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This document is being used to identify the strategies that Fort Monroe is using to reduce nutrient and sediment contributions to the Chesapeake Bay.

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Executive Summary

Fort Monroe's progress towards the Chesapeake Bay TMDL requirements is explained in the following Chesapeake Bay TMDL Action Plan (the Action Plan). Calculations of the reduction of pollutants are also stated to accurately describe the obligations that Fort Monroe will meet to reduce Chesapeake Bay TMDL for current projects. Future projects will be planned to follow this plan according to the future foreseeable outcomes that these projects are projected to have. The numbered sections under the Action Plan Elements correspond with the numbered sections in Part VI of the Department of Environmental Quality (DEQ) Chesapeake Bay TMDL Special Condition Guidance document and are relied upon by Fort Monroe in developing and maintaining this plan.

This document has been updated as of May 2018 to reflect changes made to the ownership at Fort Monroe. Additionally, it has been updated to contain proposed projects to meet the 40% pollutant reductions required during the upcoming permit cycle.

Background

The Chesapeake Bay Total Maximum Daily Load (TMDL) Phase 2 Action Plan will be implemented for Fort Monroe as an approach to reducing pollutants of concern (POC) discharging from Municipal Separate Storm Sewer Systems (MS4). The POC are total Nitrogen (TN), total Phosphorous (TP), and total suspended solids (TSS). Because the Fort Monroe Authority is an MS4 operator, the General VPDES permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (VAR04) (MS4 Permit) requires a developed Chesapeake Bay TMDL Action Plan to be submitted to DEQ.

This Action Plan demonstrates the proceedings that Fort Monroe have in place as well as the efforts that will need to be applied in order to comply with the MS4 Permit standards. It describes what Fort Monroe has accomplished during the first permit cycle (2013 – 2018) to meet their 5% reductions, and adds in what they will utilize to meet the required nutrient and sediment loading reductions and describe the amount of reduction required to achieve 40% progress in the current permit cycle. The Action Plan includes calculations of the FMA MS4 area load as of June 30, 2009; the load attributable to new construction that occurred between 2009 and June 30, 2015 and loads estimated to be generated from projects utilizing the Grandfathering provisions of 9VAC25-870-48. It also describes the management practices and retrofit programs (including improvements from redevelopment) that have been implemented between July 1, 2009 and the end of the first permit cycle to achieve the 5.0% reductions required for existing development.

Fort Monroe is a significant piece of property that has both historical and military richness. Residents and visitors have access to numerous beaches, park services, and martial structures. It is located in Hampton, Virginia but only attached to Hampton to the north. The other three sides are bounded by water; the Chesapeake Bay to the east and south and Mill Creek to the west, separating it from Hampton. Fort Monroe is the largest moat-encircled stone fortification in North America. It is a diverse landscape with 565 acres of which 8 miles are waterfront, 3 miles are beaches, and 85 acres are wetlands. Land use includes, but is not limited to, commercial, residential, National Park Service owned Fort Monroe National Monument area, and industrial. In 2000, the population was 1,253 residents according to the 2000 census. Due to the exit of the U.S. Army the population fell to 696 residents in 2010 according to the U.S. Census Bureau. The most recent American Community Survey 2016 5-year

estimates indicate the full-time population of Fort Monroe to be at 507 residents with a margin of error of +/- 100. Fort Monroe is entirely in the Chesapeake Bay Watershed which encompasses 100% of the drainage area.

Current Program and Existing Legal Authority

The Fort Monroe Authority (FMA) holds legal authority over the lands covered by MS4 Permit No. VAR040130. The Fort Monroe Authority Act gives the FMA several legal rights in the Code of Virginia:

§2.2-2336.B.4. It is the policy of the Commonwealth to protect the historic resources at Fort Monroe, provide public access to the Fort's historic resources and recreational opportunities, exercise exemplary stewardship of the Fort's natural resources, and maintain Fort Monroe in perpetuity as a place that is a desirable one in which to reside, do business, and visit, all in a way that is economically sustainable;

Through this legislation the Authority is able to manage and govern the land within the laws of the Commonwealth of Virginia and feels this is sufficient legal authority to comply with the Chesapeake Bay TMDL Special Condition.

New or Modified Legal Authority

No new legal authorities are required to implement the Chesapeake Bay Action Plan Special Conditions.

Means and Methods to Address Discharges from New Sources

The FMA is governed by a Board of Trustees with staff management of Commonwealth of Virginia lands at Fort Monroe without police power ordinances. An Erosion and Sediment Control policy/construction permit requirement is implemented that requires erosion and sediment controls on construction activities that result in land disturbance of greater than or equal to 2,500 square feet. This program is administered consistent with the Virginia Erosion and Sediment Control Regulations found at 9 VAC 25-850-10 et seq. and the approved Erosion and Sediment Control Annual Standards and Specifications filed with the Department each year.

As described in the recent MS4 program plan, FMA plans to undertake the following actions.

- FMA staff will continue to review the Erosion and Sediment Control Plans submitted by construction contractors, or others, for adherence to the state Erosion and Sediment Control Law and the approved Fort Monroe Erosion and Sediment Control Annual Standards and Specifications.
- A construction permit policy has been implemented that mandates VSMP Construction General Permits be obtained for construction activities that result in a land disturbance of greater than or equal to 43,560 square feet (one acre) or for smaller land disturbance amounts that are part of a common plan of development that disturbs greater than or equal to 43,560 square feet (one acre).
- Fort Monroe has developed and submitted to the Department annual Stormwater Management Standards and Specifications that address post-construction site runoff on construction activities that result in a land disturbance of greater than or equal to 2,500 square feet consistent with the Virginia Stormwater Management Regulations (9 VAC 25-870 et seq.).

Estimated Existing Source Loads and Calculated Total Pollutant of Concern (POC) Required Reductions

The existing loads being discharged by the MS4 based on the 2009 progress run have been calculated per the Chesapeake Bay TMDL Special Condition Guidance document dated May 18, 2015.

MS4 Area Determination

The Fort Monroe peninsula is located wholly within the City of Hampton in the Commonwealth of Virginia. The total surveyed land area of Fort Monroe is 561.35 acres as calculated in the U.S. State Plane Virginia South (U.S. Survey Feet) coordinate system, but much of the total acreage is owned and operated by agencies other than the FMA and ownership is continually evolving as the FMA fulfills its programmatic goals. Between the Phase 1 TMDL Action Plan and this current Draft Phase 2 TMDL Action Plan the ownership levels on the peninsula have substantially changed. (Table 1, Figure 1, Figure 2).

Additional land transfers are still possible in FY 2019 (Permit Year 1) and this document will be updated as applicable.

Table 1: Land ownership changes at Fort Monroe.

Land Ownership	Acres (2015)	Acres (2018)	Delta (Acres)
Fort Monroe Total Area	561.35	561.35	0.00
<i>National Park Service (Federal)</i>	<i>121.63</i>	<i>243.96</i>	<i>122.33</i>
<i>U.S. Army (Federal)</i>	<i>249.29</i>	<i>5.07</i>	<i>-244.22</i>
<i>Department of Homeland Security (Federal)</i>	<i>0.06</i>	<i>0.06</i>	<i>0.00</i>
<i>Fort Monroe Authority (State)</i>	<i>190.37</i>	<i>312.26</i>	<i>121.89</i>



Figure 1: Property Ownership in 2015

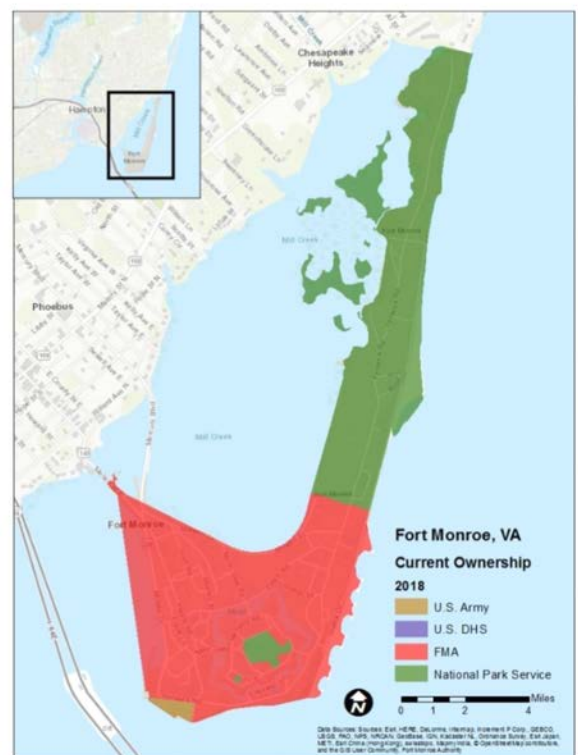


Figure 2: Property Ownership in 2018

Excluded Lands

Due to land transfers that have occurred between 2015 and 2018, FMA has recalculated their exclusion areas as specified below.

The FMA currently has no jurisdiction over lands owned and operated by other agencies within its boundaries. For this reason, it is excluding the 249.09 acres of land owned or managed by other entities as depicted in Figure 3. Of the remaining 312.26 acres operated by FMA 18.46 acres is accounted for by the moat surrounding the inner fort and which is considered open water and 31.2 acres extend into Mill Creek leaving a total of 262.60 acres of regulated land (Figure 3).

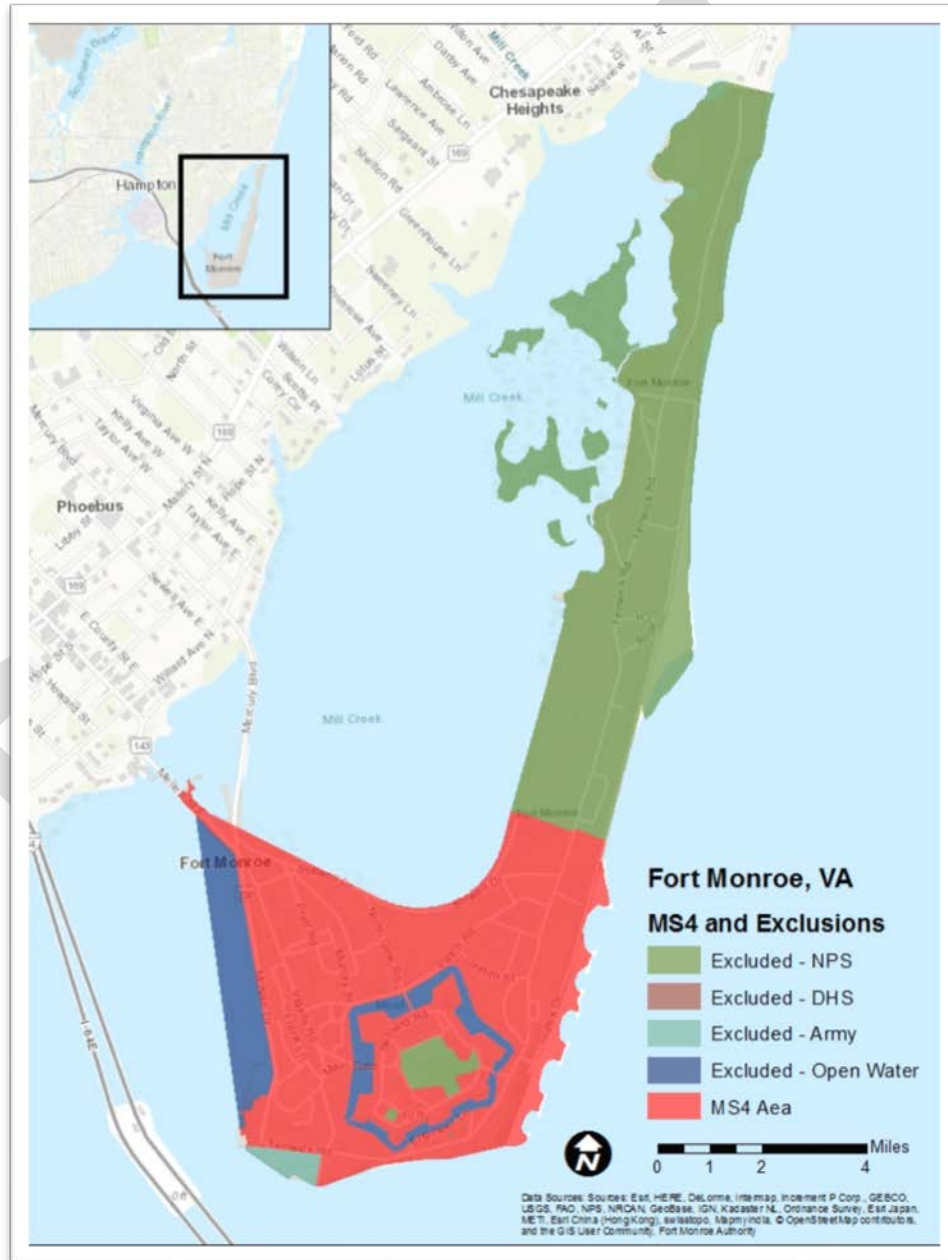


Figure 3: MS4 excluding federal and open water areas.

Final MS4 Service area

The final MS4 Service area as of May 2018 is the remaining land area consisting of 262.60 regulated acres. This document assumes the service area depicted in Figure 4. This has been updated to reflect the current ownership explained above.

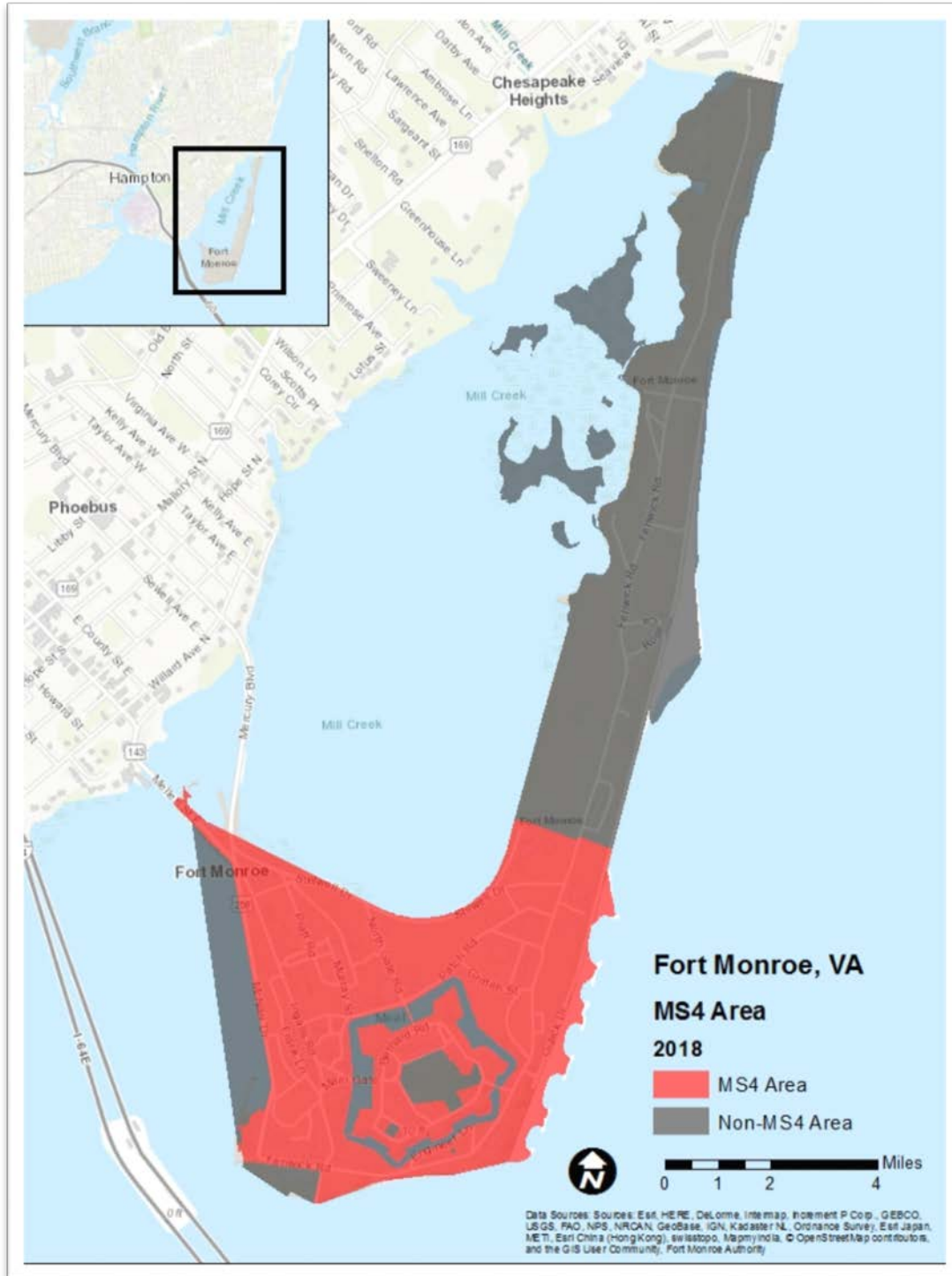


Figure 4: Final MS4 service area.

Land Cover Analysis

Existing loads for POCs have been calculated using supervised image classification on aerial photography dated March 2009 from the Virginia Geographic Information Network (VGIN). Data were classified at a 1-foot pixel size into the following classes:

- Impervious
- Managed Turf
- Forest
- Wetlands
- Open Water
- Other/Sand/Beach Dune.

For this exercise, all classes except impervious and open water were combined to encompass the MS4 Urban Pervious Category. The impervious class was used to find the MS4 Urban Impervious acreage. These two classes, pervious and impervious, were intersected with the mapped MS4 Permit Area and the corresponding total 2009 loads for POCs are shown in Table 2. The required 5% reduction based on 2009 areas are shown in Table 3.

***Note:** Areas have been updated as of May 2018 to reflect land transfers as explained above.

Table 2: Calculation Sheet for Estimating Existing Source Loads for the James River Basin (2009) *Based on Chesapeake Bay Program Watershed Model Phase 5.3.2					
<u>Subsource</u>	<u>Pollutant</u>	<u>Total Existing Acres Served by MS4 (6/30/09)</u>	<u>2009 EOS Loading Rate (lbs/ac/yr)</u>	<u>Estimated Total POC Load Based on 2009 Progress Run (lbs/ac/yr)</u>	<u>Totals 2009 Loading (lbs/ac/yr)</u>
Regulated Urban Impervious	Total Nitrogen	129.19	9.39	1,213.10	2,134.27
Regulated Urban Pervious		131.78	6.99	921.17	
Regulated Urban Impervious	Total Phosphorus	129.19	1.76	227.38	293.27
Regulated Urban Pervious		131.78	0.5	65.89	
Regulated Urban Impervious	Total Suspended Solids	129.19	676.94	87,454.49	100,775.16
Regulated Urban Pervious		131.78	101.08	13,320.67	

Table 2: 2009 estimated loads based on Land Cover in 2009

Table 3: Calculation Sheet for Estimating Source Reductions for the James River Basin					
<u>Subsource</u>	<u>Pollutant</u>	<u>Total Existing Acres Served by MS4 (6/30/09)</u>	<u>2009 EOS Loading Rate (lbs/ac/yr)</u>	<u>Estimated Total POC Load Based on 2009 Progress Run (lbs/ac/yr)</u>	<u>Totals 5% Reduction</u>
Regulated Urban Impervious	Total Nitrogen	129.19	0.042255	5.46	8.22
Regulated Urban Pervious		131.78	0.02097	2.76	
Regulated Urban Impervious	Total Phosphorus	129.19	0.01408	1.82	2.06
Regulated Urban Pervious		131.78	0.0018125	0.24	
Regulated Urban Impervious	Total Suspended Solids	129.19	6.7694	874.54	932.82
Regulated Urban Pervious		131.78	0.442225	58.28	

Table 3: Estimated 5% required reduction during first permit cycle

In order to better plan going forward FMA has used the required 5% reduction values in Table 3 (above) to extrapolate the 40% and 100% values that will be required in permit cycles two and three (Table 4).

Pollutant of Concern	5% Required in 1 st Permit Cycle	40% Required by 2 nd Permit Cycle	100% Required by 3 rd Permit Cycle
Total Nitrogen	8.22	65.78	164.45
Total Phosphorus	2.06	16.46	41.16
Total Suspended Solids	932.82	7,462.58	18,656.46

Table 4: Extrapolated reduction requirements.

Means and Methods to Meet the Required Reductions and Schedule 5% Compliance (First permit term compliance 2014-2018)



Wherry Quarter Building Demolition



Figure 5: Land use change resulting in a 3-acre impervious area reduction.

The Fort Monroe Authority has recently undergone several major land use changes, including the demolition of large areas of impervious area in the Wherry Quarter of Fort Monroe (Figure 4). The

conversion of the Wherry Quarter to Green Space has satisfied the reduction requirements for the first 5% for this permit cycle. As of October 1, 2015 Fort Monroe has met the required POC reductions by decreasing impervious area within the MS4 area by approximately 3.70 acres. This is a substantial decrease for an MS4 of this small size.

Calculations using the land conversion BMP (Impervious to Pervious) in the TMDL Guidance documents are shown in Table 5 and progress towards the total goals of the program are shown in Table 6 and Table 7. Fort Monroe has currently completed 15% to 16% of total reductions for TP and TSS and is also above the 5% goal for TN.

Pollutant of Concern	Edge of Stream Reductions (lbs/ac/yr)	Acres Converted from Impervious to Pervious	Reduction (lbs/ac/yr)
Total Nitrogen	2.29	3.70	8.47
Total Phosphorus	1.60	3.70	5.92
Total Suspended Solids	817.29	3.70	3,023.97

Table 5: Reduction using Land Cover Conversion BMP

Pollutant of Concern	2009 (lbs/ac/yr)	Decrease (lbs/ac/yr)	Required 5% Reduction	Excess (lbs/ac/yr)	% Above 5% Goal
Total Nitrogen	2,134.27	8.47	8.22	0.25	3%
Total Phosphorus	293.27	5.92	2.06	3.86	188%
Total Suspended Solids	100,775.16	3,023.97	932.82	2,091.15	224%

Table 6: Land use change POC summary.

Pollutant of Concern	To Date Reductions (lbs/ac/yr)	100% Reductions (lbs/ac/yr)	Percent of Total Required
Total Nitrogen	8.47	164.45	5.15%
Total Phosphorus	5.92	41.16	14.38%
Total Suspended Solids	3,023.97	18,656.46	16.21%

Table 7: Progress towards overall goals.

40% Compliance (Second permit term 2019-2023)

FMA is currently assessing options for obtaining 40% compliance as require during the second term of the MS4 permit. Table 8 displays the reduction requirement as extrapolated from the 5% requirement detailed in the Chesapeake Bay TMDL Special Condition Guidance (GM15-2005).

Pollutant of Concern	To Date Reductions (lbs/ac/yr)	40% Reductions (lbs/ac/yr)	Additional Required by End of Second Term
Total Nitrogen	8.47	65.78	57.31
Total Phosphorus	5.92	16.46	10.54
Total Suspended Solids	3,023.97	7,462.58	4,438.61

Table 8: 40% Reduction Requirements

Special consideration is required when assessing projects for this goal due to the unique historical nature of the Fort Monroe peninsula. Opportunities for structural BMPs may be limited due to many factors, including, but limited to:

- Consideration for archeological findings;
- Unexploded ordinance from military activities;
- Environmental resources; and,
- Existing infrastructure.

Options FMA is considering include, but are not limited to:

- Additional land conversion;
- Discussions on a Memorandum of Agreement with the Hampton Roads Sanitation District (HRSD) for joining the Sustainable Water Initiative for Tomorrow (SWIFT) program;
- Possible discussions with the City of Hampton for trading; and/or,
- Purchasing nutrient credits from a DEQ approved nutrient banking organization.

Costs to Achieve 40% Reductions

FMA cannot currently estimate the cost of achieving 40% reductions as all options are still being considered. Cost estimates will be updated in the final Phase 2 Chesapeake Bay TMDL Action Plan to be submitted at the end of the first permit year.

Means and methods to offset increased loads from new sources initiating construction between July 1, 2009 and June 30, 2014

Special Condition Requirement 7 “New Sources of Construction” (Section I.C.2.a (7)) of the General Permit applies to permittees that have:

- i. Adopted an average impervious land cover condition greater than 16% for the design of post- development stormwater management facilities under the Chesapeake Bay Preservation Act, or
- ii. Have allowed projects to be built with an impervious land cover condition greater than 16% for the design of post-development stormwater management facilities through a “fee-in-lieu of” or similar program.

If a permittee has met either of the criteria listed in (i) or (ii) above, then the permittee has to address the requirements set forth in the corresponding Special Condition. This would ultimately require further POC reductions in addition to those required for existing conditions as of June 30, 2009 (GP Section I.C.2.a (6)).

No substantial construction was undertaken between July 1, 2009 and June 30, 2014. Therefore, offsets will not be required.

Means and methods to offset increased loads from grandfathered projects that begin construction after July 1, 2014

Special Condition Requirement 7 refers to General Permit Section I.C.2.a.(8) and applies to permittees that will have future grandfathered projects in accordance with 9VAC25-870-48. As there have been no

Grandfathered Projects at Fort Monroe and therefore means and methods to offset increased loads are not necessary.

A list of future projects, and associated acreage that qualify as grandfathered

Special Condition Requirement 8 refers to General Permit Section I.C.2.a.(10) and applies to permittees that will have future grandfathered projects in accordance with 9VAC25-870-48. As there have been no grandfathered projects in the Fort Monroe MS4 Permit area and will be no future grandfathered projects this requirement does not apply.

An estimate of the expected cost to implement the necessary reductions

Fort Monroe has met the estimated 5% reduction on all POCs for the Permit Cycle 1 required under the TMDL Special Condition as shown in Table 6. There will be no additional cost during the second permit cycle to meet requirements.

Public Comments on Draft Action Plan

Fort Monroe published the Phase 1 Draft Chesapeake Bay TMDL Action Plan on the environmental portion of their website welcoming comments. No comments were received.

The Phase 2 Draft Chesapeake Bay TMDL Action Plan for Permit Cycle 2 for fiscal years 2019 – 2024 will also be posted to the environmental portion of the Fort Monroe Authority Website for public comments.