



COUNTY of ROANOKE VIRGINIA

Municipal Separate Storm Sewer System Annual Report

July 1, 2018 – June 30, 2019

Submitted:
October 1, 2019



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Town of Vinton

Roanoke Valley Resource Authority

Western Virginia Water Authority

Roanoke Valley Television Station

Clean Valley Council

Certification Statement and Requirements

As required by the MS4 Permit VAR040022, all reports required by state permits, including annual reports, and other information requested by the board or department shall be signed by a person described in Part III K 1 of the permit, or by a duly authorized representative of that person, as described in Part III K 2 of the permit.

1. *For a corporation: by a responsible corporate officer. For the purpose of this chapter, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy-making or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions that govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for state permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;*
2. *For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or*
3. *For a municipality, state, federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this chapter, a principal executive officer of a public agency includes: the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.*

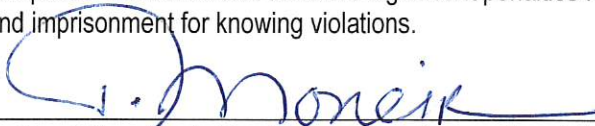
Duly Authorized Representatives

A person is a duly authorized representative only if:

1. *The authorization is made in writing by a person described in Part III K 1;*
2. *The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the operator. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and*
3. *The signed and dated written authorization is submitted to the department.*

CERTIFICATION

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



Tarek Moneir - Acting Director Development and Engineering Services

10.1.19

Date

VAR040022
Permit Number

County of Roanoke
MS4 Name

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Executive Summary

According to the United States Environmental Protection Agency (US EPA), polluted stormwater runoff is a leading cause of impairment to nearly 40 percent of surveyed U.S. water bodies that do not meet water quality standards. Whether travelling by overland flow or through stormwater conveyance systems, polluted stormwater runoff is discharged into local receiving waterways. Such untreated water pollution can result in the destruction of fish, wildlife, and aquatic life habitats; it can also cause a loss of aesthetic value and can threaten public health due to its potential to contaminate food, drinking water supplies, and recreational waterways.

The **County of Roanoke** is committed to continuing in the development, implementation, and enforcement of a Municipal Separate Storm Sewer System (MS4) Program, pursuant to the requirements of the **MS4 Permit VAR040022**, as issued by the Virginia Department of Environmental Quality. This program is designed to reduce the discharge of pollutants from the County's regulated MS4 area to the maximum extent practicable (MEP) and to satisfy the appropriate water quality requirements of the State Water Control Law and its attendant regulations.

The County's MS4 program addresses six Minimum Control Measures (MCMs), as follows:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management in New Development and Development on Prior-Developed Lands
6. Pollution Prevention and Good Housekeeping for Municipal Operations

The County has contracted with the Clean Valley Council (CVC) to provide services to meet the permit requirements of MCM-1: Public Education and Outreach on Stormwater Impacts, and MCM-2: Public Involvement and Participation. The associated Best Management Practices, as developed by the County, for which CVC is responsible are listed below:

- BMP 1-3: Stream Monitoring and Education
- BMP 1-4: Stormwater Education Program for Schoolchildren
- BMP 1-5: Public Awareness Program
- BMP 2-1: Storm Drain Stenciling Program
- BMP 2-2: Stormwater Public Events

In an effort to deliver a consistent message across the entire Roanoke Valley region, the County participates on the Roanoke Valley-Alleghany Regional Commission's regional Stormwater Advisory Committee. This group is comprised of neighboring MS4s, and interested parties such as the CVC, Upper Roanoke River Roundtable, the Virginia DEQ, and others.

The Minimum Control Measures and associated BMPs used by the County to satisfy the MS4 Permit requirements are described in detail in the County's MS4 Program Plan, dated May 2019. This Annual Report provides the required documentation regarding those MCMs and BMPs for the **reporting period of July 1, 2018 - June 30, 2019**. Both documents are posted on the County's website at: <https://www.roanokecountyva.gov/1755/Stormwater-MS4-Permit>.

Section 1. Minimum Control Measures

Pursuant to 9VAC25-89-40, Part I (Discharge Authorization and Special Conditions), the following Minimum Control Measures (MCMs) describe the actions that Roanoke County will use to develop, implement, and enforce its MS4 Program, all of which are designed to reduce the discharge of pollutants from this small MS4 to the maximum extent practical (MEP). The measures will also be employed to protect water quality and to satisfy the appropriate water quality requirements of the State Water Control Law and its attendant regulations.

- **MCM-1:** Public Education and Outreach
- **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 for New Development and Development on Prior-Developed Lands
- **MCM-6:** Pollution Prevention and Good Housekeeping for Municipal Operations
- **TMDL:** TMDL Special Conditions

NOTE:

As per Part I.B. of the General Permit, implementation of the above-listed MCMS and the Chesapeake Bay and Local TMDL requirements in Part II (as applicable) consistent with the provisions of an iterative MS4 program required pursuant to the General Permit constitutes compliance with the standard of reducing pollutants to the "maximum extent practicable," provides adequate progress in meeting water quality standards and satisfies the appropriate water quality requirements of the State Water Control Law and its attendant regulations. Due to this iterative nature of the MS4 Program, over the course of the permit term Roanoke County may find it necessary to change or replace one or more of the "anticipated" Best Management Practices (BMPs) used to satisfy the MCMs; such changes/replacements will be made when the County finds the BMP(s) to be ineffective.

This report will provide an evaluation of the MS4 Program Plan implementation, including a review of each MCM to determine the MS4 program's effectiveness and whether or not changes to the MS4 Program Plan are necessary.



MCM-1: Public Education and Outreach

This minimum control measure is intended to implement a public education and outreach program that is designed to:

1. Increase the public's knowledge of how to reduce stormwater pollution, placing priority on reducing impacts to impaired waters and other local water pollution concerns;
2. Increase the public's knowledge of hazards associated with illegal discharges and improper disposal of waste, including pertinent legal implications; and
3. Implement a diverse program with strategies that are targeted toward individuals or groups most likely to have significant stormwater impacts.

The County has developed the following Best Management Practices (BMPs) to meet these program goals:

BMP 1-1: Stormwater Educational Resources

The County has created and will maintain a comprehensive listing of existing stormwater-related agencies and organizations along with pertinent educational programs and resources, which shall be made available to the public by way of the County's stormwater website.

BMP 1-2: Roanoke County Stormwater Newsletter

Roanoke County will create and distribute a Stormwater Newsletter, which shall be annually distributed to all Roanoke County residences.

BMP 1-3: Stream Monitoring and Education

Roanoke County will provide stream monitoring and informational stream seminars for Roanoke County students and residents.

BMP 1-4: Stormwater Education Program for Schoolchildren

Roanoke County will develop and implement a stormwater education program for its schoolchildren. Different programs will target appropriate grade levels.

BMP 1-5: Stormwater Public Awareness Program

Roanoke County has developed and will implement a Stormwater Public Awareness Program that includes the distribution of stormwater merchandise, public service announcements, and other high visibility educational media. The program includes:

1. A list of the high-priority stormwater issues that Roanoke County will communicate to the public as part of its public education and outreach program;

2. The rationale for selection of each high-priority stormwater issue and an explanation of how each education or outreach strategy is intended to have a positive impact on stormwater discharges;
3. Identification of the public audience to receive each high-priority stormwater message;
4. The strategies from Table 1 of Part I.E.1.d. to be used to communicate each high priority stormwater message; and
5. The anticipated time periods the messages will be communicated or made available to the public.

BMP 1-6: Roanoke County Stormwater Webpage

Roanoke County will maintain its Stormwater webpage as a means to inform the public on the various ways to reduce stormwater pollution, placing priority on reducing impacts to impaired waters and addressing other local water pollution concerns.

BMP 1-7: Targeted Education Program

Roanoke County implements a stormwater quality education program for specific (target) audiences. This BMP coordinates with BMP 1-5.

This report provides a detailed description of the goals of each BMP, the status of the County's compliance with each BMP, and an evaluation of the BMP and any proposed modifications needed to better achieve the overall MS4 Program goals. In addition, the strategies to ensure consistency with local TMDLs are also provided, and they are broken down by impairment type: *Escherichia coli* (*E. coli*) bacteria (EC), sediment (SED), or Polychlorinated biphenyls (PCBs).

BMP 1-1: Stormwater Educational Resources

Goal:

The goal of this BMP is to create and maintain a comprehensive listing of stormwater-related agencies and organizations, educational programs and resources, such as current publications, websites, videos, maps, and training opportunities that directly address stormwater issues such as stormwater management, stormwater quality, floodplain management, stormwater pollution prevention, conservation practices, and riparian habitat protection. The public will be made aware of these resources by way of the County's stormwater website, which is located here: <https://www.roanokecountyva.gov/332/Stormwater-Resources>.

Responsible Party:

Roanoke County's Department of Community Development.

Schedule:

Roanoke County maintains and annually updates its stormwater resources database, which provides contact information and website links to aid the public in accessing the various stormwater educational resources.

Measurable Goals:

Success for this BMP will be measured by tracking website usage and the number of requests received by the County for this or similar data.

Permit Year	Viewing Statistics
(1) 2018 - 2019	102 visits; 133 Page Views

TMDL Consistency:

The County's stormwater website highlights a page discussing "Non-point Source Pollution (NPS)." This page illustrates how agriculture and straight pipes can contribute to the overall stormwater pollution problem (EC) and provides a list of NPS pollutants, including fertilizer and pesticides from lawns or farms; organic wastes from manure and sewage; pathogens such as bacteria and viruses; salt from irrigation and acid-mine drainage; sediment from erosion of unprotected lands; and toxins such as airborne chemicals, oils, and metals. (EC, PCBs, SED).

In addition, the website contains a "PCBs Fact Sheet" and highlights Illicit Discharge Detection and Elimination (IDDE) through the use of various public service messages from the County's IDDE Public Outreach video kit. The associated messages directly tie to the TMDLs (EC, SED, PCBs). The Fact Sheet can be accessed here:

<https://www.roanokecountyva.gov/DocumentCenter/View/9349/PCB-Facts-May-2017?bidId=>

Evaluation and Modification:

In accordance with the MS4 Program Plan, the number of website visits to this database within the permit year illustrates whether the website is an effective format to distribute the information concerning stormwater educational resources. With site visits and page views as shown below, the County believes this BMP is successful. No modifications are planned for this BMP.

BMP 1-2: Roanoke County Stormwater Newsletter

Goal:

The goal of this BMP is to create and distribute an annual Stormwater Newsletter, which shall be mailed to every residence in Roanoke County. The purpose of this newsletter shall be to (1) increase the public's knowledge on ways to reduce stormwater pollution, placing priority on reducing impacts to impaired waters and other local water pollution concerns; and (2) increase the public's knowledge of hazards associated with illegal discharges and improper disposal of waste, including pertinent legal implications. The target public audience for this publication will be County residents.

The newsletter, while primarily aimed at County residents, will also address regional issues that affect the entire Roanoke River watershed. Topics may include: litter prevention, stormwater pollution prevention, stormwater quality education, residential best management practices, updates on local impaired water bodies, and TMDLs. It will also include subjects that are specific to Roanoke County's Stormwater Management Program. The stormwater newsletter's focus will be coordinated with the high-priority water quality issues identified in **BMP 1-5**.

Responsible Party:

Department of Community Development.

Schedule:

Roanoke County provides its annual newsletter to every residence in the County, and distributes copies to the public libraries and schools. The newsletter is posted on the stormwater website at <https://www.roanokecountyva.gov/1648/Stormwater-Public-Education-Documents>.

Measurable Goals:

Success for this BMP is measured by documenting the number of County residences to which the newsletter was mailed.

Permit Year	Distribution Statistics
(1) 2018 - 2019	35,195 residences

TMDL Consistency:

This informative newsletter helps to address sediment, bacteria, and PCBs.

Evaluation and Modification:

This newsletter exclusively focuses on stormwater issues for homeowners. It has been well received by County residents, making it an effective BMP for delivering stormwater-related information and education to County residents. No modifications are planned for this BMP.



BMP 1-3: Stream Monitoring and Education

Goal:

In cooperation with the Clean Valley Council (CVC), Roanoke County will provide stream monitoring and informational stream seminars for Roanoke County students and residents. The goal of this BMP is to educate students and residents about field procedures for biological stream monitoring, in addition to motivating citizens to monitor waterways in their neighborhood and enhance grassroots cooperation to promote the importance of stream monitoring within the County. These seminars and monitoring sessions will provide some field exposure to aquatic habitats, update citizens on local, state, and federal water quality regulations, and keep citizens updated on local stream health.



Responsible Party:

Roanoke County's Department of Community Development, through the Clean Valley Council.

Schedule:

On behalf of Roanoke County, the Clean Valley Council will educate Roanoke County students and citizens by holding stream education seminars and monitoring sessions. Special emphasis will be placed on monitoring stream segments with a TMDL designation. The County will create a database to track the names of monitored streams and the number and type of groups participating. The database will be submitted to DEQ in the annual report.


Measurable Goals:

Success for this BMP will be measured by tracking the number of citizens/students involved in stream monitoring activities conducted by the CVC on behalf of Roanoke County. In addition, Roanoke County will track the number of stream schools given by the CVC, the number of participating students, and their respective grade level(s).

Permit Year	# of Stream Schools (CVC)	# of Participants
(1) 2018 - 2019	17 - Stream School Seminars	290 students 13 adults

All stream school seminar locations were on the Roanoke River or its tributaries.

- For more details, see the attached compact disk under the folder titled **BMP 1-3** and the summary provided below.

 <p>Clean Valley Council</p>	<h2 style="text-align: center;">Outdoor Stream School</h2> <p style="text-align: center;"><i>What is our local watershed and how does pollution affect our ecosystems?</i></p>
<p>Grade Level Biology, APES</p> <p>High Priority Issues Pollution Prevention, Excess Bacteria, Sediments, Nutrients</p> <p>Standards of Learning LS.6, LS.7, LS.8, LS.9, LS.10, LS.11, ES.8, BIO.2, BIO.8</p> <p>Duration 45-60 minutes</p> <p>Setting Outdoor Space near stream</p> <p>Vocabulary Benthic Macroinvertebrate, Riparian Corridor, Vegetative Cover, Soil Erosion, Sedimentation, Point Source Pollution, Nonpoint Source Pollution, Bacterial Load, Nutrient Load, Eutrophication, Algal Bloom, Turbidity, pH, Dissolved Oxygen, Bioassessment, Best Management Practice</p> <p>Character Education Personal effects on effects on watershed. Economic effects of external cost from pollution.</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p>Summary Students will perform a series of chemical and biological assessments on a local stream. This will enhance their understanding of the factors involved in determining water quality, and the connection between point source and non-point source pollution in their waterways. Common pollutants such as sediment, animal waste, nutrients, fossil fuels, and litter, including cigarette butts are discussed.</p> <p>Objectives Students will:</p> <ul style="list-style-type: none"> • Identify their local watersheds and map the movement of water from the land to storm drains where it empties into local waterways and ultimately the ocean • Identify macroinvertebrates and discuss how they can determine water quality. • Discover best management practices for preventing water pollution </div> <div style="width: 48%;"> <p>Materials</p> <ul style="list-style-type: none"> • Watershed maps • Stream School Kit • Water shoes for students <p>Pre-Teaching Options</p> <ul style="list-style-type: none"> • Watersheds • Ecosystems </div> </div>

TMDL Consistency:

This activity allows students and residents to have an understanding of the many factors that can affect the life in a stream. The effects of pet waste, stream bank erosion, and agricultural runoff are discussed during the monitoring sessions as being likely contributors to degraded water quality in local receiving streams. (EC & SED)

Evaluation and Modification:

Stream schools are hands-on events and no literature is distributed. The number of events and participating citizens show that this BMP is an effective method to educate citizens and enhance the grass-roots monitoring effort throughout the County. The County's goal is to continue to provide these activities as a means to educate citizens and encourage their cooperation in regional water quality health. No modifications are planned for this BMP.

BMP 1-4: Stormwater Education Program for Schoolchildren

Goal:

Roanoke County, through the Clean Valley Council (CVC), has established a stormwater education program for Roanoke County's schoolchildren. The CVC educators actually develop and implement various programs to address stormwater pollution prevention and related water quality issues. Different program materials have been developed to target appropriate grade levels and are correlated with the applicable Standards of Learning (SOLs). The messages for the various grade levels have been coordinated with the County's high-priority water quality issues, as identified in **BMP 1-5**.

Responsible Party:

Roanoke County's Department of Community Development, through the Clean Valley Council.

Schedule:

The County will document how many children have been educated on stormwater quality by tracking the number of programs provided and the number of children reached. At the end of each annual period, the County will analyze the statistics of how many programs were provided and how many children were reached to determine the most effective method.

Measurable Goals:

Success for this BMP will be measured by tracking the number of programs that were provided and the number of schoolchildren that were reached.

- This Annual Report contains the program names, a brief description of each program and their goals, dates and locations of each program that was presented, the number of participants in each program, and the high priority water quality issues they address. See the attached compact disk under the folder titled **BMP 1-4**.

Permit Year	Programs Given	# Student Participants	# Adult Participants
(1) 2018 - 2019	117	2741	158

TMDL Consistency:

Several of the educational programs that are presented to Roanoke County Schools target sources of bacteria, such as "Oceans of Trash" and "Watersheds to Oceans." (EC). Others target potential sources of sediment, such as "Soil: Who Needs It?" (SED).

Evaluation and Modification:

The number of school programs and participating students indicates that the stormwater educational programs are an effective method to address stormwater and related water quality issues in the school system. The County will continue to provide these programs and to target appropriate grade levels with SOL-applicable material. The specific educational programs will be routinely evaluated and new programs may be incorporated, as needed to address new issues that impact the community. No modifications are planned for this BMP.

BMP 1-5: Stormwater Public Awareness Program

Goal:

Roanoke County's Stormwater Public Awareness Program targets three high-priority water quality issues that contribute to the degradation of stormwater runoff and the receiving waters into which it drains: excess bacteria, excess sediments, and excess nutrients.

Rationale for Selection - Sediment and bacteria were selected because the County has been assigned a Total Maximum Daily Load (TMDL) by DEQ for these impairments, meaning the County has been put on a "pollution diet" to limit these two pollutants from entering its waterways. Nutrients (phosphorus and nitrogen, in particular) were chosen because they have such negative impacts on receiving waters when in large quantities. Excess nutrients wash off of lawns, other managed turf areas, and farm fields and are carried in stormwater runoff to the area's receiving waters (streams, creeks, and the Roanoke River). Once in the waterways, they cause algal overgrowth, which in turn decreases the oxygen that marine life need to survive. This often results in fish kills, fish illnesses, and the tainting of human food. Groundwater supplies may also be affected by nutrient pollution.

The County's Public Awareness Program focuses on (1) ways to increase the public's knowledge about how to prevent these pollutants from getting into stormwater runoff, and (2) the hazards and legal implications of illegal discharges and improper disposal of wastes.

The County has developed relevant messages for this BMP and uses a variety of means and methods, including partnering with the Clean Valley Council and RVT3, to communicate with the public via the distribution of printed materials (brochures, fact sheets, and newsletters), radio and TV advertisements, use of websites and social media, storm drain stenciling, speaking engagements, and through giveaways of stormwater-related merchandise.

In addition, as outlined in BMP 1-7, the County also targets certain public audiences with specific educational materials and messages, which are designed to help them reduce stormwater pollution in their day-to-day activities.

Responsible Party:

Department of Community Development, with assistance from the CVC and RVT3.

Schedule:

The County's Public Awareness Program incorporates the development and distribution of printed materials, billboard and mass transit advertisements, signage at select locations, radio and television advertisements, newspaper articles, and use of websites and social media. The County will annually track the number and types of materials that are distributed and posted on websites/social media and the size of the audience that is exposed to such materials, as appropriate.

Measurable Goals:

The County will document the type of public awareness method that was utilized, including the size of the audience reached, and any impact indicators that show what effect the method had on behavior.

- In this annual period, the Clean Valley Council (CVC) was involved in the following activities on behalf of Roanoke County and the other surrounding localities with which it is contracted to provide public education:

Stormwater Public Awareness Program Activities - Clean Valley Council								
#	Date	Location	School or Outreach Group	Program Type	Issues Addressed	# of Programs	Total # Students	Total # Adults
1	7/14/18	City of Roanoke	NW Neighborhood Clean Up	Event/Festival	Litter	1	25	75
2	7/20/18	City of Roanoke	Habitat Ribbon Cutting	Event/Festival	Litter/ Recycling	1	15	50
3	7/25/18	City of Roanoke	SE Neighborhood Jackson Park	Event/Festival	Litter/ Recycling	1	400	600
4	8/3/18	ALL	Fashionista - Taubman	Event/Festival	Recycling	1	50	150
5	8/18/18	City of Roanoke	Tinker Creek Clean Up	Event/Festival	SW/ Litter	1	-	100
6	8/21/18	City of Roanoke	Habitat Ribbon Cutting	Event/Festival	Litter/ Recycling	1	10	50
7	9/24/18	Botetourt	Botetourt County Country Women's Club	Meeting	Litter/ Recycling	1	-	35
8	9/26/18	ALL	Banff Film Festival	Event/Festival	All	1	30	150
9	9/27/18	City of Roanoke	Green Academy	Meeting	All	1	-	24
10	9/29/18	ALL	Daisy Fest	Event/Festival	All	2	100	230
11	9/29/18	ALL	Fall Waterways Clean Up	Event/Festival	Litter/ Recycling	1	100	542
12	9/29/18	ALL	Soaring Ridge After Party	Event/ Festival	All	1	15	150
13	10/12/18 thru 10/14/18	ALL	GoFest	Event/ Festival	All	4	300	100
14	10/19/18	ALL	Soaring Ridge Trivia Nite	Event/Festival	Stormwater	1	10	30
15	11/20/18	City of Roanoke	Rain Barrel Workshop	Classroom	Stormwater	1	1	8
16	11/2/18	ALL	Earth Summit	Classroom	Stormwater	10	85	25
17	11/2/18	ALL	Earth Summit - Evening Event	Event/Festival	All	1	-	55
18	11/7/18	Botetourt	Young at Heart	Classroom	Recycling	1	-	35
19	11/17/18	City of Roanoke	Habitat Ribbon Cutting	Event/Festival	Recycling	1	15	35
20	12/19/18	ALL	Lutheran Family Services	Event	Stormwater Recycling	1	-	20
21	2/25/19	Roanoke County	Brambleton Center REC Class	Classroom Program	Recycling	1	-	14
22	3/1/19	ALL	Ballast Point Trivia Nite	Event	Stormwater	1	-	64
23	3/2/19	ALL	Habitat Ribbon Cutting	Event/Festival	ALL	1	18	25
24	3/6/19	ALL	Habitat Ribbon Cutting	Event/Festival	ALL	1	12	32
25	3/9/19	ALL	Habitat Ribbon Cutting	Event/Festival	ALL	1	10	26
Total Outreach & Adult Education						38	1,196	2,625
TOTAL Participants						3,786		

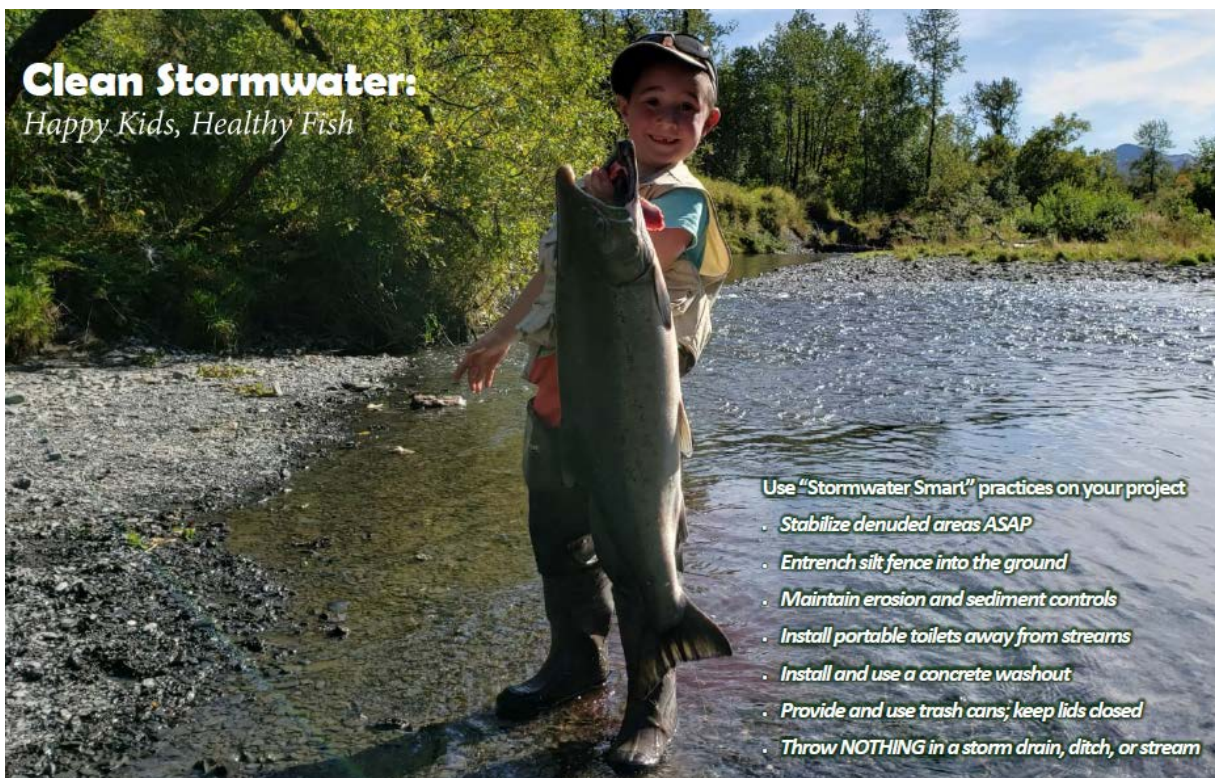
- The County's Community Development Department (Division of Planning and Zoning) distributes a monthly e-newsletter entitled Community Developments. Pertinent stormwater messages are included from time to time, and the e-newsletter reaches 1,239 individuals. In this permit year, four issues addressed stormwater management topics. These newsletters can be seen on the attached compact disk under the folder titled **BMP 1-5**.
- The County's Division of Development and Engineering Services continued to use its pet waste poster focused on "scooping the poop," as a strategy to reduce the amount of bacteria that enters receiving waters. The poster is on the County's website, in the stormwater (residential) newsletter, and it was shared on the RVTV website.



- Development and Engineering Services also created two new posters. The first one, “Clean Stormwater: Wildlife Depend on It” was used in the annual residential newsletter, entitled “A Stormwater Guide for Homeowners,” which was mailed to every residence in the County.



The second poster, shown below, was used in the annual contractor newsletter, entitled “It’s Just Dirt,” which was mailed to every land-disturbing contractor and land developer in the region and to the local engineering community and builders association.



Both posters focus on raising awareness about simple ways to keep pollution from entering stormwater, with the ultimate goal of protecting receiving waters from collecting pollutants, such as trash, fertilizers, lawn waste, cigarette butts, pet waste, and sediment. These posters can be found on the County's website at <https://www.roanokecountyva.gov/1648/Stormwater-Public-Education-Documents>.

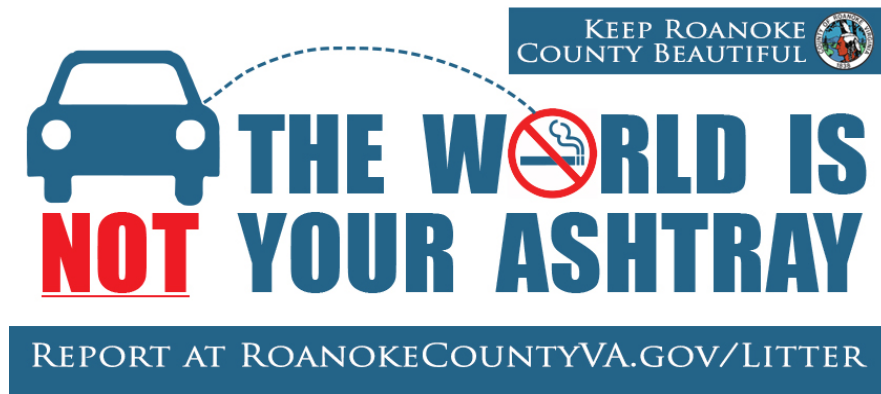
- The County uses various Public Service Announcements (PSAs) to share information with the public as part of its stormwater public awareness/education program. The PSAs encourage folks to “do the right things,” such as not littering, bagging or mulching leaves and grass clippings, bagging pet waste, washing cars on the grass, and refraining from pouring anything into the storm drain. The overarching goal for these PSAs is to address the three high priority water quality issues: bacteria, nutrients, and sediments.
- The County purchased a set of video programs that were designed for educating the general public on Illicit Discharge Detection and Elimination (IDDE) to the storm drainage system; such discharges include the selected three high-priority water quality issues: excess bacteria, sediment, and nutrients. The kit includes five videos of varying run times, which are designed to be used in specific medium/media or to reach a specific audience. Along with the aforementioned PSAs, the videos are posted on the County's website at <https://www.roanokecountyva.gov/1598/Stormwater-Public-Education-Videos>

The County tracks the size of the audiences that access the PSAs and videos. The data for this reporting year is provided below:

PSAs	Views
Granny Says	18
Leaf Solution	20
Cooking Grease	11
Car Wash	18
Scoop the Poop	20
SWM Lawn Care	20

Videos	Views
Illicit Discharge Great Concern (30 sec)	0
Illicit Discharge Great Concern (60 sec)	0
Illicit Discharge Great Concern (2 min)	2
Illicit Discharge Great Concern (5 min)	0
Illicit Discharge Great Concern (10 min)	0
(Spanish) Illicit Discharge Great Concern (30 sec)	0
(Spanish) Illicit Discharge Great Concern (60 sec)	0
(Spanish) Illicit Discharge Great Concern (2 min)	0
(Spanish) Illicit Discharge Great Concern (5 min)	0
(Spanish) Illicit Discharge Great Concern (10 min)	0
(Spanish) Illicit Discharge Great Concern (30 sec)	0

- The County continues to run its anti-littering ad campaign: *The World is Not Your Ashtray*. Permanent signs with the message have been placed at several prominent intersections, and the County's website provides an opportunity for citizens to report litter thrown out of vehicles. If the vehicle listed in the online complaint form can be confirmed, Roanoke County Police Department sends a notice to the vehicle's owner that the offense was witnessed and requests their compliance with Roanoke County's litter ordinance in the future. Only verified complaints are processed. For access to the form, click here: <https://www.roanokecountyva.gov/FormCenter/Police-6/Report-Littering-44>



- Roanoke Valley Television produced several TV segments during the permit year:
 - A Stormwater Operations segment for the May 2019 "Roanoke County Today" show. The segment was 7:35 minutes and it aired on Channel for the month of May; it was also posted to the RVTV Facebook Page, YouTube Channel, & website.
 - A :30 PSA for the Clean Valley Council
 - A 2018 Earth Summit Video "Voices of the Roanoke River" (5:35 minutes).

Note that all of the stormwater PSAs that were produced by RVTV in the past are still used as Spot Breaks in their monthly shows.

TMDL Consistency:

The various activities used for this BMP are intended to bring stormwater quality issues to the public's attention. Related activities for this BMP focus on bacteria and sediment, because the County has TMDLs for these pollutants. (EC & SED)

Evaluation and Modification:

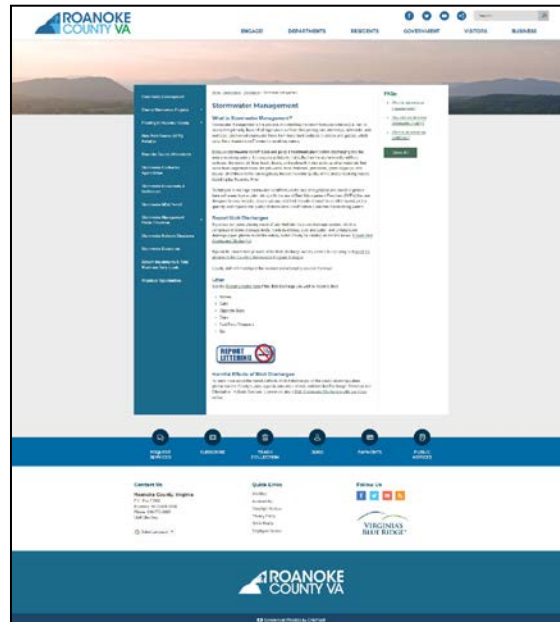
The number and types of activities, and the number and types of materials that are distributed and posted on websites/social media and the size of the audience that is exposed to such materials indicates that the Stormwater Public Awareness Program is effective.

The County will continue to use this BMP to increase the public's knowledge about how to prevent pollutants from getting into stormwater runoff and to inform the public about the hazards and legal implications of illegal discharges and improper disposal of wastes. No modifications are planned for this BMP.

BMP 1-6: Roanoke County Stormwater Webpage

Goal:

Roanoke County will maintain and monitor its Stormwater webpage, which enables the public to obtain information concerning the County's Stormwater Management Program, ordinances, design guidelines, general information, contact information, stormwater pollution prevention information, educational materials, and links to other organizations and sites. The website also helps to inform the citizens about on-going community-based projects, including storm drain stenciling, Save Our Streams and other similar stream monitoring programs, regional clean-ups, and other local water quality educational programs and events. The messages for the website will be coordinated with the high-priority water quality issues identified in **BMP 1-5**. The stormwater website address is <https://www.roanokecountyva.gov/stormwater>



In addition, the stormwater website will contain the appropriate videos from the County's IDDE Public Outreach kit (discussed in **BMP 1-5**) in an effort to inform the public about the hazards and legal ramifications of illicit discharges. The webpage includes recent versions of the County's stormwater-related public education materials, such as newsletters, fact sheets, posters, brochures, etc.

Responsible Party:

The Department of Community Development, with assistance from the County's Web Content Manager.

Schedule:

Roanoke County will maintain its stormwater website and document the webpage usage, including the annual number of visits to each page.

Measurable Goals:

Webpage statistics including the most- and least- popular material will be analyzed for effectiveness of the website.

For this reporting year, there were a total of **3,855 visits, with 5,005 page views** to the stormwater website between July 1, 2018 and June 30, 2019. The number of visitors to each webpage is shown below.

Roanoke County Stormwater Webpage Statistics

Visits/Page Views

Period: 7/1/2018 - 6/30/2019

<https://www.roanokecountyva.gov/stormwater>

Page Name	Visits	Page Views	%
Roanoke County, VA - Official Website - Flooding in Roanoke County	780	882	18%
Roanoke County, VA - Official Website - Floodplain Management	674	887	18%
Roanoke County, VA - Official Website - Stormwater Management	618	880	18%
Roanoke County, VA - Official Website - County Volunteer Opportunities	363	482	10%
Roanoke County, VA - Official Website - Stormwater Documents & Ordinances	328	461	9%
Roanoke County, VA - Official Website - Flood Warning System	180	206	4%
Roanoke County, VA - Official Website - Roanoke County Watersheds	151	174	3%
Roanoke County, VA - Official Website - Stormwater Public Education Documents	128	153	3%
Roanoke County, VA - Official Website - NPS Pollution	118	135	3%
Roanoke County, VA - Official Website - Community Rating System (CRS)	112	149	3%
Roanoke County, VA - Official Website - Stormwater MS4 Permit	102	220	4%
Roanoke County, VA - Official Website - Stormwater Resources	102	133	3%
Roanoke County, VA - Official Website - Property Protection	100	123	2%
Roanoke County, VA - Official Website - Flood Insurance	99	120	2%
TOTAL	3855	5005	100%

Permit Year	Webpage Views	Most Popular (MP) and Least Popular Page (LP)
(1) 2018 - 2019	3,855	MP: Flooding in Roanoke County LP: Flood Insurance

TMDL Consistency:

The County's stormwater webpage contains a broad range of public education materials, which address many topics, including ways to minimize sediment, bacteria, and PCBs in stormwater runoff. (EC, SED, PCBs).

Evaluation and Modification:

Roanoke County finds this BMP to be an effective way to provide the public with information about its Stormwater Management Program and to offer them a means by which they can provide input about the program, report illicit discharges, spills, and complaints about land-disturbing activities. No modifications are planned for this BMP.

BMP 1-7: Targeted Education Program

Goal:

The goal of this BMP is to implement an education program for specific public (target) audiences to raise their awareness about stormwater quality. This program will focus on three high-priority stormwater issues (i.e., stormwater pollution) that contribute to the degradation of local waters: excess bacteria, excess sediment, and excess nutrients.

The intention of the program is to inform the target audiences about (1) ways to prevent these pollutants from getting into stormwater runoff and (2) the hazards and legal implications of illegal discharges and the improper disposal of wastes.

The County selected the target audiences based on the likelihood that each of them could generate excess bacteria, sediment, and/or nutrients from their day-to-day activities. The educational materials and messages mailed to each of the target audiences are specific to their type of operation (such as car wash operations or kennel cleaning) to ensure the program is effective.

In accordance with Table 1 of Part 1 E 1 of the MS4 permit, the County selected various strategies to deliver the targeted materials and messages to the selected public audiences. These are outlined on the next several pages in Table 1-7A.

Responsible Party:

Department of Community Development.

Schedule:

Roanoke County has developed a list of public (target) audiences to receive specific messages on an annual basis about ways to reduce stormwater pollution in their day-to-day activities.

Measurable Goals:

The County documents which materials were provided to the various public audiences, including the size of each audience reached, and any impact indicators that show what effect the method had on behavior.

- The tables provided on the following pages summarize the activities conducted for this permit year:
 - Table 1-7A. Stormwater Education Program for Specific Audiences
 - Table 1-7B. Print Materials to Address Specific TMDLs
 - Table 1-7C. Program Materials and Targeted Audiences for BMP 1-7
 - Table 1-7D. Summary of Targeted Mailings and % Reach

Table 1-7A. Stormwater Education Program for Specific Audiences (eff. May 2019)

High-Priority Water Quality Issue	Target Audiences	Means to Determine Audience Size	Audience Size	Overall Messages	Means to Deliver Messages	Rationale
#1 SEDIMENT	Car Washing/Detail Facilities	Business Licenses/Yellow Pages	30	<ul style="list-style-type: none"> • All wash water to sanitary sewer. • Potential damage caused to streams by wash water. 	<ul style="list-style-type: none"> • Mailer, annually • PSAs on local cable station 	Commercial car wash facilities can contribute significant sediment if wash water is discharged into the County's MS4.
	Car Dealers	Business Licenses/Yellow Pages	33	<ul style="list-style-type: none"> • All wash water to sanitary sewer. • Potential damage caused to streams by wash water. 	<ul style="list-style-type: none"> • Mailer, annually • PSAs on local cable station 	Vehicle washing/detailing can contribute significant sediment if wash water is discharged into the County's MS4, which drains, untreated, to local streams. Residential car washing is specifically allowed; but, it still may contribute significant sediment if wash water is not properly handled.
	Auto Body Shops	Business Licenses/Yellow Pages	103	<ul style="list-style-type: none"> • All wash water to sanitary sewer. • Potential damage caused to streams by wash water. 	<ul style="list-style-type: none"> • Mailer, annually • PSAs on local cable station 	
	Homeowners	Tax Records	40,305	<ul style="list-style-type: none"> • Potential damage caused to streams by wash water. • Direct wash water to grass area for filtration and infiltration. • Never allow wash water to flow into street or storm drains. 	<ul style="list-style-type: none"> • County Publication sent annually to homeowners • PSAs on local cable station • Handouts at local environmental events, 4 per year minimum 	
	Contractors Involved in Land-Disturbing Activities	Community Development Permit Records and Yellow Pages	332	<ul style="list-style-type: none"> • Damage caused to streams by sediments. • Healthy fish populations require clear stream bottoms. • Silt fence is not enough. • Limit disturbed areas. • Stabilize as quickly as possible. 	<ul style="list-style-type: none"> • Brochure given to land-disturbance permittee when permit is issued. • Brochure given with enforcement actions 	Erosion and sediment control is required by regulations; however, more effective implementation may occur with additional education.

High-Priority Water Quality Issue	Target Audiences	Means to Determine Audience Size	Audience Size	Overall Messages	Means to Deliver Messages	Rationale
#2 BACTERIA	Restaurants	Business Licenses/ Yellow Pages	85	<ul style="list-style-type: none"> Excessive bacteria hinders stream usage and contributes to algae overgrowth, which hurts aquatic life. All wastewater to sanitary sewers. Keep exterior trash receptacles and dumpsters covered and do not wash out into storm drain. Clean kitchen hoods and floor mats; properly dispose of wastewater. 	<ul style="list-style-type: none"> Mailer, annually PSAs on local cable station 	Uncovered dumpsters containing garbage and dumpsters and greasy floor mats that are rinsed out onto the pavement can contribute bacteria to our MS4, which discharges directly to our streams.
	Pet Owners (dogs/cats)	Pet Licenses	6383 dogs; 276 cats	<ul style="list-style-type: none"> Excessive bacteria hinders stream usage. Dog waste ends up in streams. Pick up after your pet and properly dispose of waste. 	<ul style="list-style-type: none"> County Publication sent annually to Homeowners PSAs on local cable station 	Dog waste is a major source of bacteria in our streams.
	Veterinarian Offices	Business Licenses/ Yellow Pages	10	<ul style="list-style-type: none"> Excessive bacteria hinders stream usage. Dog waste ends up in streams. Pick up after your pet and properly dispose of waste. 	<ul style="list-style-type: none"> Brochures placed in Veterinarian offices, annually PSAs on local cable station 	Dog waste is a major source of bacteria in our streams.
	Pet Stores/Pet Boarding/ Grooming	Business Licenses/ Yellow Pages	25	<ul style="list-style-type: none"> Excessive bacteria hinders stream usage. Dog waste ends up in streams. Pick up after your pet and properly dispose of waste. 	<ul style="list-style-type: none"> Brochures placed in pet stores, annually PSAs on local cable station 	Dog waste is a major source of bacteria in our streams.
	County Police and Firemen; Animal Control Officer	County Records	2	<ul style="list-style-type: none"> Excessive bacteria hinders stream usage. Dog waste ends up in streams. Pick up after your pet and properly dispose of waste. 	<ul style="list-style-type: none"> In-house training 	Dog waste is a major source of bacteria in our streams; these County employees own or handle dogs as part of their work.

High-Priority Water Quality Issue	Target Audiences	Means to Determine Audience Size	Audience Size	Overall Messages	Means to Deliver Messages	Rationale
#3 NUTRIENTS	Homeowners	Tax Records/GIS	40,305	<ul style="list-style-type: none"> • How nutrients damage streams. • Do not over-fertilize. Use soil tests. • Keep fertilizer off of pavements. • Do not over-water lawns. 	<ul style="list-style-type: none"> • County Publication sent annually to Homeowners • PSAs on local cable station 	Excessive nutrients are carried off of lawns and other managed turf areas to the County's MS4 and then to local streams; this leads to algal overgrowth in the streams, which adversely impacts fish and other marine life.
	Nurseries/ Greenhouses	Business Licenses/ Yellow Pages	1	<ul style="list-style-type: none"> • How nutrients damage streams. • Do not over-fertilize. Use soil tests. • Keep fertilizer off of pavements. 	<ul style="list-style-type: none"> • Mailer, annually • PSAs on local cable station 	
	Lawn Care Services	Business Licenses/ Yellow Pages	152	<ul style="list-style-type: none"> • How nutrients damage streams. • Do not over-fertilize. Use soil tests. • Keep fertilizer off of pavements. • Encourage use of organic products. 	<ul style="list-style-type: none"> • Mailer, annually • PSAs on local cable station 	

Table 1-7B. Print Materials to Address Specific TMDLs*

Type	Name	TMDLS Addressed
Poster	"No, I am NOT the Poop Fairy"	Bacteria
	"Who Left the Dogs' Poop?"	Bacteria
	"Pups Poop, People Scoop. Do it."	Bacteria
	"Granny Says. . ."	Bacteria, Sediment, PCBs, and more
	"Clean Stormwater Makes for Happy Kids"	Bacteria, Sediment, PCBs, and more
	"Clean Stormwater: Wildlife Depend On It"	Bacteria, Sediment, PCBs, and more
	"Clean Stormwater: Happy Kids, Healthy Fish"	Bacteria, Sediment, PCBs, and more
Newsletter	"A Stormwater Guide for Homeowners" April 2019	Bacteria, Sediment, PCBs, and more
	"It's Just Dirt, A Newsletter for Contractors" May 2019	Sediment, PCBs, Minimum ESC Standards, and more
Brochure	"It's Just Dirt"	Sediment
	"Stormwater Best Management Practices for Proper Pet Waste Disposal"	Bacteria
	"Stormwater Best Management Practices for Restaurants"	Bacteria
	"Reduce, Reuse, Recycle and Properly Dispose of Hazardous Household Wastes"	Bacteria, Sediment, PCBs, and more
Fact Sheet	"Illicit Discharge Facts"	Bacteria, Sediment, PCBs, and more
	"Facts for Plumbers"	Bacteria, Sediment, PCBs, and more
	"Facts for Landscapers"	Sediment
	"Fall Foliage Facts"	Bacteria, Sediment, and more
	"Fact Sheet for Mosquito Control"	None - published as a Public Health issue
	"Tips for Homeowners - Stormwater Best Practices"	Bacteria, Sediment

■ New in 2018-2019

*All of these print materials are available on the County's website at <https://www.roanokecountyva.gov/1648/Stormwater-Public-Education-Documents>

Table 1-7C. Program Materials and Targeted Audiences for BMP 1-7

Target Audience	Product Type	Delivery Method	# of Recipients	Nature of Message
Restaurants	Letter and Brochure (RoCo only*)	Mailed	85	Stormwater Management BMPS for Restaurants; MS4 permit requirements
	Postcard	Mailed	85	Only rain down the storm drain; no solid or liquid waste; do not rinse out dumpsters.
Car Washes, Auto Repair Shops, New & Used Car Dealers, Auto Detailers, etc.	Postcard and Letter	Mailed	166	Wash water carries sediment, oil, and heavy metals to receiving waters
Vets, Groomers, Stables, Pet Daycare and Boarding, etc.	Letter, Brochure, and Poster (RoCo only*)	Mailed	37	Pet waste pollutes receiving streams; owners are encouraged to pick up after their pets.
Landscaping Professionals	Letter and Fact Sheet (RoCo only*)	Mailed	153	Grass/shrub clippings, leaves, sediment, fertilizers, etc. cause pollution to receiving waters; use BMPs to minimize lawn debris, reuse stormwater, install erosion controls, and employ alternative lawn care practices.
Violators of Illicit Discharge Ordinance	Letter, Fact Sheet(s), and ordinance	Mailed at time of violation	9	It is illegal to discharge anything into the MS4 system except for the allowable non-stormwater discharges listed in the permit.
Plumbers	Fact Sheet	Provided in Lobby	unknown	It is illegal to discharge anything into the MS4 system except for the allowable non-stormwater discharges listed in the permit.
Contractors involved in Land-disturbing activities	Brochure	Distributed with ESC Permits	298	"It's Just Dirt" brochure and newsletter describe the harm to receiving waters from excess sediment from construction sites, explains permit requirements, & provides techniques to "keep the dirt on the project."
	Newsletter	Mailed	322	
Residents	Brochure	Provided in Lobby	unknown	"Reduce, Reuse, Recycle and properly dispose of hazardous household wastes" brochure.
Residences	Newsletter	Mailed	40,305	MS4 Permit requirements; high-priority water quality issues; PCBs, reducing stormwater pollution at home, rainwater harvesting, illicit discharges

A list of County businesses that received the above-listed materials can be found on the attached compact disk under the folder titled **BMP 1-7**.

The County continued to use its previously-developed brochures, fact sheets, and posters to target certain audiences. The items were distributed, in most cases, directly to the targeted audiences and the percentages of the targeted audiences that were reached have been listed below in Table 1-7D.

Table 1-7D. Summary of Targeted Mailings and % Reach

Annual Period	Type of Educational Material	Target Group	# Sent /Total # in Target Group	% of Target Audience Reached
2018-2019 (YEAR 1)	Restaurant Postcard, Letter, and Brochure	Restaurants	85 / 85	100%
	Car Wash Postcard, Letter, and Brochure	Businesses with Car Washing	166 / 166	100%
	It's Just Dirt Newsletter	Land-disturbing Contractors	332 / 332	100%
	It's Just Dirt Brochure	Land-disturbing Contractors	298* / 332	~92.5%
	Stormwater Newsletter	Residences	40,305 / 40,305	100%
	Landscaping Fact Sheet	Professional Landscapers, Nurseries, Greenhouses	153 / 153	100%
	Pet Waste Poster, Letter, and Brochure	Veterinarians, Groomers, Stables, Pet Daycare, Pet Boarding, Animal Control, etc.	37 / 37	100%
	"Tips for Homeowners - Stormwater Best Practices"	Residential lots using individual stormwater control measures without maintenance agreements	23 / 23	100%

* Not all contractors obtain a land-disturbing permit in any given year; some contractors obtain multiple permits

In addition to all of the mailings listed above, the County developed a Pool Fact Sheet that is annually mailed to every pool-related business and every pool owner (1,580 total) within the County. Although the document does not address a specific TMDL, it is believed to be of value in helping to keep chemicals, such as chlorine and algaecide, out of the area's receiving waters.

The newest Clean Stormwater poster, entitled Clean Stormwater: Wildlife Depend On it" was included as the centerfold of the annual stormwater newsletter for homeowners, which was mailed to every residence in the County.

In previous Permit Year 4, Roanoke County developed its first annual newsletter specifically designed for land-disturbing contractors and developers. This year's version of the publication, entitled "*It's Just Dirt*," used a Clean Stormwater poster entitled "Happy Kids, Healthy Fish" as the centerfold, which featured "Stormwater Smart" practices for contractors. And, the newsletter included articles about:

- Using effective erosion controls and maintaining them to "keep the dirt out of the creek."
- Recent Stormwater Clean Award recipients; these were contractors who demonstrated excellence in stormwater management and erosion and sediment control on their projects
- Understanding MS-2: Hauling Dirt Offsite - a look at permitting requirements

- Employing the 19 Minimum Standards for Erosion and Sediment Control per the Virginia Erosion & Sediment Control regulations (VESCR).

This newsletter was mailed to every land-disturbing contractor and land developer in the County's database, and also to the Roanoke Regional Home Builders Association. It is posted on the County's website, as follows:

<https://www.roanokecountyva.gov/1648/Stormwater-Public-Education-Documents>

TMDL Consistency:

The Contractor newsletter is primarily focused on keeping dirt from construction sites out of the river. The car wash postcard targets local businesses that may have uncontrolled discharges from vehicle washing operations, which could increase sediment discharges into local receiving waters. Therefore, these documents address the TMDL for sediment (SED). Similarly, the restaurant postcard addresses rinsing of kitchen equipment and accessories, which may contribute bacteria to receiving waters. The "Who Left the Poop" poster focuses on bagging pet waste and placing it in the trash. Thus, these documents help address the County's TMDL for bacteria (EC). The Stormwater newsletter for residents and "PCBs Fact Sheet" both help address the County's TMDL for PCBs. Other materials previously developed by the County also address the TMDLs, as shown in Table 1-7B.

Evaluation and Modification:

The County finds this BMP to be effective in raising the awareness of specific public (target) audiences regarding how their day-to-day activities may affect stormwater quality. No modifications are planned for this BMP.



MCM-2: Public Involvement and Participation

This minimum control measure (MCM) is intended to provide a means for the public to be involved with and participate in the County's Stormwater Program in an effort to improve water quality and support local restoration and clean-up projects.

The County has developed the following Best Management Practices (BMPs) to meet these program goals:

BMP 2-1: Storm Drain Stenciling Program

The County will implement a storm drain inlet stenciling program, which is designed to engage citizens and educate the public about the consequences of dumping waste into the storm drainage system.

BMP 2-2: Stormwater Public Events

The County will participate in and/or conduct at least 4 public events per year (in two different categories, as listed in Table 2 in the MS4 Permit) to bring attention to current stormwater pollution issues.

BMP 2-3: MS4 Program and Stormwater Pollution Prevention Website

Roanoke County will maintain a webpage that is dedicated to the MS4 Program and Stormwater Pollution Prevention. This webpage will contain the effective MS4 permit and coverage letter, the most current MS4 Program Plan, the Annual Report for each permit year covered by the current permit, and a mechanism for the public to report (i) potential illicit discharges, improper disposal, or spills to the MS4, (ii) complaints regarding land disturbing activities, or (iii) other potential stormwater pollution concerns. It will also include the methods for how the public can provide input on the Roanoke County's MS4 program

BMP 2-4: Household Hazardous Waste Event

Roanoke County will participate in Household Hazardous Waste Collection events to help citizens dispose of household materials that could be hazardous to dispose of in landfills.

This report provides a detailed description of the goals of each BMP, the status of the County's compliance with each BMP, and an evaluation of the BMP and any proposed modifications needed to better achieve the overall MS4 Program goals. In addition, the strategies to ensure consistency with local TMDLs are also provided, and they are broken down by impairment type: *Escherichia coli* (*E. coli*) bacteria (EC), sediment (SED), or Polychlorinated biphenyls (PCBs).

BMP 2-1: Storm Drain Stenciling Program

Goal:

The goal of this BMP is to coordinate a storm drain inlet stenciling program through the Clean Valley Council. This effort will be coordinated with interested parties from local schools, neighborhoods, businesses, and other groups to stencil messages on storm drain inlets in an effort to educate people about the consequences of dumping waste into the storm drainage system.

Responsible Party: Roanoke County's Department of Community Development, through the Clean Valley Council.

Schedule:

The County coordinates its storm drain stenciling program through the CVC. A minimum of 50 storm drain inlets will be stenciled per year with messages designed to raise public awareness about stormwater pollution. The County will document the number and location of the inlets that are stenciled in each permit year.

Measurable Goals:

The County will document the number of storm drains stenciled, the number of participants, and the groups that participated. Using these numbers as indicators, the County will evaluate the effectiveness of this BMP and make adjustments to annually increase attendance.

For event dates, locations, number of participants and names of groups participating, see the attached compact disk under the folder titled **BMP 2-1**.



Permit Year	# of Storm Drain Inlets Stenciled	# of Participants
(1) 2018 - 2019	60	19

TMDL Consistency:

The storm drain stenciling program is an outreach method to inform and remind citizens that what enters storm drainage structures goes directly to local creeks and streams via underground piping. Roanoke County believes that when citizens understand that stormwater receives no treatment before being discharged to area waterways, unlike sanitary waste which goes to a wastewater treatment plant before discharge, they will be more likely to refrain from allowing their pet waste, yard clippings, and other non-stormwater debris/waste to enter the storm drain system through roadside drainage inlets. (EC)

Evaluation and Modification:

The County finds this BMP to be an effective method to educate the public about the consequences of dumping waste into the storm drainage system. No modifications are planned for this BMP.

BMP 2-2: Stormwater Public Events

Goal:

The goal of this BMP is to engage citizens in various public events to raise awareness about ways to improve water quality and to support local restoration and clean-up projects. To that end, Roanoke County will participate in and/or conduct at least 4 public events per year (in two different categories, as listed in Table 2 in the MS4 Permit) to bring attention to current stormwater pollution issues.



Responsible Party:

The County's Department of Community Development, in conjunction with Clean Valley Council, Roanoke Valley Resource Authority (RVRA), and the County's Department of Parks Recreation and Tourism (PRT).

Schedule:

The County annually participates in and/or conducts at least four of the following events in at least two of the categories to engage the public and raise awareness about stormwater pollution issues.

Public Event	Responsible Party	Category (per MS4 Permit)	Metric
Clean Valley Day (stream and watershed clean-up)	CVC	Restoration	Weight of trash collected; number of participants
Go Fest (booth, stream school)	CVC	Educational; Monitoring	Number of participants/students
Household hazardous waste collection (see BMP 2-4)	RVRA	Disposal or Collection	Weight of waste collected; number of participants
Storm drain stenciling program (see BMP 2-1)	CVC	Pollution Prevention	Number and location of storm drains stenciled; number of participants
Implementation of pet waste stations in parks and along greenways (see BMP T7 in Roanoke County's Bacteria TMDL Action Plan)	PRT	Pollution Prevention	Number and location of pet waste stations installed/maintained
Stormwater education program for Roanoke County's schoolchildren to meet applicable SOLs	CVC	Educational	Number of programs provided; number of children taught
Stream monitoring and informational stream seminars	CVC	Monitoring	Number of stream schools given; number of participating students

Measurable Goals:

The County will document the details of the events, the number of County or CVC participants, and the number of people in attendance (where applicable). Success for this BMP will be measured by the completion of at least four of the listed events and fulfillment of their corresponding metrics.

- On behalf of Roanoke County and neighboring localities, the Clean Valley Council was active in 8 regional events during the permit year, which involved **43,051** people. During these events, Clean Valley Council staff distributed a variety of materials with stormwater-related messages and addressed questions and comments about

stormwater and water quality. Information highlighted at the booths included the benefits of stream buffers, the differences between storm and sanitary sewers, and the importance of pet waste pick up and disposal. Attendance and types of materials distributed are documented in the folder titled **BMP 2-2** on the attached CD.

- Fall Waterways Cleanup
 - Go Fest (booth, stream school)
 - Earth Summit
 - Clean Valley Day Clean-up
 - Salem Riverfest
 - Grandin Earth day
 - Party for the Planet with Mill Iron Zoo
 - Riverfest
- Roanoke County's Department of Parks, Recreation, and Tourism (PRT) received matching grant funds through the Virginia Trees for Clean Water program, through the Roanoke Valley-Alleghany Regional Commission. PRT used these funds to purchase four trees that were planted at Clearbrook Elementary School for an Arbor Day celebration, held on Friday, April 12, 2019. The Roanoke County Board of Supervisors recognized National Arbor Day by encouraging citizens to plant a tree in their community. Public outreach included the Arbor Day program with the school system, Roanoke Valley Television, and social media. The grant reimbursement packet is attached for reference on the attached compact disk under the folder titled **BMP 2-2**.



Four new trees were planted during the Arbor Day celebration at Clearbrook Elementary School, held on April 12, 2019.



Arbor Day celebration - Clearbrook Elementary School, April 12, 2019

- Roanoke County's Department of Parks, Recreation, and Tourism (PRT) also hosted 16 river cleanups involving the following parks:
 - Brookside Park
 - Explore Park
 - Vinyard Park
 - Goode Park
 - Green Hill Park
 - Garst Mill Park

Volunteers came from the following groups:

- Roanoke Mountain Adventures (1 volunteer, 1 hour)
- Progressive Insurance (26 volunteers, 78 hours)
- Reyna Vazques-Miller (12 volunteers, 36 hours)
- Colonial Avenue Baptist Church (5 volunteers, 12 hours)
- Community School (14 volunteers, 42 hours)
- Friends of Mud Lick Creek (15 volunteers, 56 hours)
- Orvis (20 volunteers, 58 hours)
- United Healthcare (43 volunteers, 167 hours)
- Trout Unlimited (17 volunteers, 61 hours)
- Maria Tate (3 volunteers, 12 hours)
- Hidden Valley Middle School (6 volunteers, 52 hours)
- Martin Lucas (1 volunteer, 1 hour)
- Roanoke County Volunteer Day-2 dates (144 volunteers, 432 hours)
- Roanoke Valley Christian (24 volunteers, 72 hours)
- Advance Auto (32 volunteers, 64 hours)

Totals: Groups (15), Volunteers (363), Volunteer Hours (1,144)

Permit Year	Public Event(s)	# of Participants
(1) 2018 - 2019	8 Regional (CVC) + 16 River clean-ups; 1 Tree Planting event	43,051 - CVC events; 363 - River Cleanups; Unknown attendance at Tree Planting event

TMDL Consistency:

Since they are key regional water quality issues, pet waste and soil erosion are common issues discussed at the aforementioned events in which CVC participated, (EC & SED). In addition, the tree planting events focus on the value of stream buffers for protecting water quality, through their pollution-filtering capabilities (EC & SED) and for maintaining wildlife habitat.

Evaluation and Modification:

Based upon the attendance at these public events, Roanoke County finds this BMP to be an effective method of allowing the citizens to inquire about issues and have hands-on involvement in projects that help to improve water quality. Also, they provide the County with an opportunity to receive public input and also to disseminate pertinent stormwater-related information. No changes to this BMP are proposed at this time.

BMP 2-3: MS4 Program and Stormwater Pollution Prevention Website

Goal:

Roanoke County will maintain a webpage that is dedicated to the MS4 Program and to Stormwater Pollution Prevention. This website will contain the effective MS4 permit and coverage letter, the most current MS4 Program Plan, the Annual Report for each permit year covered by the current permit, and a mechanism for the public to report (i) potential illicit discharges, improper disposal, or spills to the MS4, (ii) complaints regarding land disturbing activities, or (iii) other potential stormwater pollution concerns. It will also include the methods for how the public can provide input on Roanoke County's MS4 program.

Responsible Party:

The Department of Community Development, with support from Roanoke County's webmaster.

Schedule:

Roanoke County maintains a webpage that is dedicated to its MS4 Program and Stormwater Pollution Prevention topics. The page can be accessed by clicking on this link:

<https://www.roanokecountyva.gov/1755/Stormwater-MS4-Permit>

The annual report for each year of the current permit's term will be posted to this webpage no later than 30 days after it has been submitted to DEQ.

Measurable Goals:

Success for this BMP will be measured by the successful posting of the MS4 permit, the corresponding permit coverage letter, the MS4 Program Plan, and the MS4 Annual Report (the latter of which will be posted within 30 days following its submittal to DEQ), along with a mechanism for the public to report its stormwater-related concerns and the methods by which the public can provide input on Roanoke County's MS4 program.

TMDL Consistency:

Access to the MS4 Program documents and stormwater management information gives Roanoke County citizens a means to familiarize themselves with the issues concerning the County's streams and rivers, the associated impairments, and any approved TMDLs. In addition, the program documents detail the County's efforts to address these issues.

This BMP helps to inform citizens on ways to get involved with current water quality issues and to make them aware of available outreach programs, both with the goal of helping citizens minimize any impacts that they may have on local water quality. (EC, SED, & PCBs)

Evaluation and Modification:

Roanoke County believes that posting the MS4 program-related documents on its Stormwater Website is an effective way to allow interested citizens to become more familiar with the County's stormwater program and to provide them with a means to make comments and become involved. No modifications are planned for this BMP.

BMP 2-4: Household Hazardous Waste Event

Goal:

The goal of this BMP is to provide citizens with an opportunity to dispose of their potentially-hazardous household materials in an environmentally-friendly manner; this will avoid having such products end up in local landfills.

Responsible Party:

The Department of Community Development, through the Roanoke Valley Resource Authority (RVRA).

Schedule:

Roanoke County will participate in at least one Household Hazardous Waste (HHW) Collection event each year. For each event, the County will document the number of attendees and the total weight of the collected waste.

Measurable Goals:

Success for this BMP will be measured by the continued participation in Household Hazardous Waste Collection Events.



- Regional statistics for the HHW Events for this permit year can be found on the attached compact disk under the folder titled **BMP 2-4**.

Permit Year	HHW Events	Attendance*
(1) 2018 - 2019	12	481

- In addition to the HHW Events, the Western Virginia Water Authority held one Rx Take-Back event in the Roanoke Valley region during this permit year, collecting a total of **1,966.3 pounds** of medication. Since September 25, 2010, a total of 17 events have been held for a grand total of 35,102 pounds of medication collected. Participating localities included: Roanoke County, City of Roanoke, Franklin County, Craig County, Botetourt County, City of Salem, and Town of Vinton. The totals by site are included on the attached compact disk in the folder titled **BMP 2-4**.

TMDL Consistency:

Currently, there is no known direct benefit that this BMP will have on any of the TMDL waste load allocations. However, it should have a beneficial effect on stream water quality by keeping these products out of local receiving waters. (EC, SED, & PCBs)

Evaluation and Modification:

Participation in the Household Hazardous Waste events has become popular with citizens. Roanoke County understands that these events are an important way to keep these hazardous wastes from being disposed of in an inappropriate fashion and, therefore, the County does not have any plans to modify this BMP.



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

The goal of this minimum control measure is to develop, implement, and enforce a program to detect and eliminate illicit discharges to the storm sewer system. The BMPs that have been established to complete this measure are listed below:

BMP 3-1: Municipal Separate Storm Sewer System (MS4) Map

The County maintains a map in its GIS network for all known locations of its municipal separate storm sewer system (MS4). This database will be maintained so that a map of all the public storm sewers in the County will be available to the public.

BMP 3-2: Illicit Discharge Ordinance

Roanoke County's Illicit Discharge Ordinance has been adopted and will be maintained to provide authority to address illicit discharges. It includes language prohibiting non-stormwater discharges into the storm drainage [MS4] system.

BMP 3-3: Illicit Discharge Detection and Elimination Program

Roanoke County maintains written procedures and implements a program to detect, identify, and address non-stormwater discharges and illegal dumping into its MS4.

BMP 3-4: Dry Weather Screening

Roanoke County implements a program to annually inspect at least 50 storm drain outfalls within its MS4 area in search of unauthorized discharges.

This report provides a detailed description of the goals of each BMP, the status of the County's compliance with each BMP, and an evaluation of the BMP and any proposed modifications needed to better achieve the overall MS4 Program goals. In addition, the strategies to ensure consistency with local TMDLs are also provided, and they are broken down by impairment type: *Escherichia coli* (*E. coli*) bacteria (EC), sediment (SED), or Polychlorinated biphenyls (PCBs).

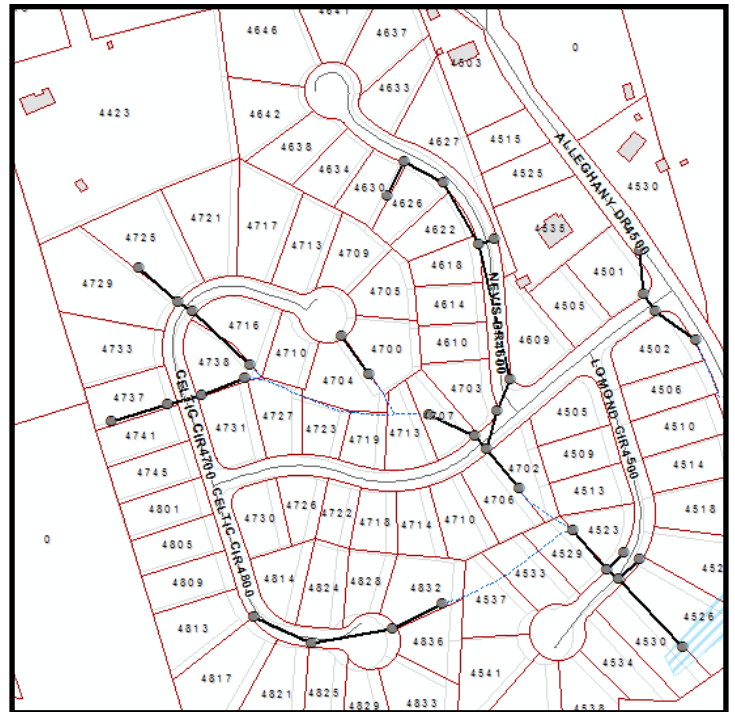
BMP 3-1: Municipal Separate Storm Sewer System (MS4) Map

Goal:

The goal of this program is to develop and maintain an accurate MS4 map (with corresponding information table), which shows the storm sewer system that is owned or operated by the County within the Census Urbanized Area identified by the 2010 decennial census.

The MS4 map shall include the location of MS4 outfalls that discharge to surface waters, a unique identifier for each mapped item, the name and location of receiving waters to which the MS4 outfall (or point of discharge) discharges, the MS4 regulated service area, and all stormwater management facilities owned or operated by Roanoke County.

The information table associated with the MS4 map shall include the following information for each outfall or point of discharge for those cases in which Roanoke County elects to map the known point of discharge:



- a) A unique identifier as specified on the storm sewer system map;
- b) The latitude and longitude of the outfall or point of discharge;
- c) The estimated regulated acreage draining to the outfall or point of discharge;
- d) The name of the receiving water;
- e) The 6th Order Hydrologic Unit Code of the receiving water;
- f) An indication as to whether the receiving water is listed as impaired in the Virginia 2016 305(b)/303(d) Water Quality Assessment Integrated Report;
- g) The predominant land use for each outfall discharging to an impaired water; and
- h) The name of any EPA-approved TMDLs for which the Roanoke County is assigned a wasteload allocation.

Responsible Party:

The Department of Community Development, with assistance from the Department of Communications/Information Technology.

Schedule:

Roanoke County maintains an accurate MS4 map and will annually update it no later than October 1 of each year. The County's updates to the storm sewer system map and outfall information table will include any new outfalls constructed or TMDLs approved, or both, during the immediate preceding reporting period.

Roanoke County will provide written notification to any downstream adjacent MS4 of any known physical interconnection established or discovered after the effective date of the current permit.

Measurable Goals:

Success for this BMP will be measured by demonstrating that the County has updated its MS4 map and outfall information table to include any new outfalls constructed or TMDLs approved or both during the immediate preceding reporting period.

- For this reporting year, the County confirms that the MS4 map and information table were updated to reflect any changes to the MS4 occurring on or before June 30, 2019. In addition, the County sent letters to the regulated MS4s to which its MS4 system is physically-interconnected.
 - The MS4 map and the letters are in the MS4 Program Plan and can be accessed on the website at <https://www.roanokecountyva.gov/DocumentCenter/Index/1538>.

TMDL Consistency:

An updated and accurate storm drainage map identifying all of the municipal separate storm sewers and their components aids Roanoke County in the discovery of illicit connections and the locations where sediment and other pollutants may be entering the regulated MS4. (SED, EC, and PCBs)

Evaluation and Modification:

Roanoke County believes that the process of mapping the storm drainage system is an appropriate method to aid in the enforcement, detection, and elimination of illicit discharges to the system. No modifications are planned for this BMP.

BMP 3-2: Illicit Discharge Ordinance

Goal:

The goal of this BMP is to adopt regulations that prohibit illicit discharges into the County's Municipal Separate Storm Sewer System and that also provide the County with an enforcement mechanism.

Responsible Party:

The Department of Community Development, in cooperation with the County Attorney.

Schedule and Evaluation:

Roanoke County's Illicit Discharge Ordinance was adopted on April 22, 2014; it is compliant with Virginia's stormwater regulations. Enforcement measures and penalties are included in the Illicit Discharge Ordinance. The County will update the ordinance, as necessary, to maintain the effectiveness of the program.

Measurable Goals:

Success of this BMP will be measured by the continued compliance of the County's Illicit Discharge Ordinance with the MS4 General Permit.

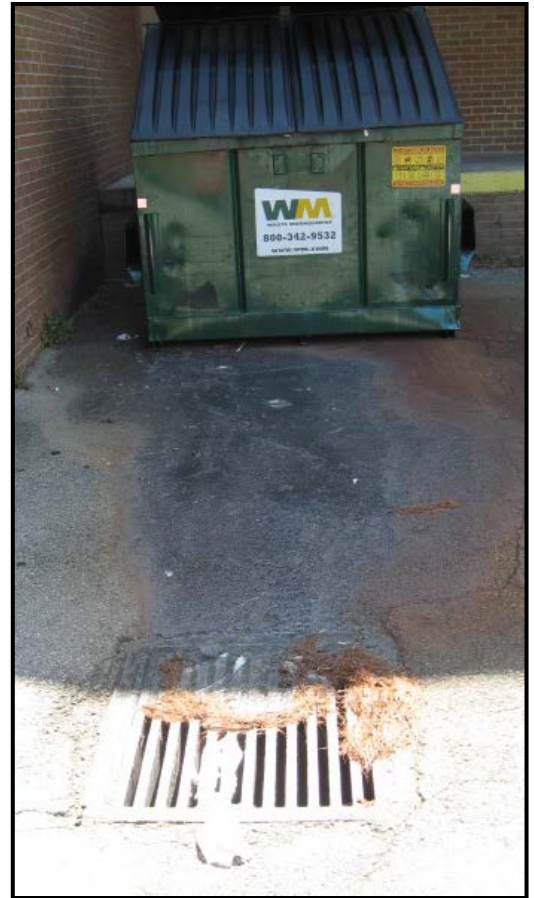
- The County's Illicit Discharge Ordinance is available on the stormwater website at:
<https://www.roanokecountyva.gov/DocumentCenter/View/5469/Illicit-Discharge-Ordinance-Eff-July-1?bidId=>

TMDL Consistency:

An Illicit Discharge Ordinance aids in the enforcement of illicit discharges to the MS4 system. This legal mechanism aids the County in eliminating illicit connections and discouraging a variety of illicit discharges to the MS4 system. (EC, SED, & PCBs)

Evaluation and Modification:

Roanoke County finds that the Illicit Discharge Ordinance is an effective tool for use in dissuading its citizens from illegally discharging into the MS4. No modifications are planned for this BMP.



BMP 3-3: Illicit Discharge Detection and Elimination Program

Goal:

The goal of this BMP is to detect, identify, and eliminate non-stormwater discharges and illegal dumping into the County's MS4. As part of this effort, the County will maintain written procedures that include:

- 1) A description of the legal authorities, policies, standard operating procedures or other legal mechanisms available to Roanoke County to eliminate identified sources of ongoing illicit discharges including procedures for using legal enforcement authorities.
- 2) A timeframe upon which to conduct an investigation to identify and locate the source of any observed unauthorized non-stormwater discharge. Priority of investigations shall be given to discharges of sanitary sewage and those believed to be a risk to human health and public safety. Per the MS4 permit, discharges authorized under a separate VPDES or state permit require no further action.
- 3) Methodologies to determine the source of all illicit discharges. If Roanoke County is unable to identify the source of an illicit discharge within six months of beginning the investigation, then staff will document that the source remains unidentified. If the observed discharge is intermittent, staff will document that attempts to observe the discharge flowing were unsuccessful.
- 4) Methodologies for conducting a follow-up investigation for illicit discharges that are continuous or that Roanoke County expects to occur more frequently than a one-time discharge to verify that the discharge has been eliminated except as provided for in Part I E 3 c (4);
- 5) A mechanism to track all illicit discharge investigations to document the following:
 - o The dates that the illicit discharge was initially observed, reported, or both;
 - o The results of the investigation, including the source, if identified;
 - o Any follow-up to the investigation;
 - o Resolution of the investigation; and
 - o The date that the investigation was closed.

Responsible Party:

The Department of Community Development.

Schedule:

Roanoke County maintains written procedures for and implements an investigation program to respond to potential illicit discharges into its MS4. The County will update its procedures, as necessary, to maintain the effectiveness of the program.

Measurable Goals:

Success for this BMP will be measured by compliance with written procedures and documentation of the complaints received/investigated and closed. The documentation includes the following information:

- A list of illicit discharges to the MS4 including spills reaching the MS4 with information as follows:
 - The source of illicit discharge.
 - The dates that the discharge was observed, reported, or both.
 - Whether the discharge was discovered by Roanoke County during dry weather screening, reported by the public, or other method (describe).
 - How the investigation was resolved.
 - A description of any follow-up activities.
 - The date the investigation was closed.

A summary of the investigations, including the required information above, is provided on the attached compact disk under the folder titled **BMP 3-3**.

Permit Year	# of Illicit Discharge Complaints Received/Investigated	# of Closed Investigations
(1) 2018 - 2019	10	10

TMDL Consistency:

Identifying and eliminating illicit discharges to the MS4 system helps to minimize the entry of pollutants into local receiving waters. (EC, SED, & PCBs)

Evaluation and Modification:

The County believes that this BMP provides a valuable strategy to identify potential illicit discharges into its MS4 system. No modifications are planned for this BMP.

BMP 3-4: Dry Weather Screening

Goal:

The goal of this BMP is to inspect storm drain outfalls to detect illicit discharges during dry weather (i.e., when the storm drainage system would normally be dry) so that actions may be taken to eliminate them.

The County maintains dry weather field screening protocols to detect, identify, and eliminate illicit discharges to the MS4. The protocol includes:

- a) A prioritized schedule of field screening activities and rationale for prioritization determined by Roanoke County based on such criteria as age of the infrastructure, land use, historical illegal discharges, dumping or cross connections.
- b) A schedule to annually screen (inspect) 50 outfalls
- c) A mechanism to track the following information:
 - The unique outfall identifier;
 - Time since the last precipitation event;
 - The estimated quantity of the last precipitation event;
 - Site descriptions (e.g., conveyance type and dominant watershed land uses);
 - Whether or not a discharge was observed; and
 - If a discharge was observed, the estimated discharge rate (e.g., width and depth of discharge flow rate) and visual characteristics of the discharge (e.g., odor, color, clarity, floatables, deposits or stains, vegetation condition, structural condition, and biology).

Responsible Party:

The Department of Community Development.

Schedule:

Roanoke County implements an annual outfall inspection program to detect and locate the source of dry weather illicit discharges that enter its MS4.

Measurable Goals:

Success for this BMP is measured by field screening a minimum of 50 outfalls per year and documenting the results of these inspections.

- For this permit year, Roanoke County selected 61 outfalls for inspection, using the following criteria, in descending order:
 - In the MS4 area
 - Drains to an impaired waterway
 - Within 1/10th of a mile from the nearest receiving water

The results of these inspections follow, and a detailed summary of the inspections can be found on the attached compact disk under the folder titled **BMP 3-4:**

Permit Year	# Outfalls Inspected	# of Illicit Discharges Found
(1) 2018 - 2019	61	0

TMDL Consistency:

Dry Weather Screening of outfalls aids in the location, identification, and elimination of illicit discharges to the MS4. This method provides staff with the methodology needed to screen, target, and monitor the storm drain system in an effort to discover existing illegal discharges and illegal connections to the MS4. (EC, SED, & PCBs)

Evaluation and Modification:

Roanoke County believes that Dry Weather Screening is a critical component in the detection and elimination of illicit discharges and illicit connections to its storm sewer system. Roanoke County will continue inspecting outfalls. No modifications are planned for this BMP.



MCM-4: Construction Site Stormwater Runoff Control

The goal of this minimum control measure is to reduce pollutants that may enter the MS4 via stormwater runoff from construction activities. To accomplish this, the County implements the Virginia Erosion and Sediment Control (VESC) Program and the Virginia Stormwater Management Program (VSMP). The BMPs that will be used to satisfy this MCM are listed below:

BMP 4-1: Legal Authorities

Roanoke County utilizes certain legal authorities to comply with Virginia's Erosion and Sediment Control Program and its Stormwater Management Program in an effort to reduce pollutants that may enter its MS4 via stormwater runoff from construction activities.

BMP 4-2: Plan Review

The County maintains and implements written procedures to ensure the proper implementation of controls for erosion and sediment and stormwater management to reduce pollutants that may enter its MS4 via stormwater runoff from construction activities.

BMP 4-3: Site Inspections

The County maintains and implements written inspection procedures to ensure that controls for erosion and sediment and stormwater management are properly implemented and that all associated documents are utilized during inspection, including the inspection schedule.

BMP 4-4: Compliance and Enforcement

The County maintains and implements written procedures for compliance and enforcement regarding construction site stormwater runoff requirements.

BMP 4-5: Responsible Land Disturber Certification

Roanoke County employees who oversee the performance of regulated land disturbance activities conducted by the County are DEQ-certified as Responsible Land Disturbors in accordance with the VESC Program.

This report provides a detailed description of the goals of each BMP, the status of the County's compliance with each BMP, and an evaluation of the BMP and any proposed modifications needed to better achieve the overall MS4 Program goals. In addition, the strategies to ensure consistency with local TMDLs are also provided, and they are broken down by impairment type: *Escherichia coli* (*E. coli*) bacteria (EC), sediment (SED), or Polychlorinated biphenyls (PCBs).

BMP 4-1: Legal Authorities

Goal:

The goal of this BMP is to maintain and use certain legal authorities to comply with Virginia's Erosion and Sediment Control Program and the Virginia Stormwater Management Program (VSMP). The County uses the following legal authorities:

- **Erosion and Sediment Control (ESC) Ordinance #022316-7:** adopted on Feb. 23, 2016; its purpose is to reduce pollutants in stormwater runoff from construction activities in an effort to keep such pollutants from entering the County's MS4.

This ordinance requires ESC controls for all regulated land disturbances of 2,500 square feet or more and an engineered ESC Plan for any land disturbance greater than 10,000 square feet. The ESC Plan must provide for the implementation of appropriate erosion and sediment controls, to include their proper placement, design, and maintenance requirements. The ordinance includes site inspection and compliance/enforcement procedures for erosion and sediment control.

- **Erosion and Sediment Control (ESC) Permit** - authorizes commencement of land disturbing activities for which an approved ESC Plan or Agreement-in-lieu-of an ESC Plan have been approved by the County.
- **Agreement-in-lieu-of an Erosion and Sediment Control Plan** - requires compliance with the minimum control measures, as listed in the Virginia Erosion and Sediment Control Regulations (9VAC25-840), for projects that disturb less than 10,000 square feet.
- **Stormwater Management Ordinance #042214-12**, adopted on April 22, 2014; its purpose is to protect property, state waters, stream channels, and other natural resources from the potential harm of unmanaged stormwater, and to establish requirements whereby stormwater is managed to protect water quality and downstream property owners.
- **Virginia Stormwater Management Program (VSMP) Permit** - issued by the County for projects that will cause one acre or more of land disturbance, and for which there is a County-approved stormwater management plan.
- **Agreement-in-lieu-of a Stormwater Management Plan** - requires compliance with certain stormwater management control strategies and is only applicable for the construction of single family homes.
- **VSMP Approval Letter from the Virginia DEQ** - provides Roanoke County with coverage under the General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems General Permit Number VAR040022.
- **Letter from DEQ Approving Alternative Inspection Program (ESC)** - authorizes Roanoke County to conduct an alternative inspection program for ESC.
- **Stormwater Management Design Manual** - provides design guidelines for regulated land-disturbing projects to ensure their compliance with the VSMP requirements.

Responsible Party:

- The Department of Community Development implements the County's Erosion and Sediment Control and Stormwater Management programs, which includes conducting plan reviews, site inspections, compliance/enforcement activities, and project permitting.
- The County Attorney's office provides support to the Department of Community Development during compliance/enforcement actions, as necessary.

Schedule:

Roanoke County implements an ESC ordinance to comply with the Virginia's Erosion and Sediment Control Law and Regulations and a SWM Ordinance to comply with the VSMP. The County will update the ordinances and supporting documents, as needed, to remain consistent with both programs.

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the ESC and SWM ordinances, coordinating updates to the supporting documents, and the continued compliance of the ordinances with Virginia's ESC and VSMP programs.

- The aforementioned documents are in the MS4 Program Plan and can be accessed on the County's website at <https://www.roanokecountyva.gov/DocumentCenter/Index/1538>

TMDL Consistency:

The ESC and VSMP ordinances target the reduction of sediment and other pollutants in stormwater runoff from construction sites. Both ordinances require the installation of onsite control measures to ensure compliance under local law. (SED)

Evaluation and Modification:

Roanoke County believes that the ESC and VSMP ordinances are critical components to aid in reducing sediment and other pollutants carried by stormwater runoff from construction activities into its MS4. No modifications are planned for this BMP.

BMP 4-2: Plan Review

Goal:

The goal of this BMP is to maintain and implement written procedures to address the proper implementation of erosion and sediment controls and stormwater management controls to address construction site stormwater runoff.

Responsible Party:

The Department of Community Development.

Schedule:

Roanoke County maintains and implements ESC and VSMP procedures to comply with Virginia's Erosion and Sediment Control Program and the Virginia Stormwater Management Program. The County will update these procedures and supporting documents, as necessary, to remain consistent with both programs.

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the written procedures and supporting documents and the number of plans approved.

- Roanoke County finds its land development procedures and other supporting documents to be effective at this time. No changes are currently proposed.

Permit Year	# of ESC Plan Reviews	# of VSMP Plan Reviews	# of Agreement-in-lieu-of ESC Plans	# of Agreement-in-lieu-of SWM Plans
(1) 2018 - 2019	10 SFR 0 TOV; 10 RoCo 27 Commercial 2 TOV; 25 RoCo	1 FR 0 TOV; 1 RoCo 27 Commercial 2 TOV; 25 RoCo	162 SFR 6 TOV; 156 RoCo, 35 Commercial 1 TOV; 34 RoCo	23 SFR 1 TOV; 22 RoCo

TOV = Town of Vinton RoCo = Roanoke County

TMDL Consistency:

Conducting plan reviews for ESC and VSMP compliance helps to ensure that active construction projects minimize sediment and other pollutants in their stormwater runoff. Both ordinances require the installation of onsite control measures to ensure compliance under local law. (SED)

Evaluation and Modification:

Roanoke County believes that ESC and VSMP plan reviews are critical components to aid in reducing sediment and other pollutants carried by stormwater runoff from construction activities into its MS4. No modifications are planned for this BMP.

BMP 4-3: Site Inspections

Goal:

The goal of this BMP is to maintain and implement written inspection procedures to address the proper installation and maintenance of erosion and sediment controls and stormwater management techniques used on active, regulated land-disturbing projects and to ensure that all associated documents are utilized during inspection, including the inspection schedule.

Responsible Party:

The Department of Community Development.



Schedule:

Roanoke County maintains and implements ESC and VSMP site inspection procedures to comply with Virginia's Erosion and Sediment Control Program and Virginia's Stormwater Management Program. The County will update these procedures and supporting documents, as necessary, to remain consistent with both programs, as they relate to construction site stormwater runoff. In addition, ESC inspections will be conducted in accordance with the County's Alternate Inspection Schedule, as approved by DEQ.

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the written ESC/VSMP site inspection procedures and the number of inspections conducted.

- Roanoke County finds its written ESC/VSMP site inspection procedures and other supporting documents to be effective at this time. No changes are currently proposed.

Permit Year	Total # of ESC Inspections	Total # of VSMP Inspections
(1) 2018 - 2019	1662 SFR 24 TOV; 1638 RoCo,	4 SFR 0 TOV; 4 RoCo,
	989 Commercial 19 TOV; 970 RoCo	90 Commercial 0 TOV; 90 RoCo

TOV = Town of Vinton RoCo = Roanoke County

TMDL Consistency:

Conducting ESC and VSMP site inspections of construction activities helps to ensure that the required controls, as shown on the approved plan, are implemented and properly maintained in the field; such controls help reduce sediment in stormwater runoff from construction sites. (SED)

Evaluation and Modification:

Roanoke County believes that conducting ESC and VSMP site inspections against written procedures and approved plans helps to reduce sediment and pollutants in stormwater runoff during land-disturbing activities. No modifications are planned for this BMP.

BMP 4-4: Compliance and Enforcement

Goal:

The goal of this BMP is to maintain and implement written procedures for achieving compliance on active construction sites through corrective action or enforcement action to the extent allowable under federal, state, or local law, regulation, ordinance, or other legal mechanisms.

Responsible Party:

- The Department of Community Development has the overall responsibility to implement the County's ESC program and VSMP, which includes conducting plan reviews, site inspections, compliance/enforcement activities, and project permitting.
- The County Attorney's office provides support to the Department of Community Development during compliance/enforcement actions, as necessary.

Schedule:

Roanoke County implements compliance and enforcement procedures to strive for compliance with its ESC program and VSMP on active construction sites. The County will revise its written enforcement procedures, as needed.

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the erosion and sediment control and VSMP compliance/enforcement procedures and documentation of the total number and type of enforcement actions implemented.

- Roanoke County finds its written ESC/VSMP compliance and enforcement procedures and other supporting documents to be effective at this time. No changes are currently proposed.
- A summary of the enforcement actions taken for this reporting period, including the total number and type of enforcement actions, is included on the attached compact disk under the folder titled **BMP 4-4**.

Year	# of Enforcement Actions
	NTC = Notice to Comply SWO = Stop Work Order NOP = Notice of Permit Requirement
2018 - 2019 (Permit Year 1)	35 - NTC 6- SWO 5 - NOP 1 - Civil Penalties [Summons]

TMDL Consistency:

Conducting ESC and VSMP compliance and enforcement activities helps to ensure that active construction projects minimize sediment and other pollutants in their stormwater runoff. (SED)

Evaluation and Modification:

Roanoke County believes that ESC and VSMP compliance and enforcement activities are critical components to aid in reducing sediment and other pollutants carried by stormwater runoff from construction activities into its MS4. No modifications are planned for this BMP.

BMP 4-5: Responsible Land Disturber Certification

Goal:

The goal of this BMP is to ensure that employees who oversee the performance of regulated land disturbance activities conducted by the County will have the qualifications to properly implement erosion and sediment control measures. Such employees will be DEQ-certified as Responsible Land Disturbers in accordance with the Virginia Erosion and Sediment Control Law and Regulations.

Responsible Party:

The Department of Community Development.

Schedule:

Roanoke County requires employees that oversee the performance of regulated land disturbance activities conducted by the County to be certified by DEQ as Responsible Land Disturbers.

Measurable Goals:

Success for this BMP will be measured by maintenance of the Responsible Land Disturber certification by the applicable employees.

EMPLOYEE	CERTIFICATION	CERTIFICATION #	EXPIRATION DATE
Eric C. Vest	RLD	10169	7-25-21
Jeff Altice	RLD	39411	4-4-22

TMDL Consistency:

Requiring employees that have responsibility to oversee the performance of regulated land disturbance activities to have the qualifications to properly implement erosion and sediment control measures helps to minimize the amount of sediment that leaves the construction site and thereby minimizes the potential of sedimentation in receiving waters. (SED)

Evaluation and Modification:

Roanoke County will continue to require the applicable personnel to hold the proper RLD certification. No modifications are planned for this BMP.



MCM-5: Post-Construction Stormwater Management for New Development and Development on Prior-Developed Lands

The goal of this minimum control measure is to implement a post-construction stormwater runoff management program that is consistent with the Virginia Stormwater Management Act (§ 62.1-44.15:24 et seq. of the Code of Virginia) and the Virginia Stormwater Management Program (VSMP) Regulations (9VAC25-870). The BMPs that will be used to satisfy this minimum control measure are listed below:

BMP 5-1: Stormwater Management Legal Authorities

Roanoke County utilizes certain legal authorities to comply with Virginia's Stormwater Management Act and Stormwater Management Program (VSMP) Regulations.

BMP 5-2: Post-Construction Inspections for Existing Stormwater Management Facilities

Roanoke County maintains and implements written inspection and maintenance procedures for post-construction stormwater management facilities (SWMFs) that discharge to the MS4 to address the long-term operation and maintenance requirements of these facilities.

BMP 5-3: Stormwater Management Facility Tracking

Roanoke County maintains and implements a GIS-based system to track stormwater management facilities to address the long-term operation and maintenance requirements of these facilities.

BMP 5-4: Strategies to Encourage Long-Term Maintenance of Stormwater Control Measures on Single Family Residential Lots

Roanoke County implements strategies to promote the long-term maintenance of stormwater control measures that are designed to treat stormwater runoff solely from the individual single family residential lot. These strategies are used in lieu of recorded maintenance agreements and post-construction inspections by the County.

BMP 5-5: Storm Sewer System Maintenance

Roanoke County implements a program to maintain and repair its storm sewer system within its MS4 program area. Such maintenance helps to keep the system working as designed, which minimizes the risk of surcharging and overflows; it also helps to minimize street flooding associated with clogged inlet structures and conveyances.

This report provides a detailed description of the goals of each BMP, the status of the County's compliance with each BMP, and an evaluation of the BMP and any proposed modifications needed to better achieve the overall MS4 Program goals. In addition, the strategies to ensure consistency with local TMDLs are also provided, and they are broken down by impairment type: *Escherichia coli* (*E. coli*) bacteria (EC), sediment (SED), or Polychlorinated biphenyls (PCBs).

BMP 5-1: Stormwater Management Legal Authorities

Goal:

The goal of this BMP is to maintain and use certain legal authorities to comply with Virginia's Stormwater Management Act and Stormwater Management Program (VSMP) Regulations, as it relates to post-construction stormwater management facilities. The County uses the following legal authorities:

- **Stormwater Management Ordinance #042214-12, adopted on April 22, 2014;** its purpose is to protect property, state waters, stream channels, and other natural resources from the potential harm of unmanaged stormwater, and to establish requirements whereby stormwater is managed to protect water quality and downstream property owners.

Responsible Party:

- The Department of Community Development has the overall responsibility to implement the County's SWM Ordinance.
- The County Attorney's office provides support to the Department of Community Development during compliance/enforcement actions, as necessary.

Schedule:

Roanoke County implements a SWM ordinance to comply with Virginia's Stormwater Management Act and Stormwater Management Program (VSMP) Regulations. The County will update this ordinance and the supporting documents, as necessary, to remain consistent with Virginia's VSMP program.

Measurable Goals:

Success for this BMP will be measured by an annual evaluation of the Stormwater Management Ordinance.

- Roanoke County finds its Stormwater Management Ordinance to be effective at this time. No changes are currently proposed. The ordinance is posted on the County's website at: <https://www.roanokecountyva.gov/DocumentCenter/View/5470/Stormwater-Management-OrdinanceChap-23-July-1?bidId=>

TMDL Consistency:

The County's Stormwater Management Ordinance requires the property owner to provide for the maintenance and repair of their stormwater structures and stormwater management facilities. This helps to ensure that such structures and facilities operate properly, which in turn helps to minimize sediment and bacteria in stormwater runoff from such facilities. (SED & EC)

Evaluation and Modification:

The County's Stormwater Management Ordinance is an effective means to achieve compliance. The ordinance provides the necessary enforcement options to ensure that property owners provide for the maintenance and repair of their stormwater structures and stormwater management facilities. No modifications are planned for this BMP.

BMP 5-2: Stormwater Management Facility Post-Construction Inspections

Goal:

The goal of this BMP is to develop and implement written inspection and maintenance procedures to provide for the long-term operation and maintenance requirements of post-construction stormwater management facilities.

Inspections will be conducted as follows:

- County-owned SWM facilities will be annually inspected.
 - When it is determined that maintenance is required during inspections of County-owned facilities, Roanoke County (or the Roanoke County Public Schools, as appropriate) will conduct the maintenance in accordance with its written procedures.
 - The County will inspect privately-owned SWM facilities that discharge into the MS4 once every 5 years. In addition, the County will:
 - Require the owner to develop and record a maintenance agreement, including an inspection schedule to the extent allowable under state or local law or other legal mechanism;
 - Utilize its legal authority for enforcement of the maintenance responsibilities if maintenance is neglected by the owner; and
 - Will implement a progressive compliance and enforcement strategy, which is included in the Program Plan.

Responsible Party:

The Department of Community Development, with assistance from the County Attorney's office during compliance/enforcement actions, as needed.

- Note that Roanoke County Public Schools (RCPS) rely on the County's Department of Community Development to conduct inspections of RCPS-owned SWMFs; however, RCPS conducts maintenance for the school-owned SWMFs.

Schedule:

Roanoke County maintains and implements procedures for post-construction stormwater management facility inspection/maintenance and compliance/enforcement to comply with the Virginia Stormwater Management Act and the Stormwater Management Program Regulations. The County will update these procedures and supporting documents, as necessary, to remain consistent with Virginia's VSMP program.

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the written post-construction inspection procedures and completion of the required post-construction inspections.

- Roanoke County finds its post-construction stormwater management facility inspection/maintenance and compliance/enforcement procedures to be effective at this time. No changes are currently proposed.

- The inspection summary for this permitting year follows:

Permit Year	Private SWMFs			Public BMPs (Owned by County or RCPS)	
	Total #	# Inspected	# of Enforcement Actions	Total #	# Inspected
(1) 2018 – 2019	684	316	0	79 31 RoCo; 44 RCPS; 4 TOV	79

TOV = Town of Vinton RoCo = Roanoke County RCPS = Roanoke County Public Schools

- During this permit year, Roanoke County inspected all of its public SWMFs and conducted routine maintenance, which consisted of periodic mowing and bush-hogging to keep woody plants off of the embankments. Other activities included weeding and maintaining vegetation in the bioretention areas, and routine maintenance of Filterra units. See folder titled **BMP 5-2** on the attached compact disk for inspection results for each facility.

TMDL Consistency:

This BMP ensures that all permanent stormwater management facilities (SWMFs) are adequately maintained and properly functioning, which is critical for flood protection and erosion prevention. (SED)

Evaluation and Modification:

Roanoke County believes that inspecting permanent stormwater management facilities is a critical component in reducing pollutants in and reducing volume and velocity of stormwater runoff from developed sites. No modifications are planned for this BMP.

BMP 5-3: Post-Construction Stormwater Management Facility Tracking

Goal:

The goal of this BMP is to maintain an electronic database or spreadsheet of all known County-owned and privately-owned stormwater management facilities that discharge into the MS4. This spreadsheet is available online at the following webpage:

<https://www.roanokecountyva.gov/stormwater>

The County's database includes the following information, as applicable:

- The SWMF type
- The SWMF location (latitude and longitude)
- The 6th Order Hydrologic Unit Code in which the SWMF is located
- The acres treated by the SWMF, including total acres, impervious acres, and pervious acres
- The date the SWMF was brought online (MM/YYYY). If the date brought online is not known, the County will use June 30, 2005
- Indication as to whether the SWMF is owned by the County or privately-owned
 - If the stormwater management facility is privately-owned, whether or not a maintenance agreement exists
- Indication as to whether the SWMF is part of Roanoke County's local TMDL action plans
- The date of Roanoke County's most recent inspection of the SWMF

Responsible Party:

The Department of Community Development, with the assistance of the Department of Communications and Information Technology.

Schedule:

- The electronic database or spreadsheet of all known County-owned and privately-owned SWMFs that discharge into the MS4 will be updated no later than 30 days after (1) a new SWMF is brought online, (2) a new BMP is implemented to meet a TMDL load reduction, or (3) after discovery of an existing SWMF.
- Roanoke County will use DEQ's Construction Stormwater Database, or other application as specified by DEQ, to report each of its SWMFs installed after July 1, 2014, to address the control of post-construction runoff from land-disturbing activities for which Roanoke County is required to obtain a General VPDES Permit for Discharges of Stormwater from Construction Activities.
- No later than October 1 of each year, Roanoke County will electronically report all other SWMFs and BMPs implemented between July 1 and June 30 of each year using the DEQ BMP Warehouse and associated reporting template.

Measurable Goals:

Success for this BMP will be measured by updating of the electronic database or spreadsheet and by submittal of the SWMF information to DEQ through the Virginia Construction Stormwater General Permit database and the DEQ BMP Warehouse, as described above.

- Roanoke County did not complete any projects requiring coverage under the General VPDES Permit for Discharges of Stormwater from Construction Activities.

- Roanoke County enters new SWMF information in the DEQ Construction General Permit tracking system when the Notice of Termination for the associated project is entered to initiate project closeout.

New Stormwater Facilities Brought Online

HUC	#	Acres Treated
30101010403	1	1.29
30101010404	1	0.70
30101010405	3	2.75
TOTAL	5	4.74

TMDL Consistency:

Tracking permanent SWMFs helps to ensure that all permanent stormwater management facilities are inspected, adequately maintained, and properly functioning, which is critical for flood protection and erosion prevention. (SED)

Evaluation and Modification:

Roanoke County believes that tracking permanent SWMFs helps to ensure that these facilities are routinely inspected, adequately maintained, and properly functioning, which is critical for flood protection and erosion prevention. No modifications are planned for this BMP.

BMP 5-4: Strategies to Encourage Long-Term Maintenance of Stormwater Control Measures on Single Family Residential (SFR) Lots

Goal:

The goal of this BMP is to implement strategies to promote the long-term maintenance of stormwater control measures that are intended to treat stormwater runoff solely from the individual single family residential (SFR) lot. These strategies will be used to replace recorded maintenance agreements and post-construction inspections by the County.

Responsible Party:

The Department of Community Development.

Schedule:

Roanoke County implements various strategies to promote the long-term maintenance of stormwater control measures to treat runoff from SFR structures. The County will update these strategies, as necessary, to remain consistent with Virginia's VSMP program.

Measurable Goals:

Success for this BMP will be measured by tracking the number of new residential lots covered by the strategies, proper implementation of the strategies, and evaluating the effectiveness of the strategies in promoting the long-term maintenance of stormwater control measures.

- See folder titled **BMP 5-4** on the attached compact disk for a list of new SFRs covered by the strategies, which include:
 - Directing stormwater runoff from rooftops as non-erosive sheet flow to well-vegetated areas on the property to the maximum extent practicable
 - Directing stormwater runoff from impervious surfaces (e.g., driveways, parking areas, sidewalks) as non-erosive sheet flow to well-vegetated areas on the property to the maximum extent practicable, and
 - Directing stormwater runoff from lawns as non-erosive sheet flow to undisturbed naturally-vegetated areas on the property to the maximum extent practicable.
- The County's Fact Sheet entitled "Tips for Homeowners: Stormwater Best Practices" provides strategies and maintenance tips for residential stormwater practices. It is on the County's website at <https://www.roanokecountyva.gov/DocumentCenter/View/7072>.

TMDL Consistency:

Stormwater management techniques target reducing sediment in stormwater runoff from developed sites and are designed to reduce volume and velocity of peak runoff rates during and after development. By implementing strategies to promote the long-term maintenance of stormwater control measures that are designed to treat stormwater runoff solely from the individual residential lot, this BMP helps to assure that such sites are not contributing large volumes of sediment to receiving waters. (SED)

Evaluation and Modification:

Roanoke County believes this is an effective BMP to address the maintenance of relatively simple stormwater management practices used on individual single family residences (SFRs). No modifications are planned for this BMP at this time.

BMP 5-5 Storm Sewer System Maintenance

Goal:

The goal of this BMP is to actively maintain and repair the County's storm sewer (i.e., drainage) system in its MS4 program area. Such maintenance helps to keep the system working as designed, which minimizes the risk of surcharging and overflows; it also helps to minimize street flooding associated with clogged inlet structures and conveyances. In addition, the County's maintenance crews have the potential to discover illicit connections and observe where pollutants may be entering the regulated storm sewer system.

Responsible Party:

The Department of Community Development, Division of Stormwater Operations and Maintenance.

Schedule:

Roanoke County implements and is committed to continuing its storm sewer (drainage) system maintenance program. The number of large stormwater maintenance/repair projects will be documented. In addition, the number of emergency projects and small-scale maintenance/repair projects completed each year will be tracked.

Measurable Goals:

Success for this BMP will be measured by the continuation of this program, and the increase in total value of improvement that has been completed to maintain the storm sewer system.

- The Stormwater Operations Division of the Department of Community Development employs two stormwater construction / maintenance crews with a total of 7 employees. These crews perform a large variety of duties including installation of pipes and structures, repair of damaged structures, emergency response to flooding problems, and other County storm drain system maintenance. In this permit year, the following were completed:

Permit Year	Total Projects			Annual Period Improvement Value
	Large	Small	Emergency	
(1) 2018 - 2019	15	10	4	\$1,577,692.00

- Implementation of these projects resulted in the following:
 - Pipe installed = **857 feet**
 - Total properties improved = **120**
 - Riprap channel installed = **820 feet**
 - Total restoration area = **253,613** square feet
 - Grass channel installed = 807 feet
 - Total amount of sediment removed = **4,266** cubic yards
 - Number of Board-approved projects = **3**

A total of **18,792 labor** hours were committed towards storm sewer system maintenance and improvements to the municipal storm sewer system. The value of these improvements that were performed in-house is estimated to be **\$1,164,435** and the value of contract help is estimated to be **\$413,257**.

TMDL Consistency:

This program is responsible for maintaining the regulated storm sewer system. This includes the improvement of eroding stream banks and channels. This program directly remediates existing areas where sediment is eroding and stabilizes the system, removing the input of sediment to the streams and channels. (SED) This program also increases the potential for discovering illicit connections to the storm drain system. (EC)

Evaluation and Modification:

Roanoke County will continue to maintain the County's storm sewer system as a means to keep the system properly functioning. Such work also provides an opportunity for the County to discover potential illicit connections its MS4. No modifications are planned for this BMP.



MCM-6: Pollution Prevention and Good Housekeeping for Municipal Operations

The goal of this minimum control measure is to implement a Pollution Prevention and Good Housekeeping Program to reduce stormwater runoff pollution and prevent illicit discharges during day-to-day operations at Roanoke County's various high-priority municipal facilities. The BMPs that will be used to satisfy this minimum control measure are listed below:

BMP 6-1: Spill Prevention, Control, and Countermeasure Plans

Roanoke County has developed and will maintain Spill Prevention, Control, and Countermeasures (SPCC) plans for some of its municipal facilities. These plans will be updated and new plans will be prepared, as needed.

BMP 6-2: Standard Operating Procedures

Roanoke County will maintain and implement written standard operating procedures (SOPs) for daily operations and maintenance activities that have a potential of discharging pollutants directly or with stormwater runoff into the MS4. The SOPs will be used in training activities.

BMP 6-3: Employee Training

Roanoke County implements biennial training for applicable employees in (1) recognition and reporting of illicit discharges; (2) good housekeeping and pollution prevention practices for: *(a) road, street, and parking lot maintenance, (b) maintenance and public works facilities, and (c) recreational facilities*; (3) spill response by emergency response employees; (4) herbicide application training; and (5) contractor oversight for environmental compliance.

BMP 6-4: Stormwater Pollution Prevention Plans for Municipal Facilities

Roanoke County will identify all high-priority facilities that have a high potential to discharge pollutants in stormwater. Stormwater Pollution Prevention Plans (SWPPPs) will be prepared, implemented, and maintained. SWPPPs will be used in training activities.

BMP 6-5 Nutrient Management Plans

Roanoke County will identify all County owned lands where nutrients are applied to a contiguous area of 1 acre or more. Nutrient Management Plans will be prepared by a certified nutrient management planner. Nutrient Management Plans will be implemented and maintained.

BMP 6-6 Pesticide Applicator Certification

All employees and County-hired contractors who apply pesticides/herbicides shall have the proper Virginia Pesticide Applicator Certificate.

This report provides a detailed description of the goals of each BMP, the status of the County's compliance with each BMP, and an evaluation of the BMP and any proposed modifications needed to better achieve the overall MS4 Program goals. In addition, the strategies to ensure consistency with local TMDLs are also provided, and they are broken down by impairment type: *Escherichia coli* (*E. coli*) bacteria (EC), sediment (SED), or Polychlorinated biphenyls (PCBs).

BMP 6-1: Spill Prevention, Control, and Countermeasure Plans

Goal:

The goal of this BMP is to develop, maintain, and implement Spill Prevention, Control, and Countermeasure (SPCC) Plans for appropriate municipal facilities, as required by Federal Oil Spills Prevention and Preparedness Regulations (40 CFR Part 112), to help municipal facilities prevent a discharge of oil into navigable waters or adjoining shorelines.

Responsible Party:

The Department of Community Development is responsible to develop and update SPCC plans. Applicable departments are responsible for compliance with SPCC plans.

Schedule:

Roanoke County updates its SPCC plans, as necessary, and creates new plans for County facilities, as needed. Training is provided for those employees who are involved with any County SPCC plan.

Measurable Goals:

Success for this BMP is measured by (1) the updating of existing SPCC plans in accordance with Federal Oil Spills Prevention and Preparedness Regulations (40 CFR Part 112.0), which require plans to be reviewed and updated every 5 years, or when a change has occurred; and (2) the creation of new SPCC plans for applicable County facilities. For this permit year:

- The County has 6 SPCC plans that were last revised in 2016. Federal regulations require SPCC plans to be updated every 5 years, or when an operational change occurs. No changes in operations occurred in the past year that would necessitate changes to the SPCC plans. Also, there were no additional facilities identified that need a SPCC Plan.
- The County facilities that currently have a SPCC plan are listed below:
 - Cave Spring Fire Station, revised May 2016
 - Clearbrook Fire Station, revised May 2016
 - Fort Lewis Fire Station, revised May 2016
 - Hollins Fire Station, revised May 2016
 - Fleet Service Center, revised June 2016
 - Public Safety Center, prepared May 2016

The completed SPCC plans may be viewed on the County's website at:

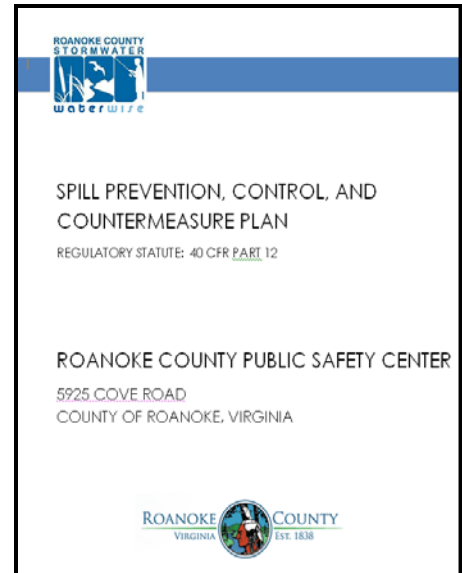
<https://www.roanokecountyva.gov/DocumentCenter/Index/639>

TMDL Consistency:

This BMP minimizes the potential for oil spills to enter the MS4. Having updated SPCC Plans aids in the education of County employees who work in areas where there is some risk of oil spills. This BMP does not directly address any of the County's TMDL requirements.

Evaluation and Modification:

SPCC plans are required for facilities per 40 CFR Part 112. The County finds this to be an effective BMP to assure the proper storage of oil. No modifications are planned for this BMP.

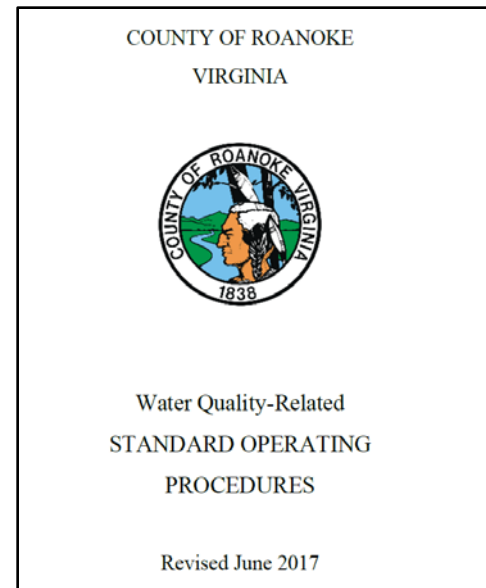


BMP 6-2: Standard Operating Procedures

Goal:

The goal of this BMP is to develop and implement written standard operating procedures (SOPs) to help prevent pollutant discharge from activities at municipal facilities such as (1) road, street, and parking lot maintenance, (2) equipment maintenance, and (3) the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers. These SOPs will be used in the employee training program (**see BMP 6-3**) and are designed to:

- 1) Prevent illicit discharges
- 2) Ensure the proper disposal of waste materials, including landscape wastes
- 3) Prevent the discharge of wastewater or County vehicle wash water or both into the MS4 without authorization under a separate VPDES permit
- 4) Require implementation of best management practices when discharging water pumped from utility construction and maintenance activities
- 5) Minimize the pollutants in stormwater runoff from bulk storage areas (e.g., salt storage, topsoil stockpiles) through the use of best management practices
- 6) Prevent pollutant discharge into the MS4 from leaking municipal automobiles and equipment
- 7) Ensure that the application of materials, including fertilizers and pesticides, is conducted in accordance with the manufacturer's recommendations



Responsible Party:

The Department of Community Development develops, evaluates, and amends the written water quality-related SOPs and provides support to applicable departments, the latter of which are responsible to comply with the SOPs that are pertinent to their activities.

Schedule:

SOPs will be annually evaluated and revised, as needed.

Measurable Goals:

Success for this BMP will be measured by the updating of the written SOPs, as necessary, and by employee training on the appropriate SOPs.

- There were no additions or modifications to the County's Water Quality-Related Standard Operating Procedures during the permit year. This document is posted on the County's website at:
<https://www.roanokecountyva.gov/DocumentCenter/View/16211/Water-Quality-Related-SOPs-June-2017>

TMDL Consistency:

This BMP ensures that all Standard Operating Procedures for water quality are in place and used for training. This is an effective BMP to help ensure pollutants from daily County operations do not enter the MS4. (SED)

Evaluation and Modification:

Roanoke County believes it is effective to maintain water quality-related SOPs and to train employees to use them, as a means to protect receiving waters from pollutants carelessly handled by employees in their daily operations. No modifications are planned for this BMP.

BMP 6-3: Employee Training

Goal:

The goal of this BMP is to provide County employees with necessary training to support the requirements of the MS4 Permit. The written training plan provides for the following:

- 1) Field personnel receive training in the Recognition and Reporting of Illicit Discharges no less than once per 24 months;
- 2) Employees performing road, street, and parking lot maintenance receive training in Pollution Prevention and Good Housekeeping associated with those activities no less than once per 24 months;
- 1) Employees working in and around maintenance, public works, or recreational facilities receive training in Pollution Prevention and Good Housekeeping practices associated with those facilities no less than once per 24 months;
- 2) Employees and contractors hired by Roanoke County who apply pesticides and herbicides are trained or certified in accordance with the Virginia Pesticide Control Act (§ 3.2-3900 et seq. of the Code of Virginia). Certification by the Virginia Department of Agriculture and Consumer Services (VDACS) Pesticide and Herbicide Applicator program shall constitute compliance with this requirement;
- 3) Employees and contractors serving as plan reviewers, inspectors, program administrators, and construction site operators obtain the appropriate certifications as required under the Virginia Erosion and Sediment Control Law and its attendant regulations;
- 4) Employees and contractors implementing the stormwater program obtain the appropriate certifications as required under the Virginia Stormwater Management Act and its attendant regulations; and
- 5) Employees whose duties include emergency response have been trained in spill response. Training of emergency responders such as firefighters and law-enforcement officers on the handling of spill releases as part of a larger emergency response training shall satisfy this training requirement and be documented in the training plan.

Responsible Party:

The Department of Community Development provides the appropriate departments with access to the training materials; each department is responsible to make certain that their employees take and comply with the pertinent training.

Schedule:

Employee training will be conducted on a biennial basis. The County will review the training program on a biennial basis and update it, as needed.

Measurable Goals:

This BMP will be measured by training of the pertinent County employees in accordance with the schedule. In addition, Roanoke County will maintain documentation of each training event for a minimum of three years after the training event. See folder titled **BMP 6-3** on the attached compact disk for the training records for this permit year.

Employees in eleven departments received training in one or more of the topics listed below, depending on job class.

Recognition and Reporting Illicit Discharges

Applicable field personnel received training in the recognition and reporting of illicit discharges. This training video takes approximately 30 minutes.

Good Housekeeping and Pollution Prevention Practices

Employees that perform road, street, and parking lot maintenance, or are employed in and around maintenance and public works facilities and at recreational facilities received training in good housekeeping and pollution prevention practices. This training video takes approximately 1 hour.

NOTE: All employees who were required to take *Good Housekeeping and Pollution Prevention Practices* were required to read and follow the County's Water Quality-Related Standard Operating Procedures (SOPs). These procedures were designed to eliminate or minimize pollutant discharges in stormwater.

Contractor Oversight for Environmental Compliance

Supervisors who oversee Contractors that perform work for the County or employees involved in developing contracts for Contractors took this training. The training explains that all Contractors must have their own written good housekeeping and pollution prevention program, or they must comply with the County's written policies and SOPs. County employees who oversee Contractors working for the County must ensure compliance by Contractors. This training video takes approximately 30 minutes.

Hazardous Materials (HAZ-MAT) Training

The County of Roanoke currently maintains basic hazardous materials training for its employees in Fire and Rescue. All career (paid) staff are certified to HAZ-MAT Operations. For this permit year, there are 184 uniformed, career employees. The number of volunteers is always in flux, but the County estimates that there are also 136 volunteers that currently have HAZ-MAT Operations training. HAZ-MAT certification does not expire from the Virginia Department of Fire Programs; however all career personnel receive annual, internal training on this topic as part of their career development training.

In addition, a summary report of all DEQ-certified staff who review, approve, and inspect the implementation of stormwater management plans is also on the enclosed compact disk in the folder titled **BMP 4-3**.

TMDL Consistency:

This BMP ensures that all employees receive pollution prevention training and targeted employees receive additional training for municipal good housekeeping, pollution prevention, and Illicit Discharge Detection and Elimination (IDDE). It also ensures that all Fire and Rescue employees maintain basic hazardous waste training to prevent any mishandling of hazardous materials in ways that could be detrimental to the environment. The contractor-specific training conducted by the County was focused on reducing sediment from construction sites. (SED/EC)

Evaluation and Modification:

Roanoke County believes it is effective to train employees in the above-mentioned topics by use of the videos acquired from EXCAL Visual and by use of the County's Standard Operating procedures for Water Quality, as discussed in **BMP 6-2**. No modifications are planned for this BMP.

BMP 6-4: Stormwater Pollution Prevention Plans for Municipal Facilities

Goal:

The goal of this BMP is to identify high-priority facilities in Roanoke County that have a high potential of discharging pollutants and to prepare, maintain, and implement a site-specific stormwater pollution prevention plan (SWPPP) for each identified facility.

High- priority facilities that have a high potential for discharging pollutants are those facilities that are not covered under a separate VPDES permit and for which any of the following materials or activities occur and are expected to have exposure to stormwater resulting from rain, snow, snowmelt, or runoff:

- 1) Areas where residuals from using, storing or cleaning machinery or equipment remain and are exposed to stormwater
- 2) Materials or residuals on the ground or in stormwater inlets from spills or leaks
- 3) Material handling equipment
- 4) Materials or products that would be expected to be mobilized in stormwater runoff during loading or unloading or transporting activities (e.g., rock, salt, fill dirt)
- 5) Materials or products stored outdoors (except final products intended for outside use where exposure to stormwater does not result in the discharge of pollutants)
- 6) Materials or products that would be expected to be mobilized in stormwater runoff contained in open, deteriorated or leaking storage drums, barrels, tanks, and similar containers
- 7) Waste material except waste in covered, non-leaking containers (e.g., dumpsters)
- 8) Application or disposal of process wastewater (unless otherwise permitted)
- 9) Particulate matter or visible deposits of residuals from roof stacks, vents or both not otherwise regulated (i.e., under an air quality control permit) and evident in the stormwater runoff

Roanoke County's SWPPP Implementation Schedule can be found here:

<https://www.roanokecountyva.gov/DocumentCenter/Index/1538>

The schedule identifies the high-priority facilities that have a high potential to discharge pollutants. This document also indicates when the various SWPPPs were prepared. Each SWPPP is kept at the high-priority facility for which it was written and contains the following information:

- 1) A site description that includes a site map identifying all outfalls, direction of stormwater flows, existing source controls, and receiving water bodies
- 2) A description and checklist of the potential pollutants and pollutant sources
- 3) A description of all potential non-stormwater discharges

- 4) Written procedures designed to reduce and prevent pollutant discharge
- 5) A description of the applicable training as required in Part I E 6 m of the MS4 Permit (see BMP 6-3)
- 6) Procedures to conduct an annual comprehensive site compliance evaluation;
- 7) An inspection frequency of no less than once per year and maintenance requirements for site-specific source controls. The date of each inspection and associated findings and follow-up shall be logged in each SWPPP
- 8) A log of each unauthorized discharge, release, or spill incident reported in accordance with Part III G of the MS4 Permit, to include the following:
 - a. Date of incident
 - b. Material discharged, released, or spilled
 - c. Estimated quantity discharged, released or spilled

Responsible Party:

The Department of Community Development evaluates the high-priority facilities and prepares and updates the necessary SWPPPs. The applicable departments implement their SWPPPs, conduct the requisite training and facility inspections, and handle incident reporting in the event of an unauthorized discharge, release, or spill.

Schedule:

Roanoke County has identified all municipal high-priority facilities, and it has determined which of these high-priority facilities have a high potential to discharge pollutants in stormwater. All necessary SWPPPs have been completed, and they will be maintained for as long as each facility has a high potential to discharge pollutants.

In accordance with the MS4 Permit, no later than June 30 of each year, Roanoke County will review any of its high-priority facilities for which a SWPPP has not been developed to determine if the facility has a high potential to discharge pollutants. If the facility is determined to be a high-priority facility with a high potential to discharge pollutants, the County will develop a SWPPP no later than December 31 of that same year.

If activities change at a facility such that it no longer meets the criteria of a high-priority facility with a high potential to discharge pollutants, Roanoke County may remove the facility from the list of high-priority facilities with a high potential to discharge pollutants.

Measurable Goals:

Success for this BMP will be measured by the implementation/maintenance of the required SWPPPs and the SWPPPs being kept at the high-priority facility for which they were written and used as part of the staff training conducted at said facility.

In addition, Roanoke County will review the contents of any site-specific SWPPP no later than 30 days after any unauthorized discharge, release, or spill reported in accordance with Part III G of the MS4 Permit to determine if additional measures are necessary to prevent future unauthorized discharges, releases, or spills. If necessary, the County will update the SWPPP no later than 90 days after the unauthorized discharge.

- In this permit year, there were:
 - No new SWPPPs developed
 - No SWPPP modifications
 - No reports of unauthorized discharges, releases, or spill incidents
- All of the County's SWPPPs are available in the MS4 Program Plan, and can be accessed on the website <https://www.roanokecountyva.gov/DocumentCenter/Index/1538>
- SWPPP inspection records are included on the attached CD in the folder titled **BMP 6-4**.

TMDL Consistency:

This BMP ensures that all high-priority facilities that have a high potential to discharge pollutants in stormwater have a SWPPP in place with employees trained to understand, implement, and maintain it. The SWPPP identifies Best Management Practices to be employed at each facility to prevent the discharge of pollutants into the MS4. (SED/EC)

Evaluation and Modification:

Roanoke County will continue to implement and update the completed SWPPPs and will prepare new SWPPPs, as necessary. No modifications are planned for this BMP.

BMP 6-5: Nutrient Management Plans

Goal:

The goal of this BMP is to ensure that excessive nutrients are not being applied to County-owned lands. To achieve this, Roanoke County will maintain and implement turf and landscape nutrient management plans that have been 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 County where nutrients are applied to a contiguous area greater than one acre. If nutrients are being applied to achieve final stabilization of a land disturbance project, application amounts will follow the manufacturer's recommendations.

Responsible Party:

The Department of Community Development will track progress. The Department of Parks, Recreation, and Tourism (PRT) is responsible for the preparation, implementation, and maintenance of Nutrient Management Plans on County-owned lands. Roanoke County Public Schools (RCPS) is responsible for the preparation, implementation, and maintenance of Nutrient Management Plans on RCPS-owned lands.

Schedule and Evaluation:

All County-owned lands where nutrients are applied to a contiguous area of 1 acre or more have been identified and Nutrient Management Plans are in place. The County will continue to implement these plans and update them, as needed.

Measurable Goals:

Success for this BMP will be measured by the implementation of the Nutrient Management Plans for the applicable lands.

- There were no new turf and landscape nutrient management plans developed in this permit year.

TMDL Consistency:

This BMP ensures that excessive nutrients are not being applied for all County-owned lands where nutrients are applied to a contiguous area of 1 acre or more. While there is no known benefit towards satisfying the TMDL requirements for *E. coli* or sediment, there is a water quality benefit associated with proper application of nutrients. The minimization of land-applied nutrients helps the County address one of its high priority water quality issues, that of preventing excess nutrients from entering receiving waters via stormwater runoff.

Evaluation and Modification:

Roanoke County will continue to implement all of its NMPs, which are in the MS4 Program Plan, and can be accessed online at <https://www.roanokecountyva.gov/DocumentCenter/Index/1538>.

BMP 6-6: Pesticide Applicator Certification

Goal:

The goal of this BMP is to ensure that all employees and contractors hired by the County who apply pesticides and herbicides are trained or certified in accordance with the Virginia Pesticide Control Act (§ 3.2-3900 et seq. of the Code of Virginia). Certification by the Virginia Department of Agriculture and Consumer Services (VCACS) Pesticide and Herbicide Applicator program shall constitute compliance with this requirement.

Responsible Party:

The Department of Community Development shall track compliance. The Departments of Parks, Recreation and Tourism and General Services are responsible to ensure that their employees or contractors who apply pesticides on County-owned lands have current pesticide/herbicide applicator certifications.

Schedule:

Roanoke County annually reviews the pesticide/herbicide applicator certifications held by its employees and hired contractors.

Measurable Goals:

Success for this BMP will be measured by maintenance of current certification by the applicable employees and any hired contractors. See the summary table, below, for those County employees that hold the requisite certifications:

EMPLOYEE	CERTIFICATION TYPE	CERTIFICATION #	EXPIRATION DATE
Eric C. Vest	Commercial Pesticide Applicator	72792-G	6/30/2021
Mick Brizendine	Commercial Pesticide Applicator	73382-G	6/30/2021
Jerad Ray	Commercial Pesticide Applicator	127518-G	6/30/2021
Eric C. Vest	Certified Fertilizer Applicator	CFA-13407-57329	6/4/2021

TMDL Consistency:

While there is no known benefit towards satisfying the TMDL requirements for *E. coli* or sediment, there is a water quality benefit associated with proper application of pesticides so as to avoid excess products entering the receiving waters by way of stormwater runoff.

Evaluation and Modification:

Roanoke County will continue to require the applicable personnel to hold the proper pesticide and fertilizer applicator certifications. No modifications are planned for this BMP.

Section II. Total Maximum Daily Load Action Plans

A. Introduction

Roanoke County has developed three Total Maximum Load (TMDL) Action Plans to reduce loadings for its pollutants of concern (sediment, bacteria, and PCBs), because the County discharges these pollutants of concern to impaired waters for which a TMDL has been approved by the U.S. Environmental Protection Agency (EPA) and in which an individual or aggregate wasteload has been allocated to Roanoke County. The plans are summarized below:

TMDL Action Plan for *E. coli*

The *Total Maximum Daily Load Action Plan for E. coli Reduction in the Roanoke River, Ore Branch, Tinker Creek, Glade Creek, Carvin Creek, and Lick Run* was completed in July 2015 and submitted to DEQ with the corresponding MS4 Annual Report. The latest version of this plan is on the County's website at:

<https://www.roanokecountyva.gov/DocumentCenter/View/16255/E-coli-TMDL-Action-Plan-rev-9-24-19>

TMDL Action Plan for Sediment

The *Total Maximum Daily Load Action Plan for Sediment Reduction in the Roanoke River* was completed in July 2015 and submitted to DEQ with the corresponding MS4 Annual Report. The latest version of this plan is on the County's website at:

<https://www.roanokecountyva.gov/DocumentCenter/View/16263/Sediment-TMDL-Action-Plan-rev-9-24-19>

TMDL Action Plan for PCBs

The *Total Maximum Daily Load Action Plan for PCBs in the Roanoke River, Mason Creek, Peters Creek, Tinker Creek, Wolf Creek, and an Unnamed Tributary to the Roanoke River* was completed in June 2016 and submitted to DEQ with the corresponding MS4 Annual Report. The latest version of this plan is on the County's website at:

<https://www.roanokecountyva.gov/DocumentCenter/View/16259/TMDL-PCB-Action-Plan-Revised-12-13-16>

Pursuant to the MS4 permit requirements, a summary of the BMPs conducted by the County to implement each of its local TMDL Action Plans follows.

B. BMPs to Address *E. coli* and Sediment TMDLS

The specific TMDL Action Plans for *E. coli* (EC) and for sediment (SED) were completed July 1, 2015 and submitted with the previous permit's corresponding Annual Report. As mentioned on the previous page, current versions of these plans are available on the County's website.

T-1: Initial Stream Assessments and BMP Planning (EC and SED)

Perform initial stream assessments of 135.4 miles of streams that drain 100 acres or more within the MS4 regulated area in order to better understand their conditions and to assist in determining the most cost-effective means of lowering pollutant loads.

T-2: Enhanced Public Education and Outreach (EC and SED)

Enhance **BMPs 1-5, 1-7 and 2-2** to ensure that they address bacteria and sediment as high priority water quality issues.

T-3: Enhanced Employee Training (EC and SED)

Enhance **BMP 6-3** to ensure that it addresses bacteria and sediment as high priority water quality issues.

T-4: County Facilities Assessments and Corrections (EC and SED)

As a part of **BMP 6-4**, all County facilities will be assessed for conditions that could result in elevated discharges of bacteria or sediment. Where sources of elevated discharges are discovered, they will be eliminated. A Stormwater Pollution Prevention Plan (SWPPP) will be prepared where appropriate.

T-5: Enhanced Illicit Discharge Detection and Elimination Program (EC)

Visit selected businesses that have a possible elevated potential to discharge bacteria or sediment to observe conditions. Take corrective actions where illicit discharges are observed.

T-6: Erosion and Sediment Control Enhanced Enforcement (EC and SED)

Evaluate the need to strengthen the erosion and sediment control program enforcement activities.

T-7: Dog Waste Stations (EC)

Increase the number of dog waste stations in public parks and greenways.

T-8: Dog Waste Ordinance (EC)

Consider a new dog waste ordinance to strengthen the requirements to pick up dog waste.

T-9: Onsite Sewage Disposal System Maintenance Ordinance (EC)

Evaluate the advisability of enacting a sewage disposal system maintenance ordinance.

T-10: Stream Buffers (EC and SED)

Evaluate the possibility of enacting stream buffer requirements.

T-11: Capital Improvements (EC and SED)

Construct cost-effective capital improvements to address impairments utilizing 50% Virginia Stormwater Local Assistance Fund grants.

T-1: Initial Stream Assessments and BMP Planning (EC and SED)

Goal:

The goal of this BMP is to perform field and office investigations of streams within the MS4 area to document existing conditions and identify opportunities for implementation of cost-effective BMPs.

Measurable Goals:

In Permit Year 2 (2014 - 2015) of the previous permit, the County hired a consultant to perform this task. The initial stream assessment was completed by the consultant and documented in a report, dated January 2016. This report was provided with 2015-2016 annual report.

The Assessment included a listing of the stream reaches (Table 6) that have the best potential opportunities for stream projects. This information is being used as the first screen in the selection of streams to be studied further and submitted for state Stormwater Local Assistance Fund grants.

Table 6. Field Reconnaissance Sites with Potential Opportunities for Stream Projects

	Site #	Site Description	Stream Reach	Total Erosion Length	Bank Height	RCI
Very Good Opportunity	6	Vacant parcel between Williams Rd & Florist Rd	Carvin Creek	250	15	0.81
	9	Read Mountain Preserve	Cook Creek	500	10	0.93
	11	Garst Mill Park	Mudlick Creek	600	5	1.21
	13	Hidden Valley High School	Mudlick Creek	1,000	15	0.76
	27	Goode Park/Wolf Creek Greenway	Wolf Creek	250	5	1.11
Good Opportunity	15	St. John's Church	Mudlick Creek	250	4	1.17
	18	Green Valley Elementary School (Adjacent to Ballfield)	Murray Run	50	15	1.13
	23	Christian Life Fellowship Church	Stypes Branch	100	15	0.96
	28	Wolf Creek Greenway	Wolf Creek	250	4	1.30
Moderate Opportunity	1	Merriman Soccer Complex	Back Creek	100	6	1.18
	3	Richfield Retirement Community	Big Bear Rock Branch	15	1	1.06
	10	Private (Vacant Parcel), Borders Garst Mill County Park	Mudlick Creek	100	12	1.15
	30	Starkey Park	Back Creek	200	12	1.06
	Pilot_05	Wal-Mart	Cook Creek	60	5	1.18
	Pilot_06	Wal-Mart	Cook Creek	90	5	1.1
	Pilot_08	Wal-Mart	Cook Creek	100	3	1.03

The results also included identifying sources of potential bacteria and sediment sources, as shown below:

Table 3. Summary of Potential Pollutant of Concern Sources by Watershed

Stream Reach	Miles Assessed in MS4 Service Area	Eroding Stream Reach Segments	Armored Stream Reach Segments	Other Sediment Sources	All Animal Sources	Potential Other Sources	Potential Additional Outfalls	Attachment 1 Map Group #
Mason Creek	1.9	0	1	2	0	0	0	05
Mill Creek	1.19	2	1	0	1	0	0	17
Mudlick Creek	17.96	39	20	5	0	2	7	06
Murray Run	1.97	12	2	2	0	6	2	07
Ore Branch	3.72	3	0	0	0	0	0	08
Paint Bank Branch	1.25	6	0	2	1	0	0	15
Peters Creek	5.98	10	6	4	2	0	0	09
Roanoke River	13.24	25	4	5	2	1	0	12
Roanoke Tributary	3.2	5	3	0	0	0	1	19/20
Stypes Branch	1.78	9	2	2	0	1	0	14
Synders Creek	0.07	0	0	0	0	0	0	16
Tinker Creek	7.74	14	5	2	0	1	2	10
Tinker Creek Lower	0.44	0	0	0	0	0	0	04
Twelve O'clock Branch	1.91	7	5	2	2	0	0	17
West Dry Branch	0.93	3	1	0	0	1	0	14
Wolf Creek	10.12	25	6	3	0	2	0	11
Total		321	129	93	25	37	14	

The assessment identified 321 eroding stream reaches and 129 armored stream sections. No further action will be taken at this time on these reaches, as County efforts will be focused on prioritized stream projects.

The results also included 14 potential additional outfalls that were not on the County's GIS mapping at the time. These potential outfalls were investigated and 11 of them were added to the County's mapping. (The remaining three were not outfall pipes but rather inflow pipes to stormwater facilities.) The associated acreage for the 11 new outfalls was previously reported.

TMDL Consistency:

This initial stream assessment identified locations where County efforts should be concentrated, at this time, to lower bacteria and sediment discharges. (EC & SED)

Evaluation and Modification:

This initial stream assessment is valuable in understanding existing stream conditions and in prioritizing the County's efforts. While the assessment itself is completed, the County is performing further evaluation and investigation of its results to determine appropriate actions.

T-2: Enhanced Public Education and Outreach (EC and SED)

Goal:

Raise awareness of the water quality issues involving *E. coli* and sediment in target audiences and the general public.

Measurable Goals:

Incorporate information concerning sediment and *E. coli* into the MS4 Program public education and outreach efforts in accordance with Table 1-7a in the TMDL Action Plans for Sediment and E-coli. See MS4 Annual Report in **BMP 1-7** for detailed assessment of compliance with goals and complete versions of Tables 1-7a through 1-7d. Note that Table 1-7a shows how the County addresses *E. coli* and sediment for certain target audiences and the general public.

TMDL Consistency:

The enhanced Public Education and Outreach goals were specifically tailored to address Sediment and E-coli water quality issues.

Evaluation and Modification:

Use of messages tailored to address sediment and *E. coli* that are focused on the proper target audiences is an effective means to raise awareness, improve individual's actions, and increase support for water quality programs. Roanoke County believes that its current activities in this area are robust, and no modifications are planned for this BMP.



T-3: Enhanced Employee Training (EC and SED)

Goal:

Raise awareness of the water quality issues involving *E. coli* and Sediment in County employees that receive employee training as a part of **BMP 6-3**.

Measurable Goals:

Compliance with **BMP 6-3** training goals in the following topics:

- Recognition and Reporting of Illicit Discharges
- Good Housekeeping and Pollution Prevention Practices
- Contractor Oversight for Environmental Compliance
- Hazardous Materials (HAZ-MAT) Training

This training was conducted in this permit year and will be performed every two years, pursuant to the MS4 permit requirements. Refer to **BMP 6-3** for more details and for training records.

TMDL Consistency:

The Enhanced Employee Training was specifically tailored to address sediment and E-coli water quality issues. (EC & SED)

Evaluation and Modification:

This training is important to give County employees and contractors the understanding of why certain procedures must be followed. No modifications are planned for this BMP.

T-4: County Facilities Assessments and Corrections (EC and SED)

Goal:

Reduce discharges of E-coli and sediment from County facilities.

Screen County facilities for conditions that could result in elevated discharges of E-coli and sediment.

Measurable Goals:

Roanoke County has identified all of its high-priority facilities that have a high potential to discharge pollutants in stormwater. Stormwater Pollution Prevention Plans (SWPPPs) have been prepared and are being implemented/maintained for each facility. Annual inspections of all facilities that have a SWPPP will be conducted to ensure that any sources of E-coli and sediment are identified and eliminated. Documentation of these inspections will be kept in each of the SWPPPs.

TMDL Consistency:

Screening County facilities, performing site inspections, preparing and implementing SWPPPs, and eliminating potential sources of elevated E-coli and sediment discharge are consistent with the E-coli and sediment TMDLs. (EC & SED)

Evaluation and Modification:

Roanoke County will continue to implement/maintain the SWPPPs, as previously identified and reported under **BMP 6-4**. No modifications are planned for this BMP.

T-5: Enhanced Illicit Discharge Detection and Elimination Program (EC)

Goal:

Identify and eliminate Illicit Discharges by proactively visiting and observing conditions at businesses that may have the potential to discharge elevated levels of *E. coli* into receiving waters.

Measurable Goals:

Each permit year, 15 businesses will be visited to perform site surveys to observe conditions. The selected business types include:

- Pet-related (veterinary clinics, kennels, doggie daycare facilities, pet stores, etc.)
- Car-wash related (auto sales, auto services, and actual car washes),
- Restaurants

Inspection reports and supporting materials for these site visits can be found on the enclosed compact disk in the folder titled **TMDLS**, sub-folder **T-5**.

TMDL Consistency:

Actively looking for illicit discharges of *E. coli* and sediment is consistent with the TMDLs. (EC & SED)

Evaluation and Modification:

This activity began in previous Permit Year 5 (2017 - 2018). Evaluation and modification are not appropriate at this time.



T-6: Erosion and Sediment Control Enhanced Enforcement (EC and SED)

Goal:

Reduce offsite discharge of silt and sediment from construction sites.

Measurable Goals:

Each permit year, the County will evaluate active construction projects and publicly recognize any land-disturbing contractors who conduct exemplary work through the proper use of erosion and sediment controls and stormwater management best practices. This Stormwater Contractor Appreciation Program is described in detail on the County's website at:

<https://www.roanokecountyva.gov/1780/Stormwater-Contractor-Appreciation>

- In this permit year, the Property Catalyst Group and Bowman Excavating, Inc. were selected for the Stormwater Clean Award based their conscientious development of the Parkside Storage facility at 7544 Plantation Road. Both firms were proactive throughout construction in maintaining erosion and sediment controls and stormwater management measures that were necessary for a successful project and for protecting downstream waterways from sediment-laden stormwater runoff.



Effective use of erosion control matting and slope interrupters at Parkside Storage

This project was highlighted in the County's May 2019 *"It's Just Dirt"* newsletter for contractors. See <https://www.roanokecountyva.gov/1648/Stormwater-Public-Education-Documents>.

TMDL Consistency:

Actions that result in lowering discharges of silt and sediment from construction sites are consistent with the TMDLs. (EC & SED)

Evaluation and Modification:

The County believes that this program is very effective in raising awareness among contractors to 'do the right thing' by keeping their dirt on their projects and out of the local receiving waters. It gives staff an opportunity to work with the Contractors in a positive way and provides them with positive and free publicity for their projects. No modifications are planned for this BMP.

T-7: Dog Waste Stations (EC)

Goal:

Increase the number of maintained dog waste stations in public parks and greenways to reduce discharge of *E. coli* from dog waste into receiving waters.

Measurable Goals:

The County will continue with dog waste station installations in accordance with the attached phasing schedule.

- In this permit year, 4 new dog waste stations were installed. This brings the total number of existing stations in Roanoke County to 25. (Refer to the attached map and inventory.)
- Future dog waste stations are planned over the next several years, in accordance with the attached phasing schedule.
- The above-mentioned materials are in the folder titled **TMDLs**, sub-folder **T-7** on the attached compact disk.

TMDL Consistency:

Actions that decrease discharges of *E. coli* are consistent with the TMDL. (EC)

Evaluation and Modification: Roanoke County will continue to install and maintain dog waste stations, as outlined above. No modifications are planned for this BMP.



T-8: Dog Waste Ordinance (EC)

Goal:

Reduce discharge of *E. coli* from dog waste.

Measurable Goals:

In previous permit year 2015 - 2016, County staff researched existing dog waste ordinances in other Virginia localities and considered the need to revise its existing Ordinance. In the event that it appeared to be advisable, a proposed dog waste ordinance would be presented to the Board of Supervisors for consideration in permit year 2016 - 2017.

TMDL Consistency:

Actions that decrease discharges of *E. coli* are consistent with the TMDL. (EC)

Evaluation and Modification:

Based upon research of existing ordinances in Virginia, County staff could not find any locality that had a dog ordinance stricter than Roanoke County's. After internal discussion, County staff determined that enacting a stricter dog waste ordinance would likely be counter-productive due to the probability of stiff citizen resistance, which could adversely impact other County-initiated water quality activities.

County staff concluded that continued public education (See **BMP 1-7**) along with providing suitable dog waste stations are the best ways to address proper management of dog waste. See the Memorandum, dated June 27, 2016, contained in the MS4 Program Plan, which can be accessed on the website at <https://www.roanokecountyva.gov/DocumentCenter/Index/1538>

No further actions will be taken on this BMP.

Stormwater Best Management Practices for Proper Pet Waste Disposal



A Guide for Roanoke County Pet Owners

T-9: Onsite Sewage Disposal System Maintenance Ordinance (EC)

Goal:

Reduce the discharge of *E. coli* due to malfunctioning onsite sewage disposal systems.

Measurable Goals:

In previous permit year 2015 - 2016, staff researched onsite sewage disposal system locations within the County and reviewed the ordinances of other Virginia localities. In previous permit year 2016 - 2017, staff gained County Administration's approval to prepare a draft ordinance for consideration by the Board of Supervisors (BOS).

In this 5th year of the previous permit, after research and consideration, staff recommended to County Administration that no further action be taken with a Septic Pump-Out Ordinance for the following reasons:

- No other non-Chesapeake Bay community (other than a portion of Franklin County adjacent to Smith Mountain Lake) has instituted such an Ordinance.
- Staff believes that there would be significant citizen resistance in implementing a Septic Ordinance and wants to first build citizen support for its water quality programs. Septic pump-out requirements could be seen as regulatory over-reach by citizens and actually undermine citizen support for the County's water quality programs.
- Implementation of this Ordinance would require additional staff resources that are not available.
- An alternative approach of providing supplemental educational outreach to septic tank owners could provide similar improvements, while continuing to build support for water quality programs. To that end, in a previous permit year the County included an article about residential septic system maintenance in its Stormwater newsletter, which was mailed to every residence in the County. The tips that were offered are shown below:

DO...

- Inspect your system every 3 years, and pump your tank as necessary, generally every 3 to 5 years.
- Use water efficiently. The less water used in the home means less water into the septic system, which can improve its operation and reduce the risk of failure.
- Repair leaky faucets or toilets, as they waste water.
- Care for your drainfield; plant ONLY grass over and near it. Tree or shrub roots can clog or damage the drainfield.
- Clean toilets, sinks, showers, and tubs with mild detergent or baking soda instead of commercial cleaners.
- Learn the location of your septic system. Keep a sketch of it with your maintenance record for service visits.

DON'T...

- Dispose of household hazardous wastes in sinks or toilets.
- Throw ANYTHING into the toilet except toilet paper.
- Allow fats, oils, or grease into the septic system, as they quickly form scum layers, which will increase the need for more frequent pumping.
- Do load after load of laundry in a day. While practical, it does not allow adequate time for your septic system to treat wastes. Flooding the drainfield does not allow for sufficient recovery time.
- Use caustic drain openers for a clogged drain. Instead, use boiling water and a drain snake to open clogs.
- Park or drive on your drainfield, as this can cause damage.

Existing onsite septic systems in Roanoke County

Date Constructed	Before 1970	1970 - 1979	1980 - 1989	1990 - 2015	TOTAL
Within MS4 Area	2,670	1,328	615	631	5,244
Outside MS4 Area	2,521	1,080	1,135	2,076	6,812

LOCATION	Located* within 100 feet of a stream	Located* between 100 feet and 200 feet of a stream	Located* beyond 200 feet from a stream	Total Number of Onsite Disposal Systems
Within MS4 Area	1530	1382	2332	5244
Outside MS4 Area	2541	1980	2291	6812
Total	4071	3362	4623	12056

TMDL Consistency:

Actions that decrease discharges of sediment and *E. coli* are consistent with the TMDLs. (EC & SED)

Evaluation and Modification:

Based on research of existing ordinances in Virginia, periodic septic pump-outs are required by state law in jurisdictions covered by the Chesapeake Bay Protection Act and in portions of some localities to protect a particular water resource (i.e., Franklin County to protect Smith Mountain Lake.) However, the County believes that a similar ordinance in Roanoke County is premature at this time. Instead, the County plans to build citizen support for its water quality programs through enhanced education. Other than enhanced education efforts, no further actions will be taken on this BMP.

T-10: Stream Buffers (EC and SED)

Goal:

Reduce discharges of sediment and *E. coli* by filtering sheet flow through vegetated buffers along streams.

Measurable Goals:

In the 4th year of the previous permit (2016 – 2017), County staff researched similar ordinances in Virginia, identified properties that border waterways in the County. Staff presented their findings to County Administration and obtained approval to develop possible stream buffer criteria for new development.

- In the 5th year of the previous permit (2017- 2018), County staff completed draft stream buffer requirements, proposed as a revision to the County Erosion and Sediment Control Ordinance. The draft requirements were presented to Administration, various stakeholders, and the Board of Supervisors during a work session. Based on feedback from these groups, staff is currently coordinating with Administration and elected officials. A work session with the BOS to discuss this possible ordinance is scheduled for November 6, 2019.

The draft ordinance can be viewed on the County's website at

https://www.roanokecountyva.gov/DocumentCenter/View/11943/2018-5-31-Draft-Stream-Buffers-Chapter_81_Erosion-and-Sediment-Control?bidId=

TMDL Consistency:

Actions that decrease discharges of Sediment and *E. coli* are consistent with the TMDLs. (EC & SED) Implementing a stream buffer ordinance will help protect streams and water quality, while also promoting good land stewardship.

Evaluation and Modification:

This activity began in permit year 2016 - 2017 and is still under development. Evaluation and modification are not appropriate at this time.

T-11: Capital Improvements (EC and SED)

Roanoke County completed the Restoration of Glade Creek at Vinyard Park, Phase 2 in the last permit year.

SLAF funding support for the restoration of Wolf Creek at Goode Park, Phase 1 was obtained in 2019. This project is currently under design. Once constructed, this project is anticipated to lower sediment discharge by approximately 349 tons per year.

Future Capital Improvement Projects

Roanoke County is evaluating potential projects to submit for future SLAF funding. The following projects are being considered:

- 1. Stabilization of a Tributary to Glade Creek at Read Mountain Preserve**

Read Mountain Preserve is a natural County Park on Read Mountain. There is a steep, intermittent stream with steep, barren side slopes through highly-erodible material. This approximately 500-foot reach is discharging excessive sediment. This project would stabilize the steep barren side slopes and provide energy dissipation for the main channel. It is anticipated that SLAF funding will be sought in October 2018.

- 2. Restoration of a tributary of Mudlick Creek at Garst Mill Park**

There was a project to restore Mudlick Creek at Garst Mill Park around 2010. This project would extend stream restoration for approximately 250 feet up a tributary, and it would eliminate excessive sediment discharges.

- 3. Stabilization of a Tributary to Mudlick Creek at Hidden Valley High School**

This tributary is severely eroded. In some cases, the channel has been lowered over 20 feet. This project is complicated by poor construction access and the need to obtain easements from 6 homeowners.

At this time, Roanoke County cannot commit to any of these projects until SLAF funding is obtained.

C. BMPs Developed to Address PCBs TMDL

The specific TMDL Action Plan for PCBs was completed July 1, 2016 and submitted with previous permit Year 3 Annual Report. It is available on the County's website. Initial implementation of the plan, which relies heavily on enhancement of some of the existing BMPs, is discussed below.

BMP 1-2: Roanoke County Stormwater Newsletter

Roanoke County promotes general public awareness of PCBs and their potential sources. An article regarding PCBs was included in the Stormwater Informational Mailer. This article, entitled *What About PCBs*, is on page 3 of the County's newsletter "A Stormwater Guide for Homeowners," dated April 2017. The newsletter is available on the County's website, which can be accessed here: <https://www.roanokecountyva.gov/DocumentCenter/View/9252/Stormwater-News-April-4-2017-?bidId=>

BMP 1-5: Stormwater Public Awareness Program

Roanoke County promotes public awareness information regarding PCBs and their potential sources specifically to the development community by incorporating the PCBs Awareness Fact Sheet into the informational materials provided by the Department of Community Development's permitting office. This sheet is also posted on the County's website at <https://www.roanokecountyva.gov/DocumentCenter/View/9349/PCB-Facts-May-2017?bidId=>

The Department of Community Development provides those applying for demolition permits with the PCBs Awareness Fact Sheet by including it with the stormwater informational materials provided by the County permit technicians. In this permit year, the County issued the following number and type of demolition permits:

Permit Year	# of Demolition Permits Issued
(1) 2018 - 2019	15 - residential 10 - commercial

BMP 1-6: Roanoke County Stormwater Webpage

Roanoke County promotes general public awareness of PCBs and their potential sources by placing the PCBs Awareness Fact Sheet on its existing stormwater webpage. The PCBs Fact Sheet can be found here: <https://www.roanokecountyva.gov/DocumentCenter/View/9349/PCB-Facts-May-2017?bidId=>

BMP 3-2: Illicit Discharge Ordinance

Roanoke County continues to identify and eliminate illicit discharges in accordance with Chapter 24 of the County Code. None of this year's complaints involved the discharge of materials that could possibly contain PCBs.

BMP 4-3: Site Inspections

Roanoke County implements local Erosion and Sediment Control and Stormwater Management programs. Through their implementation, the discharge of sediments, which may potentially have PCBs adhered to them as a result of atmospheric deposition, will be minimized.

BMP 5-2: Post-Construction Inspections for Existing Stormwater Management Facilities

As part of its Stormwater Management Post-Construction Inspections program, the County conducts annual visual site inspections of County-owned stormwater facilities and visual site inspections of privately-owned stormwater facilities once every 5-years. During these inspections, County inspectors look for evidence that the stormwater facility is properly working, specifically that adequate vegetation exists for facility stability and that water is not ponding in the facility for periods longer than designed.

Stormwater management facilities (SWMFs) provide both water quality and water quantity controls. As such, pollutants settle out and are retained in them. By ensuring that the SWMFs are functioning as designed and are being properly maintained, the SWMFs will continue to interrupt the pathway of any potential PCBs from entering into the downstream impaired waters. By properly disposing of the sediments during maintenance, as described in the Standard Operating Procedure (SOP) manual, potential PCBs-laden sediments will be eliminated as a potential source.

BMP 6-2: Standard Operating Procedures

Roanoke County incorporated the PCBs Awareness Fact Sheet and PowerPoint presentation into the County's Water-Quality Related SOP Manual. It is anticipated that through good housekeeping practices, such as the proper collection and disposal of materials from drainage structure cleaning and facility maintenance, sources of potential PCBs will be minimized and the pathway for their entry into the MS4 will be interrupted. The updated SOP Manual can be found in the MS4 Program Plan and on the County's website at:

<https://www.roanokecountyva.gov/DocumentCenter/View/16211/Water-Quality-Related-SOPs-June-2017>

BMP 6-3: Employee Training

Roanoke County has incorporated its PCBs PowerPoint presentation into its Employee Training Program. It is anticipated that through good housekeeping practices, such as the proper collection and disposal of materials from drainage structure cleaning and facility maintenance, sources of potential PCBs will be minimized and the pathway for their entry into the MS4 will be interrupted.

Emergency Spill Response and Containment

In response to spills and accidental releases, Fire and Rescue first responders are the first line of attack on spills and accidental releases. These individuals are trained to contain materials and coordinate with properly licensed and trained private clean-up companies for controlling releases. Entry into the environment of PCBs from potential sources such as leaking transformers will be minimized.

Regulation of Open Burning

Roanoke County regulates open burning under Chapter 9 of the County Code. Under Chapter 9, the County has placed restrictions on the burning of construction and demolition waste and debris. The release of PCBs contained in construction wastes and debris into the environment from local airborne deposition is minimized with the implementation of Chapter 9.

Regulation of Illegal Dumping and Littering

Roanoke County regulates illegal dumping and littering under Chapter 13 of the County Code. Chapter 13 provides the County the legal authority necessary to minimize the amount of debris and wastes that may have incidental PCBs.

Contract Language

Roanoke County uses general language in its contracts to ensure that demolition and construction wastes are properly disposed in landfills. The proper disposal of demolition and construction waste minimizes the amount of PCBs that are available for entry into receiving waters by interrupting their pathway.

DEQ Coordination

Roanoke County will continue to coordinate with the DEQ through its Blue Ridge Regional Office. Through combined state and local efforts, it is anticipated that the quantity of PCBs being discharged from current sources into the waters in and around Roanoke County will diminish. In addition, DEQ will continue to strategize on how best to remove the legacy pollutants that currently exist in these impaired waterways. Roanoke County will notify DEQ within 30-days of any potential PCBs discharges that it identifies for DEQ coordination and follow-up.

Section III. Supporting Documents

(See attached CD)