
City of Charleston

Stormwater Management Plan

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EXECUTIVE SUMMARY

The National Pollutant Discharge Elimination System (NPDES) Program was created by the Environmental Protection Agency (EPA) as a result of the Clean Water Act (CWA). As the EPA-delegated authority of South Carolina, the Department of Health and Environmental Control (SCDHEC) is responsible for implementing the various components of the NPDES program within South Carolina. The NPDES Stormwater Program for Municipal Separate Storm Sewer Systems (MS4s) was implemented in two phases: Phase I for large and medium MS4s and Phase II for regulated small MS4s.

The City of Charleston (City) has been included on the required list of regulated small MS4s since the Phase II Rule was published in the Federal Register on December 8, 1999. The City submitted a Notice of Intent to SCDHEC in 2003, and obtained coverage under the General NPDES Permit for Regulated Small MS4s (Permit) on August 31, 2007. This coverage was continued under the reissuance of the Permit, effective January 1, 2014. The current Permit will expire on December 31, 2018. One of the primary requirements of the General NPDES Permit is the development and implementation of a comprehensive Stormwater Management Plan (SWMP). The purpose of a SWMP is to provide the City with a methodical, practical plan for successfully implementing programs that fulfill the six minimum control measures (MCMs) throughout the duration of the permit term. In addition, the City will develop a monitoring and implementation plan to address water quality concerns associated with impaired waterways within the MS4 area. The six MCMs are as follows:

- Public Education and Outreach
- Public Participation and Involvement
- Illicit Discharge Detection and Elimination (IDDE)
- Construction Site Stormwater Runoff Control
- Post-Construction Stormwater Management in New Development and Redevelopment
- Pollution Prevention/Good Housekeeping for Municipal Operations

This SWMP discusses all of the permit requirements that the City of Charleston must comply with during this permit term. In addition, the existing programs within the City that are protecting the quality of stormwater runoff are discussed, and ways to modify and improve these programs are provided. The schedule for each Plan component will allow the City of Charleston to successfully comply with its permit and protect stormwater quality within its jurisdiction to the maximum extent practicable (MEP). The SWMP should be re-evaluated annually and updated as needed, and a summary of changes should be included with each Annual Report submitted to SCDHEC.



CONTACTS LIST

This Stormwater Management Plan (SWMP) is being submitted on behalf of the City of Charleston, South Carolina. The contact information for the person responsible for the implementation or coordination of all components of this SWMP is provided below:

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INTRODUCTION

2.1 NPDES General Background and Phase I

In response to the growing concern over the quality of water in the United States, Congress enacted the Clean Water Act (CWA) in 1972. The Environmental Protection Agency (EPA), as authorized by the CWA, subsequently developed the National Pollutant Discharge Elimination System (NPDES). The purpose of the NPDES regulations was to be more proactive in protecting the quality of the waters of the nation. In the State of South Carolina, the Department of Health and Environmental Control (SCDHEC) is responsible for enforcing the NPDES regulations, and thus all requirements imposed by SCDHEC relating to the NPDES program reference the discharge of pollutants to waters of the State.

Surface water pollution is a result of various human activities as well as naturally-occurring processes. This type of pollution has the potential to create waters unsafe for drinking, recreation, and other activities, as well as waters uninhabitable by fish, aquatic organisms and wildlife. The NPDES regulations prohibit any point source discharges to waters of the State without an appropriate permit. NPDES permits serve to apply provisions of the CWA to individual entities discharging into South Carolina surface waters by placing pollutant limits on effluent, requiring monitoring of discharges and reporting of the results, as well as requiring entities to implement practices throughout their jurisdiction known to decrease the degradation of surface waters.

The NPDES program targets numerous potential pollution sources, including wastewater treatment plants, industrial facilities and Municipal Separate Storm Sewer Systems (MS4s). The NPDES stormwater permit process has been implemented in two phases within South Carolina. Phase I targeted MS4s located within larger, more centralized municipalities and unincorporated areas. Specifically, medium and large MS4s (generally, MS4s serving populations of 100,000 or greater) are required to be covered under a Phase I permit. The following sections discuss the second phase of the implementation.

2.2 Stormwater Phase II General Rule

In 1999, the EPA issued the Stormwater Phase II General Rule, which targets “regulated small MS4s.” A small MS4 is generally any MS4 not already covered by a Phase I NPDES permit. The Phase II regulations automatically apply to all small MS4s located within an Urbanized Area (UA), but may also apply to small MS4s outside of the UA if SCDHEC deems it necessary.



The boundaries of UAs are delineated every ten years by the U.S. Census Bureau, and are based on population density. Currently, a UA is defined by the Bureau of the Census as “a land area comprising one or more places – central place(s) – and the adjacent densely settled surrounding area – urban fringe – that together have a residential population of at least 50,000 and an overall population density of at least 500 people per square mile.”

Phase II of the NPDES program is intended to be an extension of Phase I, instituting the use of effective preventative measures to help improve the quality of water entering into and discharging from small MS4s. The requirements of Phase II are intended to provide the owners/operators of smaller, growing MS4s with measures that can be taken to minimize the negative impacts of development and other human activities on water quality. Specifically, the owners/operators of small MS4s are required by the EPA to design their Phase II programs to accomplish the following:

- Reduce the discharge of pollutants to the Maximum Extent Practicable (MEP).
- Protect water quality.
- Satisfy the appropriate water quality requirements of the CWA.

In order to comply with a Phase II permit, the owner/operator of a small MS4 must develop and implement the six “Minimum Control Measures” (MCMs). These MCMs are as follows:

- Public Education and Outreach on Storm Water Impacts
- Public Participation and Involvement
- Illicit Discharge Detection and Elimination (IDDE)
- Construction Site Storm Water Runoff Control
- Post-Construction Stormwater Management for New Development and Redevelopment
- Pollution Prevention/Good Housekeeping for Municipal Operations

Small MS4s can either issue a Notice of Intent (NOI) to SCDHEC for coverage under the *State of South Carolina NPDES General Permit for Storm Water Discharges from Regulated Small Municipal Separate Storm Sewer Systems (SMS4)* (NPDES General Permit for Small MS4s), or they may choose to apply for an individual permit. One of the major requirements of the NPDES General Permit for Small MS4s is the development and implementation of a comprehensive Stormwater Management Plan (SWMP).



The use of the MEP standard to determine compliance with a Phase II permit requires the development and implementation of Best Management Practices (BMPs) to address each of the six MCMs. All BMPs should have measurable goals associated with them, so that SCDHEC is able to determine whether an MS4 is making significant progress toward fulfilling the requirements of its permit by successfully implementing their BMPs in accordance with their SWMP. Permittees are required to assess the effectiveness of the BMPs they have chosen by establishing measurable goals for each of them, and determining whether they are successful at eliminating the discharge of pollutants to the MEP. They are also required to make certain that their chosen BMPs satisfy the requirements of the CWA.

The NPDES General Permit for Small MS4s was originally issued in October of 2003, but it was appealed by several of the MS4s that were required to obtain coverage under the permit. The appeal was settled on December 28, 2005, and the revised permit (SCR030000) became effective on March 1, 2006, and expired on February 28, 2011. The NPDES General Permit for Small MS4s was re-issued by SCDHEC on November 1, 2013 and became effective on January 1, 2014. The re-issued NPDES General Permit for Small MS4s will expire on December 31, 2018.

2.3 City of Charleston Permit Background

The City of Charleston (City) has been included on the required list of regulated small MS4s since the Phase II Rule was published in the Federal Register on December 8, 1999. In 2014, the City retained the services of URS Corporation to assess its existing Stormwater Management Program and compliance initiatives associated with the January 1, 2014 reissuance of the NPDES General Permit for Small MS4s. In cooperation with the City, URS has developed a list of recommended BMPs for the six MCMs as well as methodology for addressing TMDL compliance requirements.

The recommended BMPs for each MCM continue the City's efforts to meet water quality requirements initially outlined in the January 2011 City of Charleston "Stormwater Management Program" document. In addition to the list of BMPs, this document also included recommendations for implementation, measurable goals for compliance, and level of effort required for continued implementation and compliance of the stormwater program.

The BMPs and procedures outlined in this SWMP maintain the initial goals set forth by the City to maintain a proactive approach to addressing water quality and maintaining compliance with the NPDES General Permit for Small MS4s.



SPECIAL CONDITIONS APPLICABLE TO PERMITTED STORMWATER DISCHARGES TO SENSITIVE WATERS

Part 3 of the NPDES General Permit for Small MS4s requires the City of Charleston to take specific actions to protect and improve the water quality in sensitive waters located within the SMS4. Sensitive waters are defined as those with a developed and approved TMDL, those listed on the most recent SCDHEC §303(d) list, those classified as either Outstanding National Resource Waters (ONRW), Outstanding Resource Waters (ORW), Trout Waters (TN, TPGT and TPT) or Shellfish Harvesting Waters (SFH), or those within Source Water Protection Areas (SWPA).

These actions include the creation of a TMDL monitoring plan, for those areas not fully supporting their designated use; an assessment of achieving Waste Load Allocations (WLA) and Water Quality Standards (WQS) within the watershed; and a plan for prioritizing BMP implementation projects within the MS4 along with an implementation schedule.

In addition, Section 3.4.2 states

“The SWMP shall include a section describing how BMP implementation will not cause or contribute to violations of water quality standards in water bodies with impaired monitoring stations identified by the SCDHEC Bureau of Water under Section 303(d) of the Federal Clean Water Act or under 40 CFR § 130.7. The SWMP shall specifically identify BMP, control techniques, system design, and engineering methods and such other provisions deemed appropriate for control of the pollutant of concern.”

Table 1 includes the current list of Sensitive Waters that receive stormwater flows from the City of Charleston. The City of Charleston’s jurisdictional limits currently contain two Water Quality Monitoring Stations (WQMS) within one approved TMDL; Charleston Harbor, Cooper Ashley and Wando Rivers (MD-264 and MD-049), hereafter referred to as Harbor TMDL.

The Harbor TMDL has been established to develop wasteload allocation requirements (WLA) associated with point discharges from individually permitted facilities. Based on requirements and recommendations outlined in the TMDL document, the City of Charleston MS4 area has no WLA reduction requirements associated with the MS4 area. Therefore, at this time, the City has no requisite schedule for water quality monitoring or BMP implementation associated with this TMDL. Moving forward, the City will continue to monitor impaired watersheds within the jurisdictional limits of the City through illicit discharge detection and outfall dry weather



screening as outlined in MCM 3. Should additional TMDLs be developed during the current permit cycle, the City will implement the monitoring and implementation requirements outlined further in this section in accordance with the requirements described in this section and corresponding NPDES Permit requirements.

Table 1: Current TMDL and §303(d) Listed Monitoring Stations

Approved TMDLs			
Monitoring Station(s)	TMDL	Technical Report	Impairment(s)
MD-264, MD-049	Charleston Harbor, Cooper, Ashley and Wando Rivers	0506-13	<i>Dissolved Oxygen</i>

2012 §303(d) Listed Water bodies			
Monitoring Station(s)	Station Description	Basin	Impairment(s)
MD-049	Ashley River at Magnolia Gardens	Santee	<i>Turbidity, Fecal coliform</i>
MD-195	Church Creek at SC 700 1 mile SW or Cedar Springs	Edisto	<i>Dissolved Oxygen</i>
RT-052098	James Island Creek, north of White Hall Plantation	Santee	<i>Dissolved Oxygen, Fecal Coliform</i>
RT-042072	Unnamed tributary to Parrot Point Creek, 0.8 miles south of Ft. Johnson	Santee	<i>Turbidity</i>
MD-025	Mouth of Elliott Cut at Edge Water Drive (S-10-26 off Highway 17)	Santee	<i>Dissolved Oxygen</i>
MD-026	Stono River at SC 700	Santee	<i>Dissolved Oxygen</i>

3.1 Existing Programs

Prior to the issuance of the 2014 SMS4 General Permit, the City of Charleston has been proactively engaged in stormwater quality improvement efforts throughout the City limits through outfall screening and coordinated illicit discharge detection efforts with Charleston Water Systems (CWS), the regional water and sewer provider within the City. The City has inspected all stormwater outfalls and conducted follow-up inspections for any suspected non-stormwater discharges to eliminate illicit discharges. Local citizens have been targeted through MS4 education and outreach programs, to encourage the proper disposal of pet waste to reduce fecal coliform loading within the watershed.

3.2 Planned Programs

As stated previously, the City has taken a proactive approach to assessing and improving water



quality within its MS4 area. The City will continue with these efforts during the current term to meet the requirements stated in the SMS4 General Permit.

The City will develop a TMDL Monitoring and Assessment Plan in accordance with the requirements set forth in the NPDES Phase II General Permit as TMDL watersheds are developed and approved within the City's jurisdiction. These plans will be developed in accordance with existing City-wide watershed plan objectives and procedures as well as SCDHEC protocol. These plans will establish water quality monitoring locations and sampling SOPs to determine the City's water quality impact within approved TMDL watersheds. Monitoring will be consistent with the requirements set forth in the Permit.

Once monitoring results are available, the City will develop an implementation plan to determine structural and non-structural BMPs that could be implemented within these TMDL watersheds to improve water quality to the MEP.

3.3 Proposed Implementation Schedule

Table 2 on the next page provides an approximate schedule for the implementation of activities associated with the Special Conditions Applicable to Permitted Discharges to Sensitive Waters portion of the SWMP.



Table 2: Proposed Implementation Schedule for Special Conditions Applicable to Permitted Storm Water Discharges to Sensitive Waters

PROGRAM ELEMENTS (BMPs)	IMPLEMENTATION GOAL
1. Complete TMDL Monitoring and Assessment Plan	12 months from effective date of new TMDL
2. Identify and train monitoring staff	18 months from effective date of new TMDL
3. Begin monitoring in waters with existing approved TMDLs	18 months from effective date of new TMDL
4. Analyze monitoring data	Annually as needed
5. Complete TMDL Monitoring Analysis and Implementation Plan	Coordinate with SCDHEC on implementation schedule for identified TMDL
6. Begin Monitoring in new TMDL waters within 18 months of the Effective Date of the TMDL	As-Needed



SWMP COMPONENTS

Part 4.1.1 of the NPDES General Permit for Small MS4s requires the City to:

“...develop, implement, and enforce a SWMP designed to reduce the discharge of pollutants from your SMS4 to the maximum extent practicable (MEP), to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act. The SWMP should include management practices; control techniques and system, design, and engineering methods; and such other provisions as the Department determines appropriate for the control of such pollutants.”

In addition, for each MCM, the SWMP must identify the BMPs that will be implemented, the measurable goals for each BMP, the person(s) responsible for implementing or coordinating the BMPs, and rationale for how and why each BMP was selected. The City of Charleston SWMP was first adopted by City Council on May 31, 2009 in compliance with General Permit Section 4.1.3. The SWMP follows the requirements of the City’s Certificate of Coverage (SCR031901), which is included in Appendix A. The Certificate of Coverage expired on February 28, 2011, and upon receipt of the new Certificate of Coverage, this information will be updated and included, as appropriate, in the SWMP and Appendix A.

4.1 Public Education and Outreach on Storm Water Impacts (MCM 1)

Section 4.2.1.1 of the NPDES General Permit for Small MS4s requires the following:

“...permittees shall continue to implement, and revise if necessary, a comprehensive stormwater education/outreach program in accordance with the items noted below.”

- Identify the pollutant(s) of concern within the municipality’s defined watershed area(s);
- Analyze the POC identified to be targeted;
- Initiate a planning process that defines the goals and objectives of the program as they relate to at least three high priority community issues with potential to decrease the POC’s effect on water quality.

- Identify and analyze the target audience(s) that is believed to have an influence on the POC identified;
- Create an appropriate message(s) in accordance with the program goals and objectives that is designed to invoke a desired response in the targeted audience(s).
- Develop an appropriate education campaign and/or materials as needed to convey any messaging created in accordance with program goals and objectives and based on knowledge of the target audience(s);
- Determine methods and process of distribution for campaign materials in accordance with a knowledgebase of the target audience(s);
- To the MEP, utilize quantitative and/or qualitative formative evaluation assessments to guide and/or change the program goals and/or program activities as needed;
- Utilize public input to the MEP in the development of this MCM;
- Implement program goals and objectives to the MEP during the permit term; and,
- Assess the stormwater education/outreach program annually as part of the annual report.

Public education and outreach builds citizen support of NPDES program-related activities, thereby allowing the City to more successfully implement the components of this SWMP. Many people are unaware of the various activities that can adversely impact the quality of stormwater runoff. Once informed and educated, they are often willing to make adjustments in their daily lives in order to help protect the quality of water. In addition, educating the public regarding ways in which they can help to reduce the amount of pollution introduced to stormwater runoff creates a sense of responsibility and pride among citizens.

4.1.1 Existing Programs

During the initial permit term, the City determined that the public education and outreach program could be more fully developed by utilizing the services of Clemson University Extension's program *Carolina Clear*. This comprehensive program is endorsed by SCDHEC and provides excellent materials and resources for meeting all requirements of the first two MCMs of Phase II.

The City allows Clemson University Extension to conduct the majority of the implementation for this minimum control measure. On April 9, 2008, the City of Charleston signed a Memorandum of Understanding (MOU) with *Carolina Clear*, to run for a period of five (5) years. The City renewed the MOU with *Carolina Clear* on April 10, 2013, for another five-year period. The MOU allows the staff of *Carolina Clear* to collaborate with the City to address stormwater education and involvement. Copies of the current MOU and Contractual Agreement between Clemson University and the City of Charleston are included in Appendix C.

In order to more efficiently use resources to reach the greatest number of people possible with the program, the City of Charleston joined together with other MS4 communities in the Charleston Urbanized Area to form the Ashley Cooper Stormwater Education Consortium (ACSEC) for the purposes of education and outreach. This is a regional stormwater outreach and involvement effort that includes the following communities at the time of submission.

- Berkeley County
- Charleston County
- Dorchester County
- City of Charleston
- City of Folly Beach
- City of Goose Creek
- City of Isle of Palms
- Town of James Island
- Town of Lincolnville
- Town of Mount Pleasant
- City of North Charleston
- Town of Sullivan’s Island
- Town of Summerville

Due to their proximity to one another, these communities have a very similar audience base to target through public education, outreach and involvement programs.

Spearheaded by Clemson University’s Cooperative Extension Service (*Carolina Clear*), the ACSEC is working together with the SMS4 communities, universities, agencies and non-profits, to help implement MCM 1, by implementing a regional watershed-scale stormwater runoff education strategy in the Charleston urbanized area. By pooling the resources of these MS4s through the ACSEC, *Carolina Clear* is able to more effectively target this common audience.

The new NPDES General Permit was issued effective January 1, 2014, and reporting for the current permit cycle will be adjusted to comply with the new permit timelines and requirements. Highlights of ACSEC activities for each year of the previous permit cycle are summarized below:



Year 1 (January 2008 through June 2009):

The official Joint Resolution Adopting a Regional Stormwater Education Strategy was signed on July 29, 2008, by Berkeley, Charleston and Dorchester Counties, and the municipalities of Charleston, Folly Beach, Hanahan, Isle of Palms, Lincolnton, North Charleston, Sullivan’s Island, and Summerville. An education plan and strategy were developed, as well as short-term and long-term goals. The long-term strategy was to link audiences with specific pollutants in order to provide a platform for a targeted outreach campaign. Short-term goals completed during Year 1 included conducting surveys to provide information on public perceptions, knowledge and behaviors to help the ACSEC better understand the region, and to support, implement and expand existing water resource education programs to increase awareness about stormwater runoff pollution.

Year 2 (July 2009 through June 2010):

The ACSEC continued to reach a wide variety of audiences through multiple outreach methods, both direct (presentations, involvement activities, direct contacts, trainings) and indirect (television, radio, billboards, print, exhibits). The primary audiences (general public, residential population and youth) were targeted with stormwater education relating to landscape practices, pet waste, hazardous materials management and auto and boat maintenance. In addition, commercial and technical audiences were targeted for structural and non-structural best management practices, specifically regarding management of sediment, pesticides, and stormwater volume. Permanent exhibits were developed at “vector” sites that receive regular visitation. Several data gathering projects and a regional characterization were completed, providing the foundation for future educational planning.

Year 3 (July 2010 through June 2011):

The first mass media campaign was phased out in Year 3, to be replaced with a new statewide and regional mass media campaign. Four new permanent exhibits were developed, and a stormwater BMP was added to an existing site, to serve as educational infrastructure and demonstrate and educate the region on both structural and non-structural stormwater BMPs. A new long-term strategic plan was developed to be used as a roadmap to focus and prioritize future efforts.

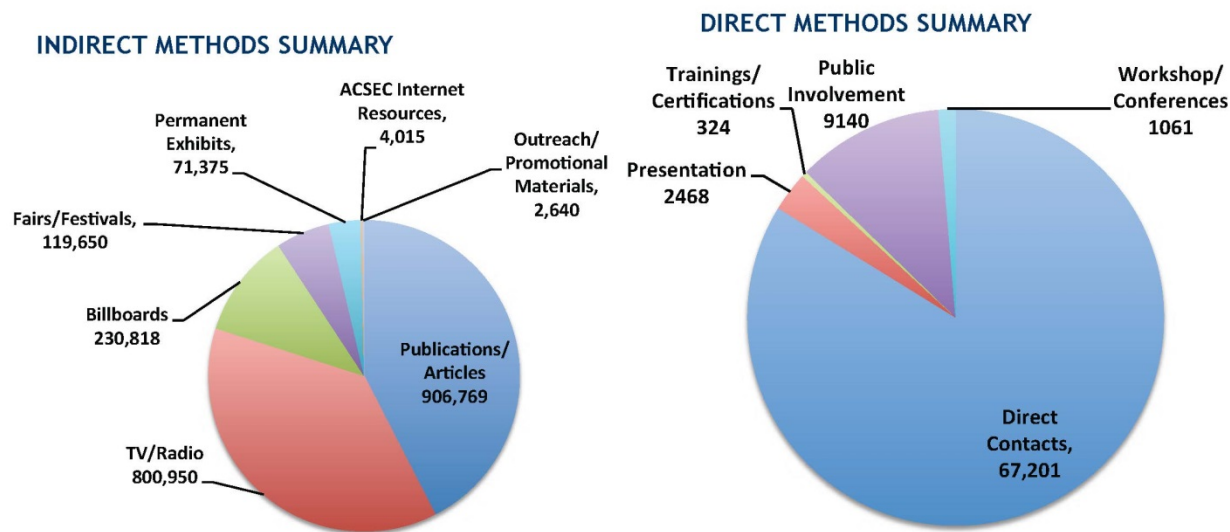
Year 4 (July 2011 through June 2012):

The new mass media campaign, “We All Live Downstream,” was launched on television and billboards. An ACSEC electronic newsletter, *The Ripple Effect*, and ACSEC Facebook page were created to provide opportunities to learn about ACSEC activities and



water stewardship information. New exhibits were developed to add to a growing list of permanent exhibits, including the “Green Teaching Garden” at the College of Charleston Grice Marine Laboratory, and a rainwater harvesting display at the South Carolina Aquarium. On March 22, 2012, the ACSEC hosted the inaugural Charleston Area Stormwater Pond Management Conference at Trident Technical College.

The educational outreach impacts from direct and indirect methods during Year 4 are presented in the following charts from the “ACSEC Year 4 Annual Report of Activities.”



Year 5 (July 2012 through June 2013):

In an effort to raise general watershed awareness, the ACSEC teamed with a local television station to conduct street interviews and community news segments. The ACSEC website was updated to include an events calendar and live Facebook feed. Readership of the electronic newsletter, *Ripple Effect*, increased to over 1,000 recipients. New permanent learning exhibits were created to add to the 15 existing exhibits. Year 5 program efforts diversified to include online learning with the Carolina Yards Online course, a five-week online course based on Clemson Extension’s Carolina Yards program. Additionally, the ACSEC partnered with Rainwater Solutions for the inaugural ACSEC rain barrel sale in which rain barrels were sold to the general public at a discounted price. Five rain garden workshops were hosted by ACSEC as part of public programming and training for Master Gardeners and Master Naturalist.

Each year, *Carolina Clear*, as part of the Ashley Cooper Stormwater Education Consortium, is



jointly responsible for developing and implementing the annual education plan. This education plan outlines outreach strategies, target audiences, target pollutants and evaluation measures to determine the success of the MCM. Success criteria are included as part of the education plan, incorporating several strategies including post-workshop assessments, follow-up surveys and activity attendance to evaluate the success of the MCM.

In addition to utilizing *Carolina Clear*, the City provides other means of public education and outreach. The Public Service page of the official City of Charleston website (<http://www.charleston-sc.gov>) currently contains a link to the Stormwater Education page, to provide general public education regarding the stormwater program. This page explains how oil, trash, chemicals, dirt, and other pollutants are picked up by stormwater flow and discharged directly into the bodies of water used for swimming, fishing and drinking. It also informs citizens that by practicing healthy habits, they can help keep common pollutants out of stormwater. The page also contains information on Stormwater Pond Maintenance and the Ashley Cooper Stormwater Education Consortium (ACSEC), and provides links to the Stormwater Design Standards Manual, Stormwater Management Plan, and information on the City's Stormwater Service. As the *Carolina Clear* program develops and is implemented, this website can continue to be utilized to post public information and links to outreach projects and ACSEC sponsored events.

The City provides a convenient means for citizens to report a concern or a service request to the City concerning stormwater management via the City's web site. REPORT A CONCERN is available from the HELP CENTER that is prominently displayed on the home page of the official City of Charleston website, and also from the Stormwater page. Utilizing the "Make A Request" link allows citizens to send a text message directly to the City for specialized attention for a complaint or concern. Stormwater-related topics under "Make A Request" include:

- Request ditch cleaning
- Ditch Piping Program information
- Request flood zones for an individual property
- Report flooding or standing water
- Report location of street drain(s) or driveway pipe(s) that need cleaning
- Request information on Keep Charleston Beautiful/Clean City Program

Issues and complaints submitted through the on-line reporting system are placed into a computerized system assuring appropriate follow-up. Charleston will continue to advertise the availability of this service, which will serve as additional public outreach.

The City of Charleston has an excellent Community Classification of 7 with the National Flood Insurance Program's (NFIP) Community Rating System (CRS) flood insurance program. Maintaining this rating requires a high level of outreach projects, stormwater management and



drainage system maintenance, which demonstrates the level of effort the City has put into the stormwater management program for years.

The City of Charleston provides environmental education opportunities through various programs within the Parks and Recreation Departments. The *Keep Charleston Beautiful* (KCB) program is administered by the Parks Department. Following is a sampling of programs offered through KCB:

Keep Charleston Beautiful		
School Programs	Clean City Clara	Through an interactive presentation, students help each other learn why litter is bad. They also learn what they can do to help cleanup and prevent litter.
	Clean Cities Sweep	Students and teachers plan and conduct cleanup and beautification projects that positively impact the local community and environment.
	Talking Trash	Based on current middle school science standards, the program focuses on proper waste management, stormwater drainage, marine debris and its impacts on the marine environment, and most importantly, constructive actions students can take to help create a cleaner, more beautiful Charleston.
Awareness Programs	My City is Not Your Ashtray	Cigarette Litter Prevention Program
	Pick Up After Your Pet	To help reduce pet waste in City parks Keep Charleston Beautiful and the Department of Parks provide dog waste removal bags for public use. The program educates pet owners about the water quality problems associated with animal wastes in parks and other public areas, and encourages pet owners to pick up after their pets.
	Lend-A-Bin Recycling	ClearStream collapsible wire frame recycling bins are loaned to interested groups for events and functions hosted within City parks and facilities.



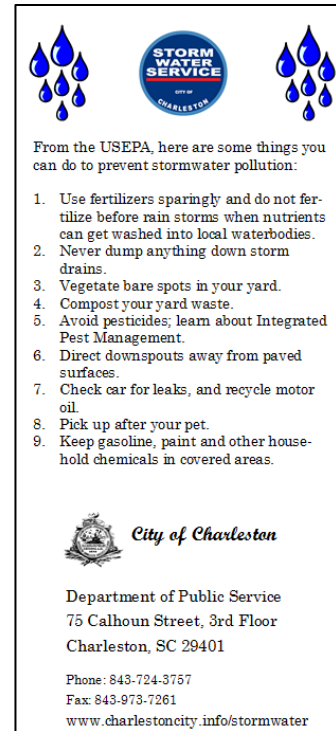
Additionally, the Environmental Education Division of the City’s Recreation Department provides interactive and educational programs that focus on Low Country habitats, environments, and wildlife. The programs are offered through Tiedemann Park Nature Center, and are geared primarily for children.



Other examples of educational outreach during the permit term are as follows:

- Water Bill Inserts: Inserts in utility bills are a convenient means to convey information about stormwater pollution to a large audience. The City of Charleston has teamed with Charleston Water System to provide educational inserts in water bills that reach water and sewer customers within its service area.
- BMPs for Restaurants: In 2010, the City began distribution of “Best Management Practices for Restaurants” to reduce and prevent stormwater pollution from restaurants entering the storm drain system in downtown Charleston. The BMP guidelines stress the importance of keeping wastes from spills, mop water, grease, leaking dumpsters and other pollutants out of the storm drain system, and providing proper BMP training to employees.
- Storm Drain Marking: The City of Charleston marks storm drains in high traffic areas and areas where illicit discharges have or are likely to occur.

Example Water Bill Insert



4.1.2 Planned Programs

The City of Charleston plans to continue to partner with the Clemson *Carolina Clear* program and the Ashley Cooper Stormwater Education Consortium to implement public education/outreach and public involvement and participation measures of the NPDES SMS4 permit. This coordinated effort will include a regional decision-making process that is consistent among all *Carolina Clear*-lead efforts with representatives from each MS4 participating in a prioritization strategy for effective outreach and involvement programming.

The pollutant of concern analysis and prioritization process will include the following considerations, pulled together through a planning and reporting framework provided by *Carolina Clear*:

- An assessment of the region’s TMDLs and 303(d) impaired water bodies list.
- Public Works Departments, stormwater staff, and educational partners will evaluate common concerns and phone calls of stormwater-related issues across the region.
- Feedback from community and educational partners will also include a review of common problems potentially affecting local water resources and the audiences that may be responsible for addressing these problems.
- Telephone survey data collected in the fall of 2013 will be available in the fall/winter of 2014 to guide outreach prioritization, educational messaging and willingness to be involved. The results of this effort will be used as public input to the development of the SWMP as well as a baseline for broad program evaluation.

The above process lead by *Carolina Clear* will result in a five-year educational outreach and involvement strategy that prioritizes resources and potential for sustainable impact across at least three pollutants of concern, behaviors to address, target audiences, motivating messages, vehicles for information delivery and short-term and long-term measures of success. This outreach plan will be a guiding document for this consortium’s efforts, recognizing that new information, media opportunities, partnerships and new water quality data may affect both the strategy and means to measure program success.

The City’s educational plan, developed in conjunction with the *Carolina Clear* program, will have defined and measurable goals to determine the annual impact of the program. This program will be evaluated on an annual basis and modified as necessary to impact the public with respect to water quality concerns to the MEP.

4.1.3 Proposed Implementation Schedule

Table 3 on the next page provides an approximate schedule for the implementation of the Public Education and Outreach on Storm Water Impacts MCM.

Table 3: Implementation Schedule for Public Education and Outreach on Storm Water Impacts

MCM 1 - PROGRAM ELEMENTS (BMPs)	IMPLEMENTATION GOAL
1. Identify the pollutant(s) of concern (POC) within the City’s defined watershed areas.	January 2015
2. Define the goals and objectives for three (3) high priority community issues with the potential to decrease the POC’s effect on water quality.	March 2015
3. Identify and analyze the audiences believed to have an influence on the POC.	March 2015
4. Create an appropriate message in accordance with program goals and objectives that is designed to invoke a desired response in the targeted audience(s).	March 2015
5. Develop and implement a revised education campaign.	March 2015 Annually Thereafter
6. Determine the methods and process for distribution.	March 2015 Annually Thereafter
7. Implement all goals and objectives identified during the permit term.	Reassess Annually Mid-Year
8. Utilize quantitative and/or qualitative formative evaluation assessments to guide and/or change the program goals and objectives and/or program activities as needed.	Annually
9. Assess the stormwater education/outreach program annually.	Annually
10. Utilize public input to the MEP.	On-going



4.2 Public Involvement and Participation (MCM 2)

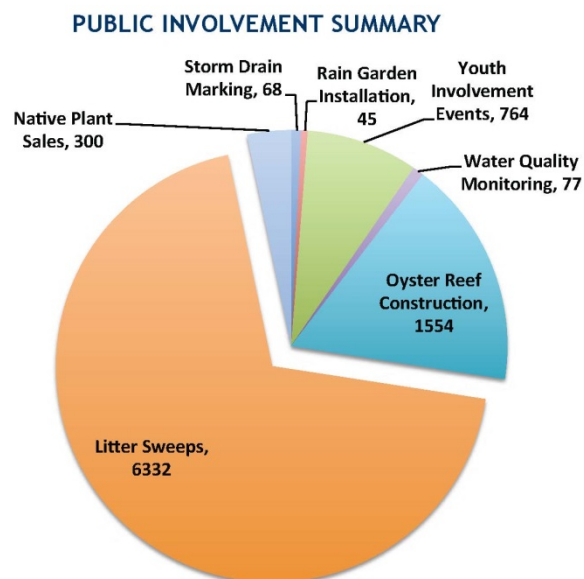
The Public Involvement and Participation MCM is similar in nature to the Public Education and Outreach on Storm Water Impacts MCM; however, its primary intent is to make citizens more active in the development and implementation of NPDES-related programs. Public involvement and participation is an essential program component because it builds a broader public support system, shortens implementation schedules, creates a broader base of expertise and economic benefits, and is a conduit to other programs.

4.2.1 Existing Programs

During the previous permit cycle, *Carolina Clear*, through the ACSEC, sponsored numerous public involvement programs, including the following:

- Litter sweeps
- Storm drain marking
- Rain garden installations
- Oyster reef construction
- Water quality monitoring
- Summer camps
- Youth involvement events
- Native plant sales
- Rain barrel sales

The public involvement impact summary for Year 4 (July 2011 through June 2012) is shown in the following chart from the “ACSEC Year 4 Annual Report of Activities.”



The City of Charleston currently participates in annual community-wide cleanups such as the *Great American Cleanup* and the *Beach Sweep/River Sweep* through *Keep Charleston Beautiful* (Charleston is an affiliate of *Keep America Beautiful*). The *Beach Sweep/River Sweep* is the largest one-day volunteer cleanup event of its kind in South Carolina.

These activities allow for the interaction between City personnel and residents of the community, and demonstrate the City's commitment to maintaining environmental quality.

As discussed previously, the City of Charleston decided to utilize the services of *Carolina Clear* to satisfy the requirements of the Public Education and Outreach MCM, as well as the Public Involvement and Participation MCM.

The *Carolina Clear/ACSEC* education plan is developed annually and outlines potential opportunities for actively involving the public in the development and implementation of this regional education program. The plan includes activities for the following target audiences: the general public, K-12 and higher education, elected and appointed officials and high-level staff, professionals such as contractors, engineers, developers, and public works staff.

As indicated by the ACSEC programs listed above, the plan includes various types of public involvement activities, including rain garden implementation, Carolina Yards & Neighborhoods programs, storm drain stenciling and tagging, volunteer monitoring or stream/beach cleanup activities. In addition, *Carolina Clear* will speak as needed or upon request at public hearings and will work with citizen volunteers willing to educate others about the program, including, but not limited to the following groups: Master Gardeners, which are required to perform outreach activities, river sweeps which engage community members in an active, awareness activity which can lead to educating friends, family and neighbors about the importance of stormwater runoff. *Carolina Clear* and the SMS4 will also maintain a presence at festivals and events to recruit citizen volunteers to work towards raising awareness of stormwater pollution. The specifics of these outreach activities will be outlined in the education plan on an annual basis.

To evaluate the success of this MCM, *Carolina Clear* and the City of Charleston have chosen to implement the following methods of assessment: assessment forms will be filled out by each participant rating the quality of the event, turnout numbers and increases in numbers over the permit period, and Google Analytics is being used to evaluate information used on the website and user characteristics (location, downloads, keywords, return user, and so on). Results are then collated and analyzed with each annual report. These results are used as part of an iterative process to improve delivery of the region's educational message



4.2.2 *Planned Programs*

During the current permit term, the City of Charleston will continue to use *Carolina Clear* to:

- Create opportunities for citizen participation;
- Make SWMP information easily available to the public; and
- Incorporate written procedures into the SWMP.

4.2.3 *Proposed Implementation Schedule*

Table 4 on the next page provides an approximate schedule for the implementation of the Public Involvement and Participation MCM.



Table 4: Implementation Schedule for Public Involvement and Participation

MCM 2 - PROGRAM ELEMENTS (BMPs)	IMPLEMENTATION GOAL
1. Incorporate written procedures for implementing the Public Involvement and Participation MCM in the Stormwater Management Plan.	January 2015
2. Create opportunities for citizens to participate in the implementation of stormwater controls (e.g., stream clean-ups, storm drain stenciling, volunteer monitoring, and educational activities).	On-going
3. Semi-annual contractor and engineer workshops.	On-going
4. Provide access so that the public can easily find information about the Stormwater Management Plan website.	On-going



4.3 Illicit Discharge Detection and Elimination (MCM 3)

Section 4.2.3 of the NPDES General Permit for Small MS4s requires the following with regard to the Illicit Discharge Detection and Elimination (IDDE) MCM:

- *“Develop, implement and enforce a program to detect and eliminate illicit discharges into your SMS4.*
- *Develop, if not already completed, a storm sewer system map, showing the location of all outfalls and the names and location of all waters of the State that receive discharges from those outfalls.*
- *...effectively prohibit, through ordinance, or other regulatory mechanism, non-stormwater discharges into your storm sewer system.*
- *Develop and implement a plan to detect and address non-stormwater discharges, including illegal dumping, to your system.*
- *Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.”*

An illicit discharge is defined as any discharge to a SMS4 that is not entirely composed of stormwater, except discharges authorized under a separate NPDES permit (other than the NPDES permit for discharges from the SMS4) and discharges resulting from firefighting activities. Typical illicit discharges include such things as sanitary wastewater, effluent from septic tanks, car wash wastewaters, improper oil disposal, radiator flushing disposal, laundry wastewaters, spills from roadway accidents, improper disposal of automobile fluids and household chemicals.

There is a limited list provided in 40 CFR §35.2005(20) for SMS4s of allowable non-stormwater discharges that are exceptions to the prohibition only if they are considered non-significant contributors of pollutants to the Small MS4. This list includes, but is not limited to, such discharges as irrigation water, lawn watering and dechlorinated swimming pool discharges. If any of these discharges are found to be significant contributors of pollutants discharging to the MS4, they must be addressed by the City and are no longer permissible.

The elimination of pollutants before they are introduced to stormwater runoff is the most effective means of eliminating pollutants in stormwater discharging from a SMS4. The implementation of an IDDE Program within a SMS4 is a positive step towards the elimination of pollutants at their source. Illicit discharges may occur inadvertently or may be intentional. In



either case, the elimination of such discharges can have a significant positive impact on water quality.

The IDDE MCM is very closely linked with the Public Education and Outreach Program MCM. Most of the population are uninformed regarding the concept of an illicit discharge, and are unaware that they may be contributing to the degradation of water quality in their Small MS4. By raising awareness about illicit discharges and illegal connections within residential areas, the City will be able to target a large portion of the population, and educate them as to steps they can take as citizens to protect the quality of their local water bodies.

4.3.1 Existing Programs

In preparation for continued coverage under the NPDES General Permit for Small MS4s, the City of Charleston has worked diligently for several years to revise and amend its Code of Ordinances. Under the initial permit cycle, it was necessary for the City to establish sufficient legal authority to impose stricter water quality requirements, as well as to enforce these requirements. One facet of these revisions was the creation of an ordinance to define and prohibit illicit discharges in an effort to ultimately eliminate them from the City's MS4. The IDDE program requirements are embedded as part of the overall Stormwater Management Ordinance in Chapter 27 of the City of Charleston Code of Ordinances. Those portions of the revised ordinance that pertain to the IDDE program are discussed in the paragraphs that follow, as well as other aspects of the IDDE program that the City already has in place.

Illicit discharges and illicit connections are defined in Article I of Chapter 27 of the City Code of Ordinances. Within this chapter, Division 4 is devoted specifically to illicit discharges. With respect to illicit connections, Division 4 Section 27-40 clearly identifies that “...it is unlawful for any person to connect any pipe, open channel, or any other conveyance system that discharges anything, except stormwater or other approved discharges into a City stormwater management system or facility or to any receiving waters.”

Section 27-40 specifically prohibits illicit discharges and illegal connections to the City's MS4, and Division 5 Section 27-53(a) establishes the authority of the City to “...enter upon the lot or parcel of land and correct the violation, and the costs incurred as a result of such action, including, but not limited to inspection, administration, labor and equipment costs shall be collected from the property owner or the operator, or shall become a lien upon the property and shall be collected in the same manner as the City's taxes are collected.” This stipulation provides the City with the follow through necessary to be able to enforce the ordinance.

There are also several other enforcement actions that may be taken by the City should any portion(s) of the ordinance be violated. Some of the enforcement actions available to the City include administrative remedies, civil penalties (monetary), criminal violations, and severance of



City services. These and all other actions are discussed in Division 5, Monitoring, Inspection, Enforcement, Abatement, and Penalties.

Another key element of the IDDE program is an effective spill prevention and response program. Division 3, Section 27-32 addresses spill response within the City and requires that “...as soon as any person has any information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into stormwater, the storm drain system, or receiving waters, said person shall take all necessary steps to discover, contain, and cleanup any such releases. This person shall also take immediate steps to protect against future recurrences of the discharge. In the event of such a release of hazardous materials, including but not limited to oils, greases, engine fluids and fuels, chemicals, herbicides and pesticides, and fertilizers, said person shall immediately notify all agencies as required by law.”

In addition to the legal authority established by the IDDE ordinance, the City also currently maintains a map of the regulated area in its GIS system. The map contains such information as contour elevations, streets and street names, parcel lot lines and delineated structures, and locations of some stormwater inlets and pipe networks, including pipe diameters and lengths of pipe segments.

A comprehensive map of the City’s storm sewer system showing the location of all outfalls is required by the NPDES General Permit for SMS4s, and is an important element in maintaining a comprehensive dry weather screening component of the IDDE program. The City currently maintains a map of a large portion of the storm sewer system outfalls that were mapped during the initial permit term. As part of the City’s planned programs for this new permit cycle, additional areas will be added to the overall map. The City utilized record drawings, field investigations and other historical data to determine the locations of stormwater outfalls within its MS4. The data dictionary in Appendix D will be used to collect any new outfall information added to the system during the current permit term.

The development of the storm sewer system outfall map coincided with the beginning of the dry weather field screening program. As the City was compiling the storm sewer system outfall map, the first round of the dry weather field screening process was initiated by completing dry weather screening along with the outfall inventory, when possible. This eliminated the need to reinvestigate outfalls after the outfall map had been completed. The City had completed Dry Weather Screening of 95% of the total outfalls during the initial permit cycle, and will continue to collect additional outfall information as areas are annexed into the City during this permit cycle.

The City organized the illicit discharge inspections based on priority, with higher priority outfalls being those on the peninsula as well as those that were found during the inventory to have a



discharge other than clear. Areas were identified where there appeared to be a high density of suspected illicit discharges, and these areas were investigated first. In this way, the City was able to eliminate the greatest number of illicit discharges from its MS4 during the beginning stages of its Dry Weather Field Screening Program.

Spill response is another important component of any IDDE program. Spills of hazardous materials, or of materials that are considered stormwater pollutants, have a very high potential to be introduced to the stormwater conveyance system if they are not properly mitigated. Spill response should include the notification of the Public Service Division of the City so that steps can be taken to prevent the contamination of stormwater runoff. In instances where the spills have immediate threat to the public health, emergency response services address the spills initially and then report activities to Public Service.

Overall, during the first permit cycle, the City made significant strides to meet elimination of illicit discharges and spills to the MEP. With an agreement in place with the predominant services provider of water and sewer within the City limits, Charleston Water Systems (CWS), the two entities worked together to identify and eliminate a significant number of illicit connections. Table 5 below, represents a sample summary of the accomplishments of the City during the first permit cycle with respect to the IDDE program. This constitutes a major component of the City's response to illicit discharge. The existing memorandum of understanding (MOU) between the City staff and CWS allows both entities to operate in conjunction with respect to identification, inspection and elimination of cross connections and illicit discharges within the system.

During the first permit cycle, the City and CWS have completed numerous projects within the City limits to eliminate cross connections. Table 5 identifies the activities undertaken on the peninsula with respect to sanitary sewer cross connections and system improvements that have vastly improved the water quality within the City and reduced illicit discharges to the receiving waters around the peninsula. The data presented herein represents only a small portion of activities that have been undertaken by CWS and the City to address cross connections and illicit discharges. CWS continues to investigate and inspect their system on James Island, Johns Island and in West Ashley.

The City views the ability to coordinate with CWS on stormwater and sanitary sewer related project to be a key success measure with respect to the IDDE program. It allows both agencies to work together to eliminate concerns that impact both the community and the health of their individual systems. As the stormwater program continues to develop, the City and CWS plan to revisit the MOU to make revisions that will both streamline coordination efforts and provide opportunities for each entity to address water quality concerns more efficiently and reduce redundancy with respect to inspection and repair activities.



Table 5: IDDE activities addressed during first permit term on Peninsular Charleston

Sub-basin	Year Inspected	Inspection Repairs Identified	Smoke Testing Repairs Identified	I/I Reduction (%)	Total Man Hours	Total Cost (\$)
10th and Grove	2011	2	53	35.6	3167.1	\$ 137,103.33
Morrison Drive	2011	0	21	38	1237.5	\$ 53,571.38
Lee Street	2011	1	14	79.8	518.5	\$ 22,445.87
South Street	2011	1	7	26.1	532.5	\$ 23,051.93
Calhoun Street	2011	1	3	47.9	366.5	\$ 15,865.79
Council Street	2012	2	45	28.27	1752.2	\$ 75,853.60
Barre Street	2012	7	53	50.32	930.2	\$ 40,269.20
Concord Street	2012	2	32	11.79	1405.3	\$ 60,835.87
Water Street	2012	2	5	20.31	245	\$ 10,606.92
Adgers Wharf	2012	0	6	61.86	255	\$ 11,038.95
Beaufain Street	2012	1	0	47.18	193	\$ 8,354.97
Bee Street	2012	0	0	0	72	\$ 3,116.88
Bayside Manor	2012	2	1	58.86	79.5	\$ 3,441.56
Fishburne Street	2012	1	0	50.62	40	\$ 1,731.60
Total		22	240		10794.3	\$ 467,287.85

Note 1: The 2011 CWS I/I program included an additional 17 sub-basins in West Ashley, not included in this table.

Note 2: The 2012 CWS I/I program included an additional 7 sub-basins in West Ashley, not included in this table.

Note 3: The 2013 CWS I/I program focused solely on 22 sub-basins in West Ashley and did not include additional I/I investigation on the peninsula

As part of the IDDE program to evaluate the overall water quality and potential for illicit connections affecting water quality within the City, a detailed analysis of water quality was performed for the high priority area of the peninsula within the City. This report, entitled Peninsula Bacteria Study Report (December 2010), evaluated potential bacteria contamination on the peninsula. The overall purpose of this study was to determine whether there were significant cross connections existing on the peninsula that needed to be addressed as part of the IDDE program. This study resulted, in part, from a 2004 Consent Order (CO) to address SCDHEC concerns with the storm sewer system discharge to the storm sewer system. This CO was the result of a 1988-1989 evaluation of the storm sewer and sanitary sewer systems. As part of the CO, and subsequent investigations, the City addressed and eliminated a substantial number of sanitary sewer leaks. The 2010 report indicates that while bacteria levels are high in some areas of the City, they are not substantially higher than anticipated bacterial loading from other areas of the country with similar populations and land use patterns. While the study indicates that the likelihood of sanitary sewer cross connections is limited, the City continues to evaluate and address illicit discharges, inflow and infiltration and sanitary sewer overflows as part of the IDDE program. This continued evaluation and elimination, in cooperation with CWS, addresses



water quality concerns and the potential for sanitary sewer discharges to the stormwater system to the MEP as prescribed by the City's MS4 Permit.

4.3.2 Planned Programs

During the current permit term the City of Charleston will continue to improve the IDDE program. The City will update the existing stormwater outfall map on an annual basis to include any newly annexed areas. This mapping update will be on-going as the City completes the next round of Dry Weather Screening for the current permit term.

Dry Weather Field Screening is an on-going program and will continue at a rate of 20% of the total outfalls per year. In order to standardize the Dry Weather Field Screening process, the City plans to update the IDDE Standard Operating Procedures guidance document (SOP). This will help to implement methods that are consistent, provide a training tool for new employees and a reference tool for employees who have already been through the training. Specific training schedules will be developed to ensure that relevant City employees are well educated on the Dry Weather Field Screening program, and that they are kept up to date on proper procedures.

The City of Charleston will also develop a more detailed Enforcement Response Guide (ERG), to supplement the City's existing enforcement response protocol outlined in Chapter 27, Division 5 of the City's Code of Ordinances, which is used to assist City personnel with the enforcement of the IDDE ordinance. This document will include guidance on the types of enforcement measures appropriate for various types of violations to ensure fair and consistent enforcement actions throughout the Small MS4 jurisdiction. The ERG should be completed and adopted within the first year of the permit term.

Based on information gathered during dry weather screening, public reported illicit discharges, cross connection work with CWS, reported SSOs and maintenance performed during the previous permit cycle, the City continues to reevaluate its priority areas for maintenance and infrastructure improvements. Initially, the City identified the peninsula area as the high priority area within the City. Subsequently, because of information gathered during the first phase of the program, additional areas may be identified as priority and will be addressed as part of the City's routine maintenance activities. These assessments will continue annually as more information and data continues to be collected as part of the routine program activities. Additionally, priority areas that are reviewed and identified on an annual basis will be coordinated with CWS and their on-going inspection programs. This means that the City and CWS can implement coordinated inspection efforts that not only address observed dry-weather screen information but also internal system information that can lead to repair and retrofit projects within the system to reduce the potential for future illicit discharges within the City.



The City constantly reassesses and modifies the Dry Weather Field Screening Program and has dedicated staff to both the dry weather screening and illicit discharge response and inspection programs. This allows the City to adjust its protocol based on field conditions to efficiently meet water quality concerns and problems identified within the City. As part of this permit cycle, the City will reevaluate its existing IDDE SOP. Updates will include sampling protocol and inspection schedules based on what has been observed during the previous permit cycle. This will also include elimination schedules for non-stormwater discharges. By developing a defined protocol, that will also be included in the ERG, the City will have greater leverage should an illicit discharge necessitate the need for any enforcement actions. This document will be included as part of the SWMP once reviewed and completed.

The City will continue its training activities of all staff. The existing training will be updated with illicit discharge information, including priority area education, once the SOP has been revised and as changes in the priority areas warrant. A detailed training schedule will be developed so that the City can train all applicable employees on an annual basis. Due to the size of the staff and complexity of coordinating training activities, the City will develop a year-long training program that will allow for multiple training opportunities for all staff.

4.3.3 Proposed Implementation Schedule

Table 6 on the next page provides an approximate schedule for the implementation of the Illicit Discharge Detection and Elimination MCM.



Table 6: Implementation Schedule for Illicit Discharge Detection and Elimination

MCM 3 - PROGRAM ELEMENTS (BMPs)	IMPLEMENTATION GOAL
1. Update written dry weather screening and analytical monitoring procedures to detect and eliminate illicit discharges to the MS4.	January 2015
2. Update priority area list annually.	On-going / January
3. Identify priority areas within the MS4 with a higher likelihood of illicit connections. Currently, the peninsula is the City’s highest priority area. Additional areas may be included based on City evaluation protocol developed in the revised IDDE SOP.	March 2015
4. Enhance City website to include additional IDDE information and potentially public reporting form.	July 2015
5. Complete assessment of field screening program.	3 rd Annual Report
6. Train all employees who have the potential to observe an illicit discharge or illicit connection to the storm sewer system.	Annually
7. Conduct field screening for illicit discharges or connections.	On-going
8. Eliminate non-stormwater discharges within 30 days of source determination.	On-going
9. Maintain a public reporting mechanism for suspected illicit discharges.	On-going
10. Update system map to include areas not completely inventoried in the first permit cycle and newly annexed areas incorporated into the MS4 not previously mapped.	On-going



4.4 Construction Site Stormwater Runoff Control (MCM 4)

Section 4.2.4 of the NPDES General Permit for Small MS4s requires the following:

“You must develop, implement, and enforce a program to reduce pollutants in any stormwater runoff to your SMS4 from construction activities that result in a land disturbance of greater than or equal to one acre.”

Construction activity includes, at a minimum:

- Clearing, grading, and excavating that result in land disturbance of equal to or greater than one acre;
- Clearing, grading, and excavating that result in disturbance of less than one acre of total land area that is part of a larger common plan of development or sale (LCP);
- Any land disturbance within one-half (1/2) mile of a receiving water body (but not for single-family homes which are not part of a subdivision development that results in any land disturbance less than five acres).

Construction site stormwater runoff control is an emphasized permit requirement for all MS4s due to the potential impact construction has on water quality. When land is disturbed for the purpose of construction, much of the natural vegetation is removed, exposing soil that can more easily be eroded away by wind or rain events. Thus, erosion and sediment control is one of the primary water quality concerns on construction sites. In addition, there is the potential for other pollutants to be introduced to stormwater runoff at a construction site. The most common of these pollutants include discarded building materials, concrete truck washout, chemicals, litter and sanitary waste.

If not properly managed, land development occurring within the City of Charleston can potentially be damaging to water quality as is the case in most other urbanized areas in the country. Conversely, reducing the amount of pollutants that exit construction sites should have a significant, positive effect on water quality.

A component of the final decision regarding the appeal of the NPDES General Permit for Small MS4s was that all small MS4s must have both the Construction Site Stormwater Runoff Control and the Post-Construction Stormwater Management in New Development and Redevelopment MCMs fully developed and implemented by September 1, 2007. The City implemented this MCM in accordance with the established deadline, as discussed in Section 4.4.1 below.



4.4.1 Existing Programs

In order for the City to adequately reduce adverse water quality impacts due to land disturbing activity, it was necessary to establish the legal authority to require BMPs and other water quality considerations on construction sites. It was also necessary to establish the legal authority to inspect sites and enforce these water quality requirements.

Prior to initial MS4 designation, the City was not a delegated entity for the purpose of plan review, and instead sent all plans to SCDHEC to be reviewed for erosion and sediment control considerations. With the issuance of the Phase II General Rule, it was determined that it would be appropriate for the City to not only become a delegated entity for the purpose of plan review, inspection and enforcement, but to also modify the entire review, inspection and enforcement process in order to become a “Qualifying Local Program” (QLP).

In order to be considered a QLP by SCDHEC, the City was required to impose more stringent sediment and erosion control requirements on all construction sites to emphasize water quality and specifically regulate sites that are one acre or greater. During the program update, the City also revised its plan review process to incorporate SCDHEC’s issuance of coverage under the *NPDES General Permit for Storm Water Discharges from Construction Activities* (NPDES Construction General Permit).

Maintaining QLP status requires the cooperative effort of plan reviewers, inspectors and Code Officers. The City has numerous highly qualified staff members who are part of the plan review, inspection and enforcement process. An organizational chart outlining the inspection and program review process along with program responsibilities, is included in Appendix E.

The City of Charleston’s Stormwater Management Ordinance (see Appendix K) contains requirements for erosion and sediment control practices at construction sites, post construction water quality and quantity control requirements, and enforcement for related violations.

In addition, the City’s Stormwater Design Standards Manual (see Appendix N) provides greater detail and guidance on the proper design, installation, and maintenance procedures for sediment/erosion control practices and post construction water quality and quantity design criteria.

To ensure compliance with the Ordinance and Design Standards Manual, proposed construction plans are first submitted and reviewed, during which engineers or other certified staff evaluates the erosion control plan for the site as shown on the construction documents. Once in construction, City of Charleston construction site inspectors are in charge of determining whether there has been a violation of the Stormwater Management Ordinance. These procedures are all outlined in the Stormwater Design Standards Manual.



In recognizing the crucial role that the public can play in identifying instances of noncompliance, the City of Charleston established an online Citizen Help Desk at <http://www.charleston-sc.gov/index.aspx?NID=879> where anyone can submit a request, complaint, or notify the City of any issue to be addressed. Once in the system, the “ticket” is distributed to the appropriate department.

4.4.2 Planned Programs

The City of Charleston plans to comply with the new requirements of the CGP and MS4 permit through revisions to its existing ordinance. These revisions are intended to:

- Ensure adequate legal authority to enforce the requirements of the construction site runoff control program.
- Provide trained and qualified plan reviewers and inspectors, and written procedures for conducting plan reviews and site inspections. For sites disturbing one acre or more, initial site inspections must occur within the first two weeks after commencement of land disturbing activities, and follow-up inspections must be conducted monthly thereafter.
- Update and maintain an inventory of active construction sites to include tracking of inspections.
- Develop an effective process for communicating and educating construction site operators about the program’s requirements.

4.4.3 Proposed Implementation Schedule

Table 7 on the next page provides an approximate schedule for the implementation of the Construction Site Stormwater Runoff Control MCM.



Table 7: Implementation Schedule for Construction Site Stormwater Runoff Management

MCM 4 - PROGRAM ELEMENTS (BMPs)	IMPLEMENTATION GOAL
1. Develop and implement the Enforcement Response Guide to provide consistency of actions taken to remedy violations of the Stormwater Management Ordinance.	January 2015
2. Update ordinance to comply with 2014 NPDES General Permit	February 2015
3. Develop a construction site operator education plan.	February 2015
4. Develop an inspection report form for public concerns related to the Construction Site Stormwater Control MCM.	July 2015
5. Provide training to all MS4 staff including inspectors and plan reviewers.	Annually / September
6. Evaluate and update inspection procedures and schedules.	Annually
7. Maintain a public reporting mechanism for public concerns related to the Construction Site Stormwater Control MCM.	On-going



4.5 Post-Construction Stormwater Management in New Development and Redevelopment (MCM 5)

Section 4.2.5.1 of the NPDES General Permit for Small MS4s requires the following:

“Permittees shall implement a program to control stormwater discharges from new development and redeveloped sites that disturb at least one acre (including projects that disturb less than one acre that are part of a larger common plan of development or sale, LCP) that discharge into an MS4. The program must apply to private and public development sites, including roads.”

Additionally, Section 4.2.5.2 states:

*“New Development Standards to be used can be either one, combination, or equivalent combination of design strategies, control measures, practices or provisions such as infiltration, evapotranspiration, rain harvesting, and stormwater reuse and recharge that demonstrate the runoff reduction and pollutant removal necessary to approximate pre-development conditions to the MEP and to protect water quality. **The first inch of runoff must be addressed.**”*

This component of the SWMP is closely linked with the Construction Site Stormwater Runoff Control component discussed in Section 4.4. These two SWMP elements are complimentary, and together are intended to aid in alleviating water quality concerns that arise due to land development. While Construction Site Stormwater Runoff Control deals with stormwater pollution concerns that can arise when land is disturbed for the purpose of development; Post-Construction Stormwater Management in New Development and Redevelopment requires the City of Charleston to plan appropriately for urbanization, and require suitable BMPs for protection of water quality after the development is complete.

As land is developed, the amount of impervious area increases significantly as paved streets, driveways, rooftops, parking lots and other components of the development take the place of trees, grass and open space. There is a direct correlation between the amount of imperviousness in an area and the quantity of pollutants entering the stormwater discharges from that area. This is due in part to the high rate of speed at which stormwater leaves the area, which decreases the amount of time and opportunity the runoff has to infiltrate into the soil, filter through foliage, and undergo other natural filtration processes. It is for this reason that runoff control from construction sites during and after development is so strongly emphasized in the Phase II program.

In order to alleviate many of the stormwater pollution issues that arise due to development, the Post-Construction Stormwater Management in New Development and Redevelopment MCM



requires MS4s to encourage developers to be proactive about implementing the use of BMPs within their developments, and also requires them to create a plan to successfully maintain those BMPs once construction is complete.

This may include the use of grass swales in place of a curb-and-gutter drainage system, or the construction of a retention pond designed to retain flood waters for a period of time great enough to allow for the sedimentation of pollutants. Some developers may even construct rain gardens or similar bioretention facilities. As discussed previously, structural BMPs typically require regular maintenance in order for them to function properly and provide the desired water quality control.

4.5.1 Existing Programs

The City of Charleston's Stormwater Management Ordinance and Stormwater Design Standards Manual contain requirements and procedures for erosion and sediment control practices at construction sites, post construction water quality and quantity control requirements, and enforcement for related violations. As outlined in these policies, the City of Charleston requires a signed agreement by the developer or owner defining operation and maintenance responsibilities and corresponding schedules. This agreement is finalized prior to issuance of a Certificate of Occupancy. Furthermore, the City of Charleston conducts post-construction inspections to ensure long-term compliance. All such data is tracked and maintained.

Structural BMPs allowed in the City's program include storage practices such as wet ponds, and extended-detention outlet structures; filtration practices such as grassed swales, bioretention cells, sand filters and filter strips; and infiltration practices such as infiltration basins and infiltration trenches.

Additionally, the City maintains a non-structural BMP in the form of a comprehensive land use plan, called the Charleston Century V plan. This is a working, frequently updated document for the citizens of the City detailing the five areas of emphasis for future planning. These five areas include: Urban growth, City development (including infill and redevelopment), Mobility, Work centers, and Municipal services. The entire document is available for downloading at <http://www.charleston-sc.gov/index.aspx?NID=285>. The intention of this land use plan is to provide requirements and standards to direct growth to identified areas, protect sensitive areas such as wetlands and riparian areas, maintain and/or increase open space (including a dedicated funding source for open space acquisition), provide buffers along sensitive water bodies, minimize impervious surfaces, and minimize disturbance of soils and vegetation.



4.5.2 *Planned Programs*

While the City has already made several improvements in its post-construction stormwater program, there are still certain areas that have been highlighted as opportunities for further improvement.

- **Require formal long term permanent maintenance agreements for structural stormwater controls.** The City currently requires a permanent maintenance agreement as part of its plan approval process. However, the City is interested in evaluating its maintenance process to determine if there is a more effective means of maintaining long-term agreements that are both enforceable and realistic. This will be evaluated as part of the City's program during this permit cycle.
- **Develop and adopt post-construction site performance standards for new and redevelopment sites to address the first inch of runoff.** The City will revise their existing stormwater ordinance and Design Standards Manual to require the treatment of the first one (1) inch of runoff from the impervious areas on development and redevelopment sites. Once approved by City Council, this requirement will be enforceable within the City. However, to promote infill and redevelopment projects, the City is considering the utilization of a credit system that would allow for redevelopment where addressing the first inch is not feasible.
- **Create an inventory/database of all stormwater structural controls located within the MS4.** The City will continue to evaluate the existing database that contains the name and contact information of the current responsible party for every stormwater facility within the municipal boundaries. Lessons learned through the initial development of the database have led to a desire to refine both the database and tracking process. This would further the City's abilities to track completed stormwater facilities and monitor for routine maintenance of the BMPs.
- **Inspect all permanent BMPs at least once per permit cycle and within 30 days of completion for new construction.** Inspection prioritization will be concurrent with the watershed prioritization developed for outfall screening in MCM3. As the program has developed within the City, a database has been developed for all permanent stormwater BMPs. This list was developed based on existing GIS and aerial photography, along with plan information that has been submitted to the City. During this cycle, the City will have each of these permanent BMPs inspected either by City staff, their designees or through enforcement of inspection and maintenance requirements of private facilities as



prescribed in the restrictive covenant of the property. These inspections will be completed so that all BMPs have been examined by the end of the permit cycle. These inspections will include a conditional assessment that will be used to develop a matrix for future repairs and maintenance schedules.

- **Provide a means and system for maintaining inspection records.** The City is implementing a new tracking system for all City projects and activities including land development, construction inspections, post-construction inspections and work orders. This new tracking system will be reviewed to determine how the mechanism can be utilized to develop a more effective tracking database for all elements of the stormwater management program.

4.5.3 Proposed Implementation Schedule

Table 8 on the next page provides an approximate schedule for the implementation of the Post-Construction Stormwater Management in New Development and Redevelopment MCM.



Table 8: Implementation Schedule for Post-Construction Stormwater Management in New Development and Redevelopment

MCM 5 - PROGRAM ELEMENTS (BMPs)	IMPLEMENTATION GOAL
1. Update ordinances to comply with 2014 NPDES General Permit	March 2015
2. Develop site performance standards for new and re-developed sites located within the MS4.	March 2015
3. Adopt a standard long-term maintenance agreement for all new and existing structural stormwater controls.	March 2015
4. Develop an inventory/database of all post-construction stormwater control measures within the MS4. (Minimum requirement to include all BMPs constructed after the Effective Date of the initial Permit)	April 2015
5. Develop BMP inspection procedure.	April 2015
6. Develop prioritized BMP inspection schedule.	April 2015
7. Inspect all BMPs a minimum of once per permit cycle and maintain inspection records.	Annually
8. Inspect all new BMPs within 30 days of completion and maintain inspection records.	On-going



4.6 Pollution Prevention/Good Housekeeping for Municipal Operations (MCM 6)

Section 4.2.6.1 of the NPDES General Permit for Small MS4s requires the following:

“Permittees shall develop and implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations as an integral part of the SWMP.”

At a minimum the City must:

- Develop a municipal facility and stormwater control inventory;
- Assess all municipally owned facilities for pollutant discharge potential and identify “High Priority” facilities;
- Complete yearly inspections of all “High Priority” facilities;
- Prioritize storm sewer system maintenance activities and implement a maintenance schedule;
- Develop a set of pollution prevention measures that will reduce the discharge of pollutants in stormwater during municipal operations and maintenance activities;
- Develop an annual employee training program for appropriate employees implementing pollution prevention and good housekeeping practices; and
- Require contractors performing municipal maintenance activities to comply with all of the SMS4 stormwater control measures, good housekeeping practices, and facility-specific stormwater management procedures.

The purpose of this MCM is to ensure that the owners/operators of small MS4s are applying the same stringent pollution prevention requirements to themselves as they are applying to other interest groups within the MS4. This measure requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) for all applicable municipal operations. These municipal operations include facilities like fire stations, police stations, parks, etc. The development of a SWPPP requires the City to examine and subsequently alter its operations to help ensure a reduction in the amount and type of pollution associated with stormwater discharged from City facilities to local waterways.

The SWPPPs provide guidance for pollution prevention and good housekeeping minimum controls for municipal operations. The SWPPPs contain the BMPs utilized by the City to



eliminate or minimize potential stormwater impact associated with the operation of City facilities.

The key SWPPP elements include:

- Identification and location of applicable City operations.
- Designation of a Pollution Prevention Team for each facility that is responsible for the implementation, maintenance, and revision of the SWPPP.
- A potential pollutant source assessment that summarizes operational related activities that may contribute potential pollutants to stormwater.
- Designation of BMPs utilized by the City to manage stormwater quality and reduce pollutants in stormwater (e.g., vehicle washing, solid waste management, material and equipment storage, etc.).
- Guidance and instruction for conducting a SWPPP inspection.
- Requirements and content of SWPPP training.

4.6.1 Existing Programs

The City maintains a storm sewer maintenance program which establishes maintenance and routine inspection schedules, as well as ensures prompt response to complaints. The City of Charleston's street sweepers continue to be used and maintained in proper working order, with at least one (1) trained and dedicated driver. The streets continue to be swept on an as-needed basis. The City continues to develop and implement Stormwater Pollution Prevention Plans (SWPPPs) for the Public Works Operation Center. The City of Charleston also continues to develop a SWPPP for the Parks Maintenance Center at 823 Meeting Street and the Service Centers of the Fire and Police Departments.

The Parks & Recreation and Public Works Departments use only personnel that are certified applicators for herbicides, pesticides, and fertilizers in order to prevent and reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance. Public Works personnel are trained annually on SWPPPs spill response and other storm water related issues.



4.6.2 *Planned Programs*

The City currently maintains a database of all municipally owned and operated facilities. SWPPPs have been developed for these facilities. Based on new permit conditions, these facilities will be evaluated to determine their level of potential for stormwater runoff impacts. Facilities that have a high potential for spills or other water quality contamination will be listed as high priority and inspected according to the permit requirements. All SWPPPs will be reevaluated to determine their effectiveness and revised accordingly.

The City will continue to progress towards the development of a full structural inventory of its stormwater system during the permit cycle. This will include, at a minimum, public and privately owned BMPs and stormwater outfall information. Once collected, this inventory will be included in long-term inspection and maintenance schedules as well as inclusion in the City's CIP list, as necessary. Currently, inspection and maintenance are performed in high priority and identified problem areas. By developing a full inventory, the City can be more proactive with respect to maintenance.

The City will develop a City-wide SOP for operational and maintenance activities to allow for consistent operational procedures across departments and functions within the City. This SOP will be developed consistent with the revised City stormwater ordinance and exist as comprehensive operational procedures for City staff and vendors operating within the City limits.

The City will continue to enhance its on-going annual training program. With the new inspection and maintenance requirements associated with high priority facilities, specific educational material and training will be provided to employees of these identified facilities.

4.6.3 *Proposed Implementation Schedule*

Table 9 on the next page provides an approximate schedule for the implementation of the Pollution Prevention and Good Housekeeping MCM.



Table 9: Implementation Schedule for Pollution Prevention and Good Housekeeping

MCM 6 - PROGRAM ELEMENTS (BMPs)	IMPLEMENTATION GOAL
1. Identify “High Priority” facilities.	January 2015
2. Complete a comprehensive assessment of pollutant discharge potential for all municipally-owned or operated facilities once during permit term.	April 2015
3. Develop a set of pollution prevention measures to reduce the discharge of pollutants from municipal operations and maintenance activities.	January 2016
4. Complete first annual comprehensive inspections of “High Priority” facilities.	January 2016
5. Prioritize owned and/or operated stormwater management systems/structures and develop and implement a maintenance schedule.	July 2016
6. Continue to develop stormwater structural control inventory.	On-going
7. Provide annual employee training and education.	Annually / September
8. Maintain a municipal facility inventory.	On-going
9. Complete regularly scheduled maintenance activities of all municipally-owned or maintained structural stormwater controls.	On-going



MONITORING, RECORDKEEPING AND REPORTING

5.1 Monitoring

All monitoring conducted within the City of Charleston MS4, including IDDE investigations and TMDL monitoring must be carried out in accordance with Section 5.1 of the NPDES General Permit for Small MS4s, which requires the following:

“You must evaluate program compliance, the appropriateness of identified BMPs, and progress toward achieving identified measurable goals. If you discharge to a water body for which a TMDL has been established, you have additional monitoring requirements under Part 3 of this permit.”

Monitoring conducted by the City, must comply with the following:

Representative monitoring. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

Test Procedures. Monitoring results must be conducted according to test procedures approved under 40 CFR part 136.

Records of monitoring information shall include:

- The date, exact place, and time of sampling measurements;
- The name(s) of individual(s) who performed the sampling or measurements;
- The date(s) analyses were performed;
- The names of the individuals who performed the analyses;
- The analytical techniques or methods used; and
- The results of such analysis

Discharge Monitoring Report. Monitoring results must be reported on a Discharge Monitoring Report (DMR)



5.2 Recordkeeping

Regarding recordkeeping, Section 5.2 of the NPDES General Permit for Small MS4s requires the following:

- *“You must retain records of all monitoring information...for a period of at least three years from the date of the sample, measurement, report or application, or for the term of this permit, whichever is longer...”*
- *You must submit your records to the Department when specifically asked to do so. You must retain a description of the SWMP required by this permit (including a copy of the permit language) at a location accessible to the Department.*
- *You must make your records, including the notice of intent (NOI) or application and the description of the SWMP, available to the public if requested to do so in writing.”*

5.3 Reporting

Section 5.3 of the NPDES General Permit for Small MS4s requires the following regarding Annual Reports:

1. *The first report covering years 1 and 2 must be submitted to SCDHEC twenty-seven (27) months after the effective date of the permit; January 1, 2014.*
2. *The following annual report, covering years 3 and 4 shall be submitted 180 days before the permit expiration date as part of renotification.*
3. *While, and if the expired permit is continued, Annual Reports are due every year on the anniversary date of the expired permit; December 31, 2018.*

Section 5.3.1 – 5.3.6 of the NPDES General Permit for Small MS4s requires that the Annual Report include:

- *The status of your compliance with permit conditions, an assessment of the appropriateness of the identified best management practices, progress towards achieving the statutory goal of reducing the discharge of pollutants to the MEP, and the measurable goals for each of the minimum control measures.*



- *Results of the information collected and analyzed, if any, during the reporting period, including monitoring data used to assess the success of the program at reducing the discharge of pollutants to the MEP.*
- *A summary of the stormwater activities you plan to undertake during the next reporting cycle (including an implementation schedule).*
- *Proposed changes to your SWMP, including changes to any BMPs or any identified measurable goals that apply to the program elements.*
- *Notice that you are relying on another entity to satisfy some of your permit obligations (if applicable).*
- *Information requested in the permit including, but not limited to: sections 1.4.7, 3.1.1.1, 3.2.1.1, 3.2.1.2.2, 3.3.6, 4.1.6 and in the additional conditions applicable to NPDES MS4 permits contained in Appendix B of the permit.*

The City of Charleston will submit an Annual Report each year which will include the abovementioned requirements. Annual Reports will be due to SCDHEC on April 1, 2016 and July 4, 2018. The Notice of Intent (NOI) for coverage under the subsequent General Permit for Small MS4s will be submitted to SCDHEC on July 4, 2018. The current permit expires on December 31, 2018. The information required for submittal as the first Annual Report is included in this SWMP. All subsequent Annual Reports will be developed using the template provided by SCDHEC, which is included in Appendix I.

