City of Manassas

TMDL Action Plan

for the Bull Run Watershed

2021 Update

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City of Manassas
Engineering Department
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Update Local TMDL Action Plan
City of Manassas

1.0 INTRODUCTION

1.1 Purpose

This TMDL Action Plan documents how the City of Manassas (City) intends to meet the "TMDL Action Plans other than the Chesapeake Bay TMDL" in Part II.B.1-5 of its Phase II Municipal Separate Storm Sewer (MS4) General Permit (No. VAR040063). The City's most recent MS4 permit was issued by the Virginia Department of Environmental Quality (DEQ) effective November 1, 2018 and will expire October 31, 2023. The City's previous Local TMDL Action Plan was approved July 26, 2016.

The City's MS4 permit requires the development of action plans for impaired streams where a total maximum daily load (TMDL) approved by the State Water Control Board assigns a waste load allocation (WLA) to the City. A TMDL establishes the maximum amount of a pollutant that can enter a water body without violating water quality standards.

This document, required to be completed within 18 months of permit issuance or not later than May 1, 2020, addresses that requirement and serves as the City's MS4 specific Local TMDL Action Plan to identify the BMPs and other activities to be implemented to address the waste load allocation assigned to the City's regulated MS4 area by:

- Evaluating significant sources of bacteria and sediment;
- Assessing the adequacy of existing programs and legal authorities;
- Identifying new action items and associated schedules and milestones; and,
- Determining how the effectiveness of the plan will be assessed.

This report provides specific programmatic and structural best management practices (BMPs), both existing and planned, implemented by the City to address sediment and bacterial contamination. The City understands it's role and responsibilities in the implementation of relevant local strategies through an adaptive management approach to support a reasonable assurance of TMDL compliance. The City is dedicated to improving the quality of both the Chesapeake Bay and local waterways.

1.2 Background

Contamination by fecal coliform bacteria is the most common cause of water quality violations in Virginia streams. According to DEQ and the United States Geologic Survey "Although fecal coliform bacteria are not necessarily dangerous to humans, their presence in streams indicates that the water is contaminated with fecal waste from warm-blooded animals…For this reason, fecal coliform bacteria are known as 'indicator organisms;' their presence in recreational waters indicates an increased risk to human health." In Virginia, water quality standards for bacteria were changed in 2003 from more general fecal coliform bacteria to E. coli (Escherichia coli). E. coli is a subset of fecal coliform bacteria and is considered a better indicator of the pathogenic potential of contamination.

Sediment pollution is a leading cause of stream degradation and has been identified as one of the major stressors associated with the decline of aquatic habitats. While some sediment is a natural part of the water environment, too much sediment can smother bottom dwelling organisms and block sunlight to underwater plants. These plants serve as habitat to many aquatic species. In addition, other pollutants such as phosphorus and PCBs may be attached to sediment particles.

The City has developed this TMDL Action Plan to address wasteloads assigned to the City for the following TMDLs:

- Bacteria TMDLs for Popes Head Creek, Broad Run, Kettle Run, South Run, Little Bull Run, Bull Run and the Occoquan River, Virginia, dated August 2006 and approved by the State Water Control Board (SWCB) on July 31, 2008
- Benthic (sediment) TMDL Development for Bull Run, Virginia, dated June 2006 and approved by the SWCB on June 27, 2007

1.3 Regulated Areas

Regulated areas are lands that produce runoff that drain through the City's stormwater system and discharge through pipes and/or ditches to the natural waterways within and adjoining the City. These are the lands covered by the City's MS4 Permit and to which a waste load allocation has been assigned. Direct discharges from land to the surrounding waters that do not pass through the City's stormwater system are not regulated under the City's MS4 permit. However, most policies and pollutant reduction practices recommended in this Action Plan will apply city-wide and address discharges from both regulated and non-regulated lands.

The City's geographic information system ("GIS") data was used in the delineation of the MS4 regulated areas and allowable exclusions. The extent of the regulated MS4 service area and the impaired waters covered by this TMDL are provided graphically in Figure 1.

The impaired benthic segment of Bull Run (VAN-A23R-01) is 4.8 miles in length extending from the Cub Run and continuing downstream to the Popes Head Creek, which is outside of the City's jurisdiction. The City estimates that the extent of the MS4 area currently serves 2,422[1] acres based upon the 2010 U.S. Census Bureau Urbanized Area of the Bull Run watershed.

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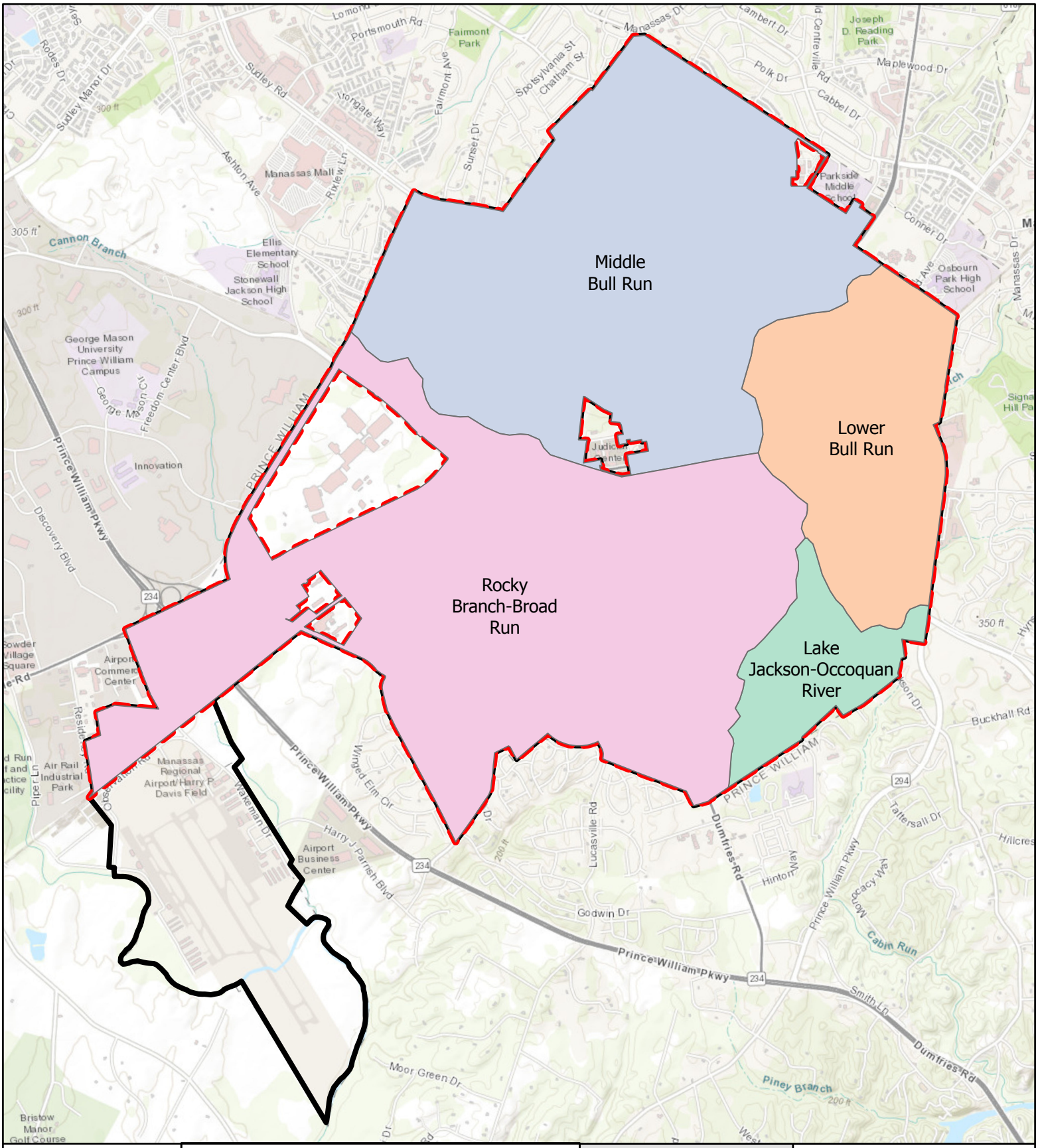
1 = Note: The Bull Run and Broad Run acreage totals here are slightly lower than the totals reported in the previous version of the Local TMDL Action Plan, because that plan reported all City properties draining into the watersheds, and not just lands covered by the MS4 Permit. These current totals only include MS4 regulated acres draining into this specific impaired Bull Run segment in which this WLA applies.



Note: This map is intended for reference purposes only. The City of Manassas does not provide any guarantee of the accuracy or completeness regarding the map information. Any determination of topography or contours, or any depiction of physical improvements, property lines or boundaries is for general information only and shall not be used for the design, modification, or construction of improvements to real property or for flood plain determination.

2.0 LEGAL AUTHORITIES

The City has developed a MS4 Program Plan in accordance with Virginia Stormwater Management Law, Virginia Stormwater Management Regulations, and MS4 Permit requirements. The Program Plan was most recently revised and submitted to DEQ in May 2019.

The City maintains erosion and sediment control and stormwater management programs that are consistent with the Virginia Stormwater Management Act (§62.1-44.15:24 of the Code of Virginia), the Virginia Erosion and Sediment Control Law (§62.1-44.15:51 of the Code of Virginia), and their attendant regulations. The City's construction site runoff control requirements are primarily implemented through Article 8 of the Design and Construction Standards Manual while post-construction runoff control requirements are primarily implemented through the City of Manassas Code.

The City's legal authorities that are applicable to reducing E. coli and sediment are as follows:

- Ordinance Chapter 58 Article III — Erosion and sediment control
- Ordinance Chapter 58 Article IV — Virginia Stormwater Management Program
- Ordinance Chapter 18 — Animals
- Ordinance Chapter 98.1 — Solid waste
- Ordinance Chapter 122 — Vegetation
- Ordinance Chapter 118-370 — Unlawful stormwater discharges
- Ordinance Chapter 118-371 — Inspecting and monitoring stormwater discharge
- Ordinance Chapter 118-372 — Notice to correct violations
- Ordinance Chapter 118-373 — Penalties for violations of subdivision

A review of City Codes and Ordinances was conducted during development of this TMDL Action Plan. No new legal authorities are necessary to meet the Special Condition requirements of the permit. The City has adequate legal authority to address not only the permit-related waste load allocation (WLA), but pollution attributable to other pollution sources included in the load allocation (LA).

The City believes that these legal authorities are adequate to meet the requirements of "TMDL Action Plans other than the Chesapeake Bay TMDL" in Part I.D.2 of the MS4 permit. All necessary ordinances have been adopted that are applicable to reducing the pollutant identified in each applicable WLA.

3.0 SEDIMENT TMDL ACTION PLAN

In compliance with the Section II B of the MS4 permit, the City is required to address the Special Conditions for approved total maximum daily load (TMDL) other than the Chesapeake Bay TMDL. MS4 permit requires the development and implementation of action plans for impaired streams. The City's only Sediment TMDL is for the Bull Run watershed.

Bull Run was first listed as being impaired on Virginia's 303(d) TMDL Priority List in 1998 because of violation of General Standard (benthic impairment). The TMDL identifies sediment as the primary stressor impacting biologically impaired segments within the watershed. Sources of the sediment loading identified in the TMDL includes urban stormwater runoff, stream bank erosion, and sediment loss from habitat degradation associated with urbanization. The TMDL states that improvement of the benthic community will rely on reducing sediment loads through stormwater controls and through restoration of streams and the associated riparian habitat.

3.1 Waste Load Allocations for Sediment

The assigned WLA for the City's Local TMDL is an aggregate for multiple MS4 permit holders (Table 1) in the City's same generalized area. Each TMDL includes a different combination of aggregated MS4 permit holders. Those aggregate MS4 permits holders are as follows:

- Virginia Department of Transportation (VDOT)
- Northern Virginia Community College (NOVA), Manassas Campus

Table 1 Waste Load Allocations

Aggregated MS4 Permit Holders	Watershed	Pollutant	Allocated Load
City of Manassas	Bull Run (VAN-A23R-01)	Sediment	210.0 (tons/year)
NOVA Manassas Campus			
VDOT Urban Area			

The City and its aggregated partners are responsible for the reducing sediment levels being discharged into Bull Run for a combined total of 210 tons per year. This equates to 420,000 pounds per year. However, the entire 420,000 pounds per year are not solely the City's responsibility. DEQ provides no guidance on how the City should distribute this 420,000 pounds per year reduction requirement between the City, NOVA's Manassas Campus, and VDOT. Land use and therefore pollution run-off may vary between these jurisdictions; however, the most expedient means of distributing this reduction requirement is based on percentage of land area.

According to the "Benthic TMDL Development for Bull Run" report, the combined acreage of the three aggregated MS4s is 2,564.0 acres (the report's Table 6-9). According to the City's Geographic Information System (GIS) analysis, the City's MS4 area draining into this impaired segment of Bull Run, for which this WLA applies, is 2,422.4 acres. This equates to 94.5 percent of the total aggregated area. Therefore, the City's share of the 420,000 pounds (210.0 tons) per year allocation is 396,816 pounds (198.4 tons) of sediment per year (Table 2).

Table 2 Waste Load Allocations Distributed Among Aggregated MS4s

Aggregated MS4 Permit Holders	Watershed	Pollutant	Allocated Load	Proportional Share of Allocated Load
City of Manassas	Bull Run (VAN-A23R-01)	Sediment	210.0 (tons/year)	198.4 (tons/year)
NOVA Manassas Campus				11.6 (tons/year)
VDOT Urban Area				

3.2 Evaluation of Significant Sources of Sediment Pollutant

The MS4 Permit requires the City to assess all significant sources of the pollution of concern from facilities owned or operated by the City that are not covered under a separate VPDES permit. However, as a whole, it is important to understand the magnitude of each of the pollution sources in the affected watersheds so that effective programs can be developed and implemented to address the TMDL in a cost-effective manner.

The Bull Run TMDL describes significant sources of sediment as being associated with overland stormwater runoff and stream bank erosion. Sediment from overland stormwater runoff is caused by erosion of exposed or poorly stabilized soils. In urban areas, soils are often subject to compaction or frequent disturbance where stabilization with vegetation is difficult. Soil stockpiles that are not protected from precipitation can also be a source of sediment. Land disturbing activities (development, utility installation, roadwork, etc.) can also be a source of sediment if not properly controlled. However, erosion from construction activities one acre and greater is considered separate from the MS4 allocation since these activities are subject to separate VPDES construction general permits.

3.2.1 Potential Sources of Sediment Pollution from Public Property

The City's Code of Ordinances and the City Design and Construction Standards Manual require adequate erosion and sediment control in accordance with the Virginia Erosion and Sediment Control Regulations and the Virginia Stormwater Management Program Regulations. The dominant source of sediment within City's streams appears to be streambank erosion and other related impacts.

As required by the Section I.B.2.d of the General VPDES Permit for Discharges of Stormwater from Small MS4s, the City identified two (2) municipal facilities/properties that are not covered under a separate Virginia Pollutant Discharge Elimination System (VPDES) permit and that may be a source of benthic TMDL. The assessment identified the following properties:

- Stonewall Park – This Park has a pool, a tennis court, basketball court, and a soccer field. Parts of the soccer field which are used continuously tend to wear and expose soil from the heavy use and approximately 10,000 square feet of the soil is currently exposed.
- Byrd Park – This Park consists of three baseball fields that have both turf and exposed soil. Approximately 0.5 acre of the soil is currently exposed.

3.2.2 Potential Sources of Sediment Pollution from Private Property

Risk factors associated with private properties are generally the same as those associated with City owned or operated properties. The City's Code of Ordinances and the City Design and Construction Standards Manual require adequate erosion and sediment control in accordance with the Virginia Erosion and Sediment Control Regulations and the Virginia Stormwater Management Program Regulations. The threshold for erosion and sediment control in the City is one (1) acre of land disturbance.

3.3 Existing and Planned Sediment Management Controls

The City has in place programs aimed at preventing new sources of sediment and E. coli and reducing the discharge of existing sources of these pollutants into the MS4. These programs include the following (Table 3):

Table 3: BMPs implemented to reduce POCs

BMP	Type of BMP	Type of POC	Description
Infiltration Systems	Structural	Sediment	Stormwater BMP that filters water into the ground through retention and pervious soils.
Detention Systems	Structural	Sediment	Stormwater BMP that temporarily retains water and influences sediment to settle out of water.
Retention Systems	Structural	Sediment	Stormwater BMP that permanently retains water and influences sediment to settle out of water. Also provides long-term removal through ecological processes in water and plants.
Filtration Systems	Structural	Sediment	Stormwater BMP that uses a physical filter such as a fabric or sand mixture to remove sediment.
LID Planning	Both	Both	Design and Construction concept to minimize amount of connected impervious area and mimic predevelopment runoff conditions.
Manufactured Systems	Structural	Sediment	Pre-fabricated systems designed to remove a specific item from stormwater runoff such as oil/water separators and clearinghouse proprietary BMPs.
Facilitating good housekeeping practices	Non-Structural	Both	Proper disposal of automotive wastes, household hazardous waste and pet waste, minimizing the use of lawn chemicals, and managing lawn debris.
Good maintenance practices	Non-Structural	Both	Catch basin cleaning, sweeping, road and ditch maintenance.
Educations and outreach programs	Non-Structural	Both	Provide handouts and presentations to young public school students to emphasize the importance of minimizing pollution of stormwater.
Storm drain stenciling	Non-Structural	Both	Metal placards that say, "No Dumping, Drains to Bay" affixed to city storm inlets to help discourage citizens from dumping items in storm drains such as trash, pet waste and yard waste.

3.3.1 MS4 Program Plan Relative to Sediment Pollution

The City has adopted a MS4 Program Plan that documents implementation of all MS4 permit requirements, including the programmatic and legal authorities required to meet the requirements for "TMDL Action Plans other than the Chesapeake Bay TMDL." The full MS4 Program Plan can be found on the City's Stormwater website at: http://manassascity.org/812/Stormwater. Table 4 provides a summary of MS4 Program Plan elements related to reducing pollution relative to this TMDL plan.

Table 4 MS4 Program Plan Sediment-Reducing Elements

Minimum Control Measure	**MS4 Program Plan Elements Related to Controlling Sediment**
MCM #1 – Public Education and Outreach on Stormwater Impacts	The City has developed a Public Education and Outreach Plan as described in the most updated Program Plan for the City of Manassas. This plan identifies sediment as one of the City's high-priority pollutants for the focus of its education and outreach efforts.
MCM #2 – Public Involvement and Participation	The City outlined in the most updated version of the Program Plan means for accomplishing its Public Involvement and Participation Permit mandates. Most of these elements are specifically relevant to sediment pollution. In addition, the City established procedures for the public to report illicit discharges and improper disposal.
MCM #3 – Illicit Discharge Detection and Elimination	The City has implemented an Illicit Discharge Detection and Elimination (IDDE) program designed to prevent, identify, and eliminate sources of pollutants, including sediment.
MCM #4 – Construction Site Stormwater Runoff Control	The City's construction site stormwater runoff control program is fully consistent with the requirements of the Virginia Erosion and Sediment Control Act and the Virginia Stormwater Management Act, and their attendant regulations, as well as the MS4 Permit's MCM #4.
MCM #5 – Post-Construction Stormwater Management	The City's post-construction stormwater runoff control program is consistent with the requirements of the Virginia Stormwater Management Act and its attendant regulations.
MCM #6 – Pollution Prevention and Good Housekeeping for Municipal Operations	The City has designed a program to prevent pollution from City facilities through the development of stormwater pollution prevention plans (SWPPPs) standard operating procedures (SOPs), Good Housekeeping Plans, and employee stormwater training.

The City, through its MS4 Program Plan has identified and implemented numerous activities at reducing the sediment being discharged through its MS4. These activities include:

- Inspecting all publicly owned/operated BMPs annually and all privately owned/operated BMPs at least once every five years for ensuring proper operation and maintenance.
- Conducting annual dry weather monitoring and investigations of at least 50 outfalls, during which, the City assesses any potential illicit discharges.
- Performing situational stream assessment investigating stream bank conditions.
- Maintenance, repair, and cleaning of the City-owned and operated MS4 system including ditches, pipes, structures, outfalls, and BMPs.
- Sweeping of streets within the City.
- A Spill Response and Illicit Discharge Detection and Elimination Program to prevent, identify, and clean potential discharges to the City's MS4.
- A Sanitary Sewer Overflow (SSO) and cross connection elimination program.
- A public education and outreach program to address water quality improvement.

- Maintaining VPDES Industrial Stormwater General permits for the City owned/operated facilities.
- Clearly indicate proper disposal locations and review recycling program.
- Post signs in materials handling areas reminding staff of good housekeeping procedures.
- Be sure employees know where routine clean-up equipment is located.
- Post warning signs in spill areas with emergency contacts and telephone numbers.
- Be sure employees are aware which materials are hazardous and where those materials are stored.

3.3.2 Management of Structural BMPs Relative to Sediment Pollution

Previous versions of the Local TMDL Action Plan expressed the pollution reductions in qualitative terms. However, the most recent MS4 Permit requires the City to express the pollutants in quantitative terms using established and approved BMP efficiencies, if available. Such quantified and established efficiencies are not available for E. coli, but they are for sediment.

The majority of the City owned and managed stormwater BMPs are older facilities constructed before modern stormwater standards. Most do not conform to design standards for which established pollution reduction efficiencies. Therefore, the established efficiencies cannot be used. However, these older stormwater BMPs, including wet ponds and dry ponds, do collect sediment, and the City situationally does remove this sediment in a place where it does not reenter storm or natural waters.

The City has instituted a inspection and maintenance program to ensure these facilities maintain their pollutant removing capabilities. Inspection of City-owned BMPs are typically conducted annually and City maintenance crews perform maintenance on the City-owned BMPs based on inspection discrepancies or on the preventative maintenance program. Re-inspections of storm water facilities are conducted to ensure maintenance has been completed.

If a condition is discovered on a private BMP and maintenance is required, the owner of the BMP is notified by an inspection report to correct all maintenance items. The BMP is then re-inspected to ensure all maintenance items are corrected and in compliance with all state and federal regulations. If problems persist, enforcement action is taken.

A list of BMPs installed in the Bull Run MS4 service area is shown in Table 5. Most of these are older legacy BMPs whereas the current design efficiencies contained in DEQ's BMP Clearinghouse website do not apply. In addition, for most of them, the City has no Site Plan or other such recorded means to quantify the designed sediment reduction capability. Therefore, many of these are potentially available for future BMP retrofit opportunities. In the meanwhile, the City maintains an electronic database containing all BMPs and will continue to provide DEQ a list of BMPs, implemented during the reporting period, as part of the MS4 annual report. Reduction in the discharges of sediment resulting from post-development BMPs will be incorporated into the assessment of the City's effectiveness in meeting the Bull Run sediment WLA.

Table 5: A list of BMPs installed in the Bull Run MS4 service area

Name	Ownership	Type	Acres Treated	Latitude	Longitude	Date
Public Works	City	Wet	285.5	38.773074	-77.462023	06/1990
Sumner Lake	City	Wet	92.7	38.776048	-77.477825	06/2003
Oakenshaw Downstream	City	Dry	5	38.743073	-77.454886	06/1987
Fairview Bainbridge	City	Dry	2	38.746014	-77.459026	06/1988
Euclid Park	City	Dry	5	38.757041	-77.454369	06/1998
Fairview Riverdale	City	Dry	2	38.748514	-77.460472	06/1988
Point of Woods	City	Wet	8	38.770145	-77.462093	06/2005
Oakenshaw Upstream	City	Dry	10	38.74271	-77.458807	06/1987
Villages at Manassas	Private	Wet	5	38.771091	-77.484787	06/2005
Manassas Lumber	Private	Dry	4	38.754871	-77.461867	06/2005
Signal Hill Richmond	City	Dry	1.72	38.752707	-77.450371	06/2004
Kao Euclid	City	Wet	12.3	38.76026	-77.449222	08/1999
Manassas Junction	Private	Dry	2	38.763835	-77.458029	06/2005
Merchants Tire	Private	Wet	2.5	38.758689	-77.451719	06/2005
Waste Management	Private	Wet	2.5	38.757413	-77.450509	06/2005
Tudor Oaks	Private	Dry	20	38.752434	-77.459366	06/2005
Davis Ford Crossing	Private	Wet	20	38.743963	-77.45241	06/2005
Signal Hill Liberia	Private	Dry	11.72	38.744215	-77.451897	06/2005
Home Depot	Private	Dry	12.14	38.76246	-77.455556	06/2005
Sudley Professional Center	Private	U/G	3.3	38.769267	-77.487515	06/2005
Fairview Square Shopping Ctr. [1]	Private	U/G	3.716	38.738871	-77.452268	10/2006
Van Metre	Private	U/G	3.21	38.752402	-77.467525	06/2013
Brown's Kia	Private	U/G	2.296	38.759283	-77.456917	09/2015
Hospital[1]	City	Wet	202	38.76537542	-77.48886826	06/2017
Walmart	Private	Wet	?	38.75457358	-77.44976791	11/2002
Shemin Nursery	Private	Dry	?	38.75744179	-77.4488743	06/2005
Hastings Market Place 1	Private	U/G	<5	38.74121899	-77.45609825	10/2002
Hastings Market Place 2	Private	U/G	<5	38.74069763	-77.45435563	10/2002
Hastings Market Place 3	Private	U/G	<5	38.74038269	-77.45298171	10/2002

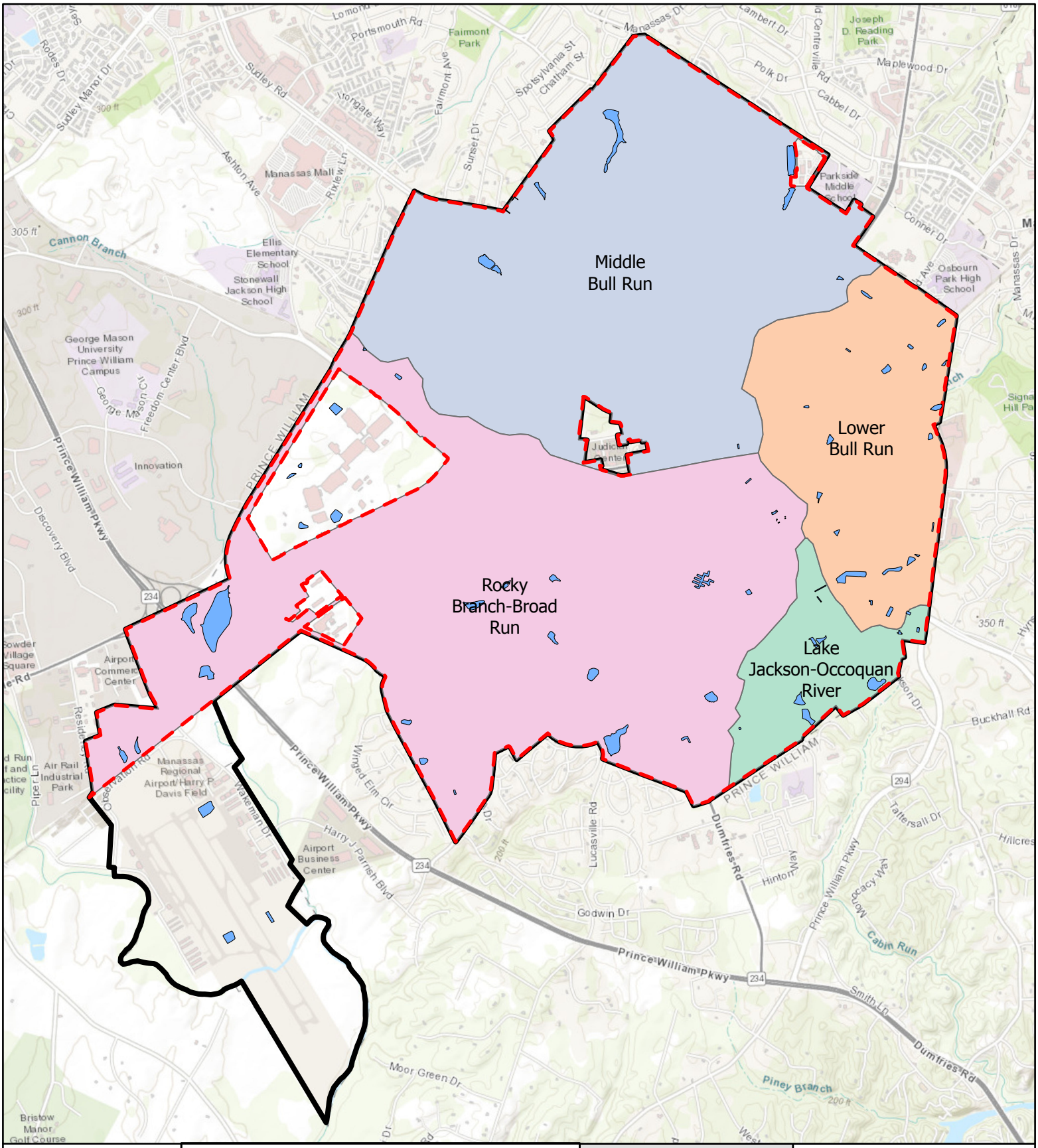
Note:

1 = These facilities meet current stormwater efficiencies so therefore are taken for sediment credit as reflected in the "Calculations" section.

3.3.3 Disturbed Land (and Sediment Management & Control) Management and Permitting

The City has implemented numerous activities at reducing the sediment being discharged through its MS4. These activities include:

- Implementation of Virginia Erosion and Sediment Control Program (VESCP) requiring land disturbing permits for the land disturbing activities exceeding 2,500 square feet.
- Implementation of Virginia Stormwater Management Program (VSMP) requiring the Stormwater Pollution Prevention Plans (SWPPPs) and Stormwater Management Plans.
- Requiring VPDES Discharges of Stormwater from Construction Activity permit for the land disturbing activities exceeding 1 acre.



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3.3.4 Chesapeake Bay TMDL Action Plan Relative to Sediment Pollution

The City has specific sediment reduction targets to meet the requirements under the Chesapeake Bay Act. The means the City plans to meet these targets are outlined in its Chesapeake Bay TMDL Action Plan. The City's MS4 Permit established a progressive three-tiered milestones system to meet the City's Chesapeake Bay TMDL requirements. The first goal was to meet five (5)-percent of the City's total reductions by 2018. The next goal was to meet 40 (35 on top of the already achieved 5) percent by 2023. The last goal is to meet the full 100-percent requirement by 2028.

The City's MS4 Permit allows the City to use these same sediment reductions obtained in the Chesapeake Bay TMDL Action Plan and apply them also to the sediment reduction targets within the Local TMDL Action Plan as long as the reductions occur within the same watershed as the Local TMDL WLA, in this case the portions of the Bull Run watershed that drain into the impaired Bull Run segment.

The City's plans to meet its Chesapeake Bay TMDL sediment reductions occur in both the Bull Run and Broad Run watersheds; therefore, only the sediment reduction activities occurring within the Bull Run watershed may be applied to the City's Local TMDL Action Plan WLA. For instance, the City is currently planning several stormwater BMP retrofit projects, including the Lucasville Regional Stormwater Pond and the Euclid Park Stormwater Pond. All sediment reductions obtained from both of these retrofits would apply towards meeting the City's Chesapeake Bay TMDL reduction requirements, but only the Euclid Park Stormwater Pond's reductions would apply to the City's Local TMDL reduction requires. This is because the Euclid Park Stormwater Pond is within the Bull Run watershed, while the Lucasville Pond is within the Broad Run watershed. In addition, some of the City's tentatively-planned stream restorations are within the Bull Run watershed, while others are within the Broad Run watershed.

The City's primary strategy for addressing its TMDL responsibilities under both the Chesapeake Bay TMDL and Local TMDL requirements will be to continue to leverage projects selected to meet other plans and activities.

Currently, the City intends to meet the Chesapeake Bay TMDL requirements through mostly stream restoration and stormwater retrofits.

The City will include in its prioritization process for selecting projects to meet the Chesapeake Bay TMDL whether the project will also achieve sediment reductions in the TMDL watershed. Projects will continue to draw from these identified needs and consider the potential to retrofit City owned or operated properties.

3.3.5 Stream Restoration

As mentioned in the Chesapeake Bay TMDL section, the City plans to meet its aggregated sediment reduction requirements through several means, including stream restorations.

The City contracted with RK&K to assess City streams for the potential to obtain nitrogen, phosphorus, and sediment reduction goals to meet the City's Chesapeake Bay TMDL requirements. The report ("Stream Stability Assessment and Prioritization Plan-Draft Report), dated April 20, 2018, assessed over 15,000 linear feet of City streams. They estimated they assessed nearly 21-percent of all City stream. The majority of the streams assessed were within the Broad Run watershed, so while they would apply towards the City's Chesapeake Bay TMDL reduction goals, they would not apply towards the Local TMDL reduction requirements. However, they assessed three reaches within the Bull Run watershed. They estimated if these three reaches were restored, it would result in a sediment reduction of 36,340 pounds per year. None of these projects have yet been implemented as of April 2020. Stream conditions have changed since the RK&K report (on both City and private owned stream parcels), so not all the assessed streams are still available or as viable as reported.

Late in 2019, the City began discussions with a private environmental consultant specializing in stream restoration. This group revisited many of the stream segments RK&K assessed earlier. This latest assessment will be more refined than RK&K's, and would provide the City with concrete numbers of restoration credits received, and the total project costs. Again, most of the streams assessed were within the Broad Run watershed; however, one additional Bull Run watershed stream was assessed (for a total of four). This assessment, for the streams within the Bull Run watershed, indicated that the City would be able to reduce its sediment load by 34,417 pounds per year. At the time of this plan (April 2020), the recent detailed assessment and report has not been completed. The City plans to have this or a related contractor complete the assessment and to initiate some of these stream restorations, including ones in the Bull Run watershed, in time to meet the City's 2023 Chesapeake Bay TMDL pollution reduction deadline.

In the meanwhile, the City will be working with contractors to identify and assess additional streams that would reduce the sediment load into the Bull Run watershed.

3.3.6 Street Sweeping and Inlet Cleaning

Due to changes in acceptable methodology, the City is not including reductions through street sweeping or inlet cleaning activities for TMDL compliance purposes.

3.3.7 Education and Outreach Relative to Sediment Pollution

The MS4 permit requires the City to develop and implement a public education and outreach program that includes measures to reduce sediment loads to the MS4. Elements of the City's program include: (1) general water resources stewardship and pollution prevention; (2) promoting, publicizing, and facilitating public reporting of the presence of illicit discharges; and, (3) encouraging private property owners to implement voluntary stormwater management techniques and/or retrofits.

The City's latest MS4 Program Plan identified for its education and outreach efforts three high-topics:

1) Illicit Discharges and Illegal Dumping from Residents
2) Pet Wastes and Bacteria TMDL
3) Sediment

Two of these priority topics (illicit discharges/illegal dumping and sediment) directly pertain to the sediment reduction requirements within this Local TMDL Action Plan.

The City's MS4 Permit requires the City to implement enhanced education and outreach efforts to support its Local TMDL sediment reduction efforts. These efforts are to be in addition of the education and outreach efforts required under the MS4 Permit Minimum Control Measure #1.

These sediment education and outreach efforts will be in the form of in-person presentations, brochures, handouts, fliers, website postings, and social media. In addition, early in 2020 the City became an official member of the Northern Virginia Clean Waters Partnership (Table 7). This Partnership will be greatly expanding its social media outreach. Partly due to the City's request, this year the Partnership will also be expanding its sediment-focused messaging.

Northern Virginia Clean Water Partners

The Northern Virginia Regional Commission, of which the city of Manassas is a member jurisdiction, oversees and manages the Northern Virginia Clean Water Partners program. The City of Manassas has recently became a paid member of this partnership. This membership provides the City with the diverse educational and outreach material available to membership organizations. This material is then distributed among the residents of the City's residents. The Partnership has long recognized that polluted and uncontrolled stormwater is the number one cause of poor stream and river quality in Northern Virginia, including within Manassas. The *Only Rain Down the Drain!* program is one example of the educational work that the Partnership performs for the interest of its membership. Some facts about the *Only Rain Down the Drain!* Regional Stormwater Education Initiative:

- The Northern Virginia Clean Water Partners *Only Rain Down the Drain!* regional stormwater education initiative is crafted by and for Northern Virginia jurisdictions and managed by NVRC
- The campaign uses cable television ads, website ads, and a website, onlyrain.org, to encourage the public to keep pollutants such as excess fertilizer and used motor oil from flowing into storm drains which lead to the Potomac River and Occoquan Reservoir, our sources of drinking water, and eventually the Chesapeake Bay
- The City of Manassas has an unprecedented opportunity to pool local outreach dollars to collectively target pollution-causing behaviors using a multi-media approach for greater impact at less cost and effort
- The strategy provides for community engagement and the production of outreach materials that can be customized and used by each locality.

Table 7: Clean Water Partners

Existing Clean Water Partners as of 2020	
• Fairfax County • Loudoun County • Arlington County • Stafford County • City of Alexandria • Fairfax Water • Loudoun Water • George Mason University • City of Falls Church • Town of Herndon • **City of Manassas**	• City of Fairfax • Town of Vienna • Town of Leesburg • Town of Dumfries • Doody Calls • Northern Virginia Regional Commission • Virginia Coastal Zone Management Program • Prince William County Public Schools • Alexandria Sanitation Authority

In addition, the City will:

- Develop interpretive and educational material on sediment impacts, with the specifically targeted audience being developers and contractors working for new construction projects within the City limits. The material will be handed out to persons and firms applying for construction and ground disturbing permits.

- Post sediment educational website links on the City's MS4 stormwater website. These links will include the Prince William County Soil and Water Conservation District

website, The Best Lawn Program website, Master Gardeners of Prince William County website, and Clean Waters Partnership's website.

- Explore partnership efforts with the Virginia Cooperative Extension Office-Prince William County on the Best Lawn Program.

> Best Lawn Program
>
> The Best Lawn Program is administered by the Virginia Cooperative Extension Office-Prince William County. Virginia Cooperative Extension is a cooperation of local, state and federal governments in partnership with tens of thousands of citizens. Program content is based on the research conducted at the state's two land-grant universities: Virginia Tech and Virginia State University. Using feedback from the community, local extension offices design, implement and evaluate Cooperative Extension's programs.
>
> The Building Environmentally Sustainable Turf (BEST) Lawn Program recognizes that to grow grass well you have to understand its needs. Healthy grass is the best defense against weeds, pests and diseases in your lawn. The BEST Lawn Program will help participants learn turf fertilization maintenance practices and timing to prevent problems. Depending upon the current condition of a person's lawn, converting to a BEST Lawn will take some time and planning.

- Ensure that all city parks containing signs state illegal dumping is prohibited; all city parks contain trash receptacles for park users to dispose of their trash and pet waste.

- Ensure signs have been erected in the common areas where problem dumping has occurred.

The MS4 Program Plan includes public education and outreach programs to provide educational information related to stormwater management, pet waste management, water quality, and stormwater pollution prevention through local publication, brochures, website, and social media. A few of the general outreach for sediment pollutants is listed in Table 8.

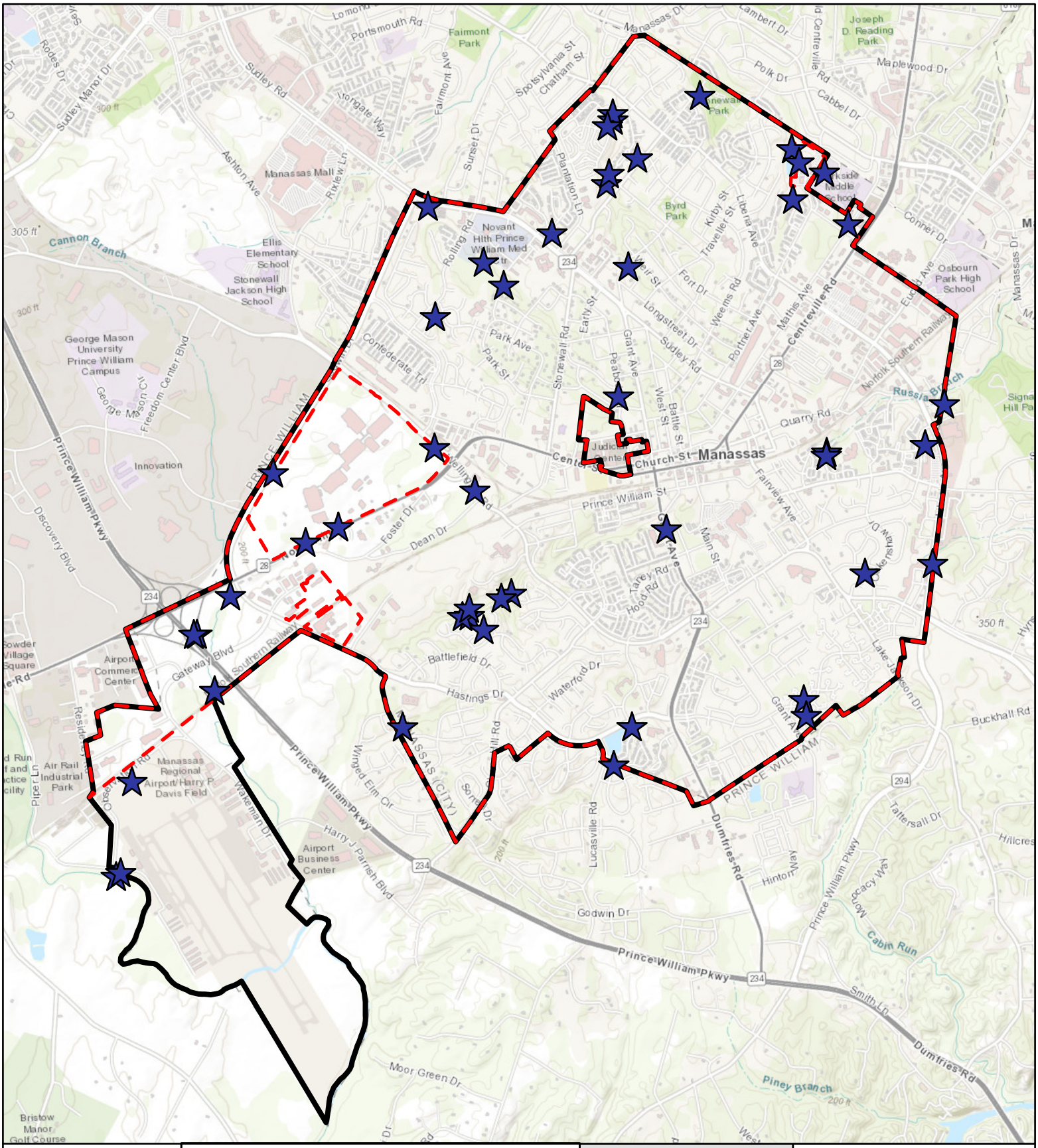

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Table 8 General Education and Outreach Efforts for Sediment and E. Coli

Outreach Activity	POC	How POC is Addressed	Future Enhancement
"Stormwater in the City of Manassas" pamphlet	E. coli & Sediment	Provides general information on causes of pollution and community solutions for bacteria and sediment.	Highlight specific sections of pamphlet in more detail through additional printed materials.
City Stormwater website	E. coli & Sediment	Provides general information on causes of pollution and community solutions for bacteria and sediment.	Unify look and information with other printed materials for a unified message.
Stormwater desktop model	E. coli & Sediment	Provides visual example of how pollutants are picked up by stormwater and impact stream ecology.	Use model in more presentations to public and in schools. Put on display in utility payment area of Public Works.
Stormwater education in public schools	E. coli & Sediment	Discuss basic examples of the causes of pollution in streams and how they can help prevent it.	Create additional school handouts that can be disrupted throughout the year. Create a children's space on website.
"No Dumping" label on storm inlets	E. coli & Sediment	Help discourage citizens from dumping items in storm drains such as trash, pet waste and yard waste.	Create additional handouts with same "No Dumping" logo discussing more specifically what not to dump and why.

3.4 Sediment Reduction Calculations

See Table 9 below for pollution reduction calculations for proposed capital improvement projects.

3.5 Assessment of Effectiveness of Sediment Reductions

Established reduction efficiencies are available for sediment. Therefore, the effectiveness of these reductions will consist of both reviewing the accomplishment for the previous year against permit requirements during submission of each Annual Report to DEQ (expressed in both qualitative terms and the quantifiable metrics contained in the compliance with the Chesapeake Bay TMDL required reductions). However, the measure of effectiveness for this Benthic TMDL Action Plan is to document progress toward meeting overall sediment load reductions in an iterative manner over multiple permit cycles.

3.6 Schedules and Milestones Relative to Sediment Reductions

The Local TMDL Action Plan will be implemented as listed in table 10 below.

This Action Plan will be updated, as needed, to reflect new or revised TMDL requirements that occur as a result of the reissuance of the general permit. If required, an updated Action Plan will be submitted along with the next annual report submitted.

Table 9- Pollution reduction calculations for Local TMDL Capital Improvement Projects.

Capital Improvement Program Local TMDL Action Plan Implementation 2023 Deadline- MS4					
			TN	TP	TSS
Local TMDL Required Nutrient Reduction by 2023:			-	-	396,816.00
Credit Received prior to July 1, 2018:	DEQ Spec.	Implementation Year	TN	TP	TSS
Hospital Pond	Level 1 Wet Pond	Complete	641.87	146.95	86,977.00
Total Reduction to be identified by City:			-641.87	-146.95	309,839.00
Projects Identified	DEQ Spec.	Implementation Year	TN	TP	TSS
Euclid/Sill's Warehouse Facility Retrofit	Level 1 ED	FY 24	56.31	6.45	27,346.00
Liberia House Stream Restoration	Stream Restoration	FY 24	1,014.00	363.00	125,120.00
Stonewall North [Proposed]	Level 1 Wet Pond	FY 28	163.95	38.20	30,000.00
Oakenshaw Upstream- SWMF Retrofit [Proposed]	Level 1 Wetland	FY 28	51.47	180.43	23,522.00
Oakenshaw Downstream- SWMF Retrofit [Proposed]	Level 2 ED	FY 28	14.57	90.29	13,839.00
Total- Identified Projects			1,300.30	678.37	219,827.00
Total reductions yet to be identified by retrofit project:			(1,942.17)	(825.32)	90,012.00

Table 10 Implementation Schedule and Notes for Sediment-related activities.

Implementation Item	Description	Status	Completion Date	Notes and Milestones
Capital Improvement Plan	Construction of retrofits, enhancements, and new stormwater management facilities as outlined in approved TMDL action plans and the City's Capital Improvement Plan.	Ongoing	FY 28	Currently identified projects are tentatively set for completion in two phases: Phase I ending in FY 23-24 and Phase II ending in FY 28-29. See Table 10 for detailed project information and pollution reduction calculations.
Construction and Post Construction Stormwater Management	The City will continue to implement and manage VESCP and VSMP programs consistent with state standards and the City Design and Construction Standards Manual (DCSM).	Ongoing	Ongoing	Program status will be highlighted in MS4 Annual Report.
Enhanced Education, Outreach, and Training	The City will enhance education, outreach, and training opportunities for internal and external stakeholders that further emphasize pollutants and their effects in the Local TMDL Area.	Ongoing	Annual	Results of all activities will be reported in the MS4 Annual Report. Education items will be posted to the City stormwater website. Training and education presentations will be conducted by City staff or as part of regional partnerships.
MS4 Program Plan	The City will continue to implement the MS4 Program Plan, including elements related to sediment pollution, in accordance with the schedule provided for in the MS4 Program Plan.	Ongoing	FY 23	See MS4 Program Plan for implementation schedule. The current MS4 General Permit expires in 2023.
Pollution Reduction Credit through UOSA Operating Agreement	The City will utilize pollution reduction credits generated as a result of UOSA operating agreement.	Annual	Annual	Report of credits received included in MS4 Annual Report.
Retrofit/Enhancement Feasibility of Publicly-Owned SWMFs	The City will review every publicly-owned property and evaluate pollution reduction opportunities by use on stormwater management facilities.	Ongoing	FY 24	Completed by June 30, 2024
SWMF Inspections and Maintenance- Private	The City will inspect privately-owned and operated facilities once every five years to confirm operational status and evaluate erosion potential.	Ongoing	Annual	Inspection reports will be generated annually for affected stormwater facilities. Results will be included in the MS4 Annual Report.
SWMF Inspections and Maintenance- Public	The City will inspect publicly-owned and operated facilities annually to confirm operational status and evaluate erosion potential.	Ongoing	Annual	Inspection reports will be generated annually for affected stormwater facilities. Results will be included in the MS4 Annual Report.
Water Quality Monitoring	The City will evaluate, enhance, and continue its water quality monitoring program for surface water and stormwater.	Ongoing	Ongoing	Sediment pollution-related Incidents of illicit discharge detection and elimination will be reported in the MS4 Annual Report.

4.0 E. COLI TMDL ACTION PLAN

In compliance with the Section II B of the MS4 permit, the City is required to address the Special Conditions for approved total maximum daily load (TMDL) other than the Chesapeake Bay TMDL. MS4 permit requires the development and implementation of action plans for impaired streams. The City has E. coli TMDL segments within the Bull Run, Broad Run, and Occoquan River watersheds.

Segments of Broad Run, Kettle Run, South Run, Popes Head Creek, Little Bull Run, Bull Run, and the Occoquan River were listed as impaired on Virginia's 1998 303(d) Total Maximum Daily Load Priority List and Report because of violations of the state's water quality standard for fecal coliform bacteria. The City has three assigned E. coli TMDLs (Table 11).

Table 11 E. coli Waste Load Allocations

Aggregated MS4 Permit Holders	Watershed	Pollutant	Allocated Load
City of Manassas VDOT Urban Area	Broad Run (VAN-A19R-01)	E. coli	1.15E+10 (cfu/yr)
City of Manassas VDOT Urban Area	Bull Run (VAN-A23R-01)	E. coli	6.82E+9 (cfu/yr)
City of Manassas VDOT Urban Area	Occoquan River (VAN-A20R-01)	E. coli	2.95E+10 (cfu/yr)

The impaired segment of Broad Run (VAN- A19R-01) is 7.26 miles long and begins at the confluence to Rocky Branch and continues downstream to confluence to Cannon Branch.

The impaired segment of Bull Run (VAN-A23R-01) begins at the confluence of Cub Run to Bull Run to its confluence with Popes Head Creek.

The impaired segment of the Occoquan River (VAN-A20R-01) is 5.01 miles long and begins downstream from the Lake Jackson impoundment and extends downstream to the confluence of Purcell Branch to the Occoquan River.

4.1 Waste Load Allocations for E. coli

The assigned WLA for the City's TMDL is an aggregate for multiple MS4 permit holders in the City's same generalized area. Each TMDL includes a different combination of aggregated MS4 permit holders. Those aggregate MS4 permits holders included in the City's allocation are as follows:

- Virginia Department of Transportation
- Northern Virginia Community College (NOVA), Manassas Campus

The DEQ allocated the following WLAs to the City in relation to Local TMDLs (Table 12):

Table 12 Waste Load Allocations Distributed Among Aggregated MS4s

MS4 Permit Holder	Watershed	Pollutant	Allocated Load
City of Manassas	Broad Run (VAN-A19R-01)	E. coli	1.15E+10 (cfu/yr)
VDOT Urban Area			
City of Manassas	Bull Run (VAN-A23R-01)	E. coli	6.82E+9 (cfu/yr)
NOVA, Manassas Campus			
VDOT Urban Area			
City of Manassas	Occoquan River (VAN-A20R-01)	E. coli	2.95E+10 (cfu/yr)
VDOT Urban Area			

4.2 Evaluation of Significant Sources of E. coli Pollution

The MS4 Permit requires the City to assess all significant sources of the pollution of concern from facilities owned or operated by the City that are not covered under a separate VPDES permit. However, as a whole, it is important to understand the magnitude of each of the pollution sources in the affected watersheds so that effective programs can be developed and implemented to address the TMDL in a cost-effective manner.

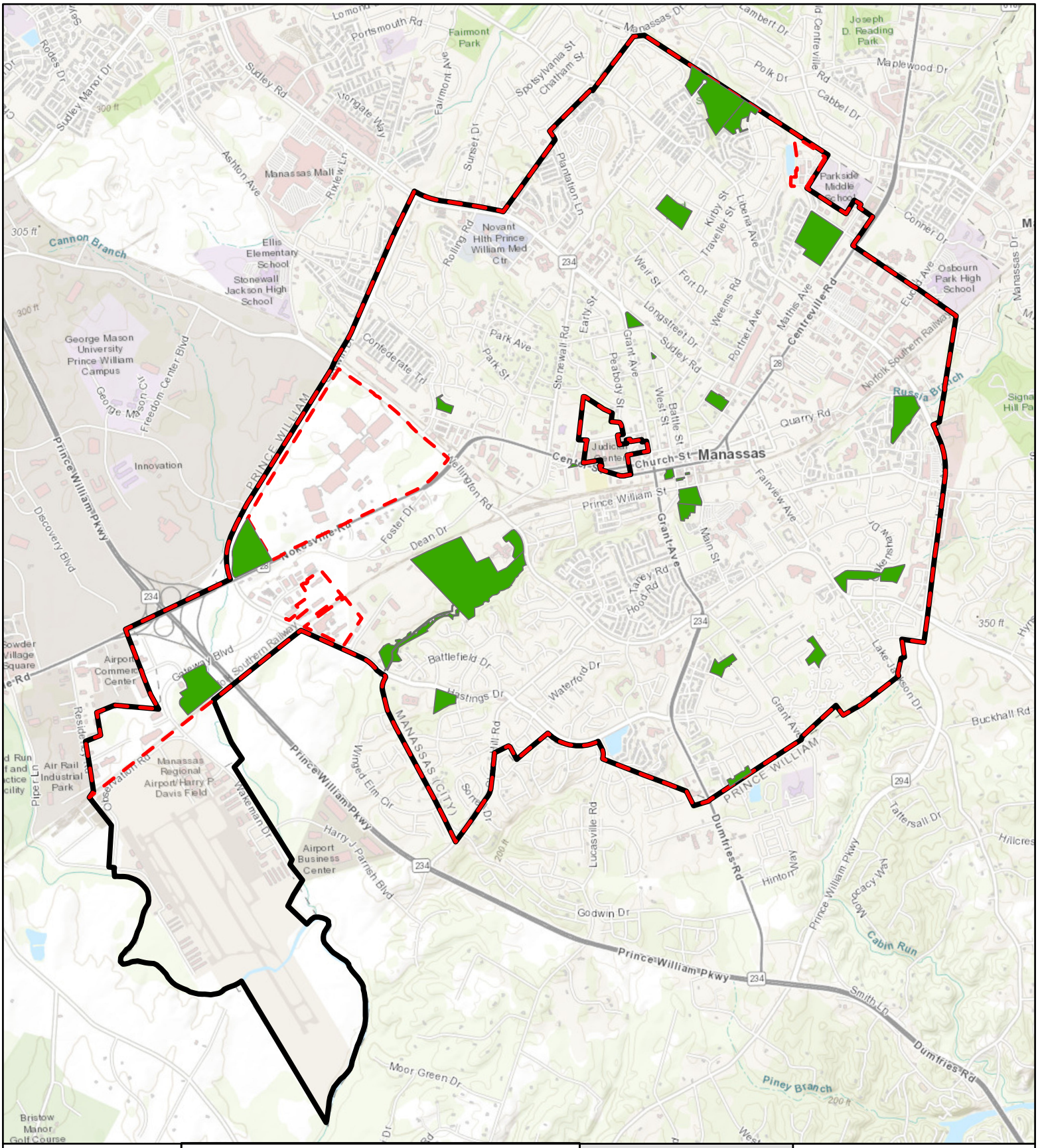
The combined Popes Head Creek, Broad Run, Kettle Run, South Run, Little Bull Run, Bull Run and the Occoquan River TMDL describes E. coli contributing sources to include human, livestock, wildlife, and pets.

4.2.1 Potential Sources of E. coli from Public Property

Potential human sources of bacteria identified in the TMDL include sanitary sewer cross-connections, spills, or leaks. The majority of the City is connected to the City-maintained public sanitary sewer.

As required by the Section I.B.2.d of the General VPDES Permit for Discharges of Stormwater from Small MS4s, the City identified four (4) municipal facilities/properties that are not covered under a separate Virginia Pollutant Discharge Elimination System (VPDES) permit and that may be a significant source of bacteria TMDL. The potential for bacteria discharges are present at the following facilities due to the pet waste and wildlife:

- Mayfield Fort – This facility is a historical site and has a walking trail that is frequented by dog owners.
- Jennie Dean Park – This Park consists of a large field and adjacent trail that is frequented by dog owners. Currently there is a pet waste station.
- Sumner Lake Regional Stormwater Management Facility – This facility has a walking trail and is also frequented by dog owners and wildlife. Pet waste stations are present and maintained by the homeowners association.
- Public Works Stormwater Pond. This stormwater pond appears to be the City's stormwater pond with the highest population of geese.



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4.2.2 Potential Sources of E. coli from Private Property

For this action plan, the City focused on the sources most likely to enter and be discharged from the MS4. This includes pet waste, sanitary sewer cross-connections, and wildlife.

Pet waste can enter the MS4 when it is left on a surface that drains to a storm sewer. Off-leash dog parks, dog kennels, and veterinary facilities are examples of specific land uses with a potential high risk for bacteria to enter into the MS4. There appears to be a total of five pet boarding, grooming, and clinics within the City's MS4 area.

4.3 Existing and Planned Management Controls Relative to E. Coli Pollution

The City has in place programs aimed at preventing new sources of sediment and E. coli and reducing the discharge of existing sources of these pollutants into the MS4. These programs include the following (Table 13):

Table 13: BMPs implemented to reduce POCs

BMP	Type of BMP	Type of POC	Description
Infiltration Systems	Structural	Sediment	Stormwater BMP that filters water into the ground through retention and pervious soils.
Detention Systems	Structural	Sediment	Stormwater BMP that temporarily retains water and influences sediment to settle out of water.
Retention Systems	Structural	Sediment	Stormwater BMP that permanently retains water and influences sediment to settle out of water. Also provides long-term removal through ecological processes in water and plants.
Filtration Systems	Structural	Sediment	Stormwater BMP that uses a physical filter such as a fabric or sand mixture to remove sediment.
LID Planning	Both	Both	Design and Construction concept to minimize amount of connected impervious area and mimic predevelopment runoff conditions.
Manufactured Systems	Structural	Sediment	Pre-fabricated systems designed to remove a specific item from stormwater runoff such as oil/water separators and clearinghouse proprietary BMPs.
Facilitating good housekeeping practices	Non-Structural	Both	Proper disposal of automotive wastes, household hazardous waste and pet waste, minimizing the use of lawn chemicals, and managing lawn debris.
Good maintenance practices	Non-Structural	Both	Catch basin cleaning, sweeping, road and ditch maintenance.
Educations and outreach programs	Non-Structural	Both	Provide handouts and presentations to young public school students to emphasize the importance of minimizing pollution of stormwater.
Storm drain stenciling	Non-Structural	Both	Metal placards that say, "No Dumping, Drains to Bay" affixed to city storm inlets to help discourage citizens from dumping items in storm drains such as trash, pet waste and yard waste.

4.3.1 MS4 Program Plan Relative to E. coli Pollution

The City has adopted an MS4 Program Plan that documents implementation of all MS4 permit requirements, including the programmatic and legal authorities required to meet the requirements for "TMDL Action Plans other than the Chesapeake Bay TMDL." The full MS4 Program Plan can be found on the City's Stormwater website at: http://manassascity.org/812/Stormwater. Table 14 provides a summary of MS4 Program Plan elements related to reducing pollution relative to this TMDL plan.

Table 14 MS4 Program Plan E. coli-Reducing Elements

Minimum Control Measure	**MS4 Program Plan Elements Related to Controlling Sediment**
MCM #1 – Public Education and Outreach on Stormwater Impacts	The City has developed a Public Education and Outreach Plan as described in the most updated Program Plan for the City of Manassas. This plan identifies bacteria as one of the City's high-priority pollutants for the focus of its education and outreach efforts.
MCM #2 – Public Involvement and Participation	The City outlined in the most updated version of the Program Plan means for accomplishing its Public Involvement and Participation Permit mandates. Most of these elements are specifically relevant to bacteria pollution.
MCM #3 – Illicit Discharge Detection and Elimination	The City has implemented an Illicit Discharge Detection and Elimination (IDDE) program designed to prevent, identify, and eliminate sources of pollutants.
MCM #4 – Construction Site Stormwater Runoff Control	The City's construction site stormwater runoff control program is fully consistent with the requirements of the Virginia Erosion and Sediment Control Act and the Virginia Stormwater Management Act, and their attendant regulations, as well as the MS4 Permit's MCM #4.
MCM #5 – Post-Construction Stormwater Management	The City's post-construction stormwater runoff control program is consistent with the requirements of the Virginia Stormwater Management Act and its attendant regulations.
MCM #6 – Pollution Prevention and Good Housekeeping for Municipal Operations	The City has designed a program to prevent pollution from City facilities through the development of stormwater pollution prevention plans (SWPPPs) standard operating procedures (SOPs), Good Housekeeping Plans, and employee stormwater training.

4.3.2 Pet Waste Programs

Pet waste can enter the MS4 when it is left on a surface that drains to a storm sewer. Dog parks, dog kennels, and veterinary facilities are examples of specific land uses with a potential high risk for bacteria to enter the MS4.

Proper pet waste disposal is an important component of the City's bacteria reduction programs; this program mostly takes place in City parks and a select number of private HOAs.

The City has identified at least five pet boarding, grooming, and clinics within the City's MS4 service area. The City will reach out to these facilities and provide them with bacteria-related stormwater education material.

The City has a policy of removing dead animals from roadways and city sidewalks and working cooperatively with Prince William County animal shelter, properly disposing them in appropriate facilities.

The City has selected bacteria in surface water as a high priority issue in the public education and outreach program. The City has also implemented numerous activities aimed at reducing the bacteria TMDL being discharged through its MS4, including:

- Promoting cleaning up pet wastes through its website and monthly newsletter.
- Promoting the installation of pet waste stations and distribution of dog waste bags at the public meetings and events.
- Installation and maintenance of pet waste stations on City facilities (parks and walking trails).
- Distribution of "Stormwater in the City of Manassas" pamphlet to citizens and placed in the utility payment center of the Public Works Department.
- Distribution of dog waste bags at City events with the tag line "Stormwater, See it – Report it."

The City will implement the activities identified above throughout the permit cycle. Specific schedules for these activities are located in the appropriate BMPs identified in the City's MS4 Program Plan, where applicable. The City will also conduct activities per the updated Public Education and Outreach program to promote methods to reduce bacteria. In addition, the City has enhanced outreach planned for the next permit year including:

- Educational handouts for children to be distributed in public schools.
- Visual information to be posted in the utility payment area of the Public Works Department.
- Enhancement of the City's Stormwater Management website to deliver consistent message

City residents tend to walk their pets on both the streets and in one or more of the 17 city parks. Therefore, the focus of the city's outreach on this topic will be in the city-owned and managed parks.

4.3.3 Wildlife Management Programs

By ordinance, feeding of native Virginia wildlife, except by bird feeders, is unlawful within the City limits except in areas designated for that purpose. While the City has no requirement to address additional wildlife contribution controls, it will nonetheless explore additional opportunities which may present benefits.

Beginning on January 9, 2020, the City began a Canada goose and waterfowl use monitoring project at the combined Public Works and Point of Woods stormwater ponds. Earlier preliminary investigations indicated that these ponds may have the highest waterfowl population. Goose fecal material around the site's parking lots and sidewalks is high. Throughout January of that year, typical waterfowl use on these ponds typically totaled 123 waterfowl (mostly Canada geese) at any one time. The highest population was 174 birds on January 30, 2020. However, when the end of March came around, the waterfowl population dropped to approximately 32 to 39 geese.

It appears that the consistent higher numbers of geese in January and February may have been wild migratory individuals, while the lower numbers within spring were non-native non-migratory permanent residents.

According to scientific and management literature, Canada geese may deficate up to 3 pounds a day. With 120 geese, that would amount to 43,800 pounds over a year. This 43,800 annual pounds may have as much as 15.7 pounds of nitrogen and 4.6 pounds of phosphorus over this same year. The City will continue to monitor waterfowl population trends on City-owned stormwater ponds, and will explore appropriate management approaches if the situation shall take such actions.

4.3.4 Sanitary Sewer Management

The City's Department of Utilities actively monitors, inspects, and repairs the City's sanitary sewer system, which in turn reduces E. coli loading of area streams and stormwater systems. The 2020 monitoring goals and accomplishments (as of April 28, 2020) is indicated in Table 15.

Table 15 Sanitary Sewer Inspections and Repair 2020 Accomplishments

Sanitary Sewer Task	2020 Target Goal	Accomplished as of 4/28/2020
Manhole Inspections	1,000	625
TV Camera Inspections	200,000	59,420
Sewer Main Rehabilitations (feet)	6,000	2,664
Sewer Line Cleanings (feet)	200,000	42,105

The City also has several larger (capital improvement projects [CIP]) projects in the works that are specific to the reduction of E. coli wastes from entering City streams and stormwater systems. The status of recent projects is listed in Table 16.

Table 16 Recent Sanitary-sewer Related Capital Improvement Projects

Project Name	Start Date	Anticipated Completion Date
Micron Force Main Sewer Line Replacement (~2,00-feet)	6/2018	8/2019
Micron Pond Liner and Aeration	12/2019	07/2020
Lateral Rehabilitation (Wilson Street and Park Ave.)	4/2020	6/2020

In addition, the City is actively building and validating its GIS data for both sanitary sewer and stormwater infrastructure. As problems are encountered, they are placed in the appropriate work order system so that they may be resolved.

4.3.5 Education and Outreach Relative to E. coli Pollution

The MS4 permit requires the City to develop and implement a public education and outreach program that includes measures to reduce E. coli loads to the MS4. Elements of the City's program include: (1) general water resources stewardship and pollution prevention; (2) promoting, publicizing, and facilitating public reporting of the presence of illicit discharges; and,

(3) encouraging private property owners to implement voluntary stormwater management techniques and/or retrofits.

The City also will implement a training program for City personnel. Biennial training will be provided in the recognition and reporting of illicit discharges and on general good housekeeping and pollution prevention practices.

The City's latest MS4 Program Plan identified for its education and outreach efforts three high-priority topics:

1) Illicit Discharges and Illegal Dumping from Residents
2) Pet Wastes and Bacteria TMDL
3) Sediment

The second one of these directly pertains to the E. coli reduction requirements within this Local TMDL Action Plan.

The City's MS4 Permit requires the City to implement enhanced education and outreach efforts to support its Local TMDL E. coli reduction efforts. These efforts are to be in addition of the education and outreach efforts required under the MS4 Permit Minimum Control Measure #1.

These E. coli education and outreach efforts will be in the form of in-person presentations, brochures, signage, handouts, fliers, website postings, and social media. In addition, early in 2020 the City became an official member of the Northern Virginia Clean Waters Partnership. This the Partnership (Table 17) will be greatly expanding its social media outreach.

Table 17: Clean Water Partners

Existing Clean Water Partners as of 2020	
• Fairfax County • Loudoun County • Arlington County • Stafford County • City of Alexandria • Fairfax Water • Loudoun Water • George Mason University • City of Falls Church • Town of Herndon • **City of Manassas**	• City of Fairfax • Town of Vienna • Town of Leesburg • Town of Dumfries • Doody Calls • Northern Virginia Regional Commission • Virginia Coastal Zone Management Program • Prince William County Public Schools • Alexandria Sanitation Authority

Northern Virginia Clean Water Partners

The Northern Virginia Regional Commission, of which the city of Manassas is a member jurisdiction, oversees and manages the Northern Virginia Clean Water Partners program. The City of Manassas has recently became a paid member of this partnership. This membership provides the City with the diverse educational and outreach material available to membership organizations. This material is then distributed among the residents of the City's residents. The Partnership has long recognized that polluted and uncontrolled stormwater is the number one cause of poor stream and river quality in Northern Virginia, including within Manassas. The *Only Rain Down the Drain!* program is one example of the educational work that the Partnership performs for the interest of its membership. Some facts about the *Only Rain Down the Drain!* Regional Stormwater Education Initiative:

- The Northern Virginia Clean Water Partners *Only Rain Down the Drain!* regional stormwater education initiative is crafted by and for Northern Virginia jurisdictions and managed by NVRC
- The campaign uses cable television ads, website ads, and a website, onlyrain.org, to encourage the public to keep pollutants such as excess fertilizer and used motor oil from flowing into storm drains which lead to the Potomac River and Occoquan Reservoir, our sources of drinking water, and eventually the Chesapeake Bay
- The City of Manassas has an unprecedented opportunity to pool local outreach dollars to collectively target pollution-causing behaviors using a multi-media approach for greater impact at less cost and effort
- The strategy provides for community engagement and the production of outreach materials that can be customized and used by each locality.

In addition, the City will:

- Post bacteria and pet waste educational website links on the City's MS4 stormwater website. These links will include the Prince William County Soil and Water Conservation District website, The Best Lawn Program website, Master Gardeners of Prince William County website, and Clean Waters Partnership's website.

- Ensure all City parks that have significant pet-walking uses have posted signs about pet waste disposal, as well as pet waste bag stations available.

- The City will explore options to encourage private HOAs to install pet waste bag stations on their private HOA lands.

The MS4 Program Plan includes public education and outreach programs to provide educational information related to stormwater management, pet waste management, water quality, and stormwater pollution prevention through local publication, brochures, website, and social media. A few of the general outreach for sediment pollutants is listed in Table 18.

Table 18 General Education and Outreach Efforts for Sediment and E. Coli

Outreach Activity	POC	How POC is Addressed	Future Enhancement
"Stormwater in the City of Manassas" pamphlet	E. coli & Sediment	Provides general information on causes of pollution and community solutions for bacteria and sediment.	Highlight specific sections of pamphlet in more detail through additional pr inted materials.
City Stormwater website	E. coli & Sediment	Provides general information on causes of pollution and community solutions for bacteria and sediment.	Unify look and information with other printed materials for a unified message.
Stormwater desktop model	E. coli & Sediment	Provides visual example of how pollutants are picked up by stormwater and impact stream ecology.	Use model in more presentations to public and in schools. Put on display in utility payment area of Public Works.
Stormwater education in public schools	E. coli & Sediment	Discuss basic examples of the causes of pollution in streams and how they can help prevent it.	Create additional school handouts that can be disrupted throughout the year. Create a children's space on website.
"No Dumping" label on storm inlets	E. coli & Sediment	Help discourage citizens from dumping items in storm drains such as trash, pet waste and yard waste.	Create additional handouts with same "No Dumping" logo discussing more specifically what not to dump and why.

4.4 E. coli Reduction Calculations

There are no recognized quantifiable E. coli reduction strategies or BMPs, so all reductions goals and accomplishments will be expressed in qualitative terms and included in each Annual Report.

4.5 Assessment of Effectiveness for E. coli Reductions

Unlike structural stormwater management controls, the practices put in place to reduce bacteria pollutants do not have assigned reduction efficiencies. The City will assess the effectiveness of its bacteria reduction efforts by reviewing the accomplishment for the previous year against permit requirements during submission of each Annual Report to DEQ and expressed in qualitative terms.

In addition to the monitoring protocols implemented as part of the IDDE program, the City implements water quality monitoring as warranted by specific problems, including problems associated with E. coli and sediment pollution.

4.6 Schedules and Milestones for E. coli Reductions

These LOCAL TMDL Action Plan will be implemented in accordance with the following schedule and milestones (Table 19).

Table 19 E. coli-related Schedules and Milestones

Implementation Item	Description	Schedule and Milestones
MS4 Program Plan	The City will continue to implement the MS4 Program Plan, including elements related to E. coli, in accordance with the schedule provided for in the MS4 Program Plan.	See MS4 Program Plan for the implementation schedule.
Pet Waste Programs	Investigating the potential to reduce wildlife bacterial contributions by placing additional signage discouraging wildlife feeding at publicly maintained wet ponds and high profile public facilities. The City will provide pet waste brochures for distribution. The City will assess the trail system within the MS4 portion of affected watersheds for opportunities to install signage reminding pet owners to clean up pet waste.	Assessment completed by September 30, 2020. Any additional signage installed by June 30, 2021. Brochures will be offered to each facility by June 30, 2021 and then at least once annually after that time. The City will conduct the assessment by September 30, 2020 and install signage by June 30, 2021.
Wildlife Management Programs	Continue the waterfowl monitoring program for the Public Works and Point of Woods stormwater ponds. Based on results of this monitoring, evaluate if an egg-oiling (goose reduction) program is needed. Evaluate the need to expand to other City-owned stormwater ponds.	The Annual Report will summarize the accomplishments and status of this program. As needed based on on-going monitoring program. Evaluation completed by September 30, 2020.
Sanitary Sewer Management	Sanitary sewer inspections, maintenance, and repair	On-going

Table 19 (continued)

Implementation Item	Description	Schedules and Milestones
Enhanced Education, Outreach, and Training.	Develop an information material that includes: basic facts about TMDLs, summary of where found in the City, what has been done to eliminate contamination, and what an individual should do to prevent and reduce pollutant discharge. Make information sheet available through the City website.	Information sheet development will begin in later part of 2020 and be on-going from that point on. Status of development and implementation will be summarized in the annual reports.
	City will become an active member of the Northern Virginia Clean Waters Partnership. The educational material provided through this forum to be distributed to appropriate City residents.	Distributed material to be presented and reported annually. City will participate in the Partnership's coordination and oversight meetings and discussions to ensure that the City's needs are sufficiently addressed.
	City will explore partnership efforts with the Virginia Cooperative Extension Office, and other appropriate City HOAs.	On-going. Reported annually in the Annual Report.
	Expand the current MS4 stormwater webpage to include an educational guide of the City's watersheds.	Completed June 30, 2021.

As indicated in Table 19, the City's allocated E. coli reduction requirement will be met by June 30, 2021.

This Action Plan will be updated, as needed, to reflect new or revised TMDL requirements that occur as a result of the reissuance of the general permit. If required, an updated Action Plan will be submitted along with the next annual report submitted.