

VIRGINIA GENERAL VPDES PERMIT FOR DISCHARGES FROM
SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS
PERMIT NUMBER: VA040063

Permit 4/Year 2 MS4 General Permit Annual Report
Reporting Period: July 1, 2019 – June 30, 2020



Submitted October 30, 2020

City of Manassas
Engineering Department
8500 Public Works Drive
Manassas, VA 20110
703-257-8391

MS4 Owner: City of Manassas
Permit Number: VAR040063
MS4 General Permit 4/Year 2 (FY2020) Annual Report

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

Print Name: W. Patrick Pate Title: City Manager

Signature:  Date: 10-29-2020

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1.0 INTRODUCTION

The City of Manassas (City) consists of approximately ten (10) square miles draining to the Occoquan River. It is composed of primarily urban mixed-use land development and surrounded by Prince William County. There are (4) four watershed areas: Broad Run-Rocky Branch, Middle Bull Run, Lower Bull Run, and Occoquan River-Lake Jackson. These watershed areas discharge into the Occoquan River.

This annual report was prepared by the City's Department of Utilities in accordance with Section II E of the Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 General Permit), effective November 1, 2018. The MS4 General Permit expires October 31, 2023. It is important to note that immediately after this reporting period, the administration of this permit was reassigned to the City Engineering Department.

This annual report describes the City's collective efforts in stormwater management and updates the progress toward meeting the Best Management Practices (BMPs) for each of the six (6) Minimum Control Measures (MCMs) and special conditions required by the MS4 General Permit. This report covers items for Permit 4/Year 2 (P4/Y2) of the City's MS4 Program Plan in compliance with the MS4 General Permit.

The administration of the City's MS4 Program Plan is an important aspect of the plan itself. Throughout the life of the current permit, the plan is a dynamic document and it will continue to be during the next permit cycle. The process has been ongoing from one permit year to the next. The most recent version of the MS4 Program Plan will remain on file with the Stormwater Division and made available upon request or found on Manassas's stormwater website via the following link:

<http://www.manassasva.gov/swm/>

Table 1 Background Information

Name	City of Manassas Municipal Storm Sewer System
Permit #	VAR040063
Reporting Period:	Permit 4/Year 2; July 1, 2019 – June 30, 2020
Modifications to Operator's Roles and Responsibilities:	The MS4 program was managed by the City Utilities Department during this reporting period. Beginning with the next reporting period, the City's MS4 program will be managed by the City's Stormwater Division in the Engineering Department.
New Outfalls and Associated Acreage by HUC	The City continues its aggressive GIS inventory of all stormwater assets, including outfalls. The review of previously identified outfalls is ongoing and the final count may vary from our current number. As of the end of this reporting period, there were 758 reported discharge points that may turn out to be regulated outfalls, and 307 tentatively identified as regulated outfalls.

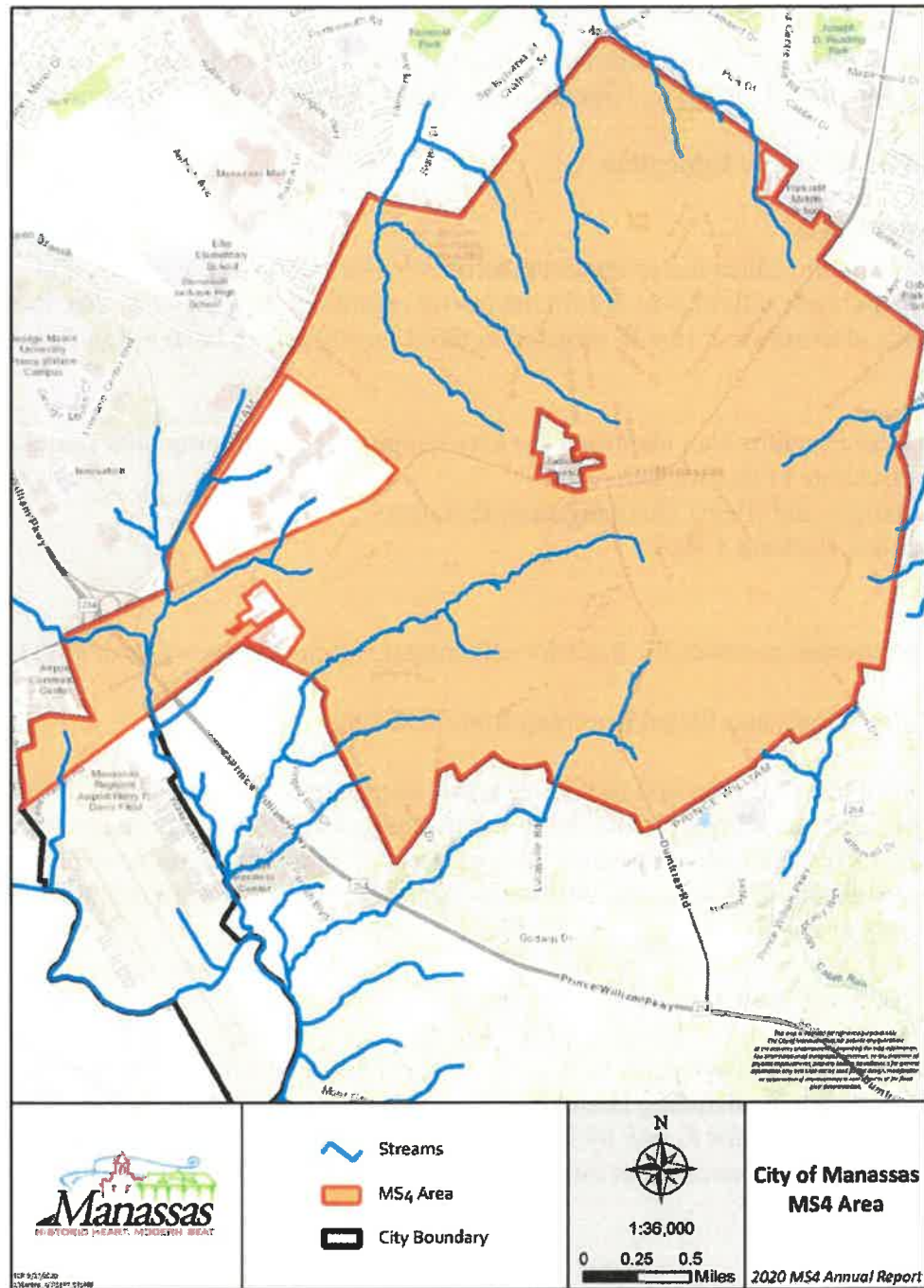


Figure 1 The City of Manassas' MS4 Area

2.0 STATUS OF COMPLIANCE (JULY 1, 2019 – JUNE 30, 2020)

The following summarizes activities performed by the City of Manassas for each of the six (6) Minimum Control Measures (MCM) and Special Conditions during this reporting period.

2.1 MCM 1: Public Education

The goals of this MCM are:

- 1) Develop a public education program to distribute information to the public, and
- 2) Develop outreach activities to inform the public regarding steps they can take to reduce pollutants in stormwater runoff, targeted to those most likely to have a significant stormwater impact.

The City's latest MS4 Program Plan identified the City's high-priority water quality issues that contribute to the discharge of stormwater:

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

The following rationale provides the basis for selecting the high-priority water quality issues:

a) Illicit Discharges and Illegal Dumping from Residents

The City has identified litter and hazardous waste as problem pollutants through field observations and citizen complaints. Improper discharges and dumping can result in the release of toxic chemicals and bacteria to the waters of Virginia. This can be mitigated by increasing outreach to students, residents, and businesses on how to prevent pollution and the legal consequences of noncompliance.

b) Pet Wastes and Bacteria TMDL

The City has identified bacteria (i.e., *E. coli*) from pet waste as a high priority water quality issue. City watersheds including Broad Run, Occoquan River, and Bull Run have been designated as impaired for *E. coli* by DEQ. Public education can play an important role in reducing bacteria by educating pet owners about the human health and legal consequences of not picking up pet waste.

c) Sediment

Common sources of sediment include stormwater runoff from urban and suburban lawns, roadways, and other developed areas. Public education and outreach efforts emphasize reductions of controllable sediment, which would in turn, reduce the quantities of sediment reaching the Chesapeake Bay.

As a result of significant organizational and staff changes within the City's stormwater program this last year, and several other related complications, not as much progress was made as originally anticipated on these elements during this last fiscal year. Although the City met the deadline for the latest Program Plan, that date (June 2020) had only less than one month to go before the end of the reporting period. Consequently, this was insufficient time to accomplish fully many of these annual goals. Despite these complications, some preliminary progress in this MCM was made during this reporting year.

A summary of the public education and outreach activities conducted by the City during the reporting period is provided in Table 2.

Table 2 Public Education Activities Conducted by City this Reporting Period

Program Element	Progress
Articles, brochures, or other educational material published on stormwater, recycling, yard waste collection and/or management, household hazardous waste handling, and illegal stormwater discharges. Television appearances related to recycling, stormwater, or water quality.	<p>The City Refuse and Recycling Division has been promoting refuse, recycling, HHW, and eWaste information.</p> <ul style="list-style-type: none"> • 11 articles in the City Connection newsletter • 3,000 Recycling "How-To" flyers • 3,000 Trash "How-To" flyers • 3,000 eWaste "How-To" flyers • 3,000 Bulk item "How-To" flyers • 3,000 Yard Waste "How-To" flyers • 3,000 Townhome generic trash and recycling "How-To" flyers • 1,500 HHW drop off day magnets • 3,000 Leaf Collection flyers • 4,000 reusable shopping bags with trashline number <p>Once a month, the City sends a newsletter out to each City resident. This newsletter contains a variety of articles on diverse topics. Within this reporting year, 7 of these 12 newsletters contained an item at least tangentially related to stormwater.</p>
Number and type of Resident Advisory Notices.	<ul style="list-style-type: none"> • 89 Resident Advisory Notices – Violation Warnings • 30 Resident Advisory Notices – Service related
Status and deliverables related to the interactive website for children on refuse and recycling.	Keep Manassas Beautiful developed a school-based trash, litter and recycling program with STEM teachers that was approved for delivery by Keep America Beautiful. This is the only school-based program approved by Keep America Beautiful in Virginia. The City of Manassas has webpages dedicated to providing children information on refuse and recycling issues.
Number of web visits to stormwater websites.	<p>Stormwater official webpage 734</p> <p>MS4 Stormwater Permits, Plans, and Reports 383</p> <p>Stormwater Information page 308</p>
Number of calls received on the Trashline	19,500 calls to the Trashline. Increase in calls with people home and a 40% increase in trash/100% increase in yard waste at the curb.

Table 2 (continued) Public Education Activities Conducted by City this Reporting Period

Program Element	Progress
<p>Explain/Summarize City involvement and participation in any citizen advisory committees or groups.</p>	<p>The Citizen's Advisory Committee on Solid Waste is a committee of residents appointed by City Council that:</p> <ul style="list-style-type: none"> • Evaluates trash, recycling and litter control activity within the City of Manassas; • Explores opportunities for improving refuse and recycling services and community outreach; • Provides staff with valuable knowledge and insight in developing new and improved way of keeping the City of Manassas clean, safe and beautiful. • Nine Citizen's Advisory meetings were held in FY20. The group is very active and attends community events and public meetings with the Refuse and Recycling Coordinator.
<p>Number of stormwater-related activities (e.g. hazardous waste clean-up days, tree plantings, volunteer-oriented festivals, stream clean-ups, etc.) participated, promoted, or sponsored.</p>	<p>Six different outreach activities were held in FY20. The number of participants ranged averaged around 500 depending on the actual event and some activities were repeated by groups.</p> <ul style="list-style-type: none"> • 7 HHW & eWaste drop off days avg. 863 people. 153 tons of recyclable material was collected during these events • 1 RecycleFests avg. 500 people attending. • 253 Adopta! volunteers collected over 1 ton of litter. • 1 community event, Utilities Day avg. 200 total attendance at event. All spring events cancelled due to COVID. • On 11/4/19, two City of Manassas' stormwater staff participated as practice reviewers to Baldwin Elementary STEM students that had prepared a presentation on stormwater pollution.
<p>Forms and variety of Public messages sent out promoting volunteer events and household hazardous waste collection events.</p>	<p>The City uses several methods of outreach to provide information on clean-up and drop-off events including:</p> <ul style="list-style-type: none"> • Social media • City Connection Newsletter • Website • Posters and flyers • Press Releases • Government Channel • Email shots
<p>Publish an article that addresses stormwater issues such as recycling, yard waste collection, hazardous waste handling, and illegal discharges.</p>	<p>Refuse and Recycling regularly addresses yard waste, trash and litter issues through monthly contributions to the City Connection Newsletter.</p>

Table 2 (continued) Public Education Activities Conducted by City this Reporting Period

Program Element	Progress
Provide printed brochures to citizens at various locations around the City to increase knowledge concerning stormwater pollution.	<p>All brochures and additional materials were provided to residents at the following locations:</p> <ul style="list-style-type: none"> • Customer service counter at the Department of Public Works and Utilities office • City Hall • HHW and eWaste drop off site • Town Hall meetings • City events • HOAs/Community Centers <p>Evidence provided by the Virginia Recycling Association has suggested that the audience for printed material is shrinking and that younger residents are more inclined to use smartphones to access information. Therefore, the money spent on printed materials will slowly transition into the investment in more valuable forms of outreach relevant to our audience.</p>
Evaluate the education and outreach program for appropriateness of high-priority issues and target audiences and the effectiveness of message and mechanisms of delivery employed in reaching the target audience.	<p>As reported by the City Communications staff, approximately 40,000 of the 42,500 City residents have been reached during the reporting period through the following efforts:</p> <ul style="list-style-type: none"> • 11,000 residential and commercial utility customers the City Connection Newsletter • 7,000+ people reached through the Refuse and Recycling website.
Post pet waste pick-up and trash dumping regulations in City parks.	The signs have been posted in all parks. Our standard park rules sign that is posted in each location lists what is prohibited in the parks. Specifically, the sign states illegal dumping is prohibited and per City code owners must pick up after their dogs.
Place trash receptacles in City parks.	All City parks have trash receptacles.
Place pet waste stations in City parks.	Eight (8) of the City's 19 parks have pet waste stations. The servicing of both the trash receptacles and pet waste stations is fulfilled through the Didlake, Inc. contract administered through the Refuse & Recycling Coordinator.
Adaptively manage trash in City parks.	The City of Manassas established a Litter Prevention Strategy and a Master Plan for Parks in 2017. Both contain strategies for planning and managing trash, recycling and litter in our City parks. These are currently supported with a litter collection contract through Didlake Services. In addition, Manassas City Police are provided with annual training regarding litter and illegal dumping issues, which heightens their awareness and increases the number of patrols in the parks and surrounding public spaces.
Explore creative ways to use the Keep Manassas Beautiful program to accomplish the City's MS4 goals.	Keep Manassas Beautiful, an Affiliate of Keep America Beautiful, provides the overarching program for street, stream, park, field, and site adoptions throughout the City. Activities including all HHW, electronics and shredding events, community clean-ups, litter reduction, and outreach and education activities throughout the City and in City schools. The program is overseen by a citizen's advisory committee comprised of members from the Citizen's Advisory Committee on Solid Waste, Beautification, and Parks Culture and Recreation.

Table 3 **Planned Trash and Recycling Receptacle Installation within Manassas City Parks**

Fiscal Year	Parks, Culture & Recreation Planned Schedule for Installation of New Waste Receptacles
FY19	Liberia House and Annaburg Manor received one dog waste station and trash receptacle. Harris Pavilion received two dog waste stations.
FY20	Cavalry Run Park received trash receptacles, one recycling receptacle and two dog waste stations. Annaburg Manor received one trash receptacle and one dog waste station. Mayfield Fort is scheduled to receive trash receptacles and two dog waste stations. Dean Park Dog Park is under construction with an anticipated opening date of spring/summer 2021. The Dog Park planning includes a minor site plan, dog waste stations and trash receptacles. Earth Day 2020 a generous private company donated and planted 100 trees in three parks and four schools.
FY21	Baldwin Elementary School will be receiving playground improvements. The chosen improvements are a poured rubber play surface under the play equipment. This was a necessary improvement as the rain water was washing away the play mulch regularly.

Discussion on the FY2020 accomplishments and progress on these goals are as follows:

- Pursue other outlets to distribute existing stormwater (e.g. pet waste management animal shelters and to City parks).

The City continues to evaluate ways to best meet its public education requirements. In light of coronavirus, the City intends to create new content and use existing content to reach stakeholders digitally. The City will carry this goal into the next permit year.

- Create a working group of educators to advise and assist the Stormwater Division in the development of curriculum-based stormwater educational material for City schoolchildren.

In the next program year, the City will redouble its efforts to facilitate the availability and implementation of an age appropriate, standards-based curriculum for Manassas City Schools. Due to time and resource constraints, as well as coronavirus restraints, the City did not make any further progress during the reporting period.

- Provide in-house stormwater training for the school's custodial staff.

Training was not provided during this last reporting year due to coronavirus constraints. The City will carry this goal over into the next permit year.

In addition, City stormwater staff will work with the Communications Department to implement a City-wide stormwater awareness training course that will include informational brochures and links to the stormwater website. This training will include staff members of Manassas City Schools.

- Post electronic versions of informational brochures on the City's website or create a web page with a stormwater focus.

The City continues to evaluate all of its informational/educational offerings including brochures and web site offerings. The City will focus more in the next program year on illicit discharges

generally, ongoing topics such as swimming pool discharges and bacteria-related concerns, and what target audiences can do to mitigate these issues.

- Hold at least two stormwater/MS4 permit-focused sessions during the routine Water and Sewer Friday training schedules.

The City's MS4 Coordinator presented one 1.5-hour long orientation/training session during the Water and Sewer Department's October 18, 2019 training session. There were 21 attendees representing several departments.

- Expand and update the City's Erosion and Sediment Control website(s) and make it easier for the public to understand and navigate the construction stormwater process.

The City has recently launched a new website with increased functionality and additional ways to present information. The City will carry this goal into the new permit year and implement this goal within six months of the annual report submission date.

- Place a link to the informational brochure/web page on the City Employee Intranet.

Within six months of the annual report submission date, the City stormwater staff will work with the Communications Department to implement a City-wide stormwater awareness training course that will include informational brochures and links to the stormwater website.

- Continue distributing recycling and hazardous waste educational material to the public.

The City will continue its partnership with the Department of Public Works Refuse and Recycling Program to distribute recycling and hazard waste educational material, as well and support existing recycling and hazard waste programs. These materials are provided in both English and Spanish languages.

- Develop an educational initiative focused on nutrients in the Sumner Lake region in order to increase resident's awareness of stormwater and water quality issues in their neighborhood.

City staff initiated a comprehensive and updated vegetation management agreement between the City and the Sumner Lake community. This agreement is still in draft form, but it has already been through multiple reviews by City staff and the HOA president, and each respective attorney. This agreement is nearing completion. Once completed, it will provide the foundation that will lead to greater vegetation management communication and therefore in turn a reduction in excess fertilizer runoff which leads to Sumner Lake water quality problems.

The City will carry this goal into the next permit year in order to implement a public education and outreach plan that focuses on each pollutant of concern and associated targeted audiences, as well as hotspot location that require additional education/outreach attention. Sumner Lake residents, managers, and homeowners' association will be included as part this plan.

- Develop and disseminate educational handout material focused on stream sediment.

The City will carry this goal into the next permit year in order to implement a public education and outreach plan that focuses on each pollutant of concern and associated targeted audiences. As sediment has been listed by the City as a pollutant of concern, the plan will include sediment-specific educational items and those in the community that will be targeted.

- Update the City's stormwater page, including developing a Spanish version.

The City has recently launched a new website with increased functionality and additional ways to present information. The City will carry this goal into the new permit year and continue to update the site as new content is generated and/or new guidance material is issued. The Google Translate function continues to be available on all City webpages to translate English text into one of over 80 different languages.

- Continue disseminating informational and educational material on yard waste management, recycling, and hazardous waste collection

The City will continue its partnership with the Department of Public Works Refuse and Recycling Program to distribute recycling and hazard waste educational material, as well and support existing recycling and hazard waste programs. These materials are provided in both English and Spanish.

- Provide in-house stormwater training for the parks and recreation staff.

Due to limitations imposed by coronavirus, the City will carry all training goals into the next year. City stormwater staff will work with the Communications Department to implement a City-wide stormwater awareness training course that will include informational brochures and links to the stormwater website.

- With input and involvement from other departments, draft a City-wide communications plan; and provide a strategic vision for the City's stormwater-related communications.

This City will carry this goal into the new permit year in order to coordinate with appropriate staff to create and implement a public education/outreach/involvement plan that will place heavy emphasis on how the stormwater management program communicates with the public.



Figure 2 Pet Waste Station example located in the Wellington HOA Area (that the Wellington Home Owners Association paid for, installed, and maintain)

2.2 MCM 2: Public Involvement/Participation

The goals of this MCM are to promote the availability of the MS4 Program Plan to the public for review and comment, provide access to the annual stormwater report, and to promote participation in activities that will reduce stormwater pollution.

A summary of the public involvement/participation activities conducted by the City during the reporting period is provided in Table 4.

Table 4
Volunteer Clean-up Events Hosted by Parks, Culture & Recreation Staff this Reporting Period

Volunteer Name/Group	Date	Hours	# Volunteers	Total Hours	Trash Bags Collected
SAM Company	8/10/2019	2	10	20	
Didlake	8/16/2019	1.5	4	6	1
GS Troop 6848 & 3345	9/10/2019	1	8	8	2
Kiwanis Club	9/14/2019	1	8	8	3
Didlake	9/16/2019	1	5	5	1
Micron	9/24/2019	7	23	80.5	5
NOVAGO	9/28/2019	3	10	30	30
Rotary Club	9/28/2019	2	20	40	5
SAM Company	9/28/2019	3	6	18	10
Kiwanis Club	10/26/2019	1.5	15	22.5	
Manassas GOP	11/2/2019	3	3	9	3
Sam Faulk	11/12/2019	2	15	30	15
Kiwanis Club	11/30/2019	1.5	15	22.5	
Patrick & Leigh Stevens	12/23/2019	.75	1	.75	1
Patrick & Leigh Stevens	1/7/2020	.75	1	.75	1
Patrick & Leigh Stevens	1/13/2020	1	1	1	1
Patrick & Leigh Stevens	1/17/2020	1	1	1	1
Patrick & Leigh Stevens	1/20/2020	1	1	1	1
Patrick & Leigh Stevens	1/24/2020	1	1	1	1
GS Troop 6848 & 3345	1/27/2020	1	15	15	3
Bull Run Rotary	1/28/2020	1	2	2	1
Barbara Nugent	3/21/2020	3	2	6	8
Beta Sigma Phi	4/18/2020	2	9	18	4
Bull Run Rotary	6/6/2020	2	5	10	7
Total		44	181	356	104

Table 5 Summary of Public Involvement/Participation Activities this Reporting Period

Program Element	Progress
<p>Stormwater telephone See-Click-Fix program established to report stormwater, illicit discharges, and other related complaints.</p>	<p>For most of the reporting period, a 24-hour/7-day per week stormwater telephone hotline number had been posted on the website. However, this has since been replaced with an on-line reporting system—which is easily accessible from the City’s website. In addition, an online comment section has been added to the “Report a Concern Form” on the City’s website.</p> <p>The web link for reporting stormwater concerns is: http://www.manassasva.gov/swm/ and click on ‘Report An Issue.’</p> <p>Residents may also download a SeeClickFix smartphone app to report issues.</p>
<p>Publish MS4 Program Plan and annual reports on the City of Manassas website for download. Provide printed copies of the MS4 Program Plan and annual reports upon request.</p>	<p>The MS4 Program Plan and annual reports are provided to the public on the City’s website and by request in the Stormwater Division office. PDFs of the Program Plan and annual reports are available on the site. Hard copies of the Plan and associated reports have been made available at all public meetings. Web links for annual reports and the program plan are provided below. The webpage for City MS4 plans and reports was visited 383 times during this reporting period:</p> <p>http://www.manassasva.gov/swm/</p>
<p>City park managers organizes litter pick-up volunteer events and supports similar efforts conducted by others.</p>	<ul style="list-style-type: none"> • A park cleanup schedule is created and publicized annually. • The Parks, Culture & Recreation webpage for volunteers is linked to the Keep Manassas Beautiful website that is managed by the Refuse & Recycling Coordinator. The PCR website link for volunteers is https://www.manassascity.org/things_to_do/manassas_museum/volunteer_at_the_museum.php and is linked to https://www.manassascity.org/public_works/trash_recycling/keep_manassas_beautiful/index.php. • Park cleanup volunteers are provided the necessary tools to properly pick up and dispose of the litter that is found in the parks. • Adopt-a-Park program has been very successful. 18 out of the 19 parks have been adopted. Communication has been through 1) Constant Contact email; 2) direct email; 3) Facebook; 4) community engagement meetings; and 5) fliers distributed to City Hall, Boys & Girls Club, Schools, and Manassas Museum. • Adopt-a-Field program has been slow in gaining traction as the teams/leagues have minimal time to support the required field maintenance. As of the 2020 athletic field season, 5 of the 16 athletic fields (parks and elementary schools) were adopted.

2.3 MCM 3: Illicit Discharge Detection and Elimination (IDDE)

The goal of this Minimum Control Measure is to develop, implement, and enforce a program to detect and eliminate illicit discharges into regulated small MS4s. To meet this goal, operators of a regulated small MS4 must:

- Develop and maintain an updated storm sewer map and outfall database;
- Prohibit through ordinance or other legal mechanism non-stormwater discharges to the extent allowable by law;
- Develop and implement procedures to detect and eliminate illicit discharges;
- Promote public reporting of potential illicit discharges; and
- Notify any downstream-regulated MS4s of physical interconnections.

Geographic Information System (GIS) Stormwater IDDE Support

To aid the City in managing and tracking illicit stormwater discharges, among other MS4 stormwater management purposes—the City continues to update and validate the City’s stormwater-related geo-spatial data.

Last year, the City reported that we had 768 discharge points, with 179 tentatively labeled as outfalls. As we verify the data, corrections are made to these “discharges” and decisions are made to which of these “discharges” are regulated “outfalls.” Consequently, the total amount of actual outfalls is still being determined.

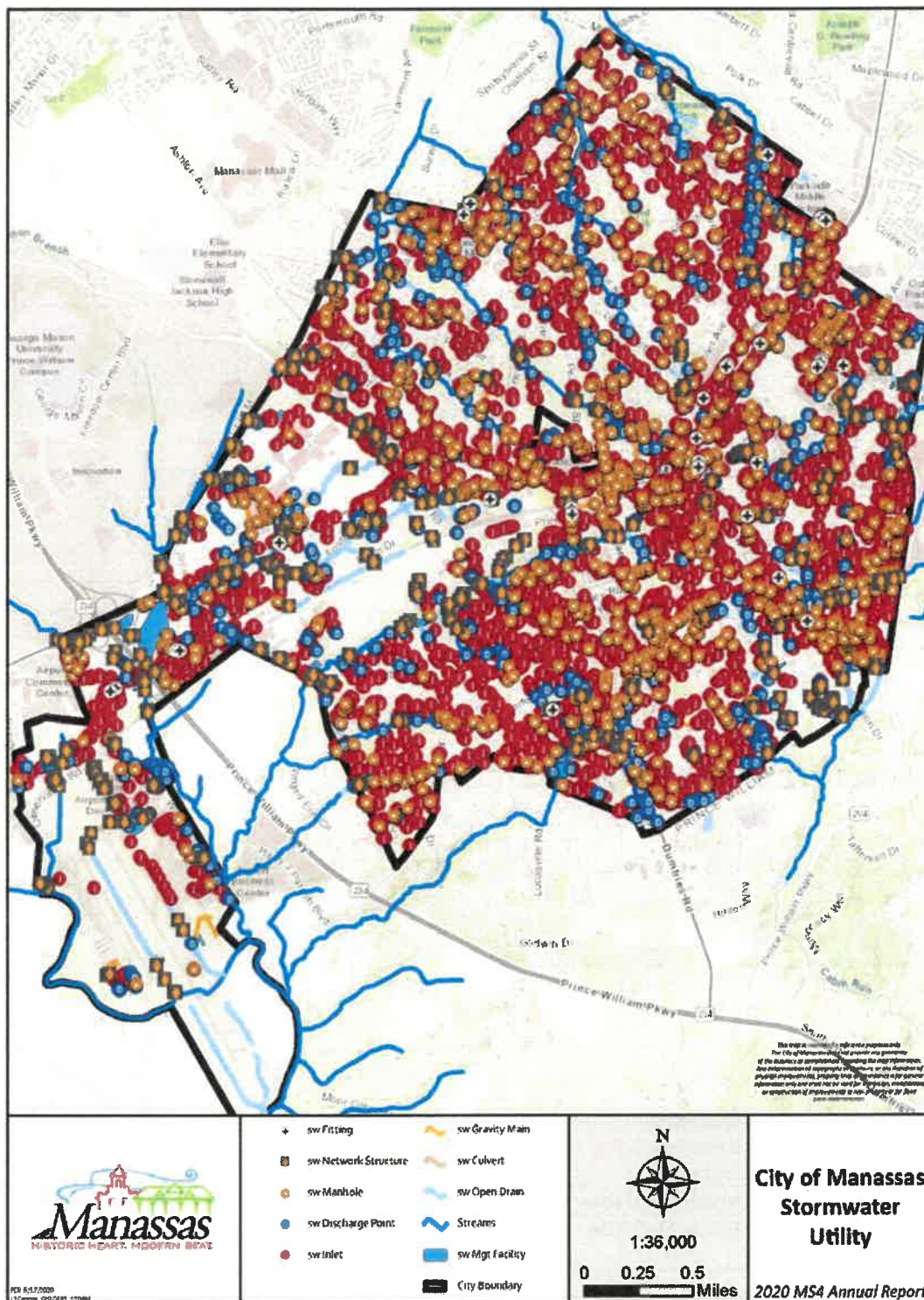


Figure 3 The City Manassas' Stormwater System

Table 6 Inventory Validation Progress of Stormwater Facilities this Reporting Period

Item	Number Inspected as of 9/18/20	Estimated Facility Totals as of 9/18/20	Estimated Percentage Inspected as of 9/18/20
Stormwater Inlets Field-Checked and Validated	909	5,012	18%
Stormwater Discharges Checked and Validated	457	712	64%
Stormwater Manholes Checked and Validated	113	971	12%
Stormwater Network Structures Validated	136	357	38%
Stormwater Gravity Mains Validated	72	6,300	1%
Stormwater Culverts Validated	61	168	36%
Stormwater Open Drains Validated	20	104	19%
Stormwater BMPs Validated	40	74	54%
Total	1,808	13,698	13%
Item	Number Inspected as of 8/7/19	Estimated Facility Totals as of 8/7/19	Estimated Percentage Inspected as of 8/7/19
Stormwater Inlets Field-Checked and Validated	317	5,100	6%
Stormwater Discharges Checked and Validated	293	768	38%
Stormwater Manholes Checked and Validated	52	998	5%
Stormwater Network Structures Validated	61	152	40%
Stormwater Gravity Mains Validated	52	6,200	1%
Stormwater Culverts Validated	26	90	29%
Stormwater Open Drains Validated	20	104	19%
Stormwater BMPs Validated	26	55	47%
Total	847	13,467	6%

Dry Weather Screening

City staff performed 55 Dry Weather Screening assessments during this reporting year.

Table 7 Dry Weather Outfall Screenings during this Reporting Period

HUC12 Watershed Code	Watershed Name	Subwatershed	% of City (Area)	Outfalls Screened FY20	% Outfalls Screened FY20
20700100504	Broad Run-Rocky Branch	Cannon Br.	15.7%	8	15%
		Winters Br.	13.9%	13	24%
		Cockerille Br.	7.4%	19	35%
		Broad Run ¹	15.6%	0	0%
20700100801	Occoquan River-Occoquan Reservoir-Lake Jackson	Cabin Run	4.9%	1	2%
20700100703	Middle Bull Run	Flat Branch	31.6%	10	18%
20700100705	Lower Bull Run	Russia Br.	7.9%	3	5%
		Buckhall Br.	3.0%	1	2%
			100%	55	100%

¹ Although the Broad Run watershed occupies 15.6 percent of the City of Manassas, only a small percentage of this watershed is within the City's MS4 area (most of this area is within the airport, which has its own Individual Permit).

Table 8 Summary of Dry Weather Screenings This Reporting Period by Watershed

Watershed Name	Subwatershed	% of City (Area)	Idealized # Outfalls to be Screened	Average Screened FY19-20
Broad Run-Rocky Branch	Cannon Br.	15.7%	10	4
	Winters Br.	13.9%	9	7
	Cockerille Br.	7.4%	6	12
	Broad Run ²	15.6%	1	0
Occoquan River-Occoquan Reservoir-Lake Jackson	Cabin Run	4.9%	2	2
Middle Bull Run	Flat Branch	31.6%	16	23
Lower Bull Run	Russia Br.	7.9%	4	3
	Buckhall Br.	3.0%	2	3
		100%	50	53.5

Table 9 Dry Weather Screenings This Reporting Period

Water shed	Sub-watershed	Outfall #	Date	Days Since Last Rain	Photo #	Flow	Odor	Color	Float-ables
BR-RB	Winters Br.	59535	11/26/19	2	IMG_E0282	No	No	No	No
	Cockerille Br.	59436	06/16/20	5	IMG_E0339	No	No	No	No
		59556	06/16/20	5	IMG_E0340	No	No	No	No
		59555	06/16/20	5	IMG_E0341	No	No	No	No
		59366	06/16/20	5	IMG_E0342	No	No	No	No
	Broad Run		Not sampled this year						
	Cannon Br.		Not sampled this year						
OR-OR-LJ	Cabin Run	59302	06/16/20	5	IMG_E0336	No	No	No	No
		89735	06/16/20	5	IMG_E0337	No	No	No	No
		89742	06/16/20	5	IMG_E0338	No	No	No	No
LBR	Russia Br.	59476	08/05/19	6	IMG_E0190	No	No	No	No
		59604	08/05/19	6	IMG_E0191	No	No	No	No
		59772	06/16/20	5	IMG_E0334	No	No	No	No
	Buckhall Br.	59662	11/21/19	3	IMG_E0278	No	No	No	No
		59517	11/21/19	3	IMG_E0279	No	No	No	No
		59661	11/21/19	3	IMG_E0280	No	No	No	No
		59309	11/21/19	3	IMG_E0281	No	No	No	No
		59306	06/16/20	5	IMG_E0335	No	No	No	No

Key to Table 9:

BR-RB Broad Run-Rocky Branch Watershed
OR-OR-LJ Occoquan River-Occoquan Reservoir-Lake Jackson Watershed
LBR Lower Bull Run Watershed
MBR Middle Bull Run Watershed

² Although the Broad Run watershed occupies 15.6 percent of the City of Manassas, only a small percentage of this watershed is within the City's MS4 area (most of this area is within the airport, which has its own Individual Permit).

Table 9 (continued)

Dry Weather Screenings This Reporting Period

Water shed	Sub-watershed	Outfall #	Date	Days Since Last Rain	Photo #	Flow	Odor	Color	Float-ables
MBR	Flat Br.	59834	08/05/19	6	IMG E0196	Yes	No	No	No
		nn	06/16/20	5	IMG E0319	No	No	No	No
		nn	06/16/20	5	IMG E0320	No	No	No	No
		59900	06/16/20	5	IMG E0322	Yes	No	No	No
		59901	06/16/20	5	IMG E0323	No	No	No	No
		59362	06/16/20	5	IMG E0324	Yes	No	No	No
		66479	06/16/20	5	IMG E0325	No	No	No	No
		90421	06/16/20	5	IMG E0326	No	No	No	No
		59331	06/16/20	5	IMG E0327	No	No	No	No
		59317	06/16/20	5	IMG E0328	No	No	No	No
		59316	06/16/20	5	IMG E0329	No	No	No	No
		59325	06/16/20	5	IMG E0330	No	No	No	No
		59379	06/16/20	5	IMG E0331	No	No	No	No
		59406	06/16/20	5	IMG E0332	No	No	No	No
		59715	06/16/20	5	IMG E0333	No	No	No	No
		90397	06/29/20	3	IMG E0343	No	No	No	No
		59713	06/29/20	3	IMG E0344	No	No	No	No
		59840	06/29/20	3	IMG E0345	No	No	No	No
		90866	06/29/20	3	IMG E0346	No	No	No	No
		59804	06/29/20	3	IMG E0347	No	No	No	No
		59401	06/29/20	3	IMG E0348	No	No	No	No
		66201	06/29/20	3	IMG E0349	No	No	No	No
		66203	06/29/20	3	IMG E0350	No	No	No	No
		66206	06/29/20	3	IMG E0351	No	No	No	No
		66202	06/29/20	3	IMG E0352	No	No	No	No
		66207	06/29/20	3	IMG E0353	No	No	No	No
		65954	06/29/20	3	IMG E0354	No	No	No	No
		66209	06/29/20	3	IMG E0355	No	No	No	No
		66210	06/29/20	3	IMG E0356	No	No	No	No
		66212	06/29/20	3	IMG E0357	No	No	No	No
		65966	06/29/20	3	IMG E0358	No	No	No	No
		65997	06/29/20	3	IMG E0358	No	No	No	No
		59275	06/29/20	3	IMG E0359	No	No	No	No
		89914	06/29/20	3	IMG E0360	No	No	No	No
		89915	06/29/20	3	IMG E0361	No	No	No	No
		89913	06/29/20	3	IMG E0362	No	No	No	No

Key to Table 9:

BR-RB Broad Run-Rocky Branch Watershed

OR-OR-LJ Occoquan River-Occoquan Reservoir-Lake Jackson Watershed

LBR Lower Bull Run Watershed

MBR Middle Bull Run Watershed

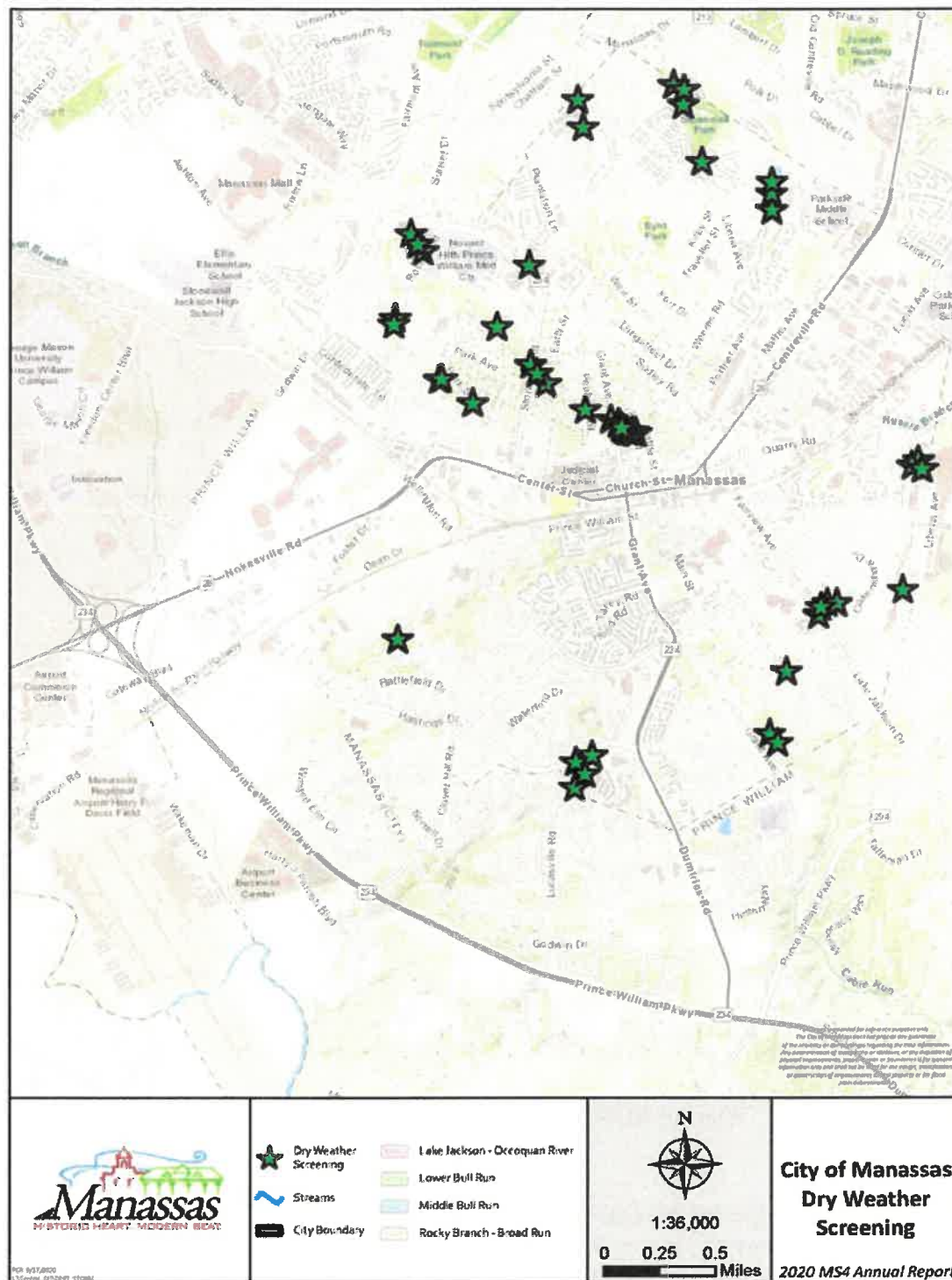


Figure 4 Dry Weather Screening Locations Conducted during this Reporting Period

Dry Weather Screening Initiated Illicit Discharge Investigations

Of the outfalls monitored during this last reporting year, three contained potential illicit discharges. All three were in the Flat Branch (Middle Bull Run) watershed. A description of each investigation follows:

Outfall #59834

The City conducted a dry weather screening assessment on August 5, 2019. There was a small quantity of liquid coming out. All indications were that this is a natural stream directed into this gravity main, but it was marked as a potential illicit discharge for later investigation.

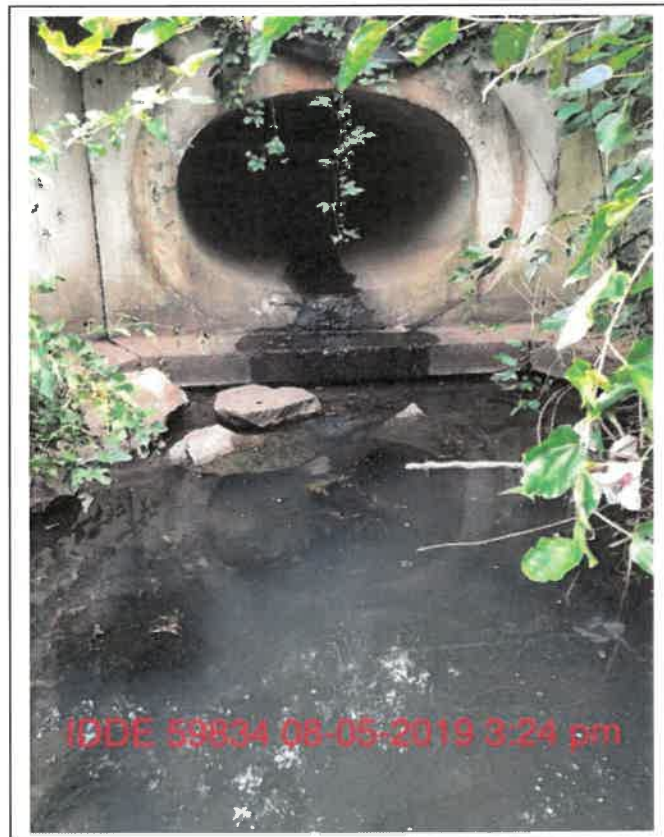


Figure 5 Outfall #59834 taken on August 5, 2019.

The discharge point was inspected several times over the next few months following the initial issue. Each time it was actively flowing. It was flowing quite strongly during a September 9, 2020 visit. Other area discharge pipes were not flowing at the time. Even the City's GIS baseline map shows this discharge point near the middle of a long stream channel; therefore, this flow is determined to be a piped natural stream, and not an illicit discharge. It is also not a regulated outfall. An email was sent to the City's GIS department to change the status of this discharge point and indicate that it is not an outfall.

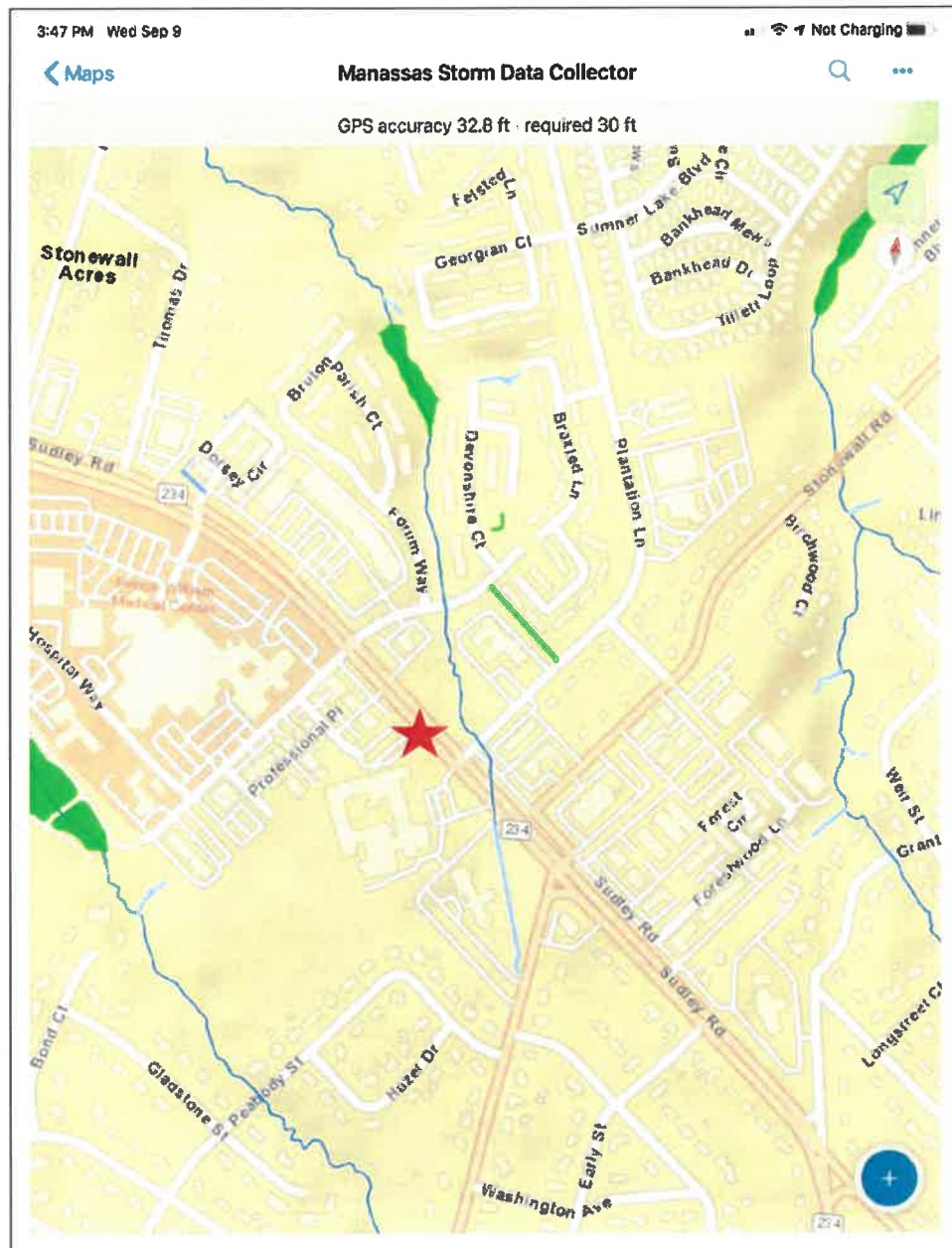


Figure 6 Red star indicates this in-stream pipe outlet which was incorrectly listed as a regulated outfall (#59834).

Outfall #59900

When City staff visited this outfall on June 16, 2020, there was flow coming out of the pipe. It was noted as a potential illicit discharge to be followed up later. The same City staff returned on September 9, 2020 and saw discharge coming from the pipe at a time that other nearby outfalls had none. The employee followed the flow up the pipe and found the source. The water was coming from a crack in the concrete inside of an inlet junction box at the seal outside of an incoming pipe. This was obviously groundwater, likely from high groundwater in the area from heavy rains the previous week. This groundwater/saturated soil water enters the stormwater system from this crack in the seal. Therefore, it is not an illicit discharge, but this repair will be passed onto the City's Public Works Department so that a proper seal may be made that would prevent infiltration.



Figure 7 The source of water coming out of outfall #59900

Outfall # 59362

When City staff visited this outfall on June 16, 2020, there was flow coming out of the pipe. It was noted as a potential illicit discharge to be followed up later. The same City staff returned on September 9, 2020 and saw discharge coming from the pipe at a time that other nearby outfalls had none. The employee followed the flow up the pipe and found the source. Someone had (likely without authorization) connected two four-inch pipes into the City inlet junction box by punching a hole in the concrete. Due to the angle of the pipes, they appear to originate from the private residence located at 9005 Stonewall Rd. (however, there is a possibility that it may be the residence at 9406 Stuart Ave.).

The water was coming from outside the pipe. Likely there is high groundwater in the area from heavy rains the previous week, and saturated soil was leaking into the City's stormwater system through this unsealed connection. Therefore, it is not an illicit discharge, but this repair was assigned the City's Public Works Department for repair that would prevent any infiltration.

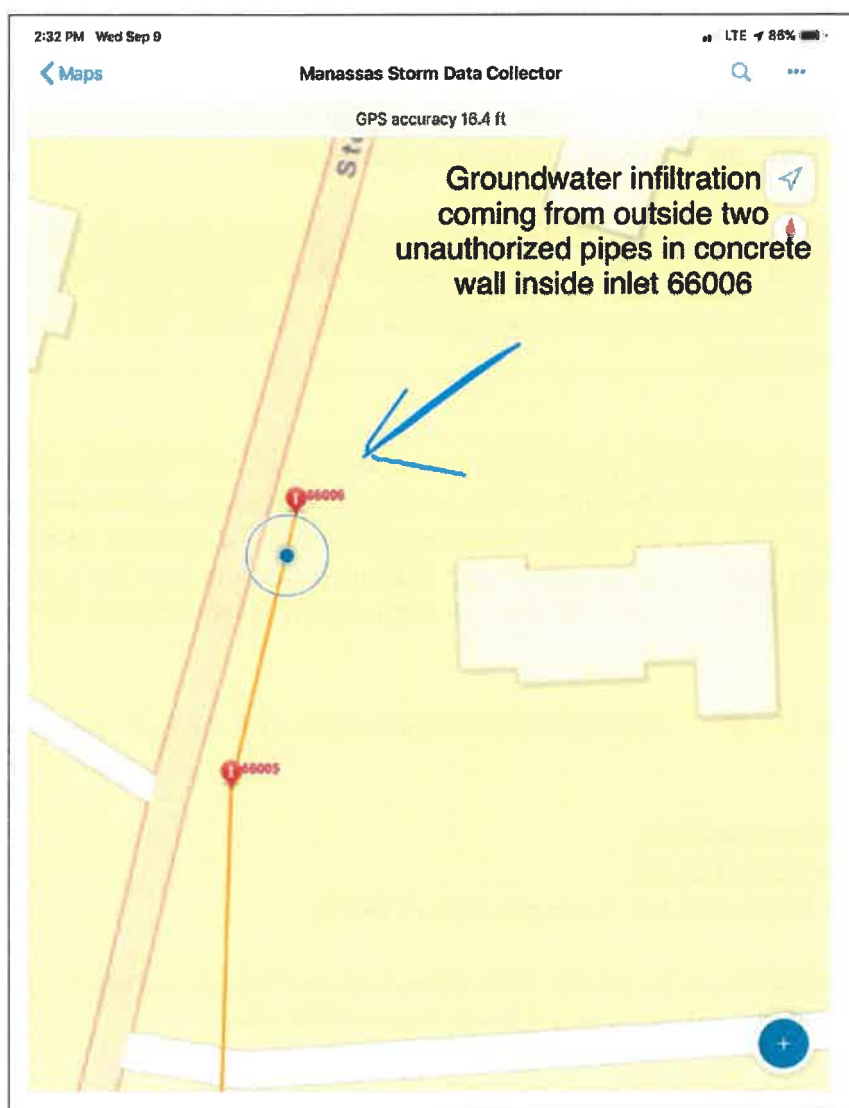


Figure 8 The source of water coming out of outfall # 59362

Other Illicit Discharges

During this reporting period, the City merged its legacy tracking systems with the City's broad-based "See-Click-Fix" commercial software complaint tracking program. The "stormwater" complaint category within this on-line reporting system includes complaints ranging from trash in streams, flooding, failing stormwater infrastructure, poor drainage problems, to illicit discharge. During this reporting period, there were 53 recorded stormwater complaints. Of these, 14 (Table 12) were illicit discharges.

The City's Fire and Rescue Services responds and manages illicit discharges that involve an immediate public health threat, such as the spillage of flammable chemicals. They reported no such illicit discharges for this reporting period.

Each of the accidental sewer discharges into the City's stormwater system depicted in Table 11 were reported to Virginia's Department of Environmental Quality.

The City is reevaluating how the illicit discharge detection and implementation program will be implemented. It is anticipated the stormwater management program will be assigned responsibility for both administration and implementation in the next permit year.

Table 10 Estimate of Sanitary Sewage Entering City Streams during this Reporting Period

Item	Location	Watershed	Gallons
Spill #1	Intersection of Stonewall Rd. and Beauregard Ave.	Middle Bull Run Watershed	2,500
Spill #2	Intersection of Stonewall Rd. and Beauregard Ave. (same location as above)	Middle Bull Run Watershed	

The previous MS4 Annual Report indicated that there had been 286.9 million gallons of chlorinated water that entered the City's stormwater system as a result of routine maintenance-related water line and hydrant flushing. However, the City had since then implemented a rigorous de-chlorination procedure that brought the total gallons of chlorinated water flushings entering the City's stormwater system to zero (0). The City's Utilities Department uses de-chlor tablets set in diffusers for all their water flushing needs.

- The City has identified storm sewer interconnections with the following three (3) neighboring MS4s:
 - City of Manassas Park
 - Prince William County
 - Virginia Department of Transportation (VDOT)

Written notifications were sent to these interconnected MS4s on June 23, 2014, in P3/Y1 and again on March 11, 2020 (during this last reporting period).

- Chapter 118, Article IV, Section 118-369, Division 5 (Wastewater Discharge), Subdivision II(A) (Stormwater Pollution) of the City of Manassas Code of Ordinances prohibits nonstormwater discharges into the City's storm sewer system.

Table 11 Other Known Illicit Discharges during this Reporting Period

Date Illicit Discharge	Incident	DEQ Case #	Watershed	Resolution	Enforcement Action	Date Closed
8/10/19	Trash effluent draining into stormwater	292084	Occoquan River-Occoquan Reservoir-Lake Jackson	Cleaned up.	Letter of Warning	
9/25/19	Illicit swimming pool discharge	292245	Middle Bull Run	Information Provided	Still open	
11/6/19	Discharge of diesel into groundwater well	292678	Middle Bull Run	DEQ handled	None by City	
1/23/20	Petroleum products spilled into stream	293540	Rocky Branch-Broad Run	DEQ handled	Deferred to DEQ	
2/4/20	Liquid and solid waste draining into stormwater		Lower Bull Run	Turned over to Code Enforcement	In Progress	
2/6/20	Persistent flow from unknown location		Rocky Branch-Broad Run	Investigated potential source(s)	None	
2/7/20	Fire suppression foam spill	293715/	Rocky Branch-Broad Run	Fire Marshal handled	Deferred to PWC	
3/29/20	Hydraulic fluid spill	294473/294496	Rocky Branch-Broad Run	Cleaned up.	None	
4/15/20	Sewage spill	294699	Middle Bull Run	Cleaned up.	None	
4/29/20	Stormwater smelled like sewer	294923	Middle Bull Run	Performed leak tests	None	
5/21/20	Improper water line flushing	295186	Rocky Branch-Broad Run	None	None	
6/12/20	Illicit swimming pool discharge	295443	Middle Bull Run	Combined with earlier still open investigation.	Open	
6/16/20	Hydraulic fluid spill	295506	Rocky Branch-Broad Run	Cleaned up	None	
6/18/20	Illicit swimming pool discharge	295612	Middle Bull Run	Presented Information	In Progress	

2.4 MCM 4: Construction Site Stormwater Runoff Control

The goal of this MCM is to develop, implement, and enforce procedures to reduce pollutants in stormwater runoff from construction activities that result in a land disturbance of greater than or equal to one (1) acre. This has been modified by the City's ordinance which has a disturbed area threshold of 2,500 square feet or greater and all erosion control devices inspected and approved by the City Inspector prior to the initiation of any land disturbing activity. Construction site runoff control in the City is implemented through its Erosion and Sediment (E&S) Control Program. A summary of the construction site stormwater runoff control activities conducted by the City during the reporting period is provided below.

- The Virginia Stormwater Management Program (VSMP) was adopted by the City Council on June 16, 2014 and became effective as of July 1, 2014. During the reporting period, the City implemented the requirements of the Virginia Erosion and Sediment Control Law and Regulations. The Department of Community Development is the responsible party for administering the City's E&S Control Program. Table 13 provides a summary of land-disturbing activities for the reporting period.

Table 12 Summary of Land Disturbing Activities, Inspections, and Enforcement Actions Taken by the City during this Reporting Period

Item		Total	
Total Number of Land-Disturbing Activities		15	
Total Number of Disturbed Acres		26.452	
Number of Plan Reviews (over 1 acre)		47	
Notice of Terminations		2	
Total E&S Inspections Conducted	Total Number Commercial/Residential E&S Inspections Conducted	483	539
	Total Number of City/CIP Project Inspections	56	
Number of Stop Work Orders		0	
Number of Commercial and/or Residential E&S Violations		4	
Number of Notices to Comply		3	
Number of Enforcement Actions		7	

- The City's E&S Control staff is required to remain certified by the Virginia Erosion and Sediment Control Law, attendant regulations, and the City's E&S Control Program. Recertification is required on a rolling schedule at least once every three (3) years. Table 14 provides information on City E&S staff certification statuses.

Table 13 Summary of Staff SWM Certifications Held During this Reporting Period

Item	Number of FY 19-20 Staff Certifications
City employees certified for E&S Inspections	1
City employees certified for E&S Plan Review	0
City employees certified for E&S Program Administration	1
City employees certified for E&S Combined* Administration	2

*Combined Administrators are co-certified at the Plan Review, Program Administration, and Inspection levels.

A comprehensive list of staff members and corresponding certifications are available upon request.

Other Accomplishments:

Within this reporting period, the City developed a system to automate inspection reports. The system is currently in its testing phase. The results of this testing will be reported in next year's Annual Report.

2.5 MCM 5: Post-Construction Stormwater Management

The goal of this MCM is to develop and implement procedures for design review/approval, construction inspection, operational inspections, and follow-up maintenance of permanent structural and non-structural stormwater management (SWM) facilities for both City-maintained and privately-maintained facilities. As such, the City utilizes its legal authority to ensure that stormwater runoff controls are designed, approved, installed, and maintained according to state and local criteria standards. Periodic routine inspections are conducted for both City-maintained and privately-maintained permanent structural and non-structural stormwater facilities. The City maintains a database of all SWM facilities and related inspection activities.

The City has developed requirements for the design, implementation, and construction of SWM facilities as outlined in the Design and Construction Standards Manual (DCSM). The City adheres to these requirements, which provides for the proactive management of post-construction stormwater runoff.

A summary of the post-construction SWM activities conducted by the City during the reporting period is provided below.

- During this last reporting period, City staff kept and maintained frequent contact and communications with private BMP owners.
- As of June 30, 2020, the City had identified 47 private stormwater BMPs, 27 City-owned stormwater BMPs, and 1 Virginia Department of Transportation stormwater BMP within the City's jurisdiction. This totals 75 stormwater BMPs. Some of the changes made in the City's BMP records during this last reporting year include the following:
 - Formerly the Manassas Learning Center was listed as one privately-owned BMP. Upon further investigation, it consists of six separate underground facilities. Therefore, there was a net increase of five new private BMPs added to the City's inventory. Note: the names of these six BMPs are Manassas Learning Center DW-1 through Manassas Learning Center DW-6.
 - Similarly, the Hastings Marketplace development was thought to contain one underground stormwater BMP, but in fact it contains five separate BMPs. Therefore, four new BMPs were added to the inventory. Of these five BMPs, one serves the residential parts of the development, Hastings Marketplace Residential 1 (F2); while four serve the commercial section (these BMPs are named Hastings Marketplace Commercial 2-5.
 - The city-owned Winters Branch Forebay Pond was added to the City's inventory this last year. While this pond was built several years previously, the name "Winters Branch Forebay" hinted that is one part of the Winters Branch Pond. However, later investigation indicated that it was built after the Winters Branch Pond; they are separated from each nearly by nearly 1,000-feet; and was designed for treatment capacity above that of the design for the older Winters Branch Pond. The City classifies these facilities as two separate BMPs.
 - At the same time as the Winters Branch Forebay Pond was designed and built, an adjacent constructed wetland Winters Branch Wetland was constructed and made

operational. This wetland was designed to be a stormwater BMP and is classified by the City as a separate BMP.

- The Manassas Station Redevelopment project included a new, privately-owned underground stormwater BMP. This is a new BMP added to the inventory this last year.
 - The Chantilly Air development included a new, privately owned underground BMP. This is a new BMP added to the inventory this last year.
- The City maintains a new, and updated list of stormwater BMPs, within an electronic database and includes the following information on the City's stormwater BMPs³:
 - Facility Name
 - Facility ID (New Designation)
 - Facility ID (Old Archived Designation)
 - Facility Type
 - Facility Street Address
 - Location, Latitude
 - Location, Longitude
 - Surface Area of BMP
 - Acres Treated
 - Pervious Acres Treated
 - Impervious Acres Treated
 - Date Brought Online
 - Ownership/Management Category (City, private, other)
 - Receiving Water Body (Watershed Name)
 - HUC Number
 - ID Number of Outfall BMP Discharges To
 - Impaired Water Segments
 - Site Plan ID
 - Tax Map ID
 - Date of Most Recent Inspection

The electronic database is maintained by the City and is available upon request.

- The City performs visual inspections of the City-owned SWM facilities after each significant rainfall event to check for debris or any physical failures that may require immediate attention.
- During the reporting period, the City completed inspections of all public SWM facilities. All facilities were determined to be operating as designed and inspection records are maintained and available upon request.

All appropriate City BMPs were inspected during the previous reporting period. All of these 27 inspections were performed by City staff.

³ Not all these fields in this database are populated yet; City staff continually review and resolve these data gaps when identified.

Maintenance of these public SWM facilities is in the planning stages and will begin in the next reporting period.

- The private SWM facilities were required to be inspected during the reporting period;

There were no private SWM facilities that were specifically required to inspect during this reporting period. However, the City inspected a total of 8 private SWM facilities during this reporting period.

- The City has developed tools to aid in the implementation of the SWM program through databases, GIS, and spreadsheets. These tools are updated on an as-needed basis to remain current with field conditions.
- The City SWM Facility Plan Reviewers and Inspectors are required to remain certified by the Virginia Erosion and Sediment Control Law, attendant regulations, and the City's SWM facility Inspection and Maintenance Program. Recertification is required on a rolling schedule at least once every three (3) years. Table 14 provides information on the status of the City's stormwater staff certifications.

Table 14 **Summary of Staff SWM Certifications Held During this Reporting Period**

Item	Number of FY 19-20 Staff Certifications
City employees certified for Stormwater Inspections	2
City employees certified for Stormwater Plan Review	0
City employees certified for Stormwater Program Administration	1
City employees certified for Stormwater Combined* Administration	1
City employees certified for Dual# Combined Administration	0

*Combined Administrators are co-certified at the Plan Review, Program Administration, and Inspection levels.

A comprehensive list of staff members and corresponding certifications are available upon request.

2.6 MCM 6: Pollution Prevention/Good Housekeeping for Municipal Operations

The goal of this MCM is to develop and implement written procedures designed to minimize or prevent pollution discharge to the maximum extent possible from normal daily municipal operations. These procedures cover the planning and tracking necessary to ensure the following activities are conducted:

- Staffing

Table 15 Stormwater Staffing during this Reporting Period

City Department	Number Staff that Performs Stormwater Functions	Percentage of Time Staff Devote to Stormwater Issues	Approximate Full-Time-Equivalents (FTE)
Engineering Department—Environmental Programs	2	100%	2.0
Utilities Department—Water & Sewer	2	25%	0.5
Engineering Department—Other	6	25%	1.5
Community Development—Parks, Culture & Recreation*	1	65%*	0.7
Department of Public Works—Streets	7	50%	3.5
GIS Department	4	38%	1.5
TOTAL	22		9.7

Key: * = Data not available at time of report, so these values are estimated.

- Identification of high priority facilities with a high potential for discharging pollutants

The City continues to list the following four sites as high priority municipal facilities:

- 1) Public Works Materials Reduction Site (Previously Identified as Boneyard/Sort Yard)
- 2) Police Vehicle Impound Yard
- 3) Fire Stations (excluding Fire HQ)
- 4) Water Storage Facilities [note: City staff have begun developing the draft SWPPP for these facilities: it will be listed in next year's accomplishments]

Evaluation of these sites is ongoing and any changes to this list will be called out in subsequent reports.

- Identification of contiguous areas over one (1) acre receiving applied nutrients

Table 16 List of Applicable Lands where Nutrients are Applied to Contiguous Areas of More Than One (1) Acre for which Nutrient Management Plans (NMPs) have been developed.

Land	Acreage	Watershed	Latitude	Longitude	Plan Status
E.G. Smith Ball Fields	16.43	Rocky Branch-Broad Run	38°44'46.0"N	77°30'40.8"W	Complete
Manassas Museum	3.55	Rocky Branch-Broad Run	38°44'54.9"N	77°28'19.1"W	Complete
Jennie Dean Ball Fields	5.73	Rocky Branch-Broad Run	38°44'42.0"N	77°29'28.4"W	Complete
Byrd Park Ball Fields	2.62	Middle Bull Run	38°46'08.1"N	77°28'20.0"W	Complete
Public Works Hillside	2.41	Middle Bull Run	38°46'11.7"N	77°27'39.9"W	Complete
Total	30.74				

Note: the approved NMPs call for both nitrogen and phosphorus nutrients, but due to the anticipated uses of these fields, and the City's attempts to reduce unneeded phosphorus use, the City's Arborist has only been applying the nitrogen fertilization called for in the NMP; we have not been applying any of the phosphorus.

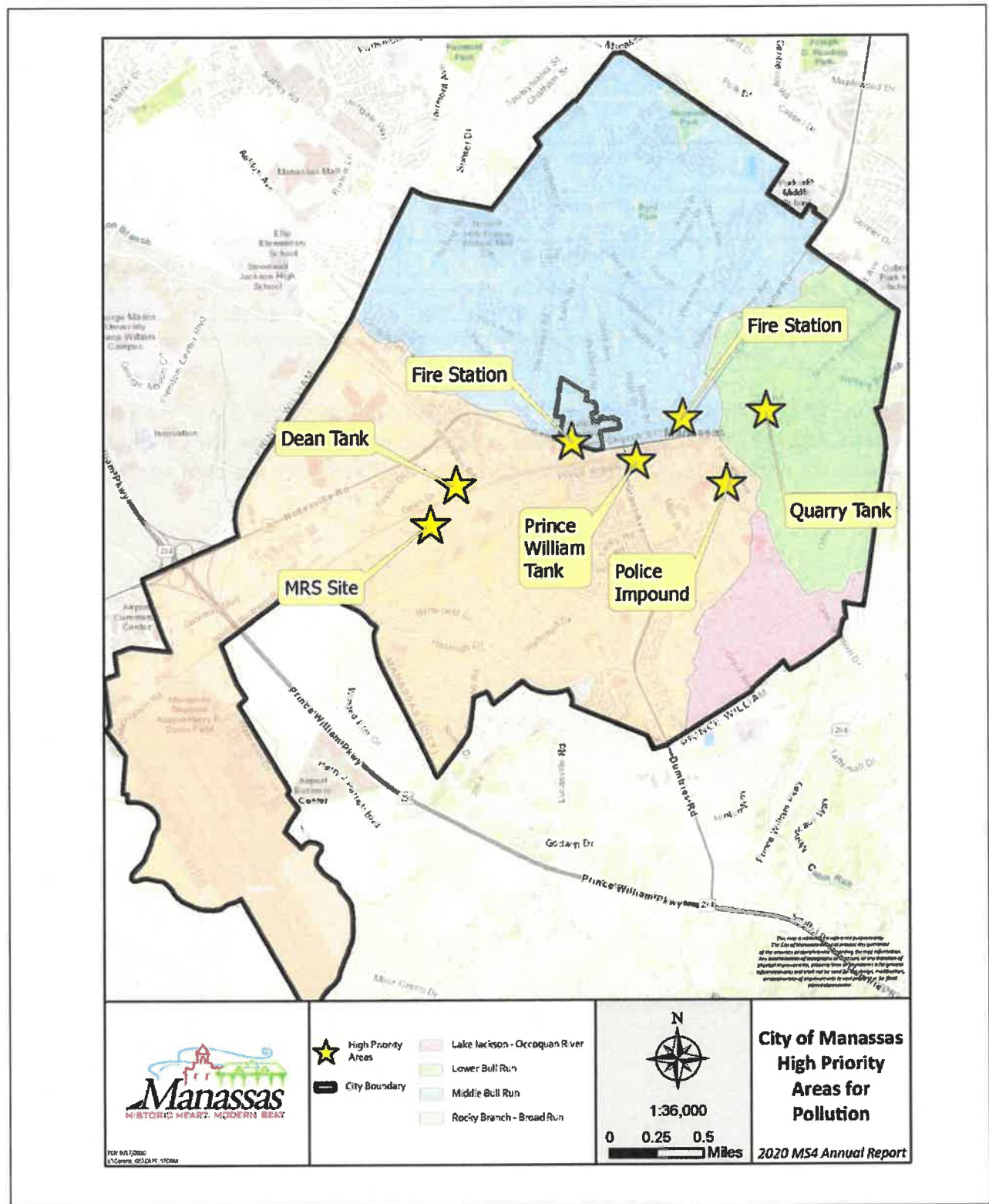


Figure 9 Location of High Priority Facilities

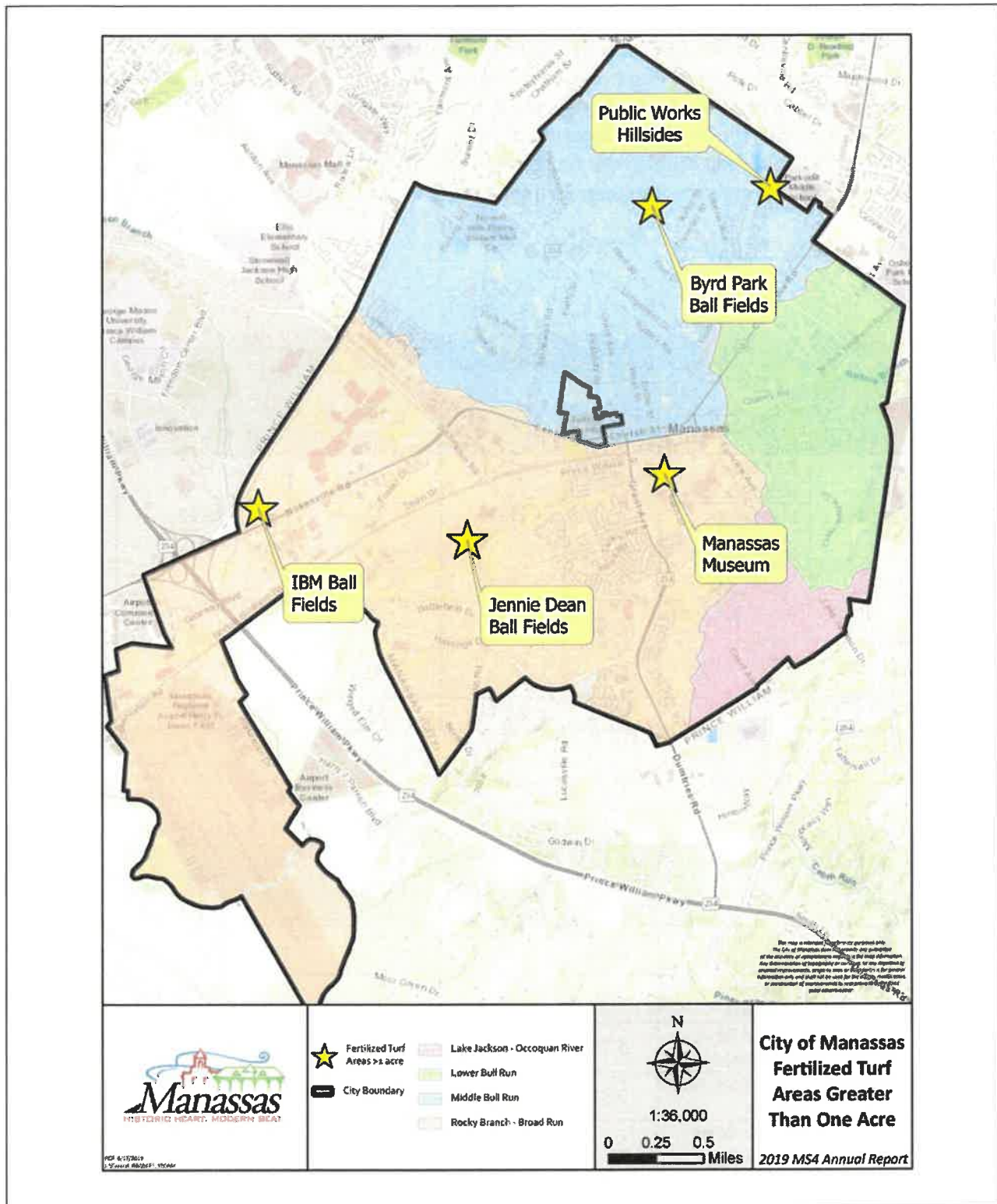


Figure 10 Location of Fertilized Turf Areas Greater than One Acre where NMPs have been Developed

Chemical Applications by TruGreen:

The City requires TruGreen to use appropriate control measure procedures by requiring that all employees applying pesticides and herbicides to be properly trained or certified in accordance with State Law. Businesses that apply pesticides for compensation must be registered with the Virginia Department of Agriculture and Consumer Services (VDACS), and their employees must hold the appropriate certifications. This requirement is enforced through the language in TruGreen's contract, which is available upon request.

Products applied by TruGreen:

Table 17 Summary of Nitrogen Fertilizer Applied during this Reporting Period

Summary of Nitrogen Fertilizer Applied					
Watershed	Land	Acreage	Acreage Summary	Lbs. N Fertilizer Applied	Pounds N Applied
Rocky Branch-Broad Run	E.G. Smith Ball Fields	16.43	25.71	1,428	2,220
	Manassas Museum	3.55		290	
	Jennie Dean Ball Fields	5.73		502	
Middle Bull Run	Byrd Park Ball Fields	2.62	5.03	212	424
	Public Works Hillsides	2.41		212	
Total		30.74	30.74	2,644	2,644

Table 18
Summary of Dimension 2 EW Post Emergent Herbicide Applied during this Reporting Period

Summary of Tri-power Post Emergent Herbicide Applied					
Watershed	Land	Acreage	Acreage Summary	Gallons Applied	Gallons Applied
Rocky Branch-Broad Run	E.G. Smith Ball Fields	16.43	25.71	3.1	4.8
	Manassas Museum	3.55		0.6	
	Jennie Dean Ball Fields	5.73		1.1	
Middle Bull Run	Byrd Park Ball Fields	2.62	5.03	0.5	1.0
	Public Works Hillsides	2.41		0.5	
Total		30.74	30.74	5.8	5.8

Table 19

Summary of Barricade 4 FL Pre-emergent Herbicide Applied during this Reporting Period

Summary of Barricade 4 FL Pre-emergent Herbicide Applied					
Watershed	Land	Acreage	Acres	Pounds	Pounds Applied
Rocky Branch-Broad Run	E.G. Smith Ball Fields	16.43	25.71	8.2	12.9
	Manassas Museum	3.55		1.8	
	Jennie Dean Ball Fields	5.73		2.9	
Middle Bull Run	Byrd Park Ball Fields	2.62	5.03	1.3	2.5
	Public Works Hillsides	2.41		1.2	
Total		30.74	30.74	15.4	15.4

Table 20

Summary of Escalade 2 BCW Post-emergent Herbicide Applied during this Reporting Period

Summary of Escalade 2 BCW Post-emergent Herbicide Applied					
Watershed	Land	Acreage	Acres	Gallons	Gallons Applied
Rocky Branch-Broad Run	E.G. Smith Ball Fields	16.43	25.71	5.2	8.1
	Manassas Museum	3.55		1.1	
	Jennie Dean Ball Fields	5.73		1.8	
Middle Bull Run	Byrd Park Ball Fields	2.62	5.03	0.8	1.5
	Public Works Hillsides	2.41		0.7	
Total		30.74	30.74	9.6	9.6

Chemicals Applied by City of Manassas Employees (the City has one certified Pesticide Applicator):

Ranger Pro Herbicide- 30 gallons non-diluted
 3D 3-way broad leaf herbicide- 7.5 gallon non-diluted
 Alligar (Triclopyr) Herbicide- ½ gallon non-diluted
 Atrimec growth regulator- 6 gallon diluted
 Daconil Fungicide- 150 gallon diluted
 Bifenthrin insecticide- 5 gallon diluted
 Zylam insecticide- 205 gallon diluted
 Prodiamine 65 WDG Herbicide (Pre-emergent)- 2,950 gallon diluted
 Snapshot Herbicide (pre-emergent)- 5 lbs
 Horticultural Oil insecticide- 35 gallon diluted
 Spreader Sticker Surfactant- 1.5 gallon
 Bio-Advantage Fertilizer- 5 gallon non-diluted

Sea 3 Fertilizer- 5 gallon non-diluted
 Nutricote 18-6-8 Fertilizer- 40 lbs

Public Stormwater Wet Pond Algae and Weed Management

The City solicited bids for nuisance algae and aquatic weed treatment and entered a contract for pond maintenance services on 7/16/2019. Modifications were made to the scope of services on the previous contract to limit routine algaecide and herbicide applications to ponds with residential or business waterfront. The less visible City ponds requiring treatment will receive those services on an on-call basis under the new contract. These changes were made to reduce the overall load of these chemicals discharged from the City's MS4, and to re-allocate funds previously spent on excessive treatments to other stormwater program areas.

Table 21a Algaecide Applied to Public Stormwater Ponds July 1, 2019 to June 30, 2020

Pond Name	Gallons Applied						Pounds Applied
	Aquathol	Captain	Clipper	Diquat	Nautique	Platoon	Copper Sulfate
Hospital Pond	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lucasville							
Owens Brooke Downstream		4					105
Owens Brooke Upstream		2				16	120
Sumner Lake	1	4.5	3	0.5	1	0	505
Wakeman Large							1005
Wakeman Small	1	6.5	5	1	2		335
TOTAL	2.0	17.0	8.0	1.5	3.0	16.0	2,070

Note: Blue dye was also applied in these ponds this last year, but it was not quantified.

Table 21b Algaecide Applied to Public Stormwater Ponds July 1, 2018 to June 30, 2019

Pond Name	Gallons Applied						Pounds Applied
	Aquathol	Captain	Clipper	Diquat	Nautique	Platoon	Copper Sulfate
Hospital Pond		1.0				0.2	
Lucasville		1.0					50
Owens Brooke Downstream		4.5					170
Owens Brooke Upstream		2.5					140
Sumner Lake		29.5	24.0				525
Wakeman Large							120
Wakeman Small	1.5	3.0		1.5			140
TOTAL	1.5	41.5	24.0	1.5	0.0	0.2	1,145

Note: Blue dye was also applied in these ponds this last year, but it was not quantified.

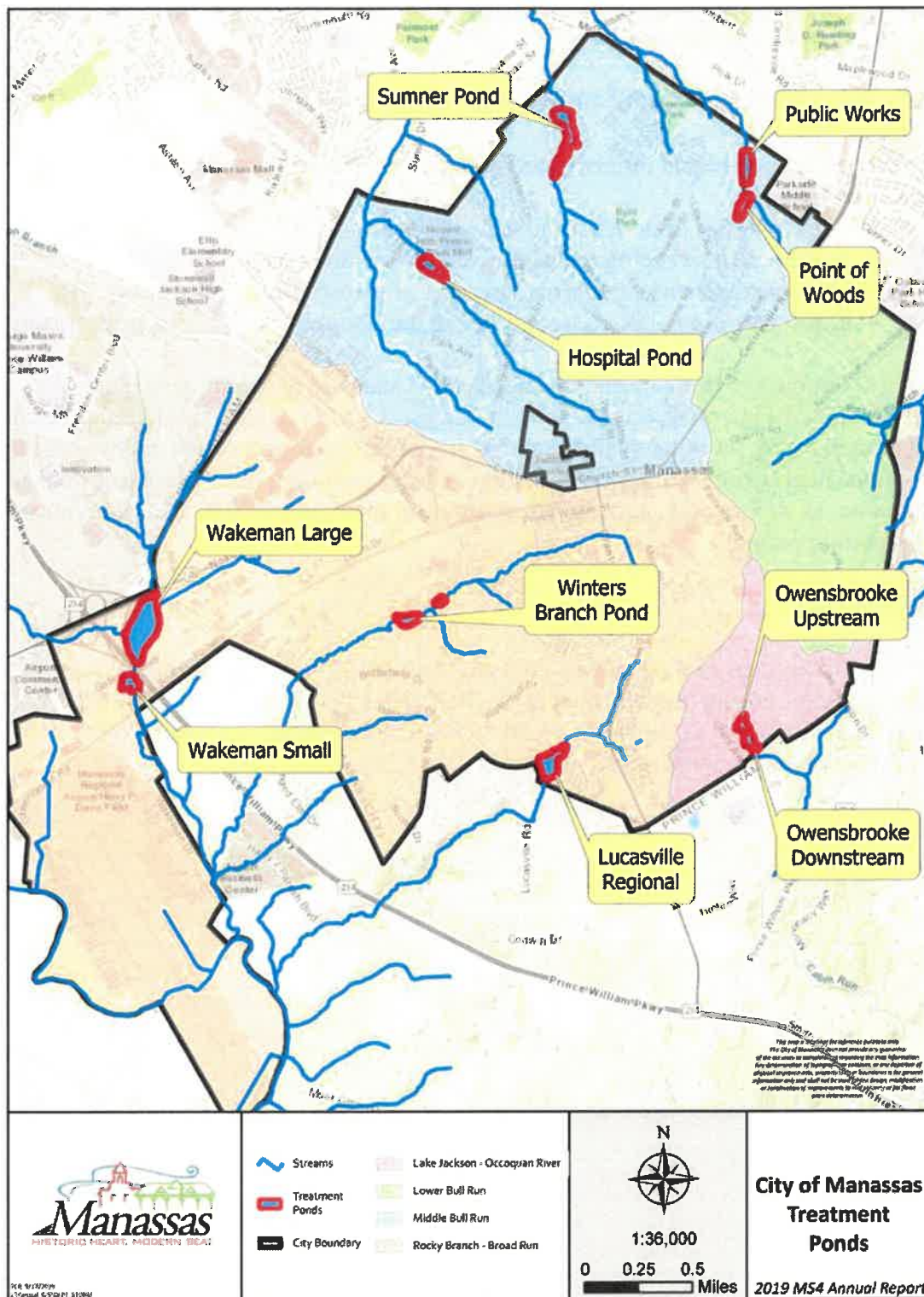


Figure 11 Location of Stormwater Ponds that are Routinely Treated with Algaecide

- Maintenance of applicable certification and related training [Virginia Erosion and Sediment Control Law Certification, Proper application/storage/disposal of land-applied substances (e.g., pesticides, herbicides, and fertilizers)]:

Certification credentials for staff are available upon request.

- The City has developed and implemented Standard Operating Procedures (SOPs) for the following activities:
 - 1) Proper storage of de-icing salt and chemicals,
 - 2) Proper street sweeping techniques and debris disposal,
 - 3) Shop maintenance/storage and disposal of grease, oil, and chemicals, and
 - 4) Enforcement regulations as outlined in our adopted illicit discharge ordinance.

The City continues to evaluate and update all of its standard operating procedures on a regular basis. The City began reviewing its policies and procedures related to pollution prevention and good housekeeping for municipal operations during this reporting period and will continue through the next permit year. Policies and procedures regarding illicit discharge detection and elimination, as well as post-construction stormwater management will also be reviewed in the next reporting period.

- City Staff Training.

The City continues to evaluate the content and delivery of all training it provides. A new training plan will be created and implemented in the 2020-2021 permit year that will build upon the content already presented and will also allow for remote training options in light of coronavirus-related restrictions on gatherings.

Table 22 Stormwater-related Trainings

Trainings	Trainer	Date	Hrs.	Number Attendees
Virginia Lakes and Watersheds Conference	Virginia Lakes & Watersheds Association Conference	8/9-10/2019	12	1 (David Ek)
L203-19 Stormwater Management-Quality	Engineers and Surveyors Institute	9/17/2019	6	1 (Lance Kilby)
L204-19 Stormwater Management-Quality	Engineers and Surveyors Institute	10/1/2019	6	1 (Lance Kilby)
MS4 Stormwater Basics/Orientation	David Ek (City of Manassas)	10/18/2019	1.5	21 (mostly W&S crews)
EPA Region III & Virginia DEQ Virginia MS4 Forum, Hanover Co., VA	EPA Region III & Virginia DEQ Virginia	10/21-23/19	20	1 (David Ek)
2020 Stormwater and Litter Workshop	Virginia DEQ	2/10/2020	8	1 (David Ek)
Program Administrator for ESC Curriculum	Virginia DEQ	6/5/2020	6	1 (Lance Kilby)
Program Administrator for SWM Curriculum	Virginia DEQ	6/5/2020	6	1 (Lance Kilby)
Stormwater BMP-Dry Swale	Virginia DEQ	06/10/2020	0.5	1 (Greg Bokan)
Stormwater BMP-Rooftop Disconnection	Virginia DEQ	06/10/2020	0.5	1 (Greg Bokan)
Stormwater BMP-Extended Detention (ED) Pond	Virginia DEQ	06/10/2020	0.5	1 (Greg Bokan)
Stormwater BMP-Bioretenion	Virginia DEQ	06/10/2020	0.5	1 (Greg Bokan)
Stormwater BMP-Grass Channels	Virginia DEQ	06/10/2020	0.5	1 (Greg Bokan)
Stormwater BMP-Constructed Wetlands	Virginia DEQ	06/10/2020	0.5	1 (Greg Bokan)
Stormwater BMP-Permeable Pavement	Virginia DEQ	06/10/2020	0.5	1 (Greg Bokan)
Stormwater Pollution Prevention Refresher	Virginia DEQ	06/10/2020	0.5	1 (Greg Bokan)
Inspector for ESC Curriculum	Virginia DEQ	6/17/2020	12	1 (Lance Kilby)
Inspector for SWM Curriculum	Virginia DEQ	6/27/2020	12	1 (Lance Kilby)
VRPS Annual Conference				1 (Christen Fox)
NSPF Pool Operations certification				1 (pool manager)
Total			123.5	

Street Sweeping Operations

- The City applied deicing materials throughout the City during the reporting period. Within this reporting period, there were 3,606 Lane Miles swept using modern vacuum style street sweeping trucks—among all City street types.

Table 23 Summary of Deicing Materials Applied

Item	Quantity (7/1/19 – 6/30/20)	Quantity (7/1/18 – 6/30/19)	Units
Road Salt ⁴	785	1,692.1	tons
Sand ⁵	0	0	tons
Ice Ban Liquid ⁶	9,000	9,000	gallons

⁴ Based on the quantity purchased during the reporting year (the City does not track the amount actually used).

⁵ Based on the quantity purchased during the reporting year (the City does not track the amount actually used).

⁶ Purchased no de-icer during the reporting year, but filled up the tanks at the end of the previous year, and at the end of the reporting year, the two tanks are mostly empty; therefore, this data is the estimate of the tank's capacity.

Other Additional Street Department Accomplishments:

Table 24: General Stormwater-related Tasks Performed by the Streets Department (between July 1, 2019 and June 30, 2020)

Month	Stormwater-related Task
July 2019	Regrade ditch line on Ewell Street Clean outfall structure at Round Elem. Pond Replace STGM0088460 Inlet maintenance Section 1 Pond sweep for trash/debris
August 2019	Replace driveway culvert on Lincoln Avenue Clean debris along concrete spillway at Beauregard Avenue Inlet maintenance Section 1 Flushing for camera inspections (see collector app) Pond sweep for trash/debris
September 2019	Inlet maintenance Section 2 Flushing for camera inspections (see collector app) Pond sweep for trash/debris
October 2019	Reset manhole cover on STNS0090732 Replace STCV0090742 Clean out and dress up STOD0090745 and STOD0090746 Leaf removal (see 2019 schedule) Flushing for camera inspections (see collector app) Pond sweep for trash/debris
November 2019	Leaf removal Pond sweep for trash/debris
December 2019	Leaf removal Pond sweep for trash/debris
January 2020	Leaf removal Flush from STIN0066189 to STIN0066263 Pond sweep for trash/debris
February 2020	Clean up trash and graffiti at Jerry's Circle Pond Inlet maintenance Section 2 Replace driveway culvert on Powers St and regrade ditch line Pond sweep for trash/debris
March 2020	Repair erosion issues at 9008 Stonewall Road Clean trash/debris along Winters Branch Trail Cleaned STCV0070105 and STCV0070107 Restored inlet and outfall protection Pond sweep for trash/debris
April 2020	Cleaned STCV0070105 and STCV0070107 Restored inlet and outfall protection Inlet maintenance Section 3 Pond sweep for trash/debris
May 2020	Cleaned STCV0070108 Restored inlet and outfall protection Cleaned STCV0070111 Restored inlet and outfall protection Inlet maintenance Section 3 Pond sweep for trash/debris
June 2020	Cleaned STCV0070110 Restored inlet and outfall protection Inlet maintenance Section 3 Pond sweep for trash/debris

- Within the Capital Improvement Plan, a parks maintenance project for renovations and improvements every two years. The method of the project is to go park by park addressing the deferred maintenance and adding amenities chosen by the community as funding permits. Part of the project objectives is to add dog waste stations, improve trash and recycle collection and address stormwater areas within the park.
- The City worked closely with the pool contractor during de-winterization, operational season and winterization of the Stonewall Pool. At the time of de-winterization both pools are completely emptied to clean and prepare for the swim season. During winterization, the baby pool is completely emptied and the main pool is partially drained. The preferred method to drain pool water is through the filtration trash line to the City's waste water system underground. If a second method of draining is deemed necessary, the contractor is required to drain the pool water over vegetation that does not directly flow into City waterways.
- City staff is primarily responsible for the cleanliness of the pool water during the operational season (Memorial Day to Labor Day annually). Staff records the water quality results hourly to properly maintain the health department regulations for safe water quality. The filtration system is cleaned weekly where the dirty water is emptied through the trash line into the City's waste water system underground. All chemicals located on site are properly stored separately with a protective containment barrier. In FY19 staff exceeded the safety protocol by making available additional chemical spill kit that contains absorbent pads, containment barrel, absorbent powder and chlorine reduction chemicals. The FY20 year the pool facility was closed to the general public but was operating to prevent a public health hazard. All water chemicals were properly handled and water quality was maintained per Health Department requirements.
- The City Park Maintenance Manual, produced in January 2017, was made available to the public by being posted online a Park Maintenance manual was published and made available online to the public. This manual can be found at http://www.manassascity.org/DocumentCenter/View/29195/Maintenance-Task-Frequency-Chart_Final?bidId=. This manual goes into great detail on how the City maintains the park land, stormwater, site amenities, athletic fields, etc. Park maintenance is carried out by the Public Works Building & Grounds division and supplemented by City contractors.

Table 25 Summary: Coordination & Training Meetings Involving Regional Partners

Date	Category	Topic	Hours	Employee
7/2/2019	Coordination	GKY Evaluation Meeting	1.5 hours	
7/15/2019		Coordination Meeting with Sumner Lake HOA	2.0 hours	
7/31/2019		Coordination meeting with Prince William County RE: Sumner Lake nutrients	1.5 hours	
8/2/2019		GKY Evaluation Meeting	1.0 hours	
8/9-10/2019		Virginia Lakes and Watersheds Association conference	12 hours	David Ek
10/3/2019		GKY Evaluation Meeting	1.0 hours	
10/12/2019	Education	Utilities Day-Stormwater Model demonstrations	4.0 hours	18 people
10/18/2019	Training	David Ek presented MS4 training to W&S Staff	1.5 hours	21 people attended
10/21-23/2019		EPA Region III & Virginia DEQ Virginia MS4 Forum, Hanover Co., VA	20 hours	
11/4/2019	Education	Baldwin Elementary School STEM class, program evaluation	2 hours	Ivy Ozmon and David Ek were reviewers
11/7/2019	IDDE	Cleared Code Enforcement Tudor Oaks HOA		
11/13/2019		GIS Day		
12/3/2019		Police Station SWPPP	1 hours	
12/6/2019		DEQ Audit		
1/27/2020		Water Resources Technical Committee meeting, Metropolitan Washington Council of Governments	1.0 hours	
2/10/2020		2020 Stormwater and Litter Workshop	8.0 hours	
		Total	154.5 hours	

- Water chestnut, the highly aggressive and invasive non-native aquatic plant that has invaded northern Virginia in the last few years has been confirmed within the City of Manassas' stormwater system. During this last reporting period, the City began a systematic inventory of infected sites, and has begun an eradication/control program (using hand-pulling). The City has also been coordinating with regional partners that also have infestations. To date, water chestnut has been confirmed in the following stormwater BMPs:
 - 1) Point of Woods Pond (City owned and maintained), moderate population
 - 2) Public Works Pond (City owned and maintained), heavy population
 - 3) Merchant Tire Pond (privately owned and maintained), heavy population
 - 4) Owens Brooke-Upstream Pond (City owned & maintained), minor population
 - 5) Signal Hill-Richmond Pond (City owned and maintained), minor population

2.7 Special Conditions – Implementation of TMDL Action Plans (SECTION I B 5 and SECTION I C 2)

Special Conditions for Approved Total Maximum Daily Loads (TMDLs) other than the Chesapeake Bay TMDL: The City currently has four (4) local wasteload allocations (WLAs) assigned for local waters. Table 13 provides a summary of those WLAs.

Table 26 Summary of Current WLAs Assigned to the City for Local Waters

Watershed	Pollutant	WLA	*Est. Watershed Discharge (cu. ft.)	*Est. Pollutant Discharge
Bull Run	Sediment	210 tons	~129499	< 210 tons
Bull Run	E. coli	6.82 E+09 cfu	~129499	< 6.82 E+09 cfu
Broad Run	E. coli	1.15 E+10 cfu	~129499	< 1.15 E+10 cfu
Occoquan River	E. coli	2.95 E+10 cfu	~258999	< 2.95 E+10 cfu

*Quantities derived from average rainfall and drainage area, no field testing was completed.

Bacteria TMDLs for Popes Head Creek, Broad Run, Kettle Run, South Run, Little Bull Run, Bull Run and the Occoquan River

P4/Y2 (FY2020) Accomplishments

The TMDL details that 99% of Manassas City properties are tied directly to the sanitary sewer. As such, bacteria contribution from human sources is currently being managed. To minimize contribution from the sanitary system, the City's Department of Utilities maintains an annual inspection and maintenance program. The Department of Utilities also implements a capital improvement program aimed, in part, to replace and rehabilitate aging sewer infrastructure, increase system reliability and maintain regulatory compliance. These pollutant reduction activities represent a significant effort by the City to reduce bacteria discharges to receiving waters that are outside of the City MS4 program.

In addition to the efforts regarding sanitary sewer described above, the City continues to expend effort to reduce other sources of bacteria contribution to the impaired receiving waters through IDDE and public education and outreach. Aside from those activities discussed regarding the six (6) MCMs, the City of Manassas completed the following during the reporting period:

- Maintenance and upkeep of a web page for submitting concerns regarding both sanitary and storm sewer issues.
- Continued pet waste facility implementation at locations where pet owners often frequent with their pets such as within the stormwater BMP located in Kinsley Mill Park, and the Sumner Lake Regional Stormwater Management Facility (Figure 4).
- Continued outreach to increase public awareness regarding pet cleanup through public signage and the City web page.

- The City also installed a number of pet waste stations in parks, expanding on stations already located in many private residential developments in Manassas.
- Waterfowl Monitoring

As stated in the City's Local TMDL Action Plan, during this current reporting period, the City initiated an on-going geese/waterfowl monitoring project. The first phase of this monitoring project began on Point of Woods and Public Works Ponds. Both of these stormwater wet ponds are city-owned and managed. While this monitoring project has so far been focused on these two ponds, incidental waterfowl data was also collected at the following seven stormwater ponds: Sumner Lake, Owens Brooke Upstream, Owens Brooke Downstream, Lucasville Pond, Villages at Manassas Pond (private), Waterford Drive Pond (private), and the Hospital Pond.

A note regarding these bird observations: casual observations during the summer months (not indicated in the official counts) lead to the conclusion that this summer resident population may share its habitat with other nearby waters. Some days, and some portions of the day, may contain a high bird population, and then they fly off—and only to return a day or two later. What the other nearby waters this population uses is unknown.

To characterize waterfowl populations, one would have to differentiate between year-round resident geese populations and the wild migrating segment that only overwinters in area waters. The migrating populations likely leave Manassas in early March bound for breeding in the eastern Arctic. The return in the fall to overwinter in our milder climate.

The resident populations often have the greatest impact on area waters, and their locally-born offspring will likely remain year-round residents, so this segment of the population usually increases (if other local conditions remain the same).

Table 27 Waterfowl Monitoring Results for the Combined Public Works and Point of Woods Ponds (during the 7/1/2019 to 6/30/2020 reporting period)

Date	Geese Count	Non-Geese Waterfowl Count	Combined Waterfowl Count
01/09/2020	4	32	36
01/10/2020	72	43	115
01/13/2020	66	13	79
01/14/2020	119	4	123
01/16/2020	40	26	66
01/17/2020	23	26	49
01/21/2020	106	34	140
01/30/2020	167	7	174
Mean Winter Population	75	23	98
02/19/2020	0	9	9
03/03/2020	30	9	39
03/31/2020	31	1	32
Mean Transition Period	20	6	27
06/01/2020	74	1	75
06/16/2020	51	0	51
Mean Summer Pop.	63	1	63
Mean Overall Population	60	16	76

In the winter months, the largest population of non-Canada goose species is the hooded merganser. Non-Canada goose use of these ponds in the summer months appear minimal, with only an occasional mallard.

The New Hampshire Department of Environmental Services estimates that an average Canada goose may defecate as much as 3 pounds a day, and these feces contains on average 4.4-percent nitrogen and 1.3-percent phosphorus—two of the biggest pollutants in area waters and the Chesapeake Bay. Using these figures as a rough estimate, then these 76 waterfowl in these two adjacent waters may be contributing as much as 83,220 pounds of bird feces into these Manassas waters—a Bull tributary. Using these New Hampshire Department of Environmental Services data, this 83,220 pounds of feces may contribute as much as 3,600 pounds of nitrogen and 1,000 pound of phosphorus into these already nitrogen and phosphorus impaired waters.

P4/Y3 (FY2021) Proposed Activities

The City proposes to implement the following during the upcoming reporting period:

- Continued implementation of its IDDE program.
- Continued implementation of its public outreach program.

- Evaluation and update of the Bacteria TMDLs for Popes Head Creek, Broad Run, Kettle Run, South Run, Little Bull Run, Bull Run and the Occoquan River Action Plan in a manner compliant with the 2018 MS4 General Permit.

Benthic TMDLs for the Bull Run Watershed

P4/Y2 (FY2020) Accomplishments

In addition to the pollutant reduction efforts discussed regarding the six (6) MCMs, the City of Manassas completed the following during the current reporting period:

- Continued implementation of its Virginia Erosion and Sediment Control Program (VESCP) including the more conservative requirement that land disturbing activities that disturb greater than 2,500 square feet obtain a permit from the City.
- Continued implementation of its VSMP program.
- Continued implementation of its enhanced street sweeping program.
- The City took the initiative to contract with GKY for them to perform a detailed and comprehensive program evaluation for the entire stormwater-related functions within the City.

P4/Y3 (FY2021) Proposed Activities

The City proposes to implement the following during the upcoming reporting period:

- Continued implementation of its VESCP including the more conservative requirement that land disturbing activities that disturb greater than 2,500 square feet obtain a permit from the City.
- Continued implementation of its VSMP program.
- Continued implementation of its enhanced street sweeping program.
- Continues evaluation and update of the Benthic TMDLs for the Bull Run Watershed Action Plan in a manner compliant with the 2018 MS4 General Permit as needed.

Special Condition for the Chesapeake Bay TMDL

Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment

P4/Y2 (FY2020) Accomplishments

During the current reporting period, the City continued to address required pollutant of concern (POC) reductions in response to the Chesapeake Bay TMDL for Nitrogen, Phosphorus and Sediment as follows:

- Continued implementation of its VESCP to address POC loads from Transitional Sources. The City continues to require E&S control plans from land disturbing activities greater than 2,500 square feet, which is more conservative than the State mandated 10,000 square feet.
- Continued implementation of its VSMP to address POC loads from New Sources.
- Continue to address Existing Source POC loads by:
 - Continued evaluation of salt management strategies by the Department of Public Works
 - Continued implementation of its contract with TruGreen to ensure proper nutrient management on 30.74 acres of City property.

P4/Y3 (FY2021) Proposed Activities

The City proposes to implement the following during the upcoming reporting period:

- Continued implementation of its VESCP including the more conservative requirement that land disturbing activities that disturb greater than 2,500 square feet obtain a permit from the City.
- Continued implementation of its VSMP program.
- Continued implementation of its enhanced street sweeping program.
- Continued evaluation and update of the Chesapeake Bay TMDL Action Plan in a manner compliant with the 2018 MS4 General Permit as needed.
- Implementation of a capital improvement plan that addresses existing SWM facility retrofits. Potential projects have been identified in reports from 2018 and 2020 that articulate retrofit options, pollutant reductions, and cost estimates. Both reports were completed consultant GKY.
- Planning for the selection, design, and construction of prioritized stream restoration projects.

3.0 RESULTS OF INFORMATION COLLECTED AND ANALYZED

The City of Manassas continued its preliminary monitoring program of the City's stormwater. Some goals and focus areas of this monitoring is as follows:

- Using water quality sondes sampling equipment, better characterize and identify typical surface water, groundwater, and stormwater water in order to aide illicit discharge investigations.
- Better understand and identify the source(s) of the high nutrients in Sumner Lake.
- Provide sound water quality data to inform management decisions relative to stormwater and natural stream activities.
- Explore better ways to manage and implement its algae management program and responses that are more consistent with water quality and ecosystem function improvement.
- Explore better metrics to gage the effectiveness of algae treatment and water quality improvement projects.

This monitoring program continues to be a long-term monitoring effort. There have been 11 sampling events since this inventory began. Water quality data was collected from 39 different locations, ranging from public and private stormwater ponds (both the inlet and outlets), natural surface water streams, and illicit discharges currently under investigation. Field data collected from the 39 sampling locations is summarized in Table 28:

Table 28

Summary of Water Quality Monitoring within City's Waters

Parameter	N	Mean	SD	Range
Temperature (degrees C)	161	16.1	9.4	1.7 to 36.8
Dissolved Oxygen Saturation (%)	129	90.2	32.0	23.3 to 193.8
Dissolved Oxygen Saturation (mg/L)	161	9.4	3.3	1.67 to 15.91
Specific Conductance (uS/cm)	161	415.6	668.3	94.5 to 8,322
pH	161	7.64	0.56	6.18 to 9.81
Chlorophyll (ug/L)	107	14.0	21.9	-0.04 to 137.40
Turbidity (NTU)	122	7.6	8.9	0.42 to 58.9
Nitrite (mg/L)	88	0.02	0.03	0 to 0.184
Nitrate (mg/L)	20	3.54	9.80	0.22 to 45.8
Total Nitrogen (mg/L)	20	4.14	9.3	0.62 to 45.3
Free Ammonia (mg/L)	86	0.26	1.12	0 to 10.0
Total Ammonia (mg/L)	81	0.26	1.18	0.005 to 10.6
Orthophosphate (mg/L)	86	0.22	0.35	0 to 2.06
Total Phosphorus (mg/L)	20	0.32	0.12	0.085 to 0.606
Mono-chlorimine (mg/L)	86	0.007	0.05	0 to 0.44
Alkalinity	86	66	35.3	20 to 197
Hardness	86	91	84.7	22 to 700

Table 29 Mean Water Quality and Nutrient Values for Select Manassas Waters

Parameter	Hospital Pond	Lucasville Pond	Owens Brooke Upstream Pond	Public Works Pond	Sumner Lake	Wakeman-Small Pond	Winters Branch Pond	Russia Branch Stream
Temp. (deg. C)	16.0	22.3	21.8	19.4	16.3	21.2	19.6	17.3
Dissolved Oxygen (mg/L)	8.4	8.8	7.9	8.6	9.2	11.7	8.5	8.7
SpC (uS/cm)	239.9	220.8	150.0	180.9	281.8	422.4	298.8	294.6
pH	7.5	8.1	7.9	7.3	7.9	8.5	7.8	7.4
Nitrite (mg/L)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Nitrate (mg/L)	0.3	0.3	0.2	0.7	0.8	0.3	1.8	1.4
Total Nitrogen (mg/L)	2.0	1.9	1.4	1.5	1.7	0.9	2.9	1.9
Total Ammonia (mg/L)	0.1	0.1	0.0	0.2	0.1	0.1	0.2	0.1
Orthophosphate (mg/L)	0.2	0.0	0.2	0.1	0.6	0.0	0.2	0.2
Total Phosphorus (mg/L)	0.6	0.3	0.4	0.3	0.4	0.2	0.5	0.3
Notes	Phos. concern, otherwise average	Generally healthy	Generally healthy, but shows some nutrient issues	Beginning to show some signs of nutrient stress	Multiple signs of nutrient stress	Healthy from a nutrient perspective but very high mean SpC value	Nutrient Stressed	This is the only stream on this chart: the others are ponds

Key: The red highlights depicts the highest of the mean values for the listed nutrient-related parameters.

Note: the above sites are not the only waters monitored, but these are mostly city-owned waters and are distributed fairly evenly throughout the City within all major watersheds.

Table 30 Summary of Stormwater-related Complaints Received during Reporting Period⁷

Category	Number Complaints
Stormwater Infrastructure	17
Stormwater Drainage	15
Stream/Stormwater Pollution	13
Improper Swimming Pool Discharge	3
Floodplain	1
Improper Water Flushing	1
Erosion	1
Total	51

As this long-term monitoring project continues, it will provide the City with more refined data to better characterize water quality parameters within the City's waters.

⁷ These categories are imprecise. For instance, some infrastructure complaints may have been due to a clogged inlet, which resulted in drainage and flooding concerns.

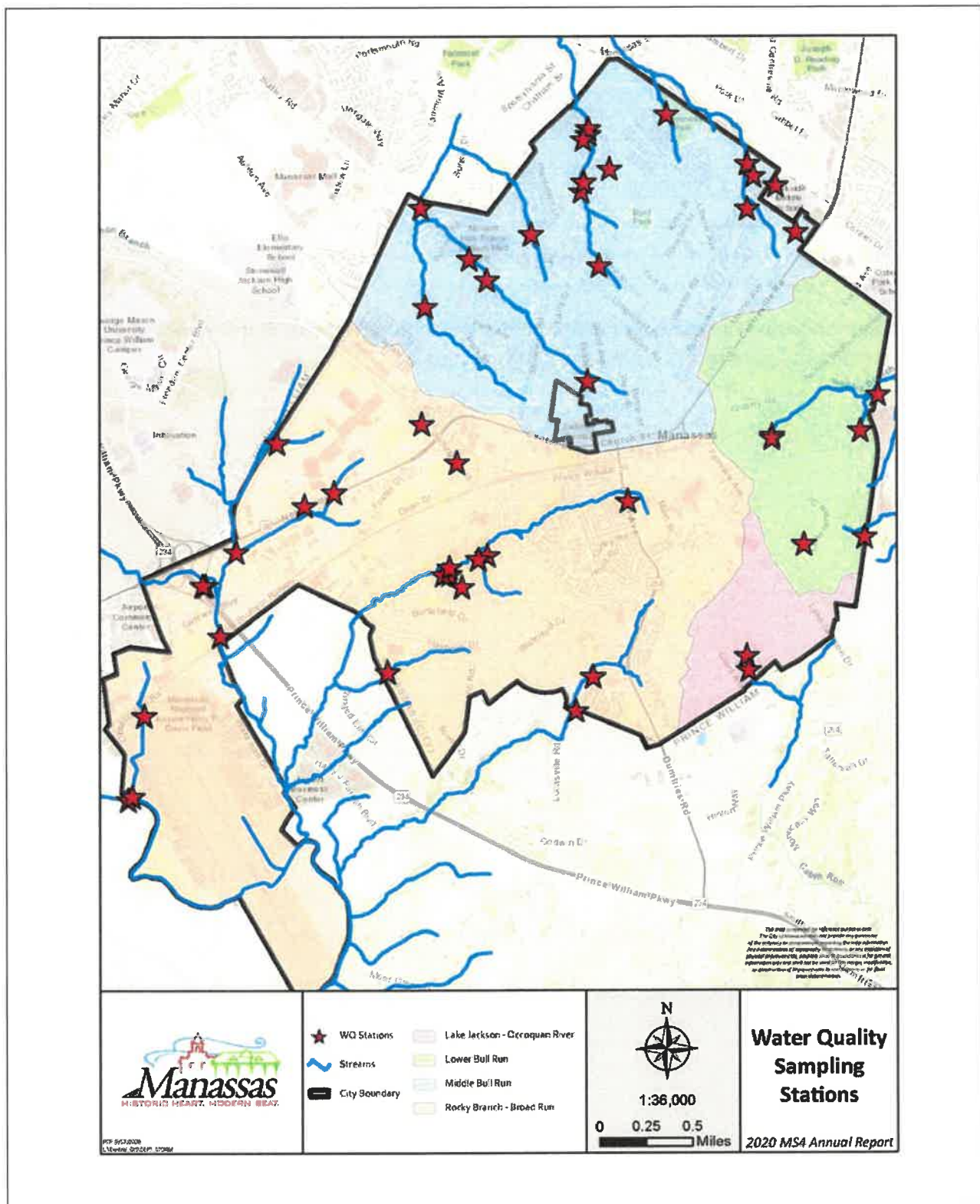


Figure 12 Location of the City's Water Quality Monitoring Stations

4.0 SUMMARY OF ACTIVITIES PLANNED FOR PERMIT 4/PERMIT YEAR 3

During P4/Y3, the City will continue to implement the activities identified in the current MS4 Program Plan, relating to public outreach and participation, public involvement, illicit discharge and elimination, construction site stormwater runoff control, post-construction stormwater management, good housekeeping for municipal operations, and TMDL specific projects. The City will update the MS4 Program Plan to meet the requirements of the next year within the permit's coverage.

5.0 CHANGES IN IDENTIFIED BMPs OR MEASURABLE GOALS

No changes in BMPs or measurable goals were identified for any of the MCMs including steps to be taken to address any deficiencies as of this report's completion. Any changes will be submitted to VADEQ when identified.

6.0 RELIANCE ON OTHER GOVERNMENT AND THIRD-PARTY ENTITIES

During this reporting period, the City MS4 and TMDL programs were implemented under the supervision of the City's Department of Utilities. Utilities utilizes other City departments to assist in the implementation of the City's stormwater management program. The City does not rely on any other government entities or third parties to meet the requirements of the MS4 General Permit.

