City of Hopewell

Municipal Separate Storm Sewer System Program Plan & Annual Report

For

General Permit No. VAR040015

And

Annual Reporting from

July 1, 2017 through June 30 2018

Submitted: September , 2018

This plan and annual report is submitted in accordance with 9VAC25-890-30 and 9VAC25-890-40 as part of the registration statement for permit coverage to discharge stormwater to surface waters of the Commonwealth of Virginia consistent with the VAR04 General Permit, effective July 1, 2013.

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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 ensure 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."

Printed Name: John M. Altman, Jr.
Title: City Manager

Signature: John M. Altman Date: 9.25.18

DEFINITIONS

Definitions provided herein do not supersede those within the City of Hopewell's City Code, but are solely intended to supplement interpretation of the City's MS4 Program Plan and Annual Report.

"Best management practice" or "BMP" means schedules of activities, prohibitions of practices, including both structural and nonstructural practices, maintenance procedures, and other management practices to prevent or reduce the pollution of surface waters and groundwater systems from the impacts of land-disturbing activities.

"Chesapeake Bay Preservation Act land-disturbing activity" means a land-disturbing activity including clearing, grading, or excavation that results in a land disturbance equal to or greater than 2,500 square feet and less than one acre in all areas of jurisdictions designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations (9VAC25-830) adopted pursuant to the Chesapeake Bay Preservation Act.

"Chesapeake Bay watershed" means all land areas draining to the following Virginia river basins: Potomac River Basin, James River Basin, Rappahannock River Basin, Chesapeake Bay and its small coastal basins, and York River Basin.

"Construction activity" means any clearing, grading or excavation associated with large construction activity or associated with small construction activity.

"Department" means the Department of Environmental Quality.

"Discharge," when used without qualification, means the discharge of a pollutant.

"Drainage area" means a land area, water area, or both from which runoff flows to a common point.

"Hydrologic Unit Code" or "HUC" means a watershed unit established in the most recent version of Virginia's 6th Order National Watershed Boundary Dataset.

"Illicit discharge" means any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except discharges resulting from firefighting and the following discharges, unless identified by the MS4 operator as significant contributors of pollutants: water line flushing, landscape irrigation, diverted stream flows, rising groundwaters, uncontaminated groundwater infiltration, uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water.

"Impervious cover" means a surface composed of material that significantly impedes or prevents natural infiltration of water into soil.

"Land disturbance" or "land-disturbing activity" means a man-made change to the land surface that potentially changes its runoff characteristics including clearing, grading, or excavation except that the term shall not include those exemptions specified in Section 1-3) of the City of Hopewell's Stormwater Management Ordinance.

"Municipal separate storm sewer" or “MS4” means a conveyance or system of conveyances otherwise known as a municipal separate storm sewer system, including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains.

“MS4 Program Plan” means the completed registration statement and all approved additions, changes and modifications detailing the comprehensive program implemented by the operator under this state permit to reduce the pollutants in the stormwater discharged from its municipal separate storm sewer system (MS4) that has been submitted and accepted by the department.

"Outfall" means, when used in reference to municipal separate storm sewers, a point source at the point where a municipal separate storm sewer discharges to surface waters and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other surface waters and are used to convey surface waters.

“Public” means, for the purpose of this Program Plan, the general population who work and/or live within the City’s limits

"State waters" means all water, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction, including wetlands.

"Stormwater" means precipitation that is discharged across the land surface or through conveyances to one or more waterways and that may include stormwater runoff, snow melt runoff, and surface runoff and drainage.

"Stormwater management plan" means a document(s) containing material for describing methods for complying with the requirements of the Virginia Stormwater Management Program

"Total maximum daily load" or "TMDL" means the sum of the individual wasteload allocations for point sources, load allocations (LAs) for nonpoint sources, natural background loading and a margin of safety. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure. The TMDL process provides for point versus nonpoint source trade-offs.

"Virginia Stormwater Management Handbook" means a collection of pertinent information that provides general guidance for compliance with the Act and associated regulations and is developed by the department with advice from a stakeholder advisory committee.

"Wasteload allocation" or "wasteload" or "WLA" means the portion of receiving surface water's loading or assimilative capacity allocated to one of its existing or future point sources of pollution. WLAs are a type of water quality-based effluent limitation.

"Watershed" means a defined land area drained by a river or stream, karst system, or system of connecting rivers or streams such that all surface water within the area flows through a single outlet.

1.0 PROGRAM PLAN STRUCTURE

The City of Hopewell's MS4 Program Plan is structured to serve as a stand-alone document that, when implemented, meets the requirements of the VAR04 *General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4s)*, referred to in the remainder of this Plan as the General Permit. This Program Plan consists of Best Management Practices (BMPs) targeted to address specific Minimum Control Measures (MCMs) and is implemented over a five-year period that started in 2013. The Program Plan implementation is intended to be an iterative process that seeks to improve the effectiveness the plan. To facilitate this iterative process, measures of effectiveness are incorporated into each BMP and this annual report itemizes any changes to BMPs or the implementation schedule as noted below.

1.1 Minimum Control Measures

The General Permit requires the City's Program Plan to include BMPs to address the requirements of six minimum control measures (MCMs) described in Section II of the General Permit. The MCMs are summarized as:

- MCM 1: Public Education and Outreach on Stormwater Impacts
- MCM 2: Public Involvement and Participation
- MCM 3: Illicit Discharge Detection and Elimination
- MCM 4: Construction Site Stormwater Runoff Control
- MCM 5: Post-construction Stormwater Management
- MCM 6: Pollution Prevention/Good Housekeeping for Operations

1.2 Best Management Practices

Section 3.0 of the Plan includes BMPs developed to explicitly address each General Permit requirement for each MCM. Each BMP included in the Program Plan is provided in a series of text boxes. The first text box for each BMP provides the BMP number and title, and a reference to the corresponding permit section in the heading, with additional information about the BMP as follows:

BMP 1.2 Develop Public Education & Outreach Program (Section II B.1.c.1-6)
Description:
Documentation:
Responsible individual for implementation:
Objectives and expected results in meeting measurable goals:
Implementation schedule:
Method to determine effectiveness:

This represents the BMP initially developed in 2013.

The second text box for each BMP is the **Annual Reporting Form** which indicates the progress made during the reporting year. The third text box is the **Measure of Effectiveness Form** which provides an assessment of how well the BMP worked in reaching the goals outlined in the Program Plan.

These text boxes allow for a quick review of the status of each BMP and how it has performed as measured using the method to determine effectiveness. The completion of these forms requires all information necessary to explicitly satisfy the reporting requirements of the General Permit

1.3 Special Conditions for Chesapeake Bay and Local Water TMDLs

The City of Hopewell is subject to the Special Conditions for the Chesapeake Bay TMDL that requires the development and submission to DEQ (the Department), for its review and acceptance, an approvable TMDL Action Plan. The City's *Chesapeake Bay TMDL Action Plan* (**BMP CB-SC.1**) and *Action Plan Implementation* (**BMP CB-SC.2**) are provided in **Section 3.2** and are presented in the same three text box format as the BMPs in Section 3.1.

The City of Hopewell is also subject to the TMDL Special Conditions for the following approved local TMDLs where a waste load allocation (WLA) has been assigned to the City:

- Appomattox River Watershed TMDL for *E. coli*, approved December 20, 2005
- James River-Hopewell to Westover Watershed TMDL for *E. coli*, approved April 28, 2009

The Special Conditions require the City to update this Program Plan to incorporate implementation of TMDL Action Plans that identify best management practices and milestones to be implemented during the remaining term of this permit cycle which concludes July 1, 2018. BMPs for these local TMDLs are provided in **Section 3.3** for development and implementation of Action Plans to address the *E. coli* TMDLs listed above.

BMPs are also provided to ensure the City annually determines if a WLA has been assigned during the reporting year and to provide public opportunity for participation in development of new TMDLs.

1.4 Annual Reporting

The City will submit an Annual Report to the Department of Environmental Quality (DEQ) by October 1st of each year with the reporting period spanning from July 1st through June 30th. This report includes all information necessary to explicitly satisfy the reporting requirements of the General Permit:

- Cover sheet, which will be updated with the specific reporting year;
- Certification, that follows the table of contents and will be signed;
- "Annual Reporting – General Information Form" on the following page, completed annually;
- The "Annual Reporting Form" following each BMP in **Section 3**; and
- The Measure(s) of Effectiveness Form following each BMP in **Section 3**.

Information compiled for effectiveness for each BMP in **Section 3.0** will be utilized to evaluate and, if necessary, modify the respective BMP. Any modifications will be reported in the "Annual Reporting – General Information Form" in **Section 1.5**. Any modifications to the Program made by the City will be done in accordance with the General Permit requirements described in **Section 1.6**.

The General Permit requires certification of the annual report which is provided immediately after the table of contents of this document. Certification is required by a principle executive officer or a duly authorized representative. The duly authorized representative has overall responsibility of the City operations and written authorization will be provided to the Department.

1.5 Annual Reporting – General Information Form	
➢ The BMPs described in Section 3 of this Program Plan/Annual Report are the stormwater activities that the City plans to undertake during the remainder of the permit cycle. ➢ The City does not rely on another entity to implement portions of their MS4 Program Plan. ➢ Completed Annual Reporting Forms for each BMP in Section 3 provide an assessment of the appropriateness of each BMP, progress towards achieving each measurable goal, and results of collected information analyzed for appropriate assessments and effectiveness of the BMP. ➢ See the updated Outfall Inventory in Appendix C for new MS4 outfalls that came online during the reporting year and their associated drainage area by HUC.	
➢ Did modifications to the responsible individual of any program role or responsibility or specific BMP included in the Program occur during the reporting year? (yes/no)	☐ Yes ☒ No
If yes, list modifications (provide BMP # to reference modification rationale):	
➢ Based on a review of the reporting forms completed for the reporting year within Section 3 of this Program Plan, does the City finds itself compliant with the permit conditions (yes/no):	☒ Yes, the City is compliant ☐ No (see below)
If no, listed below are additional BMPs and/or changes made to BMPs or measurable goals for any of the MCMs, including steps to address any deficiencies (Refer to Section 1.5):	
➢ Does the City's MS4 directly discharge to waters that are identified as impaired in the 2010 § 305(b)/303(d) Water Quality Assessment Integrated Report? (yes/no)	☒ Yes ☐ No
If yes, list the impaired waters and pollutant impairment: James River: bacteria, benthic, pH; Appomattox River: PCB in fish tissue, bacteria; Bailey Creek/Cattail Creek: PCB in fish tissue, PCB in water column, bacteria; Cattail Creek: pH; Poythress Run: PCB in fish tissue, PCB in water column, pH	
➢ Based on the water quality issues identified in BMP 1.2 and impairments identified above, does a review of the effectiveness of the BMPs listed in the program indicate they are appropriate? (yes/no)	☒ Yes ☐ No
Explain water quality issues identified in BMP 1.2 effectiveness in context to the impairment waters identified above or identify potential modifications if not effective: <u>Water quality issues and their corresponding relevant messages on outreach material are effective since they address pollutants of concern.</u>	

1.6 Program Modifications

Modifications to the MS4 Program may occur throughout the life of this Program Plan as part of an iterative process to reduce the pollutant loadings and to protect water quality. Modifications will most often be made when a BMP is deemed ineffective, based on reporting for the "Measure of Effectiveness Forms" for each BMP in **Section 3**. When a BMP is determined ineffective, updates and modifications to the MS4 Program must be made in accordance with the following procedures:

- Adding (but not eliminating or replacing) BMPs may be made by the City at any time. Additions shall be reported as part of the annual report in the "Annual Reporting – General Information Form" in **Section 1.5**.
- Updates and modifications to specific standards and specifications, schedules, operating procedures, manuals, checklists, and other documents routinely evaluated and modified are permitted provided that the updates and modifications are done in a manner that:
    - Is consistent with the conditions of the General Permit;
    - Follow any public notice and participation requirements established in the General Permit; and
    - Are documented in the annual report in the "Annual Reporting – General Information Form" in **Section 1.5**.
- Replacing, or eliminating without replacement, any ineffective or infeasible strategies, policies, and BMPs with alternate strategies, policies, and BMPs may be requested at any time. Such requests must include the following:
    - An analysis of how or why the BMPs, strategies, or policies are ineffective or infeasible, including cost prohibitive;
    - Expectations on the effectiveness of the replacement BMPs, strategies, or policies;
    - An analysis of how the replacement BMPs are expected to achieve the goals of the BMP's to be replaced;
    - A schedule for implementing the replacement BMPs, strategies, and policies;
    - An analysis of how the replacement strategies and policies are expected to improve the City's ability to meet the goals of the strategies and policies being replaced;
    - Requests or notifications made in writing to the Department and signed by a principle executive officer or a duly authorized representative; and
    - The City follows the public involvement requirements identified in the General Permit.

2.0 SCHEDULE

As discussed in Section 1, each BMP described in Section 3 of the Program Plan includes an implementation schedule. Some of the BMPs require supplemental actions to be taken to assist in the development or implementation of the BMP. Table 1 lists some of these actions with a summary of dates critical for assuring compliance with the permit. The Table is not intended to provide schedules for Program BMP implementation; but only to assist with Program Plan implementation.

Table 1. Summary of critical items and deadlines for program implementation.

BMP	Necessary Action	Due date
2.2	Public participation activities	4x annually
2.1	Post Annual Report on website	30 days after submittal
6.3a	Employee Good Housekeeping/Pollution Prevention Training Plan	**Complete**
1.1, 1.2	Provide for public participation for education and outreach plan	**Complete**
1.2	Public Education/Outreach Plan	**Complete**
3.1	Notification of MS4 Interconnections	**Complete**
3.3	Develop IDDE Program Manual	**Complete**
6.3a	Written Training Program (see IDDE and Good Housekeeping/Pollution Prevention Manuals)	**Complete**
6.2	Identify high priority areas (see BMP 6.2)	**Complete**
5.3	Post-construction SWM Inspection/Maintenance Program Manual	**Complete**
3.4, 6.1	Good Housekeeping/Pollution Prevention Program Manual	**Complete**
1.2, 3.4, 4.2	Website postings (see BMPs for details)	**Complete**
6.3b, 6.5	Good housekeeping contract language for municipal contractors	**Complete**
3.3	Methodology for prioritizing outfalls	**Complete**
3.1	Storm sewer mapping/information table	**Complete**
5.2	Update BMP database attributes	**Complete**
6.2	High-priority facility SWPPP implementation	**Complete**
CB-SC.1	Chesapeake Bay Action Plan	**Complete**
SC.1	Appomattox River E. Coli Action Plan	**Complete**
SC.2	James River-Hopewell E. Coli Action Plan	**Complete**

3.0 PROGRAM PLAN BEST MANAGEMENT PRACTICES

Minimum Control Measure 1: Public Education and Outreach on Stormwater Impacts

BMP 1.1 Public Participation for Public Education and Outreach Plan (Section II B.1.c.4)
Description: Public participation for the Public Education and Outreach Program (PEOP) consisted of feedback derived from City Engineering Staff, suggestions from MS4 Consultants with their experience from public education surveys taken from other MS4s, local Total Maximum Daily Loads (TMDLs), and general knowledge of City concerns. The City will provide for more expansive public participation using results from a survey distributed to the public. Results from the survey will be used to verify, or modify as necessary, the relevance of the current public education and outreach program (PEOP) water quality issues identified in BMP 1.2. The public survey will assess the public's knowledge and provide the opportunity for written comment. The results of the survey scheduled for next year will be used to inform the water quality issues in preparation of the PEOP in the next permit cycle. **Documentation:** (1) Public Survey; (2) Public Survey results **Responsible individuals for implementation:** Stormwater Program Manager and Stormwater Quality Analyst **Objectives and expected results in meeting measurable goals:** The objective is to include the broader public in the verification of water quality issues identified in the Public Education and Outreach Plan. **Implementation schedule**: The PEOP was developed in the first year of the permit cycle. An opportunity for broader public participation will be provided via a survey to be distributed in the winter of 2016-2017. Survey results will be incorporated, as appropriate, into the Public Education and Outreach Plan (BMP 1.2) to refine the PEOP as part of an iterative program. A public survey will be distributed again in the spring of 2018 before the end of the permit cycle to assess improvement in public knowledge of stormwater issues. **Method to determine effectiveness:** Effectiveness will be measured by the number of individuals responding to the survey and the incorporation of survey results into the Public Education and Outreach Plan.

BMP 1.1 Annual Reporting Form (Completed once during the development of the Public Education and Outreach Plan)	
Has pubic participation been incorporated into the development of the PEOP?	☒ Yes ☐ No
Dates that survey was distributed for broader public participation: The City previously scheduled to distribute a citizen survey this reporting year (July 1, '16 to June 30, '17) with the intent to verify, or modify as necessary the current PEOP. The distribution of the survey has been deferred. In its place, the City implemented a more expansive and interactive public participation and public outreach effort to gain a better understanding of local water quality issues and continue to update the Water Quality Issues in the PEOP. This effort is described in BMP 2.2.	
Number of surveys completed:	
Description of how survey results and responses were incorporated into the Program: Stormwater program staff participated in the 'Third Thursdays Open Air Market' to engage citizens and recruit for various participation activities.	

Documents are not provided in this report, but will be preserved according to the file retention policy.

BMP 1.2 Develop Public Education and Outreach Program (Section II B.1.c.1-6)

Description: Identify three (3) high priority water quality issues contributed to by the discharge of stormwater. For each issue identified, provide

- Rationale for the selection of each issue;
- An identification and estimate of population size of the target audience who is most likely to have significant impacts on the water quality issue; and
- A relevant message and educational and outreach materials to convey the message for distribution to the target audience.

Documentation: (1) Survey results from BMP 1.1; (2) Written Public Education and Outreach Plan describing the rationale of the selection of each water quality issue, identification of target audience and estimated population, and relevant message; (3) Materials described in the Public Education and Outreach Plan such as brochures.

Responsible individual for implementation: Stormwater Program Manager and Stormwater Quality Analyst

Objectives and expected results in meeting measurable goals: Objectives are to convey relevant information to target audiences regarding the specified water quality issues. The expected result is that the target audiences will have an increased knowledge of the water quality issues over time.

Implementation schedule: Outreach will be conducted a minimum of once a year to at least 20% of each target audience for each water quality issue identified in the Public Education and Outreach Plan.

Method to determine effectiveness: As described in BMP 1.1, two public surveys will be distributed to verify the appropriateness of PEOP water quality issues and to assess the effectiveness of the public's knowledge of the message delivered for each water quality issue. Effectiveness will be measured by using a scoring system to compare results of the two surveys to determine if public knowledge regarding each water quality issue has increased.

BMP 1.2 Annual Reporting Form				
Has a written Public Education and Outreach Plan been developed? The Public Education and Outreach Plan is part of the City's adaptive management process and is updated each year. It should be considered an Annual Public Education and Outreach Plan with which to allocate resources and guide the Plan's implementation by Program staff during the coming year.				☒ Yes ☐ No
If no, explain, if yes, summarize below: N/A				
Water quality Issue #	List of educational and outreach activities identified and implemented in **'17-'18** Public Education and Outreach Plan Update	Target Audience	# people to be reached for reporting year	Minimum % of target audience to be reached
1	Public education on stormwater issues (stream restoration)	General Public	2,000	20
2	Public education on special water quality concerns (E.coli, pet waste)	General Public	2,000	20
3	Public education on stormwater issues (connecting litter in storm drains to water quality)	General public	2,000	20
Water quality Issue #	List of educational and outreach activities that will be conducted during the ***next*** (**'18-'19**) reporting year	Target Audience	# people to be reached for reporting year	Minimum % of target audience to be reached
1	Public education on stormwater impacts	General Public	2,000	20
2	Education on special water quality concerns (E.coli)	General Public	2,000	20
3	Good housekeeping/pollution prevention practices	Staff	50 (Approximate)	90

Documentation related to the following Public Education and Outreach activities are provided in **Appendix A**:

1. City VSMP/Stormwater Website
2. Third Thursday Open Air Market, July 20, 2017
3. Third Thursday Open Air Market, August 17, 2017
4. Rain Barrel Installations: visit candidate homes August 11, then return September 15, 2017 to install rain barrels
5. Hopewell Harvest Festival, November 18, 2017
6. Beginning Gardening Class – segment on proper application and timing of fertilizers to reduce runoff and pollution
7. Third Thursday Open Air Market, June 21, 2018
8. Brochures and Door Hangers
9. Simulcast presentation to City Council: City Stormwater Program, January 23, 2018

BMP 1.2 Measure of Effectiveness Form	
Average "knowledge" score from previous survey:	TBD per schedule
Average "knowledge" score from latest survey:	TBD per schedule
Has the "knowledge" score gone up over the permit cycle?	☐ Yes (BMP effective) ☐ No ☒ N/A (See below)
If no, discuss potential ineffectiveness of the BMP (outreach materials, training approach, etc.): The use of a mailed survey has been deferred. In its place, the City implemented more expansive and interactive public education and outreach activities in an effort to gain a better understanding of citizen's knowledge of local water quality issues. These activities included the development and distribution of seasonal and/or topic specific brochures and door hangers, as well as an emphasis on reaching a larger audience with the Public Involvement & Participation activities. The notable result of these activities has been a significant increase in citizen reports of drainage issues and potential illicit discharges.	
If no, Suggest BMP modifications to the Program Plan with rationale to increase effectiveness:	

Minimum Control Measure 2: Public Involvement and Participation

BMP 2.1 Public Involvement through web posting of MS4 Program information (Section II B.2.a.1-2)
Description: The following documentation will be maintained on the City's stormwater website: • The latest version of this MS4 Program Plan and Annual Report, including the City's: o MS4 Program Plan document; o Public Education and Outreach Plan, as described in BMP# 1.2; o Illicit Discharge, Detection & Elimination Program Manual, as described in BMP# 3.3; o Post-Construction Stormwater Management Program Manual, as described in BMP# 5.3a; o Good Housekeeping/Pollution Prevention Manual, as described in BMP# 6.1; and the o TMDL Action Plans described in BMP# CB-SC.1 and BMP# SC.1. Public education and outreach materials developed for BMP 1.2 will include links maintained on the City's stormwater website. **Documentation:** (1) City of Hopewell MS4 Program Plan; (2) City of Hopewell MS4 Annual Reports; (3) Web address of posted materials; (4) Educational and outreach material from BMP 1.2 **Responsible individual for implementation:** Stormwater Program Manager **Objectives and expected results in meeting measurable goals:** Objectives are to provide an opportunity to the public to review the City's MS4 Program documentation. Expected results are an increase in public knowledge of the effects of stormwater runoff on water quality and BMPs implemented by the City to improve water quality from stormwater runoff. **Implementation schedule**: The City's Program Plan and Annual Report are included in this single document. This document will be posted on the web page within 30 days of submittal to DEQ, or by November 1st of each year. **Method to determine effectiveness:** Same as BMP 1.2.

BMP 2.1 Annual Reporting Form
Web link to the City's Program Plan/Annual Report is provided below:
http://hopewellva.gov/stormwater-permit

City Website documents are provided in **Appendix A**.

BMP 2.2 Public participation (Section II B.1.b)
Description: The City of Hopewell will participate, through promotion, sponsorship, or other involvement, in a minimum of four local activities annually. **Necessary documentation for implementation:** (1) A list of public participation opportunities; (2) Documentation of participation for each activity. **Responsible individual for implementation:** Stormwater Program Manager **Objectives and expected results in meeting measurable goals:** The objective is to increase public participation to reduce stormwater pollutant loads; improve water quality; and support local restoration and clean-up projects, programs, groups, meetings, or other opportunities for public involvement. Measurable goals include a measure or estimation of the number of people that participate in each local activity. **Implementation schedule**: Public participation will be conducted a minimum of four times a year. **Method to determine effectiveness:** Effectiveness will be determined by successful public turn-out or exposure at each event. Selection of specific events may be modified from year to year based on opportunity, the potential impact of the audience that can be reached, and anticipated public turn-out.

Documentation of the following Public Involvement & Participation activities are provided in **Appendix B**:

1. Storm drain stenciling with the James River Association and Art on Wheels
2. Storm drain painting in selected neighborhoods
3. Litter pick up and brush removal at Harry E. James Elementary School stormwater basin
4. Litter pick up at Virginia American Water Co and the Appomattox River
5. Litter pick up in association with CBF's Clean the Bay Day

BMP 2.2 Annual Reporting Form		
Local activity #1 Description and Date	Participation Type	Est. # people reached
James River Association: Paint Out Pollution August 31, 2017 Stenciled Eagle, Osprey, Blue Crab, Box Turtle onto selected storm drains in downtown area	☐ Promotion ☐ Sponsorship ☒ Other: Participation	10,000
Summary of documentation that demonstrates participation: Photos, map of storm drains to be marked from the presentation to City Council		
Activity effective? ☒ Yes ☐ No	Explain why it was effective: Everyone visiting businesses sees them. They still look great and attract citizen and visitor appreciation.	
Local activity #2 Description and Date	Participation Type	Est. # people reached
Paint anti-pollution messages on selected storm drains, multiple dates in August and November 2017	☐ Promotion ☒ Sponsorship ☒ Other: Participation	2,000
Summary of documentation that demonstrates participation: Photos of artwork, photo showing children who painted their neighborhood drain.		
Activity effective? ☒ Yes ☐ No	Explain why it was effective: Everyone loves the artwork! Each site had a unique stencil that was chosen by local residents. Each receiving stream was also identified.	
Local activity #3 Description and Date	Participation Type	Est. # people reached
Litter pick-up and brush removal at the Harry E. James Elementary School stormwater basin April 20, 2018	☒ Promotion ☒ Sponsorship ☒ Other: Participation	150
Summary of documentation that demonstrates participation: Photos, “thank- you” email from Hopewell Public Schools staff		
Activity effective? ☒ Yes ☐ No	Explain why it was effective: Volunteers from local industry Ashland Specialty Chemicals participated in this first Earth Day-related project	
Local activity #4 Description and Date	Participation Type	Est. # people reached
Litter pick-up at Virginia American Water Co and along the shore of Appomattox River April 13, 2018	☒ Promotion ☐ Sponsorship ☒ Other: Participation	20
Summary of documentation that demonstrates participation: Photos		
Activity effective? ☒ Yes ☐ No	Explain why it was effective: Volunteers, staff from Chesapeake Bay Foundation, Recreation and Parks staff, and Stormwater staff worked together. It was a good team-building experience and together we removed 2 truckloads of trash and 1 trailer load of tires	

Local activity #5 Description and Date	Participation Type	Est. # people reached
CBF's Clean the Bay Day - Litter pick-up along detention ponds behind Oaklawn Blvd June 2, 2018	☒ Promotion ☒ Sponsorship ☒ Other: Participation	20
Summary of documentation that demonstrates participation: Photo		
Activity effective? ☒ Yes ☐ No	Explain why it was effective: A volunteer, staff from Chesapeake Bay Foundation and Stormwater staff worked together in this isolated spot. We hauled 150 pounds of mostly plastic	

Documentation is located in Appendix B

BMP 2.2 Measure of Effectiveness Form
If ineffective activity identified above, describe modifications to be made for next reporting year (e.g. different activity or different approach):

Minimum Control Measure 3: Illicit Discharge Detection and Elimination

BMP 3.1 Storm Sewer Outfall Map and Outfall Information Table (Section II B.3.a.1-5)

Description: The City of Hopewell will maintain an accurate storm sewer system map and update the associated information table per Section II.B.3.a (1-5) of the General Permit. The map, at a minimum, will:

- Continue to include the mapped location of all MS4 outfalls with a unique identifier that corresponds to the information table;
- Continue to include the name and location of all waters receiving discharges from City's MS4 outfalls and the associated sixth order hydrologic unit code (HUC) from Virginia's 6th Order National Watershed Boundary Dataset; and
- Continue to be updated in the case of installation of new outfalls.

The information table, at a minimum, will:

- Continue to include a unique identifier for each outfall;
- Will be updated to estimate acreage served by each outfall;
- Will be updated to include the name of the receiving surface water and indication as to whether the receiving water is listed as impaired on the Virginia 2010 303(d)/305(b) list; and
- Be updated to name any applicable TMDL or TMDLs into which the outfall discharges.

The information table will be updated as new outfalls come on-line. The City will notify downstream MS4s where applicable and in writing of any new or newly discovered interconnections that occur with new development.

Documentation: (1) Storm Sewer System Outfall Map; (2) Outfall Information Table; (3) Written notification of new physical interconnections to the downstream MS4, where applicable.

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective is to maintain an up-to-date map of the storm sewer outfalls that provides a tool for the City's Illicit Discharge Detection and Elimination Program (see BMP 3.3). Expected results are that the mapping and the information table will serve as a useful tool for tracking potential illicit discharges.

Implementation schedule: The storm sewer mapping and information table has been completed. The mapping and information table will be updated each year as new outfalls are installed or additional outfalls are identified.

Method to determine effectiveness: Effectiveness will be determined based on its use as a tool for identifying illicit discharges.

BMP 3.1 Annual Reporting Form	
Outfall Inventory (Storm Sewer) Information Table is available in Appendix B	
Has the Information Table been updated per the current General Permit and as described in this BMP? (yes/no)	☒ Yes ☐ No
If no, explain: N/A	
Notifications to interconnected MS4s	
➢ During the reporting year, were any new outfalls installed or identified that physically interconnect to another MS4? (yes/no)	☐ Yes ☒ No
If yes, has the interconnected MS4 received written notification from the City regarding the interconnection? (yes/no or not applicable)	☐ Yes ☐ No ☒ N/A
If yes, list the notified MS4 written notifications by providing the MS4: 30 new outfalls were identified during the reporting year and the outfall mapping and outfall tables were updated accordingly, to represent a total of 237 outfalls. However, no new physical interconnections were identified. VDOT and Fort Lee were previously notified of interconnections in our MS4 system~~s~~.	
If an interconnected MS4 was not notified of a new interconnection, please explain why and indicate when the notification will be provided: N/A	
Estimated drainage acreage to each HUC	
JL07=4,203 Acres	JA45=2,787 Acres

Outfall screening/inspection documents are not provided in this report, but will be preserved according to the file retention policy.

BMP 3.1 Measure of Effectiveness Form
If any potential illicit discharges were identified or reported (refer to reporting for BMP 3.2 and 3.3), was outfall mapping used to address the issue: The outfall mapping was merged with a drainage system (MS4) map.

BMP 3.2 Prohibit non-stormwater discharges (Section II B.3.b)
Description: The City of Hopewell prohibits non-stormwater discharges, including illegal dumping, into the storm sewer system through Chapter 31 Article I and VI of the City Code (Illicit Storm Sewer Discharges). Article V prohibits illicit connections and discharges to the storm sewer system and establishes legal authority to inspect, conduct surveillance, and monitor to ensure compliance. The Article also gives the City the authority to initiate enforcement actions and establishes enforcement penalties and for violations. **Documentation:** (1) Chapter 31 of the City Code; (2) A list of any instances of violation and summary of actions taken by the City; (3) Completed IDDE Follow-up Documentation, as provided in Appendix C of the City's IDDE Program Manual. **Responsible individual for implementation:** Stormwater Program Manager **Objectives and expected results in meeting measurable goals:** The objective is to effectively prohibit non-stormwater discharge to the extent allowable under federal, state, or local law, regulation, or ordinance. Expected result is the appropriate use of enforcement actions to eliminate an illicit discharge, when necessary. **Implementation schedule**: Implementation of Chapter 31 of the City Code will continue with implementation consistent with the methods described in BMP 3.3. Standardized IDDE Tracking forms will begin being used July 1, 2014. **Method to determine effectiveness:** Effectiveness will be determined based on the elimination of reported or observed non-stormwater discharges. Effectiveness will also be based on implementation of the inspections, surveillance, monitoring, and enforcement procedures in response to reports.

BMP 3.2 Annual Reporting Form
Reported or observed non-stormwater discharges are provided in Appendix C. Information in Appendix C includes a memo for each reported or observed discharge, including: • Date of violation the potential illicit non-stormwater discharge • Location of the potential illicit non-stormwater discharge • Description of the potential illicit non-stormwater discharge • Necessary corrective or disciplinary action taken

BMP 3.2 Measure of Effectiveness Form	
Number of potential illicit non-stormwater discharges reported or observed, as described in Appendix C:	2
Number of potential illicit non-stormwater discharges resolved, as described in Appendix C:	2
➢ Is the number in the two boxes above is the same? (yes/no)	☒ Yes (BMP effective) ☐ No (See below)

If no, based on information provided for non-resolved potential illicit non-stormwater discharges, describe any necessary modifications to the BMP to improve effectiveness in resolving potential illicit non-stormwater discharges: N/A

BMP 3.3 Develop Illicit Discharge Detection and Elimination Procedures (Section II B.3.c, e)

Description: The City of Hopewell will develop and implement an Illicit Discharge Detection and Elimination (IDDE) Program Manual that includes written procedures to detect, identify, and address non-stormwater discharges, including illegal dumping. Procedures will include written dry weather field screening methodologies that incorporate field monitoring that provide:

- A schedule of field screening activities to ensure at least 50 outfalls are screened annually with outfalls selected for screening based on a prioritization based on land use, age of infrastructure, historical issues, or other appropriate characterization;
- Methodologies to collect information such as time since the last rain, the quantity of the last rain, site descriptions (e.g., conveyance type and dominant watershed land uses), estimated discharge, and visual observations (e.g., order, color, clarity, floatables, deposits or stains, vegetation condition, structural condition, and biology;
- A time frame upon which to conduct an investigation to identify and locate the source of any observed continuous or intermittent non-stormwater discharge prioritized based on potential hazard to human health;
- Methodologies to determine the source of all illicit discharges;
- Mechanisms to eliminate identified sources of illicit discharges including a description of the policies and procedures for when and how to use legal authorities;
- Methods for conducting a follow-up investigation in order to verify that the discharge has been eliminated; and
- A mechanism to track all investigations to document, at a minimum, the date(s) that the illicit discharge was observed and reported; the results of the investigation; any follow-up of the investigation; resolution of the investigation; and the date that the investigation was closed.

Documentation: (1) Illicit Discharge Detection and Elimination (IDDE) Manual; (2) Outfall information table; (3) Completed outfall screening field forms, (4) Completed IDDE Follow-up Information, as provided in Appendix C of the IDDE Program Manual.

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective is to establish effective methods and procedures for detecting, identifying, and addressing non-stormwater discharges, including illegal dumping, into the storm sewer. Expected results are effective identification and response to illicit discharges identified during screening activities and those reported by the public.

Implementation schedule: Staff ~~The City~~ will screen at least 50 outfalls each year. Starting July 1, 2015, methods in the City's IDDE Program Manual will be used to identify and follow-up from screening results.

Explain how it was effective: Effectiveness will be determined based on the percentage of the reported and identified non-stormwater discharges that are eliminated.

BMP 3.3 Annual Reporting Form	
Outfall Screening Record Summary	
Total number of outfalls (refer to BMP 3.1):	237
Total number of outfalls screened during the reporting year:	50
Were at least 50 outfalls screened during the reporting year?	☒ Yes (Objective achieved) ☐ No (Objective not achieved)
If 50 outfalls were not screened during the reporting year, explain why with a schedule to screen additional outfalls the following reporting year: N/A	
Were the outfalls screened selected based on prioritization criteria (land use, age of infrastructure, historical issues, etc.)?	☐ Yes (Objective achieved) ☒ No (Objective not achieved)
If no, explain why with a schedule for prioritizing outfalls: 30 new outfalls were identified during the reporting year and added to the Outfall Table and Map. Prioritization of inspections were based on knowledge of specific properties and neighborhoods gained while mapping the drainage system. The prioritization serves as a guide, but specific hands-on knowledge is deemed to provide a better basis for the use of limited manpower.	
Were follow up investigations performed for all outfalls where screening characterized the outfall as potential, suspected or obviously having an illicit discharge?	☐ Yes (Objective achieved)[1] ☐ No (See below) ☐ Partially (See below) ☒ N/A (None identified)
If no, explain why with a schedule for investigating outfalls characterized as potential, suspect or obvious for being subject to an illicit discharge: N/A	
Sample outfall screening form is provided in Appendix C; Screening form for all outfalls are available upon request. **Refer to Appendix C for detail of any follow-up actions necessary based on screening results.**	

BMP 3.3 Measure of Effectiveness Form	
Number of screened outfalls characterized as potential, suspect or obvious for an illicit discharge that received a follow up investigation:	0
Number of investigations that were closed:	0
Based on the percentage of investigations closed, provide rationale for the effectiveness or ineffectiveness of the BMP.	

BMP 3.4 Facilitate public reporting of illicit discharges and provide response (Section II B.3.d)
Description: The City will promote, publicize, and facilitate public reporting of illicit discharges into or from the MS4 with information describing an illicit discharge and contact information on the stormwater website and with inclusion of educational material described in BMP 1.2. The City will investigate all reports using methods and procedures described in the IDDE Program Manual described in BMP 3.3. **Documentation:** (1) Web address of posted material; (2) Educational material with illicit discharge reporting information; (3) Completed IDDE Tracking Form for each incident. **Responsible individual for implementation:** Stormwater Program Manager **Objectives and expected results in meeting measurable goals:** The objective is to first educate the public to recognize an illicit discharge and provide contact information that allows for the reporting of an observed illicit discharge. The ultimate objective is to investigate and eliminate reported illicit discharges. **Implementation schedule**: Illicit discharge material and contact information will be placed on the website by July 1, 2015. Response to illicit discharge reports will be on-going, occurring in response to reports per the IDDE Manual. **Method to determine effectiveness:** Effectiveness will be measured by the percentage of illicit discharge reports that are closed (as will be documented in the IDDE Tracking Forms).

BMP 3.4 Annual Reporting Form
Illicit Discharge Reports
Refer to reporting for BMP 3.2 for follow-up actions necessary based on reported illicit discharges.

IDDE Reporting Information from the City website is provided in **Appendix A**
A sample of an IDDE Outfall Screening form is provided in Appendix C of this report; all screening forms will be preserved according to the file retention policy and made available upon request.

BMP 3.4 Measure of Effectiveness Form	
Total # of potential illicit discharges reported by staff for the reporting year:	5
Total # of potential illicit discharge reported by the public for the reporting year:	5
Percentage of reported illicit discharge instances that have been closed: Numerous reports are called into Public Works of illicit discharges of leaves, grass clippings, unsecured soil piles and other instances of citizens using the drainage system as a receptacle for yard waste (which has been a standard practice in the City for many years). Stormwater Program staff investigate each report and talk to the citizen and/or provide a brochure/flyer.	100
Were all potential illicit discharge reports resolved?	☒ Yes (BMP Effective) ☐ No (See below)
If no, provide explanation of why reports were not resolved and, if necessary, modifications needed for the BMP to improve effectiveness: N/A	

Minimum Control Measure 4: Construction Site Stormwater Runoff Control

BMP 4.1 ESC compliance for land disturbance activities (Section II B.4.a-c3, c5 c6, e1-6)
Description: Regulated land disturbance activity is subject to Chapter 14, Article II of the City Code (Erosion and Sediment Control). Regulated land disturbance activities are those defined in §62.1-44.15:51 of the Code of Virginia that result in the disturbance of 2,500 square feet or greater and those on individual residential lots or sections of residential developments being developed by different property owners and where the total land disturbance of the residential development is 2,500 square feet or greater. The City utilizes an agreement in lieu of a plan as provided in §62.1-44.15:55 of the Code of Virginia for this category of land disturbances. Section 14-26 of Article II requires a land disturbance permit prior to engaging in land disturbance activity that is conditioned on an approved erosion and sediment control plan or an agreement in lieu of a plan in accordance with the Erosion and Sediment Control Law (§62.1-44.15:51 et seq. of the Code of Virginia). Plans shall be compliant with the minimum standards identified in 9VAC25-840-40 of the Erosion and Sediment Control Regulations. Section 14-5 of Article II provides legal authority to conduct inspections with an inspector holding an ESC Inspector's Certification from DCR/DEQ. Inspections will be conducted: ✓ Upon initial installation of erosion and sediment controls; ✓ At least once during every two-week period; ✓ Within 48 hours of any runoff-producing storm event; and ✓ Upon completion of the project and prior to the release of any applicable performance bonds. Section 14-5 of Article II also provides legal authority to require compliance with the approved plan and require changes to an approved plan when an inspection finds that the approved plan is inadequate. **Documentation:** (1) Chapter 14 of the City Code; (2) ESC Plan(s) approved, including procedures and documents used in plan review (e.g. checklists); (3) Documentation of ESC Inspector Certification; (4) Completed ESC Inspection Forms for each regulated project; (5) Notice to Comply and/or Stop Work Orders documentation and documentation of follow-up actions. **Responsible individual for implementation:** Stormwater Program Manager **Objectives and expected results in meeting measurable goals:** The objective is to ensure ESC plans are prepared and approved according to ESC Laws and Regulations, inspections are performed as specified in the regulations, and that correction or enforcement, when appropriate, occurs when inspections find deficiencies. The expected result is that ESC is effective at all regulated land disturbance activities. **Implementation schedule**: The implementation of this BMP will be on-going with all regulated land disturbance activities that disturb greater than 2,500 square feet. **Method to determine effectiveness:** Effectiveness will be initially measured by the number of enforcement actions (notice to comply, notice of violation, or stop-work order). The long-term goal is to educate and improve contractor compliance to the point of no longer needing to issue a notice of violation or a stop work order.

BMP 4.1 Annual Reporting Form				
Total sites subject to ESC Ordinance other than those issued an agreement in lieu of a plan =				**17**
The total agreements in lieu of a plan =				**20**
Regulated ESC Land Disturbance			Construction Site Inspection	
Activity Description	Approved and bonded ESC plan	Disturbed acreage	# of inspections	# of enforcement actions
Parkview Pointe (VAR10C838)	☒ Yes ☐ No	10.6	0[1]	0[1]
Hopewell Police Station	☒ Yes ☐ No	0.93	25	0
Hopewell Fire Station[2]	☒ Yes ☐ No	2.3	12	0
Hopewell Gateway C2	☒ Yes ☐ No	0.79	9	0
Hopewell Water Renewal Plant: Woodson Gravity Sewer Replacement	☒ Yes ☐ No	0.9	9	1 NOV
AdvanSix Resins & Chemicals LLC: Steam Boiler Install	☒ Yes ☐ No	0.5	4	0
Ashland Specialty Chemicals: Lagoon Berm Repair	☒ Yes ☐ No	7.46	13	0
Ashland Specialty Chemicals: Demo Electric Station	☒ Yes ☐ No	0.4	2	0
Captain D's Seafood	☒ Yes ☐ No	0.84	14	2 warnings
CVS Pharmacy	☒ Yes ☐ No	1.8	18	0
Dominion Hopewell Power Station: Consolidation Stormwater Outfall	☒ Yes ☐ No	0.14	3	0
Evonik: Demo Entrance #3	☒ Yes ☐ No	0.17	4	0
ISET Academy	☒ Yes ☐ No	0.1	5	1 NOV/SWO
Kippax Place Apartments	☒ Yes ☐ No	0.13	13	0
Saucy's Bar BQ	☒ Yes ☐ No	0.31	9	0
Hopewell City Park Playground Renovations	☒ Yes ☐ No	0.2	6	0
Hopewell Riverside Park	☒ Yes ☐ No	4.3	27	0

1. Parkview Pointe Common Plan of Development covered by CGP and has been stabilized; individual home construction inspection and enforcement performed under individual lot agreement in lieu of plan.
2. Only partial land disturbance. Site is stabilized, scheduled for construction next year.
*Documents will be preserved according to the file retention policy.

The following enforcement actions consisted of Notice of Violation (NOV) letters to the owners and were resolved within the allotted time period.

1. ISET Academy: began work without a permit
2. Hopewell Water Renewal, Woodson Gravity Sewer Replacement: began work before permit was issued
3. Captain D's: failure to maintain concrete washout facility

BMP 4.1 Measure of Effectiveness Form	
For the sites listed above, do the number of enforcement actions (notice to comply or stop work orders) seem excessive?	☒ No (BMP effective) ☐ Yes (See below) ☐ N/A (No activities)
Discuss the nature of excessive enforcement action issues. Provide rationale that determines if the BMP is effective or ineffective. If ineffective, what modifications could improve effectiveness? The BMP is effective because of the violations were addressed and contractors are making improved efforts to comply with ESC requirements. With continued contractor training and education this number is expected to be further lowered next year.	

BMP 4.2 Receive and respond to complaints regarding land disturbing activity (Section II B.4.c4)

Description: The City will promote to the public through the stormwater webpage information on land disturbance erosion and sediment controls and provide a contact number for reporting complaints regarding regulated land disturbing activities. The City will initiate investigation of all reports within 72-hours and address the issue with the construction site operator by requiring maintenance to ESC controls, or plan modifications, as necessary, in accordance with BMP 4.1.

Documentation: (1) Web address of posted material; (2) Land disturbance complaint/report tracking record with date, description, and resolution for each complaint (see Appendix C for all reported or observed instances of illicit discharges).

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective is to educate the public to understand the purpose of ESC controls on a land disturbance activity, recognize the off-site impacts resulting from potential failure of ESC controls, and provide contact information that allows for the reporting of an off-site impact and ultimately the resolution of a reported issue.

Implementation schedule: Information regarding ESC Program and Permit requirements for land disturbance activities and for reporting complaints was placed on the website and is regularly updated.

Method to determine effectiveness: Effectiveness will be measured by the percentage of resolved complaints that are reported by the public.

BMP 4.2 Annual Reporting Form

The total number of complaints from the public related to land disturbance activity during the reporting year:			0
Complaint #	Date of complaint	Description of complaint	Resolution of the investigation
N/A			

Documents are not provided in this report, but will be preserved according to the file retention policy.

BMP 4.2 Measure of Effectiveness Form

Were all complaints resolved?	☒ Yes (BMP effective) ☐ No (See below) ☐ N/A (no complaints)
Describe the reason for any unresolved complaint and any necessary program modifications to ensure complaints are resolved in the future. If no modifications are needed, provide rationale: N/A	

BMP 4.3 Ensure land disturbance activities secure VSMP General Permit (Section II B.4.c.7, d)

Description: Regulated land disturbance activities are subject to the City of Hopewell's Stormwater Management Ordinance. Section 1-4 requires evidence that the General VPDES Permit for Discharges of Stormwater from Construction Activities (VAR 10 General Permit) is obtained prior to the issuance of a land disturbance permit. The VAR10 General Permit and Section 1-7 of Hopewell's Stormwater Management Ordinance requires a Pollution Prevention Plan for regulated land disturbances equal to or greater than an acre. Through the development and implementation of the Pollution Prevention Plan, appropriate controls to prevent non-stormwater discharges such as wastewater, concrete washout, fuels and oils, and other illicit discharges will be implemented. ESC inspections described in BMP 4.1 will include inspection components that ensure implementation of Pollution Prevention Plans.

Documentation: (1) Stormwater Management Ordinance; (2) Project-specific Pollution Prevention Plan (maintained within SWPPPS on construction sites by the site operator); (3) Record of evidence of General Permit coverage for regulated construction activity.

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objectives are: (1) To provide a mechanism for assuring that VSMP General Permit coverage is obtained for all land disturbances exceeding 1-acre. The expected result is that coverage is obtained for all applicable land disturbances prior to commencement of the activity; (2) Ensure development and implementation of Pollution Prevention Plans through the contractor's requirement to develop and implement the Stormwater Pollution Prevention Plan (SWPPP) per the VAR10.

Implementation schedule: The City will continue verifying regulated land disturbances greater than or equal to 1-acre will obtain a VAR10 General Permit prior to commencement of land disturbance activity.

Method to determine effectiveness: Effectiveness will be determined based on: (1) all regulated land disturbance activity operating under VSMP General Permit coverage and a SWPPP, (2) the number of violations related to pollution prevention from construction activity as identified in the reporting for BMP 3.2, 3.3, 3.4, and 4.2.

BMP 4.3 Annual Reporting Form			
The total number of regulated land disturbance activities during the reporting year requiring a VAR10 General permit (greater than or equal to 1-acre):			6
1	2	3	4
Regulated Land Disturbance Activity Description	Was VSMP General Permit coverage obtained?	Is a SWPPP available on site for the project?	Any illicit discharge reports from the activity? (see reporting for BMPs 3.2, 3.3, 3.4, and 4.2)
Parkview Pointe (VAR10C838)	☒ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☒ No
CVS (VAR10K075)	☒ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☒ No
Hopewell Fire Station (VAR10K052)	☒ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☒ No
Hopewell Police Station (VAR10K051)	☒ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☒ No
Ashland Hercules (VAR10I026)	☒ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☒ No
Hopewell Riverside Park (VAR10J941)	☒ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☒ No

Documents will be preserved according to the file retention policy.
1: City completed limited site preparation in order to place excess soil from the Police Station project. Site is now stabilized and dormant.

BMP 4.3 Measure of Effectiveness Form	
If no is answered in columns 2 or 3 above, explain why and actions to be taken to address the issue. Include rationale that describes if the BMP is ineffective, and if so, modification to the BMP to improve effectiveness: N/A	
Is yes answered in any row in column 4?	☐ Yes (See below) ☒ No (Effective BMP) ☐ N/A (No activity)
If yes in the question above, describe the instance(s) and provide rationale if BMP modification is necessary to improve the effectiveness of the BMP? If not necessary, provide rationale for no modification. N/A	

Minimum Control Measure 5: Post-Construction Site Stormwater Runoff Control

BMP 5.1 Compliance with post-construction stormwater management regulation (Section II B.5.a, b. d.1,2)
Description: New development and development on prior developed lands is subject to the Stormwater Management Ordinance that ensures post-construction stormwater management (SWM) for all regulated land disturbance activities over 2,500 square feet. Approval ensures the SWM Plan has been prepared per the VSMP Regulations that, in part, require that stormwater runoff controls: • Are designed and installed in accordance with the appropriate water quality and water quantity design criteria as required in Part II (9VAC25-870-40 et seq.) of 9VAC25-870; and • Have an inspection and maintenance plan recorded at the local courthouse. The City will retain a copy of each SWM facility inspection record (5 years) and maintenance plan (in perpetuity or until the BMP is removed) from the approved stormwater management plan for proposed stormwater management facilities to be used with the implementation of BMP 5.3. A stormwater facility maintenance agreement will be required to be recorded prior to permit termination. **Documentation:** (1) Approved SWM plans and calculations (maintained on active construction sites); (2) Material used for plan review (e.g. checklists, BMP Clearinghouse Standards and Specifications); (3) SWM Facility Inspection and Maintenance Plans for approved projects with SWM facilities; (4) Proof of recordation of inspection and maintenance agreements. **Responsible individual for implementation:** Stormwater Program Manager **Objectives and expected results in meeting measurable goals:** The objective is to ensure regulated projects are in compliance with the VSMP Stormwater Management Regulations. The expected goal is that all regulated projects have City approved SWM Plans with recorded SWM facility inspection and maintenance plans. **Implementation schedule**: The implementation of this BMP began July 1, 2014 with the adoption of the Stormwater Management Ordinance. **Method to determine effectiveness:** Effectiveness will be measured by: (1) all regulated land disturbance activities having an approved SWM Plan; and (2) all stormwater management facilities with recorded inspection and maintenance plans and/or agreements, where applicable.

BMP 5.1 Annual Reporting Form			
Total sites subject to SWM Ordinance other than those issued an agreement in lieu of a plan =			17
1	2	3	4
Land Disturbance Activity subject to SWM (same as BMP 4.1)	Does it have an approved SWM plan?	Does it have an Inspection/ Maintenance plan?	Maintenance agreement recorded?
Parkview Pointe Section 2	☒ Yes ☐ No	☒ Yes ☐ No ☐ No Facility	☐ Yes ☒ No-pending[1] ☐ No Facility
Elm Street Auto	☒ Yes ☐ No	☒ Yes ☐ No ☐ No Facility	☐ Yes ☒ No-pending[2] ☐ No Facility
Hopewell Police Station	☒ Yes ☐ No	☐ Yes ☐ No ☒ No Facility	☐ Yes ☒ No[3] ☐ No Facility
Hopewell Fire Station	☒ Yes ☐ No	☒ Yes ☐ No ☐ No Facility	☐ Yes ☒ No[3] ☐ No Facility
Hopewell Gateway C2	☒ Yes ☐ No	☐ Yes ☐ No ☒ No Facility	☐ Yes ☐ No ☒ No Facility
Hopewell City Park Playground Renovations	☒ Yes ☐ No	☒ Yes ☐ No ☐ No Facility	☐ Yes ☒ No[3] ☐ No Facility
AdvanSix Steam Boiler Install	☒ Yes ☐ No	☐ Yes ☐ No ☒ No Facility	☐ Yes ☐ No ☒ No Facility
Ashland Lagoon Berm Repairs	☒ Yes ☐ No	☐ Yes ☐ No ☒ No Facility	☐ Yes ☐ No ☒ No Facility
Ashland Demo Electric Station	☒ Yes ☐ No	☐ Yes ☐ No ☒ No Facility	☐ Yes ☐ No ☒ No Facility
Captain D's Seafood	☒ Yes ☐ No	☒ Yes ☐ No ☐ No Facility	☒ Yes ☐ No ☐ No Facility
CVS Pharmacy	☒ Yes ☐ No	☒ Yes ☐ No ☐ No Facility	☒ Yes ☐ No ☐ No Facility

Land Disturbance Activity subject to SWM (same as BMP 4.1)	Does it have an approved SWM plan?	Does it have an Inspection/ Maintenance plan?	Maintenance agreement recorded?
Dominion Hopewell Station Stormwater Outfall Pave	☒ Yes ☐ No	☐ Yes ☐ No ☒ No Facility	☐ Yes ☐ No ☒ No Facility
Evonik: Demo Entrance #3	☒ Yes ☐ No	☐ Yes ☐ No ☒ No Facility	☐ Yes ☐ No ☒ No Facility
ISET Academy	☒ Yes ☐ No	☐ Yes ☐ No ☒ No Facility	☐ Yes ☐ No ☒ No Facility
Kippax Place Apartments	☒ Yes ☐ No	☐ Yes ☐ No ☒ No Facility	☐ Yes ☐ No ☒ No Facility
Saucy's Bar B Q	☒ Yes ☐ No	☐ Yes ☐ No ☒ No Facility	☐ Yes ☐ No ☒ No Facility
Hopewell Riverside Park	☒ Yes ☐ No	☒ Yes ☐ No ☐ No Facility	☐ Yes ☒ No[3] ☐ No Facility

1. Pre-dates City ordinance requiring a recorded maintenance agreement. A maintenance agreement was developed and developer/HOA has agreed to have it recorded before termination of permit.
2. Required prior to termination of Permit
3. City owned facilities

BMP 5.1 Measure of Effectiveness Form	
➢ Was yes answered for all activities in Column 2 in the Annual Reporting Form on the previous page?	☒ Yes (BMP effective) ☐ No (See below) ☐ N/A (No activity)
Describe the reason for any activity that does not have an approved SWM plan and any necessary program modifications to the BMP to ensure an approved plan is obtained. If no modifications are needed, provide rationale: N/A	
➢ Was "yes" or "no facility" answered for all activities in Columns 3 or 4 in the Annual Reporting Form?	☐ Yes (BMP effective) ☒ No (See below) ☐ N/A (No activity)
Describe the reason for any activity that does not have an approved inspection and maintenance plan or agreement. Provide any necessary program modifications to ensure plans are obtained and agreements are recorded. If no modifications are needed, provide rationale: The annual reporting form includes footnotes to explain the instances where an Inspection/Maintenance Plan has not been recorded. In one instance, Parkview Pointe, a subdivision initiated prior to the adoption of the City's SWM Ordinance, has an agreement that was never recorded. However, the City has worked with the developer and the existing agreement will be recorded prior to permit termination. Other instances reference City owned facilities. The BMP is effective since all facilities subject to the Stormwater Management Ordinance will be required to have an Inspection/Maintenance Plan and recorded SWM Maintenance Agreement prior to any facility coming online post-construction.	

BMP 5.2 Stormwater management facility tracking and reporting (Section II B.5.e)

Description: The City will maintain an updated electronic database in Excel format of all known stormwater management (SWM) facilities that discharge into the MS4. The database will include:

- The unique SWM facility ID #;
- The stormwater management facility type;
- A general description of the facility's location, including the address or latitude and longitude;
- The acres treated by the facility, including total acres, as well as the breakdown of pervious and impervious acres;
- The date the facility was brought online (MMYYYY);
- The sixth order hydrologic unit code (HUC) in which the stormwater management facility is located;
- The name of any impaired water segments within each HUC listed on the 2010 § 305(b)/303(d) Water Quality Assessment Integrate Report to which the stormwater management facility discharges;
- Whether the stormwater management facility is operator-owned or privately-owned;
- The date of the last inspection.

Upon acceptance of a newly constructed stormwater management facility, the facility will be included within the database.

Documentation: (1) Updated SWM Tracking and Reporting Excel database; (2) Completed inspection checklist forms (see BMP 5.3)

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective is to maintain an updated record of all of the SWM facilities. The expected result is that the list will be utilized to assist with implementation of BMP 5.3 and will be maintained as new SWM facilities come online.

Implementation schedule: The maintenance of a BMP database will be on-going.

Method to determine effectiveness: Effectiveness will be measured by the completeness of the database.

BMP 5.2 Annual Reporting Form	
➢ The Stormwater Management Facility database is provided electronically in Excel as an enclosure with this annual report and also provided in Appendix D.	
Did any new SWM facilities come online during the reporting year?	☒ Yes ☐ No
If yes, was the electronic database updated?	☒ Yes ☐ No ☐ N/A (No new facilities)
If the database was not updated, explain why and describe any necessary modification to ensure the database is update when new facilities come online: Several facilities that were previously included in the City's BMP tracking database have been identified as not being stormwater BMPs, and were removed from the database.	

BMP 5.2 Measure of Effectiveness Form	
Is the database complete to include all of the attributes for each new BMP described in this BMP and as required by the MS4 General Permit?	☒ Yes (BMP effective) ☐ No (See below) ☐ N/A (No facilities)
Describe the reason that the database is incomplete and provide rationale that determines whether or not the BMP needs to be modified to ensure completion of the data base: NA	

BMP 5.3a Inspection, operation, and maintenance of City-owned SWM facilities (Section II B.5.c.2, d.3, 5)

Description: The City will perform long-term inspections and maintenance on all City-owned stormwater facilities utilizing the inspection and maintenance plans obtained from implementation of BMP 5.1. Where inspection and maintenance plans are not available from approved SWM plans, the City will utilize BMP-specific inspection and maintenance instruction from the City's Post-Construction Stormwater Management Program Manual. Inspections will be performed either:

- As dictated on the schedule provided on the inspection and maintenance plans; or
- A minimum of once annually, whichever are the more frequent criteria.

Inspections will be performed using the written procedures in the Post-Construction Stormwater Management Program Manual. BMP-type specific inspection and maintenance checklists provided in the Program Manual lists potential issues and methods to address each issue. Necessary maintenance identified during inspections will be conducted in a timely manner as indicated on the checklist or no later than the next scheduled inspection.

Documentation: (1) BMP Database described in BMP 5.2; (2) BMP-specific Inspection and Maintenance Plan, if available; (3) The Post-Construction Stormwater Management Program Manual; (4) Completed BMP Inspection Forms; (5) Documentation of maintenance performed, where necessary.

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective is to ensure the intended function of all City-owned SWM facilities is maintained through long-term inspections and maintenance. The expected result is completed inspection forms and timely maintenance, when necessary.

Implementation schedule: The implementation of this BMP will be on-going, with the procedures specified in this BMP and the Post-Construction Stormwater Management Program Manual beginning July 1, 2015.

Method to determine effectiveness: Effectiveness will be measured by: (1) completion of required inspections, as scheduled, and (2) timely maintenance once a maintenance issue is identified during inspections.

BMP 5.3a Annual Reporting Form
Stormwater Management Facility Inspection Record*
The following information is provided in the SWM Facility database described in BMP 5.2: • SWM Facility ID • Inspection Schedule (e.g. monthly, quarterly, annually) • Dates of inspection(s) for the reporting year • If inspected, any identified necessary maintenance per inspection form • If maintenance is necessary, type and date the maintenance was performed

* Provided as electronic database with annual report in Excel format and hard copy as Appendix D. This BMP applies to those identified as "public" in the database.

BMP 5.3a Measure of Effectiveness Form	
➢ Do dates in the database indicate that inspections were performed for City-owned (public) BMPs at least once within the reporting year?	☒ Yes (BMP effective) ☐ No (See below)
If no answered above, describe the reason for inspections that were not performed on City-owned BMPs and provide rationale that determines whether or not the BMP needs to be modified to ensure completion of inspections: N/A	
➢ Do dates in the database indicate that maintenance was performed, where necessary and in a timely manner?	☐ Yes (BMP effective) ☒ No (See below)
Describe the reason maintenance was not performed on City-owned BMPs in a timely manner (e.g. minor repair needed that does not affect function of the facility) and provide rationale that determines whether or not the BMP needs to be modified to ensure completion of inspections: The inflow pipe repair to the Route 10 basin has not been engineered. No timeline has been negotiated. No modifications to the BMP are needed.	

BMP 5.3b Inspection, operation, and maintenance of privately-owned SWM facilities (Section II B.5.c.1, d.3, 5)

Description: The City will ensure long-term operations and maintenance of all privately-owned stormwater facilities utilizing the maintenance agreements and inspection and maintenance plans obtained from the implementation of BMP 5.1. Where inspection and maintenance plans are not available from approved SWM plans, staff will utilize BMP-specific inspection and maintenance instructions from the Post-Construction Stormwater Management Program Manual. Inspections of all privately owned stormwater BMPs will be performed at least once during every permit cycle (once per 5-years). Inspection for each facility may be satisfied by either:

- A field inspection conducted by staff using the written procedures and checklists in the Post Construction Stormwater Management Program Manual; or
- Documentation of an inspection conducted by the Owner or designee, provided the inspection was performed by a DEQ Certified SWM Inspector.

Section 1-10 of the Stormwater Management Ordinance requires maintenance, inspection and repair of stormwater management facilities, where necessary.

Documentation: (1) BMP Database described in BMP 5.2; (2) BMP-specific Inspection and Maintenance Plan, if available; (3) The Post-Construction Stormwater Management Program Manual; (4) Documentation of inspections and maintenance performed, where necessary.

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective is to ensure the intended function of all privately-owned SWM facilities is maintained through long-term inspections and maintenance. The expected result is completed inspection forms and timely maintenance, when necessary, in accordance with the schedule described in the description above.

Implementation schedule: The implementation of this BMP will be on-going, with the procedures specified in this BMP and the Post-Construction Stormwater Management Program Manual.

Method to determine effectiveness: Effectiveness will be measured by: (1) Completion of required inspections, as scheduled, and (2) timely maintenance once a maintenance issue is identified during inspections.

BMP 5.3b Annual Reporting Form
Privately Owned Stormwater Management Facility Inspection Record*
The following information is provided in SWM Facility database described in BMP 5.2: • SWM Facility ID • Inspection Schedule (e.g. monthly, quarterly, annually) • Dates of inspection(s) for the reporting year (not yet conducted) • If inspected, any identified necessary maintenance per inspection form • If maintenance is necessary, type and date the maintenance was performed

* Provided as Appendix D. This BMP applies to those identified as "private" in the database.

BMP 5.3b Measure of Effectiveness Form	
➢ Do dates in the database indicate that inspections were performed for at least 20% of the privately owned BMPs as necessary during the reporting year to achieve the 5-year objective?	☐ Yes (BMP effective) ☒ No (See below)
If less than 20% of privately-owned BMPs were inspected during the reporting year, provide a schedule to ensure 100% can be inspected prior to the end of the permit cycle (July 1, 2018): <u>All BMPs were inspected in 2016 or 2017</u>	
➢ Where inspection resulted in the identification of required maintenance, has the City notified the entity responsible of the maintenance needs with reference to the Stormwater Management Ordinance and a specified timeframe for completing the maintenance?	☒ Yes (BMP effective) ☐ No (See below)
If the entity responsible for maintenance has not been notified, explain: N/A	
Have notified entities performed maintenance within the time period specified by the City?	☐ Yes (BMP effective) ☒ No (See below) ☐ N/A (No instances)
If no to the previous question, was enforcement action taken?	☒ Yes (BMP effective) ☐ No (See below) ☐ N/A (No instances)
If enforcement action was taken, did it resolve the issue?	☐ Yes (BMP effective) ☒ No (See below) ☐ N/A (No instances)
If the issue was not resolved from enforcement action, described necessary modifications to the BMP to improve effectiveness: <u>2 commercial properties developed prior to 2014 and without recorded maintenance agreements have been unresponsive. City is reviewing options of enforcement or completing maintenance with City personnel.</u>	

Minimum Control Measure 6: Pollution Prevention & Good Housekeeping

BMP 6.1 Pollution Prevention Procedures for Operations & Maintenance Activities (Section II B.6.a)

Description: The City will develop and implement comprehensive written procedures for good housekeeping and pollution prevention for daily operations and equipment maintenance as described within the City's Good Housekeeping and Pollution Prevention Program Manual. At a minimum the Program Manual includes procedures with the following goals:

- Prevent illicit discharge;
- Ensure the proper disposal of waste materials, including landscape waste;
- Prevent discharge of municipal vehicle wash water to the storm sewer without authorization under a separate VPDES permit;
- Prevent the discharge of wastewater to the storm sewer without authorization under a separate VPDES permit;
- Require BMPs to filter water pumped from utility construction and maintenance activities;
- Require BMPs to prevent pollutants in runoff from stored and stockpiled materials (e.g. soil stockpiles and salt storage);
- Prevent pollution discharge from leaking municipal automobiles and equipment;
- Ensure application of materials, such as pesticides, is conducted in accordance with manufacturer's specifications.

Effective implementation will be supported with site-specific SWPPPs for high-priority areas as described in BMP 6.2 and the employee training described in BMP 6.3.

Documentation: (1) The Good Housekeeping/Pollution Prevention Program Manual; (2) Site-specific SWPPPs; (3) Training documentation; (4) Completed SWPPP Site Evaluation forms (see BMP 6.2).

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective is to minimize or prevent pollutant discharges from City operations and maintenance activities. The expected result is staff's adherence to the Good Housekeeping/Pollution Prevention Manual resulting in minimal or no illicit discharges from municipal facilities and activities.

Implementation schedule: The Good Housekeeping/Pollution Prevention Manual is complete. Training will be provided biennially (annually while water quality issue #3 in BMP 1.2 is in place), where the initial training was performed by July 1, 2015. Site-specific evaluations will be performed with the schedule described in BMP 6.2.

Method to determine effectiveness: Effectiveness will be measured by the results of the annual comprehensive site-specific compliance evaluations for high-priority facilities, as described in BMP 6.2. Measure of effectiveness for this BMP will be based on recurring issues identified during the site-specific evaluations.

BMP 6.1 Annual Reporting Form	
Good Housekeeping/Pollution Prevention Manual	
Has a Good Housekeeping/Pollution Prevention Manual been developed?	☒Yes ☐No
*** See BMPs 6.2 and 6.3 for additional reporting. ***	

BMP 6.1 Measure of Effectiveness Form
*** See BMP 6.2 for measure of effectiveness information. ***

BMP 6.2 Stormwater Pollution Prevention Plans (Section II B.6.b)

Description: The City will implement site-specific SWPPPs for City owned properties that have been identified as "high-priority" facilities according to Section II B.6.b.2 of the General Permit.

For each high-priority facility, a SWPPP will be developed to include:

- Mapping that identifies all outfalls, direction of flows, existing source controls, and receiving water bodies;
- A discussion and checklist of potential pollutants and pollutant sources;
- A discussion of all potential non-stormwater discharges;
- Written procedures, or reference to written procedures, designed to reduce and prevent pollutant discharge;
- A description of the applicable training described in BMP 6.3;
- Procedures to conduct an annual comprehensive site compliance evaluation; and
- An inspection and maintenance schedule for site specific source controls. The date of each inspection and associated findings and follow-up shall be logged in each SWPPP.

The SWPPP will provide instruction for updates, as necessary, to reflect changes on the respective site, modifications to operations and maintenance procedures, or short-comings resulting in a reportable spill, as defined in the Good Housekeeping/Pollution Program Manual. Inspection forms will be completed in accordance with the prescribed schedule within the SWPPP and maintained on file with the on-site SWPPP.

Documentation: (1) The Good Housekeeping/Pollution Prevention Manual; (2) Site-Specific SWPPPs for high-priority facilities; (3) Completed annual comprehensive site compliance evaluation.

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective and expected result is to minimize or prevent pollutant discharges from high-priority facilities through adherence to the site-specific SWPPPs.

Implementation schedule: The City has identified a high priority facility that requires a SWPPP. The annual comprehensive site compliance evaluation is completed 1/year.

Method to determine effectiveness: Effectiveness will be measured by the results of the annual comprehensive high priority facility compliance evaluation, specifically the number of recurring issues identified in the annual comprehensive site compliance evaluations. Effectiveness will also be evaluated based on the number of illicit discharges observed or reported that originate from high-priority facilities.

BMP 6.2 Annual Reporting Form	
Stormwater Pollution Prevention Plan	
➢ Have SWPPPs been completed for each high priority facility identified in the BMP? City Public Works Yard; Public Works Stockpile Area at the closed City Landfill	☒Yes ☐No
If no, explain: N/A	
➢ Did any changes on high priority facilities that could potentially affect stormwater runoff occur during the reporting year (e.g. new outfalls, facilities)?	☒Yes ☐No
If yes, are the changes reflected in the SWPPP?	☒Yes ☐No
If the changes were not reflected, explain why: N/A	

Documents are not provided in this report, but will be preserved according to the file retention policy.

BMP 6.2 Measure of Effectiveness Form	
➢ Results from Comprehensive High Priority Site Compliance Evaluations	
Total number of recurring items originating from site-specific activities identified Spring 2017*:	salt storage, equipment leaks, vehicle washwater
Total number of recurring items originating from site-specific activities identified Spring 2018:	
Total number of recurring items originating from site-specific activities identified Spring 2019:	
Has the # of recurring items trended downward or remained at zero from year to year?	☒ Yes (BMP effective) ☐ No (See below)
If no, discuss the specific recurring items and describe how the BMP can be modified to improve effectiveness to specifically address recurring items (e.g. improved training, improved inspection form) or describe why modification is not necessary: SWPPPs were developed in the prior reporting year and included proposed operational and structural BMPs. Budgetary constraints have prevented full implementation of structural BMPs, however, the operational BMPs have been implemented through staff training on the SWPPP	
* Note that measure of effectiveness begins in 2017 since recurring items would not be available in 2016 with the first inspection.	
➢ Were any illicit discharges reported or identified in the reporting forms for BMPs 3.2 and 3.3 found to originate from high-priority facilities activities?	☒ Yes (See below) ☐ No (BMP effective)
If yes, describe how the BMP can be modified to improve effectiveness to specifically address the cause of the illicit discharge(s) or describe why modification is not necessary. Modification of the BMP is not needed. Rather, adequate funding for implementation of improvement plans, including structural BMPs, designed in 2016.	

BMP 6.3a Employee Good Housekeeping/Pollution Prevention Training Plan (Section II B.6.d)

Description: The City will incorporate a written Training Plan into its Good Housekeeping/Pollution Prevention and IDDE Program Manuals, including a schedule of training events. The Program Manuals will serve as the training material and include Appendices to document training and list relevant staff for the following specific training:

- Annual training to relevant field personnel in the recognition and reporting of illicit discharges. Training will utilize the IDDE Manual described in BMP 3.3.
- Annual training to relevant employees in good housekeeping and pollution prevention practices that are to be employed during road and parking lot maintenance, around maintenance and operations facilities, and in and around recreational facilities. Training will utilize the Good Housekeeping/Pollution Prevention Manual described in BMP 6.1.

The plan will also require the following:

- Training or certification in spill response for emergency response employees.
- Training or certification for applying pesticides and herbicides in accordance with the Virginia Pesticide Control Act (§ 3.1-249.27 et seq. of the Code of Virginia) for employees performing applications.

For certifications as required under the Virginia Erosion & Sediment Control Law, see BMP 4.1.

Documentation: (1) Training documentation or appropriate certifications for employees; (2) The IDDE Manual; (3) The Good Housekeeping/Pollution Prevention Program Manual.

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective is to ensure effective training on the procedures provided in the Good Housekeeping/Pollution Prevention and IDDE Program Manuals and to have them carried out during employee daily operations. The expected result is well trained employees that minimize pollutant discharge through good housekeeping practices and IDDE screening and source identification and elimination.

Implementation schedule: The written training plan is complete and incorporated in the Good Housekeeping/Pollution Prevention and IDDE Program Manuals. Training and certification requirements began June 2015, with illicit discharge and good housekeeping training occurring once every two years thereafter.

Method to determine effectiveness: Effectiveness will be measured by the results of a “Knowledge Check” quiz that will be taken by each employee that takes the training. The “Knowledge Check” quiz is provided in the Appendix of the Program Manuals.

BMP 6.3a Annual Reporting Form	
Training Plan	
Has the Written Training Plan been developed?	☒Yes ☐No
Training & Certifications	
Has employee training been provided?	☒Yes ☐No
If no, explain: N/A	
Date of latest training to relevant field personnel in the recognition and reporting of illicit discharges:	3/6/17
Number of employees that participated in the latest training in the recognition and reporting of illicit discharges:	3
Date of last training to relevant employees in good housekeeping and pollution prevention practices:	6/24/16
Number of employees that participated in the latest training in good housekeeping and pollution prevention practices:	20
Do the number of individuals reported above that participated in training represent all employees that conduct daily activities that could potentially affect stormwater runoff?	☒Yes ☐No
If no, explain: Several administrative personnel not included in this year's training participated in training the previous year, meeting the biennial requirement. The City will continue to identify additional employees that may be appropriate to include in training.	
Did any employees apply pesticides and herbicides?	☒Yes ☐No
If yes, identify the employee and their certification: Pesticide Applicator Certificate: Michele A. Corneau #81223-G, James R. Wooten JR #72056-T, Darius M. White #75230-G, Teresa L. Miller #87905-T, Trinity Firestar 145303-T	
Provide a summary of the training or certification program provided to emergency response employees that include training in spill response: Key personnel in Public Works as well as the City fire department receive extensive training in HazMat response due to the industrial presence within the city. Public Works personnel are also provided training on spill response as related to their day to day operations.	

Documents are not provided in this report, but will be preserved according to the file retention policy.

BMP 6.3a Measure of Effectiveness Form	
Did scores from the "Knowledge Check" quiz improve from the previous training?	☐ Yes (BMP effective) ☐ No (See below) ☒ N/A
If no, describe modifications to the BMP to increase effectiveness (e.g. training frequency, training material, etc.): N/A	

BMP 6.3b Contractor Certification for Pollution Prevention (Section II B.6.d.4)
Description: The City will require, through contract language, the certification for contractors applying pesticides and herbicides in accordance with the Virginia Pesticide Control Act (§ 3.1-249.27 et seq. of the Code of Virginia). Contract language will require contractors provide proof of the appropriate certification prior to contract execution. **Necessary documentation for implementation:** (1) Contract language; (2) Proof of certifications. **Responsible individual for implementation:** Stormwater Program Manager **Objectives and expected results in meeting measurable goals:** The objective is to ensure the proper application of pesticides and herbicides. The expected result is that contractors used by the City will have appropriate certifications for application of pesticides and herbicides. **Implementation schedule**: City contracts require that all contractors comply with all applicable regulations and/or policies related to the execution of the services provided. **Method to determine effectiveness:** Effectiveness will be measured by evaluation of trends in confirmed reports of illicit discharge related to herbicides and pesticides.

BMP 6.3b Annual Reporting	
Pesticides and Herbicides	
Number of contracts executed during the reporting year that includes application of pesticides and herbicides?	2
Was proof of certification provided for each contract that includes the application of pesticides and herbicides?	☒ Yes ☐ No ☐ N/A
If no, explain:	

BMP 6.3b Measure of Effectiveness	
Were any illicit discharges related to herbicides and pesticides application by contractors reported or identified in the reporting forms for BMPs 3.2 and 3.3?	☐ Yes (See below) ☒ No (BMP effective)
If yes, describe how the BMP can be modified to improve effectiveness to specifically address the cause of the illicit discharge(s) or describe why modification is not necessary: N/A	

BMP 6.4 Turf and Landscape Management (Section II B.6.c)
Description: Staff will implement a turf and landscape nutrient management plan (NMP) developed by a certified turf and landscape nutrient management planner in accordance with §10.1-104.2 of the Code of Virginia on all lands owned or operated by the City where nutrients are applied to a contiguous area greater than one acre. In addition, the City will not apply any deicing agent containing urea or other forms of nitrogen or phosphorus to parking lots, roadways, and sidewalks, or other paved surfaces. **Documentation:** (1) Hopewell Nutrient Management Plan; (2) Completed Fertilizer Application Record; (3) Ingredients of deicers used. **Responsible individual for implementation:** Stormwater Program Manager **Objectives and expected results in meeting measurable goals:** The objective is to avoid excessive application of nutrients where applied on City property subject to the NMP. The expected results are reduction of downstream impacts from nutrient loads through documented implementation of the NMP. **Implementation schedule**: Applicable lands subject to the NMP, those being a contiguous acre or more, will be identified by July 1, 2015. Implementation will ensure that 15% of the applicable lands are covered initially, 40% of the applicable lands by July 1, 2016, and 75 % by July 1, 2017 with complete coverage by July 1, 2018. **Method to determine effectiveness:** Effectiveness will be measured by the implementation of the NMP through completion of the application record and periodic updates to the NMP to make necessary adjustments based on soils conditions.

BMP 6.4 Annual Reporting Form		
Nutrient Management Plan		
Were nutrients used during the reporting year?	☐ Yes ☒ No	If no, no further reporting necessary for this BMP
Total acreage of lands where nutrient management plans are required:		N/A
Acreage of lands upon which nutrient management plans have been implemented:		N/A*
Date of last NMP update:		N/A*
Total percentage of land where nutrient management plans are required and being implemented =		N/A*
Does the percentage meet the schedule described in the BMP? (yes/no)		☐ Yes ☐ No ☒ N/A (no application)
If no, explain and provide a schedule for achieving the implementation requirement: * The City applies nutrients to a non-contiguous areas around the Courthouse and City Hall. Total acreage is less than 1 acre.		

Documents will be preserved according to the file retention policy.

BMP 6.4 Measure of Effectiveness Form	
Was the NMP's fertilizer application record maintained and in adherence to the NMP?	☐ Yes (BMP effective) ☐ No (See below) ☒ N/A (No application)
If no, describe how the BMP can be modified to improve effectiveness. Provide rationalization for modification or if modification is deemed unnecessary: N/A	

BMP 6.5 Improved Contractor Safeguards to Ensure Program Consistent Measures and Procedures (Section II B.6.e)
Description: The City's current contract language will be enhanced to incorporate references to sections in the Good Housekeeping and Pollution Prevention Manual to require contractors to use appropriate control measures and procedures for stormwater discharges, when applicable. Oversight will be provided by the City with inspections and generated reports on the measures of adherence to the contract documents; effectiveness of the measures to control illicit discharges; and the Contractor's maintenance of the measures. Contract language will require contractors address items identified during inspections within a time period appropriate to prevent the potential of non-stormwater discharges. When needed, if the Contractor fails to take immediate action or remediate to the satisfaction of the City, the City shall remediate the pollution and receive a credit in the existing contract for the cost of remediation. Contract language described in this BMP is not intended for regulated land disturbance activity addressed with BMPs 4.1, 4.2, and 4.3. **Documentation:** (1) Good Housekeeping and Pollution Prevention Manual; (2) Completed inspection reports generated, when applicable; (3) Contract language. **Responsible individual for implementation:** Stormwater Program Manager **Objectives and expected results in meeting measurable goals:** The objective and expected result is to minimize or prevent pollutant discharges from contractor activities. **Implementation schedule**: The City has contract language requiring contractors to use appropriate control measures and procedures for stormwater discharges. **Method to determine effectiveness:** Effectiveness will be measured by the inspection results specific to work performed by contractors, the responsiveness of contractors to address observed issues, or reported illicit discharges originating from contracted municipal work.

BMP 6.5 Annual Reporting Form	
Contractor Safeguards	
Has contract language, as described above, been developed?	☒Yes ☐No
Has contract language, as described above, been included in contracts with all contractors where the work performed could require appropriate control measures and procedures for stormwater discharges?	☒Yes ☐No
If no, explain: Standard contract language related to compliance with all City codes, ordinances, and policies, including pollution prevention is included in the City's contracts as appropriate for the particular contracted services.	
Was oversight necessary for any contracts subject to the contract language described in the BMP?	☐Yes ☒No ☐N/A (no contracts)
If no, explain: Oversight by City inspection personnel is standard for land disturbing or construction related projects. Other service contracts are performance-based and are managed without direct City supervision	

Documents will be preserved according to the file retention policy.

BMP 6.5Measure of Effectiveness Form	
Were any illicit discharges related to municipal contracted work (other than regulated land disturbance activity) reported or identified in the reporting forms for BMPs 3.2 and 3.3?	☐ Yes (See below) ☒ No (BMP effective)
If yes, describe how the BMP can be modified to improve effectiveness to specifically address the cause of the illicit discharge(s) or describe why modification is not necessary: NA	

3.1 Special Conditions for the Chesapeake Bay TMDL

BMP CB-SC.1 Chesapeake Bay TMDL Action Plan (Section I C.2)

Description: The City will develop a phased Chesapeake Bay Action Plan that incorporates public comment and includes:

- A review of the Program Plan BMPs described in Section 3.1 for consistency with the TMDL and for the purpose of identifying necessary modifications;
- An estimate of the annual POC loads discharged from the existing sources as of June 30, 2008, based on the 2009 progress run;
- An estimate of the total reductions necessary to reduce the annual POC loads from existing sources to the L2 implementation level;
- The means and methods that will be utilized to implement sufficient reductions from existing sources equal to 5.0% of the estimated total reductions necessary;
- Mechanism to address any modification to the TMDL or watershed implementation plan that occurs during the term of this state permit as part of its permit reapplication and not during the term of this state permit;
- An estimate of the expected costs to implement the requirements of this special condition during the state permit cycle; and
- An opportunity for receipt and consideration of public comment regarding the draft Chesapeake Bay TMDL Action Plan.
- A draft second phase Chesapeake Bay TMDL Action Plan designed to reduce the existing pollutant load by an additional 35%

The Action Plan development will consider DEQ's Chesapeake Bay Action Plan Guidance. Additional BMPs will be included in this Section of the Program Plan to include the identified means and methods.

Documentation: (1) Chesapeake Bay TMDL Action Plan; (2) Documentation of public participation; (3) Program Plan Updates, as necessary.

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective is to achieve reductions required by the Chesapeake Bay TMDL for sediment, phosphorus, and nitrogen. The expected result is the development and implementation of a TMDL Action Plan.

Implementation schedule: The Chesapeake Bay Action Plan was developed and the schedule developed in the Action Plan was implemented.

Method to determine effectiveness: Effectiveness will be determined by the selection of cost effective BMPs supported by model quantification to achieve the required pollutant reductions.

BMP CB-SC.1 Annual Reporting Form	
Chesapeake Bay Action Plan	
Method to receive and consider public comment, including dates: The Action Plan was posted online to allow for public comment. A public survey (see BMP 1.1) will solicit additional comments on the Action Plan during the 2017-2018 reporting year.	
Has the City Chesapeake Bay Action Plan been developed?	☒ Yes ☐ No
The Chesapeake Bay Action Plan was submitted to DEQ on October 1, 2015.	
Does pollutant load reduction quantification demonstrate the selected means and methods in the completed Action Plan can achieve the required reductions?	☒ Yes ☐ No

Documents will be preserved according to the file retention policy.

BMP CB-SC.1 Measure of Effectiveness	
Does pollutant load reduction quantification demonstrate the selected means and methods in the completed Action Plan can achieve the required reductions in the required time frames?	☒ Yes ☐ No
If no, explain how the Action Plan can be modified to achieve the required reductions in the required time frames:	

BMP CB-SC.2 Chesapeake Bay TMDL Action Plan Implementation (Section I B.5.b)

Description: On an annual basis, the City will report progress on the implementation of the Chesapeake Bay Action Plan and associated evaluation. In addition to continued implementation of the City's MS4 Program BMPs, the City's Chesapeake Bay Action Plan Implementation Schedule is summarized below as refined based on actual implementation:

Chesapeake Bay TMDL Action Plan Implementation Plan

Step	General Description	Measurable Goal	Target Date
1	Continued sweeping	Sweep a minimum of 156 lane miles annually with a regenerative/vacuum sweeper, or greater miles as may be needed if utilizing both regenerative and mechanical sweepers.	Annually
2	Tracking and information on areas swept	Supporting materials for tracking documentation	Annually

Street sweeping is performed and tracked in accordance with DEQ Guidance Memo No. 15-2005: Chesapeake Bay TMDL Special Condition Guidance Qualifying Street Lanes Method. This requires the tracking of mileage swept by sweeper type. Mileage logs for each sweeper for the annual reporting period and the annual load reductions are summarized in **Appendix E**

The City's Chesapeake Bay Action Plan also presents pollutant reductions achieved with the "*Marina Connectivity Greenway/BMP Project,"* intended to serve as a means to achieve pollutant reductions in future permit cycles. The project was completed in July of 2018. Pollutant reductions as computed in the DRAFT Phase II TMDL Action Plan are reported in Appendix E.

Documentation: (1) **DRAFT** Chesapeake Bay Phase II TMDL Action Plan; (2) Documentation of Measurable Goals described in the Implementation Plan.

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective is to achieve sediment, phosphorus, and nitrogen reductions required by the MS4 General Permit.

Implementation schedule: Per the Implementation Plan summarized in the City's Phase I and DRAFT Phase II TMDL Action Plan .

Method to determine effectiveness: Effectiveness will be determined by the quantitative computation of pollutant reductions using approved or scientifically supportable methods.

BMP CB-SC.2 Annual Reporting Form

Description of progress towards achieving measurable goals: The City's progress on the implementation of the Chesapeake Bay Action Plan measurable goals is reported below. Supporting documentation is not provided with the annual report, but can be provided upon request.

Step	Measurable Goal(s)	Progress Towards Measurable Goal
1	Sweep a minimum of 156 lane miles annually with a regenerative/vacuum sweeper.	The City's street sweeping schedule has increased the lane miles swept to account for the use of a mechanical sweeper in addition to the regenerative vacuum sweeper. Refer to Appendix E
2	Supporting materials for tracking documentation	Sweeper mileage data by sweeper type.

Marina Connectivity Greenway/BMP Project:
A contract was awarded in May, 2017 for the construction of the Marina Connectivity Greenway/BMP Project. The final pollutant reduction calculation summary as documented by the City's Phase I and DRAFT Phase II TMDL Action Plan, provided in **Appendix E**

BMP CB-SC.2 Measure of Effectiveness	
Were measurable goals achieved consistent with the Action Plan schedule?	☒ Yes ☐ No
If no, explain how the City plans to achieve Action Plan measurable goals for the permit cycle, consistent with the DEQ-approved Action Plan: NA	

3.2 Special Conditions for Approved TMDL other than the Chesapeake Bay TMDL

BMP SC.1 Appomattox River Watershed and James River - Hopewell to Westover TMDLs Action Plan (Section I B)

Description: Hopewell has been assigned a waste load allocation (WLA) for E. Coli in the Appomattox River Watershed TMDL approved on December 20, 2005 as well as in the James River – Hopewell to Westover TMDL approved in 2010. Hopewell will develop an action plan to address the WLAs that include:

- A list of legal authorities applicable to reducing E. coli;
- Identification and methods for maintaining a list of practices, methods, and controls implemented to reduce the E. Coli;
- Description of means for incorporation of identified practices, methods, and controls into the public education and outreach and employee training programs;
- Results of an assessment of facilities of concern for significant contribution of E. Coli;
- Develop methodology for assessing effectiveness of the TMDL Action Plan using modeling tools (in-lieu of water quality monitoring), specifically the Excel spreadsheet based Watershed Treatment Model (WTM). Assessment will also incorporate methodology for evaluation of facilities identified to significantly contribute to the POC;
- An annual reporting worksheet consistent with the TMDL Action Plan and the General Permit.

Additional BMPs will be included in this Section of the Program Plan, as necessary, to include implementation of the Action Plans.

Documentation: (1) James River and Appomattox Watersheds TMDLs Action Plan; (2) Hopewell Program Plan Updates, as necessary.

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective is to achieve reductions required by the Appomattox River Watershed and the James River TMDLs for E. Coli. The expected result is the development and implementation of a TMDL Action Plan.

Implementation schedule: The Action Plan was developed and the schedule was implemented.

Method to determine effectiveness: Effectiveness will be determined by the selection of cost effective BMPs supported by model quantification to achieve the required pollutant reductions.

BMP SC.1 Annual Reporting Form	
Appomattox River Watershed and James River – Hopewell to Westover Action Plan	
Has the Hopewell Action Plan been developed?	☒ Yes ☐ No
If no, please explain and provide expected date of completion: _____	

Documents will be preserved according to the file retention policy.

BMP SC.1Measure of Effectiveness Form	
Does quantification demonstrate the selected means and methods in the completed Action Plan can achieve the required reductions in the required time frames?	☒ Yes ☐ No
If no, explain how the Action Plan can be modified to achieve the required reductions in the required time frames: N/A	

BMP SC.2 Appomattox River Watershed and James River - Hopewell to Westover TMDLs Action Plan Implementation (Section I B.5.b)

Description: On an annual basis, the City will report progress on the implementation of the Appomattox River Watershed and James River - Hopewell to Westover TMDLs Action Plan and associated evaluation. As described in Section 4.1 of the Action Plan, BMPs implemented to address each minimum control measure (MCM) in the MS4 Program BMPs are applicable to the reduction of E. coli. To reduce E. coli to the maximum extent practicable, the E. coli Action Plan also lists practices and controls to address E. coli beyond those incorporated into the MCM BMPs summarized as:

Appomattox River Watershed and James River - Hopewell to Westover TMDL Action Plan Practices & Controls

BMP General Description	Measurable Goals
Pet Waste Controls	(1) Maintain signage and waste stations at City parks that allow dog walking - Atwood Soccer Complex and at Crystal Lake Park; (2) Enforce leash requirements at City parks. Install 3 new pet waste signs at Riverside Park in 2018.
Sanitary Sewer System Rehabilitation	Continue rehabilitation and repair of the sanitary sewer system by Hopewell Regional Wastewater Treatment Facility (HRWFT) with dedicated funds.
Prevention of Septic System Failures	Continue implementation of septic pump-out program.
Elimination of Straight Pipe Connections	(1) Continued annual outfall screening and mapping (as new outfalls are identified); (2) Continued elimination of illicit discharges, as identified; (3) Staff training to recognize straight pipes.
Source Controls at City-Owned Properties	(1) Conduct review of approach to pet waste as an E. coli source that includes a review of the code and considers additional pet waste stations; (2) Consider additional controls at the public works facility to address potential sources.
Enhanced Public Education & Outreach Plan	Inclusion of educational information into: (1) Public Education and Outreach Plan and (2) Employee training.

Documentation: (1) James River and Appomattox Watersheds TMDLs Action Plan; (2) Measurable goal documentation, as necessary.

Responsible individual for implementation: Stormwater Program Manager

Objectives and expected results in meeting measurable goals: The objective is to achieve reductions required by the Appomattox River and the James River TMDLs for E. Coli. The expected result is implementation of the identified measurable goals.

Implementation schedule: Ongoing, to the maximum extent practicable, or as otherwise identified for applicable BMPs in the City's Program Plan.

Method to determine effectiveness: Effectiveness will be determined based on the achievement of measurable goals described in this BMP.

BMP SC.2 Annual Reporting Form

Description: The City's progress on the implementation of the Appomattox River Watershed and James River - Hopewell to Westover TMDLs Action Plan measurable goals is reported below. Supporting documentation is not provided with the annual report, but can be provided upon request.

Appomattox River Watershed and James River - Hopewell to Westover TMDL Action Plan Practices & Controls

BMP General Description	Progress Towards Measurable Goals
Pet Waste Controls	The City partnered with the Chesapeake Bay Foundation for a grant proposed to install 10 pet waste disposal stations and educational signage at targeted sites in the City, including City Parks, to encourage pet owners to properly dispose of waste. The grant also funds the development and distribution of brochures for placement at veterinary facilities and pet stores to promote proper waste disposal. Refer to **Appendix E**
Sanitary Sewer System Rehabilitation	This City has continued an aggressive sanitary sewer rehabilitation and replacement program of the sanitary sewer system. During this reporting year, H2O Renewal (formerly Hopewell Regional Wastewater Treatment Facility) has accomplished the following: Sanitary sewer replacement: **2,649 l.f., Cured in Place Pipe (CIPP) 13,501 l.f.**
Prevention of Septic System Failures	The City continues implementation of septic pump-out program. The City developed a GIS point shapefile of septic systems during the last reporting year and utilizes the dataset to target reduction of the systems, where appropriate (i.e. redevelopment or extension of the sanitary sewer system).
Elimination of Straight Pipe Connections	(1) Outfall screening was performed (see reporting for BMPs 3.3). Newly identified outfalls mapped and included in outfall database in Appendix C; (2) Any identified/reported illicit discharge eliminated (see reporting BMPs 3.2 and 3.4); (3) Training conducted as reported in BMP 6.3a.
Source Controls at City-Owned Properties	(1) See above efforts for pet waste controls; (2) The City completed the design of a Public Works Yard site improvement plan that includes a stormwater management facility, sweeping material dewatering area and other controls. Phased construction is expected to begin in 2019.
Enhanced Public Education & Outreach Plan	(1) E. coli as a pollutant of concern is incorporated into the City's PEOP as described in BMP 1.2; (2) E. coli, as a pollutant of concern was incorporated into employee training reported in BMP 6.3a.

BMP SC.2 Measure of Effectiveness

Were measurable goals achieved consistent with the Action Plan?	☒ Yes ☐ No
If no, explain how the City plans to achieve Action Plan measurable goals for the permit cycle, consistent with the DEQ-approved Action Plan	

APPENDICES

Appendix A – MCM 1 Documentation of Public Education & Outreach Activities

Appendix B – MCM 2 Documentation of Public Participation Activities

Appendix C – MCM 3 Outfall Mapping, Screening, and IDDE Follow-up Information

Appendix D – MCM 5 SWM BMP Facility Tracking Database

Appendix E – Chesapeake Bay & Local TMDLs

Appendix A – Documentation of MCM 1 Public Education and Outreach

Activity 1: City Stormwater/VSMP Website

Activity 2: Third Thursday Open Air Market, July 20,

Activity 3: 2017Third Thursday Open Air Market, August 17, 2017

Activity 4: Install Rain Barrels with CBF staff, August and September 2017

Activity 5: Harvest Festival, November 18, 2017

Activity 6: Gardening for Beginners, May 19, 2018

Activity 7: Third Thursday Open Air Market, June 21, 2018

Activity 8: Brochures and Door Hangers

Activity 9: Presentation to City Council – January 23, 2018

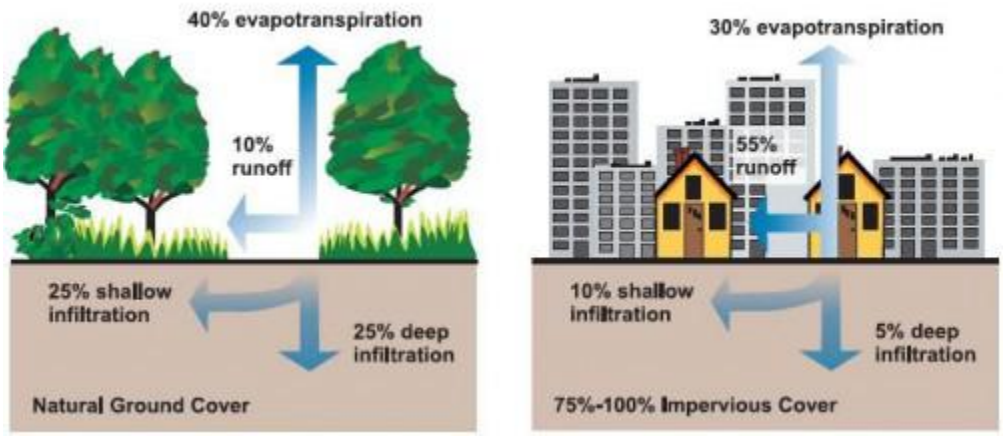
http://hopewellva.gov/storm-water/

ACTIVITY 1
City VSMP/Stormwater Website

STORMWATER MANAGEMENT

What is Stormwater?

When it rains, impervious surfaces such as rooftops, driveways, parking lots and roads prevent water from being absorbed into the ground. Instead, this rainwater drains downhill and is known as stormwater runoff.



U.S. Environmental Protection Agency

Unlike household wastewater, stormwater is not treated. That means the everyday pollutants and litter has a direct impact on our local water quality.

Why is Stormwater Management Important?

Stormwater runoff can erode soil and wash a wide variety of pollutants off the land, such as fertilizers and pesticides, soil and debris from lawns, oil, antifreeze, and metals from streets and parking lots, and litter. These pollutants are washed into our storm drains and can clog the system causing local flooding, and eventually empty into our waterways, causing pollution related closures, fish kills, and other negative impacts.

Urban runoff can carry oil, grease, trash, and other pollutants to our streams and rivers.

Because the waterways and aquatic resources around the City are deemed to have a significant economic and quality of life value, federal and state regulations require us to better manage the quality of the stormwater that is entering our creeks and streams, the Appomattox and James River, and the Chesapeake Bay. These regulations require much planning and educational effort to be effective, but the benefits include cleaner water and a healthier environment!

What is the City Doing to Reduce Stormwater Pollution?

The City of Hopewell is hard at work developing and implementing stormwater management programs that include construction of best management practices (BMPs), drainage system maintenance, enforcement of City Ordinances and public education. Some examples of what we are doing includes:

- Street sweeping – this helps remove litter and debris that would otherwise be washed into storm drains and into our waterways.
- Inspecting construction sites for erosion and sediment controls to decrease the amount of soil carried off site.
- Inspecting storm drains for illicit discharges.
- Educating our employees and the public about pollutants in stormwater runoff. This helps to determine the source of pollutants, which can help localities to better target future program efforts. Citizen input is very helpful in reporting illicit dumping into storm drains.

Many of these activities are required by the Clean Water Act and are written into the **City's Stormwater Permit**.

http://hopewellva.gov/stormwater-permit/

STORMWATER PERMIT

The City's Stormwater Permit

The City of Hopewell owns and operates a Municipal Separate Storm Sewer System (MS4) which is regulated under the Federal Clean Water Act. Therefore, the Virginia Department of Environmental Quality (VDEQ) requires that the City comply with the Commonwealth's General Virginia Pollutant Discharge Elimination System Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems, affectionately referred to as the MS4 Permit (9VAC25-890-40)

This permit requires that the City implement 6 Minimum Control Measures (MCMs):

1. Public education and outreach on stormwater impacts;
2. Public involvement & participation;
3. Illicit discharge detection and elimination;
4. Construction site stormwater runoff control;
5. Post-construction stormwater management on new and re-development projects; and
6. Pollution prevention/good housekeeping for municipal operations.

City has initiated numerous programs and activities to comply with these MCMs. The City's MS4 Program Plan details these activities and is combined with the Annual Report submitted each year to VDEQ.

The City's most recent MS4 Program Annual Report can be accessed here:

City of Hopewell MS4 Program Plan and Annual Report (2016)

In addition to these 6 MCMs, the City is required to implement water quality projects to address the Total Maximum Daily Load (TMDL) of pollutants into the Appomattox River, the James River, and the Chesapeake Bay. The TMDL is basically the measure of the allowable amount of pollutants: nitrogen, phosphorus, sediment, and bacteria that can be discharged into these water bodies and still be considered healthy for recreation.

In order to comply with these requirements, the City has developed a Chesapeake Bay Action Plan and a Bacteria Action Plan for the Appomattox and James Rivers.

Action Plans

- **Chesapeake Bay TMDL Action Plan**
- **Appomattox and James River Bacteria TMDL Action Plan**

http://hopewellva.gov/stormwater-best-management-practices/

STORMWATER BEST MANAGEMENT PRACTICES

The City's Post-Construction Stormwater Management Manual provides an overview of stormwater Best Management Practices (BMPs). Stormwater BMPs include structural and non-structural practices:

• Non-Structural BMPs include the development and implementation of policies and procedures that serve to reduce the impacts of stormwater runoff. This can include ordinances that require tree and/or stream buffer preservation, as well as public education and outreach programs designed to teach citizens the importance of keeping household chemicals, solvents, paint, etc., under cover and away from stormwater.

• Structural BMPs are built into the landscape to manage the runoff from urban areas. Common stormwater BMPs in the City include Dry detention ponds (these are normally dry, and fill up with runoff during rain events and then are dry again), wet ponds (these are normally wet, and the water level rises during rain events and then goes back down to the normal pond depth).

Examples of the most common stormwater BMPs found in the city include wet ponds and dry ponds (ponds that are normally dry, but fill with stormwater runoff during rain events and then draw down).

These BMPs manage both the quality and the quantity of stormwater runoff and are required on land development projects to prevent the increase in runoff from causing damage to downstream properties and streams. More information about these BMPs and how they help filter pollutants out of runoff can be found on the **Virginia Water Resources Research Center's BMP Clearinghouse website (www.vwrrc.vt.edu/swc/)**.

New stormwater BMPs that are required as part of a development project are inspected by the designer, the contractor and the City before they are considered complete. All BMPs must be regularly inspected and documented by the property owner. And when warranted, the property owner must also perform maintenance. BMP maintenance includes both routine maintenance and corrective maintenance.

The City's Post Construction Stormwater Management Program Manual outlines the City's requirements and procedures for BMP inspection and maintenance.

http://hopewellva.gov/illicit-discharges-reporting-stormwater-pollution

ILLICIT DISCHARGES: REPORTING STORMWATER POLLUTION

What are illicit discharges?

An illicit discharge is an unlawful act of disposing, dumping, or any discharge of any substance other than stormwater into the storm drain system. The storm drain system consists of catch basins, yard inlets, and the street gutters that drain stormwater to them.

Examples of illicit discharges include:

- Paint, old fuel, or other household chemicals poured into or near a storm drain;
- Changing engine oil or antifreeze without a containment system for collecting the fluid before it hits the street and gutter;
- Discarding yard waste, e.g. leaves and brush, in or near a storm drain or drainage ditch
- Draining chlorinated swimming pool water in or near a storm drain or drainage ditch

What are illicit connections?

An illicit connection is an unlawful connection of a pipe or other direct connection to the storm drain system, drainage ditch, or any water feature that allows the discharge of non-stormwater to the system or a stream, pond, lake, or river.

Examples of illicit connections:

- Floor drains going into the storm drain system
- Wash water from residential washing machines, laundromats, or car washes connected to a storm drain system or ditch
- Sewer service pipe connected into a storm structure or emptying into a stream.

See the City's ordinance prohibiting illicit discharges: City Code Chapter 31- Sewers and Sewage Disposal, Article I and Article VI

Reporting Stormwater Pollution

If you see something other than stormwater going into the drainage system or into a stream, or if you see something and are not sure what it is, i.e., flowing water when there hasn't been any rain, you should contact the City's Public Works Department.

1. **WHERE**: The location of the incident. In order for the City to investigate we need to know where the problem is.
2. **WHEN**: The sooner an incident is reported the greater the likelihood that an environmentally protective response can be made.
3. **WHAT**: If you know what was released and how much, that can help determine the type of investigation needed.
4. **WHO**: If you know the source of the problem or the company/individual causing the problem, please give us that information.

To report a chemical or fuel spill or other emergency situation:

- Hopewell Fire Department or Police Department: 9-1-1

To report water pollution or illicit discharges:

- Hopewell Department of Public Works, Stormwater Division: (804) 541-2295

To report spills or water pollution outside the City:

- During *normal work hours*: VDEQ Pollution Response Program (PREP): (804) 527-5020;
- *Nights, holidays, and weekends:* the Department of Emergency Management's (DEM) 24 hour reporting number: 1 (800) 468-8892

http://Hopewellva.Gov/Erosion-Sediment-Control-And-Stormwater-Management-For-Land-Disturbing-Activities/

EROSION & SEDIMENT CONTROL AND STORMWATER MANAGEMENT FOR LAND DISTURBING ACTIVITIES

The City of Hopewell (City) implements a consolidated Erosion and Sediment Control (ESC) & Stormwater Management (SWM) Program in accordance with the City Code. The City Code incorporates, by reference, the provisions the Virginia ESC and SWM Laws and Regulations.

Full text of the City's ESC and SWM Ordinances:

Erosion & Sediment Control Ordinance; Chapter 31 Article I & II

Stormwater Management Ordinance; Adopted February, 2015

The City ordinances require that land disturbing activities that disturb **2,500 square feet or more** obtain a City Land Disturbing Permit; and

Land disturbing activities that disturb **one acre or more**, obtain a City Virginia Stormwater Management Program (VSMP) permit. The VSMP Permit is the City's authorization of coverage under the General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Construction Activities (VAR10).

A detailed explanation of the City's permitting requirements, including permit application and plan submittal requirements, can be found here:

Hopewell Guidance for Land Disturbing Activities

Appendix B

LDA Form 01 – Application for a Land Disturbing Permit

LDA Form 02 – Application for a Land Disturbing Permit – Single Family Residence with an Agreement in Lieu of an ESC Plan

LDA Form 03 – Land Disturbing Permit, ESC Plan, and VSMP Permit Fee

Appendix C

LDA Form 04 – ESC Plan Preparer-Reviewer Checklist

LDA Form 05 – SWM Plan Preparer-Reviewer Checklist

Appendix D

LDA Form 06 – Preconstruction Meeting Verification Form

Appendix E

LDA Form 07 – Construction Site Inspection Form For Single-Family Residence with Agreement in Lieu of Plan

LDA Form 08 – Construction Site Inspection Form Less than 1 acre

LDA Form 09 – Construction Site Inspection Form for 1 acre or greater

Appendix F

LDA Form 10 – SWM Facility Record Drawing and Certification

LDA Form 11 – Notification of Termination of Land Disturbing Activity

Appendix G

LDA Form 12 – SWPPP Template for Single Family Detached Residential Construction

LDA Form 13 – SWPPP Template for Regulated Land Disturbing Activities

http://hopewellva.gov/public-education-and-outreach/

PUBLIC EDUCATION AND OUTREACH

City Erosion Control and Stormwater Inspector Diane Cook at the 2016 Riverfest

The Federal Clean Water Act recognizes that to address the negative impacts of stormwater runoff effectively the strategy must include measures to reduce the sources of nonpoint source pollution. Nonpoint source pollution is defined as pollutants from diffuse sources.

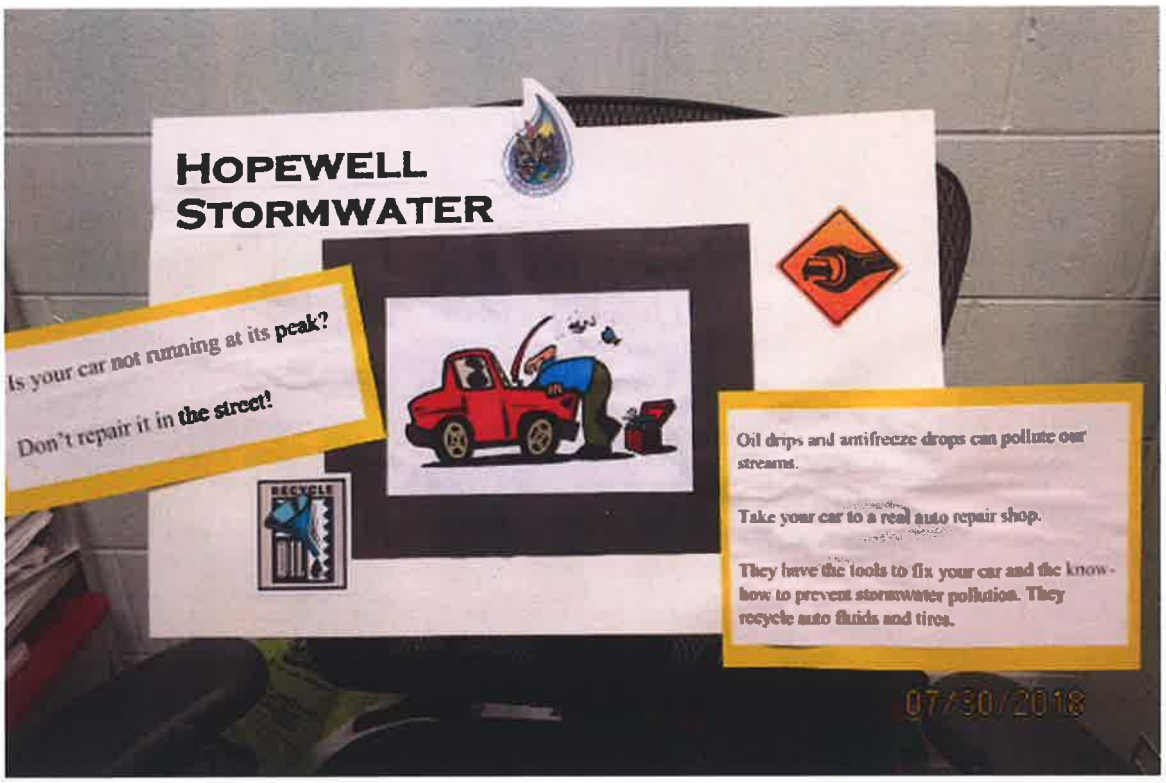
Therefore, the City's MS4 permit includes a requirement to develop a program that provides opportunities and materials to educate the public on stormwater impacts, including general information about stormwater, why it is important, and steps that can be taken by individuals to reduce or eliminate sources of stormwater pollution.

The City's Public Education & Outreach Program includes a combination of passive educational opportunities in the form of pamphlets and brochures, this website, etc., as well as in-person outreach efforts such as program staff attending neighborhood functions, organizing or participating in community stream clean-up events, etc. The Stormwater Program staff is also partnering with the Chesapeake Bay Foundation to develop a series of events including workshops on installing rain gardens and rain barrels, watershed walks, educational boat trips for students and adults aboard the Chesapeake Bay Foundation educational vessel *Baywatcher*, and other activities.

ACTIVITY 2
Third Thursdays Open Air Market - July 20, 2017

ACTIVITY 3

Third Thursdays Open Air Market - August 17, 2018



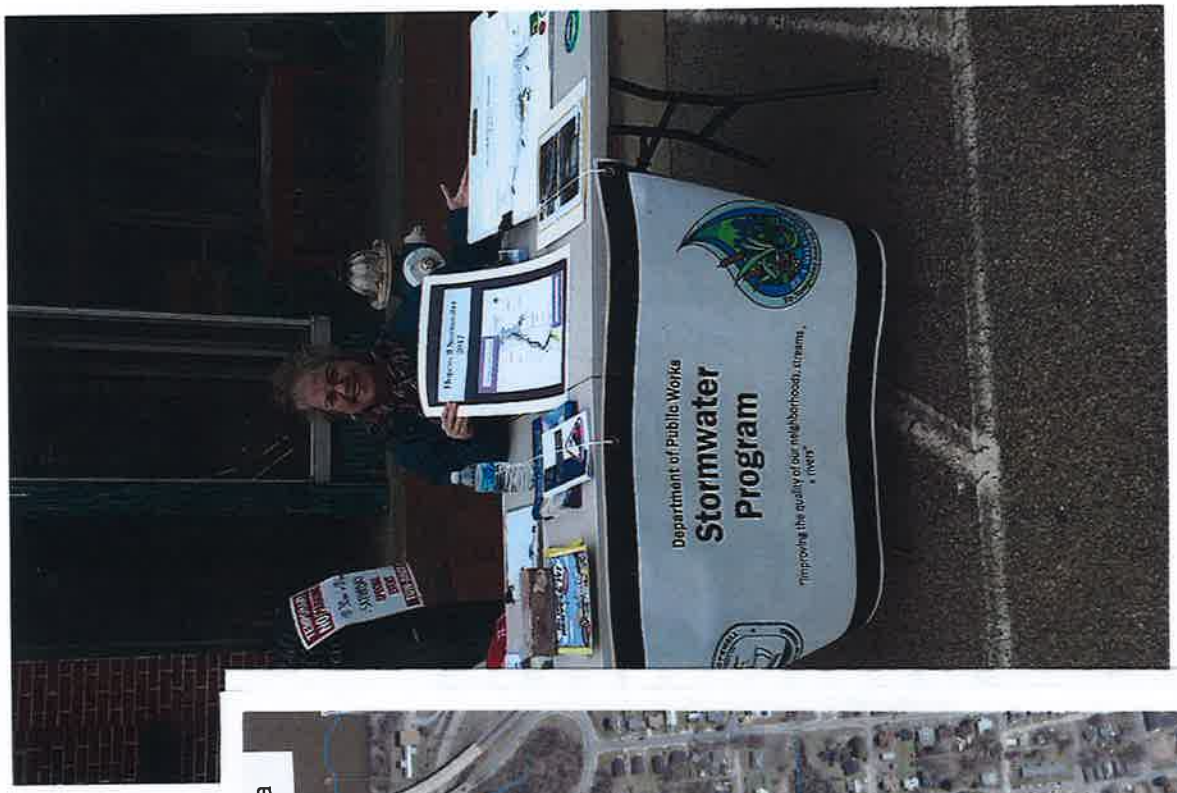
ACTIVITY 4

Installing Rain Barrels in Partnership with CBF - September 15, 2017

Appendix A - Public Education & Outreach

ACTIVITY 5

Harvest Festival - November 18, 2017



KLEER-POLY
#286

ANGLER'S CO., LTD
FLUSHING NY 11358

Appendix A - Public Education & Outreach

ACTIVITY 6

Gardening for Beginners in Partnership with Hopewell Dept. of Recreation & Parks

May 19, 2018

Gardening for Beginners
May 19, 2018

ACTIVE ADULTS

UNCH

Hopewell

ous for its peanuts
items include fried
Lunch is on your own

SUMMER GARDENING SERIES

Gardening for Beginners

For ages 18+. Learn the ins and outs of basic gardening at the Heritage Gardens Community Garden. The class will cover basic tips on when to plant certain vegetables and how to prepare soils. This program will be led by a master gardener. Equipment will be provided.

8 Award about
Fertilizer: all fert has label w/ 3 parts:
N-P-K by weight
Nitrogen
phosphate
potash

What you need depends on what
Root crops like carrots + potatoes nee
Leafy Greens + corn like - lots of N

Several small applications are better
big one. Slow release or timed relea
is good - we want timing of fertilizer
when your plan will use it, othe

9

Nutrients can become polluta

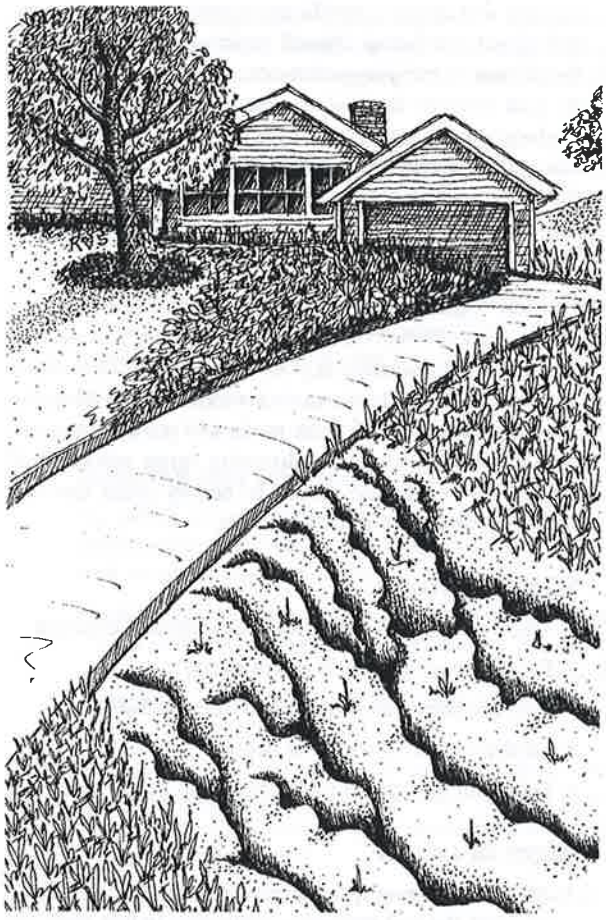
Plants need nutrients, but too mu
wrong time. Is when nutrients n

N + P are major sources of P
in our waterways. They can con
our gardens, animal waste, sewa
treatment plants, farm fields &
automobile exhaust.

A general rule of thumb is: N for l
Phos - root + fruit production
Potash - cold hardiness, disease resi
general durability

Virginia Gardener

Reducing Erosion and Runoff



Virginia Cooperative Extension
Virginia Tech • Virginia State University

Appendix A - Public Education & Outreach

ACTIVITY 7

Third Thursdays Open Air Market - June 21, 2018

ACTIVITY 8
Brochures and Door Hangers

New dog waste station at Hopewell City Marina

HOPEWELL STORMWATER

Winter 2017

Learn more about the Hopewell Stormwater Program on the City's website: hopewellva.gov and search for "stormwater"

BE A SOLUTION! To Nonpoint Source Pollution

Contact the Stormwater Division at
(804) 541-2295

Storm Drain System

The Hopewell storm drain system is the network of roadside curb & gutter, inlets, pipes and ditches designed to carry stormwater runoff away from houses, yards, roads and buildings into nearby streams and rivers.

Pet waste left on the ground will wash into the storm drain system and reach the nearest stream—Yuck!

Pick up after your dog—every scoop makes a difference!

Why Pet Waste Can Be Harmful

1. Dog poop is NOT good lawn fertilizer. It's toxic to your lawn!
2. You may not live on the water, but unscooped poop from your yard is carried by overland water flow or is washed into storm drains, ending up in nearby streams, rivers and ground water.
3. The U.S. Center for Disease Control and Prevention confirms pet waste can spread parasites including hookworms, ringworms, tapeworms and Salmonella. When infected dog poop comes into contact with your lawn, the poop will eventually "disappear", but the parasite eggs can linger for years! When a human or other animal comes into contact with that soil through everyday activities like walking barefoot, gardening or playing, they risk infection from those eggs ... even years after the poop is gone.
4. Pet waste is teaming with E. coli and other harmful bacteria including fecal coliform bacteria, which causes serious kidney disorders, intestinal illness, cramps and diarrhea in humans.

(adapted from an article by Joanne Osband)

Who We Are and What We Do

The waterways in and around Hopewell provide a significant economic and quality of life value. The City's Stormwater Program staff are working to improve the quality of our streams, wetlands, and the Appomattox and James Rivers by reducing the amount of pollutants discharged from the storm drain system into our streams and rivers. These pollutants include (but are not limited to) excess nitrogen and phosphorus, sediment from construction sites and stream erosion, oil & grease from cars and trucks, **and bacteria from pet waste** and leaking sewer pipes.

We reduce these pollutants by

- sweeping streets,
- inspecting and repairing storm drain systems,
- inspecting construction projects, and
- **educating citizens on why it's important to pick up after their dogs**.

Stormwater Program staff member Diane speaks at the Hopewell Third Thursday Open Air Market about sources of water pollution.

Contact the Stormwater Division at

(804) 541-2295

Learn more about the Hopewell Stormwater Program on the City's website; just type in stormwater management

HOPEWELL STORMWATER

Summer 2017

Storm Drain System

The Hopewell storm drain system is a network of roadside curb & gutter, inlets, pipes and ditches designed to carry stormwater runoff away from houses, roads and buildings into nearby streams and rivers.

Any materials that are dumped or left near the storm drain system, such as grass clippings, leaves, and litter will eventually clog the system and cause flooding.

How You Can Help

- Mulch grass clippings into your lawn — grass clippings help fertilize the soil
- Use leaves as mulch around plants
- Pick up pet waste and place it into the trash
- Repair vehicle leaks and drips

Please Don't Sweep Grass Clippings into the Street

Warm weather and rain together make great grass. It might seem like a good idea to simply blow clippings into the street. Before you do that, consider composting or leaving them to naturally fertilize your lawn.

In Hopewell, water that enters storm drains travels to

either the Appomattox River or the James River.

Storm drains are not meant for litter, leaves, or grass clippings. These materials can clog pipes, causing flooding or drainage problems. Grass clippings also add nutrients (nitrogen and phosphorous) to our waterways, which leads to unwanted algae and aquatic weeds.

Thank you for helping keep Hopewell's storm drain system clean!

Who We Are and What We Do

The waterways in and around Hopewell provide a significant economic and quality of life value. The City's Stormwater Program staff are working to keep the drainage system clear of debris and pollutants to improve the quality of our streams, wetlands, and the Appomattox and James Rivers. We do this by preventing pollutants such as nutrients, sediment from construction sites, oil & grease from cars and trucks, and bacteria from pet waste and leaking sewer pipes from getting into our drainage system.

We reduce these pollutants by

- sweeping streets,
- inspecting and repairing storm drain systems,
- inspecting construction projects, and
- educating citizens on ways to prevent stormwater pollution.

City of Hopewell
Stormwater Division

Summer 2017

Manage Grass Clippings

The Hopewell storm drain system is a network of roadside curb & gutter, inlets, pipes and ditches designed to carry stormwater runoff away from houses, yards, roads and buildings into nearby streams.

Any materials dumped or dropped near a storm drain system, such as grass clippings, leaves, and other yard waste will eventually clog the system and cause flooding.

How You Can Help

- Cut your grass when it's dry
- Cut your grass regularly
- Cut your grass with a sharp blade
- Leave grass clippings where they fall

City of Hopewell
Stormwater Division

Summer 2017

Manage Grass Clippings

The Hopewell storm drain system is a network of roadside curb & gutter, inlets, pipes and ditches designed to carry stormwater runoff away from houses, yards, roads and buildings into nearby streams.

Any materials dumped or dropped near a storm drain system, such as grass clippings, leaves, and other yard waste will eventually clog the system and cause flooding.

How You Can Help

- Cut your grass when it's dry
- Cut your grass regularly
- Cut your grass with a sharp blade
- Leave grass clippings where they fall

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Who We Are and What We Do

The waterways in and around Hopewell provide an important economic and quality of life benefit. The City's Stormwater Program staff are working to improve the quality of our streams, wetlands, and the Appomattox and James Rivers by reducing the amount of pollutants discharged from the storm drain system.

These pollutants include surplus nitrogen and phosphorus, sediment from construction sites and stream erosion, oil and grease from cars and trucks, and bacteria from pet waste and leaking sewer pipes.

We reduce these pollutants by

- Sweeping streets,
- Inspecting and repairing storm drain systems,
- Inspecting construction projects, and
- Educating citizens on ways to prevent stormwater pollution.

Find more information on the City's website:
www.hopewellva.gov/stormwater-permit/

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ACTIVITY 9

Presentation to City Council - January 23, 2018

RIVERSIDE PARK STORMWATER GREENWAY

City of Hopewell

Stormwater Management Program

Joseph Battiata, P.E.

1

CITY OF HOPEWELL STORMWATER PROGRAM

1. Why Have a Stormwater Program
2. Minimum Control Measures
3. Meet the Staff
4. Chesapeake Bay TMDLs
5. Riverside Park Stormwater Greenway
6. Questions

2

WHY HAVE A STORMWATER PROGRAM?

3

WHY HAVE A STORMWATER PROGRAM?

Community Drivers

- **Protection of property from flood damage**
- **Local water quality**
- **Healthy & safe environment**
- **Stormwater & drainage system infrastructure operation & maintenance**

4

WHY HAVE A STORMWATER PROGRAM?

Regulatory drivers:

- Federal Clean Water Act
- National Pollutant Discharge Elimination System (NPDES) Permits
  - NPDES Municipal Separate Storm Sewer System (MS4) Permit
  - NPDES General Permit for Discharges of Stormwater from Construction Activities
- Chesapeake Bay and Local Waters Total Maximum Daily Loads (TMDLs)

5

BACKGROUND

- 1983 – First Chesapeake Bay Agreement
- 1987 – Commitment; 40% reductions by 2000
- 2000 – Chesapeake 2000 Agreement
- 2009 – CBF Files lawsuit against EPA

6

BACKGROUND

CBF/EPA Settlement: May 11, 2010

Executive Order 13508: May 12, 2010

- ✓ **Improve Stormwater Permit Programs**
- ✓ Federal Facilities
- ✓ **Bay TMDL Implementation Schedule**

Chesapeake Bay TMDL: Dec 29, 2010

- ✓ 185.9 million lb TN/yr (25% reduction)
- ✓ 12.5 million lb TP/yr (24% reduction)
- ✓ 6.45 billion lb Sediment/yr (20% reduction)

Achieved by 2025

7

IMPROVE STORMWATER PERMIT PROGRAMS

- VDEQ VPDES MS4 Permit:
  - Phase I MS4 Permit (large MS4s): 11 Municipalities + VDOT
  - **Phase II MS4 Permit** (small & medium MS4s): 102 Municipalities, Federal Facilities, Colleges & Universities (Effective 2003 with 5 yr permit cycles)
- VDEQ VPDES Permit for Discharges of Stormwater from Construction Sites or CGP
  - Local Implementation via designation of a municipality as a **Virginia Stormwater Management Program (VSMP) Authority** (effective July 1, 2014)

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CITY OF HOPEWELL MS4 PERMIT

- **Virginia VPDES Permits:**
  - **MS4 Permit 6 (+1) Minimum Control Measures (MCMs)**
    1. Public Education & Outreach on Stormwater Issues
    2. Public Participation
    3. Illicit discharge detection & elimination (IDDE) Program
    4. Construction Site ESC program
    5. Post-construction SWM program
    6. Pollution Prevention & Good Housekeeping for Municipal Operations
    7. Compliance with Chesapeake Bay & Local TMDLs

9

CODE OF ORDINANCES

Chapter 14 – Erosion & Sediment Control

Article I. In General: Sections 14-1 thru 8. (Sections 14-9 thru 25 Reserved)

Article II. Permit & Plan for Land Disturbing Activities: Sections 14-26 thru 32 (Sections 14-33 thru 50 Reserved)

Article III. Stormwater Management: Sections 14-51 thru 65

Code of Ordinances Chapter 31 – Sewers & Sewage Disposal

Article VI. Storm Sewers: Sections 31-137 thru 144

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CITY OF HOPEWELL STORMWATER PROGRAM

Mission: Improve the quality of our neighborhoods, streams, and rivers

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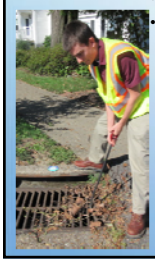
CITY OF HOPEWELL STORMWATER PROGRAM

Program Staff

- Joe Battiata, P.E., Stormwater Program Manager 11/2015
- Diane Cook, Water Quality Analyst 03/2016
- John DeGroot, Stormwater Utility Engineer 09/2016



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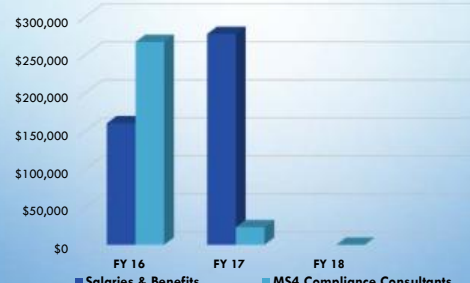
COST OF DOING BUSINESS



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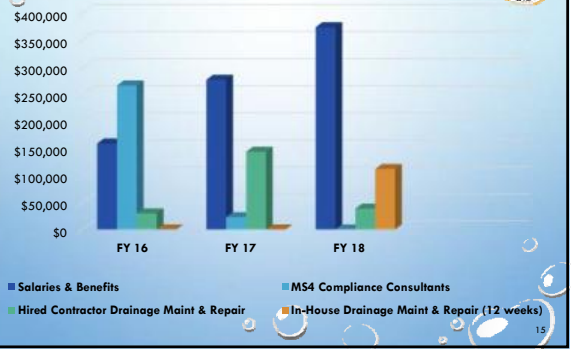
CITY OF HOPEWELL STORMWATER PROGRAM

Program Staff (2/3 of 1 crew)

- Tony Lane, Public Works Maintenance Crew Leader 4/2017
- Charles Banton, Jr., Sr. Public Works Maintenannce Specialist 7/2017

14

COST OF DOING BUSINESS



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CITY OF HOPEWELL STORMWATER PROGRAM

MS4 Infrastructure Maintenance & Repair

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CITY OF HOPEWELL STORMWATER PROGRAM

1. **Stormwater Infrastructure Maintenance**
2. **Stormwater Infrastructure Repair**
   - I. **TMDL Compliance:** Does the project address MS4 Program, Chesapeake Bay, or Local TMDL compliance;
   - II. **Public Safety:** Does the project address a public safety issue? What are the implications of 'doing nothing'?
   - III. **Watershed Scale:** Does the project address multiple properties?
   - IV. **Public Access:** Is the project located on public property or an easement?
   - V. **Cost:** Is the estimated cost within the budget of the Stormwater Program?

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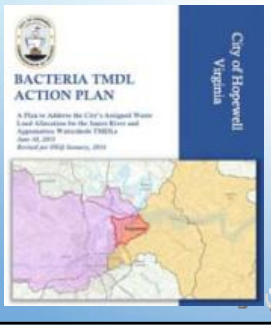
JAMES & APPOMATTOX RIVER WATERSHEDS TMDL



- Pet Waste Controls
- Sanitary Sewer System Rehabilitation
- Prevention of Septic System Failures
- Elimination of Straight Pipe Connections
- Source Controls at City-owned and Operated Properties

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CHESAPEAKE BAY TMDL IMPLEMENTATION SCHEDULE

- ✓ Virginia's Phase I Watershed Implementation Plan (WIP): November 2010
- ✓ Virginia's Phase II WIP: March 2012
  - Stormwater Regulations Technical Criteria Part IIB
  - MS4 Permit Level 2 implementation (3 Permit Cycles: 5%, 35%, 60%)

	Required Reduction (2009 Baseline)		
	TN	TP	Sediment
Impervious Land	9%	16%	20%
Pervious Land	6%	7.25%	8.75%

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HOPEWELL'S TMDL IMPLEMENTATION SCHEDULE

Required Reductions (lb/yr)				
Pollutant	1st Cycle (2013 – 2018)	2nd Cycle (2018 – 2023)	3rd Cycle (2023 – 2028)	Total
	5%	35%	60%	**100%**
Nitrogen	109.1	763.70	1,309.20	**2,182.0**
Phosphorus	22.61	158.27	271.32	**452.2**
TSS	9,730.2	68,111.4	116,762.4	**194,604.0**
Achieved Reductions (lb/yr)				
Nitrogen	1,616 / 145*	-	-	**1,761**
Phosphorus	453 / 23*	-	-	**476**
TSS	81,054 / 61,100*	-	-	**142,154**

* Riverside Park / Street Sweeping

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RIVERSIDE PARK STORMWATER GREENWAY

- Design & permitting initiated in FY15
- IFB #05-17 due December 15, 2016
- IFB #09-17 due April 6, 2017
- Engineer's Estimate: $2,006,204.
- Awarded to Sargent Corporation: $1,993,785.

Cost Effectiveness*: $5,913/lb TP

* Includes engineering, construction, construction admin, and property & easement acquisition

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RIVERSIDE PARK STORMWATER GREENWAY

Total Project Cost: **$ 2,673,718**

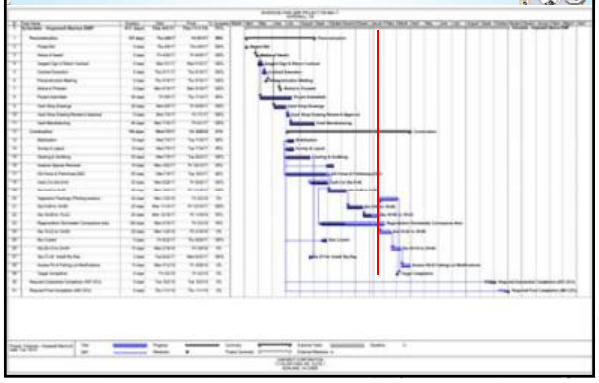
Project Funding:

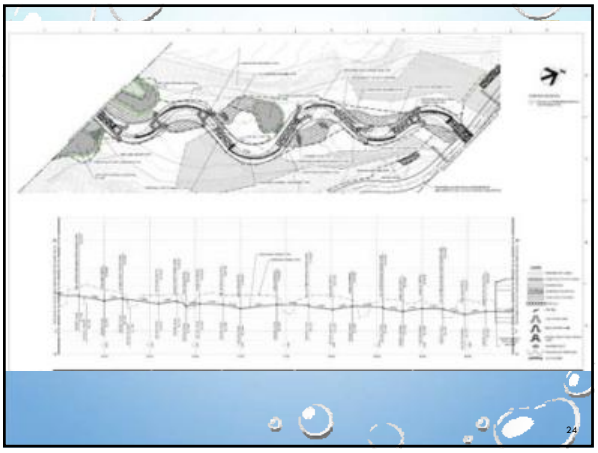
- Virginia Stormwater Local Assistance Fund (50% Match Grant for eligible costs of $2,548,465): **$ 1,274,233**
- Chesapeake Bay Foundation: **$ 70,000**
- National Fish & Wildlife Foundation: **$ 451,000**

$ 1,795,233

22

Total Completed & Stored to Date/Contract Price = 53%





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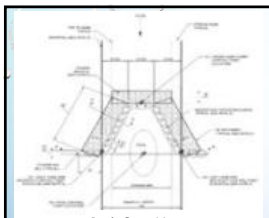
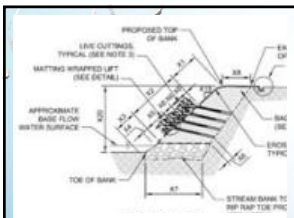


Rock Cross Vane

RIVERSIDE PARK STORMWATER GREENWAY

- 2,364 linear feet (lf) stream restoration & stabilization;
- Regenerative Stormwater Conveyance;
- Wetlands enhancements & expansion;
- Pocket wetlands;
- Permeable Pavement & Bioretention at Riverside Trailhead;

25

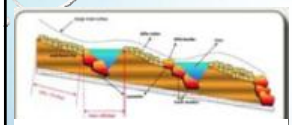


GeoGrid Bank Stabilization (Black Willow)

RIVERSIDE PARK STORMWATER GREENWAY

- 2,364 linear feet (lf) stream restoration & stabilization;
- Regenerative Stormwater Conveyance;
- Wetlands enhancements & expansion;
- Pocket wetlands;
- Permeable Pavement & Bioretention at Riverside Trailhead;

26



Regenerative Stormwater Conveyance

Constructed Stormwater Wetland

RIVERSIDE PARK STORMWATER GREENWAY

- 2,364 linear feet (lf) stream restoration & stabilization;
- Regenerative Stormwater Conveyance;
- Wetlands enhancements & expansion;
- Pocket wetlands;
- Permeable Pavement & Bioretention at Riverside Trailhead;

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RIVERSIDE PARK STORMWATER GREENWAY

Landscaping Plan:

- **840 trees**
  White Oak, Willow Oak, Bald Cypress, River Birch, Sycamore, American Beech, Green Ash, Tulip Poplar
- **767 Shrubs**
  Spicebush, Pawpaw, Mountain Laurel, Silky Dogwood, Southern Arrowwood
- **3,500 Herbaceous plugs**

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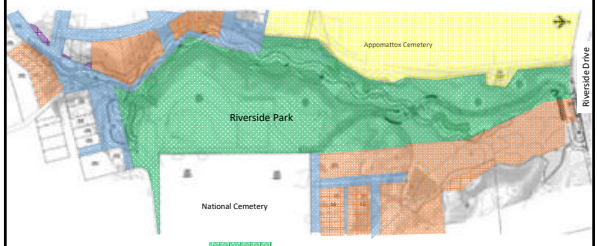
RIVERSIDE PARK STORMWATER GREENWAY

Property & Easement Acquisition



Existing Riverside Park
Existing City Property & Right-of-Way
Property Acquisition
Appomattox Cemetery
Easement Acquisition

Cost of Property & Easement Acquisition (incl. Surveying) ~ 10acres ~ $135,000

RIVERSIDE PARK STORMWATER GREENWAY

- Estimated Completion: Spring/Summer 2018
- Walking Trails
- Interpretive signs: water quality, stream ecosystems, trees & shrubs
- ADA Accessible parking and tidal wetland boardwalk @ Riverside Dr. Trailhead

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CITY OF HOPEWELL STORMWATER PROGRAM

On-Going Program Responsibilities

1. TMDL Compliance:
   - (421 lb/yr) TN;
   - (52,450 lb/yr) Sediment
2. MS4 Permit Compliance (6 MCMs)
3. MS4 Maintenance and Repair
4. Complaint Response

Future Projects

1. ADA Accessible Boardwalk at Riverside Dr. Trailhead
2. Cattail Creek Trib 3
3. Drainage System at 15th & Broadway
4. City Point Rd & Brooklawn Ave Outfall

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QUESTIONS?

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CITY OF HOPEWELL STORMWATER PROGRAM

MS4 Maintenance & Repair
& Complaint Response

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CITY OF HOPEWELL STORMWATER PROGRAM

Drainage System @15th & Broadway

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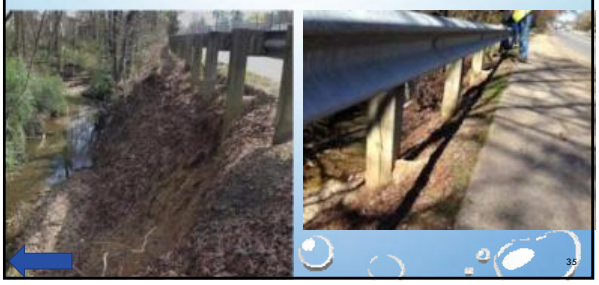
CITY OF HOPEWELL STORMWATER PROGRAM

Cattail Creek Tributary 3
Winston Churchill west of Arlington Road (looking East)



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Appendix B – Documentation of MCM 2 Public Involvement and Participation

Activity 1: James River Association and Art on Wheels: Paint Out Pollution, August 31, 2017

Activity 2: Paint Anti-pollution messages on selected storm drains, August 1 and 4, November 29 and 30, 2017

Activity 3: Litter pick up and brush removal at Harry E. James Elementary School, April 20, 2018

Activity 4: Litter pick up and tire removal at Virginia American Water Co and along the Appomattox River, April 13, 2018

Activity 5: CBF Clean the Bay Day, June 2, 2018

ACTIVITY 1
Paint Out Pollution in Partnership w/ JRA
August 31, 2017

Get Involved!

Register to volunteer at:

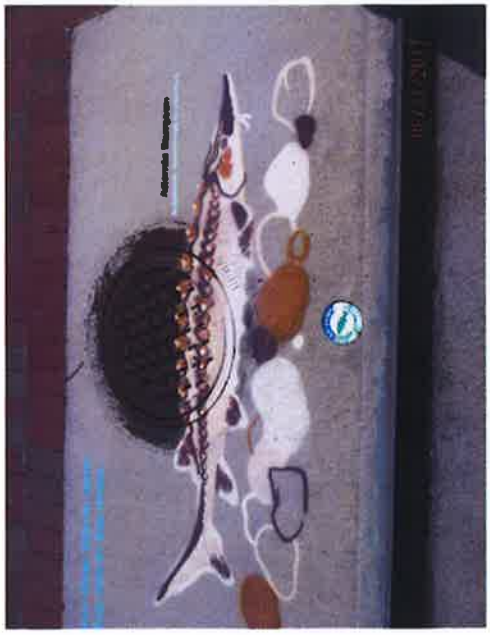
www.JRAVA.org

Help the James • Paint Out Pollution

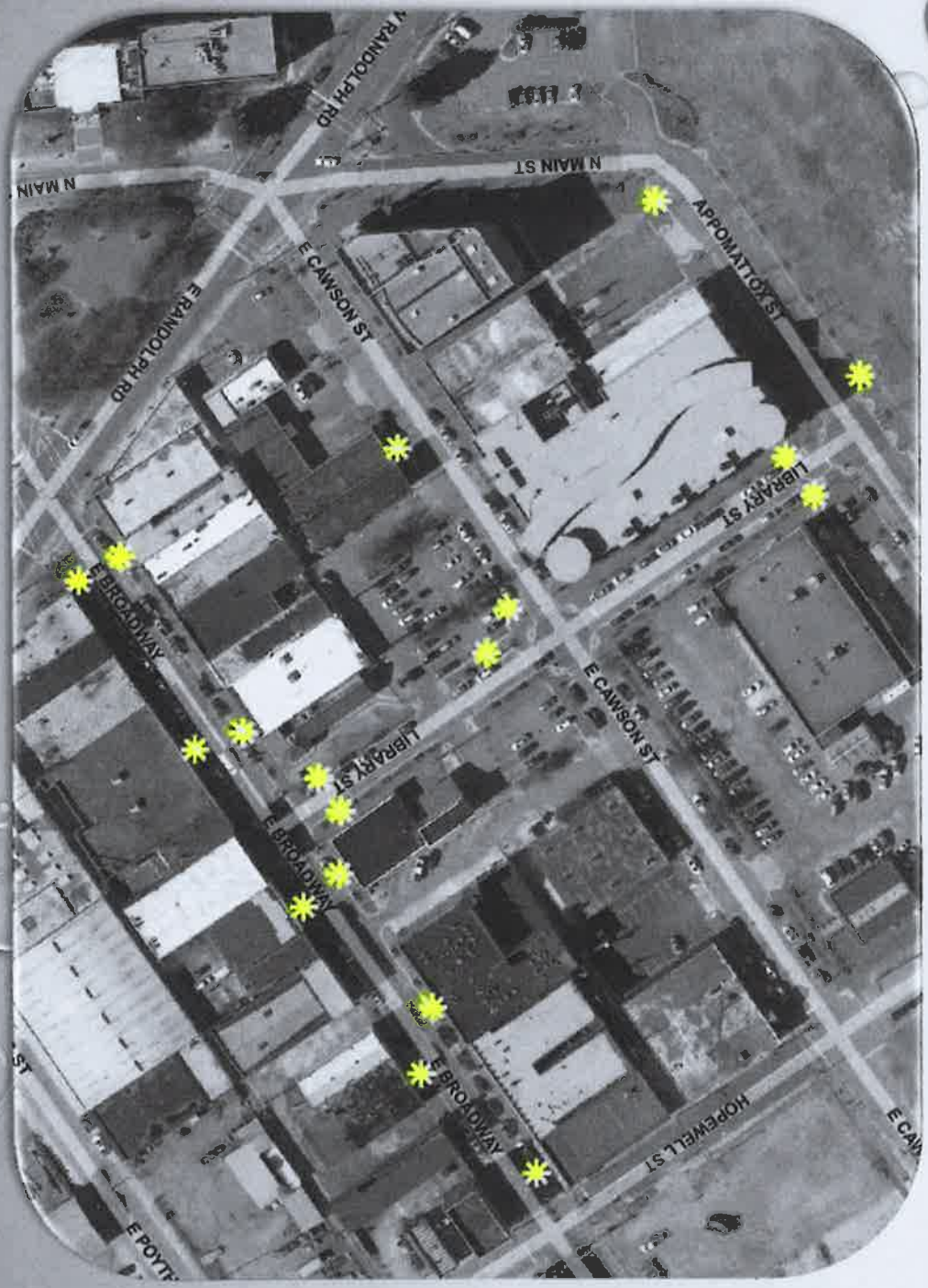
JAMES RIVER ASSOCIATION
Our River. Our Water. Our Future.

Paint Out Pollution is a partnership between the James River Association and Art on Wheels.

ART ON WHEELS



Paint Out Pollution Stencil Locations



ACTIVITY 2

Storm Drain Painting with Local youth Groups August 4, 2017

East Broadway
8.1.2017

ACTIVTY 3

Litter Pick Up at Harry James Elementary School in Partnership with Ashland Hercules (local industry)

April 20, 2018

ACTIVITY 4

Appomattox River Clean Up in Partnership w/ VA American Water Co.

April 13, 2018

ACTIVITY 5
Chesapeake Bay Cleanup Day
June 2, 2018

Appendix C – MCM 3 Outfall Mapping, Screening, and IDDE Follow-up Information

1. Screen Shot of GIS MS4 Outfall Map
2. Outfall Unique Identifier from GIS MS4 Outfall Map
3. MS4 Outfall Information Table
4. MS4 Outfall Annual Screening Form
5. 2017-18 MS4 Outfall Screening Database
6. IDDE Tracking Form

Appendix C: City of Hopewell Outfall Mapping, Screening, & IDDE Information

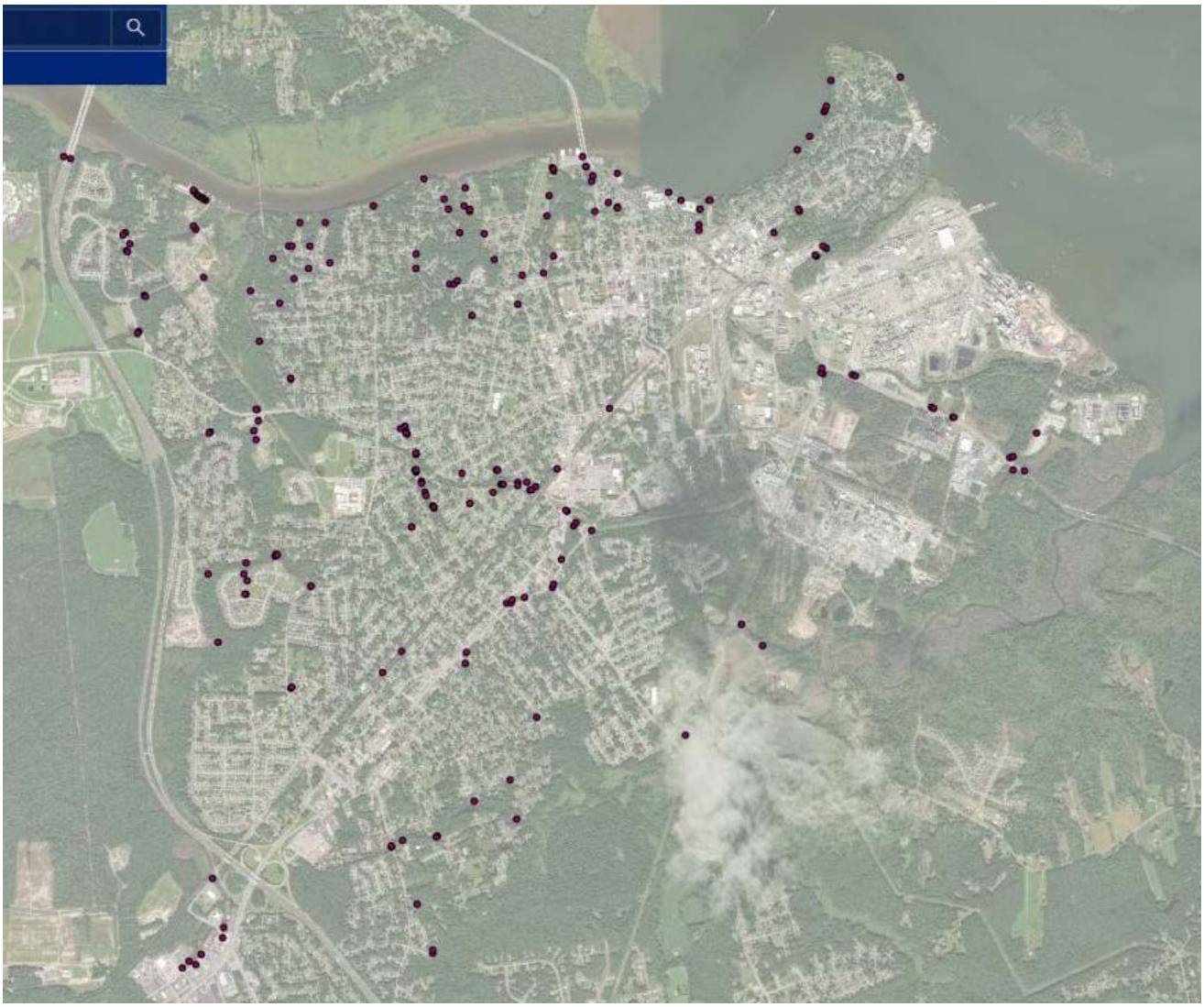


Figure 1: Screen shot of GIS Outfall Map

Each dot represents a unique outfall with a unique ID (scale prevents showing each ID)

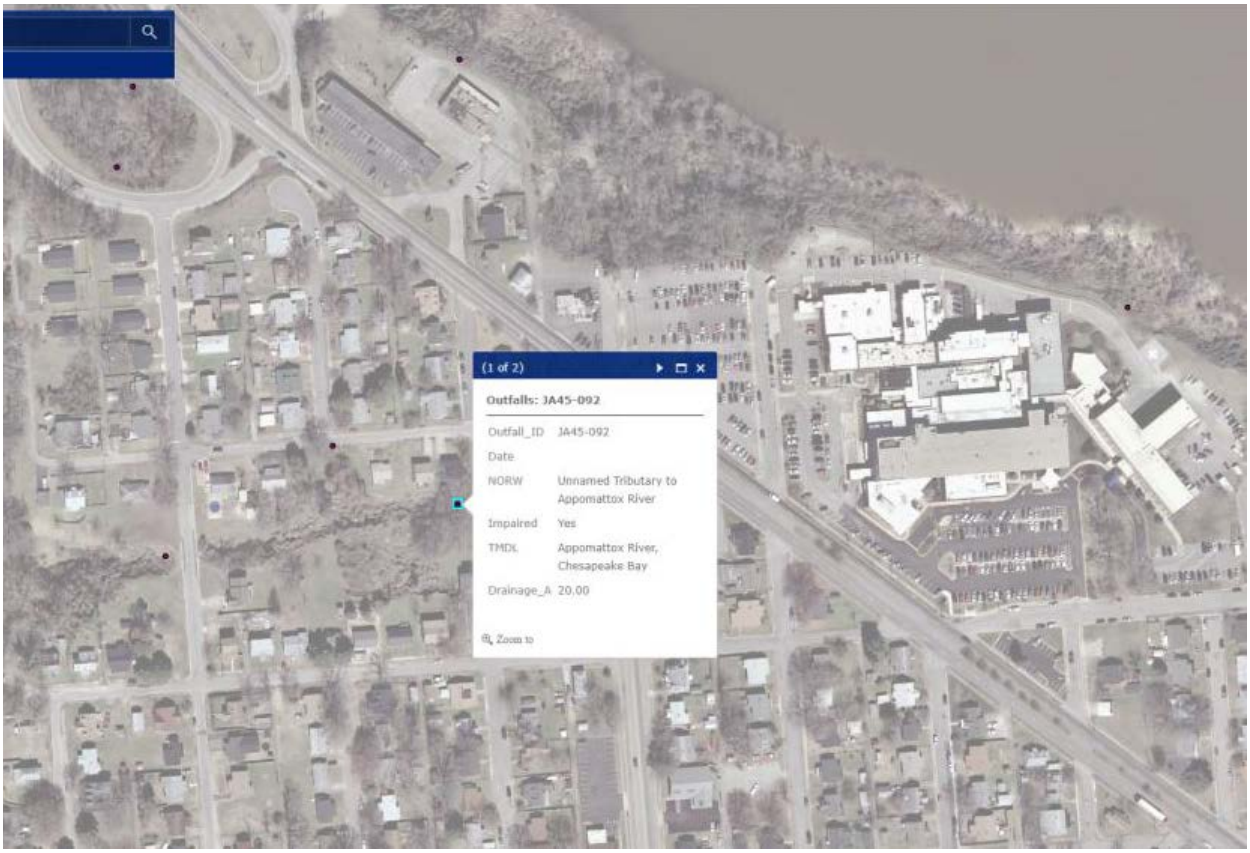


Figure 2: Outfall Unique Identifier Label

MS4 Outfall Information Table

Outfall_ID	Area Drainage to Outfall (Acres)	Name of Receiving Water	Is Receving Water Impaired (Yes / No)	Applicable TMDL(s)	Date of Last Inspection
JA45-001	0.21	Unnamed Tributary to Appomattox River	No	Chesapeake Bay, Appomattox River	6/28/2016
JA45-002	0.23	Unnamed Tributary to Appomattox River	No	Chesapeake Bay, Appomattox River	6/16/2015
JA45-003	0.21	Unnamed Tributary to Appomattox River	No	Chesapeake Bay, Appomattox River	6/16/2015
JA45-004	2.77	Unnamed Tributary to Appomattox River	No	Chesapeake Bay, Appomattox River	6/16/2015
JA45-005	1.11	Unnamed Tributary to Appomattox River	No	Chesapeake Bay, Appomattox River	6/16/2015
JA45-006	0.60	Unnamed Tributary to Appomattox River	No	Chesapeake Bay, Appomattox River	6/16/2015
JA45-007	0.19	Unnamed Tributary to Appomattox River	No	Chesapeake Bay, Appomattox River	6/16/2015
JA45-008	0.98	Unnamed Tributary to Cabin Creek	No	Chesapeake Bay, Appomattox River	6/15/2015
JA45-009	1.11	Unnamed Tributary to Cabin Creek	No	Chesapeake Bay, Appomattox River	6/15/2015
JA45-010	0.42	Unnamed Tributary to Cabin Creek	No	Chesapeake Bay, Appomattox River	6/15/2015
JA45-011	0.46	Unnamed Tributary to Cabin Creek	No	Chesapeake Bay, Appomattox River	6/15/2015
JA45-012	0.68	Bullhill Run	No	Chesapeake Bay, Appomattox River	6/17/2015
JA45-013	0.48	Bullhill Run	No	Chesapeake Bay, Appomattox River	6/17/2015
JA45-014	2.26	Cabin Creek	No	Chesapeake Bay, Appomattox River	6/17/2015
JA45-015	0.99	Cabin Creek	No	Chesapeake Bay, Appomattox River	6/17/2015
JA45-016	2.82	Cabin Creek	No	Chesapeake Bay, Appomattox River	6/17/2015
JA45-017	1.71	Bullhill Run	No	Chesapeake Bay, Appomattox River	4/6/2017
JA45-018	3.14	Bullhill Run	No	Chesapeake Bay, Appomattox River	6/16/2015
JA45-019	2.94	Unnamed Tributary to Cabin Creek	No	Chesapeake Bay, Appomattox River	6/15/2015
JA45-020	0.80	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/28/2016
JA45-021	0.92	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/28/2016
JA45-023	0.59	Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-024	0.19	Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-025	0.26	Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-026	0.31	Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-027	0.27	Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-028	0.29	Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-029	0.33	Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-030	0.40	Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-031	0.72	Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-032	1.66	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/15/2015
JA45-033	0.48	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/15/2015
JA45-034	1.14	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/28/2016
JA45-035	0.29	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/28/2016
JA45-036	1.44	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/28/2016
JA45-037	1.69	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	4/10/2018
JA45-038	0.70	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/15/2015
JA45-039	2.07	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/15/2015
JA45-040	0.50	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/15/2015

JA45-041	1.10	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/15/2015
JA45-042	0.75	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/15/2015
JA45-043	1.34	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	4/4/2018
JA45-044	3.15	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	4/6/2017
JA45-045	0.27	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/15/2015
JA45-046	0.56	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	4/6/2017
JA45-047	1.15	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	4/4/2018
JA45-048	3.62	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/15/2015
JA45-049	0.81	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-050	0.38	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-051	0.46	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-052	0.93	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/16/2015
JA45-053	1.32	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/15/2015
JA45-054	0.63	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/28/2016
JA45-055	3.61	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/28/2016
JA45-056	4.17	Appomattox River	Yes	Chesapeake Bay, Appomattox River, Tidal James River	4/4/2017
JA45-057	1.26	Appomattox River	Yes	Chesapeake Bay, Appomattox River, Tidal James River	6/28/2016
JA45-058	2.96	Appomattox River	Yes	Chesapeake Bay, Appomattox River, Tidal James River	6/17/2015
JA45-059	1.44	Appomattox River	Yes	Chesapeake Bay, Appomattox River, Tidal James River	6/17/2015
JA45-060	5.03	Appomattox River	Yes	Chesapeake Bay, Appomattox River, Tidal James River	4/4/2017
JA45-061	1.00	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/15/2015
JA45-062	0.62	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/17/2015
JA45-063	2.48	Unnamed Tributary to Appomattox River	Yes	Chesapeake Bay, Appomattox River	6/17/2015
JA45-064	4.75	Appomattox River	Yes	Chesapeake Bay, Appomattox River, Tidal James River	6/15/2015
JA45-065	1.63	Appomattox River	Yes	Chesapeake Bay, Appomattox River, Tidal James River	6/15/2015
JA45-067	2.58	Appomattox River	Yes	Chesapeake Bay, Appomattox River, Tidal James River	6/15/2015
JA45-068	1.57	Appomattox River	Yes	Chesapeake Bay, Appomattox River, Tidal James River	6/15/2015
JA45-069	2.47	Appomattox River	Yes	Chesapeake Bay, Appomattox River, Tidal James River	6/15/2015
JA45-070	4.11	Appomattox River	Yes	Chesapeake Bay, Appomattox River, Tidal James River	4/4/2017
JA45-071	1.41	Cabin Creek	No	Chesapeake Bay, Appomattox River	1/14/2016
JA45-072	2.25	Cabin Creek	No	Chesapeake Bay, Appomattox River	1/14/2016
JA45-073	13.69	Cabin Creek	No	Chesapeake Bay, Appomattox River	1/14/2016
JA45-084	14.01	Cabin Creek	No	Chesapeake Bay, Appomattox River	4/10/2018
JA45-085	12.58	Cabin Creek	No	Chesapeake Bay, Appomattox River	1/19/2016
JA45-086	29.05	Cabin Creek	No	Chesapeake Bay, Appomattox River	1/14/2016
JA45-087	0.38	Poythress Run	Yes	Chesapeake Bay, James River	1/14/2016
JA45-088	4.47	Poythress Run	Yes	Chesapeake Bay, James River	1/14/2016
JA45-089	15.50	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	4/4/2017
JA45-090	0.10	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	4/5/2018
JA45-091	50.00	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	4/4/2017
JA45-092	20.00	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	*
JA45-093	22.50	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	*
JA45-094	1.00	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	*
JA45-095	4.00	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	4/7/2017
JA45-096	5.00	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	4/4/2017
JA45-097	2.00	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	4/10/2018
JA45-098	7.25	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	

JA45-099	1.00	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	4/7/2017
JA45-100	62.00	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/5/2017
JA45-101	62.00	Cabin Creek	No	Appomattox River, Chesapeake Bay	*
JA45-102	0.10	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/4/2018
JA45-103	10.89	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/4/2018
JA45-104	5.65	Cabin Creek	No	Appomattox River, Chesapeake Bay	*
JA45-105	5.65	Cabin Creek	No	Appomattox River, Chesapeake Bay	*
JA45-106	0.25	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/4/2018
JA45-107	3.50	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/10/2018
JA45-108	0.60	Cabin Creek	No	Appomattox River, Chesapeake Bay	*
JA45-109	1.00	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	*
JA45-110	13.90	Cabin Creek	No	Appomattox River, Chesapeake Bay	*
JA45-111	5.00	Appomattox River	Yes	Appomattox River, Chesapeake Bay	4/4/2017
JA45-112	32.00	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	4/4/2017
JA45-113	96.00	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	4/4/2017
JA45-114	3.00	Unnamed Tributary to Appomattox River	Yes	Appomattox River, Chesapeake Bay	4/5/2017
JA45-115	23.00	Unnamed Tributary to Appomattox River	Yes	Appomatoox River, Chesapeake Bay	4/5/2017
JA45-116	1.00	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/5/2017
JA45-117	1.00	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/5/2017
JA45-118	18.00	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/6/2017
JA45-119	4.00	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/7/2017
JA45-120	9.00	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/7/2017
JA45-121	2.00	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/7/2017
JA45-122	4.00	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/7/2017
JA45-123	2.36	Unsegmented Rivers in J15	No	Appomattox River, Chesapeake Bay	4/4/2018
JA45-124	4.21	Unsegmented Rivers in J15	No	Appomattox River, Chesapeake Bay	4/4/2018
JA45-125	5.13	Unsegmented Rivers in J15	No	Appomattox River, Chesapeake Bay	4/4/2018
JA45-126	13.90	Unsegmented Rivers in J15	No	Appomattox River, Chesapeake Bay	4/4/2018
JA45-127	12.64	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/4/2018
JA45-128	3.17	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/4/2018
JA45-129	11.85	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/4/2018
JA45-131	2.00	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/5/2018
JA45-132	2.99	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/5/2018
JA45-133	1.56	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/5/2018
JA45-134	9.80	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/5/2018
JA45-135	5.40	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/5/2018
JA45-136	3.48	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/5/2018
JA45-137	42.86	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/5/2018
JA45-138	0.51	Unsegmented Rivers in J15	No	Appomattox River, Chesapeake Bay	4/6/2018
JA45-139	0.76	Appomattox River	Yes	Appomattox River, Chesapeake Bay	4/10/2018
JA45-140	2.09	Unsegmented Rivers in J15	No	Appomattox River, Chesapeake Bay	4/10/2018
JA45-141	2.53	Unsegmented Rivers in J15	No	Appomattox River, Chesapeake Bay	4/10/2018
JA45-142	14.40	Unsegmented Rivers in J15	No	Appomattox River, Chesapeake Bay	4/10/2018
JA45-143	2.26	Cabin Creek	No	Appomattox River, Chesapeake Bay	4/10/2018
JA45-144	0.82	Cabin Creek	No	Chesapeake Bay, Appomattox River	6/18/2015
JA45-145	0.54	Cabin Creek	No	Chesapeake Bay, Appomattox River	1/13/2016
JA45-146	0.54	Cabin Creek	No	Chesapeake Bay, Appomattox River	1/13/2016

JA45-147	0.68	Cabin Creek	No	Chesapeake Bay, Appomattox River	1/13/2016
JA45-148	0.71	Cabin Creek	No	Chesapeake Bay, Appomattox River	1/13/2016
JA45-149	0.75	Cabin Creek	No	Chesapeake Bay, Appomattox River	1/13/2016
JL07-001	0.51	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	6/17/2015
JL07-002	6.24	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	6/17/2015
JL07-003	1.56	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	6/17/2015
JL07-004	3.25	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	6/17/2015
JL07-005	1.61	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	6/17/2015
JL07-006	1.67	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	6/17/2015
JL07-007	1.56	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	6/17/2015
JL07-008	0.65	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	6/17/2015
JL07-009	0.66	Gravelly Run	No	Chesapeake Bay, James River	6/17/2015
JL07-010	0.82	Gravelly Run	No	Chesapeake Bay, James River	6/18/2015
JL07-011	0.59	Gravelly Run	No	Chesapeake Bay, James River	6/18/2015
JL07-012	1.84	Gravelly Run	No	Chesapeake Bay, James River	6/18/2015
JL07-013	1.62	Gravelly Run	No	Chesapeake Bay, James River	6/18/2015
JL07-014	0.51	Poythress Run	Yes	Chesapeake Bay, James River	4/6/2017
JL07-015	1.15	Poythress Run	Yes	Chesapeake Bay, James River	6/18/2015
JL07-016	1.93	Unnamed Tributary to Poythress Run	Yes	Chesapeake Bay, James River	4/4/2017
JL07-017	2.84	Unnamed Tributary to Poythress Run	Yes	Chesapeake Bay, James River	6/15/2015
JL07-018	3.92	James River	Yes	Chesapeake Bay, James River	4/4/2018
JL07-019	5.64	Unnamed Tributary to Gravelly Run	No	Chesapeake Bay, James River	6/28/2016
JL07-020	0.93	Unnamed Tributary to Gravelly Run	No	Chesapeake Bay, James River	6/28/2016
JL07-021	0.71	Unnamed Tributary to Gravelly Run	No	Chesapeake Bay, James River	6/18/2015
JL07-022	2.17	Unnamed Tributary to Gravelly Run	No	Chesapeake Bay, James River	6/18/2015
JL07-023	0.43	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	6/18/2015
JL07-024	2.32	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	6/18/2015
JL07-025	0.65	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	6/18/2015
JL07-026	0.44	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	6/18/2015
JL07-027	0.88	Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/13/2016
JL07-028	0.54	Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/13/2016
JL07-029	0.20	Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/13/2016
JL07-030	0.19	Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/13/2016
JL07-031	0.47	Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/13/2016
JL07-032	0.29	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/13/2016
JL07-033	0.82	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/13/2016
JL07-034	1.56	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	4/5/2018
JL07-035	62.21	Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/19/2016
JL07-036	13.01	Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/19/2016
JL07-037	10.12	Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	4/5/2018
JL07-038	0.29	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/13/2016
JL07-039	0.19	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/13/2016
JL07-040	0.31	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/13/2016
JL07-041	0.31	Unnamed Tributary to Bailey Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/13/2016
JL07-043	0.54	Cabin Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/13/2016
JL07-048	0.40	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2018
JL07-049	15.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	*

JL07-050	28.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/7/2017
JL07-051	1.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	*
JL07-052	0.20	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	*
JL07-053	149.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-054	0.40	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	*
JL07-055	0.20	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	*
JL07-056	0.20	Cattail Creek	No	Cattail Creek, Bailey Creek. James River, Chesapeake Bay	*
JL07-057	10.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-058	0.25	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-059	0.20	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	*
JL07-060	5.80	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-061	0.25	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2018
JL07-062	0.80	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2018
JL07-063	129.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-064	0.60	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	*
JL07-065	1.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	*
JL07-066	0.60	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	*
JL07-067	1.20	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	*
JL07-068	28.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-069	45.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-070	1.10	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2018
JL07-071	0.70	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2018
JL07-072	0.10	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	*
JL07-073	0.10	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	*
JL07-074	12.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-075	69.00	Poythress Run	No	James River, Chesapeake Bay	4/4/2017
JL07-076	4.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-077	125.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-078	266.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-079	5.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-080	3.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-081	31.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/5/2017
JL07-082	1.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/6/2017
JL07-083	1.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/6/2017
JL07-084	20.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/6/2017
JL07-085	5.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/7/2017
JL07-086	56.00	Cattail Creek	No	Cattail Creek, Bailey Creek, James River, Chesapeake Bay	4/7/2017
JL07-087	59.00	Cattail Creek	No	Bailey Creek, James River, Chesapeake Bay	4/7/2017
JL07-088	2.70	Bailey Creek	Yes	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	4/5/2018
JL07-089	1.13	Bailey Creek	Yes	Chesapeake Bay, James River, Bailey Creek	4/5/2018
JL07-090	0.41	Cattail Creek	Yes	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	4/5/2018
JL07-091	1.26	Cattail Creek	Yes	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	4/5/2018
JL07-092	3.83	Cattail Creek	Yes	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	4/6/2018
JL07-093	7.02	Bailey Creek	Yes	Chesapeake Bay, James River, Bailey Creek	4/5/2018
JL07-094	7.26	Bailey Creek	Yes	Chesapeake Bay, James River, Bailey Creek	4/5/2018
JL07-095	3.67	Cattail Creek	Yes	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	4/6/2018
JL07-096	1.48	Bailey Creek	Yes	Chesapeake Bay, James River, Bailey Creek	4/10/2018

JL07-099	0.55	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	4/5/2018
JL07-100	0.92	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	4/5/2018
JL07-101	0.66	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/14/2016
JL07-102	0.20	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/14/2016
JL07-103	0.55	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/14/2016
JL07-104	3.12	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/14/2016
JL07-105	3.84	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/14/2016
JL07-106	1.21	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/14/2016
JL07-107	0.88	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/14/2016
JL07-108	22.58	Unnamed Tributary to Cattail Creek	No	Chesapeake Bay, James River, Bailey Creek, Cattail Creek	1/14/2016
ening. Determined to NOT be an MS4 outfall.					

* Outfall located but not inspected

Appendix C

MS4 Outfall Annual Screening Form

Site ID	**JA45-111**
Date	4/4/2017
Inspector	John DeGroot
Open Channel	No
Shape	Circular
Pipe Sizes	15"
Material	HDPE
Last Rainfall	> 2 days, < 5 days
Seasonal Climate	Average
Standing Water	Yes
Mosquito Larvae	No
Outfall Submerged	No
Debris Around	None
Debris in Pipe	None
Flow Volume	None
Flow Color	Clear
Flow Odor	None
Pipe Condition	Good
Describe	
Receiving Stream	Appomattox
HUC	JA45
Drainage Area (Acres)	5
Action Taken	
Notes	
Notes Continued	
Impaired	No
Longitude	-77.28720569
Latitude	37.30787535
TMDL	Bacteria

Appendix C

2018 Outfall Screening Inspection Data

Outfall ID	Date	Inspector	Open Channel	Pipe Size	Shape	Material	Last Rainfall	Seasonal Climate	Standing Water	Mosquito Larva	Outfall Submerged	Debris Around outfall	Debris in outfall	Flow Volume	Flow Color	Flow Odor	Pipe Conditon	Describe	Receiving Channel	Longitude	Latitude	HUC	Impaired	TMDL	Drainage Area
JA45-047	4/4/2018	John DeGroot	No	12	Curcular	HDPE	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good	single wall hdpe	Unsegmented Rivers in J15	-77.30655389240	37.30312350460	JA45	No	No	0.23
JA45-123	4/4/2018	John DeGroot	No	12	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	Trash	None	None	Clear	None	Poor	channel severely erc	Unsegmented Rivers in J15	-77.30725801830	37.30435332810	JA45	No	No	2.36
JA45-124	4/4/2018	John DeGroot	No	10	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Poor	2 sections of pipe fa	Unsegmented Rivers in J15	-77.30762941570	37.30527953110	JA45	No	No	4.21
JL07-018	4/4/2018	John DeGroot	No	15	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	Trash	Sediment	None	Clear	None	Good		James River	-77.27253172260	37.31552050880	JL07	Yes	Bacteria	0.10
JA45-125	4/4/2018	John DeGroot	No	18	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	Low	Clear	None	Good		Unsegmented Rivers in J15	-77.30970013610	37.30424959690	JA45	No	No	5.13
JA45-043	4/4/2018	John DeGroot	No	18	Curcular	HDPE	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Unsegmented Rivers in J15	-77.30969584320	37.30467147630	JA45	No	No	4.32
JA45-126	4/4/2018	John DeGroot	No	18	Curcular	Concrete	> 2 days, < 5 days	Average	Yes	No	No	None	None	None	Clear	None	Good		Unsegmented Rivers in J15	-77.30884120460	37.30080500570	JA45	No	No	13.90
JA45-106	4/4/2018	John DeGroot	No	15	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good	erosion below outfa	Cabin Creek	-77.32062301010	37.30441764170	JA45	No	No	1.60
JA45-127	4/4/2018	John DeGroot	No	30	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Cabin Creek	-77.31906625330	37.30179298650	JA45	No	No	12.64
JA45-102	4/4/2018	John DeGroot	No	12	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	Sediment	Sediment	None	Clear	None	Good		Cabin Creek	-77.32020070940	37.30170654250	JA45	No	No	0.12
JA45_128	4/4/2018	John DeGroot	No	12	Curcular	HDPE	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Cabin Creek	-77.32242852730	37.30079425200	JA45	No	No	3.17
JA45-103	4/4/2018	John DeGroot	No	30	Curcular	Steel	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Poor	rusted out bottom	Cabin Creek	-77.32167753710	37.29934953880	JA45	No	No	10.10
JA45-129	4/4/2018	John DeGroot	No	30	Curcular	Steel	> 2 days, < 5 days	Average	Yes	No	No	None	None	None	Clear	None	Fair		Cabin Creek	-77.32011212020	37.29674881930	JA45	No	No	11.85
JL07-098	4/5/2018	John DeGroot	No	12	Curcular	Concrete	> 2 days, < 5 days	Average	Yes	No	No	None	None	None	Clear	None	Good		Cattail Creek	-77.31044890330	37.29382734370	JA45	Yes	No	1.26
JL07-097	4/5/2018	John DeGroot	No	12	Curcular	Concrete	> 2 days, < 5 days	Average	Yes	No	No	None	None	None	Clear	None	Good		Cattail Creek	-77.31049469180	37.29382333070	JA45	Yes	No	0.47
JL07-048	4/5/2018	John DeGroot	No	12	Curcular	Concrete	> 2 days, < 5 days	Average	Yes	No	No	None	None	None	Clear	None	Good		Cattail Creek	-77.30970880890	37.29258996550	JL07	Yes	No	0.62
JL07-061	4/5/2018	John DeGroot	No	15	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Cattail Creek	-77.30835369200	37.28931739960	JL07	Yes	No	1.77
JL07-071	4/5/2018	John DeGroot	No	15	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Cattail Creek	-77.30894026080	37.28995503360	JL07	Yes	No	2.85
JL07-062	4/5/2018	John DeGroot	No	15	Curcular	Concrete	> 2 days, < 5 days	Average	Yes	No	No	None	None	None	Milky/Clouc	None	Good		Cattail Creek	-77.30903801290	37.29021346840	JL07	Yes	No	2.52
JL07-070	4/5/2018	John DeGroot	No	12	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Cattail Creek	-77.30926445260	37.29073665690	JL07	Yes	No	2.47
JA45-131	4/5/2018	John DeGroot	No	30	Curcular	Concrete	> 2 days, < 5 days	Average	Yes	No	No	Sediment	Sediment	None	Clear	None	Good		Cabin Creek	-77.32465168170	37.26741461350	JA45	No	No	2.00
JA45-090	4/5/2018	John DeGroot	No	12	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	Sediment	None	Clear	None	Good		Unsegmented Rivers in J15	-77.30154747310	37.30339393030	JA45	No	No	1.56
JL07-034	4/5/2018	John DeGroot	No	30	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	Low	Clear	None	Fair	end section fallen o	Bailey Creek	-77.30241607590	37.27233880610	JL07	Yes	No	12.23
JL07-088	4/5/2018	John DeGroot	No	18	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	Sediment Partially	Sediment	Sediment	None	Clear	None	Good		Bailey Creek	-77.30021644510	37.27234737880	JL07	Yes	No	2.70
JL07-089	4/5/2018	John DeGroot	No	18	Curcular	Concrete	> 2 days, < 5 days	Average	Yes	No	Sediment Partially	Sediment	Sediment	None	Clear	None	Good		Bailey Creek	-77.30012663290	37.27240018170	JL07	Yes	No	1.13
JA45-132	4/5/2018	John DeGroot	No	24	Curcular	Steel	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Cabin Creek	-77.32415327400	37.27718990400	JA45	No	No	2.99
JA45-133	4/5/2018	John DeGroot	No	12	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Cabin Creek	-77.32414016590	37.27688327570	JA45	No	No	1.56
JA45-134	4/5/2018	John DeGroot	No	21	Curcular	Steel	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Cabin Creek	-77.32416799220	37.27652851860	JA45	No	No	9.80
JA45-135	4/5/2018	John DeGroot	No	15	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	Sediment	Low	Clear	None	Good		Cabin Creek	-77.32350366800	37.27597425260	JA45	No	No	5.40
JA45-136	4/5/2018	John DeGroot	No	15	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Cabin Creek	-77.32290250830	37.27599979930	JA45	No	No	3.48
JA45-137	4/5/2018	John DeGroot	No	45	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	Low	Clear	None	Good		Cabin Creek	-77.32289277160	37.27598257870	JA45	No	No	42.86
JL07-090	4/5/2018	John DeGroot	No	15	Curcular	HDPE	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Cattail Creek	-77.29835459540	37.28626409570	JL07	Yes	No	0.41
JL07-091	4/5/2018	John DeGroot	No	24	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	Sediment Partially	Sediment	Sediment	None	Clear	None	Good		Cattail Creek	-77.29792892190	37.28665536650	JL07	Yes	No	1.26
JL07-037	4/5/2018	John DeGroot	No	30	Curcular	Concrete	> 2 days, < 5 days	Average	Yes	No	Water Partially	Sediment	None	None	Clear	None	Good		Bailey Creek	-77.28909498900	37.27538150640	JL07	Yes	No	20.20
JL07-092	4/5/2018	John DeGroot	No	15	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Bailey Creek	-77.28465781810	37.27548987060	JL07	Yes	No	1.89
JL07-093	4/5/2018	John DeGroot	No	24	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Fair	end section fell out	Bailey Creek	-77.28445033480	37.27739276670	JL07	Yes	No	7.02
JL07-094	4/5/2018	John DeGroot	No	24	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	Low	Clear	None	Good		Bailey Creek	-77.28445770190	37.27739208790	JL07	Yes	No	7.26
JA45-138	4/6/2018	John DeGroot	No	12	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Unsegmented Rivers in J15	-77.29990734200	37.30388471670	JA45	No	No	0.51
JL07-095	4/6/2018	John DeGroot	No	24	Curcular	Concrete	> 2 days, < 5 days	Average	Yes	No	No	None	None	None	Clear	None	Good		Cattail Creek	-77.28792826030	37.27895084330	JL07	Yes	No	3.67
JL07-109	4/6/2018	John DeGroot	No	18	Curcular	Concrete	> 2 days, < 5 days	Average	Yes	No	No	None	None	None	Clear	None	Good		Cattail Creek	-77.28747735950	37.28371071570	JL07	Yes	No	3.83
JA45-139	4/10/2018	John DeGroot	No	12	Curcular	HDPE	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Appomattox River	-77.29489572130	37.31016854270	JA45	Yes	Bacteria	0.76
JA45-140	4/10/2018	John DeGroot	No	15	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	Sediment Partially	Sediment	Trash	None	Clear	None	Good		Unsegmented Rivers in J15	-77.33590640790	37.30581646030	JA45	No	No	2.09
JA45-141	4/10/2018	John DeGroot	No	30	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	Sediment Fully	Sediment	Sediment	None	Clear	None	Good		Unsegmented Rivers in J15	-77.33606734540	37.30760913550	JA45	No	No	2.53
JA45-142	4/10/2018	John DeGroot	No	36	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Unsegmented Rivers in J15	-77.33242250950	37.30787975050	JA45	No	No	14.40
JA45-143	4/10/2018	John DeGroot	No	15	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Cabin Creek	-77.32522554460	37.29394989860	JA45	No	No	2.26
JA45-084	4/10/2018	John DeGroot	No	15	Curcular	Concrete	> 2 days, < 5 days	Average	Yes	No	No	None	None	Low	Clear	None	Good	green alge	Cabin Creek	-77.32504627330	37.28107980790	JA45	No	No	15.16
JA45-037	4/10/2018	John DeGroot	No	18	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good	sever erosion	Unsegmented Rivers in J15	-77.31630779740	37.30419128700	JA45	No	No	3.19
JA45-107	4/10/2018	John DeGroot	No	12	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Cabin Creek	-77.31789674390	37.30385347610	JA45	No	No	3.46
JL07-096	4/10/2018	John DeGroot	No	12	Curcular	Concrete	> 2 days, < 5 days	Average	No	No	No	None	None	None	Clear	None	Good		Bailey Creek	-77.29288609760	37.27391549350	JL07	Yes	No	1.48
JA45-097	4/10/2018	John DeGroot	No	33	Curcular	Steel	> 2 days, < 5 days	Average	No	No	No	Trash	None	None	Clear	None	Good	lots of grass clipping	Cabin Creek	-77.31731044550	37.29745870470	JA45	No	No	29.84

IDDE TRACKING Form

Date Illicit Discharge Observed/Reported: J u n e 1 3 , 2 0 1 7 **Outfall # (if applicable):** System draining to JL07-075 (E Broadway & Kippax St.

Description of IDDE: Fuel spill resulting from an accident between two tractor trailers on E. Randolph Rd (Route 10) near E. City Point

Date of Investigation: J u n e 1 3 , 2 0 1 7

Was the Source found? [X] **Yes** [ ] **No**

If "Yes", please describe: Vehicles remained at the scene

Was IDDE Resolved? [X] **Yes** [ ] **No**

If "Yes", please explain how it was resolved (Please include any personnel or outside parties contacted or involved):

City Fire Dept. HazMat team responded and immediately blocked the inlet adjacent to the accident location and then blocked the outgoing pipe of the closest manhole (access structure) that had not received flow yet. Absorbent booms and pads were then deployed in the street, gutter pans and in each affected manhole.

If "No", please explain why it was not resolved: _____

_____

_____

Is any follow-up action required? [ ] **Yes** [X] **No**

If "Yes", please explain: _____

_____

Date investigation closed: June 14, 2017

Attach photos to this form and retain for records.

Appendix D – MCM 5 SWM Facility Tracking Database

1. Stormwater BMP Database
2. Stormwater BMP Map

Appendix D - Hopewell Stormwater Management BMP Inventory

Table 1 - Hopewell City-owned Facilities

Facility ID	Owner	Type	MM/YYYY Facility brought online	HUC	Ownership	Impaired Waters	Latitude	Longitude	Estimated Treated Drainage Area (Acres)	Estimated Treated Impervious Area(Acres)	Estimated Treated Pervious Area (Acres)	Date of Last Inspection	Maintenance Agreement?
1-3	City of Hopewell, Carter Woodson Middle Sch	Dry Detention Pond	06/2005	JL07	Public	Unnamed tributary to Cattail Creek (No)	37°17'21.13"N	77°17'32.13"W	6.8	5.18	1.62	3/23/2018	NA
1-4	City of Hopewell, SB1 @ closed landfill	Dry Detention Pond	06/2005	JL07	Public	Cattail Creek (Yes)	37°16'49.79"N	77°16'59.93"W	54.2	1	53.2	3/23/2018	NA
1-5	City of Hopewell, SB2 @ closed landfill	Dry Detention Pond	06/2005	JL07	Public	Cattail Creek (Yes)	37°16'45.557"N	77°17'13.678"W	7.22	0	7.22	3/23/2018	NA
1-6	City of Hopewell, Patrick Copeland Elementary Sch	Wet Retention Pond	06/2005	JA45	Public	Cabin Creek (No)	37°17'25.00"N	77°19'11.98"W	4.6	2.7	1.9	3/23/2018	NA
1-7	City of Hopewell, Hopewell High School	Wet Retention Pond	01/2009	JA45	Public	Cabin Creek (No)	37°17'29.84"N	77°19'2.33"W	8.9	5.15	3.75	3/23/2018	NA
1-8	City of Hopewell, Harry E. James Elementary Sch	Dry Detention Pond	06/2005	JL07	Public	Unnamed tributary to Bailey Creek (Yes)	37°16'43.65"N	77°17'28.73"W	13	6	7	3/28/2018	NA
1-9	City of Hopewell, Water Renewal, SB1	Bioretention	10/2017	JL07	Public	Gravelly Run	37°17'45.499"N	77°15'21.068"W	TBD	TBD	TBD	4/16/2018	NA
1-10	City of Hopewell, Water Renewal, SB2	Bioretention	10/2017	JL07	Public	Gravelly Run	37°17'38.814"N	77°15'16.3"W	TBD	TBD	TBD	4/16/2018	NA
1-11	City of Hopewell, South 20th Avenue	Dry Detention Pond	06/2005	JL07	Public	Cattail Creek (No)	37°17'25.44"N	77°18'2.003"W	5.9	2.1	3.8	4/26/2018	NA
1-12	City of Hopewell, Oaklawn Blvd Improvements	Dry Detention Pond	06/2011	JA45	Public	Unnamed tributary to Cabin Creek (No)	37°15'33.345"N	77°19'41.848"W	6.8	5.3	1.5	3/7/2017	NA
1-13	City of Hopewell, Randolph Rd basin at bridge	Dry Detention Pond	06/2005	JA45	Public	Unnamed tributary to Appomattox River (Yes)	37°18'34.723"N	77°17'47.889"W	5.2	1.1	4.1	3/28/2018	NA
1-14	City of Hopewell, City Park	Filter Strip	10/2017	JA45	Public	Appomattox River (yes)	37°18'26.5"N	77°17'13.47"W	1.03	0.18	0.85	Oct-18	NA
1-15	City of Hopewell, Riverside Park	Bioretention	08/2018	JA45	Public	Appomattox River (Yes)	37°18'34.352"N	77°17'56.707"W	TBD	TBD	TBD	9/18/2018	NA
1-16	City of Hopewell, Riverside Park	RSC	08/2018	JA45	Public	Appomattox River (Yes)	37°18'16.37"N	77°17'56.39"W	45.2	29.33	15.87	9/18/2018	
1-17	City of Hopewell, Riverside Park	Constructed Wetland	08/2018	JA45	Public	Appomattox River (Yes)	37°18'28.54"N	77°17'52.42"W	60.05	39.14	20.91	9/18/2018	
1-18	City of Hopewell, Riverside Park	Permeable Pavers	08/2018	JA45	Public	Appomattox River (Yes)	37°18'34.352"N	77°17'56.707"W	0.06	0.06		9/18/2018	

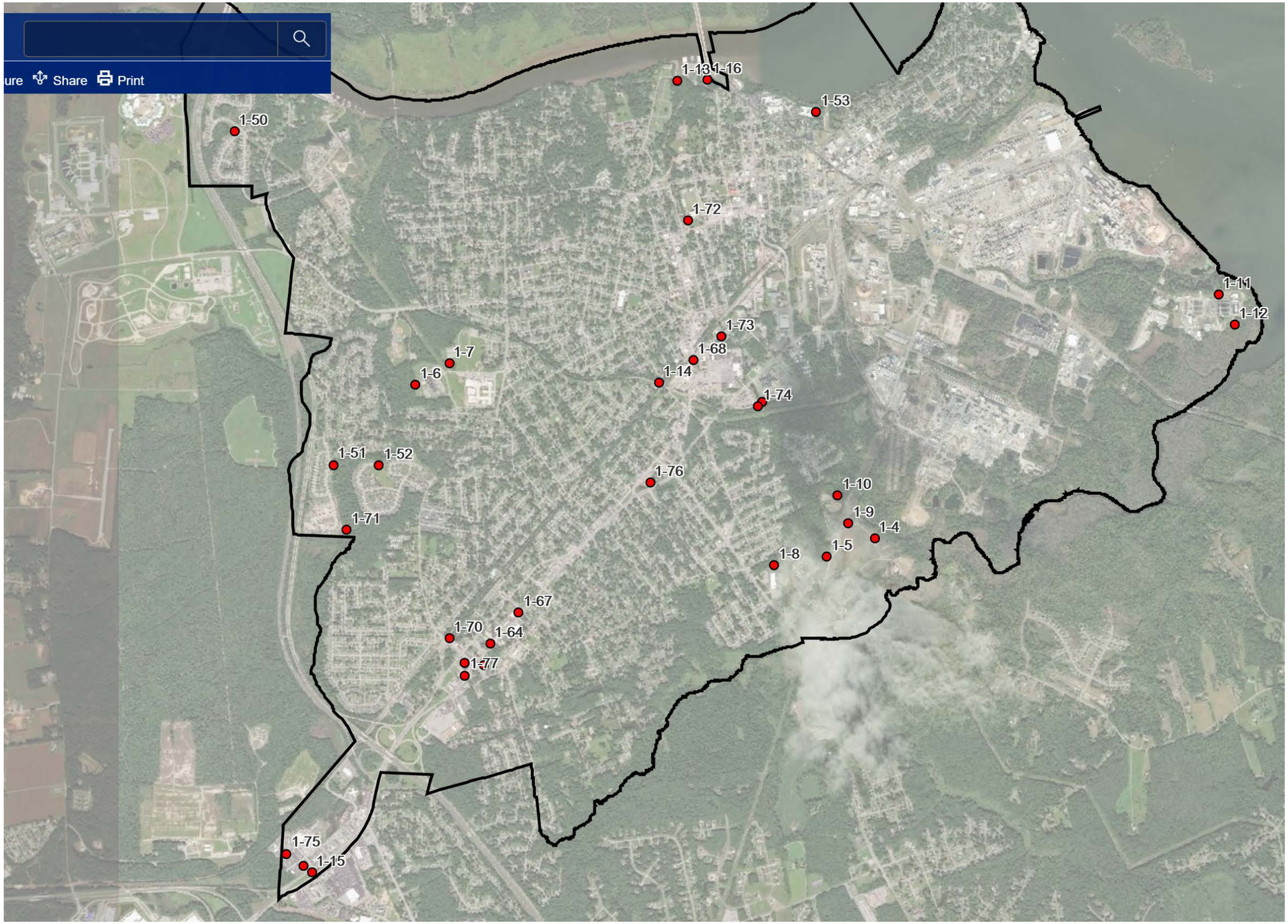
Table 2 - Privately Owned Facilities

Facility ID	Owner	Type	MM/YYYY Facility brought online	HUC	Ownership	Impaired Waters	Latitude	Longitude	Estimated Treated Drainage Area (Acres)	Estimated Treated Impervious Area(Acres)	Estimated Treated Pervious Area (Acres)	Date of Last Inspection	Recorded Maintenance Agreement*
1-50	Camerons Landing LLC HOA	Wet Detention Pond	01/2007	JA45	Private	Appomattox River (Yes	37°18'22.93"N	77°20'4.10"W	16.7	5.29	11.41	2/2/2017	No
1-51	James Jones LLC, Parkview Pointe Section 1 HOA	Dry Detention Pond	01/2008	JA45	Private	Cabin Creek (No)	37°17'6.62"N	77°19'35.66"W	12.58	4.04	8.54	1/31/2017	No
1-71	James Jones LLC, Parkview Pointe Section 2 HOA	Dry Detention Pond	05/2018	JA45	Private	Cabin Creek (No)	37°16'51.815"N	77°19'31.709"W	15.9	6.8	9.1	NA	No
1-52	Cobblestone LLC HOA	Dry Detention Pond	01/2006	JA45	Private	Cabin Creek (No)	37°17'6.45"N	77°19'22.51"W	29.05	15.2	13.85	1/31/2017	No
1-53	Riverview On The Appomattox	Dry Detention Pond	01/2007	JA45	Private	Appomattox River (Yes)	37°18'27.38"N	77°17'16.76"W	4.71	2.17	2.54	1/16/2018	No
1-55	Walgreens LLC	Subsurface	06/2005	JL07	Private	Unnamed tributary to Bailey Creek (No)	37°16'21.21"N	77°18'57.80"W	0.23	0.23	0	3/15/2017	Yes
1-63	Hopewell Animal Hospital	Subsurface	01/2011	JL07	Private	Unnamed tributary to Bailey Creek (No)	37°16'20.74"N	77°18'52.22"W	0.16	0.16	0	1/4/2017	No
1-64	O'Reillys Auto Parts	Subsurface	06/2005	JL07	Private	Unnamed tributary to Bailey Creek (No)	37°16'25.71"N	77°18'50.43"W	0.67	0.67	0	Unknown	No
1-66	VA Auto Center	Subsurface	06/2005	JA45	Private	Cabin Creek (No)	37°15'34.89"N	77°19'44.25"W	0.24	0.24	0	12/17/2016	No
1-67	Dollar General	Subsurface	06/2005	JL07	Private	Unnamed tributary to Bailey Creek (No)	37°16'32.76"N	77°18'42.28"W	0.78	0.41	0.37	1/12/2017	No
1-68	Family Dollar	Subsurface	01/2012	JL07	Private	Unnamed tributary to Cattail Creek (No)	37°17'30.52"N	77°17'52.13"W	0.65	0.65	0	5/11/2017	No
1-70	Flagstop Carwash	Subsurface	01/2014	JA45	Private	Unnamed tributary to Bailey Creek (No)	37°16'26.86"N	77°19'2.20"W	0.12	0.12	0	1/8/2017	No
1-72	Mallonee Lofts LLC	Bioretention	01/2009	JA45	Private	Unnamed tributary to Appomattox River (No)	37°18'2.53"N	77°17'53.63"W	0.64	0.64	0	1/31/2017	No
1-73	Elm Street Auto	Infiltration	05/2017	JL07	Private	Cattail Creek (No)	37°17'36"N	77°17'44"W	0.85	0.42	0.43	12/8/2016	No
1-74	Langston Park, Summit Apartments	Dry Detention Pond	01/2016	JL07	Private	Unnamed tributary to Cattail Creek (No)	37°16'26.86"N	77°19'2.20"W	4.7	2.9	1.8	1/12/2017	Yes
1-75	Hopewell Dementia, Sunflower Gardens	Dry Detention Pond	01/2016	JA45	Private	Unnamed tributary to Cabin Creek (No)	37°16'26.86"N	77°19'2.20"W	2.5	2	0.5	1/12/2017	
1-76	CVS Pharmacy	Bioretention	05/2018	JL07	Private	Unnamed tributary to Bailey Creek (No)	37°17'2.496"N	77°18'4.538"W	0.59	0.48	0.11	3/19/2018	Yes
1-77	Captain D's Seafood	Subsurface	12/2017	JL07	Private	Unnamed tributary to Bailey Creek (No)	37°16'18.452"N	77°18'57.703"W	0.44	0.44	0	11/20/2017	Yes

* Installation of this facility predates the regulatory requirement for a recorded Maintenance Agreement

Table 3 - VPDES Permit Facilities

Facility ID	Owner	Type	MM/YYYY Facility brought online	HUC	Ownership	Impaired Waters	Latitude	Longitude
1-25	Evonik Corp	Wet Retention Pond	06/2005	JL07	Private	Unnamed tributary to Bailey Creek (No)	37°17'25.05"N	77°15'56.917"W
1-78	Evonik Corp	Wet Retention Pond	12/2016	JL07	Private	Unnamed tributary to Bailey Creek (No)	37°17'24.603"N	77°15'57.543"W
1-57	Green Plains	Wet Retention Pond	12/2010	JL07	Private	Unnamed tributary to Cattail Creek (No)	37°17'38.756"N	77°17'18.56"W
1-69	Dominion Power Biomass	Subsurface, Dry Pond	06/2005	JL07	Private	Gravelly Run (No)	37°17'51.226"N	77°16'55.785"W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Appendix E: BMP CB-SC.2 Chesapeake Bay TMDL Action Plan Implementation

1. Excerpts from: *Pollutant Reduction Calculations Technical Memorandum*
   City of Hopewell Chesapeake Bay DRAFT Phase II TMDL Action Plan
   June 30, 2018 (revised September 14, 2018)

2. *Hopewell Restoration Project Scope of Work*: In Partnership with the Chesapeake Bay Foundation and the National Fish & Wildlife Foundation

Table 3: Calculation Sheet for Estimating Existing Source Loads and Reduction Requirements for the James River
(derived from 2018-2023 DRAFT MS4 Permit Part II Table 3a)

Pollutant	Subsource	A. Loading Rate (lbs/ac/yr) [1]	B. Existing Developed Lands 6/30/09 (acres)[2]	C. Loading (lbs/yr) [3]	D. Total L2 Reduction	E. % of L2 Reduction	F. Required 40% Reduction by 6/30/2023 (lbs/yr) [4]	G. Required 40% Cumulative Reduction by 6/30/2023 (lb/yr) [5]
Nitrogen	Urban Impervious	9.39	1,264.3	11,872	9%	40%	427.39	**873**
	Urban Pervious	6.99	2,654.2	18,553	6%	40%	445.27	
Phosphorus	Urban Impervious	1.76	1,264.3	2,225	16%	40%	142.80	**181**
	Urban Pervious	0.5	2,654.2	1,327	7.25%	40%	38.48	
Total Suspended Solids	Urban Impervious	676.94	1,264.3	855,855	20%	40%	68,468.40	**77,858**
	Urban Pervious	101.08	2,654.2	268,287	8.75%	40%	9,390.03	

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

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

[3] Column C = Column A x Column B

[4] Column F = Column C x (Column D ÷ 100) x (Column E ÷ 100)

[5] Column G = The sum of the Subsource Cumulative Reduction Required by 6/30/23 (lbs/yr) as calculated in Column F.

4.0 MEANS TO ACHIEVE POLLUTANT REDUCTIONS

The DEQ Guidance was used to identify appropriate means and methods for achieving the required reductions. The first permit cycle 5% reduction was achieved through implementation of a street sweeping program. The additional reductions required during the 2nd permit cycle will be achieved through the implementation of the Riverside Park Stormwater Greenway project. The details of the reductions derived from these strategies are provided below.

4.1 Street Sweeping

The City of Hopewell will continue to implement street sweeping as a component of the strategy to achieve POC reductions. The "qualifying street lanes method," as described in the DEQ Guidance, is utilized to determine the load reduction achieved by the street sweeping program.

The Department of Public Works utilizes two street sweeping trucks: a mechanical sweeper that sweeps the primary travel routes through the city, and a vacuum sweeper that sweeps the secondary and subdivision streets. The routes are shown in Appendix D. The operation of the two sweepers is geared to address specific road conditions as well as the different characteristics of the two sweepers.

The mechanical sweeper truck utilizes steel brushes to push road debris onto a conveyor that loads the debris into the truck's hopper. The sweeper operates at a slower speed than the vacuum sweeper in order to optimize the ability of these mechanisms to capture sediment and nutrients. The benefit is that this sweeper is better able to pick up debris that is larger than typical sediment and street grit, or when there are large quantities of material. The primary travel routes through the City are heavily travelled by large trucks bringing in raw materials for the numerous industrial facilities in town and are routinely littered with wood chips and other organic debris in addition to the typical loading associated with a high traffic urban area. In order to address this unique condition, the mechanical sweeper operates on an 8-hour night shift where it can operate at the desired slower speed without impeding traffic. During seasonal influences, such as in the fall with leaves, or in the winter after sand application during snow events, public works crews will strategically place City dump trucks so the sweeper can unload the debris hopper without having to return to the public Works yard to unload, saving valuable time.

The vacuum sweeper operates at higher speeds, and therefore sweeps during the day and sweeps a greater number of lane miles per shift. The 8-hour shift is interrupted by having to return to the public works yard to empty the hopper. In addition, the vacuum sweeper must be periodically run at close to highway speeds in order to maintain the various hydraulic features of the sweeping mechanism. As a result, both sweepers accumulate greater mileage on the odometer than the actual 'lane miles swept'. Table 4 provides the service areas in terms of lane miles swept and additional acreage associated with municipal parking lots, and Appendix D provides the monthly odometer totals.

Table 5 provides the load reductions attributed to the City's street sweeping program

Table 4 Sweeper Route Mileage and Acres Swept							
Sweeper	**Total Route Centerline Miles**	**4-curb Line Centerline Miles**	**2-Curb Line Centerline Miles**	**Total Lane Miles Swept**	**Total Lane Acres**	**Municipal Parking Acres Swept**	**Total Acres Swept**
Mechanical	33	6	27	78	95		95
Regen/Vacuum	118	0	118	236	286	6	292

Table 5 Street Sweeping Annual Load Reduction Calculations					
			TN	**TP**	**TSS**
Loading Rate (lb/ac/yr)			15.4	2	1300
Sweeper Pickup Factor - Mechanical			0.04	0.04	0.1
Sweeper Pickup Factor – Regenerative/Vacuum			0.05	0.06	0.25
			Load Reduction (lb/ac/yr)[3]		
Sweeper Type	**Miles Swept[1]**	**Acres[2]**	**TN**	**TP**	**TSS**
Mechanical	78	95	59	8	12,354
Regen/Vacuum	236	292	225	35	94,757
		Total	**283**	**43**	**107,111**

1. Miles swept derived from sweeper route map
2. Acres = conversion from miles, assume lane width = 10'; additional 6 acres for Regen/Vacuum sweeping municipal parking lots
3. Load Reduction (lb/ac/yr) = (acres swept)*(loading rate)*(pickup factor) (from *Qualifying Street Lanes Method VDEQ Chesapeake Bay TMDL Special Condition Guidance Memo GM15-2005*)

4.2 Riverside Park Stormwater Greenway

The Riverside Park Stormwater Greenway project was initiated in 2015 with the initial surveying and stream assessment. Design was completed and the project awarded for construction in the spring of 2017. The project is scheduled for completion in June 2018.

The project consists of four inter-related pollutant reduction strategies or Best Management Practices (BMPs): stream restoration, regenerative stormwater conveyance, wetland enhancement, and wetland expansion; as well as two additional BMPs: permeable pavement and a bioretention basin treating runoff from existing impervious surfaces. The following provides an explanation of the

pollutant load reduction calculations for each project component provided in Table 6, with computational tables provided in Appendix E.

4.2.1 Stream Restoration (POC Reduction Calculation Appendix E Table 1)

This portion of the project is based on a comprehensive watershed-level approach that directs restoration efforts that provide the most benefit in terms of pollutant reduction, improves stream function and health, and reconnects the stream to the floodplain and adjacent wetlands. The contributing drainage area for this methodology is 296.2 acres. Full stream restoration is targeted for 2,214 linear feet, while an additional 150 linear feet is targeted for streambank stabilization.

The stream restoration design addresses long-term stability of the channel, banks, and floodplain reconnection. Reconnection to the floodplain is aided by a lifting of the existing stream bed using Natural Channel Design principles. Stream grade structures divert flows into the newly created pocket wetlands along the stream channel and the existing wetlands at the lower end of the project. In addition, the existing wetlands are being enhanced to provide a functional lift in terms of storage volume.

These design elements along with numerous other factors demonstrate that the project meets the basic qualifying conditions for sediment and nutrient reduction credit protocols outlined in the Expert Panel Report. Basic qualifying conditions include the following:

- The stream reach is greater than 100 feet in length;
- the channel is actively eroding in response to existing upstream development as identified through the Bank Assessment for Nonpoint Source Consequences of Sediment (BANCS), a determination of the Bank Erosion Hazard Index (BEHI), and Near Bank Stress (NBS)
- the project represents a comprehensive restoration that includes grade structures and bed and bank stabilization treatments that are specifically designed to:
  - improve the hydrologic, hydraulic, geomorphic, water quality, and biological condition,
  - address the long-term stability of the channel,
  - reconnect the stream with its floodplain, and
  - create wetlands and instream habitat features that promote nutrient uptake and denitrification
- Complies with all state and federal permitting requirements including pre-project assessment and data collection, as well as post construction monitoring (USACOE permit issued on December 30, 2016)

Protocol 1: Credit for Prevented Sediment during Storm Flow

The BEHI estimation tool to predict stream bank erosion rate was used to predict the sediment loss prevented by the restoration. Field investigation identified variability in the measured bulk density. The value used for the 150 linear feet of bank stabilization was derived from soil samples taken in that immediate area, while the values used for the restoration represents an average of three different samples taken over the remaining length of the restoration. This was considered a more conservative approach than using a single value.

It should be noted that the conversion factors provided in the Expert Panel Report to translate estimates of sediment into estimates of nutrients (1.05 pounds P/ton sediment, and 2.28 pounds N/ton) sediment represent conservative values that were reduced based on the assumption that projects would be only 50% effective in reducing sediment. In addition, a sediment delivery ratio of 0.061 (coastal plain average) is applied to account for depositional processes between the edge-of-field and edge-of stream loads. (This sediment delivery ratio is not applied to the nutrient load reduction).

Protocol 2: Credit for In-Stream and Riparian Nutrient Processing within the Hyporheic Zone during Base Flow

The Rosgen Level II approach was utilized to identify the channel dimension, profile, and bed materials in order to develop design parameters for pattern, profile, materials, and construction that maximize potential for nutrient removal (appendix G Expert Panel Report). The Protocol 2 credit is applicable for the length of stream reach that has improved connectivity to the floodplain as indicated by a bank height ratio of 1.0 (bank full storm) or less for projects that use the natural channel design approach. An average bank height ratio of 1.0 was calculated for this project restoration.

4.2.2 Regenerative Stormwater Conveyance BMP (POC Reduction Calculation Appendix E Table 2)

The Regenerative Stormwater Conveyance (RSC) BMP is essentially a series of stepped pools/infiltration beds that collect and infiltrate runoff prior to reconnecting with the stream. This detention effect serves to allow for sediment and nutrient reduction, and the reductions were calculated using the runoff-reduction pollutant removal adjustor curves and procedures outlined in VDEQ Guidance Memo No. 15-2005.

The regenerative stormwater conveyance system includes three infiltration cells with a combined storage volume of surface storage (10,178 ft^3) and sand media and stone storage (1,843 ft^3) for a total storage of 12,021 ft^3 to manage and treat the flow from a drainage area of 45.2 acres. The drainage area consists of 29.33 acres of impervious cover and 15.87 acres of pervious cover.

The Engineering Parameter (or Runoff Depth Captured per Impervious Acre) needed to determine the load reduction from the Removal Rate Adjustor Curves is therefore calculated to be 0.113 inches.

4.2.3 Wetland Enhancement (POC Reduction Calculation Appendix E Table 3)

A rigorous field and desktop investigation was performed for the purposes of defining the extent of jurisdictional wetlands within the project site with the intent of enhancing their hydraulic performance as well as increasing the functional lift. The wetlands were found to be impaired and disconnected from the incised stream within the project boundaries. As such, the wetlands will be enhanced through a variety of methods including invasive species removal, stream reconnection, increased retention volume, and installation of native plantings. The key pollutant reduction parameter is the overall retention volume which is being increased from 3 inches to 9 inches (or a net increase of 6 inches).

The drainage area to these wetlands includes the entire project drainage area of 296 acres, with 204.1 acres of impervious cover ness and 91.9 acres of pervious cover. The load reductions are calculated as the difference between the existing retention depth (3 inches) and the proposed (9 inches). The Engineering Parameter (or Runoff Depth Captured per Impervious Acre) needed to determine the load reduction from the Removal Rate Adjustor Curves is therefore calculated to be 0.044 inches for the existing condition, and 0.132 inches for the proposed condition.

4.2.4 Wetland Expansion – Restoration (POC Reduction Calculation Appendix E Table Table 4)

Additional wetlands will be constructed as part of this project and represent a net increase of approximately 0.34 acres of new constructed wetland located just up gradient of the confluence of a small tributary and the existing wetland area proposed for enhancement. Pollutant reduction will be accomplished by converting a sizeable portion of the delta formed between this tributary and the main stream channel and installing stream grade structures in the small tributary to divert flows into the wetland.

The contributing drainage area to the new constructed wetland is approximately 60 acres and consists of 39.14 acres of impervious cover and 20.91 acres of pervious cover. The Engineering Parameter (or Runoff Depth Captured per Impervious Acre) needed to determine the load reduction from the Removal Rate Adjustor Curves is therefore calculated to be 0.0.079 inches.

4.2.5 Wetland Expansion – Pocket Wetlands (POC Reduction Calculation Appendix E Table 5)

A series of “Pocket Stormwater Wetlands” totaling 0.75 acres are proposed in the former streambed where the stream has been relocated. DEQ review and consultation determined that the nutrient and sediment reductions for the proposed pocket wetlands along the alignment of the stream channel restoration should be assessed as wetland expansion, i.e., new wetlands. Stream grade structures are utilized to divert base and low-flow storm flows from the restored channel into each pocket wetland.

Stabilized outlet sections are provided at the downstream end of the pocket wetland in order to maintain a 9" retention storage volume within each pocket.

The design stormwater flow and pollutant load for these pocket wetlands is primarily from the drainage areas that enter the system at and above the confluence with the channel at the Regenerative Stormwater Conveyance system. This drainage area has been measured to be 176 acres, with 114 acres of impervious cover, and 62 acres of pervious cover.

The Engineering Parameter (or Runoff Depth Captured per Impervious Acre) needed to determine the load reduction from the Removal Rate Adjustor Curves is therefore calculated to be 0.059 inches.

4.2.6 Parking Lot Permeable Pavement (POC Reduction Calculation Appendix E Table 6)

A handicap accessible permeable pavement parking area and trail head is proposed at the lower end of the project adjacent to Riverside Drive. The parking area and adjacent pedestrian plaza will be surfaced with permeable interlocking concrete pavement (PICP). The area of PICP is designed as a Permeable Pavement Level 2 as outlined in VDEQ BMP Design Specification 7, i.e., no run-on from adjacent impervious or pervious areas.

Pollutant loading and reduction calculations for TP and TN are based on the VDEQ Runoff Reduction Spreadsheet and the calculations for TSS reductions are based on the Chesapeake Bay Program Pollutant Removal RR Adjustor Curves.

4.2.7 Parking Lot Bioretention Basin (POC Reduction Calculation Appendix E Table 7)

A Level 1 Bioretention Basin is proposed for the area between the parking and Riverside Drive. The contributing drainage area consists primarily of Riverside Drive (1/2 the right of way) and the adjacent residential property: approximately 1.68 acres. The Level 1 design includes a forebay followed by a primary treatment cell. Runoff enters the basin through a series of curb cuts and exits via an underdrain and an overflow weir.

The sizing of the Bioretention Basin is smaller than the minimum sizing as outlined in the VDEQ BMP Design Spec No. 9: Bioretention Basins. The pollutant loading and reduction calculations are therefore computed using the Chesapeake Bay Program Pollutant Removal RR Adjustor Curves.

Table 6 provides a summary of the pollutant reductions described for each project component. Appendix E provides the detailed calculation values for each project component.

Table 6 Summary of Riverside Park Stormwater Greenway POC Reductions			
BMP/Process	**N Removal (lb/yr)**	**P Removal (lb/yr)**	**TSS Removal (lb/yr)**
Stream Restoration Protocol 1	812	374	43,425
Stream Restoration Protocol 2	428	NA	NA
RSC	54	11	3,648
Wetland Enhancement	205	45	23,592
Wetland Expansion (Wetland No. 1)	31	6	2,861
Wetland Expansion (Pocket Wetlands)	75	16	4,807
Permeable Pavement	1.4	0.2	80
Bioretention	9.1	1.1	430
Totals =	**1,616**	**453**	**78,843**

4.3 Phase II TMDL Action Plan POC Loading and Load Reductions Provided

Table 7 provides a summary of the total POC reductions achieved by the strategies described in this plan.

Table 8 provides a summary of POC Loadings, Required Reductions, and Phase II Action Plan Reductions Provided. As noted, this Phase II Action Plan achieves the required reductions for all three POCs.

Table 7 Summary of Total DRAFT Phase II TMDL Action Plan POC Reductions			
BMP/Process	**N Removal (lb/yr)**	**P Removal (lb/yr)**	**TSS Removal (lb/yr)**
Street Sweeping	283	43	107,111
Riverside Park Stormwater Greenway	1,616	453	78,843
Totals =	**1,899**	**496**	**185,954**

Table 8
Chesapeake Bay TMDL Action Plan Summary of POC Loadings, Required Reductions, and Phase II Action Plan Reductions Provided

Pollutant	Regulated Urban Land	2009 EOS Loading Rate (lbs/acre)	Total Existing Acres Served by MS4 (06/30/09)	Estimated Total POC Load Based on 2009 Progress Run (lbs)	L2 Model Run Reduction (%)	L2 Model Run Reduction (lb/yr)	L2 Model Run Total Reduction (lb/yr)	Required 40% Reduction by 6/30/2023 (lb/yr)	Phase II Action Plan Reduction (lb/yr)
Nitrogen	Impervious	9.39	1,264.3	11,872	9	1,068	2,181	873	**1,899**
	Pervious	6.99	2,654.2	18,553	6	1,113			
Phosphorus	Impervious	1.76	1,264.3	2,225	16	356	452	181	**496**
	Pervious	0.5	2,654.2	1,327	7.25	96			
TSS	Impervious	676.94	1,264.3	855,855	20	171,171	194,628	77,858	**185,954**
	Pervious	101.08	2,654.2	268,287	8.75	23,475			

City of Hopewell
Scope of Work
Hopewell Restoration Project
10/1/16 – 9/30/18 (extended to 12/30/2018)

The *Hopewell Restoration Project* proposes to educate the community on the benefits of conservation practices and increase the number of green infrastructure practices installed within the City of Hopewell. The following represents the Scope of Work tasks to be carried out by City Stormwater Program personnel unless noted otherwise.

Task	Timeline
1. Boat Trip for Hopewell community and government leaders City staff will assist in contacting City leaders and promoting attendance	Spring 2017. Completed May 2017
2. Develop & mail informational postcards City Stormwater Program staff will provide residential and commercial addresses as needed for mailing postcards. Public works staff will assist with site visits to evaluate the installation of rain barrels and/or raingardens	Summer 2017. Completed July 2017
3. Work with residents, schools, faith-based institutions, and/or businesses to install five (5) small-scale rain gardens and 45 rain barrels. City Stormwater Program staff will assist in design and tracking of installations	Rain gardens Fall 2017 Completed August 2017. Rain barrels Fall 2018
4. Install a bioretention basin and permeable paver BMPs at the entrance to Riverside Park (near the City Marina) as part of the city's larger Hopewell Marina Connectivity and Greenway Project. City Stormwater Program staff is responsible for all tasks related to the design, survey, construction, and inspection of the BMPs;	Fall 2018 Completed Spring 2018
5. Install educational signage on green infrastructure at the BMP installations and other select locations City Stormwater Program staff will provide feedback to CBF on content of educational signage; and assist in identifying additional locations as needed.	Fall 2018
6. Conduct a GIS-based urban tree canopy assessment City Stormwater Program staff will assist as needed in developing a GIS mapping layer **Identify appropriate sites and plant 100 trees to increase the city's tree canopy** City Stormwater Program staff, Recreation & Parks staff will assist in identifying appropriate locations for tree plantings. City Public Works crews will provide equipment and workers as may be needed in transporting and planting trees.	GIS Layer – Summer 2017 Plantings Fall 2017 Completed
7. Create two buffers at public sites and host volunteers to plant native trees, shrubs, and perennials. Recreation & Parks staff will facilitate access to Hopewell Community Center and Atwater Park, and other City properties as may be needed.	Fall 2017 and Spring 2018.
8. Install ten scoop the poop stations and educational signage Recreation & Parks and Stormwater staff will assist in identifying and installing the stations and signage as need.	By completion of project. Completed Fall 2017

City of Hopewell
Scope of Work
Hopewell Restoration Project
10/1/16 – 9/30/18 (extended to 12/30/2018)

9. Host two classes of students from schools within the city aboard a CBF educational vessel; and offer one educational trip for adults to paddle the Appomattox and explore their river. Recreation & Parks and Stormwater staff will assist as needed.	Student trips in fall 2017 and spring 2018. Adult trip in spring 2018.
10. Host four neighborhood walks for residents City Stormwater Program staff will assist in developing talking points related to the City stormwater program	One each in summer, and fall of 2017 and spring and summer of 2018.
11. Host a tour of the Hopewell wastewater treatment plant Hopewell Water Renewal will lead the tour	Spring 2018. Completed Fall 2017
12. Design and mail billing inserts to all utility customers City stormwater program staff will assist CBF in designing and providing contact information for the City's utility billing vendor in order to incorporate educational inserts into all utility bills	Spring 2018. Completed Spring 2018
13. Engage volunteers in educational and restoration activities, including six cleanups and three urban gardening workshops City stormwater program staff will assist CBF in scheduling activities, logistics for trash & debris removal, and curriculum and materials for gardening workshops.	Throughout project.

Budget:
Upon receipt of invoices and reports, CBF will pay the City of Hopewell $70,000 over the contract period for the installation of the bioretention basin and permeable pavement noted in **Task 4**.

Permeable Pavement Item	Estimated Quantity	Contract Price
Permeable Pavement (full section including base)	265 sq.yds.	$ 34,450.
Vertical curb (permeable pavement edge)	390 linear ft.	$ 9,750.
15" & 18" drainage Pipe	70 linear ft.	$ 4,200.
6" PVC Underdrain	225 linear ft.	$ 3,375.
Observation Well	3	$ 1,500.
Bioretention Outlet Structure	1	$ 8,500.
No. 57 Aggregate	100 tons	$ 3,500.
No. 8 Aggregate	30 tons	$ 1,500.
Bioretention Soil Media	120 cu.yds.	$ 13,090.
	TOTAL	**$ 79,865**