


# Berkeley County
# City of Goose Creek
# City of Hanahan
# Stormwater Management Program (SWMP)

Prepared in accordance with SCDES NPDES General Permit for Storm Water Discharges from Regulated Small Municipal Separate Storm Sewer Systems (SMS4)
**Permit No. SCR030000**

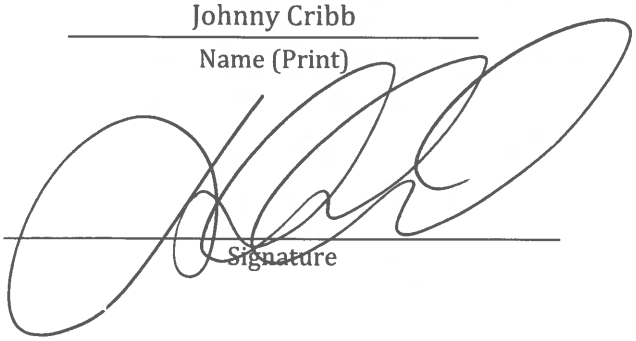
Adopted July 1, 2014
**Revised January 29, 2026**

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## CERTIFICATION OF STORMWATER MANAGEMENT PROGRAM

I certify that Berkeley County has taken the necessary steps to obtain and maintain full legal authority to implement and enforce each of the requirements contained in the NPDES General Permit for Storm Water Discharges from Regulated Small Municipal Separate Storm Sewer Systems (SMS4), Permit Number SCR030000. Items 4.1.4.3(a-d) are addressed within this SWMP.

Johnny Cribb
Name (Print)



Signature

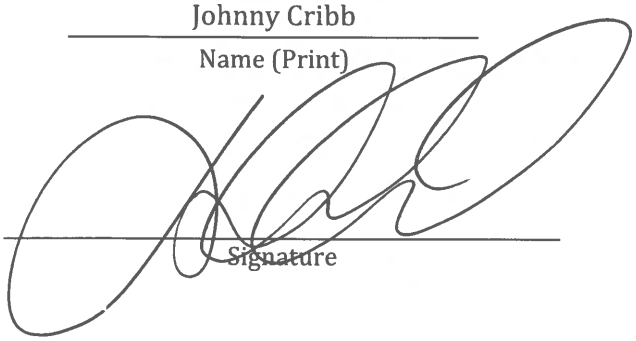
County Supervisor
Title

1/29/2026
Date

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Johnny Cribb
Name (Print)



Signature

County Supervisor
Title

1/29/2026
Date

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# List of Acronyms and Abbreviations

| | |
|---|---|
| BMP | Best Management Practice |
| CEPSCI | Certified Erosion Prevention and Sediment Control Inspector |
| CSR | Construction Site Runoff |
| CUCES | Clemson University Cooperative Extension Service |
| EPA | Environmental Protection Agency |
| EPSC | Erosion Prevention and Sediment Control |
| ERP | Enforcement Response Plan |
| IDDE | Illicit Discharge Detection and Elimination |
| IECA | International Erosion Control Association |
| MEP | Maximum Extent Practicable |
| MCM | Minimum Control Measure |
| MS4 | Municipal Separate Storm System |
| NPDES | National Pollutant Discharge Elimination System |
| NOI | Notice of Intent |
| PP&GH | Pollution Prevention and Good House Keeping |
| PCR | Post Construction Runoff |
| PEO | Public Education and Outreach |
| PIP | Public Involvement and Participation |
| SMS4 | Small Municipal Separate Storm System |
| SCDES | South Carolina Department of Environmental Services |
| SOP | Standard Operating Procedure |
| SWMP | Stormwater Management Program |
| SWP3 | Storm Water Pollution Prevention Plan |
| TMDL | Total Maximum Daily Load |

# Berkeley County, Goose Creek and Hanahan NPDES Stormwater Management Program (SWMP)

## 1.0 Introduction

This Stormwater Management Program (SWMP) is designed to reduce the discharge of pollutants from Berkeley County's Municipal Separate Storm Sewer System (MS4) to the maximum extent practicable, to protect water quality and to satisfy the appropriate requirements of the Clean Water Act. The contents are expected to change with time due to the iterative process of developing the SWMP recognized by the Environmental Protection Agency (EPA) and the South Carolina Department of Environmental Services (SCDES). EPA predicts that it will likely take two to three SMS4 general permit terms (5-year terms) to fully develop and implement the SWMP. The first permit term focused heavily on data collection, organization, development of necessary programs, and initial implementation. During the current second SMS4 general permit cycle, the SWMP was amended based on the observed effectiveness of existing plan components and to address the terms and conditions of the new permit. This document is meant to be a living document that will be reviewed and updated, as necessary, on an annual basis to reflect accomplishments, revisions to plan components, and additions of other or expanded efforts.

There are a number of departments within each government that conduct stormwater-related activities. For Berkeley County, these departments include:

- Codes Enforcement
- Planning
- Engineering
- Roads and Bridges
- Facilities and Grounds
- Sangaree Tax District

For Goose Creek, these departments include:

- Codes Enforcement
- Planning,
- Engineering
- Facilities & Grounds.

For Hanahan, these departments include:

- Codes Enforcement
- Planning
- Facilities & Grounds.

This SWMP addresses the requirements of the NPDES General Permit for Stormwater Discharges from Regulated Small MS4s; Permit No. SCR030000, effective January 1, 2014 and expiring December 31, 2018, with the conditions of the expired permit, continuing in force under S.C. Code section 1-23-370(b) until the effective date of a new permit. Specific language from the SMS4 general permit has been copied and pasted into this SWMP for consistency. The section numbers used in this SWMP correspond with the general permit section numbers.

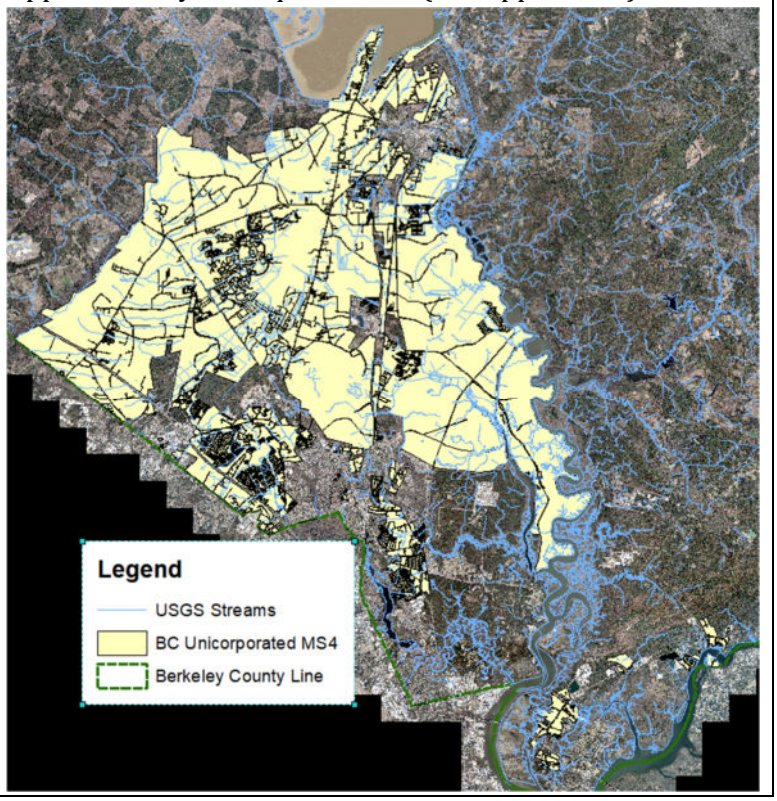
Updates to the SWMP will be included in Appendix B.

In October 2015, intergovernmental agreements between Berkeley County, the City of Hanahan, and the City of Goose Creek were signed. Berkeley County is responsible for the items stated in the agreements (located in Appendix H) and will continue to provide the services stated in those agreements. In the second reporting period (2016-2017), Berkeley County updated this SWMP to address these additional municipalities.

## 2.0 Notice of Intent (NOI) Information

Notice of Intent information has been provided in three separate tables for Berkeley County, the City of Goose Creek, and the City of Hanahan.

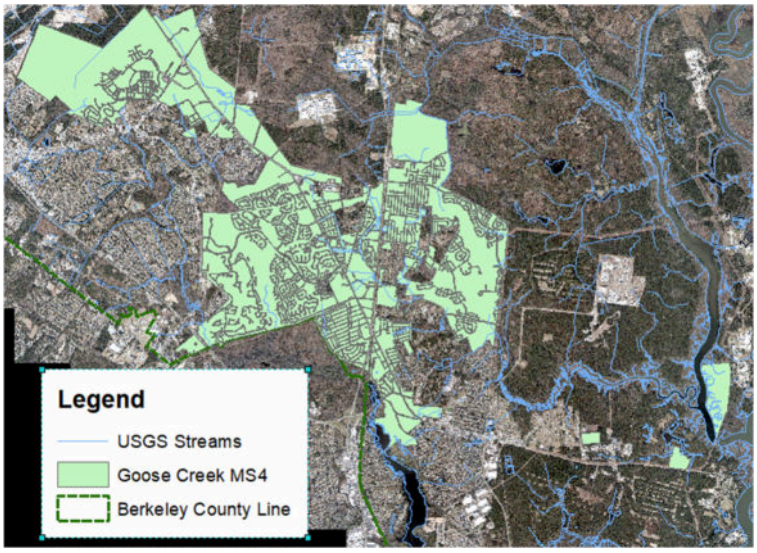
*Table 1: Berkeley County NOI Information*

| General Permit Section | NOI Requirement | Description |
|---|---|---|
| 2.2.1 INFORMATION ON THE PERMITTEE: | | |
| 2.2.1.1 | Name of Municipality: | Berkeley County |
| | Mailing Address: | Johnny Cribb<br>County Supervisor<br>1003 Highway 52<br>PO Box 6122<br>Moncks Corner, SC 29461-6122 |
| | Telephone Number: | (843) 719-4094 |
| 2.2.1.2 | Public Entity Type: | County |
| **2.2.2 INFORMATION ON THE SMS4:** | | |
| 2.2.2.1 | Map of Berkeley County's MS4 Regulated Area: | SMS4 Location:<br>MS4 Regulated Area<br>SMS4 Center Coordinates:<br>Latitude: N32° 12.38'<br>Longitude: W79° 58.98'<br>MS4 Regulated Area:<br>Approximately 160 square miles (See Appendix A)<br>  |

| General Permit Section | NOI Requirement | Description |
|---|---|---|
| 2.2.2.2 | Major Receiving Waters: | Lindy Branch, Ashley River**, Cooper River**, Back River, Durham Creek*, Sophia Swamp, Laural Swamp, Daisy Swamp, Canterhill Swamp, Lake Dennis, Lake Hastie, Molly Branch, Stony Branch, Black Tom Bay, Gants Mill Branch, Biggins Creek, California Branch, Cypress Swamp, Sandy Run*, Smith Branch*, Miller Dam Branch, Felder Branch, Dawson Branch, Kelley Branch, Stanley Branch*, Dorchester Creek**, Sawmill Branch**, Limehouse Branch, King Branch, Long Branch*, Stroberfield Branch*, Ancrum Swamp, Tillmans Branch, Poplar Branch, Lake Moultrie*, Mill Branch*, Big Run, Wassamassaw Swamp*, Foster Creek*, Goose Creek*, Goose Creek Reservoir*,Prioleau Creek, Martin Creek*, Tail Race Canal*, Wando River**, Charleston Harbor** |
| 2.2.2.3 | Indian Lands: | No portion of Berkeley County's MS4 is located on Indian Country Lands. |
| 2.2.2.4 | List of Entities within Berkeley County's SMS4 Area that Operate a Small Separate Storm Sewer System: | There is no small separate storm sewer system operator within the Regulated MS4 area of Berkeley County. |
| 2.2.2.5 | Other Governmental Entities: | Clemson University Cooperative Extension Service: Responsible for the public education and outreach and the public participation/involvement components of the NPDES program. |
| 2.2.2.6 | BMP Information: | See Section 4.0 for a discussion of the Best Management Practices (BMPs) for each minimum measure. Each minimum measure contains all available information on the BMPs that are to be implemented, their measurable goals, a schedule for their implementation, and the person(s) responsible. |

*Listed on the CWA §303(d) list; **Allocated a TMDL

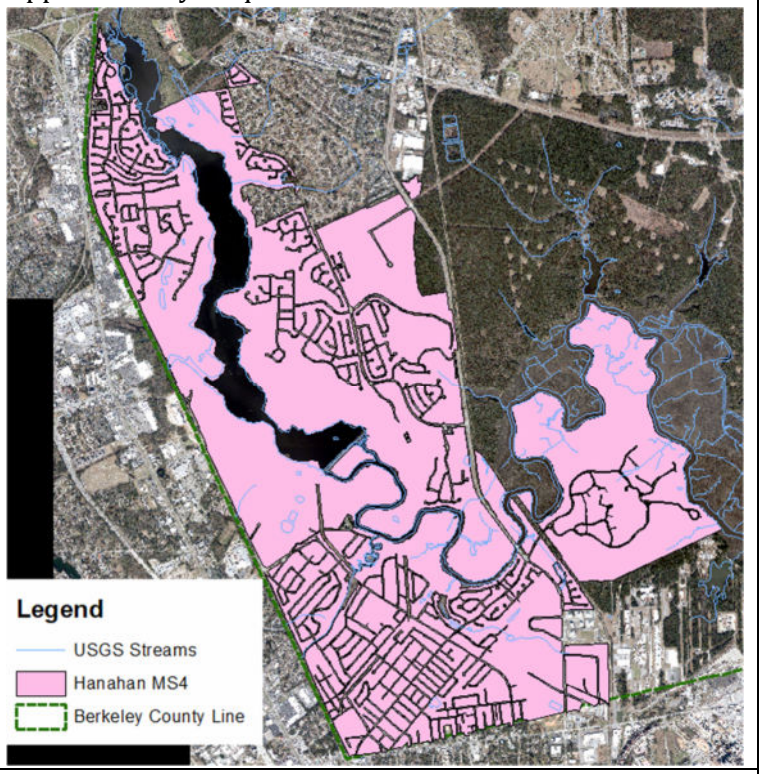
*Table 2: City of Goose Creek NOI Information*

| General Permit Section | NOI Requirement | Description |
|---|---|---|
| 2.2.1 INFORMATION ON THE PERMITTEE: | | |
| 2.2.1.1 | Name of Municipality: | City of Goose Creek |
| | Mailing Address: | Natalie Zeigler, City Administrator<br>519 North Goose Creek Blvd.<br>P.O. Drawer 1768<br>Goose Creek, SC 29445 |
| | Telephone Number: | (843) 797-6220 ext. 1115 |
| 2.2.1.2 | Public Entity Type: | City |
| **2.2.2 INFORMATION ON THE SMS4:** | | |
| 2.2.2.1 | Map of the City of Goose Creek's MS4 Regulated Area: | SMS4 Location:<br>MS4 Regulated Area<br>SMS4 Center Coordinates:<br>Latitude: N32° 58.86'<br>Longitude: W80° 1.96'<br>MS4 Regulated Area:<br>Approximately 17 square miles<br>  |
| 2.2.2.2 | Major Receiving Waters: | Back River, Bluehouse Swamp, Brick Bound Swamp, Cooper River**, Daisy Swamp, Foster Creek*, Goose Creek*, Goose Creek Reservoir*, King Branch, Lindley Branch, Sawmill Branch** |
| 2.2.2.3 | Indian Lands: | No portion of the City's MS4 is located on Indian Country Lands. |

| General Permit Section | NOI Requirement | Description |
|---|---|---|
| 2.2.2.4 | List of Entities within the City of Goose Creek's SMS4 Area that Operate a Small Separate Storm Sewer System: | There is no small separate storm sewer system operator within the Regulated MS4 area of City of Goose Creek. |
| 2.2.2.5 | Other Governmental Entities: | Responsibility for all the City's permit obligations associated with all applicable BMPs was transferred to Berkeley County via an IGA dated 15 October 2015. These include:<br>• MCM 1: Public Education and Outreach<br>• MCM 2: Public Involvement and Participation<br>• MCM 3: Illicit Discharge Detection and Elimination<br>• MCM 4: Construction Site Stormwater Runoff Control<br>• MCM 5: Post-Construction Stormwater Management<br>• MCM 6: Pollution Prevention/Good Housekeeping for Municipal Operations |
| 2.2.2.6 | BMP Information: | See Section 4.0 for a discussion of the Best Management Practices (BMPs) for each minimum measure. Each minimum measure contains all available information on the BMPs that are to be implemented, their measurable goals, a schedule for their implementation, and the person(s) responsible. |

*Listed on the CWA §303(d) list; **Allocated a TMDL

*Table 3: City of Hanahan NOI Information*

| General Permit Section | NOI Requirement | Description |
|---|---|---|
| 2.2.1 INFORMATION ON THE PERMITTEE: | | |
| 2.2.1.1 | Name of Municipality: | City of Hanahan |
| | Mailing Address: | Courtney Soler, City Administrator<br>1255 Yeamans Hall Road<br>Hanahan, SC 29410 |
| | Telephone Number: | (843) 576-5255 |
| 2.2.1.2 | Public Entity Type: | City |
| **2.2.2 INFORMATION ON THE SMS4:** | | |
| 2.2.2.1 | Map of the City of Hanahan's MS4 Regulated Area: | SMS4 Location:<br>MS4 Regulated Area<br>SMS4 Center Coordinates:<br>Latitude: N32° 54.80'<br>Longitude: W80° 0.19'<br>MS4 Regulated Area:<br>Approximately 9 square miles<br>  |
| 2.2.2.2 | Major Receiving Waters: | Goose Creek*, Goose Creek Reservoir*, Cooper River**, Turkey Creek* |
| 2.2.2.3 | Indian Lands: | No portion of the City's MS4 is located on Indian Country Lands. |

| General Permit Section | NOI Requirement | Description |
|---|---|---|
| 2.2.2.4 | List of Entities within the City of Hanahan's SMS4 Area that Operate a Small Separate Storm Sewer System: | There is no small separate storm sewer system operator within the Regulated MS4 area of City of Hanahan. |
| 2.2.2.5 | Other Governmental Entities: | Responsibility for all the City's permit obligations associated with all applicable BMPs was transferred to Berkeley County via an IGA dated 3 November 2015. These include:<br>• MCM 1: Public Education and Outreach<br>• MCM 2: Public Involvement and Participation<br>• MCM 3: Illicit Discharge Detection and Elimination<br>• MCM 4: Construction Site Stormwater Runoff Control<br>• MCM 5: Post-Construction Stormwater Management<br>• MCM 6: Pollution Prevention/Good Housekeeping for Municipal Operations |
| 2.2.2.6 | BMP Information: | See Section 4.0 for a discussion of the Best Management Practices (BMPs) for each minimum measure. Each minimum measure contains all available information on the BMPs that are to be implemented, their measurable goals, a schedule for their implementation, and the person(s) responsible. |

*Listed on the CWA §303(d) list; **Allocated a TMDL

# 3.0 Special Conditions Applicable to Permitted Stormwater Discharges to Sensitive Waters

The SMS4 general permit requires that Berkeley County, City of Goose Creek and City of Hanahan determine whether their systems discharge to sensitive waters. For the purpose of the permit, sensitive waters are waters:

- With a Total Maximum Daily Load (TMDL) developed and approved, or established by EPA,
- Included in the most recent SCDES Bureau of Water Clean Water (CWA) Section 303(d) list approved by EPA,
- Pursuant to DES Water Classifications & Standards (R.61-68) and Regulations (R.61-69) classified as either:
- Outstanding National Resource Waters (ONRW)
- Outstanding Resource Waters (ORW)
- Trout Waters (Natural (TN), Put, Grow, and Take (TPGT) & Put and Take (TPT), or
- Shellfish Harvesting Waters (SFH), and
- In Source Water Protection Areas (SWPA).

## 3.1 Determination of Receiving Water Conditions and Impacts

The SMS4 general permit requires Berkeley County, City of Goose Creek and City of Hanahan to determine whether their SMS4 discharges to receiving waters within a TMDL watershed or on the most recent SCDES's CWA Section 303(d) impaired waters list. To meet this permit requirement, Berkeley County has collected information from SCDES on the location of existing TMDLs and impaired waters, as determined from results of the State's monitoring program, that could potentially be impacted by discharges from the SMS4 urbanized areas for Berkeley County, City of Goose Creek and City of Hanahan. Tables 4 and 5 in the sections below provide a list of approved TMDLs and the impaired waterbodies on the 2024 303(d) list that Berkeley County's, City of Goose Creek's, and or City of Hanahan's SMS4 contributes to, either directly or indirectly.

## 3.2 TMDL Monitoring and Assessment

In compliance with Section 3.2.1 of the SMS4 general permit, TMDL monitoring and assessment plans will be developed for all TMDL waters receiving SMS4 discharges of pollutant(s) of concern, except where Section 3.1.1.2 of the SMS4 general permit is applicable. For TMDLs existing before the effective date of permit coverage, TMDL monitoring and assessment plans will be completed, submitted to SCDES, and attached to this SWMP within 12 months of the effective date of permit coverage. For newly established TMDLs, Berkeley County, City of Goose Creek, or City of Hanahan will complete a TMDL monitoring and assessment plan within 12 months of the effective date of the TMDL. As completed, TMDL monitoring and assessment plans will be submitted to SCDES and attached to this SWMP in Appendix C. Monitoring will be initiated within 18 months of the effective date of permit coverage for TMDLs existing before the effective date of permit coverage. For newly established TMDLs, Berkeley County, City of Goose Creek, or City of Hanahan will initiate monitoring activities within 18 months of the effective date of the TMDL.

A list of approved TMDLs for the waterbodies within the regulated MS4 area for Berkeley County, City of Goose Creek, and City of Hanahan, and/or which these MS4 areas drain to, can be found in Tables 4a, 4b, and 4c. Berkeley County, City of Goose Creek and City of Hanahan were not named as a contributor and were not assigned a waste load allocation in any of the TMDLs listed in Table 4a, 4b, or 4c.

*Table 4a: Approved TMDLs within Berkeley County's Regulated MS4 Area*

| TMDL Watershed | Pollutant of Concern | Monitoring Stations | Effective Date |
|---|---|---|---|
| Charleston Harbor, Cooper, Ashley, and Wando Rivers | Dissolved Oxygen | MD-115, MD-264, CSTL-102, MD-049, RT-032046, MD-052, RO-09363, CSTL-085, and MD-152 | 2002 (Original) 2013 (Revision) |
| Dorchester Creek and Sawmill Branch | Fecal Coliform | CSTL-013, CSTL-043 | 2003 |

*Table 4b: Approved TMDLs within the City of Goose Creek's Regulated MS4 Area*

| TMDL Watershed | Pollutant of Concern | Monitoring Stations | Effective Date |
|---|---|---|---|
| Charleston Harbor, Cooper, Ashley, and Wando Rivers | Dissolved Oxygen | MD-115, MD-264, CSTL-102, MD-049, RT-032046, MD-052, RO-09363, CSTL-085, and MD-152 | 2002 (Original) 2013 (Revision) |
| Dorchester Creek and Sawmill Branch | Fecal Coliform | CSTL-013, CSTL-043 | 2003 |

*Table 4c: Approved TMDLs within the City of Hanahan's Regulated MS4 Area*

| TMDL Watershed | Pollutant of Concern | Monitoring Stations | Effective Date |
|---|---|---|---|
| Charleston Harbor, Cooper, Ashley, and Wando Rivers | Dissolved Oxygen | MD-115, MD-264, CSTL-102, MD-049, RT-032046, MD-052, RO-09363, CSTL-085, and MD-152 | 2002 (Original) 2013 (Revision) |

## 3.3 TMDL Implementation and Analysis

In compliance with Section 3.3.2 of the SMS4 general permit, TMDL implementation and analysis plans will be developed for all approved TMDL waters receiving SMS4 discharges of pollutant(s) of concern, except where Section 3.1.1.2 of the SMS4 general permit is applicable. TMDL implementation and analysis plans will be completed and submitted to SCDES within 48 months from the effective date of permit coverage, or, for TMDLs established after the effective date of permit coverage, within 48 months of the effective date of the TMDL. The progress on the TMDL implementation and analysis will be included in the Annual Report.

## 3.4 Discharges to Impaired Waterbodies

Berkeley County will determine whether stormwater discharges from SMS4 system contribute directly or indirectly to the impaired waterbodies listed with monitoring stations in the SCDES 303(d) list. BMP applications will be conducted through implementation of the minimum control measures in section 4.2 to protect water quality. The BMP implementation strategies are designed so as not to cause or contribute to violations of water quality standards in water bodies with impaired monitoring stations.

A list of all impaired water bodies receiving discharges from the Berkeley County, City of Goose Creek and City of Hanahan SMS4 can be found in the Tables 5a, 5b, and 5c below, respectively.

*Table 5a: 2024 303(d) List of Impaired Stations within Berkeley County's SMS4 Area and/or that the SMS4 Area Drains Into*

| HUC 12 | SITE | DESCRIPTION | CAUSE | PRIORITY RANKING |
|---|---|---|---|---|
| 030502010402 | RO-056092 | BERESFORD CREEK 5.3 MI NNE OF WANDO AND COOPER RIVER CONFLUENCE | DO | 3 |
| 030502010503 | CSTL-063 | WASSAMASSAW SWP AT US 176 | ECOLI | 3 |
| 030502010701 | CSTL-062 | TAIL RACE CANAL AT US 52 & 17A BELOW LAKE MOULTRIE (SC-033) | HGF | 3 |
| 030502010703 | MD-240 | FOSTER CREEK AT CHARLESTON CPW WATER INTAKE | DO | 3 |
| 030502010704 | CSTL-124 | BUSHY PARK RESERVOIR IN FOREBAY EQUIDISTANT FROM DAM AND SHORELINES | DO | 3 |
| 30502010704 | MD-042 | COOPER RIVER @ BUSHY PARK | HGF | 3 |
| 030502010704 | MD-217 | DURHAM CK AT S-08-9 BRIDGE | HGF | 3 |
| 30502010704 | RS-22060 | UNNAMED TRIB TO LAUREL SWAMP SAMPLE SITE ADJACENT TO PLANTATION MEMORIAL GARDENS ON HWY 17A | ECOLI | 3 |
| 030502010706 | CSTL-612 | STROBERFIELD BRANCH @ END OF DIRT ROAD PAST END OF KENT STREET | BIO | 3 |
| 030502010706 | MD-039 | GOOSE CK AT S-08-136 BRIDGE | ENTERO | 3 |

| | | | | |
|---|---|---|---|---|
| 30502010706 | RL-01008 | GOOSE CK RES 2.3 M S OF GOOSE CREEK TOWN CENTER | DO | 3 |
| 030502010706 | RL-03340 | GOOSE CREEK RESERVOIR 1.0 MI NW OF SPILLWAY NEAR W SHORELINE | CHLA, DO, TP | 3 |
| 030502010706 | RL-04390 | GOOSE CREEK RESERVOIR 2.8 MI NW OF SPILLWAY NEAR OTRANTO | CHLA, DO, TP | 3 |
| 030502010706 | RL-05412 | GOOSE CREEK RESERVOIR 0.55 MI W OF DAM | TP | 3 |
| 030502010706 | RL-06434 | GOOSE CREEK RESERVOIR 2 MI N OF SPILLWAY | TP | 3 |
| 030502010706 | RL-07017 | GOOSE CK RESERVOIR 0.6 MI NW OF 2ND POWERLINES US OF BOAT RAMP; NEAR W SHORE BTWN 2 WESTERN EMBAYMENTS | DO | 3 |
| 030502010706 | RL-08065 | GOOSE CK RESERVOIR MIDLAKE IN LINE WITH NORTHBROOK BLVD | TP | 3 |
| 030502010706 | RL-09081 | GOOSE CREEK RESERVOIR 0.1 MILE NORTHEAST OF THE JOHN R. BETTIS BOAT LANDING AND 0.1 MILES SOUTHEAST OF ST-033 NEAR THE NORTHEAST BANK. | CHLA, TP | 3 |
| 030502010706 | RL-10104 | LAKE; GOOSE CK RESERVOIR 1.95MI WEST OF POPPENHEIM CROSSING | CHLA, DO, TP, ECOLI | 3 |
| 030502010706 | RL-10108 | LAKE; GOOSE CK RESERVOIR 2.5MI SW OF POPPENHEIM CROSSING | CHLA, DO, TP | 3 |
| 030502010706 | RL-11118 | GOOSE CREEK RESERVOIR APPROXIMATELY 1.3 MILES UPSTREAM FROM THE DAM. SITE IS LOCATED 100 YARDS SOUTH OF THE MAJOR POINT ON THE EAST BANK IN THE MIDDLE OF THE RESERVOIR. | TP | 3 |
| 030502010706 | RL-13132 | GOOSE CK RESERVOIR APPROX 250 YDS NW OF END OF HANAHAN RD | PH, TP | 3 |
| 30502010706 | RL-15109 | GOOSE CREEK RESERVOIR 2.58 MILES NORTH OF JOHN R BETTIS LANDING | CHLA, TP | 3 |
| 030502010706 | RL-19259 | GOOSE CREEK RESERVOIR 0.25 MI WSW FROM CENTER OF GOOSE CREEK PRIMARY SCHOOL | CHLA, TP | 3 |
| 030502010706 | ST-032 | GOOSE CREEK RESERVOIR 100 M US OF DAM | TP | 3 |
| 030502010706 | ST-033 | GOOSE CK RESERVOIR AT 2ND POWERLINES US OF BOAT RAMP | TP | 3 |

*Table 5b: 2024 303(d) List of Impaired Stations within the City of Goose Creek's SMS4 Area and/or that the SMS4 Area Drains Into*

| HUC 12 | SITE | DESCRIPTION | CAUSE | PRIORITY RANKING |
|---|---|---|---|---|
| 030502010703 | MD-240 | FOSTER CREEK AT CHARLESTON CPW WATER INTAKE | DO | 3 |
| 030502010704 | CSTL-124 | BUSHY PARK RESERVOIR IN FOREBAY EQUIDISTANT FROM DAM AND SHORELINES | DO | 3 |
| 30502010704 | MD-042 | COOPER RIVER @ BUSHY PARK | HGF | 3 |
| 030502010706 | MD-039 | GOOSE CK AT S-08-136 BRIDGE | ENTERO | 3 |
| 30502010706 | RL-01008 | GOOSE CK RES 2.3 M S OF GOOSE CREEK TOWN CENTER | DO | 3 |
| 030502010706 | RL-03340 | GOOSE CREEK RESERVOIR 1.0 MI NW OF SPILLWAY NEAR W SHORELINE | CHLA, DO, TP | 3 |
| 030502010706 | RL-04390 | GOOSE CREEK RESERVOIR 2.8 MI NW OF SPILLWAY NEAR OTRANTO | CHLA, DO, TP | 3 |
| 030502010706 | RL-05412 | GOOSE CREEK RESERVOIR 0.55 MI W OF DAM | TP | 3 |
| 030502010706 | RL-06434 | GOOSE CREEK RESERVOIR 2 MI N OF SPILLWAY | TP | 3 |
| 030502010706 | RL-07017 | GOOSE CK RESERVOIR 0.6 MI NW OF 2ND POWERLINES US OF BOAT RAMP; NEAR W SHORE BTWN 2 WESTERN EMBAYMENTS | DO | 3 |
| 030502010706 | RL-08065 | GOOSE CK RESERVOIR MIDLAKE IN LINE WITH NORTHBROOK BLVD | TP | 3 |
| 030502010706 | RL-09081 | GOOSE CREEK RESERVOIR 0.1 MILE NORTHEAST OF THE JOHN R. BETTIS BOAT LANDING AND 0.1 MILES SOUTHEAST OF ST-033 NEAR THE NORTHEAST BANK. | CHLA, TP | 3 |
| 030502010706 | RL-10104 | LAKE; GOOSE CK RESERVOIR 1.95MI WEST OF POPPENHEIM CROSSING | CHLA, DO, TP, ECOLI | 3 |
| 030502010706 | RL-10108 | LAKE; GOOSE CK RESERVOIR 2.5MI SW OF POPPENHEIM CROSSING | CHLA, DO, TP | 3 |
| 030502010706 | RL-11118 | GOOSE CREEK RESERVOIR APPROXIMATELY 1.3 MILES UPSTREAM FROM THE DAM. SITE IS LOCATED 100 YARDS SOUTH OF THE MAJOR POINT ON THE EAST BANK IN THE MIDDLE OF THE RESERVOIR. | TP | 3 |

| | | | | |
|---|---|---|---|---|
| 030502010706 | RL-13132 | GOOSE CK RESERVOIR APPROX 250 YDS NW OF END OF HANAHAN RD | PH, TP | 3 |
| 30502010706 | RL-15109 | GOOSE CREEK RESERVOIR 2.58 MILES NORTH OF JOHN R BETTIS LANDING | CHLA, TP | 3 |
| 030502010706 | RL-19259 | GOOSE CREEK RESERVOIR 0.25 MI WSW FROM CENTER OF GOOSE CREEK PRIMARY SCHOOL | CHLA, TP | 3 |
| 030502010706 | ST-032 | GOOSE CREEK RESERVOIR 100 M US OF DAM | TP | 3 |
| 030502010706 | ST-033 | GOOSE CK RESERVOIR AT 2ND POWERLINES US OF BOAT RAMP | TP | 3 |

*Table 5c: 2024 303(d) List of Impaired Stations within the City of Hanahan's SMS4 Area and/or that the SMS4 Area Drains Into*

| HUC 12 | SITE | DESCRIPTION | CAUSE | PRIORITY RANKING |
|---|---|---|---|---|
| 30502010704 | MD-042 | COOPER RIVER @ BUSHY PARK | HGF | 3 |
| 030502010706 | MD-039 | GOOSE CK AT S-08-136 BRIDGE | ENTERO | 3 |
| 30502010706 | RL-01008 | GOOSE CK RES 2.3 M S OF GOOSE CREEK TOWN CENTER | DO | 3 |
| 030502010706 | RL-03340 | GOOSE CREEK RESERVOIR 1.0 MI NW OF SPILLWAY NEAR W SHORELINE | CHLA, DO, TP | 3 |
| 030502010706 | RL-04390 | GOOSE CREEK RESERVOIR 2.8 MI NW OF SPILLWAY NEAR OTRANTO | CHLA, DO, TP | 3 |
| 030502010706 | RL-05412 | GOOSE CREEK RESERVOIR 0.55 MI W OF DAM | TP | 3 |
| 030502010706 | RL-06434 | GOOSE CREEK RESERVOIR 2 MI N OF SPILLWAY | TP | 3 |
| 030502010706 | RL-07017 | GOOSE CK RESERVOIR 0.6 MI NW OF 2ND POWERLINES US OF BOAT RAMP; NEAR W SHORE BTWN 2 WESTERN EMBAYMENTS | DO | 3 |
| 030502010706 | RL-08065 | GOOSE CK RESERVOIR MIDLAKE IN LINE WITH NORTHBROOK BLVD | TP | 3 |
| 030502010706 | RL-09081 | GOOSE CREEK RESERVOIR 0.1 MILE NORTHEAST OF THE JOHN R. BETTIS BOAT LANDING AND 0.1 MILES SOUTHEAST OF ST-033 NEAR THE NORTHEAST BANK. | CHLA, TP | 3 |
| 030502010706 | RL-10104 | LAKE; GOOSE CK RESERVOIR 1.95MI WEST OF POPPENHEIM CROSSING | CHLA, DO, TP, ECOLI | 3 |
| 030502010706 | RL-10108 | LAKE; GOOSE CK RESERVOIR 2.5MI SW OF POPPENHEIM CROSSING | CHLA, DO, TP | 3 |

| | | | | |
|---|---|---|---|---|
| 030502010706 | RL-11118 | GOOSE CREEK RESERVOIR APPROXIMATELY 1.3 MILES UPSTREAM FROM THE DAM. SITE IS LOCATED 100 YARDS SOUTH OF THE MAJOR POINT ON THE EAST BANK IN THE MIDDLE OF THE RESERVOIR. | TP | 3 |
| 030502010706 | RL-13132 | GOOSE CK RESERVOIR APPROX 250 YDS NW OF END OF HANAHAN RD | PH, TP | 3 |
| 30502010706 | RL-15109 | GOOSE CREEK RESERVOIR 2.58 MILES NORTH OF JOHN R BETTIS LANDING | CHLA, TP | 3 |
| 030502010706 | RL-19259 | GOOSE CREEK RESERVOIR 0.25 MI WSW FROM CENTER OF GOOSE CREEK PRIMARY SCHOOL | CHLA, TP | 3 |
| 030502010706 | ST-032 | GOOSE CREEK RESERVOIR 100 M US OF DAM | TP | 3 |
| 030502010706 | ST-033 | GOOSE CK RESERVOIR AT 2ND POWERLINES US OF BOAT RAMP | TP | 3 |

## 3.5 Discharges to Classified Waters

For discharges to Classified Waters, BMP applications will be conducted through implementation of the minimum control measures in section 4.2. The BMP implementation strategies will not cause or contribute to violations of water quality standards in water bodies with impaired monitoring stations. Lists of Classified Waters in Berkeley County, Goose Creek, and Hanahan are provided in the tables below.

*Table 6a: Discharges to Classified Waters in Berkeley County MS4*

| Waterbody | Classification | Description |
|---|---|---|
| Ralston Creek | SFH | The entire creek tributary to Wando River |
| Sawmill Branch | FW | The entire branch tributary to Dorchester Creek |
| Wando River | SFH | That portion from its headwaters to a point 2.5 miles north of its confluence with Cooper River |
| Wando River | SA | That portion from a point 2.5 miles north of its confluence with Cooper River to its confluence with Cooper River |
| West Branch Cooper River | FW | The entire river from Biggin Creek to its confluence with East Branch Cooper River (the Tee) |
| Back River | FW | The entire river tributary to Cooper River |
| Beresford Creek | SFH | That portion of the creek from Wando River to a point 4 miles from Wando River |
| Beresford Creek | SA | That portion of the creek from a point 4 miles from Wando River to Clouter Creek |
| Cooper River | FW | That portion of the river from the confluence of West Branch Cooper River and East Branch Cooper River (the Tee) to a point approximately 30 miles above the junction of Ashley and Cooper Rivers |

| | | |
|---|---|---|
| Cooper River | SB | That portion of the river below a point approximately 30 miles above the junction of Ashley and Cooper Rivers to the junction of Ashley and Cooper Rivers |
| Goose Creek | FW | That portion of the creek from its headwaters to Goose Creek Reservoir dam |
| Goose Creek | SB | That portion of the creek from Goose Creek Reservoir dam to Cooper River |

*Table 6b: Discharges to Classified Waters in Goose Creek MS4*

| Waterbody | Water Quality Classification | Description |
|---|---|---|
| Goose Creek | FW | That portion of the creek from its headwaters to Goose Creek Reservoir dam |
| Goose Creek | SB | That portion of the creek from Goose Creek Reservoir dam to Cooper River |

*Table 6c: Discharges to Classified Waters in Hanahan MS4*

| Waterbody | Water Quality Classification | Description |
|---|---|---|
| N/A | N/A | The City of Hanahan does not discharge to waters classified as Outstanding Resource (ORW), Trout (TM. TPGT & TPT) or Shellfish Harvesting (SFH). |

## 3.6 Discharges to Source Water Protection Areas

For discharges to Source Water Protection Areas (SWPA), BMP applications will be conducted through implementation of the six minimum control measures in Section 4.2 for protection necessary to support its uses. The tables below list the details associated with each regulated MS4 area that discharge to a SWPA; please note that the City of Hanahan does not discharge to any SWPA.

*Table 7a: Discharges to Source Water Protection Areas in Berkeley County MS4*

| Waterbody | Buffer | Intake | Facility |
|---|---|---|---|
| Bushy Park Reservoir | 200 ft | S10104 | Charleston Commissioners of Public Works |

*Table 7b: Discharges to Source Water Protection Areas in Goose Creek MS4*

| Waterbody | Buffer | Intake | Facility |
|---|---|---|---|
| Bushy Park Reservoir | 200 ft | S10104 | Charleston Commissioners of Public Works |

# 4.0 Stormwater Management Plan (SWMP)

## 4.1 Permit Requirements

### *4.1.1 Requirements of the NPDES SMS4 General Permit*

Berkeley County has implemented this SWMP to reduce the discharge of pollutants from SMS4 areas for the County, City of Goose Creek and City of Hanahan to the maximum extent practicable to protect water quality.

### *4.1.2 SWMP Development*

On behalf of the City of Goose Creek, City of Hanahan and Berkeley County, the County has revised and updated the written SWMP document and will submit the SWMP to SCDES Bureau of Water within six months from the effective date of the newly issued permit.

### *4.1.3 Contents of the SWMP*

Berkeley County, City of Goose Creek, and City of Hanahan have met the minimum requirements for a SWMP by including ordinances, or other regulatory mechanisms, and by providing the legal authority necessary to implement and enforce the requirements of the SMS4 general permit. See Appendix D of the SWMP for the Stormwater Management Ordinances for Berkeley County, City of Goose Creek, and City of Hanahan.

### *4.1.4 Requirement to Develop Adequate Legal Authority*

Within one year from the effective date of the permit, the County reviewed and revised the Stormwater Management Ordinance to provide adequate legal authority to control pollutant discharges into and from the SMS4, and to meet the requirements of the SMS4 general permit. In November 2014, the Berkeley County Ordinance was amended to establish regulations to develop and enforce a Stormwater Management Program. Additionally, both Goose Creek and Hanahan have established stormwater management ordinances in place since 2014 and amended in 2018 for conformance with the written Inter-Governmental Agreement (IGA).

At a minimum the legal authority addresses the following:

- Authority to Prohibit Illicit Discharges
- Determination of Allowable Non-Stormwater Discharges
- Authority to Prohibit Spills or Other Releases
- Authority to Require Compliance
- Authority to Require Installation, Implementation, and Maintenance of Control Measures
- Authority to Receive and Collect Information
- Authority to Inspect
- Response to Violations
- Monetary Penalties
- Civil/Criminal Penalties
- Interagency Agreements (if applicable)

A certification statement has been included in this SWMP that certifies Berkeley County has taken the necessary steps to obtain and maintain full legal authority to implement and enforce each of the requirements contained in the NPDES SMS4 general permit for each respective entity. (see Page i).

### *4.1.5 Enforcement Measures and Tracking*

Berkeley County (2014), City of Goose Creek (2015) and City of Hanahan (2014) have developed and implemented an enforcement response plan (ERP) within 12 months from the effective date of this permit. Each ERP sets out Berkeley County's potential responses to violations and addresses repeat and continuing violations through progressively stricter responses as needed to achieve compliance. Amended City of Goose Creek and City of Hanahan ordinances, in 2018, for conformance with the written Inter-Governmental Agreement (IGA), necessitated updates, to all three jurisdictions ERP for a unified approach in 2019.

#### 4.1.5.2 Enforcement Tracking:

The County continues to track instances of non-compliance either in hard-copy files or electronically for Berkeley County, City of Goose Creek, and City of Hanahan.

#### 4.1.5.3 Recidivism Reduction:

The County summarizes inspection results by consuetudinary violators and include incentives, disincentives, or an increased inspection frequency at the operator's sites for Berkeley County, City of Goose Creek, and City of Hanahan.

### *4.1.6 Report Requirements*

Berkeley County has submitted the following information in the Annual Report for the County, City of Goose Creek, and City of Hanahan (See Section 5.3 for details).

- The status of implementing the components of the SWMP that are established as permit conditions;
- Proposed changes to the SWMP that are established as permit conditions;
- Revisions, if necessary, to the assessment of controls and the fiscal analysis, including a description of staff resources necessary to meet the requirements of the permit;
- A summary of data, including monitoring data, that is accumulated throughout the reporting year; and,
- A summary describing the number and nature of enforcement actions, inspections, and public education programs.

### 4.1.7 SWMP Minimum Control Measure Requirements

The Berkeley County SWMP includes the following information for the County, City of Goose Creek and City of Hanahan for each of the six minimum control measures (MCM) described in Section 4.2 of this SWMP in detail:

- Best management practices (BMP) that the County or another entity will implement for each of the MCM;
- Measurable goals for each BMP including, as appropriate, the months and years in which the County will undertake required actions, including interim milestones and the frequency of the action; and,
- Person, or persons, responsible for implementing or coordinating the BMPs for each entities SWMP.

### 4.1.10 SWMP Modifications

SCDES Bureau of Water may notify Berkeley County of the need to modify the SWMP document to be consistent with the permit, in which case Berkeley County will have 90 days to finalize such changes to the plan.

Berkeley County has kept the SWMP document up to date during the term of the permit. Where Berkeley County determined that ordinance modifications were needed to address any procedural, protocol, or programmatic change, such changes were made as soon as practicable, but not later than 360 days. The following table describes schedule, frequency and responsible party for SWMP requirements:

*Table 8: SWMP Requirements*

| **SWMP REQUIREMENTS** | | | |
|---|---|---|---|
| **Develop and Implement SWMP** | **Not Started:☐ In Progress :☒ Completed:☐** | | |
| | **Section: 4.1.2** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Revise and update written SWMP document to be utilized by Berkeley County, City of Goose Creek and City of Hanahan, and submit the SWMP to SCDES Bureau of Water. | Throughout Permit Term | Annually | County Engineer |
| **Update:**<br>• Berkeley County has regularly updated this SWMP to reflect the responsibilities it has undertaken on behalf of the County, Goose Creek and Hanahan. | | | |
| **Update Stormwater Management Ordinance** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
| | **Section: 4.1.3** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |

| | | | |
|---|---|---|---|
| Review and revise the Stormwater Management Ordinance, or adopt any new ordinances or other regulatory mechanisms that provide adequate legal authority to control pollutant discharges into and from the SMS4, and to meet the requirements of the SMS4 general permit. | January 1, 2015 | Once | County Engineer |

**Update:**

- In November 2014, the Berkeley County Ordinance was amended to establish regulations to develop and enforce a Stormwater Management Program. Additionally, both Goose Creek and Hanahan have stormwater management ordinances that were established in 2014 and amended in 2018 for conformance with the written Inter-Governmental Agreement (IGA). Copies can be found in Appendix D of the SWMP.

| **Enforcement Response Plan (ERP)** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
|---|---|---|---|
| | **Section: 4.1.5** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Develop & Implement an enforcement response plan (ERP). | January 1, 2015 | Once | County Engineer |

**Update:**

- Berkeley County, Goose Creek and Hanahan have updated their ERPs for a unified approach mechanism and a copy can be found in Appendix F of the SWMP.

| **Update Stormwater Management Plan** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
|---|---|---|---|
| | **Section: 4.1.10** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Review and revise the SWMP document as necessary to keep it up to date during the term of the permit. | Throughout Permit Term | Annually | County Engineer |

**Update:**

- Berkeley County has regularly updated this SWMP to reflect the responsibilities it has undertaken on behalf of the County, Goose Creek and Hanahan.

## 4.2 Minimum Control Measures

In compliance with SMS4 general permit requirements, this SWMP includes a description of the six minimum control measures (MCMs) and details on the development and implementation of the plan to address MCM requirements. The details on each minimum measure include the measurable goals for each proposed BMP, the implementation schedule for the BMP (implementation date and frequency), and the responsible person(s) to implement the BMP.

### *4.2.1 Public Education and Outreach (Minimum Measure #1)*

#### 4.2.1.1 Minimum Measure #1 Permit Requirements

In order to meet the requirements of Minimum Measure #1, Berkeley County has partnered with Clemson University and utilizes Clemson University Cooperative Extension Service's (CUCES) Carolina Clear program to focus on the development and implementation of educational programs designed to inform the public (both in the County and City of Goose Creek and City of Hanahan) about the impacts that stormwater discharges could have on local waterbodies and the steps that the public can take to reduce pollutants in stormwater runoff. The County will continue its agreement with Clemson University, scheduled for continuation until July 1, 2027, to efficiently reach as many citizens as economically possible through public education and outreach efforts. See Appendix G for Contract.

*Table 9: Minimum Measure #1 Permit Requirements*

| |
|---|
| 4.4.1.1.1 The pollutant(s) of concern (POC) within the watershed areas of Berkeley County, Goose Creek and Hanahan: |
| **Bacteria (ENTERO and ECOLI) –** Ashley River, Cooper River, Wando River<br>**Litter –** Ashley River, Cooper River, Wando River<br>**Nutrients (TP and N) –** Ashley River, Cooper River, Wando River |
| 4.4.1.1.2 Description of the POC(s) listed above: |
| Enterococci (ENTERO) and *Escherichia coli* (ECOLI) impairments can be a result of various sources including but not limited to: Failing Septic and Wastewater Systems and Animal Waste being transported through runoff during storm events.<br>Total Phosphorus (TP) impairments can be a result of various sources including but not limited to: Wastewater Treatment Operations, Urban Runoff that includes fertilizers and pet yard waste, Runoff from pastures and croplands, and waterfowl.<br>Nitrogen (N) impairments can be a result of various sources including but not limited to: Wastewater Treatment Operations, Urban Runoff that includes fertilizers and pet yard waste, Runoff from pastures and croplands, and waterfowl.<br>Litter impacts are the result of single-use plastics not properly disposed of. Improper disposal of cigarette butts from smokers, illegal dumping activities, and improper cover of trash/debris while vehicles are in transport. |
| 4.4.1.1.3 Programs targeted at high priority community issues with the potential to decrease the POC's effect on water quality: |
| On behalf of Goose Creek, Hanahan, and the County MS4 areas, Berkeley County utilizes Clemson University's Cooperative Extension Service's Carolina Clear Program to assist in meeting the requirements of Minimum Measure 1 and 2. The Contract can be found in Appendix G. |
| 4.4.1.1.4 The audience(s) that is believed to have an influence on the POC identified and that is believed to have an influence on the goals and objectives identified: |
| On behalf of Goose Creek, Hanahan, and the County MS4 areas, Berkeley County utilizes Clemson University's Cooperative Extension Service's Carolina Clear Program to assist in meeting the requirements of Minimum Measure 1 and 2. The Contract can be found in Appendix G. |
| 4.4.1.1.5 The message(s) directed at the target audience(s) listed above to achieve the program goals and objectives: |
| On behalf of Goose Creek, Hanahan, and the County MS4 areas, Berkeley County utilizes Clemson University's Cooperative Extension Service's Carolina Clear Program to assist in meeting the requirements of Minimum Measure 1 and 2. The Contract can be found in Appendix G. |

| | |
|---|---|
| 4.4.1.1.6 | Education campaign(s) and materials: |
| | On behalf of Goose Creek, Hanahan, and the County MS4 areas, Berkeley County utilizes Clemson University's Cooperative Extension Service's Carolina Clear Program to assist in meeting the requirements of Minimum Measure 1 and 2. The Contract can be found in Appendix G. |
| 4.4.1.1.7 | Distribution of campaign materials: |
| | On behalf of Goose Creek, Hanahan, and the County MS4 areas, Berkeley County utilizes Clemson University's Cooperative Extension Service's Carolina Clear Program to assist in meeting the requirements of Minimum Measure 1 and 2. The Contract can be found in Appendix G. |
| 4.4.1.1.8 | Quantitative and/or qualitative formative assessment of programs: |
| | On behalf of Goose Creek, Hanahan, and the County MS4 areas, Berkeley County utilizes Clemson University's Cooperative Extension Service's Carolina Clear Program to assist in meeting the requirements of Minimum Measure 1 and 2. The Contract can be found in Appendix G. |
| 4.4.1.1.9 | Utilization of public input into the development of this program: |
| | On behalf of Goose Creek, Hanahan, and the County MS4 areas, Berkeley County utilizes Clemson University's Cooperative Extension Service's Carolina Clear Program to assist in meeting the requirements of Minimum Measure 1 and 2. The Contract can be found in Appendix G. |
| 4.4.1.2.10 | Implementation of program goals and objectives: |
| | On behalf of Goose Creek, Hanahan, and the County MS4 areas, Berkeley County utilizes Clemson University's Cooperative Extension Service's Carolina Clear Program to assist in meeting the requirements of Minimum Measure 1 and 2. The Contract can be found in Appendix G. |
| 4.4.1.1.11 | Process for annual adjustment of program based upon program assessment: |
| | On behalf of Goose Creek, Hanahan, and the County MS4 areas, Berkeley County utilizes Clemson University's Cooperative Extension Service's Carolina Clear Program to assist in meeting the requirements of Minimum Measure 1 and 2. The Contract can be found in Appendix G. |

**Minimum Measure #1 BMP Implementation**

Evaluation of the success of this minimum measure will be through careful analysis of the measurable goals for each BMP included in this minimum measure. Table 10 describes the components of Berkeley County's, Goose Creek's, and Hanahan's Public Education and Outreach program:

*Table 10: Best Management Practices - Minimum Measure #1*

| **PUBLIC EDUCATION AND OUTREACH BMPS** | | | |
|---|---|---|---|
| **Contractual Agreement with Clemson University** | **Not Started:☐ On-going :☒ Completed:☐** | | |
| | **Section: 4.2.1.1** | | |
| **Milestone(s)** | **Schedule/Deadline** | **Frequency** | **Responsible Party** |
| Continue County's Contract with Clemson University to implement a public education/outreach program for the MS4 regulated areas in Berkeley County, Goose Creek, and Hanahan. | Throughout Permit Term | Annually | County Engineer and CUCES's Carolina Clear Program |
| **Measurable Goal:** | | | |
| • A program that provides public education concerning water quality issues in the MS4 regulated area of Berkeley County, Goose Creek and Hanahan. | | | |
| **Measurable Goal Update:** | | | |

| | | | |
|---|---|---|---|
| • Berkeley County is continuing their agreement with Clemson University's Carolina Clear Program to address MCM #1 and MCM #2. | | | |
| **Support Ashley-Cooper Stormwater Education Consortium** | **Not Started:☐ On-going :☒ Completed:☐** | | |
| | **Section: 4.2.1.1.3** | | |
| **Milestone(s)** | **Schedule/Deadline** | **Frequency** | **Responsible Party** |
| Berkeley County will support the Ashley-Cooper Stormwater Education Consortium by: participating in meetings/workshops, promoting/advertising events, distributing water quality awareness campaign items, and providing other general assistance as resources allow. | Throughout Permit Term | Annually | County Engineer |
| **Measurable Goal:** | | | |
| • Support Ashley-Cooper Stormwater Education Consortium. | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County is continuing to support the Ashley-Cooper Stormwater Consortium to address MCM #1 and MCM #2. | | | |

### *4.2.2 Public Involvement/Participation (Minimum Measure #2)*

#### 4.2.2.1 Minimum Measure #2 Permit Requirements

Berkeley County has collaborated with CUCES's Carolina Clear to efficiently reach as many citizens in the County, Goose Creek, and Hanahan as economically possible through public involvement and participation efforts. CUCES's Carolina Clear provides the citizens of Berkeley County, Goose Creek, and Hanahan opportunities to participate in activities and events relating to water quality preservation and water quality education.

*Table 11: Minimum Measure #2 Permit Requirements*

| | |
|---|---|
| 4.2.2.1.1 | Create opportunities for citizens to participate in the implementation of stormwater controls: |
| | CUCES's Carolina Clear program provides opportunities for citizen participation in the implementation of stormwater controls in Berkeley County, Goose Creek, and Hanahan. |
| 4.2.2.1.2 | Accessing information on this SWMP: |
| | Berkeley County includes the SWMP on the County's Stormwater Management webpage. |
| 4.2.2.1.3 | Incorporate written procedures for implementing the public involvement/participation (PIP) MCM in the SWMP: |
| | Berkeley County (on behalf of the County, Goose Creek, and Hanahan) will continue to implement its written procedures (Contract) with Clemson University to Implement a Public Involvement and Participation Program |

### Minimum Measure #2 BMP Implementation

The measurable goals for each BMP for the Public Participation and Involvement minimum measure will be used to evaluate the success of each BMP. Table 12 describes the components of the Public Involvement/Participation program for Berkeley County, Goose Creek, and Hanahan:

*Table 12: Best Management Practices – Minimum Measure #2*

| **Opportunities for Citizen Participation** | **Not Started:☐ On-going :☒ Completed:☐** | | |
|---|---|---|---|
| | **Section: 4.2.2.1.1** | | |
| **Milestone(s)** | **Schedule/ Deadline** | **Frequency** | **Responsible Party** |
| Contract with Clemson University to implement a public involvement/participation program for Berkeley County, Goose Creek, and Hanahan. | Throughout Permit Term | Annually | County Engineer and CUCES's Carolina Clear Program |
| **Measurable Goal:** | | | |
| • A program that will provide the citizens of Berkeley County, Goose Creek, and Hanahan opportunities to participate in activities and events relating to water quality preservation and water quality education. | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County has continued the contract with Carolina Clear and is involved with the Ashley-Cooper Stormwater Consortium. Through these resources, the County has provided opportunities for citizen participation in the County, Goose Creek, and Hanahan. | | | |
| **Provide Access to Information for the SWMP** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
| | **Section: 4.2.2.1.2** | | |
| **Milestone(s)** | **Schedule/ Deadline** | **Frequency** | **Responsible Party** |
| Ensure the public can easily find information about the SWMP. | Throughout Permit Term | Once during permit term | County Engineer |
| **Measurable Goal:** | | | |
| • Berkeley County will include the updated SWMP on the County's webpage. | | | |
| **Measurable Goal Update:** | | | |
| •The County has a section on their website for forms and documents. The updated SWMP will be added to the website by July 1, 2026. The SWMP information is located at: https://berkeleycountysc.gov/dept/swmp/ and includes the City of Goose Creek and City of Hanahan. | | | |

| Written Procedures for Implementing MCM#2 | Not Started:☐ On-going :☒ Completed:☐ | | |
|---|---|---|---|
| | Section: 4.2.2.1.3 | | |
| **Milestone(s)** | **Schedule/ Deadline** | **Frequency** | **Responsible Party** |
| Berkeley County will continue implementing the public education and involvement MCM. | Throughout Permit Term | Annually | County Engineer and CUCES's Carolina Clear Program |
| **Measurable Goal:** | | | |
| • Signed Contract with Clemson University/Carolina Clear. | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County has continued their contract with Carolina Clear and is involved with the Ashley-Cooper Stormwater Consortium. Through these resources, the County has provided opportunities for citizen participation for the County, Goose Creek, and Hanahan. | | | |

### *4.2.3 Illicit Discharge Detection and Elimination (Minimum Measure #3)*

#### 4.2.3.1 Minimum Measure #3 Permit Requirements

Berkeley County will locate and eliminate illicit discharges in the County, Goose Creek, and Hanahan by continuing to implement a program in accordance with the SMS4 general permit requirements. The County has developed selection criteria to establish priority areas and identify the priority areas. The basis for selection of each priority area is documented. Screening points identified within the priority areas are visited to check for dry weather flow. Outfalls that have been identified to have dry weather flow are screened to identify potential illicit discharges. Prior to illicit tracking activities, the County has reviewed and updated the existing Standard Operating Procedures for Use in Field Investigation for Illicit Discharges (SOP) document as necessary for illicit tracking procedures.

*Table 13: Minimum Measure #3 Permit Requirements*

| | |
|---|---|
| 4.2.3.2.1 | Development of the storm sewer system map: |
| | Berkeley County has developed a storm sewer system map for the County, Goose Creek, and Hanahan showing the location of known outfalls, and names and locations of all waters of the United States that receive discharges from those outfalls. The storm sewer map is updated as needed to show new outfalls due to new developments. |
| 4.2.3.2.2 | Identification of priority areas: |
| | Berkeley County has developed selection criteria to establish priority areas and identify the priority areas in the County, Goose Creek, and Hanahan. The County documented the basis for its selection of each priority area and created a list of all priority areas identified in the system no later than 12 months after the effective date of permit coverage. A list of the priority area is updated *annually* to reflect changing priorities and is available for review by the permitting authority. |
| 4.2.3.2.3.a | Field screening to detect illicit discharges: Conduct Field Screening |
| | Berkeley County will conduct dry weather field screening and / or analytical monitoring, when necessary, at major outfall locations, to identify the source of illicit discharges in the County, Goose Creek, and Hanahan. At a minimum, Berkeley County:<br>• Identifies all field screening points utilizing Major Outfalls as defined by Reg. 61-9 within the priority areas where field screening and potential analytical monitoring will take place. A list |

of screening points has been developed utilizing Major Outfalls as defined by Reg. 61-9. The County also conducts field screening and any necessary analytical monitoring outside the priority areas at known non-stormwater discharges. The areas and the schedule for conducting the screening, and field screening points are identified annually.

- Reviews and updates the SOP document for dry weather screening procedures to include:
  - A description of which screening methods will be used and a description as to why it is appropriate;
  - A description of field screening equipment with respective methodologies for use; and
  - All dry weather screening activities will be conducted after 72-hours of continuous dry conditions following at most 0.10 inches of rainfall.

The elimination of all illicit discharges is documented. The SOP document has been reviewed and updated to develop documentation procedures as described in section 4.2.3.2.5/6

4.2.3.2.3.b Field Screening Assessment:

Berkeley County has assessed the effectiveness of the Field Screening component of the IDDE program for the County, Goose Creek, and Hanahan to determine if the level of effort is adequate in attaining the effective prohibition of non-stormwater discharges into the MS4. Where updates are found to be necessary, Berkeley County will make such changes and include them as part of the re-notification required under Part 2.5 of Permit SCR030000.

4.2.3.2.3.c Procedures for notifying another MS4 of an illicit discharge:

For non-traditional MS4 permittees, if illicit connections or illicit discharges are observed related to another operator's municipal storm sewer system then Berkeley County will notify the other operator as soon as practical but no later than 3 business days.

4.2.3.2.3.d Addressing a notification of an illicit discharge by another operator:

Berkeley County will follow appropriate procedures when notified of an illicit discharge by another MS4 operator.

4.2.3.2.4/5 Tracing the source of an illicit discharge:

- Berkeley County has reviewed and is updating the existing IDDE SOP document, applicable in Goose Creek and Hanahan, for procedures for conducting illicit tracking and elimination.
- After becoming aware of an illicit discharge, Berkeley County will initiate an investigation(s) to attempt to identify and locate the source of any continuous or intermittent non-stormwater discharge on as soon as practical but no later than 3 business days.
- Berkeley County will report immediately the occurrence of any dry weather flow believed to be an immediate threat to human health of the environment to SCDES Emergency Response, 1-888-481-0125.
- Illicit Discharges suspected of being sanitary sewage and/or significantly contaminated will be considered a high priority and will be reported to appropriate public utility owner within 24 hrs.
- Investigations of illicit discharges suspected of being cooling water, wash water, or natural flows may be delayed until after all discharges suspected of having the potential for adversely impact either human health or water quality have been investigated, eliminated, and/or resolved.
- At a minimum, Berkeley County will document the date(s) the illicit discharge was observed; the results of the investigation; any follow-up of the investigation; and the date the investigation was closed.

| 4.2.3.2.6 Determining the source of the illicit discharge: |
|---|
| Berkeley County will determine and document through their investigations the source of all confirmed illicit discharges in the County, Goose Creek, and Hanahan. If the source of the suspected illicit discharge is found to be a suspected non-compliance with an NPDES permit, the appropriate SCDES Regional Office will be notified.<br>a. If an illicit discharge is found, but within six (6) months of the beginning of the investigation neither the source nor the same non-stormwater discharge has been identified/observed, then Berkeley County will maintain written documentation for review by the permitting authority.<br>b. If the observed discharge is intermittent, Berkeley County will document that a minimum of three (3) separate investigations were made to observe the discharge when it was flowing. If these attempts are unsuccessful, Berkeley County will maintain written documentation for review by the permitting authority. However, since this is an ongoing program, Berkeley County will periodically recheck these suspected intermittent discharges. |
| 4.2.3.2.7 Corrective Action plan to eliminate illicit discharges: |
| Once the source of the illicit discharge in the County, Goose Creek or Hanahan has been determined, Berkeley County will:<br>a. Notify the responsible party of the problem as soon as practical but no later than 3 business days.<br>b. Require the responsible party to conduct all necessary corrective actions to eliminate the non-stormwater discharge within 30 days. When, and if, elimination will take longer than 30 days, Berkeley County will require responsible parties to submit a plan with a schedule for elimination.<br>c. Conduct a follow-up investigation and field screening, consistent with Part 4.2.3.4/5 of this SWMP, to verify that the discharge has been eliminated.<br>d. Document their follow-up investigations.<br>e. Follow the SWMP ERP and include the resulting enforcement actions in the subsequent report. |
| 4.2.3.2.8 Public reporting mechanism: |
| Berkeley County has established an illicit reporting hotline for the public and staff to report illicit discharges in the County, Goose Creek, and Hanahan.<br><br>The County has established and implemented citizen request response procedures in the illicit tracking procedures document created for section 4.2.3.2.4/5. This includes:<br>a. Development of a written spill/dumping response procedure for responding to public notices of illicit discharges, the various responsible agencies and their contacts, and who would be involved in illicit discharge incidence response.<br>b. Procedures for inspections in response to complaints and follow-up inspections as needed to ensure that corrective measures have been implemented by the responsible party to achieve and maintain compliance. |

| 4.2.3.2.9 Employee training: |
| --- |
| Berkeley County will implement a training program for all appropriate municipal staff, which, as part of their normal job responsibilities, may come into contact with, or otherwise observe, an illicit discharge or illicit connection to the storm sewer system. This BMP will be implemented through training for Pollution Prevention in Section 4.2.6.5 |

**Minimum Measure #3 BMP Implementation**

In order to meet the requirements of Minimum Measure #3, Berkeley County has listed BMPs that focus on the detection and elimination of illicit discharges into the SMS4 for the County, Goose Creek, and Hanahan. In order to provide a summative document for the various IDDE permit requirements, Berkeley County has reviewed and is updating the existing IDDE SOP document and IDDE Priority Areas document to include the following sections: map of priority areas, list of screening points in the priority area, dry weather screening procedures, illicit tracking procedures, illicit elimination procedures, Major Outfalls as defined by Reg. 61-9, and IDDE documentation procedures. Evaluation of the success of this minimum measure is based on the level of implementation of the BMPs included in this minimum measure. The below table describes the components of the County's Illicit Discharge Detection and Elimination (IDDE) program.

To meet the requirements of Minimum Measure #3, Berkeley County will:

- Update the Storm Sewer Map
- Identify Priority Areas for Illicit Discharges
- Identify Screening Points Utilizing Major Outfalls as Defined by Reg. 61-9
- Update Field Screening and Illicit Tracking Procedures
- Assess Field Screening Procedures
- Conduct Field Screening (Dry Weather Screening)
- Conduct Illicit Tracking
- Eliminate Illicit Discharges
- Document Illicit Discharge Investigations
- Provide Employee Training on Illicit Discharge Identification

Table 14 describes the components of Berkeley County's, Goose Creek's, and Hanahan's Illicit Discharge Detection and Elimination (IDDE) program.

*Table 14: Best Management Practices – Minimum Measure #3*

| IDDE BMPs | | | |
|---|---|---|---|
| **Update Storm Sewer Map** | **Not Started:☐ In Progress :☒ Completed:☐** | | |
| | **Section: 4.2.3.2.1** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Update the storm sewer map showing the location of all outfalls and names and locations of all waters of the United States that receive discharge from those outfalls. | Throughout Permit Term | Annually | County Engineer |
| **Measurable Goal:** | | | |
| • To provide a complete inventory of SMS4 outfalls for use in performing illicit discharge detection and elimination, and potential stormwater monitoring. | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County has an updated storm sewer map for the County, Goose Creek, and Hanahan. This map will be updated as necessary. Additionally, existing outfall locations were used to identify Major Outfall locations. | | | |
| **Identify Priority Areas** | **Not Started:☐ On-going :☐ Completed:☒** | | |
| | **Section: 4.2.3.2.2** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| • Develop selection criteria to establish priority areas and document the basis for selection of each priority area.<br>• Create list of all priority areas<br>• The list will be updated annually. | Throughout Permit Term | Annually | County Engineer |
| **Measurable Goal:** | | | |
| • The priority list will be used to set the boundaries for SMS4 Dry-Weather Screening for the given permit year and the County will create prioritized areas. | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County has updated the Priority Areas to consolidate Priority Areas for Berkeley County, City of Goose Creek and City of Hanahan. The new list was compiled in an effort to effectively and efficiently assess each MS4's concerns. Priority areas are listed below. | | | |
| • Priority Area 1: Municipally owned and/or operated facilities with "hot spot" activities, such as vehicle maintenance, storage areas, etc.<br>• Priority Area 2: Known areas with repetitive, historical illicit discharges<br>• Priority Area 3: Known areas with a history of illegal dumping<br>• Priority Area 4: Known areas with older sewer lines, history of sanitary sewer overflows (SSOs), or known cross-connections<br>• Priority Area 5: Areas thought to be causative of pollutants of concern (POC) upstream to sensitive waterbodies and/or impaired monitoring stations. | | | |

| **Develop Field Screening & Illicit Tracking Procedures** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
|---|---|---|---|
| | **Section: 4.2.3.2.3a/3c/3d/4/5/7/8** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Develop Illicit section for the ERP.<br><br>Review and update the SOP document to include:<br>• A description of the screening methods to be used<br>• A description of field screening equipment with respective methodologies to be used<br>• Procedures for notifying another MS4 of an illicit discharge<br>• Procedures for addressing notifications from another MS4 of an illicit discharge<br>• A map of the priority area (updated annually)<br>• A schedule for screening<br>• List of outfalls to be screened in priority area (updated annually)<br>• Field screening documentation procedures<br>• Illicit tracking procedures<br>• Illicit discharge elimination procedures<br>• Illicit discharge reporting procedures<br>• Illicit discharge documentation procedures<br>• Procedures for responding to public notices of illicit discharge<br>• Corrective action plan | January 1, 2015 | Once during permit term | County Engineer |
| **Measurable Goal:** | | | |
| • The Field Screening and Illicit Tracking procedures will provide the methodology in which outfall screening and illicit tracking will be conducted. | | | |
| **Measurable Goal Update:** | | | |
| • The illicit discharge ERPs can be found in Appendix F and the Standard Operating Procedures for Use in Field Investigation for Illicit Discharges can be found in Appendix E and was last updated in 2021 to include Major Outfalls. | | | |
| **Conduct Field Screening** | **Not Started:☐ On-going :☒ Completed:☐** | | |
| | **Section: 4.2.3.2.3a** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Conduct dry weather flow screening at outfalls in the priority areas and at dry weather discharges. | Throughout Permit Term | Annually | County Engineer |
| **Measurable Goal:** | | | |
| • The Field Screening activities are used to identify potential illicit discharges. | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County continues to conduct field screenings for the MS4 areas in the County, City of Goose Creek and City of Hanahan utilizing Major Outfalls as defined by Reg. 61-9. | | | |

| **Field Screening Assessment** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
|---|---|---|---|
| | **Section: 4.2.3.2.3b** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Create a report assessing the effectiveness of the Field Screening program in the third annual report. | January 1, 2017 | Once during permit term | County Engineer |
| **Measurable Goal:** | | | |
| • The Field Screening Assessment document will determine the effectiveness of the program, and potentially provide recommendations for changes in field screening procedures. | | | |
| **Measurable Goal Update:** | | | |
| • The County has provided a review of the Field Screening for the County, Goose Creek, and Hanahan in the Annual Report. | | | |
| **Conduct Illicit Tracking** | **Not Started:☐ On-going :☒ Completed:☐** | | |
| | **Section: 4.2.3.2.4/5** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Conduct illicit tracking at outfalls identified as potential illicit discharges by the field screening effort | Throughout Permit Term | As Needed | County Engineer |
| **Measurable Goal:** | | | |
| • Determine source and eliminate illicit discharges. | | | |
| **Measurable Goal Update:** | | | |
| • The County continues to track illicit discharges for the County, Goose Creek, and Hanahan. A summary of all illicit discharges has been included in the Annual Report (54 illicit discharges were identified in the last reporting year). | | | |
| **Document Illicit Discharge Investigations** | **Not Started:☐ On-going :☐ Completed:☒** | | |
| | **Section: 4.2.3.2.5/6** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Create a document for illicit discharge tracking and elimination activities to include:<br>• Date(s) the illicit discharge was observed<br>• Results of the illicit investigation<br>• Results of any follow-up investigations;<br>• Date the investigation was closed.<br>• Source of illicit discharge<br>• Documentation for unresolved illicit tracking investigations in which no source is located. | Throughout Permit Term | As Needed | County Engineer |
| **Measurable Goal:** | | | |
| • Document of Illicit Tracking and Elimination activities. | | | |
| **Measurable Goal Update:** | | | |
| • During the current reporting cycle (January 2024- December 2025) Berkeley County conducted 19 dry weather screenings. Zero (0) illicit discharges were found during these screenings. Berkeley County also conducted 41 complaint-driven illicit discharge investigations during this reporting cycle. Of these 41 investigations, 16 were found to be invalid. All others were tracked to their source and eliminated. A total of zero (0) enforcement actions were escalated past written notice. | | | |

| **Develop a Written Spill/Dumping Response Procedure** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
|---|---|---|---|
| | **Section: 4.2.3.2.8.a** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Develop a written spill/dumping response procedure for responding to public notices of illicit discharges, the various responsible agencies and their contacts, and who would be involved in illicit discharge incidence response. | January 1, 2017 | Once | County Engineer |
| **Measurable Goal:** | | | |
| • Written spill/dumping response procedures. | | | |
| **Measurable Goal Update:** | | | |
| • The procedures for the County, Goose Creek, and Hanahan are included in the Standard Operating Procedures for Use in Field Investigation for Illicit Discharges found in Appendix E. | | | |
| **Develop Public Reporting Mechanism** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
| | **Section: 4.2.3.2.8** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Promote, publicize, and facilitate a reporting mechanism for the public and staff to report illicit discharges and establish and implement citizen request response procedures. | January 1, 2015 | Once | County Engineer |
| **Measurable Goal:** | | | |
| • Provide a means for the public to report potential illicit discharges. | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County, the City of Goose Creek, and the City of Hanahan advertises a webpage, email address, and/or phone numbers on their Stormwater Management Program Components webpages and Berkeley County's Stormwater Facebook page. Additionally, the webpage contains an electronic fillable complaint form for public input. These options allow the public and staff to report potential illicit discharges in the County, Goose Creek, and Hanahan. | | | |
| **Employee Training** | **Not Started:☐ On-going :☒ Completed:☐** | | |
| | **Section: 4.2.3.2.9** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Provide internal staff training for identifying potential illicit discharges. | January 1, 2015 | Ongoing | County Engineer |
| **Measurable Goal:** | | | |
| • Provide training to appropriate staff for identifying potential illicit discharges | | | |
| **Measurable Goal Updates:** | | | |
| • Nineteen (19) IDDE and Good Housekeeping trainings were conducted in 2024-2025:<br>• 516 municipal employees Berkeley County, Hanahan, and Goose Creek were accounted for during the nineteen trainings in 2024 and 2025. | | | |

### *4.2.4 Construction Site Stormwater Runoff Control (Minimum Measure #4)*

#### 4.2.4.1 Minimum Measure #4 Permit Requirements

Berkeley County will review and update the existing construction stormwater management program by implementing BMPs in order to meet the SMS4 general permit requirements. The County will update appropriate design requirements, the Stormwater Design Standards Manual, Stormwater Ordinance and corresponding plan review procedures. Site inspection procedures will be updated to conform to the SMS4 general permit requirements, and an enforcement response plan (ERP) will be developed to determine how the County will use specific type of responses to address various types of violations.

*Table 15: Minimum Measure #4 Permit Requirements*

| 4.2.4.4.1 Regulatory requirement for erosion and sediment controls: |
|---|
| Below is a copy of the relevant sections of the existing ordinance which requires erosion and sediment controls as well as sanctions to ensure compliance.<br><br>Ordinance section requiring erosion and sediment controls for Berkeley County, City of Goose Creek and City of Hanahan can be found in<br><br>• Berkeley County Stormwater Management Ordinance Section 3.2 and 3.3 Design and Engineering Standards<br><br>Ordinance section for sanctions to ensure compliance for Berkeley County, City of Goose Creek, and City of Hanahan can be found in<br><br>• Berkeley County Stormwater Management Ordinance Section 6.1, 6.2, and 6.3 Enforcement<br><br>A copy of the Ordinances for Berkeley County, City of Goose Creek, and City of Hanahan can be found in Appendix D. |
| 4.2.4.4.2 Requirements for erosion and sediment controls and soil stabilization practices: |
| Berkeley County will provide requirements for the County, City of Goose Creek and City of Hanahan for construction site operators to implement appropriate BMP such as,<br><br>a. Erosion and Sediment Controls, and<br><br>b. Soil Stabilization Practices |
| 4.2.4.4.3 Requirements for pollution prevention measures: |
| Berkeley County will provide requirements for the design, installation and maintenance of effective pollution prevention measures for construction site operators to:<br><br>a. Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge.<br><br>b. Minimize the exposure of building materials, building products, construction wastes, trash, |

landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on site to precipitation and to stormwater runoff that may cause adverse impacts to water quality, and,

c. Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.

d. The following discharges from sites are prohibited:

i. Wastewater from washout of concrete, unless managed by an appropriate control;
ii. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
iii. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and,
iv. Soaps or solvents used in vehicle and equipment washing.

4.2.4.4.4 Requirements for Stormwater Pollution Prevention Plans (SWP3):

Berkeley County will require each operator of a construction activity to prepare and submit a Stormwater Pollution Prevention Plan (SWP3) prior to the disturbance of land for the County, Goose Creek, and Hanahan SMS4 for review and approval.

4.2.4.5 Review of SWP3:

Berkeley County's plan review procedures will at a minimum meet the following:

a. Make clear to operators of construction activity that they are prohibited from commencing construction activity until they receive of written approval of the plans.

b. Approve SWP3 that complies with the technical requirements of Berkeley County's Stormwater Design Standards Manual requirements and requirements of the NPDES General Permit for Storm Water Discharges from Construction Activities, SCR100000.

c. The SWP3 must include the rationale used for selecting control measures, including how the control measure protects a waterway or stormwater conveyance.

d. Berkeley County will use qualified individuals, knowledgeable in the technical review of SWP3 to conduct reviews.

e. Document the review of each SWP3 plan using a checklist or similar process.

f. Procedures for SWP3 review, including the review of pre-construction site plans, for construction activity that discharge pollutant(s) of concern to TMDL waters and to waters on the 303(d) List of Impaired Waters, the SWP3 must identify potential water quality impacts the permitted discharges may have. The SWP3 shall limit sediment discharges to the MEP, shall protect water quality. Procedures for SWP3 review shall:

    i. Incorporate consideration of potential water quality impacts,
    ii. Include the review of construction site plans,
    iii. For construction projects that disturb less than 25 acres, carefully evaluate all selected BMPs and their ability to control the pollutant(s) of concern.
    iv. For construction projects that disturb 25 acres or more, require a written quantitative and qualitative assessment showing that the selected BMP will control the discharge of the pollutant, or pollutants, of concern from construction and post construction within a TMDL watershed, or to a water on the 303(d) List of Impaired Waters, and,
    v. Require that SWP3 prepared by construction activity applicants for SMS4 review and approval must demonstrate that stormwater discharges will neither cause nor contribute to a violation of water quality standards.

4.2.4.6 Site inspections:

a. Berkeley County will maintain an inventory of all active construction projects for the County, Goose Creek and Hanahan. The inventory will be continuously updated as new projects are permitted and projects are completed. The inventory will contain relevant contact information for each project (e.g., name, address, phone, etc.), the size of the project and area of disturbance. Berkeley County will make the inventory available to SCDES upon request. As part of this inventory,

i. Berkeley County will track the number of inspections for the inventoried construction sites throughout the reporting period to verify that the sites are inspected at the minimum frequencies required, and,

ii. Document inspections and enforcement activities for each site in the inventory.

b. Berkeley County will implement procedures for inspecting construction projects in the County, City of Goose Creek, and City of Hanahan in accordance with the frequency listed in the SMS4 General Permit.

c. Berkeley County will adequately inspect all phases of construction for the County, Goose Creek, and Hanahan. At a minimum, inspections must occur following installation of initial BMPs, during active construction, and after final site stabilization.

d. Berkeley County will have trained and qualified inspectors for the County, Goose Creek, and Hanahan. Berkeley County will also continue to follow, and revise as necessary, written procedures outlining the inspection and enforcement procedures.

Inspections of construction sites must, at a minimum:

i. Check for coverage under SCR100000 by requesting a copy of any application or Notice of Intent (NOI), the stamped approved stormwater pollution prevention plan or other relevant application form during initial inspections.

ii. Review the applicable stormwater pollution prevention plan and conduct a thorough site inspection to determine if control measures have been selected, installed, implemented, and maintained according to the plan.

iii. Assess compliance with Berkeley County's, Goose Creek's, and Hanahan's ordinances and permits related to stormwater runoff, including the implementation and maintenance of designated minimum control measures.

iv. Assess the effectiveness of control measures.

v. Visually observe and record non-stormwater discharges, potential illicit connections, and potential discharge of pollutants in stormwater runoff.

vi. Provide a written or electronic inspection report generated from findings in the field.

| 4.2.4.7 Enforcement Response Plan (ERP): |
|---|
| Berkeley County, City of Goose Creek, and City of Hanahan will develop Enforcement Response Plans (ERPs). The ERP will contain descriptions of how each MS4 will use specific type of responses to address various types of violations. The ERP will include, but is not limited to:<br><br>a. Types of response;<br>i. Verbal warnings,<br>ii. Written notices, and<br>iii. Escalated enforcement measures such as citations, fines, stop work orders, etc.<br><br>b. Specific strategies for escalating enforcement response, where necessary, to address persistent, repeat or escalating violations.<br><br>c. Ensure ERPs are reasonably effective in reducing pollutant discharges to the MEP and to protect water quality. |
| 4.2.4.8 MS4 staff training: |
| Berkeley County, will ensure that all staff, whose primary job duties are related to implementing the construction stormwater program, including permitting, plan review, construction site inspections, and enforcement, are trained to conduct these activities for the County, Goose Creek, and Hanahan. |
| 4.2.4.9 Construction site operator and public involvement: |
| 4.2.4.9. a Construction operator education: |
| Berkeley County will develop and implement an effective communication process with construction contractors to educate them on areas in which improvements are needed and to enforce any required actions for the County, Goose Creek, and Hanahan. |
| 4.2.4.9. b Public involvement: |
| Berkeley County will implement procedures for receipt and consideration of information submitted by the public for the County, Goose Creek, and Hanahan. This will be coordinated with the public participation program. |

## Minimum Measure #4 BMP Implementation

In order to meet the requirements of Minimum Measure #4, Berkeley County, City of Goose Creek and City of Hanahan have listed BMPs that focus on the reduction of pollutants in stormwater runoff to the SMS4 from construction activities that result from a land disturbance greater than or equal to one acre, or any land disturbing activity within ½ mile of a receiving waterbody (but not for single family homes which are not part of a subdivision development), that result in any land disturbance less than five acres. Evaluation of the success of this minimum measure will be through careful analysis of the measurable goals for each BMP included in this minimum measure. Measurable goals for each BMP were selected by formulating attainable goals for the various BMP implementation steps or tasks. In order to meet the requirements of Minimum Measure #4, Berkeley County will as needed:

- Update Pollution Prevention BMP Requirements
- Review and Update, as necessary, the SWP3 Submittal & Review Requirements
- Update SWP3 Review Procedures for Discharges to Impaired Waters
- Update and Maintain a Construction Site and Site Inspection Inventory
- Update Site Inspection Procedures
- Develop and Update Section of ERP for Construction Activities
- Update the County's Stormwater Design Standards Manual
- Update the County's Stormwater Management Ordinance
- Develop and Implement Effective Communication Procedure with Construction Operator
- Develop and Implement Procedures for Receipt and Consideration of Information Submitted by the Public

Table 16 describes the components of the Berkeley County's, Goose Creek's, and Hanahan's construction site stormwater runoff control program:

*Table 16: Best Management Practices - Minimum Measure #4*

| **CONSTRUCTION SITE STORMWATER RUNOFF CONTROL BMPs** | | | |
|---|---|---|---|
| **Erosion Prevention and Sediment Control (EPSC) Requirements** | **Not Started:☐ In Progress :☒ Completed:☐** | | |
| | **Section: 4.2.4.4.2** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Update the Stormwater Management Design Standards Manual to include requirements for Erosion and Sediment Controls and Soil Stabilization Practices. | April 1, 2026 | Once during permit term; As needed | County Engineer |
| **Measurable Goal:** | | | |
| • Provide a tool to assist construction site operators to implement appropriate EPSC BMPs. | | | |
| **Measurable Goal Update:** | | | |
| • All construction site operators are provided education and training via pre-construction meetings and subsequently throughout the inspection process, and if necessary, in the enforcement process. Additionally, materials and documentation for proper implementation of EPSC BMPs are provided on the County website. | | | |

| Pollution Prevention Requirements | Not Started:☐ In Progress :☒ Completed:☐ | | |
|---|---|---|---|
| | Section: 4.2.4.4.3 | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Update the Stormwater Management Design Standards Manual to include requirements for Pollution Prevention Measures listed in Section 4.2.4.4.3 of Table 18. | April 1, 2026 | Once during permit term; As needed | County Engineer |
| **Measurable Goal:** | | | |
| • Provide a tool to assist construction site operators to implement appropriate Pollution Prevention BMPs | | | |
| • Update Stormwater Management Design Standards Manual for Submittal requirement 4.2.4.4.4 | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County's Goose Creek's, and Hanahan's Stormwater Design Standards Manual is in the process of being updated. Pollution Prevention requirements are currently located in Section 2.2.2.1.3.w-z in Appendix J. | | | |

| Update Plan Review Procedures | Not Started:☐ In Progress :☐ Completed:☒ | | |
|---|---|---|---|
| | Section: 4.2.4.5 | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Update the Stormwater Management Design Standards Manual to include SWP3 approval requirements that comply with the technical requirements of the effective NPDES General Permit for Storm Water Discharges from Construction Activities, SCR100000, or establish alternative technical criteria that are equally, or more, protective of water quality.<br><br>Update the Stormwater Management Design Standards Manual to include procedures for SWP3 review, including the review of pre-construction site plans, for construction activity that discharge pollutant(s) of concern to TMDL waters and to waters on the 303(d) List of Impaired Waters must identify potential water quality impacts the permitted discharges may have. The SWP3 shall limit sediment discharges to the MEP, and shall protect water quality. | April 1, 2026 | Once during permit term; As needed | County Engineer |
| **Measurable Goal:** | | | |
| • Review and update plan review procedures to ensure compliance with stormwater design standards and to address the pollutants of concern for construction activities. | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County's Goose Creek's, and Hanahan's Stormwater Design Standards Manual is currently being updated and expected to be completed by Spring 2026. This document includes Plan Review procedures. Plan review procedures will be updated concurrently with the Design Standards Manual. | | | |

| **Develop Construction Site and Site Inspection Inventory** | **Not Started:☐ On-going :☒ Completed:☐** | | |
|---|---|---|---|
| | **Section: 4.2.4.6(a)** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Maintain an inventory of all active construction projects to include information for:<br>• Relevant contact information<br>• The size of the project<br>• Area of disturbance<br>• Number of inspections by Berkeley County for each construction site<br>• Inspection results and enforcement activities | Throughout Permit Term | Ongoing | County Engineer |
| **Measurable Goal:** | | | |
| • Develop a database for construction sites to provide general site information and ensure appropriate site inspections are conducted by the construction operator. The database will be available for review upon request. | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County maintains an inventory of active construction projects for Berkeley County Goose Creek, and Hanahan in a database. | | | |
| **Update Site Inspection Procedures** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
| | **Section: 4.2.4.6(b-d)** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Update the Stormwater Management Design Standards Manual (or other document) for site inspection procedures to include:<br>• Updated inspection frequency requirements<br>• Procedures for inspecting all phases of construction<br>• Ensuring coverage under SCR100000<br>• Determining if control measures have been selected, installed, implemented, and maintained according to the SWP3<br>• Ensuring compliance with Berkeley County's ordinances and design manuals<br>• Assessing the effectiveness of control measures<br>• Addressing and documenting non-stormwater discharges<br>• Electronic inspection documentation procedures | April 1, 2026 | Once during permit term | County Engineer |
| **Measurable Goal:** | | | |
| • Update County Stormwater Management Design Standards Manual. | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County's, Goose Creek's, and Hanahan's Stormwater Design Standards Manual is currently being updated and expected to be completed by Spring 2026. This document includes the inspection process and procedures for Berkeley County. The inspection process and procedures for Berkeley County is in Section 4.1.2. in Appendix J. | | | |

| **Develop Section of ERP for Construction Activities** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
|---|---|---|---|
| | **Section: 4.2.4.7** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Develop enforcement responses for permit violations, SWP3 violations, and EPSC BMP installation, operation, and maintenance violations. | January 1, 2015 | Once during permit term | County Engineer |
| **Measurable Goal:** | | | |
| • Develop an enforcement response plan to clearly identify types of violations, response to violations, and enforcement measures. The response plan will be made available to construction site operators and SCDES. | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County, Goose Creek and Hanahan have developed unified Enforcement Response Plan which includes a section on construction/permitting violations. The ERPs can be found in Appendix F. | | | |
| **Update Stormwater Management Ordinance** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
| | **Section: 4.2.4.7** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Berkeley County, Goose Creek and Hanahan will update their Stormwater Management Ordinance to meet the criteria in this MCM. | January 1, 2015 | Once during permit term | County Engineer |
| **Measurable Goal:** | | | |
| • Update the Stormwater Management Ordinance. | | | |
| **Measurable Goal Update:** | | | |
| • The Stormwater Management Ordinances for Berkeley County, Goose Creek and Hanahan provide the appropriate authority to meet and enforce the criteria of this MCM and are included in Appendix D of this SWMP. | | | |
| **Train MS4 Staff** | **Not Started:☐ On-going :☒ Completed:☐** | | |
| | **Section: 4.2.4.8** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Berkeley County, Goose Creek, and Hanahan will ensure that all staff, whose primary job duties are related to implementing the construction stormwater program, including permitting, plan review, construction site inspections, and enforcement, is trained to conduct these activities. | Throughout Permit Term | Throughout permit term | County Engineer |
| **Measurable Goal:** | | | |
| • Train staff whose primary job duties are related to implementing the construction stormwater program. | | | |
| **Measurable Goal Update:** | | | |
| • The County's Stormwater Inspectors are CEPSCI certified and are offered CEPSCI Certification or Recertification Training when needed. The goal is for all stormwater engineers to obtain Stormwater Plan Reviewer Certification. Most of the staff has been certified and certification/recertification is offered to new hires. CEPSCI certified inspectors must be recertified every 3 years. This training is provided by Clemson. | | | |

| Develop Construction Site Operator Education | Not Started:☐ On-going :☒ Completed:☐<br>Section: 4.2.4.9.a | | |
|---|---|---|---|
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Berkeley County, Goose Creek, and Hanahan will develop and implement an effective communication process with construction contractors to educate them on areas in which improvements are needed and to enforce any required actions. | January 1, 2016 | Annually | County Engineer |
| **Measurable Goal:**<br>• Implement an effective communication process with construction contractors. | | | |
| **Measurable Goal Update:**<br>• Berkeley County inspectors and engineers hold pre-construction meetings with construction site operators. This allows the County to have an open and effective communication process and discuss items that may arise and ways to prevent enforcement actions. | | | |

| Develop Public Involvement Procedures | Not Started:☐ In Progress :☐ Completed:☒<br>Section: 4.2.4.9.b | | |
|---|---|---|---|
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Berkeley County will implement procedures for receipt and consideration of information submitted by the public. | January 1, 2016 | Annually | County Engineer |
| **Measurable Goal:**<br>• Implement procedures for receipt and consideration of information submitted by the public. | | | |
| **Measurable Goal Update:**<br>• Berkeley County advertises an email address and phone number on their Stormwater Management Program Components webpage. These allow the public and staff to report information. Additionally, forwarding information to Berkeley County's contact information is made available on Goose Creek's and Hanahan's websites and provided by municipal staff. | | | |

## *4.2.5 Post-Construction Stormwater Management for New Development and Redevelopment (Minimum Measure #5)*

### 4.2.5.1 Minimum Measure #5 Permit Requirements

The post construction stormwater management program is designed to give Berkeley County the authority to require structural and non-structural stormwater quality BMPs on sites being developed in the MS4 areas in the County, City of Goose Creek, and City of Hanahan. Berkeley County currently provides design requirements to control stormwater discharges from new development and redeveloped sites. Berkeley County will review and update the post construction program by developing additional or revising existing site performance standards and ensuring post construction BMPs are inspected and maintained appropriately.

*Table 17: Minimum Measure #5 Permit Requirements*

| 4.2.5.1 Post-construction stormwater management program: |
|---|
| Berkeley County will provide water quality design requirements for the MS4 areas in the County, Goose Creek, and Hanahan to control stormwater discharges from new development and redeveloped sites that disturb at least 0.5 acres (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 SMS4. The requirements apply to private and public development sites, including roads. |
| 4.2.5.2 Site performance standards: |
| In accordance with Section 4.2.5.2 of the SMS4 general permit, Berkeley County will produce a set of site performance standards which will be applied to all new development and redevelopment sites discharging to the SMS4 areas in the County, Goose Creek, and Hanahan, which disturb greater than or equal to 0.5 acres. These standards will ensure that projects approximate pre-development conditions to the MEP to protect water quality. |
| 4.2.5.3 Site plan review: |
| To ensure that all applicable new development and redeveloped sites conform to the performance standards required in Section 4.2.5.2, Berkeley County will implement project review, approval, and enforcement procedures.<br>Berkeley County will conduct site plan reviews of all new development and redeveloped sites which will disturb greater than or equal to 0.5 acres and discharge to Berkeley County, Goose Creek, and Hanahan MS4s (including sites that disturb less than one acre that are part of a LCP). The site plan review will specifically address how the project applicant meets the performance standards and how the project will ensure long-term maintenance of post construction BMP. |
| 4.2.5.4 Long-term maintenance of post-construction stormwater control measures: |
| All structural stormwater control measures installed and implemented to meet the site performance standards will be maintained in perpetuity. Berkeley County will ensure the long-term maintenance of structural stormwater control measures installed in the County, Goose Creek, and Hanahan.<br>Berkeley County will require that property owners or operators of any new development or redeveloped site in the MS4 areas in the County, Goose Creek, and Hanahan subject to the site performance standards will provide verification of maintenance for the approved structural stormwater control measures used to comply with the performance standards. |

| |
|---|
| 4.2.5.5 Inventory of post-construction stormwater control measures: |
| Berkeley County will maintain an inventory of all post-construction structural stormwater control measures installed and implemented at new development and redeveloped sites, including both public and private sector sites located within the permit areas for the County, Goose Creek, and Hanahan. At a minimum, the inventory shall contain all BMP constructed since the effective date starting with the effective date of this permit. |
| 4.2.5.6 Inspections and enforcement: |
| 4.2.5.6.1 Inspection procedures: |
| To ensure that all stormwater control measures are operating correctly and are being maintained as required consistent with its applicable maintenance agreement, Berkeley County will conduct inspections of each project site, for the County, Goose Creek, and Hanahan, covered under the performance standards listed in the Stormwater Design Standards Manual, at least one time during the permit term. |
| 4.2.5.6.2 Post-construction notification: |
| Within 30 days of completion of construction of any project required to meet the performance standards, Berkeley County will conduct a post construction inspection, for the County, Goose Creek, and Hanahan, to verify that BMP have been installed as per approved plans. |
| 4.2.5.6.3 Inspection reports: |
| Berkeley County will document its inspection findings for the MS4 areas in the County, City of Goose Creek and City of Hanahan in an inspection report. Berkeley County will document and maintain records of inspection findings and enforcement actions and make them available for review by the permitting authority. |

## Minimum Measure #5 BMP Implementation

To meet the requirements of Minimum Measure #5, Berkeley County, City of Goose Creek, and City of Hanahan will:

- Review and Update Water Quality Design Requirements
- Review and Update Site Performance Standards
- Revise Plan Review Checklist & Stormwater Design Standards Manual for Post Construction SWP3 Submittal Requirements
- Develop Long Term Maintenance Requirements for Post Construction BMPs
- Create Post Construction BMP Inventory
- Develop Post Construction BMP Inspection Procedures
- Conduct Initial Post Construction BMP Installation Inspections
- Conduct Post Construction BMP Maintenance and Operation Inspections
- Document Post Construction BMP Inspections

Table 18 describes the components of Berkeley County's, Goose Creek's, and Hanahan's Post-Construction stormwater management plan:

*Table 18: Best Management Practices – Minimum Measure #5*

| POST-CONSTRUCTION STORMWATER MANAGEMENT BMPS | | | |
|---|---|---|---|
| **Develop Water Quality Design Requirements** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
| | **Section: 4.2.5.1** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Develop post-construction program requirements to be implemented in the Stormwater Design Standards Manual to control stormwater discharges from new development and redeveloped sites. | April 1, 2026 | Once during permit term; As needed | County Engineer |
| **Measurable Goal:** | | | |
| • Provide design community with design guidance for Post Construction BMPs | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County's, Goose Creek's, and Hanahan's Stormwater Design Standards Manual is currently being updated and expected to be completed by Spring 2026. This document addresses post-construction requirements and is in Appendix J. | | | |
| **Develop Site Performance Standards** | **Not Started:☐ In Progress :☒ Completed:☐** | | |
| | **Section: 4.2.5.2** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Update Storm Water Design Standards Manual to include Post Construction Site Performance Standards | April 1, 2026 | Once during permit term | County Engineer |
| **Measurable Goal:** | | | |
| • Provide design community with performance and design standards for Post Construction BMPs | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County's Stormwater Design Standards Manual in Appendix J includes site performance standards. Additionally, the Design Standards Manual in Appendix J is in the process of additional updates being developed and adopted after SCDES's finalized CGP update. These updates will include revisions to performance and design standards for Post Construction BMPs. | | | |
| **Revise Plan Review Checklist for Post Construction SWP3 Submittal Requirements** | **Not Started:☐ In Progress :☒ Completed:☐** | | |
| | **Section: 4.2.5.3** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Revise the Plan Review Checklist to include SWP3 submittal requirements for Post Construction Site Performance Standards. | January 1, 2017 | Once during permit term | County Engineer |
| **Measurable Goal:** | | | |
| • Develop SWP3 requirements for Post Construction Site Performance Standards. | | | |
| **Measurable Goal Update:** | | | |

- Berkeley County's Stormwater Design Standards Manual in Appendix J includes SWP3 submittal requirements for post construction site performance standards in Appendix C of the Design Standards Manual. Additionally, the Design Standards Manual in Appendix J is in the process of additional updates being developed and adopted after SCDES's finalized CGP update. These updates will include performance and design standards for Post Construction BMPs.

| **Develop Long Term Maintenance Requirements for Post Construction BMPs** | **Not Started:☐ In Progress :☐ Completed:☒** | | |
|---|---|---|---|
| | **Section: 4.2.5.4** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Update the long-term maintenance agreement form for post construction BMPs to be signed by the property owner.<br><br>Develop maintenance verification process to ensure post construction BMPs are properly maintained. | January 1, 2016 | Update As Needed | County Engineer |

**Measurable Goal:**

- Develop a post construction BMP maintenance agreement form and a post construction BMP maintenance verification process.

**Measurable Goal Update:**

- The County requires a maintenance covenant that can be found on the County's website at in Appendix B of the Design Standards Manual, found in Appendix J of this document.
- The County Stormwater Inspectors schedule periodic post-construction inspections to ensure that privately owned post-construction BMPs are properly maintained.

| **Post Construction BMP Inventory** | **Not Started:☐ On-going :☒ Completed:☐** | | |
|---|---|---|---|
| | **Section: 4.2.5.5** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Develop an inventory of all County permitted post-construction BMPs constructed since the effective date of permit SCR030000 (January 1, 2014). | January 1, 2015 | Annually | County Engineer |
| Update County permitted post-construction BMP inventory. | Throughout Permit Term Beginning in Year 2 | Annually | County Engineer |

**Measurable Goal:**

- Develop an inventory of County permitted Post-Construction BMPs.

**Measurable Goal Update:**

- The County has an inventory of all permitted post-construction BMPs constructed since January 1, 2014 in the County, Goose Creek and Hanahan. This is stored in the County's project management system (EnerGov) and is updated as needed.

| **Post-Construction BMP Inspections Program** | **Not Started:☐ On-going :☒ Completed:☐** | | |
|---|---|---|---|
| | **Section: 4.2.5.6** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Develop procedures and forms for post-construction BMP installation inspections. | January 1, 2015 | Once during permit term | County Engineer |

| | | | |
|---|---|---|---|
| Conduct post-construction BMP inspections on County permitted post-construction BMPs within 30 days of construction completion to ensure BMP is installed per approved plans. | Throughout Permit Term Beginning in Year 2 | Annually | County Engineer |
| Develop procedures and forms for post-construction BMP maintenance inspections. | January 1, 2015 | Once during permit term | County Engineer |
| Conduct post-construction BMP inspections on County permitted post-construction BMPs to ensure BMPs are maintained properly after the County is notified through a Notice of Termination (NOT). | Throughout Permit Term Beginning in Year 2 | Once during permit term | County Engineer |
| Document and maintain records of inspection findings and enforcement actions and make them available for review by the permitting authority. | Throughout Permit Term Beginning in Year 2 | Annually | County Engineer |
| **Measurable Goal:** | | | |
| • Develop procedures and forms for Post-Construction BMP installation inspections and include procedures in this document. | | | |
| • Inspect all County permitted post-construction BMPs within 30 days of construction completion. | | | |
| • Develop procedures and forms for Post-Construction BMP maintenance inspections and include procedures in this document. | | | |
| • Inspect appropriate construction sites to ensure County permitted post-construction BMPs are maintained and operating correctly. | | | |
| • Provide documentation of Post-Construction BMP inspections. | | | |
| **Measurable Goal Update:** | | | |
| • Berkeley County conducts post-construction inspections for all applicable sites within the Berkeley County, City of Goose Creek, and City of Hanahan SMS4 area. | | | |

### *4.2.6 Pollution Prevention / Good Housekeeping (Minimum Measure #6)*

#### 4.2.6.1 Minimum Measure #6 Permit Requirements

To meet the requirements of Minimum Measure #6, Berkeley County, City of Goose Creek and City of Hanahan will implement a range of BMPs targeted to reduce pollutants from County and City-Owned facilities and storm sewer systems. A County, Goose Creek, and Hanahan inventory of municipal facilities was developed, and each facility was assessed for the potential pollutant discharges. Based on the assessment, a list of high priority facilities has been developed, and annual inspections will be conducted at the high priority facilities. Berkeley County prioritized the County, Goose Creek, and Hanahan owned and /or operated stormwater management systems and implemented a maintenance schedule. All County and City-Owned structural controls (stormwater BMPS) will continue to be inspected and maintained. In addition, the County will continue to review and update, as necessary, the pollution prevention measures for operation and maintenance activities. Berkeley County will continue to provide training to County, Goose Creek, and Hanahan appropriate employees to ensure pollution prevention and good housekeeping activities are practiced throughout the County's, Goose Creek's, and Hanahan's separate departments and that are consistent with the current Good Housekeeping Manual.

*Table 19: Minimum Measure #6 Permit Requirements*

| | |
|---|---|
| 4.2.6.1 | Development of a municipal facility and stormwater control inventory: |
| | Berkeley County will update and maintain an inventory of municipally-owned and stormwater controls that are not covered under a separate general or individual NPDES permit (i.e. industrial, solid waste, etc.) for the County, City of Goose Creek, and City of Hanahan. Examples of these types of facilities may include but are limited to composting facilities, equipment storage and maintenance facilities, landscape maintenance on municipal property, material storage yards, public buildings, golf courses, public work yards, recycling facilities, salt storage facilities, municipally owned and/or maintained structural stormwater controls.<br><br>Berkeley County will also include a list of industrial facilities owned or operated by the County, City of Goose Creek or City of Hanahan that are subject to SCDES NPDES General Permit for Storm Water Discharges associated with Industrial Activity (SCR000000) or individual NPDES permits for discharges of storm water associated with industrial activity that ultimately discharge to the SMS4. The SCDES permit number or a copy of the Industrial NOI form for each facility will be included. |
| 4.2.6.2 | Municipally-owned or operated facility assessment: |
| 4.2.6.2.1 | Comprehensive assessment of pollutant discharge potential: |
| | Berkeley County will develop a comprehensive assessment of all municipally-owned or operated facilities for the County, City of Goose Creek, and City of Hanahan identified in Part 4.2.6.1 at least once during the permit term and include it in the permit reapplication for their potential to discharge pollutants in stormwater. |
| 4.2.6.2.2 | Identification of high priority facilities: |
| | Berkeley County will identify “high-priority” facilities for the County, City of Goose Creek, and City of Hanahan that have a high potential to generate stormwater pollutants. |
| 4.2.6.2.3 | Documentation of comprehensive assessment results: |
| | Berkeley County will document the results of the assessments and maintain copies of all site evaluation checklists used to conduct the comprehensive assessment for the County, City of Goose Creek and City of Hanahan. The documentation will include the results of Berkeley County’s initial assessment, any identified deficiencies and corrective actions taken. |

| | |
|---|---|
| 4.2.6.3 | Annual comprehensive inspections of high priority facilities: |
| | Starting no later than 24 months from the effective date of coverage and at least once per year thereafter, a comprehensive inspection of "high priority" facilities (Part 4.2.6.2.2), including all stormwater controls, must be performed by Berkeley County on County, City of Goose Creek, and City of Hanahan facilities. Specific attention will be given to waste storage areas, dumpsters, vehicle and equipment maintenance/fueling areas, material handling areas, and similar potential pollutant-generating areas. The yearly inspection results will be documented, and records will be maintained by Berkeley County. The inspection report will also include any identified deficiencies and the corrective actions taken to fix the deficiencies. |
| 4.2.6.4 | Storm sewer system maintenance activities – MS4 maintenance: |
| 4.2.6.4.1 | Assessment/prioritization of stormwater management systems/structures: |
| | Berkeley County will prioritize municipally owned and /or operated storm water management systems / structures for the County, City of Goose Creek and City of Hanahan, and implement a maintenance schedule. |
| 4.2.6.4.2 | Municipal activities and operation: |
| | Berkeley County will review and update a set of pollution prevention measures for the County, City of Goose Creek and City of Hanahan that, when applied during municipal O&M activities, will reduce the discharge of pollutants in stormwater. Municipal operation and maintenance activities to be considered include but are not limited to; pavement and rights-of-way maintenance, bridge maintenance, cold weather operations, and municipally sponsored events. |
| 4.2.6.4.3 | Maintenance of municipally-owned and/or maintained structural stormwater controls: |
| | Berkeley County will inspect, and maintain, wherever and whenever necessary, all County and municipally owned or maintained structural stormwater controls. Berkeley County will also maintain all County and municipally owned green infrastructure practices through regularly scheduled maintenance activities. |

| 4.2.6.5 | Employee training and education requirements: |
|---|---|
| | Berkeley County will develop an annual employee training program for appropriate employees in the County, City of Goose Creek and City of Hanahan involved in implementing pollution prevention and good housekeeping practices.<br><br>This annual training will include a general stormwater education component, any new technologies, operations, or responsibilities that arise during the year, and the Permit Requirements that apply to the staff being trained.<br><br>A description of the program will be maintained for review by the permitting authority.<br><br>Berkeley County will also identify and track all personnel requiring training and records must be maintained.<br><br>Training will begin within the first year from the effective date of permit authorization. |
| 4.2.6.6 | Requirements for contractor oversight: |
| | Contractors hired by Berkeley County, Goose Creek or Hanahan to perform municipal maintenance activities will be contractually required to comply with all of Berkeley County's stormwater control measures, good housekeeping practices, and facility-specific stormwater management procedures.<br><br>Berkeley County will provide oversight of contractor activities to ensure that contractors are using appropriate control measures and procedures. |

## Minimum Measure #6 BMP Implementation

In order to meet the requirements of Minimum Measure #6, Berkeley County, the City of Goose Creek, and the City of Hanahan will:

- Develop a Municipal Facility Inventory
- Conduct Assessment of Non-Permitted Municipal Facility & Identify High Priority Facilities
- Conduct High Priority Facility Inspections
- Prioritization Stormwater Management Systems/Structures
- Review and Update Pollution Prevention Measures for Operation and Maintenance Activities
- Inspect and Maintain County-Owned Structural Controls (stormwater BMPs)
- Conduct Pollution Prevention and Good House Keeping Employee Training

Table 20 describes the components of Berkeley County's, Goose Creek's, and Hanahan's pollution prevention/good housekeeping for municipal operations program:

*Table 20: Best Management Practices – Minimum Measure #6*

| POLLUTION PREVENTION / GOOD HOUSEKEEPING BMPS | | | |
|---|---|---|---|
| **Municipal Facility Inventory** | **Not Started:☐ In Progress:☐ Completed:☒** | | |
| | **Section: 4.2.6.1** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Develop an inventory of all County & City-owned facilities and stormwater controls that are not covered under a separate NPDES permit.<br><br>In addition, develop a list of all municipally owned facilities that are covered under a separate NPDES permit for industrial activities. | January 1, 2015 | Once during the permit term: As needed | County Engineer |
| **Measurable Goal:** | | | |
| • An inventory of non-permitted municipal facilities | | | |
| • A list of all municipally owned facilities that are covered under a separate NPDES permit for industrial activities. | | | |
| **Measurable Goal Update:** | | | |
| • An inventory of non-permitted municipal facilities was completed and is stored in an Excel spreadsheet. | | | |
| • A list of all municipally owned facilities that are covered under a separate NPDES permit for industrial activities in the County, Goose Creek and Hanahan is stored in an Excel spreadsheet. | | | |
| **Assessment of Non-Permitted Municipal Facilities** | **Not Started:☐ In Progress:☐ Completed:☒** | | |
| | **Section: 4.2.6.2** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Conduct an analysis based on type of facility/use, locations to waterbody, County & City owned BMPs to rank County & City facilities. | July 1, 2015 | Once during permit term | County Engineer |
| Based on the results of the analysis, identify high priority facilities. | July 1, 2015 | Once during permit term | County Engineer |
| Create a site evaluation checklist that will be used to conduct an assessment of all facilities. | July 1, 2015 | Once during permit term | County Engineer |
| Conduct facility site inspections with evaluation checklist at each facility identified in the inventory from Section 4.2.6.1. | January 1, 2017 | Once during permit term | County Engineer |
| Document results of facility evaluations. | January 1, 2017 | Once during permit term | County Engineer |
| **Measurable Goal:** | | | |
| • An analysis to identify potential high priority facilities. | | | |
| • A site evaluation checklist for facility assessment. | | | |
| • Conduct inspections at municipal facilities and complete site evaluation checklist. | | | |

- Documentation of site evaluation checklists.
- A list of high priority facilities.

**Measurable Goal Update:**

- Using the comprehensive list of all municipal facilities and any activities at each location which might harm the water quality of stormwater runoff, a list of high priority facilities was created.
- A site evaluation checklist was created to use during facility inspections and high priority municipal facilities were listed.

| **Conduct High Priority Facility Inspections** | **Not Started:☐ On-going:☒ Completed: ☐** | | |
|---|---|---|---|
| | **Section: 4.2.6.3** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Create a high priority inspection report template with sections for identified deficiencies and corrective action taken for each site inspection. | January 1, 2016 | Once during permit term | County Engineer |
| Conduct and document annual facility site inspections including evaluations of potential "pollutant generating" areas. | Throughout Permit Term Beginning in Year 3 (January 1, 2016) | Annual | County Engineer |

**Measurable Goal:**

- A high priority facility inspection report form.
- Conduct annual inspections and determine potential "polluting generating" areas at high priority facilities.
- Documentation of facility inspection report forms.

**Measurable Goal Update:**

- A high priority inspection form was created and used during facility inspections.
- Inspections of the high priority facilities for the County, Goose Creek, and Hanahan were conducted for the current reporting years of 2024 and 2025.
- The high priority inspections completed in 2024 and 2025 for the County, Goose Creek, and Hanahan were documented and are included in the Berkeley County Facility Inspection reports.

| **Prioritization of Stormwater Management Systems/Structures** | **Not Started:☐ In Progress:☐ Completed:☒** | | |
|---|---|---|---|
| | **Section: 4.2.6.4.1** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Prioritize storm water management systems / structures and develop and implement a maintenance schedule. | July 1, 2016 | Once during permit term | County Engineer |

**Measurable Goal:**

- Create a maintenance schedule based on the prioritization of the storm water management systems / structures

**Measurable Goal Update:**

- A maintenance schedule was created and is updated as necessary, by staff conducting the maintenance, via Electronic Asset Management software.

| **Review and Update Pollution Prevention Measures for Operation and Maintenance Activities** | **Not Started:☐ In Progress:☐ Completed: ☒** | | |
|---|---|---|---|
| | **Section: 4.2.6.4.2** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Review and Update a written set of pollution prevention measures for municipal operation and maintenance activities. | July 1, 2016 | Once during permit term | County Engineer |

**Measurable Goal:**

- Create a set of pollution prevention measures for municipal operation and maintenance activities.

**Measurable Goal Update:**

- Pollution prevention measures for municipal operation and maintenance activities are described in the Good Housekeeping Manual (revised April 2023).

| **Inspect and Maintain County Owned Structural Controls** | **Not Started:☐ On-going:☒ Completed: ☐** | | |
|---|---|---|---|
| | **Section: 4.2.6.4.3** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Conduct inspections and perform necessary maintenance for County owned structural controls | January 1, 2016 | Annually; As needed | County Engineer |

**Measurable Goal:**

- Conduct inspections and perform maintenance.

**Measurable Goal Update:**

- County and municipality-owned structural controls are inspected annually and maintained as necessary.

| **Pollution Prevention and Good House Keeping Employee Training** | **Not Started:☐ On-going:☒ Completed: ☐** | | |
|---|---|---|---|
| | **Section: 4.2.6.5** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Conduct pollution prevention and good housekeeping employee training. | Throughout Permit Term | Annually | County Engineer |

**Measurable Goal:**

- Conduct employee training.

**Measurable Goal Update:**

- Nineteen (19) IDDE and Good Housekeeping trainings were conducted in 2024-2025:
- 516 municipal employees Berkeley County, Hanahan, and Goose Creek were accounted for during the nineteen trainings in 2024 and 2025.

## 4.4 Sharing Responsibility

In October 2015, intergovernmental agreements between Berkeley County, the City of Hanahan, and the City of Goose Creek were signed. Berkeley County is responsible for the items stated in the agreements (located in Appendix H) and will continue to provide the services stated in those

agreements. In the second reporting period (2016-2017), Berkeley County updated this SWMP to address these additional municipalities. Updates to the SWMP in the fourth reporting period (2020-2021) are inclusive of the municipalities of Goose Creek and Hanahan.

## 4.5 Reviewing and Updating Storm Water Management Plans

*Table 21: Reviewing and Updating SWMP*

| SWMP REQUIREMENTS | | | |
|---|---|---|---|
| **Update Storm Water Management Plan** | **Not Started:☐ In Progress:☐ Completed:☒** | | |
| | **Section: 4.5.1 & 4.5.2** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Review and update the SWMP document to keep it up to date during the term of the permit. | Throughout the permit term | Annually | County Engineer |
| **Storm Water Management Plan Updates Required by SCDES** | **Not Started:☒ In Progress:☐ Completed: ☐** | | |
| | **Section: 4.5.3** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| SCDES requested changes to the SWMP | TBD | As Required | County Engineer |

This SWMP is a living document and will be updated and revised throughout the permit term. In accordance with Section 4.5.2 of the SMS4 general permit, additions (but not subtracting or replacing) components to the SWMP will be made at any time with a written notification made to SCDES.

Any changes intended to replace an ineffective or unfeasible BMP with an alternate BMP will be requested and submitted in written form to SCDES at any time. Unless denied SCDES, changes proposed in accordance with the criteria below will be deemed approved and may be implemented sixty (60) days from submittal of the request. If request is denied, SCDES will send Berkeley County, Goose Creek, or Hanahan a written response giving a reason for the decision. The modification requests must include the following:

- An analysis of why the BMP is ineffective or infeasible (including cost prohibitive),
- Expectations on the effectiveness of the replacement BMP, and
- An analysis of why the replacement BMP is expected to achieve the goals of the BMP to be replaced.

Additionally, SCDES may request Berkeley County, Goose Creek, or Hanahan to make changes to the SWMP at any time to:

- Address documented impacts on receiving water quality caused, or contributed to, by discharges from the SMS4;
- Include more stringent requirements necessary to comply with new Federal statutory or regulatory requirements; or

- Include such other conditions deemed necessary by the Department to comply with the goals and requirements of the Clean Water Act.
- Changes requested by SCDES must be made in writing, set forth the time schedule for Berkeley County, City of Goose Creek, and City of Hanahan to develop the changes, and offer the Berkeley County, City of Goose Creek, and City of Hanahan the opportunity to propose alternative plan changes to meet the objective of the requested modification. All changes required by SCDES will be made in accordance with South Carolina Water Pollution Control Permits Regulation 61-9 124.5, 122.62, or as appropriate 122.63.

# 5.0 Monitoring, Record Keeping, and Reporting

## 5.3 Reporting

*Table 22: Reporting*

| REPORTING | | | |
|---|---|---|---|
| **1st Report** | **Not Started:☐ In Progress:☐ Completed: ☒** | | |
| | **Section: 5.3** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Complete and Submit 1st Report (covering years 1 and 2) | April 1, 2016 | Once | County Engineer |
| **2nd Report** | **Not Started:☐ In Progress:☐ Completed: ☒** | | |
| | **Section: 5.3** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Complete and Submit 2nd Report (covering years 3 and 4) | July 4, 2018 | Once | County Engineer |
| **3rd Report** | **Not Started:☐ In Progress:☐ Completed: ☒** | | |
| | **Section: 5.3** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Complete and Submit 3rd Report (covering years 5 and 6) | April 1, 2020 | Once | County Engineer |
| **4th Report** | **Not Started:☐ In Progress:☐ Completed: ☒** | | |
| | **Section: 5.3** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Complete and Submit 4th Report (covering years 7 and 8) | December 31, 2021 | Once | County Engineer |
| **5th Report** | **Not Started:☐ In Progress:☐ Completed: ☒** | | |
| | **Section: 5.3** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Complete and Submit 5th Report (covering years 9 and 10) | April 1, 2024 | Once | County Engineer |
| **6th Report** | **Not Started:☐ In Progress:☒ Completed: ☐** | | |
| | **Section: 5.3** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |

| | | | |
|---|---|---|---|
| Complete and Submit 6th Report (covering years 11 and 12) | April 1, 2026 | Once | County Engineer |
| **7th Report** | **Not Started:☒ In Progress:☐ Completed: ☐** | | |
| | **Section: 5.3** | | |
| **Milestone(s)** | **Schedule** | **Frequency** | **Responsible Party** |
| Complete and Submit 7th Report (covering year 13) | April 1, 2027 | Once | County Engineer |

Unless SCDES requires more frequent reports, reports will be submitted based on the following schedule:

1. The first report covering years 1 and 2 must be submitted to the Department twenty-seven (27) months after the effective date of the permit.

2. The following report, covering years 3 and 4 shall be submitted 180 days before the permit expiration date as part of the renotification.

3. While, and if the expired permit is continued, Reports are due every year on the anniversary date of the expired permit.

All reports shall be sent to the address below unless the Department instructs permittees to submit via alternate mechanisms (i.e. electronic mechanisms):

SCDES Bureau of Water
Water Pollution Compliance & Enforcement
2600 Bull Street
Columbia, SC 29201-1708

All reports will include:

- The status of the County's, Goose Creek's, and Hanahan's compliance with permit conditions, an assessment of the appropriateness of the identified BMP under Part 4, 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 information collected and analyzed, if any, during the reporting period, including monitoring data used to assess the success of the plan at reducing the discharge of pollutants to the MEP;

- A summary of the storm water activities the County, Goose Creek, and Hanahan plans to undertake during the next reporting cycle (including an implementation schedule);

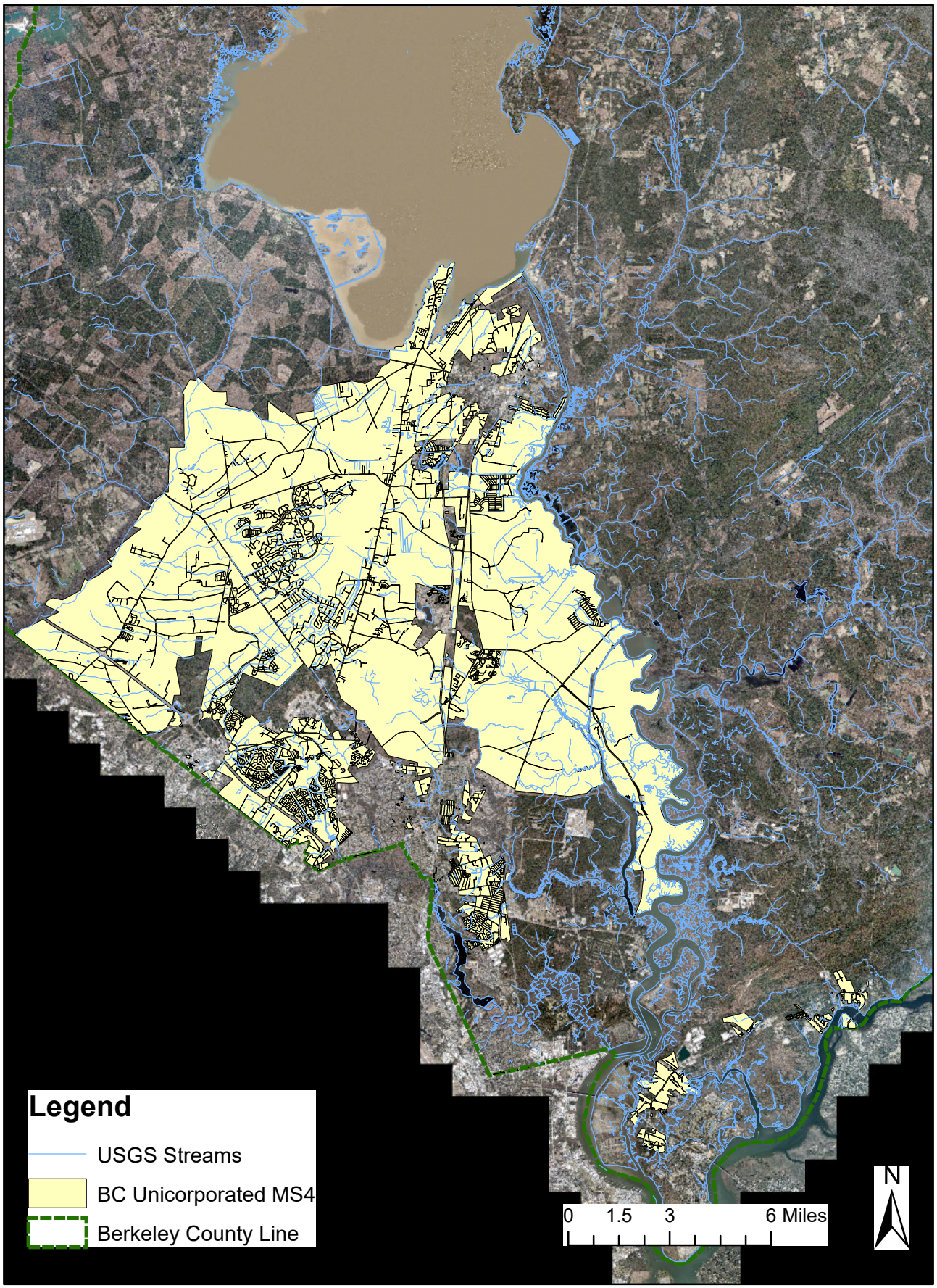
- Proposed changes to the County's, Goose Creek's, and Hanahan's SWMP, including changes to any BMP or any identified measurable goals that apply to the plan elements; and

- Notice that the County, Goose Creek, and Hanahan are relying on another entity to satisfy some of the SMS4 general permit obligations (if applicable).

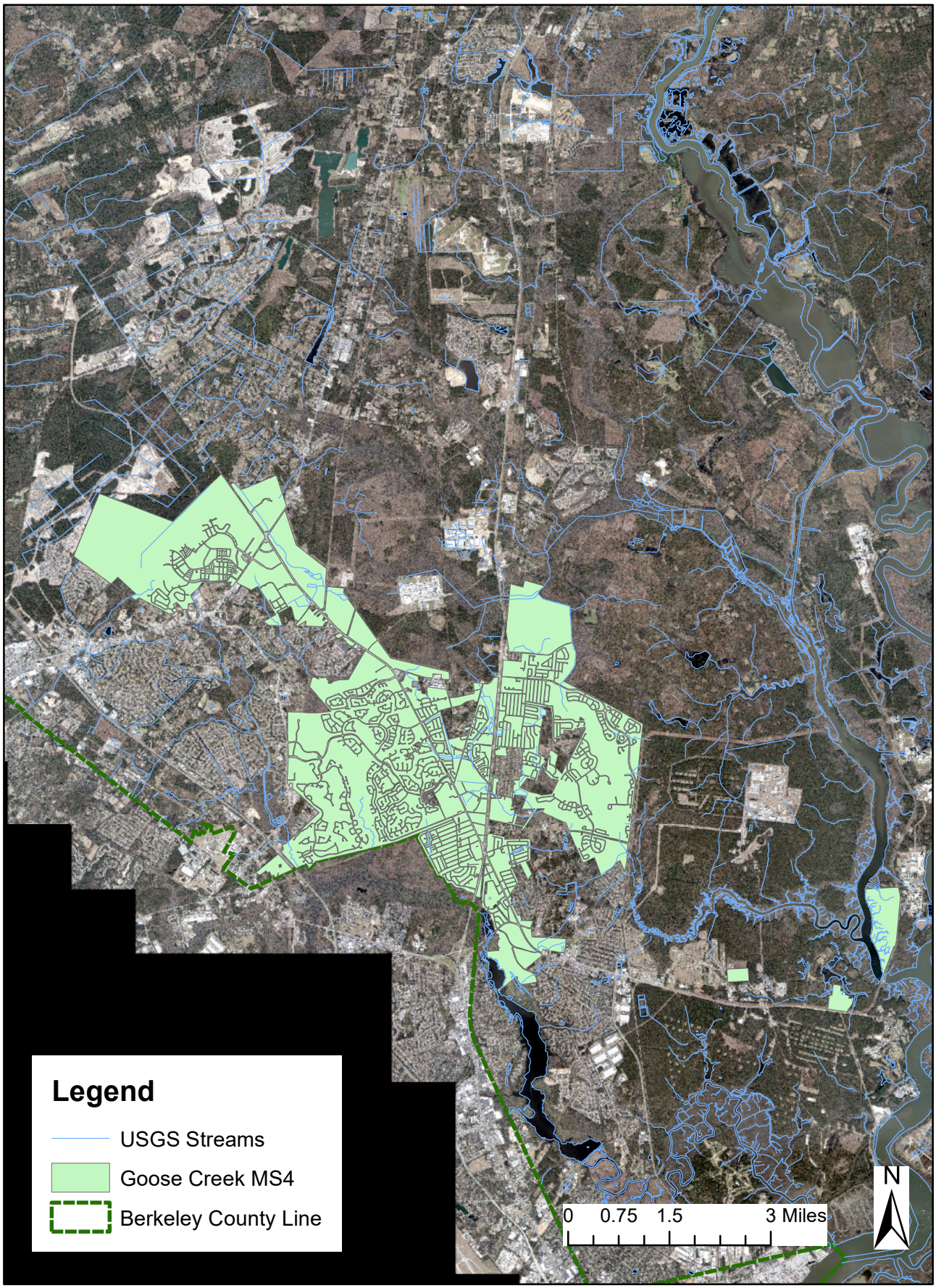
- Information requested in the SMS4 general permit including, but not limited to: sections 1.4.7, 3.1.1.1, 3.2.1.1, 3.2.1.2.2, 3.3.6, 4.1.6 and in the additional conditions applicable to NPDES MS4 permits contained in Appendix B of the SMS4 general permit

# Appendix A: MS4 Regulated Areas

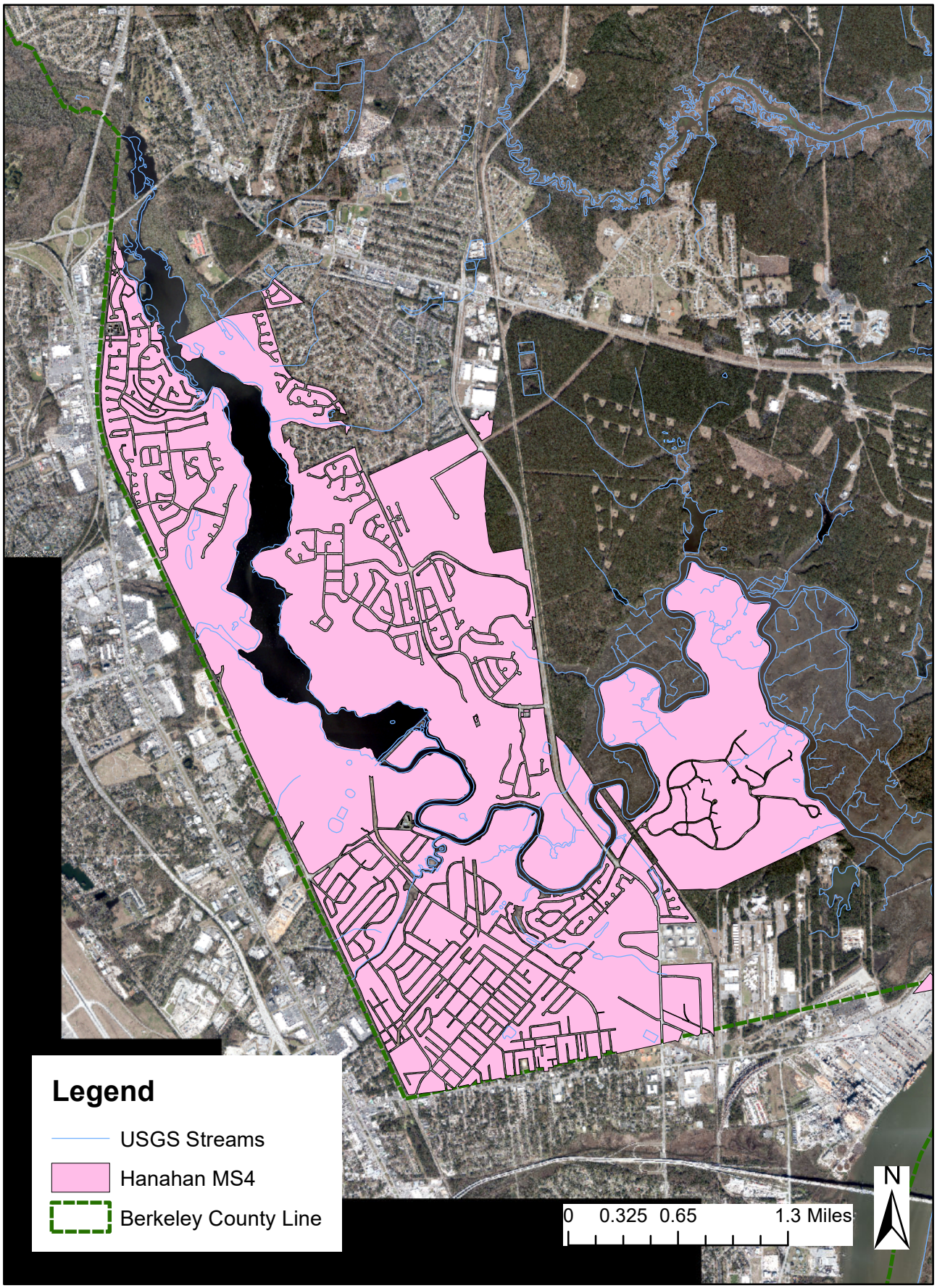
# Berkeley County Unicorporated MS4 Regulated Area



# Goose Creek MS4 Regulated Area



# Hanahan MS4 Regulated Area



# Appendix B: SWMP Updates

| Date | Description of Update or Revision |
|---|---|
| January 26, 2026 | Update language throughout document and appendices to synthesize and consolidate information for Berkeley County, City of Goose Creek, and City of Hanahan. |
| | Updated tables 5a, 5b, and 5c to reflect the 2024 303(d) List of Impaired within Berkeley County, Goose Creek, and Hanahan SMS4 Area and/or that the SMS4 Area Drains Into. |
| | Updated tables 6a and 6b to reflect the 2023 Classified Waters list within the Berkeley County, Goose Creek, and Hanahan SMS4 Area and/or that the SMS4 Area Drains Into. |
| | Updated document with current figures for measurable goal updates. |
| | Appendices have been updated to reflect revised/updated documentation. |

# Appendix C: TMDL Monitoring and Assessment Plans

Berkeley County does not have any WLAs currently assigned to the SMS4 area and therefore are not monitoring and do not have a TMDL Monitoring and Assessment Plan.

# City of Goose Creek
# TMDL Monitoring and Assessment Plan

**December 2014**

## Introduction

The purpose of this Total Maximum Daily Load (TMDL) Monitoring and Assessment Plan is to establish the procedures and protocols that the City of Goose Creek will utilize when, and if, a non-point source related TMDL is approved in a watershed into which the City's municipal separate storm sewer system (MS4) discharges. Currently the only existing approved TMDL in the Goose Creek area is the Charleston Harbor, Cooper, Ashley and Wando Rivers Dissolved Oxygen (DO) TMDL, however the wasteload allocation (WLA) for that TMDL is for continuous non-stormwater discharges (i.e. industrial and wastewater treatment plant discharges) only. The Charleston Harbor TMDL states that "available data and modeling indicate that regulated and unregulated stormwater nonpoint sources do not contribute to the allowable DO depression" and the TMDL does not contain any wasteload allocations for non-point source/stormwater runoff. The City does understand that there could be other TMDLs developed in the future for which there will need to be a monitoring and assessment plan and will therefore implement the following procedures within twelve (12) months of the EPA-approval or effective date of a new TMDL.

## TMDL Monitoring and Assessment Plan

The monitoring plan to measure the pollutant levels discharged from SMS4 outfalls to waters subject to any future TMDLs shall include:

a. A schedule for monitoring activities to be initiated no more than eighteen (18) months from the effective date of the TMDL.
b. Requirements to monitor the pollutants of concern (POC), on a frequency necessary to determine statistically significant seasonal pollutant loads baseline, with duration of not less than two (2) years. Minimum frequency and representativeness are stipulated as follows:
    i. Samples and measurements taken for the purpose of the TMDL Monitoring Plan shall:
        (1) Be representative of the SMS4 discharges,
        (2) Be reasonably distributed in time, while maintaining representative sampling,
        (3) Not be terminated for the purpose of preventing the analysis results from a permit or water quality violation,
        (4) Describe and consider frequency, mass and/or rate of discharge, as appropriate, and,
        (5) Be expressed in terms of units or measurements consistent with the requirements contained in the wasteload allocations (WLA).
    ii. The information contained in the TMDL Monitoring Plan shall include:
        (1) Monitoring locations, appropriate for representative data collection
        (2) Explanation of why monitoring is being conducted for selected locations
        (3) A description of whether the location(s) are representative and contribute to pollutant loads,
        (4) An indication the seasons during which sampling is intended,
        (5) The pollutant of concern, or its surrogate(s), as a sampling parameter,
        (6) Description of the sampling equipment, and,
        (7) A rationale supporting the proposed monitored location(s) as reflective of water quality concerns to the maximum extent practical (MEP).
    iii. The TMDL monitoring plan shall focus on the pollutant of concern, or its surrogates, to characterize the quality and quantity of the SMS4 permitted discharges to evaluate the progress toward the WLA and/or Water Quality

Standards (WQS) attainment by implementing one, or a combination, of the following strategies to the MEP:
(1) In-stream monitoring, and/or
(2) Outfall monitoring.

Monitoring location(s) should be selected based on one, all, or a combination of the following basis:
(1) Percent (%) of MS4 area draining to the WQMS, at least 25%,
(2) Collection of a representative contributing watershed,
(3) Inclusion of the entire TMDL watershed within the MS4.

iv. Established field and sampling protocols shall be followed when characterizing MS4 discharges, such as:
(1) Guidance for collecting samples under the stormwater permitting program while fulfilling NPDES stormwater sampling needs is provided in the NPDES Stormwater Sampling Guidance Document (EPA 833-8-92-001) and it is incorporated by reference herein. It can be found by visiting, http://www.epa.gov/npdes/pubs/owm0093.pdf
(2) Technical assistance and support for MS4 subject to NPDES program regulations for storm water point source discharges can be found in the Guidance Manual for the Preparation of NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems (EPA-833-B-92-002) and it is incorporated by reference herein. Visit, http://www.epa.gov/npdes/pubs/owm0246.pdf

v. The City may collect composite samples using different protocols than those indicated above with respect to the time duration subject to the approval of SC DHEC.

vi. Where field analysis does not involve analytical methods approved under 40 CFR 136, the City shall provide a description of the method used including the name of the manufacturer of the test method along with the range and accuracy of the test.

vii. When no analytical method is approved, the City may use any suitable method but must provide a description of the method.

viii. For each monitoring location selected in above, samples of stormwater discharges shall be collected at a minimum of once per season per year.

ix. Samples collected for laboratory analysis for all wet weather flows discharged from the SMS4, shall be analyzed for the POC, or surrogates, in the TMDL.

x. For SMS4 discharges to tidal influenced waters, alternative accepted sampling protocols may be used to collect the samples. A description of the methodology used shall be provided as required by SC-R 61-9 122.26(d)(1)(iv)(D) & (d)(2)(iii). Adherence to the MEP is expected. Documentation of any deviation is required.

c. Biological monitoring may be appropriate at some locations to demonstrate the recovery of biological communities after implementation of stormwater control measures. Monitoring locations in receiving waters must be at least both upstream and downstream of major MS4 discharges, with a frequency of at least annual basis for the permit term. Regardless of, the monitoring type, representativeness of the location, pollutant(s) of concern and/or parameters to be sampled, description of sampling equipment and sampling frequency of ambient waters should be strategically designed to demonstrate the level of progress made towards meeting the applicable WLA and addressing impairments in the receiving and/or in downstream waters;

d. For each pollutant of concern, the City shall report on the progress of the characterization of the relative pollutant levels from various SMS4 discharges to

TMDL waters. Resulting data shall be included in every annual report following the commencement of monitoring for TMDL pollutant characterization.

**Assessment of achieving the WLA/WQS** will consist of the following:

a. Process and schedule for assessing the monitoring data to prioritize areas of the SMS4 that will be targeted for implementation of BMPs,
b. Process and schedule for selection of appropriate BMPs that will implement the WLA to the MEP, will protect water quality, and will satisfy the appropriate water quality requirements of the Clean Water Act, and,
c. Updates to TMDL Monitoring and Assessment Plans to be submitted in each annual report.
d. Progress on the TMDL Monitoring and Assessment Plan shall be documented in the Annual Report.

**TMDL Implementation and Analysis**

The City shall initiate the monitoring described above. Any monitoring data and information generated from the previous year of the monitoring program to satisfy the provisions of the MS4 Permit will be made available to SC DHEC upon request.

The City shall complete and submit TMDL Implementation Plans for approved TMDLs within 48 months from the new TMDL effective date.

TMDL Implementation Plans submitted to SC DHEC Bureau of Water shall describe the following:

a. Assessment of the monitoring data. Where long-term data is available, this assessment should include an analysis of the data to show trends;
b. Prioritization of areas targeted for BMP implementation and underlying rationale;
c. Structural and nonstructural BMPs to address the WLA. The City will include a brief explanation of why the BMPs are selected (e.g., expected load reductions or percent of capture); and,
d. Schedule for completing BMP implementation as soon as practicable. The schedule shall describe all of the BMP implementation activities that are expected to occur during the current and the next permit term. In addition to the BMP implementation activities that are expected to occur during the current permit cycle, the TMDL Implementation Plan shall include proposed monitoring to be used to evaluate the effectiveness of the BMP and facilitate the iterative revision of the BMP Implementation Plan to achieve progress towards addressing the TMDL's WLA as long as the intended uses are not supported.

The City shall implement those elements of the TMDL Implementation Plan that are scheduled to occur within the term of the MS4 permit. Progress on the TMDL Implementation and Analysis shall be documented in the Annual Report.

Should there be no water quality improvement of the discharges from permitted SMS4 resulting from BMP implementation, the City understands that they may be required to implement additional control measures or make changes to the TMDL implementation plan.

# City of Hanahan

# TMDL Monitoring and Assessment Plan

**December 2014**

## Introduction

The purpose of this Total Maximum Daily Load (TMDL) Monitoring and Assessment Plan is to establish the procedures and protocols that the City of Hanahan will utilize when, and if, a non-point source related TMDL is approved in a watershed into which the City's municipal separate storm sewer system (MS4) discharges. Currently the only existing approved TMDL in the Hanahan area is the Charleston Harbor, Cooper, Ashley and Wando Rivers Dissolved Oxygen (DO) TMDL, however the wasteload allocation (WLA) for that TMDL is for continuous non-stormwater discharges (i.e. industrial and wastewater treatment plant discharges) only. The Charleston Harbor TMDL states that "available data and modeling indicate that regulated and unregulated stormwater nonpoint sources do not contribute to the allowable DO depression" and the TMDL does not contain any wasteload allocations for non-point source/stormwater runoff. The City does understand that there could be other TMDLs developed in the future for which there will need to be a monitoring and assessment plan and will therefore implement the following procedures within twelve (12) months of the EPA-approval or effective date of a new TMDL.

## TMDL Monitoring and Assessment Plan

The monitoring plan to measure the pollutant levels discharged from SMS4 outfalls to waters subject to any future TMDLs shall include:

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b. Requirements to monitor the pollutants of concern (POC), on a frequency necessary to determine statistically significant seasonal pollutant loads baseline, with duration of not less than two (2) years. Minimum frequency and representativeness are stipulated as follows:

   i. Samples and measurements taken for the purpose of the TMDL Monitoring Plan shall:

      (1) Be representative of the SMS4 discharges,
      (2) Be reasonably distributed in time, while maintaining representative sampling,
      (3) Not be terminated for the purpose of preventing the analysis results from a permit or water quality violation,
      (4) Describe and consider frequency, mass and/or rate of discharge, as appropriate, and,
      (5) Be expressed in terms of units or measurements consistent with the requirements contained in the wasteload allocations (WLA).

   ii. The information contained in the TMDL Monitoring Plan shall include:

      (1) Monitoring locations, appropriate for representative data collection
      (2) Explanation of why monitoring is being conducted for selected locations

(3) A description of whether the location(s) are representative and contribute to pollutant loads,
(4) An indication the seasons during which sampling is intended,
(5) The pollutant of concern, or its surrogate(s), as a sampling parameter,
(6) Description of the sampling equipment, and,
(7) A rationale supporting the proposed monitored location(s) as reflective of water quality concerns to the maximum extent practical (MEP).

iii. The TMDL monitoring plan shall focus on the pollutant of concern, or its surrogates, to characterize the quality and quantity of the SMS4 permitted discharges to evaluate the progress toward the WLA and/or Water Quality Standards (WQS) attainment by implementing one, or a combination, of the following strategies to the MEP:

(1) In-stream monitoring, and/or
(2) Outfall monitoring.

Monitoring location(s) should be selected based on one, all, or a combination of the following basis:

(1) Percent (%) of MS4 area draining to the WQMS, at least 25%,
(2) Collection of a representative contributing watershed,
(3) Inclusion of the entire TMDL watershed within the MS4.

iv. Established field and sampling protocols shall be followed when characterizing MS4 discharges, such as:

(1) Guidance for collecting samples under the stormwater permitting program while fulfilling NPDES stormwater sampling needs is provided in the NPDES Stormwater Sampling Guidance Document (EPA 833-8-92-001) and it is incorporated by reference herein. It can be found by visiting, http://www.epa.gov/npdes/pubs/owm0093.pdf
(2) Technical assistance and support for MS4 subject to NPDES program regulations for storm water point source discharges can be found in the Guidance Manual for the Preparation of NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems (EPA-833-B-92-002) and it is incorporated by reference herein. Visit, http://www.epa.gov/npdes/pubs/owm0246.pdf

v. The City may collect composite samples using different protocols than those indicated above with respect to the time duration subject to the approval of SC DHEC.
vi. Where field analysis does not involve analytical methods approved under 40 CFR 136, the City shall provide a description of the method used including the name of the manufacturer of the test method along with the range and accuracy of the test.

vii. When no analytical method is approved, the City may use any suitable method but must provide a description of the method.

viii. For each monitoring location selected in above, samples of stormwater discharges shall be collected at a minimum of once per season per year.

ix. Samples collected for laboratory analysis for all wet weather flows discharged from the SMS4, shall be analyzed for the POC, or surrogates, in the TMDL.

x. For SMS4 discharges to tidal influenced waters, alternative accepted sampling protocols may be used to collect the samples. A description of the methodology used shall be provided as required by SC-R 61-9 122.26(d)(1)(iv)(D) & (d)(2)(iii). Adherence to the MEP is expected. Documentation of any deviation is required.

c. Biological monitoring may be appropriate at some locations to demonstrate the recovery of biological communities after implementation of stormwater control measures. Monitoring locations in receiving waters must be at least both upstream and downstream of major MS4 discharges, with a frequency of at least annual basis for the permit term. Regardless of, the monitoring type, representativeness of the location, pollutant(s) of concern and/or parameters to be sampled, description of sampling equipment and sampling frequency of ambient waters should be strategically designed to demonstrate the level of progress made towards meeting the applicable WLA and addressing impairments in the receiving and/or in downstream waters;

d. For each pollutant of concern, the City shall report on the progress of the characterization of the relative pollutant levels from various SMS4 discharges to TMDL waters. Resulting data shall be included in every annual report following the commencement of monitoring for TMDL pollutant characterization.

**Assessment of achieving the WLA/WQS** will consist of the following:

a. Process and schedule for assessing the monitoring data to prioritize areas of the SMS4 that will be targeted for implementation of BMPs,

b. Process and schedule for selection of appropriate BMPs that will implement the WLA to the MEP, will protect water quality, and will satisfy the appropriate water quality requirements of the Clean Water Act, and,

c. Updates to TMDL Monitoring and Assessment Plans to be submitted in each annual report.

d. Progress on the TMDL Monitoring and Assessment Plan shall be documented in the Annual Report.

**TMDL Implementation and Analysis**

The City shall initiate the monitoring described above. Any monitoring data and information generated from the previous year of the monitoring program to satisfy the provisions of the MS4 Permit will be made available to SC DHEC upon request.

The City shall complete and submit TMDL Implementation Plans for approved TMDLs within 48 months from the new TMDL effective date.

TMDL Implementation Plans submitted to SC DHEC Bureau of Water shall describe the following:

a. Assessment of the monitoring data. Where long-term data is available, this assessment should include an analysis of the data to show trends;

b. Prioritization of areas targeted for BMP implementation and underlying rationale;

c. Structural and nonstructural BMPs to address the WLA. The City will include a brief explanation of why the BMPs are selected (e.g., expected load reductions or percent of capture); and,

d. Schedule for completing BMP implementation as soon as practicable. The schedule shall describe all of the BMP implementation activities that are expected to occur during the current and the next permit term. In addition to the BMP implementation activities that are expected to occur during the current permit cycle, the TMDL Implementation Plan shall include proposed monitoring to be used to evaluate the effectiveness of the BMP and facilitate the iterative revision of the BMP Implementation Plan to achieve progress towards addressing the TMDL's WLA as long as the intended uses are not supported.

The City shall implement those elements of the TMDL Implementation Plan that are scheduled to occur within the term of the MS4 permit. Progress on the TMDL Implementation and Analysis shall be documented in the Annual Report.

Should there be no water quality improvement of the discharges from permitted SMS4 resulting from BMP implementation, the City understands that they may be required to implement additional control measures or make changes to the TMDL implementation plan.

# Appendix D: Stormwater Management Ordinance

**BERKELEY COUNTY COUNCIL**
**Daniel W. Davis** - Supervisor & Chairman
**Dennis L. Fish** - Vice Chairman (District No. 5)

RECEIVED
DEC - 3 2014
BERKELEY COUNTY
ENGINEERING DEPARTMENT

COMMITTEE CHAIRMEN

**District 1**
**Phillip Farley**
Committee on Land Use & Development

**District 2**
**Timothy J. Callanan**
Committee on Finance

**District 3**
**Kenneth E. Gunn, Jr.**
Committee on Justice & Public Safety

**District 4**
**Cathy S. Davis**
Committee on Water & Sanitation

**District 5**
**Dennis L. Fish**
Committee on Human Resources & Purchasing

**District 6**
**Jack H. Schurlknight**
Committee on Human Services

**District 7**
**Caldwell Pinckney, Jr.**
Committee on Community Services

**District 8**
**Steve C. Davis**
Committee on Facilities & Code Enforcement

December 2, 2014

Ms. Kace Smith
Berkeley County Deputy Supervisor/Finance
P.O. Box 6122
Moncks Corner, SC 29461

Re: Ordinance No. 14-11-36, to amend Ordinance No. 07-07-44, an ordinance establishing regulations to develop and enforce a Stormwater Management Program to reduce the discharge of pollutants associated with stormwater runoff and Berkeley County's Storm Sewer System.

Dear Ms. Smith:

You will find enclosed a certified copy of the above referenced ordinance adopted by Berkeley County Council at a Regular Meeting of Council on November 24, 2014.

If any additional information is required, please do not hesitate to give our office a call.

With kind regards,

Catherine R. Windham
Clerk to Council

Enclosure: as stated

Copy w/enclosure to:
Mr. Frank Carson, County Engineer
Mary P. Brown – For Filing

14-11-36

# Berkeley County

## Stormwater Management Ordinance

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Certified True and Correct Copy of Original Record
Clerk to Council
County Council Berkeley County SC

14-11-36

# STORMWATER MANAGEMENT ORDINANCE

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Bill No. 14-37

ORDINANCE NO. 14-11-36

**AN ORDINANCE TO AMEND ORDINANCE NO. 07-07-44, AN ORDINANCE ESTABLISHING REGULATIONS TO DEVELOP AND ENFORCE A STORMWATER MANAGEMENT PROGRAM TO REDUCE THE DISCHARGE OF POLLUTANTS ASSOCIATED WITH STORMWATER RUNOFF AND BERKELEY COUNTY'S STORM SEWER SYSTEM.**

**WHERAS,** Berkeley County Council adopted a Stormwater Management Ordinance for Berkeley County, on July 24, 2007;

**WHEREAS**, uncontrolled stormwater runoff may have significant, adverse impact on the health, safety and general welfare of Berkeley County and the quality of life of its citizens; and

**WHEREAS**, Berkeley County is required by federal and State law to obtain a National Pollutant Discharge Elimination System (NPDES) permit from the South Carolina Department of Health and Environmental Control for stormwater discharges from Berkeley County's stormwater systems; and

**WHEREAS**, the NPDES permit requires that Berkeley County develop, implement, and enforce a stormwater management program in its regulated area designed to reduce the discharge of pollutants from its small municipal separate storm sewer systems to the maximum extent practicable, to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act.

**NOW, THEREFORE BE IT ENACTED** by Berkeley County Council, in a meeting duly assembled, that Ordinance No. 07-07-44, is amended and revised as follows:

## DIVISION 1
## GENERAL PROVISIONS

### Section 1.1 Title

This ordinance shall be known as the "Stormwater Management Ordinance of Berkeley County, South Carolina."

### Section 1.2 Authority

This ordinance is adopted pursuant to the authority conferred upon Berkeley County by the South Carolina Constitution, Act No. 194 of the Acts and Joint Resolutions of 1971 enacted by the General

Assembly of the State of South Carolina, approved April 23, 1971, in 1976 South Carolina Code of Laws Sections 4-9-30, 4-9-40, 5-7-30, and 5-7-60.

**Section 1.3 Jurisdiction**

The boundaries and jurisdiction of this Ordinance shall encompass those portions of unincorporated Berkeley County defined as the "regulated area" and such additional areas lying inside the corporate limits of other governments as approved by Berkeley County Council.

**Section 1.4 Findings**

Berkeley County Council makes the following findings:

(a) Uncontrolled stormwater runoff may have significant, adverse impact on the health, safety and general welfare of Berkeley County and the quality of life of its citizens. The potential impacts of uncontrolled stormwater can lead to the degradation of water quality and general riverine ecosystem through excessive or illegal pollutant discharges, erosion, and flooding thereby limiting or removing its designated and potential uses.

(b) Berkeley County is required by federal law [33 U.S.C 1342(p) and 40 CFR 122.26] and by State law [S. C. Code Reg. 61-9 122.32 & 122.33] to obtain a National Pollutant Discharge Elimination System (NPDES) permit from the South Carolina Department of Health and Environmental Control ("SCDHEC") for stormwater discharges from Berkeley County's stormwater systems. The NPDES General Permit for Storm Water Discharges from Regulated Small Separate Storm Sewer Systems (SMS4), SCR030000, requires that Berkeley County develop, implement, and enforce a stormwater management program (SWMP) in its regulated area designed to reduce the discharge of pollutants from its small municipal separate storm sewer systems (SMS4) to the maximum extent practicable (MEP), to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act.

**Section 1.5 Purpose**

(a) It is the purpose of this ordinance to protect, maintain, and enhance water quality and the environment of Berkeley County and the short-term and long-term public health, safety, and general welfare of the citizens of Berkeley County. This ordinance is also designed to minimize property damage by establishing requirements and procedures to control the potential adverse effects of increased stormwater runoff and related pollutant loads associated with both future development and existing developed land. Proper management of stormwater runoff will further the purpose of this Ordinance to insure a functional drainage system, reduce the effects of development on land and stream channel erosion, attain and maintain water quality standards, enhance the local environment associated with the drainage system, reduce local flooding, maintain to the maximum extent practical pre-developed runoff characteristics of the area in terms of flow rate, volume and pollutant concentration, and facilitate economic development through residential, commercial, and industrial construction and development while mitigating associated pollutant, flooding, erosion, and drainage impacts.

(b) It is further the purpose of this ordinance to direct the development and implementation of a Stormwater Management Program (SWMP) and to establish legal authority which authorizes or enables Berkeley County at a minimum to:

(1) Comply with State and Federal requirements related to stormwater management developed pursuant to the Clean Water Act;

(2) Prohibit illicit connections and discharges to Berkeley County stormwater management systems and facilities and waters of the State;

(3) Control to the maximum extent practical the discharge of spills, dumping, or disposal of materials other than stormwater to Berkeley County stormwater management systems and facilities and waters of the State;

(4) Address specific categories of non-stormwater discharges and similar other incidental non-stormwater discharges listed in the SWMP;

(5) Require that violators cease and desist illicit discharges of stormwater in violation of any ordinance, permits, contracts or orders;

(6) Require installation, implementation, and maintenance of control measures from owners/operators of construction sites, new development and redevelopment to minimize the discharge of pollutants to the MEP and to protect water quality;

(7) Require from operators of construction sites, new or redeveloped land, including industrial and commercial facilities information including, but not limited to, specific requirements to control construction and post-construction discharges of pollutants in stormwater;

(8) Enforce, penalize, stop work, and require compliance for controlling pollutants from construction sites, new or redeveloped land, including industrial and commercial facilities;

(9) Where necessary, require stormwater discharge rate and volume control during and following development, redevelopment, or construction;

(10) Define and implement procedures of site plan review and site inspection of all applicable construction projects within regulated areas of Berkeley County;

(11) Control the discharge from Berkeley County stormwater management systems and facilities of pollutants in such quantity that water quality standards are met or to otherwise address post-construction, long-term water quality. This includes the necessary means needed to comply with State and Federal regulations regarding stormwater management quantity and quality;

(12) Define procedures for addressing citizen complaints of stormwater-related issues within Berkeley County;

(13) Provide for adequate long term operation and maintenance of Best Management Practices (BMPs);

(14) Prior to applying for approval of construction activities within the Regulated Area of Berkeley County that require DHEC construction general permit coverage, the County must receive notification from DHEC's Office of Ocean and Coastal Resource

Management (OCRM) that states the proposed project is consistent with the Coastal Zone Management Plan;

(15) Carry out inspection, surveillance and monitoring procedures necessary to determine compliance and noncompliance with permit conditions and Ordinance requirements including the prohibition on illicit discharges to Berkeley County stormwater management systems and facilities and waters of the State;

(16) Enter private property for the purpose of inspecting any facilities, equipment, practices, or operations related to Stormwater discharges to determine whether there is compliance with conditions in ordinances, permits, contracts or orders;

(17) Encourage the use of non-traditional strategies to control stormwater discharges;

(18) Encourage the creation of stream buffers and preservation of natural spaces to provide areas that could be used for flood storage, stormwater treatment and control, and recreation. Such areas may be required in special protection areas needed to protect, maintain, or enhance water quality and protect property from flooding problems;

(19) Develop, implement, and enforce action plans to address pollutant load reductions required in impaired waterbodies and to work towards compliance with Total Maximum Daily Loads (TMDLs) established by EPA or SCDHEC and to work towards meeting water quality standards.

(20) Enable enforcement of all said authorizations.

(c) It is still further the purpose of this ordinance to establish authority for the County Engineer for determining consistency of construction projects with the Berkeley County SWMP.

**Section 1.6 Construction and Scope**

(a) The provisions of this Ordinance shall apply throughout those portions of unincorporated Berkeley County defined as the "regulated area" and such additional areas lying inside the corporate limits of other governments as approved by Berkeley County Council. The County Council will approve the designation of the "regulated area".

(b) The Berkeley County Engineer or his designee shall be primarily responsible for the coordination and enforcement of the provisions of this Ordinance and the SWMP.

(c) The application of this Ordinance and the provisions and references expressed herein shall be the minimum stormwater management requirements and shall not be deemed a limitation or repeal of any other ordinances of Berkeley County or powers granted to Berkeley County by the State of South Carolina statues, including, without limitation, the power to require additional or more stringent stormwater management requirements. If site characteristics on new development and/or redevelopment indicate that complying with these minimum requirements will not provide adequate designs or protection for local property, residents, or the environment, the property owner, operator, or person responsible for land disturbing activities shall be required to provide additional and appropriate management practices, control techniques, system design, and engineering methods to attain an adequate level of protection.

**Section 1.7 Severability**

Should any word, phrase, clause or provision of this ordinance be declared invalid or unconstitutional by a court of competent jurisdiction, such declaration shall not affect this ordinance as a whole or any part hereof except that specific provision declared by such court to be invalid or unconstitutional.

**Section 1.8 Rules of Language and Interpretation**

(a) The word "shall" is mandatory; the word "may" is permissive.

(b) The particular shall control the general.

(c) Words used in the present tense shall include the future, and words used in the singular include the plural, and the plural the singular, unless the context clearly indicates the contrary.

(d) All public officials, bodies and agencies to which reference is made are those of Berkeley County, unless otherwise indicated.

**Section 1.9 Relationship with Other Laws, Regulations and Ordinances**

Whenever the provisions of this Ordinance impose more restrictive standards than are required in or under any other law, regulation or ordinance, the requirements contained in this article shall prevail. Whenever the provisions of any other law, regulation or ordinance require more restrictive standards than are required in this article, the requirements of such law, regulation or ordinance shall prevail.

**Section 1.10 Amendments**

Berkeley County Council, may, in its discretion and following procedures specified by State law, amend or change this Ordinance or adopt additional regulations or resolutions to implement this Ordinance, implement the SWMP, or to otherwise further the goal of protecting the quality of the waters into which Berkeley County stormwater management systems and facilities outfall.

**Section 1.11 Conflicting Ordinances Repealed**

All ordinances or parts of ordinances related to stormwater management in conflict with the provisions of this Ordinance are hereby repealed. This Ordinance shall prevail in any and all conflicts with guidelines, manuals, or other publications pertaining to stormwater management.

**Section 1.12 Definitions**

"Applicant" is a person, firm, governmental agency, partnership, or any other entity who seeks to obtain approval under the requirements of this Ordinance and who will be responsible for the land disturbing activity and related maintenance thereof.

"As-built drawings" are revised construction drawings that show in the installed location of the new facilities on a project, including the stormwater system. This term and "record drawings" shall be synonymous.

"Best Management Practices (BMPs)" are any structural or non-structural measure or facility used for the control of stormwater runoff, be it for quantity or quality control. BMPs also includes schedules of activities, prohibitions of practices, maintenance procedures, treatment requirements, operating procedures, and other management practices to control site runoff, spillage or leaks, sludge or waste disposal, drainage from raw material storage, or otherwise prevent or reduce the pollution of waters of the State.

"Construction" or "Construction Activity" is a land-disturbing activity involving clearing, grading, excavating, transporting, filling, or any other activity which results in a change in the natural cover or topography that may cause erosion and contribute to sediment and alter the quality and quantity of stormwater runoff.

"Design Manual" refers to the Berkeley County Stormwater Design Standards Manual.

"Developer" means any person, or others who act on his own behalf, who is required to submit an application for approval of construction activities and is thereafter responsible for maintaining compliance with this Ordinance and conditions of the approved application.

"Easement" is an authorization by a property owner to the general public, a corporation, or a certain person or persons for the use of any designated part of his property for a specific purpose.

"Erosion" means the wearing away of the land surface by the action of wind, water, gravity, ice, or any combination of those forces.

"Flood/flooding" is a temporary rise in the level of water which results in the inundation of areas not ordinarily covered by water.

"Hazardous material" is any item or agent (biological, chemical, physical) which has the potential to cause harm to humans, other living organisms, or the environment, either by itself or through interaction with other factors.

"Illicit connection" means a man-made conveyance connecting an illicit discharge directly to a Berkeley County stormwater management system or facility that results in a discharge that is not composed entirely of stormwater runoff except discharges pursuant to an NPDES permit (other than the NPDES MS4 permit for Berkeley County).

"Improper disposal" means any disposal other than through an illicit connection that results in an illicit discharge, including, but not limited to the disposal of used oil and toxic materials resulting from the improper management of such substances.

"Illicit discharge" or "Illegal discharge" is defined in South Carolina Water Pollution Control Permits Regulation 61-9 122.26(b)(2) and refers to any discharge to a Berkeley County stormwater management system or facility or waters of the State that is not composed entirely of stormwater except (a) discharge pursuant to an NPDES permit (other than the NPDES MS4 Permit for Berkeley County) and (b) discharges resulting from the fire-fighting activities.

"Low Impact Development (LID)" means an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible.

"Maintenance" means any action necessary to preserve stormwater system component, including conveyances, facilities and BMPs in proper working condition, in order to serve the intended purposes set forth in this ordinance and to prevent structural failure of such components.

"MS4" means municipal separate storm sewer system and includes all conveyances or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) which is (a) owned or operated by Berkeley County; (b) designed or used for collecting or conveying stormwater; (c) not a combined sewer system; and (d) not part of a Publicly Owned Treatment Works (POTW).

"New Development" or "Re-Development" means any of the following actions undertaken by any person, including, without limitation, any public or private individual or entity:

(a) division of a lot, tract, or parcels or other divisions by plat or deed;

(b) the construction, installation, or alteration of land, a structure, impervious surface or drainage facility;

(c) clearing, scraping, grubbing or otherwise significantly disturbing the soil, vegetation, mud, sand or rock of a site; or

(d) adding, removing, exposing, excavating, leveling, grading, digging, burrowing, dumping, piling, dredging, or otherwise disturbing the soil, vegetation, mud, sand or rock of a site.

"NPDES" means National Pollutant Discharge Elimination System.

"NPDES MS4 permit" means the General Permit for Storm Water Discharges from Regulated Small Separate Storm Sewer Systems (SMS4), SCR030000, issued by SCDHEC pursuant to the Clean Water Act and the federal stormwater discharge regulations (40 CFR 122.26) that allows for restricting pollutant loads as necessary to meet water quality standards.

"Operator" means the person who has operational control of the property, including an operator or person who is in charge of any activity related to land disturbance, construction or post construction stormwater quality or quantity.

"Outfall" or "Discharge point" means a point source as defined by section 122.2 of SC Regulation 61-9 at the point where a Berkeley County stormwater management system or facility discharges to waters of the State and does not include any conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the State and are used to convey waters of the State.

"Owner" means the property owner, or any person who acts in his own behalf, that submits an application for approval to disturb land or vegetation or encroachment and the person, if so designated by default or on legal documents, as the responsible party for maintenance of a stormwater system(s) and facility(s).

"Person" means any individual, public or private corporation, political subdivision, association, partnership, corporation, municipality, State or Federal agency, industry, firm, trust, estate, any other legal entity whatsoever, or an agent or employee thereof.

"Pollutant" is defined at §122.2 of SC Regulation 61-9 as dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water. Typical construction site pollutants include sediment, oil and grease, pesticides and fertilizers, pollutants from construction wastes, and pollutants from construction materials.

"Property Owner" means the legal owner of the property.

"Receiving waters" or "receiving water body" refers to any lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic Ocean within the territorial limits of the State of South Carolina, and all other bodies of surface or underground water, natural or artificial, public or private, inland or coastal, fresh or salt.

"Regulated Area" refers to the boundaries of Berkeley County's urbanized areas as determined by Decennial Census Data from the United States Bureau of the Census. Regulated Area also includes any portion of the County that is so designated by Berkeley County Council. The Regulated Area designated by Berkeley County Council is established by the map, titled "Berkeley County Regulated Area Map", dated November 24, 2014. This map may be amended from time to time by Berkeley County Council. Any amendments to this map for the purpose of removing properties from annexation do not require the approval of County Council.

"Regulation" means any regulation, rule or requirement prepared by and/or adopted by Berkeley County Council pursuant to this Ordinance.

"Spill" means any accidental or purposeful discharge of any pollutants, hazardous materials, or other substance which is otherwise potentially detrimental to the designated use of a receiving water.

"SWMP" means Berkeley County Stormwater Management Program, which may describe the components to be used by Berkeley County to control stormwater discharges, address flooding, and meet water quality standards discharged from the Berkeley County stormwater management systems and facilities.

"Stormwater" is defined at South Carolina Water Pollution Control Permits Regulation 61-9 122.26(b)(13) and means stormwater runoff, snowmelt runoff, and surface runoff and drainage.

"Stormwater management" means the collection, conveyance, storage, treatment and disposal of stormwater runoff in a manner to meet the objectives of this ordinance and its terms, including, but not limited to, measures that control the increased volume and rate of stormwater runoff and water quality impacts caused by manmade changes to the land.

"Stormwater management systems and facilities" means those natural and man-made channels, swales, ditches, swamps, rivers, streams, creeks, branches, reservoirs, ponds, drainage ways, inlets, catch basins, pipes, head walls, storm sewers, lakes and other physical works, properties, and improvements which transfer, control, convey, or otherwise influence the movement of stormwater runoff, be it for quantity or quality control.

"TMDL" is a Total Maximum Daily Load wasteload allocation designation. It is a regulatory value developed to represent the amount of a pollutant that a waterbody can incorporate while meeting water quality standards. TMDL is further defined as the legal document developed by EPA and SCDHEC designating the pollutant load a permitted discharge is allowed to input into a waterbody. It is a

calculation of the maximum amount of a specific pollutant that a waterbody can receive and still meet water quality standards. It is the sum of the allowable loads or allocations of a given pollutant from all contributing point (wasteload allocation (WLA)) and nonpoint (load allocation (LA)) sources. It also incorporates a margin of safety and consideration of seasonal variation. For an impaired waterbody, the TMDL document specifies the level of pollutant reductions needed for waterbody use attainment. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure.

"Variance" means the modification of the minimum stormwater management requirements contained in this Ordinance and the SWMP for specific circumstances where strict adherence to the requirements would result in unnecessary hardship and not fulfill the intent of this Ordinance.

"Watercourse" is any natural or man-made conveyance used to transport runoff from one location to the next.

"Watershed" is a drainage area or drainage basin contributing to the flow of stormwater to a single point into a receiving watercourse or water body."

"Waters of South Carolina, or Waters of the State" means lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic Ocean within the territorial limits of the State, and all other bodies of surface or underground water, natural or artificial, public or private, inland or coastal, fresh or salt, which are wholly or partially within or bordering the State or within its jurisdiction and all waters of the United States within the political boundaries of the State of South Carolina. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA are not waters of the South Carolina. This exclusion applies only to manmade bodies of water which neither were originally created in waters of South Carolina (such as disposal areas in wetlands) nor resulted from the impoundment of waters of South Carolina.

"Waters of the United States, or Waters of the U.S." means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(b) All interstate waters, including interstate "wetlands";
(c) All other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, wet meadows, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:
    (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes;
    (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    (3) Which are used or could be used for industrial purposes by industries in interstate commerce;
(d) All impoundments of waters otherwise defined as waters of South Carolina under this definition;
(e) Tributaries of waters identified in paragraphs (a) through (d) of this definition;
(f) The territorial sea; and
(g) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

"Water Quality" means those characteristics of stormwater runoff that relate to the physical, chemical, biological, or radiological integrity of water.

"Water Quantity" means those characteristics of stormwater runoff that relate to the rate and volume of the stormwater runoff.

**Section 1.13 Reserved**

## DIVISION 2
## ORGANIZATION AND ADMINISTRATION

**Section 2.1 Berkeley County Stormwater Management Program (SWMP)**

The SWMP being developed by Berkeley County to implement the purposes of this Ordinance shall serve as the basis for directing Berkeley County's efforts to control stormwater and to comply with all applicable State and federal regulatory and permitting requirements. The SWMP and any modifications and/or revisions to the SWMP are incorporated by reference and is hereby a part of this Ordinance. The SWMP requirements and any modifications and/or revisions to the SWMP are to be complied with and shall be enforced in accordance with the provisions of this Ordinance.

**Section 2.2 Coordination with Other Agencies**

The County Engineer may coordinate Berkeley County's activities with other federal, State, and local agencies that manage and perform functions relating to the protection of receiving waters through written agreement.

**Section 2.3 Right of Entry**

(a) The County Engineer or his designee shall have right-of-entry on or upon the property of any person subject to this Ordinance. The County Engineer or his designee shall, upon showing satisfactory credentials, be provided ready access to the necessary parts of the premises for the purposes of inspecting, monitoring, sampling, inventorying, examining and copying of records, and performing any other duties necessary to determine compliance with this Ordinance.

(b) Where the property owner or operator has security measures in force requiring proper identification and clearance before entry onto the premises, the person shall make necessary arrangements with the necessary parties so that, upon presentation of suitable identification, the County Engineer or his designee will be permitted to enter without delay for the purposes of performing such responsibilities identified in (a).

**Section 2.4 Reserved**

## DIVISION 3
## STORMWATER QUANTITY AND QUALITY MANAGEMENT REQUIREMENTS

**Section 3.1 Regulations**

(a) The County Engineer shall be responsible for day to day coordination, implementation, and enforcement of this Ordinance and the SWMP as well as the long-term management of the

County's drainage. Without limitation, the County Engineer shall have the following authority:

(1) To issue any approval, certification, or license that may be required to comply with this Ordinance.

(2) To deny a connection to a Berkeley County stormwater management system or facility, if State requirements and this Ordinance are not met.

(3) To enact and amend the Berkeley County Stormwater Designs Standards Manual (Design Manual). The Design Manual may be used to convey design and engineering standards, construction management processes and procedures, and other aspects necessary for compliance with this Ordinance.

The Design Manual shall be amended by staff with approval of the County Engineer.

(4) To require the submittal of an application for all applicable construction activities that result in construction activities with a land disturbance area of greater than or equal to one (1) acre, or other sites as deemed necessary by the Stormwater Design Standards Manual.

These applications must include a plan to control stormwater pollutants and other components detailed in Berkeley County's Stormwater Design Standards Manual.

(5) To require the development of stormwater management and sediment/erosion control plans for all applicable new and re-development projects and enforcement of these plans.

(6) To approve applicable construction activities and to require as a condition of such approvals, structural or non-structural controls, practices, devices, operating procedures, or other mechanisms to protect public and private property from flooding and erosion and attain TMDL-mandated pollutant load reductions and water quality standards.

(7) To require performance bonds as necessary of any person to secure that person's compliance with approval, certificates, licenses, or authorizations issued by the County Engineer pursuant to this Ordinance, the SWMP and Federal and State laws. The County Engineer shall develop a process that organizes the closure of bonds and construction projects to accommodate development phases and property ownership transfers.

(8) To conduct all activities necessary to carry out the SWMP and other requirements included in this Ordinance, and to pursue the necessary means and resources required to properly fulfill this responsibility.

(9) To require appropriate post construction best management practices and appropriate continued maintenance of those best management practices.

(10) To require maintenance bonds as necessary to ensure the long-term maintenance of stormwater management best management practices.

(11) To determine appropriate fees, to impose penalties, and to take necessary and appropriate actions to enforce this Ordinance.

(12) To require encroachment permits as necessary.

**Section 3.2 Prohibitions and Exemptions**

No person shall (1) develop any land; (2) engage in any industry or enterprise; (3) construct, operate or maintain any landfill, hazardous waste treatment, disposal or recovery facility, or any other industrial or related facility; (4) dispose of any hazardous material or toxic substance or other pollutant; or (5) otherwise allow the transport of sediment and other pollutants associated with stormwater runoff beyond their property boundaries without having provided for compliance with this Ordinance.

In cases where an imminent threat to the health or safety of the general public or the environment is suspected, the County Engineer or his designee shall perform an assessment to determine if immediate action is necessary. Such assessment may be made with or without the consent of the owner or operator. If such consent is refused, the County Engineer or his designee may utilize the enforcement measures authorized in this Ordinance to remove such threat. In such cases, the owner or operator, as the case may be, shall reimburse the County for its direct and related expenses. If the owner or operator, as the case may be, fails to reimburse the County, the County is authorized to file a lien for said costs against the property, file an action in magistrate or civil court for recovery of incurred expenses, and enforce such actions in magistrate or civil court.

The following development activities are exempt from the provisions of this Ordinance.

(a) Land disturbing activities undertaken on forestland for the production and harvesting of timber and timber products and conducted in accordance with best management practices and minimum erosion protection measures established by the South Carolina Forestry Commission pursuant to Section 48-18-70 of the 1976 Code of Laws of South Carolina, as amended.

(b) Land disturbing activities on agricultural land for production of plants and animals, including but not limited to: forages and sod crops, grains and feed crops, tobacco, cotton, and peanuts; dairy animals and dairy products; poultry and poultry products; livestock, including beef cattle, sheep, swine, horses, ponies, mules, or goats, including the breeding and grazing of these animals; bees, fur animals, and aquaculture. The construction of an agricultural structure that requires the disturbance of one or more acres, such as, but not limited to, broiler houses, machine sheds, repair shops, coops, barns, and other major buildings shall require the submittal and approval of necessary application materials as outlined in the Design Manual prior to the start of the land disturbing activity.

(c) Linear utility installation activities that are covered under their own DHEC approved utility general permit requiring associated assurance of proper stormwater management.

(d) Activities undertaken by persons who are otherwise regulated by the provisions of Chapter 20 Title 48, the South Carolina Mining Act.

(e) Discharges of dredged or fill material into waters of the United States which are regulated under section 404 of the Clean Water Act (CWA).

**Section 3.3 Design and Engineering Standards**

Design and engineering standards must define the desired level of quality and performance for stormwater management systems on all applicable construction activities in order to meet the purpose

of this Ordinance. The standards establish the minimum technical requirements needed to express compliance through calculations, maps and drawings, or others as necessary.

The County Engineer is authorized to develop and adopt policies, criteria, specifications, and standards for the proper implementation of the requirements of this Ordinance, Federal and State laws, and the SWMP, and to provide a sound technical basis for the achievement of stormwater management, including water quality and quantity objectives. These standards may be presented in the Stormwater Design Standards Manual.

It shall be the responsibility of the property owner, operator, or person responsible for land disturbing activities to provide adequate controls to meet the design and engineering standards.

**Section 3.4 Application Approval Process**

The entire application process and requirements as described in the Design Manual must be adhered to for all applicable construction activities.

It shall be the responsibility of the applicant (property owner, operator, or person responsible for construction activities) to provide a complete application package that meets the requirements of this Ordinance, the SWMP, and other State and Federal regulations.

**Section 3.5 Stormwater Design Standards Manual**

The County Engineer is authorized to develop and adopt a Stormwater Design Standards Manual. The Design Manual may include design standards, procedures and criteria for conducting hydrologic, hydraulic, pollutant load evaluations, and downstream impact for all components of the stormwater management system. Although the intention of the manual is to establish uniform design practices, it neither replaces the need for engineering judgment nor precludes the use of information not presented. Other accepted engineering procedures may be used to conduct hydrologic, hydraulic and pollutant load studies if approved by the County Engineer.

The Design Manual, shall contain at a minimum the following components:

(a) Required application and approval procedures for all applicable construction activities;

(b) Construction completion and closeout processes;

(c) Hydrologic, hydraulic, and water quality design criteria (i.e., design standards) for the purposes of controlling the runoff rate, volume, and pollutant load. Suggested reference material shall be included for guidance in computations needed to meet the design standards;

(d) Information and requirements for new and re-development projects in special protection areas necessary to address TMDLs, known problem areas and other areas necessary to protect, maintain, and enhance water quality and the environment of Berkeley County and the public health, safety, and general welfare of the citizens of Berkeley County.

(e) Construction document requirements;

(f) Minimum easement requirements;

(g) Required and recommended inspection schedules and activities for all components of the stormwater management system, including construction-related BMPs.

The Design Manual shall be updated periodically to reflect the advances in technology and experience gathered with time.

**Section 3.6 Ownership and Berkeley County Participation**

(a) Property owners are responsible for maintaining stormwater quantity and quality facilities and all conveyance structures located on their property. Prior to the issuance of any approval of construction plans or applications required by the Design Manual, the property owner shall execute a legal document entitled "Covenants for Permanent Maintenance of Stormwater Systems". The property owner shall record the Covenants in the Office of the Berkeley County Register of Deeds. The location of the facility, the recorded location of the Covenants document, and a statement of the property owner's responsibility for maintenance shall be included and also shown on a plat. In the case of an operator other than the property owner, a copy of a maintenance agreement between the operator and the property owner shall be included with the Covenants, defining the operators' duties and responsibilities and that the property owner shall be responsible for maintenance activities upon the termination of the agreement.

(b) The property owner shall grant to Berkeley County a perpetual, non-exclusive, transferable easement, beginning or ending at a public street or other access point that allows for public inspection and emergency repair of all components of the drainage system, including all conveyances and all water quantity and quality control facilities. At the request of the County Engineer or his designee, the property owner shall grant to Berkeley County right-of-ways.

(c) Stormwater quantity and quality control facilities shall be located so that required easements can be effectively used and ownership and maintenance responsibility can be clearly defined in deeds and plats.

(d) Berkeley County shall be responsible for maintenance activities for stormwater collection/conveyance systems associated with County accepted public roads and County projects.

(e) For projects that are not County accepted public road projects, Berkeley County may in its sole discretion either accept or decline ownership and maintenance of all or part of a stormwater system.

(f) The minimum maintenance requirements will be performed at necessary intervals by the property owner or operator during construction and for as long as a stormwater management system or component is in use. Failure to perform such activities will constitute a violation of this Ordinance.

(g) If a facility or any portion of the stormwater system is not being maintained as required, the County Engineer or his designee will notify the property owner or operator in writing. If the property owner or operator fails to repair or maintain the facility within the allotted time, the County Engineer may authorize the work to be performed by the County or others. In such cases, the property owner or operator shall reimburse the County for its direct and related expenses. If the property owner or operator fails to reimburse the County, the County is

authorized to file a lien for said costs against the property, file an action in magistrate or civil court for recovery of incurred expenses, and enforce such actions in magistrate or civil court.

(h) A property owner or operator may hire or contract others to perform necessary maintenance actions, but Berkeley County will hold the person named in the Covenants as the responsible party should legal actions described in (g) be necessary.

(i) When the County Engineer or his designee determines that additional storage capacity or pollution reduction beyond that required by the applicant for on-site stormwater management is necessary in order to enhance or provide for the public health, safety and general welfare, to correct unacceptable or undesirable existing conditions or to provide protection in a more desirable fashion for future development, Berkeley County may:

(1) require that the applicant grant any necessary easements over, through or under the applicant's property to provide access to or drainage for such a facility;

(2) require that the applicant obtain from the owners of property over, through or under where the stormwater management facility is to be located, any easements necessary for the construction and maintenance of same;

**Section 3.7 Maintenance, Construction, Inspection, and Closeout**

Maintenance of the stormwater management system is critical for the achievement of its purpose of controlling stormwater runoff quantity and quality and the short-term and long-term public health, safety, and general welfare of the citizens of Berkeley County.

(a) A maintenance plan for the stormwater management system shall be included as part of the submittal required by the Design Manual to perform a construction activity, and must address activities to be conducted during and after construction. As part of the maintenance plan, the property owner or operator of such facility shall specifically agree, through recordation of Covenants, to be responsible for keeping the system and facilities in working order. The County Engineer shall develop procedures to provide reasonable assurance that maintenance activities are performed for both Berkeley County and privately maintained systems. The County Engineer shall also define procedures for transferring maintenance responsibilities to another entity.

(b) The County Engineer shall define procedures for conducting site inspections during construction and after construction until a stormwater management system or facility is no longer in use. Such inspections may be performed by County staff or an approved inspector. Berkeley County has the authority to levy fees for inspections and re-inspections as described in the Stormwater Design Standards Manual.

(c) As required in the Design Manual, the applicant shall submit his own maintenance and inspection schedules to be implemented during construction and for as long as a stormwater management system or facility is in use. Required and recommended schedules for BMP maintenance and inspection are to be provided in the Design Manual.

(d) If the construction is to be phased, no stage work, related to the construction of stormwater management facilities shall commence until the preceding stage of work is completed in accordance with any approved construction plans or applications required by the Design

Manual. The procedure for construction phases beginning and ending and what constitutes such conditions shall be developed.

(e) The applicant shall notify the County Engineer or his designee before commencing any work and upon completion of any phase or designated component of the site. Notification schedules shall be provided for in the Design Manual. All self-inspections, maintenance actions, BMP replacements, and changes to the approved application shall be documented and presented upon request to the County Engineer or his designee.

(f) The construction project completion and closeout process must be completed prior to any of the following actions, as applicable:

(1) The use or occupancy of any newly constructed components of the site.

(2) Final acceptance of any road into the official Berkeley County road inventory or designation of road owner and associated stormwater management system.

(3) Release of any bond held by Berkeley County.

(4) Approval and/or acceptance for recording of maps, plats, or drawings, the intent of which is to cause a division of a single parcel of land into two or more parcels, and/or acceptable bonding is provided.

**Section 3.8 Watercourse Protection**

Every person owning or operating property through which a watercourse passes shall keep and maintain that part of the watercourse within the property free of trash, debris, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or operator shall maintain existing privately owned structures within or adjacent to a watercourse so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

To assist in the compliance with State and Federal laws and regulations, the County Engineer may develop special protection areas which require additional control of stormwater quality and quantity than provided by minimum design standards. Such areas may consist of watersheds corresponding to established TMDLs, known flooding problems and pollution impairments, or other areas necessary to protect, maintain, and enhance water quality and the environment of Berkeley County and the public health, safety, and general welfare of the citizens of Berkeley County. These areas can be expected to change with time as development continues and as federal and state law demands.

New stormwater systems created as the result of any new and re-development project shall be connected to the existing drainage system in a manner so as not to degrade the integrity of the existing system, whether natural or manmade, and shall have demonstrated this prior to project closeout. Discharge points shall be confined to connections with an existing natural or man-made drainage system. When there is a direct stormwater discharge into collection systems not owned and maintained by Berkeley County, the owners of these systems shall maintain the right to disapprove new connections to their system.

**Section 3.9 Notification of Spills**

Notwithstanding other requirements of law, as soon as any person responsible for a facility or the facility's operation and maintenance, or responsible for emergency response for a facility or operation has 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 waters of the State, said person shall take all necessary steps to discover, contain, and cleanup any such releases. The 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 necessary agencies of the occurrence. This shall include E911, Berkeley County Emergency Preparedness, and the County Engineer. Such notifications of hazardous spills shall be confirmed by written notice addressed and mailed to the County Engineer within five (5) business days of the spill event. In the event of a release of non-hazardous materials, said person shall record an on-site written record of the spill. The owner or operator of such facility shall retain an onsite written record of any and all spills that will include information on cleanup measures taken and the actions to prevent its recurrence. Such records shall be retained for at least five (5) years. Failure to provide notification of a release as provided above is a violation of this ordinance.

**Section 3.10 Cleanup Procedures**

Berkeley County may develop spill procedures on how spills are cleaned up, and who is responsible for the cleanup in terms of the activities to be performed and cost of such actions.

**Section 3.11 Reserved**

## DIVISION 4
## DETECTION AND ELIMINATION OF ILLICIT CONNECTIONS AND ILLICIT DISCHARGES AND IMPROPER DISPOSAL

**Section 4.1 Illicit Connections, Illicit Discharges, and Improper Disposal**

(a) 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 Berkeley County stormwater management system or waters of the State.

(b) It is unlawful for any person to continue the operation of any such illicit connection regardless of whether the connection was permissible when constructed. Improper connections in violation of this ordinance must be disconnected and redirected, if necessary, to the satisfaction of the County Engineer or his designee and any other federal, state, or local agencies or departments regulating the discharge.

(c) It is unlawful for any person to throw, drain, or otherwise discharge to a Berkeley County stormwater management system or facility or to waters of the State or to cause, permit, or allow a discharge that is composed of anything except stormwater or unpolluted water which is approved by the County Engineer.

(d) The County Engineer shall develop procedures for detecting, tracking, and eliminating illicit discharges and improper disposals to the stormwater system.

(e) The County Engineer or his designee may require controls for or exempt the following discharges from the prohibition provision in (a), (b), and (c) above, provided that a reasonable determination is made that they are not a significant source of pollution:

(1) Unpolluted industrial cooling water, but only under the authorization and direction of the County Engineer or his designee and if an appropriate Industrial NPDES permit is in place.

(2) Water line flushing, diverted stream flows, rising ground waters, and uncontaminated pumped ground waters, and uncontaminated ground water infiltration.

(3) Discharges from potable water sources, foundation drains, air conditioning condensation, landscape irrigation, springs, water from crawl space pumps, footing drains, lawn watering, individual car washing, dechlorinated swimming pool discharges, flows from riparian habitats and wetlands, and street wash water.

(4) Discharges or flows from fire fighting.

(f) The County Engineer may develop procedures for allowing other non-stormwater discharges.

**Section 4.2 Detection of Illicit Connections, Illicit Discharges, and Improper Disposal**

(a) The County Engineer shall take appropriate steps to detect and eliminate illicit connections and illicit discharges to Berkeley County stormwater management systems and facilities, including the adoption of a program to screen illicit discharges and identify their source or sources, perform inspections, and levy fines if not removed.

(b) County staff shall take appropriate steps to detect and eliminate improper disposal. These steps may include programs to screen for disposal, programs to provide for public education and public information, inspection, levying fines, and other appropriate activities to facilitate the proper management and elimination of improper disposal.

**Section 4.3 Waste Disposal Prohibitions**

No person shall throw, deposit, leave, maintain, keep, or permit to be thrown, deposited, left, or maintained, in or upon any public or private property, driveway, parking area, street, alley, sidewalk, component of the storm drain system, or waters of the State, any refuse, rubbish, garbage, litter, pet fecal matter, or other discarded or abandoned objects, articles, and accumulations, so that the same may cause or contribute to pollution. Yard debris, including natural foliage, may be deposited in the public right of way but not in or on any stormwater conveyance structures, including inlets and gutters, but only if a collection service is available. Wastes in proper waste receptacles may be placed in the street for collection, but again only if collection by or through Berkeley County is in place. No waste or yard debris shall be placed in the street without such a collection service.

**Section 4.4 Reserved**

## DIVISION 5
## MONITORING AND INSPECTIONS

**Section 5.1 Monitoring**

The County staff may monitor the quantity and concentration of pollutants in stormwater discharges from the areas and/or locations designated in Berkeley County's SWMP.

**Section 5.2 Inspections**

(a) The County Engineer or his designee, bearing proper credentials and identification, may enter and inspect all properties for regular inspections, periodic investigations, monitoring, observation measurement, enforcement, sampling and testing, to effectuate the provisions of this ordinance and the SWMP programs. Such inspections may be made at active construction sites or at any stormwater management system or facility in perpetuity. The County Engineer or his designee shall duly notify the owner of said property or the representative on site and the inspection shall be conducted at reasonable times.

(b) Upon refusal by any property owner to permit an inspector to enter or continue an inspection, the inspector shall terminate the inspection or confine the inspection to the areas where no objection is raised. The County Engineer or his designee shall document the refusal and the grounds for such and promptly seek appropriate compulsory process.

(c) In the event that the County Engineer or his designee reasonably believes that discharges from the property into a Berkeley County stormwater management system or facility may cause an imminent and substantial threat to human health or the environment, the inspection may take place at any time and without notice to the owner of the property or a representative on site. The inspector shall present proper credentials upon reasonable request by the owner or representative.

(d) Inspection reports shall be maintained in a file located in the Engineering Department's office.

(e) At any time during an inspection or at such other times as the County Engineer or his designee may request information from an owner or representative, the owner or representative may identify areas of his facility or establishment, material, or processes that contain or might reveal a trade secret. If the County Engineer or his designee has no clear and convincing reason to question such identification, all material, processes and information obtained within such areas shall be conspicuously labeled "CONFIDENTIAL – TRADE SECRET." The trade secret designation shall be freely granted to any material claimed to be such by the owner or representative unless there is clear and convincing evidence for denying such designation. In the event the County Engineer or his designee does not agree with the trade secret designation, the material shall be temporarily designated a trade secret and the owner or representative may request an appeal of the Engineering Department's decision in the manner in which all such appeals are handled in this ordinance.

**Section 5.3 Reserved**

## DIVISION 6
## ENFORCEMENT, PENALTIES, AND ABATEMENT

**Section 6.1 Enforcement**

(a) The County Engineer or his designee may initiate an enforcement action when violations of this Ordinance occur, including:

(1) When the County Engineer or his designee finds that work done for new development and re-development fails to conform to any approved applications or plans as required by the Design Manual, or finds that the approved work has not been done;
(2) When the County Engineer or his designee determines that an owner or operator has failed to maintain a stormwater management facility;

(3) When the County Engineer or his designee determines that an owner of any property is causing or partially causing flooding, erosion, or non-compliance with water quality standards or this Ordinance.

(b) The County Engineer or his designee shall direct conformity to approvals and this Ordinance by written Notice of Violation (NOV). The NOV shall serve as a legal requirement to remove the violation(s). The written NOV shall be provided to the owner or the person responsible for land disturbing activities, illicit connections, illicit discharges, and improper disposals, stating the nature of the violation, the amount of time in which to correct deficiencies, the date on which an inspection will be made to make sure that corrective action has been performed, and the proposed penalty structure if corrective action is not taken by the inspection date. It shall be sufficient notification to deliver the notice to the person to whom it is addressed, or to deposit a copy of such in the United States Mail, properly stamped, certified and addressed to the address used for tax purposes or the address provided on submittals required by the Design Manual. The NOV may address the entire site or a specific portion of the site so as not to unduly impede the development of areas being managed for the control of stormwater runoff and associated pollutants.

(c) After the issuance of the NOV, the County Engineer or his designee is hereby given the authority to proceed with enforcement actions which may include:

(1) Issuing a written order to comply, to suspend work, or to revoke the approval issued;

(2) Seeking redress through legal action;

(3) Withholding the release of permanent electric power to the site or certificate of occupancy;

(4) Withholding or revoking other permits related to the site; and/or

(5) Levying fines.

(d) The County Attorney is hereby directed to take all legal actions necessary to correct situations described in (a), (b) and (c), including actions that are necessary to remove from the property such objectionable conditions constituting non-compliance with this Ordinance.

(e) Nothing contained in this Ordinance shall impair the right or ability of the County Attorney to exercise any and all other remedies available, of-law or in equity, including without limitation, the pursuit of injunctive relief, under emergency circumstances where there exists the danger of bodily injury or death.

(f) The authorized enforcement agency or its appointed agent may obtain injunctive relief to enjoin violations of the provisions of this Ordinance, and any person damaged as a result of

such violations may, upon a proper showing of such damages, obtain payment therefore by a civil action.

(g) This Ordinance may be enforced by any other remedy of law or equity that the County Attorney is authorized to pursue, to include the authorities and powers conferred to local governments by the General Assembly of South Carolina. The penalties and other remedies provided in this Ordinance are cumulative and not exclusive, and may be independently and separately pursued against the same person for the activity constituting a violation of this Ordinance. The enforcement of any remedy provided herein shall not prevent the enforcement of any other remedy or remedies in other provisions of this Code or other laws and regulations.

**Section 6.2 Fines**

Any person violating any provision of this ordinance shall be subject to a fine of not more than one thousand dollars ($1,000) for each violation. Each separate day of violation constitutes a new and separate violation. Notice of civil penalty shall be provided via the issuance of a uniform summons.

**Section 6.3 Additional Legal Measures**

(a) Where Berkeley County is fined and/or placed under a compliance schedule by the State or federal government for a violation(s) of its NPDES permit, and Berkeley County can identify the person(s) who caused such violation(s) to occur, Berkeley County may pass through the penalty and cost of compliance to that person(s).

(b) The County Attorney may institute injunctive, mandamus or other appropriate action or proceedings at law or equity, including criminal conviction, for the enforcement of this Ordinance or to correct violations of this Ordinance, and any court of competent jurisdiction shall have the right to issue restraining orders, temporary or permanent injunctions, mandamus or other appropriate forms of remedy or relief.

**Section 6.4 Criminal Penalties**

In addition to any applicable civil penalties, any person who willfully, with wanton disregard, or intentionally violates any provision of this Ordinance shall be guilty of a misdemeanor and upon conviction shall pay a fine of not more than $500.00 or imprisoned for not more than thirty (30) days. Each day of violation shall constitute a new and separate offense.

**Section 6.5 Corrective Action**

In the event a violation of this Ordinance has not been corrected within the applicable time period for correction, Berkeley County, or its contractor, may enter upon the lot or parcel of land and correct the violation, and the costs incurred as a result of such action (including inspection, administration, labor and equipment costs) shall be collected from the bond, if in place and sufficient to cover such costs, or shall become a lien upon the property and shall be collected in the same manner as Berkeley County taxes are collected.

**Section 6.6 Stop Work Order**

The County Engineer, his designee, or other authorized personnel may issue a stop work order if it is found that a construction activity is being conducted in violation of this Ordinance.

The stop work order may allow or require correction of Notice of Violation (NOV) issues, but shall otherwise stop all other construction related activities. A stop work order may carry with it civil penalties as well. Any person in violation of a stop work order is subject to payment of all fees, bonds, and penalties prior to the lifting of the stop work order.

**Section 6.7 Approval Suspension and Revocation**

Any approved plans or applications required by the Design Manual may be suspended or revoked if one or more of the following violations have been committed:

(a) Violations of the conditions in any approved plans or applications required by the Design Manual;

(b) Construction is not in accordance with the approved plans;

(c) Non-compliance with correction notice(s) or stop work order(s);

(d) The existence of an immediate danger to a downstream area (in the judgment of the County Engineer or his designee);

(e) Other violations of this Ordinance.

**Section 6.8 Reserved**

## DIVISION 7
## VARIANCES

**Section 7.1 Variance Criteria**

The County Engineer may grant a variance only upon a determination that:

(a) The variance will not be detrimental to the public health, safety, and general welfare of the County, and

(b) The variance will not adversely affect the reasonable development of adjacent property, and

(c) The variance is justified because of topography or other special conditions unique to the property involved, and the variance is not requested due to mere inconvenience or financial disadvantage, and

(d) The variance is consistent with the objectives of this Ordinance and will not have the effect of nullifying the intent or purpose of this Ordinance, or any other pertinent County or State regulations.

A written request for a variance shall be required and shall state the specific variance sought and the reasons, with supporting data, a variance should be granted. The request shall include all information necessary to evaluate the proposed variance.

**Section 7.2 Reserved**

## DIVISION 8
## APPEALS

### Section 8.1 Appeals Process

Any person aggrieved by a decision, Notice of Violation, or denial of a variance by the County Engineer or his designee may appeal the same by filing a written notice of appeal with the Berkeley County Council within fifteen (15) days of the issuance of said decision, Notice of Violation, or denial of a variance. The Berkeley County Council will review the appeal and will either reverse or preserve the previous decision. In either case, a notice of appeal from the Berkeley County Council will state the reason for their appeal decision.

The Berkeley County Council shall hear such appeals in a quasi-judicial capacity within forty-five (45) days, at the next regularly scheduled meeting or such other time as may be mutually agreed upon and will render a decision within ten (10) working days after the appeal has been heard.

If Berkeley County Council fails or neglects to repeal the said decision, Notice of Violation, or denial of a variance within sixty (60) days of the appeal request, the appeal of the said decision, Notice of Violation, or denial of a variance is automatically granted.

Any person aggrieved by the decision of the Berkeley County Council may appeal the decision to the Berkeley County Circuit Court in accordance with its rules and procedures.

### Section 8.2 Reserved

## DIVISION 9
## CHARGES AND FEES

### Section 9.1 Stormwater Management Utility Fee

Berkeley County has implemented a Stormwater Management Utility and established Stormwater Management Utility Fees and Classifications to help fund implementation of this Stormwater Management Ordinance and its associated programs.

### Section 9.2 Stormwater Plan Review Fee

Costs associated with stormwater plan review of land development construction documents other than those routinely performed by the County staff will be assessed a fee to compensate for the cost in labor, equipment, and materials expended in the conduct of the review. Stormwater plan review fees have been established by Resolution and revision of such fees shall be approved by Berkeley County Council.

### Section 9.3 Stormwater Inspection Fee

Costs associated with stormwater inspection and re-inspections for land development or construction activities other than those routinely performed by the County Staff as part of compliance monitoring will be assessed a fee to compensate for the cost in labor, equipment, and materials expended in the conduct of the inspection. In addition, post-construction maintenance inspection fees may be assessed by the County Engineer. Stormwater inspection and re-inspection fees have been established by Resolution and revision of such fees shall be approved by Berkeley County Council.

**Section 9.4 Connection to Conveyances**

The County shall have the right to establish a schedule of appropriate fees for any person or property owner establishing a new discharge to Berkeley County stormwater management systems or facilities. Application fees shall be established on the basis of facility classes relating to the quantity and quality of approved discharge. Establishment and revision of such fees shall be established by Resolution and revision of such fees shall be approved by Berkeley County Council

**Section 9.5 Reserved**

14-11-36

**THE WITHIN ORDINANCE SHALL BECOME EFFECTIVE IMMEDIATELY UPON ITS ADOPTION BY BERKELEY COUNTY COUNCIL.**

**ADOPTED** this **24th** day of **November 2014**.

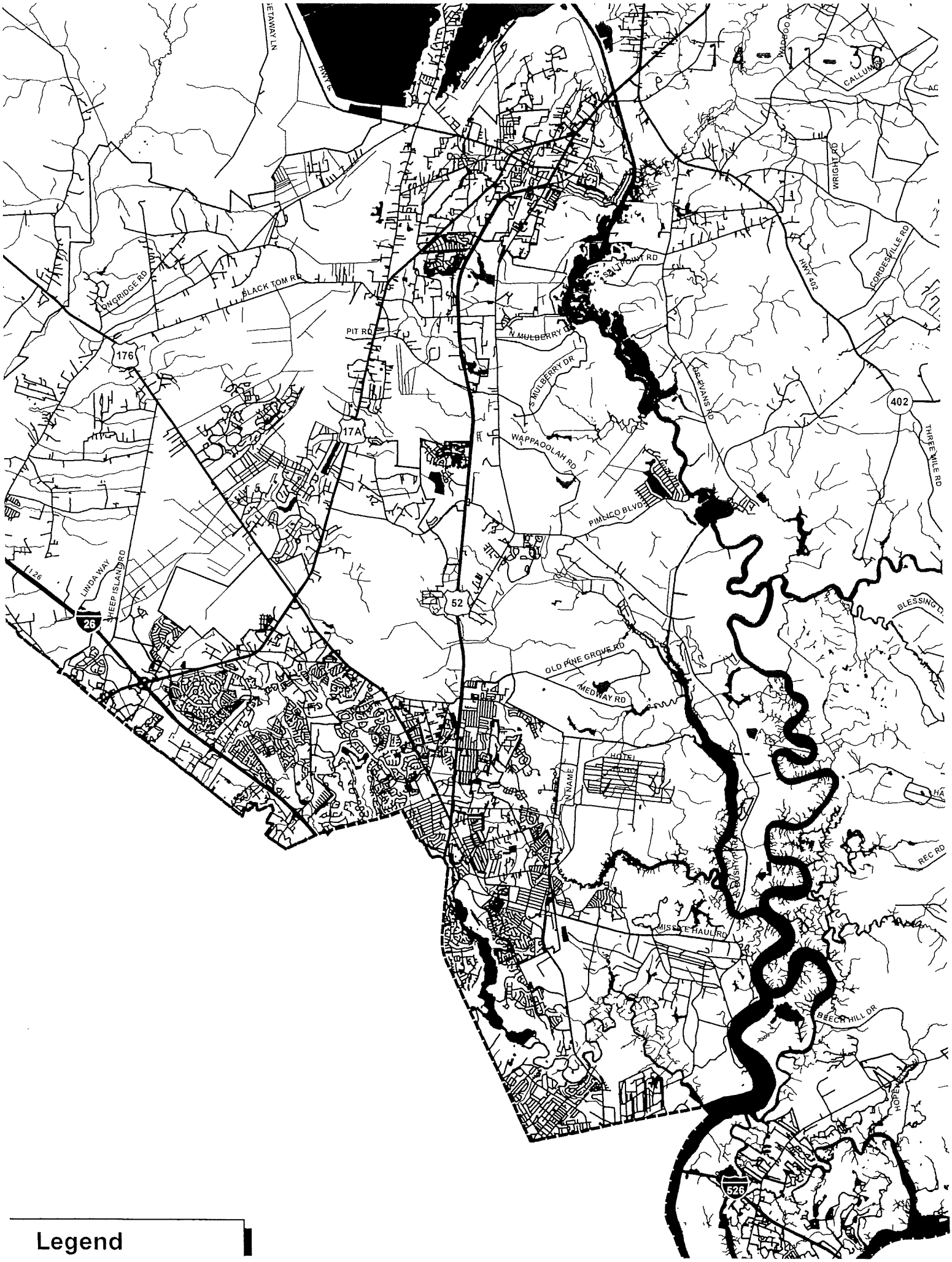
**BERKELEY COUNTY, SOUTH CAROLINA**

DANIEL W. DAVIS, CHAIRMAN
Berkeley County Council

Attest:

Catherine R. Windham
Clerk of County Council

| | |
|---|---|
| First Reading: | September 22, 2014 |
| Second Reading: | October 27, 2014 |
| Public Hearing: | November 24, 2014 |
| Third Reading: | November 24, 2014 |


4-11-36
CALLUM
WRIGHT RD
CORDESVILLE RD
HWY 402
SALTPOINT RD
BLACK TOM RD
PIT RD
N MULBERRY RD
S MULBERRY DR
DR EVANS RD
WAPPAOOLAH RD
PIMLICO BLVD
THREE MILE RD
176
17A
402
52
26
LINDA WAY
SHEEP ISLAND RD
OLD PINE GROVE RD
MEDWAY RD
REC RD
MISSILE HAUL RD
BEECH HILL DR
526
Legend

14-11-36

**MEMBERS OF COUNTY COUNCIL**

PHILLIP FARLEY Voting YES

DENNIS L. FISH Voting YES

TIMOTHY J. CALLANAN Voting YES

JACK H. SCHURLKNIGHT Voting YES

KENNETH E. GUNN, JR. Voting YES

CALDWELL PINCKNEY, JR. Voting

CATHY S. DAVIS Voting

STEVE C. DAVIS Voting YES

Certified True and Correct Copy of Original Record

Kelly J. Lovette, MMC
City Clerk, City of Goose Creek, South Carolina

**ORDINANCE NO: 18-024**

**AN ORDINANCE**

**AN ORDINANCE TO AUTHORIZE BERKELEY COUNTY TO ENFORCE THEIR STORMWATER MANAGEMENT PROGRAM WITHIN THE MUNICIPAL LIMITS AND TO REPEAL AND RESCIND ANY PROVISIONS WITHIN CHAPTER 50 OF ORDINANCE NUMBER 07-017, ESTABLISHED ON 11-13-2007 FOR THE CREATION OF A STORMWATER MANAGEMENT PROGRAM ORDINANCE, WHICH ARE IN CONFLICT WITH ANY PROVISIONS OF THE BERKELEY COUNTY STORMWATER MANAGEMENT ORDINANCE 14-11-36, AND ALL SUBSEQUENT REVISIONS OR AMENDMENTS OF ORDINANCE 14-11-36**

**WHEREAS,** on October 15, 2015, the City of Goose Creek entered into an Intergovernmental Agreement with Berkeley County authorizing the County to charge a stormwater fee to residents within the city limits in exchange for managing stormwater drainage within the city limits; and

**WHEREAS,** the County reviews construction plans, inspects construction sites, maintains stormwater ditches and performs stormwater capital improvements projects within the city limits pursuant to the terms of the Agreement; and

**WHEREAS,** in order to maintain uniformity across jurisdictional lines to make consistent enforcement possible, the City wishes for its stormwater ordinance to mirror the County's stormwater ordinance; and

**WHEREAS,** the City hereby repeals and rescinds provisions within the City of Goose Creeks' Code of Ordinances Chapter 50 of Ordinance sections 50.011 to 50.999, with the exception of 50.127 authorizing the City of Goose Creek to develop and authorize additional stormwater fees.

The City hereby adopts as new section 50.09 of its Code of Ordinances:

***Incorporation and Adoption of Berkeley County Stormwater Management Ordinance***

***The City of Goose Creek hereby adopts and incorporates by reference the Berkeley County Stormwater Management Ordinance 14-11-36 and shall automatically incorporate any revisions to the Berkeley County Stormwater Management Ordinance enacted thereafter.***

All ordinances in conflict with this ordinance are hereby repealed.

This ordinance shall be effective on the date of final reading.

INTRODUCED the 11th day of September 2018.

DONE the 9th day of October 2018.

Mayor Gregory S. Habib

Attest:
Kelly J. Lovette, MMC, City Clerk

Mayor Pro Tem Kevin M. Condon

Councilmember Debra Green-Fletcher

Councilmember Brandon L. Cox

Councilmember Corey McClary

Councilmember Jerry Tekac

Councilmember Gayla S.L. McSwain

# ORDINANCE NO. 5-2018

## AN ORDINANCE AMENDING THE CITY OF HANAHAN'S STORMWATER MANAGEMENT ORDINANCE

**WHEREAS,** the City of Hanahan had entered into an Inter-Governmental Agreement with Berkeley County; and,

**WHEREAS,** the City of Hanahan has agreed to allow Berkeley County to enforce their Stormwater Management Program within the municipal limits; and

**NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF HANAHAN, SOUTH CAROLINA:**

**Amend the Hanahan Stormwater Management Ordinance with the addition of the following text.**

**Title Amendment**

"An Ordinance to authorize Berkeley County to enforce their Stormwater Management Program within the municipal limits and to repeal and rescind any provisions within Ordinance Number 9-2014, established on 12-09-2014 for the creation of a Stormwater Management Program Ordinance, which are in conflict with any provisions of the Berkeley County Stormwater Management Ordinance 14-11-36, and all subsequent revisions or amendments of Ordinance 14-11-36, this 11th day of September, 2018 until the Inter-Governmental Agreement – NPDES Stormwater Discharge Permit Compliance and Other Stormwater Related Services, signed into agreement on the 9th day of October, 2015, is properly terminated by either party."

Adopted and approved this the 11TH day of September, 2018.

Minnie Newman, Mayor

ATTEST:

Kim Peters, Clerk of Council

Introduced by: Johnny Cribb

First Reading and Public Hearing: August 14, 2018

Second Reading: September 11, 2018

# Appendix E: Standard Operating Procedures for Use In Field Investigation for Illicit Discharges

***FINAL***

# Berkeley County Stormwater

## Illicit Discharge Detection and Elimination Standard Operating Procedures Manual

## Berkeley County, South Carolina

***27 October, 2021 (Revised)***

*Prepared by (2 February, 2018):*

AECOM

*Project #60552634*

# Record of Revisions

| DESCRIPTION OF REVISION | DATE | PREPARED BY |
|---|---|---|
| Original Manual | June 2010 | Woolpert, Inc. |
| Revised Manual | February 2018 | AECOM |
| Revised Manual | October 2021 | Berkeley County Stormwater Management |
| | | |
| | | |
| | | |
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# Statement of Limitations

***This report and the intellectual property herein has been prepared for the sole utilization of Berkeley County. Any unauthorized use, modification or copying, whole or in part, without the written consent of Berkeley County and AECOM may be considered copyright infringement.***

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# Section 1 Project Overview

## 1.1 Introduction and Purpose of SOP

An understanding of the nature of illicit discharges in urban watersheds is essential to find, eliminate, and prevent them. This document is provided as an update to the February 2018 revision of the Illicit Discharge Detection and Elimination (IDDE) Standard Operating Procedures (SOP) Manual for Berkeley County (County). The manual herein has been revised to adhere to current requirements, at the time of publication, for National Pollutant Discharge Elimination System (NPDES) Phase II Municipal Separate Storm Sewer Systems (MS4) communities. The State of South Carolina NPDES General Permit for Stormwater Discharges from Regulated Small Municipal Separate Storm Sewer Systems (MS4 Permit) requires the County to develop and implement an IDDE program that contains a set of standard investigative procedures to identify the source of illicit connections or discharges and enforce their removal. Although the permit does not specifically dictate these procedures, the IDDE program must, to the maximum extent practical (MEP), increase knowledge of the County's stormwater collection system and pollutants of concern.

The remaining portion of this section provides the specific requirements from the NPDES Phase II permit and definitions. These requirements are addressed as part of this manual and the associated County Stormwater Management Plan (SWMP). **Section 2** provides a summary of the County's IDDE program processes and procedures. **Section 3** provides an overview of dry weather field screening procedures, data collection and data management as outlined in the ***Berkeley County Stormwater GIS/GPS Procedures Manual (GIS/GPS Manual)***, February 2018 edition. **Section 4** describes the field procedures for illicit discharge detection, tracing, and elimination. Appendices are included which provide supplemental and detailed information for sampling procedures, GIS applications, reporting forms, and technical references.

## 1.2 Permit Requirements

The procedures outlined within this manual are specifically designed and implemented to assist the County with outfall inventorying and screening to ensure compliance with the regulations outlined below within the MS4 limits of the unincorporated area of Berkeley County. Additionally, in October 2015, Berkeley County entered into an intergovernmental agreement (IGA) with the incorporated municipalities of Hanahan and Goose Creek. As part of this agreement, Berkeley County is responsible for developing and implementing the stormwater program for these municipalities. This includes the implementation of the IDDE program. With this IGA in place, all regulatory references in this document referring to "Berkeley County" or the "County" include Hanahan and Goose Creek, by reference, through the stipulations of the IGA.

In accordance with the MS4 Permit (Permit No. SCR030000) the County must develop an IDDE program that complies with the following requirements:

- The County shall develop, implement and enforce a program to detect and eliminate illicit discharges into the MS4. The IDDE program must include the following:

    - Develop a storm sewer system map showing the location of all outfalls, and names and location of all waters of the United States that receive discharges from those outfalls.

    - Identify priority areas (i.e. problem areas) for more detailed screening of the system based on higher likelihood of illicit connections (e.g. areas with older sanitary sewer lines), and/or conduct ambient sampling to locate impacted reaches. This priority area list must be updated annually to reflect changing priorities.

    - The County must implement written dry weather field screening and analytical monitoring procedures to detect and eliminate illicit discharges to the MS4. Dry weather field screening may consist, but is not limited to, (1) visual observations; (2) field screening monitoring; and may include (3) analytical laboratory monitoring at selected points to the extent necessary to identify and eliminate an illicit discharge.

    - The County must conduct dry weather field screening, and/or analytical monitoring, when necessary, to identify the source of illicit discharges. At a minimum, they must:

        - Identify all field screening points within the priority areas identified above where field screening and analytical monitoring, if warranted, will take place. In addition, identify screening points that occur outside of the priority areas, points, outfalls, or major outfalls for field screening.

        - Identify the areas and the schedule for conducting the screening, the proposed location of outfalls or field screening points which may reflect water quality concerns, and to protect water quality to the MEP.

        - Provide a description of which screening methods will be used and a description as to why it is appropriate for each area.

        - Identify field screening equipment with their respective methodologies for use.

        - Conduct all dry weather visual observations and required field screening at each outfall. All dry weather screening activities should be conducted after 72-hours of continuous dry conditions consisting of less than 0.10-inch of rainfall.

        - Document elimination of the illicit discharge.

- If another operator/MS4 notifies the County of an illegal connection or illicit discharge to the MS4 system, the County is required to conduct follow-up investigation and corrective action as described below.

- The County is required to develop written procedures for conducting investigations into the source of all identified illicit discharges, including approaches to requiring such discharges to be eliminated.

- At a minimum, after becoming aware of an illicit discharge, the County is required to initiate an investigation(s) to identify and locate the source of any continuous or intermittent non-stormwater discharge within a timeframe that is consistent with the procedures found in the County's SWMP.

    - The County must report immediately the occurrence of any dry weather flows believed to be an immediate threat to human health or the environment to the South Carolina Department of Health and Environmental Control (SCDHEC) Emergency Response at 1-888-481-0125.

    - Illicit discharges suspected of being sanitary sewage and/or significantly contaminated must be considered a high priority and addressed in a timeframe consistent with the procedures found in the County's SWMP.

    - Investigations of illicit discharges suspected of being cooling water, wash water, or natural flows may be delayed until after all discharges suspected of having the potential for adverse impact to either human health or water quality have been investigated, eliminated, and/or resolved.

    - The County must track all investigations to document at a minimum (a) the date(s) the illicit discharge was observed, (b) the results of the investigation, (c) any follow-up of the investigation, and (d) the date the investigation was closed.

- The County is required to determine and document through their investigations the source of all documented illicit discharges. If the source of the suspected illicit discharge is found to be a suspected non-compliance with an NPDES permit, the appropriate SCDHEC regional office must be notified.

    - If an illicit discharge is found, but within six months of the beginning of the investigation neither the source nor the same non-stormwater discharge has been identified/observed, then County must maintain written documentation for review by the permitting authority.

    - If the observed discharge is deemed to be intermittent, the County must document that a minimum of three separate investigations were made to observe the discharge when it was flowing. The County should periodically recheck these suspected intermittent discharges for potential illicit discharge.

- Once the source of the illicit discharge has been determined, the County shall:
    - Notify the responsible party of the problem in a timeframe consistent with the procedures found in the County's SWMP.
    - Require the responsible party to conduct all necessary corrective actions to eliminate the non-stormwater discharge within 30 days. When, and if, elimination will take longer than 30 days, the County shall require responsible parties to submit a plan with a schedule for elimination.
    - The County shall conduct a follow-up investigation and field screening to verify that the discharge has been eliminated upon being notified that the discharge has been eliminated.
    - Document the follow-up investigation.
- The County must promote, publicize, and facilitate a reporting mechanism for the public and staff to report illicit discharges and establish and implement citizen request response procedures.
    - The County must develop a written spill/dumping response procedure for responding to public notices of illicit discharges, the various responsible agencies and their contacts, and who would be involved in illicit discharge incidence response.
    - The County must conduct reactive inspections in response to complaints and follow-up inspections as needed to ensure that corrective measures have been implemented by the responsible party to achieve and maintain compliance.
- The County must implement a training program for all appropriate municipal field staff that may come into contact with or otherwise observe an illicit discharge or illicit connection to the storm sewer system.

## 1.3 Important Terminology and Key Concepts

The following is a summary of key terms and concepts that are referenced and used throughout this manual with respect to dry weather screening, illicit discharge detection, sampling, reporting, and source tracing.

**Authorized Non-Stormwater Discharges –** Non-stormwater discharges (e.g. non-commercial or charity car washes, etc.) that discharge less than significant quantities of pollutants to the MS4, due to either the nature of the discharges or because there are conditions the County has established for allowing these discharges to their MS4 (e.g., a charity car wash with appropriate controls on frequency, proximity to sensitive water bodies, Best Management Practices (BMPs) on the wash water, etc.), are allowed. The County is authorized (in their MS4 Permit) to discharge the following non-stormwater sources provided that SCDHEC has not determined these sources to be substantial contributors of pollutants to the County's MS4:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground waters
- Uncontaminated ground water infiltration (as defined at 40 CFR § 35.2005(20))
- Uncontaminated pumped ground water
- Discharges from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water (not consisting of treated, or untreated waste water)
- Springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual residential car washing
- Natural flows from riparian habitats and wetlands
- Dechlorinated swimming pool discharges
- Street wash water
- Discharges or flows from firefighting activities

**Discharge Flow Types –** Dry weather discharges are composed of one or more possible flow types:

- *Sewage and septage* flows are produced from sewer pipes and septic systems.

- *Washwater* flows are generated from a wide variety of activities and operations. Examples include discharges of gray water (laundry) from homes, commercial carwash wastewater, fleet washing, commercial laundry wastewater, and floor washing to shop drains.

- *Liquid waste* refers to a wide variety of flows, such as oil, paint, and process water (radiator flushing water, plating bath wastewater, etc.) that enter the storm drain system.

- *Tap water* flows are derived from leaks and losses that occur during the distribution of drinking water in the water supply system. Tap water discharges in the storm drain system may be more prevalent in communities with high loss rates (i.e., greater than15%) in their potable water distribution system.

- *Landscape irrigation* flows occur when excess potable water used for residential or commercial irrigation ends up in the storm drain system.

- *Groundwater and spring water* flows occur when the local water table rises above the bottom elevation of the storm drain (known as the invert) and enters the storm drain either through cracks, joints, or where open channels or pipes associated with the MS4 intercept seeps and springs.

Water quality testing is used to identify flow types found in storm drains. Testing can distinguish illicit flow types (sewage/septage, washwater, and liquid wastes) from cleaner discharges (tap water, landscape irrigation, and ground water). Each flow type has a distinct chemical fingerprint. The chemical fingerprint for each flow type can differ regionally, so it is a good idea to develop your own "fingerprint" library by sampling each local flow type.

**Discharge Frequency –** The frequency of dry weather discharges in storm drains is important and can be classified as continuous, intermittent or transitory.

- **Continuous** discharges occur most or all of the time, are usually easier to detect, and typically produce the greatest pollutant load.
- **Intermittent** discharges occur over a shorter period of time (e.g., a few hours per day or a few days per year). Because they are infrequent, intermittent discharges are hard to detect, but can still represent a serious water quality problem depending on their flow type.
- **Transitory** discharges occur rarely, usually in response to a singular event such as an industrial spill, ruptured tank, sewer break, transport accident or illegal dumping episode. These discharges are extremely hard to detect with routine monitoring, but under the right conditions, can exert severe water quality problems on downstream receiving waters.

**Illicit Discharge –** "Illicit Discharge" or "Illegal Discharge" means any activity which results in a discharge to a County stormwater management system or facility or receiving waters that is not composed entirely of stormwater except (a) discharge pursuant to an NPDES permit (other than the NPDES MS4 Permit for the County) and (b) discharges resulting from the fire- fighting activities.

**Illicit Discharges Types** – The three major categories of illicit discharges most commonly found are as follows:

***Pathogenic and toxic discharges*** should be considered the most severe since contact or consumption of stormwater contaminated by these discharges could cause illness and significant water treatment problems for downstream users. These discharges may contain hazardous pollutants originating from:

- Sanitary, commercial, and industrial wastewater
- Inappropriate household toxicant disposal
- Automobile engine de-greasing
- Excessive use of chemicals (pesticides, herbicides and fertilizers)

***Nuisance Discharges*** may contain pollutants that have the potential to contribute to aquatic life-threatening conditions in the storm drainage system. These pollutants can cause excessive dissolved oxygen depletions, tastes, odors, colors in downstream water supplies, algal blooms, offensive floatables, and noticeably turbid water. These pollutants may originate in residential areas from:

- Sanitary wastewaters
- Laundry wastewaters
- Lawn irrigation runoff
- Automobile wash waters
- Construction site dewatering
- Washing of concrete trucks

***Clean water*** discharged through a storm drainage system is commonly found during an outfall inventory. Clean water discharges can originate from the following:

- Natural springs in urban areas that have been piped to a nearby creek or stream
- Infiltrating groundwater
- Infiltration from potable waterline leaks

Pathogenic and nuisance discharges should be prioritized in a manner that ensures prompt action in the source identification process as these types of pollutants have the most potential for harmful effects to the environment. Any future outfall inventories or illicit discharge tracing efforts should make use of the illicit discharge tracing procedures outlined in this manual. Additional outfall inventory or illicit discharge tracing projects, already in progress, can enter the procedural flowchart at any time and work towards completion.

**Mode of Entry –** Illicit discharges are classified based on the owner of the system to which the potential illicit discharge drains and how the discharge enters the storm drain system. The mode of entry can either be **direct** or **indirect.**

**Direct Entry** means that the discharge is directly connected to the storm drain pipe through a sewage pipe, shop drain, or other kind of pipe. Direct entry usually produces discharges that are continuous or intermittent. Direct entry usually occurs when two different kinds of "plumbing" are improperly connected. The two main situations where this occurs are:

- **Sewage cross-connections** – A sewer pipe that is improperly connected to the storm drain system produces a continuous discharge of raw sewage to the pipe. Sewage cross-connections can occur in catchments where combined sewers or septic systems are converted to a separate sewer system, and a few pipes get "crossed." The term "Straight Pipe" refers to relatively small diameter pipes that intentionally bypass the sanitary connection or septic drain fields, producing a direct discharge.

- **Industrial and commercial cross connections** – These occur when a drain pipe is improperly connected to the storm drain system producing a discharge of wash water, process water, or other inappropriate flows into the storm drain pipe. Older industrial areas tend to have a higher potential for illicit cross-connections.

**Indirect** entry means that flows generated outside the storm drain system enter through storm drain inlets or by infiltrating through the joints of the pipe. Generally, indirect modes of entry produce intermittent or transitory discharges, with the exception of groundwater seepage. The five main modes of indirect entry for discharges include:

- **Groundwater seepage into the storm drain pipe** – Seepage frequently occurs in storm drains after long periods of above average rainfall. Seepage discharges can be either continuous or intermittent, depending on the depth of the water table and the season. Groundwater seepage usually consists of relatively clean water that is not an illicit discharge by itself but can mask other illicit discharges. If storm drains are located close to sanitary sewers, groundwater seepage may intermingle with diluted sewage.

- **Spills that enter the storm drain system at an inlet** – These transitory discharges occur when a spill travels across an impervious surface and enters a storm drain inlet. Spills can occur at many industrial, commercial, and transport- related sites. A very common example is an oil or gas spill from an accident that then travels across the road and into the storm drain system.

- **Dumping a liquid into a storm drain inlet –** This type of transitory discharge is created when liquid wastes such as oil, grease, paint, solvents, and various automotive fluids are dumped into the storm drain. Liquid dumping occurs intermittently at sites that improperly dispose of rinse water and wash water during maintenance and cleanup operations. A common example is cleaning deep fryers in the parking lot of fast food operations.

- **Outdoor washing activities that create flow to a storm drain inlet** – Outdoor washing may or may not be an illicit discharge depending on the nature of the generating site that produces the wash water. For example, hosing off individual sidewalks and driveways may not generate significant flows or pollutant loads. On the other hand, routine washing of fueling areas, outdoor storage areas, parking lots (power washing), and construction equipment cleanouts may result in unacceptable pollutant loads.

- **Non-target irrigation from landscaping or lawns that reaches the storm drain system** – Irrigation can produce intermittent discharges from over-watering or misdirected sprinklers that send tap water over impervious areas. In some instances, non-target irrigation can produce unacceptable loads of nutrients, organic matter, or pesticides. The most common example is a discharge from commercial landscaping areas adjacent to parking lots connected to the storm drain system.

**MS4 –** An MS4 is a conveyance or system of conveyances that is (a) owned by a state, city, town, village, or other public entity that discharges to waters of the U.S., (b) designed

or used to collect or convey stormwater (e.g., storm drains, pipes, ditches), (c) not a combined sewer, and (d) not part of a sewage treatment plant or publicly owned treatment works (POTW).

**Outfall –** means a point source as defined by section 122.2 of SC Regulation 61-9 at the point where an MS4 discharges to waters of the State and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the State and are used to convey waters of the State.

**Major Outfall –** as defined by SCDHEC Reg. 61-9, a municipal separate storm sewer outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (discharge from a single conveyance other than circular pipe which is associated with a drainage area of more than 50 acres); or for municipal separate storm sewers that receive storm water from lands zoned for industrial activity (based on comprehensive zoning plans or the equivalent), an outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (discharge from a single conveyance other than a circular pipe associated with a drainage area of 2 acres or more).

**Partner MS4 –** Any municipality in which the County agrees to do all or part of the municipality's stormwater management program through a legal contract. At the time of publication of this manual, this includes the city of Hanahan and town of Goose Creek.

**Point Source –** means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture.

**Receiving System Owner –** The County MS4, Partner MS4, other MS4 (i.e. SCDOT), State and/or Federal Facility or Entity which receives an illicit discharge.

**Regulated Area –** The regulated area refers to the boundaries of Berkeley County's urbanized areas, as well as any Partner MS4, as determined by Decennial Census Data from the United States Bureau of the Census. Regulated Area also includes any portion of the County that is so designated by Berkeley County Council. The Regulated Area designated by Berkeley County Council coincides with the area defined as "Service Zone 1" by the "Transportation Impact Fee Ordinance for Unincorporated Berkeley County" (Ordinance No. 06-11-75).

**Source Identification –** These are the office and field tasks used to track potential illicit discharges to the source and determine if the discharge is in fact an illicit discharge based on an analysis of samples taken.

# Section 2 Summary of County IDDE Procedures

This section provides a summary of the County's IDDE program structure and reporting mechanisms. This section provides the framework and contact information for reporting illicit discharges within the MS4 area. As the County's MS4 is bounded by multiple other MS4s, it is important to coordinate between MS4s in the event of a multi-jurisdictional illicit discharge, as it impacts adherence to permit requirements for all municipalities involved.

All illicit discharge reporting within the County begins with notification of the County's Engineering Department. Once the Engineering Department is notified, it should be determined whether additional MS4s should be included as part of the illicit discharge reporting. Figure 2.1 provides a flowchart summarizing the County's IDDE program identification and notification procedures.

## 2.1 Illicit Discharge Identification Methods

There are a variety of sources and methods to identifying illicit discharges. Identification is expected to be achieved through outfall screening by the Engineering Department personnel, internal reporting from other County personnel, external reporting/citizen complaints, or other watershed planning efforts by the field investigations of prioritized land uses. The identification methods are described below:

**Outfall Screening** – The County's MS4 Permit requires the development of a storm sewer system map showing the location of all outfalls, and names and location of all waters of the United States that receive discharges from those outfalls. As part of the system inventory mapping efforts the Engineering Department is expected to find some potential illicit discharges through these efforts.

**Major Outfall Screening** – The County conducted a review of the existing system inventory database to identify all major outfalls, as defined in Section 1.3 of this manual, that are inside the County's MS4. The system inventory database will be updated as needed to include new or modified outfalls and infrastructure resulting from new development, capital projects or infrastructure improvements. Any new updates to the database will be reviewed for the addition of new major outfalls. The County shall conduct, at a minimum, at least one screening of all major outfalls during the County's permit cycle.

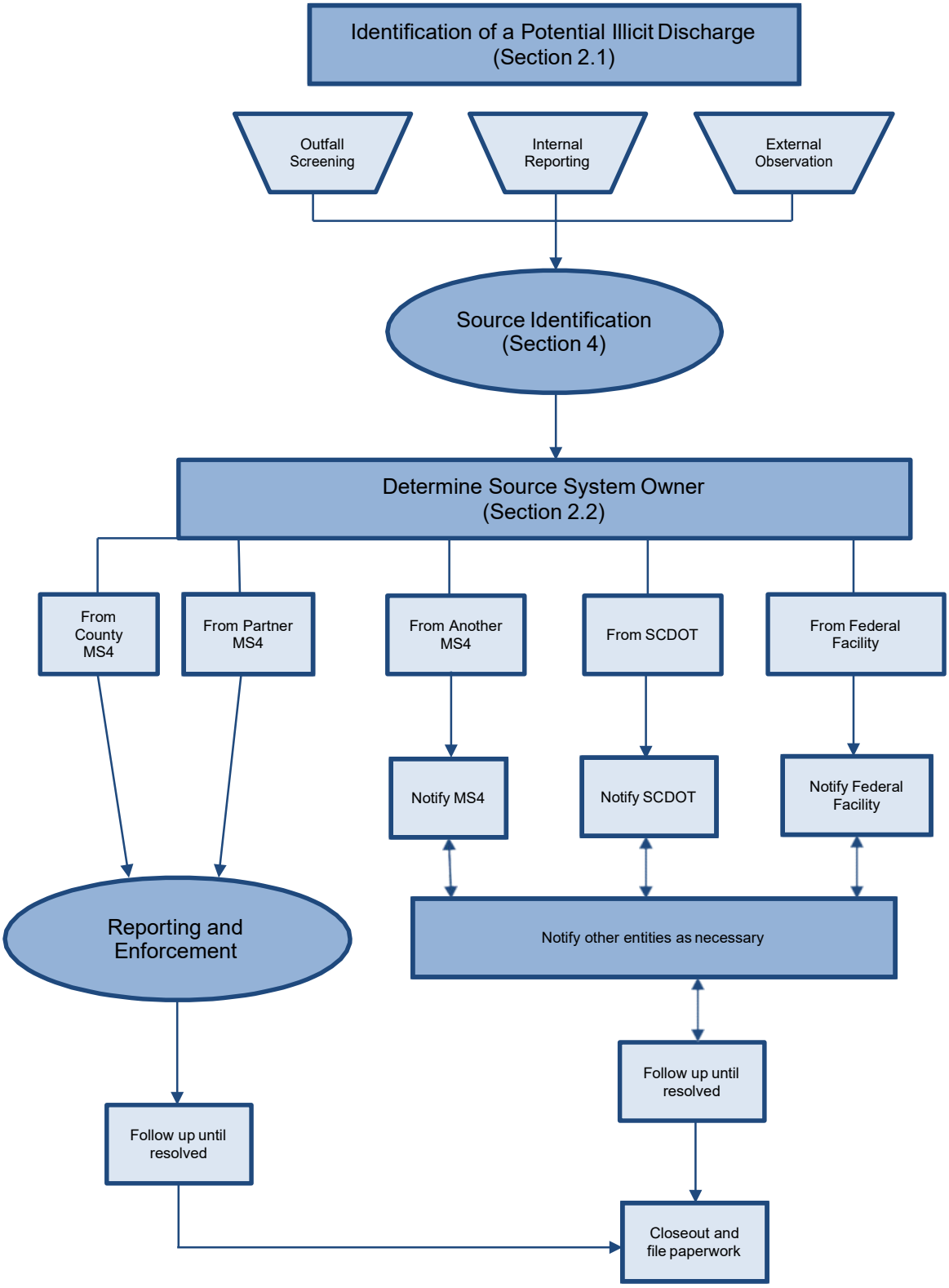
**Internal Reporting** – The Engineering Department also expects to find some potential illicit discharges through various County Departments (e.g. Public Works maintenance crews, Buildings and Codes, etc.).

**External Observation** – County citizens, visitors, and others are also expected to notify the Engineering Department of some potential illicit discharges. Suspected illicit discharges can be reported to the Engineering Department at (843) 719-4127.

**Watershed-Based Planning** – The County is currently exploring other potential ways of identifying possible illicit discharges. These would include watershed planning and

prioritization tasks to systematically address potential illicit discharges at perceived "hotspots" such as restaurants, dry cleaners, auto shops, and car washes. The County has created a Priority Areas list that is reviewed and updated annually to identify problem areas for more detailed screening of their respective systems based on higher likelihoods of illicit connections.

**Figure 2.1 – IDDE Program Identification and Notification Procedures**



## 2.2 Determination of Contributing System Owner

Once a potential illicit discharge is made known to the Engineering Department through one of the above referenced methods, field operations will commence to first determine the source of the potential illicit discharge based on regulatory and jurisdictional boundaries.

If the illicit discharge originates in and is discharging entirely within the limits of the County or a partner MS4, illicit discharge source identification will begin to determine the source and if the discharge is truly an illicit discharge, as defined in this manual (see Sections 3 and 4). Enforcement procedures will be implemented if necessary, to include follow-up field visits.

If the potential illicit discharge originates in, or discharges to another MS4 or a Federal Facility, that owner will be notified of the discharge by a letter from the County (Appendix F). The County will implement follow-up procedures for the potential illicit discharge. See Section 2.3 below for more detail related to the notifications. If the discharge presents a potential threat to human health or is of an immediate environmental concern, SCDHEC will be notified as soon as possible.

Given the topography of the County and interconnectivity of the various drainage systems, the County expects some illicit discharges to flow through multiple systems and therefore affect multiple owners. By first identifying all potential MS4s and Federal Facilities that may be impacted by the identified potential illicit discharge, the enforcement process can then begin, either initiated by the County, SCDHEC, or other MS4s.

## 2.3 Notification to Other MS4s, SCDHEC and Federal Facilities

If the source of the potential illicit discharge is neither the County nor one of its partner MS4s, then the Engineering Department will notify the determined owner through a letter. The list below provides contact information for the potential entities. Templates for illicit discharge notification letters are provided in Appendix F.

**MS4s**

**City of North Charleston**
5800 Casper Padgett Way
North Charleston, SC
29406 (843) 745-1026
Claude G Burns

**Town of Summerville**
Department of Public
Works 1105 Yancey Street
Summerville, SC 29485
(843) 851-4225
Russ Cornette

**Charleston County**
County Stormwater
Division 4045 Bridge View
Drive North Charleston, SC
29405 (843) 202-7639
Chris Wannamaker

**City of Charleston**
2 George Street
Charleston, SC 29401
(843) 724-3757
Kinsey Holton

**Dorchester County**
2120 East Main
Street Dorchester,
SC 29437
(843) 832-0070
Mike Goldston P.E.

**SCDOT**
P.O. Box 191
Columbia, SC 29202
(803) 737-0998
Jay Hawkins, P.E.

**Federal Facilities**

Naval Weapons Station,
Charleston 2316 Red Bank Rd
Goose Creek, SC 29445
(843) 963-5608

**SCDHEC**

1362 McMillian Avenue, Suite, 300
Charleston, SC 29405
(843) 953-0150

## 2.4 Follow-up Procedures

The Engineering Department must routinely follow-up on notifications sent to other entities described above to ensure permit compliance. Follow-up procedures will include a periodic check of the potential IDDE location database to see which locations may need to be addressed, phone calls to the appropriate entities to check for resolution, and if necessary, re-visiting locations to clarify ownership and/or source. For more detail, see Section 4.4.

# Section 3 Dry Weather Field Screening

## 3.1 Background

**Outfall identification** involves the location and classification of all outfalls within the MS4 area that drain directly to receiving waters (streams, ponds, lakes, rivers) of the State. These outfalls are predominantly pipes, culverts, channels, bridges, or emergency spillways. The identification of these outfalls is not only required as part of the NPDES permit but is necessary to identify potential sources of water quality problems within the MS4.

**Major Outfall identification** involves a desktop review of all outfalls within the County's stormwater system inventory database to determine if they meet the criteria defined in Section 1.3 of this manual.

The outfall identification process should be implemented as a multi-tiered approach that both identifies the outfall structures and indicates the potential presence of illicit discharges at the outfalls. In order to accomplish these combined tasks, the outfall identification should be performed only during dry weather. This is also known as **dry weather field screening**. *Dry weather is defined as a 72-hour period with no runoff-producing rainfall (rainfall less than 0.1 inches). However, due to topographic constraints, flatter areas often will exhibit runoff for longer than 72 hours. Thus, field conditions should be assessed during the investigation.*

The following procedures should be followed for screening of **all** regulatory outfalls as identified by the County or their designee. Upon completion of dry weather screening, if no discharge is present, the screening is considered complete and the field inspector can proceed to the next outfall. If flow is present, the field inspector shall initiate the illicit discharge detection procedures as outlined in Section 4 and associated Appendix B.

It should be noted that the GIS Database has been updated to allow for multiple records at each outfall location. Therefore, for each individual outfall, there is the potential to record multiple dry weather screening events, illicit discharge sampling, and illicit discharge tracing. This allows for the County to maintain an on-going record of all illicit discharge events within the system. This information can be utilized in determining priority areas for investigation in the future.

## 3.2 Initial Procedures

The proper procedures for Dry Weather Field Screening identified within this section should be followed wherever practicable. All information should be recorded. Where certain criteria cannot be obtained due to site specific constraints (standing water, broken pipe, etc.), this should be noted and reported to the Engineering Department. Additional field visits should be attempted if seasonal changes could alter the data collection limitations at the outfall.

Oftentimes, unanticipated conditions may be encountered in the field that are not

addressed or covered in this manual. In those circumstances it is the responsibility of the field technician to notify the Engineering Department of these conditions. The Engineering Department will make the final decision on how to proceed with the field investigation in order to meet the conditions of the NPDES permit requirements for the MS4. All field work should be performed under the direction of the Engineering Department. It is not up to the discretion of the field technician to determine the proper procedures in the case of unanticipated field conditions.

The following equipment should be on-hand during the dry weather field screening:

- Existing field maps
- Field data collection sheets (if applicable)
- Digital camera
- GPS unit with Data Dictionary loaded (see Appendix C)
- Spray paint or marking tape
- Cell phone
- Tape measure
- Appropriate Personal Protective Equipment (PPE)
- Clip board and pencils
- First Aid kit
- Sampling equipment (see specifications in Appendix B)

Prior to initiating dry weather field screening, it must be understood that the investigation may include investigation onto private property. While many outfalls are located within deeded and recorded drainage easements, many are not and it may be necessary to cross or enter privately held lands to record the necessary field information. Therefore, it is imperative that all property owners within the investigation area are identified as to the nature of the investigation. How this notification is disseminated is up to the discretion of the Engineering Department. However, at a minimum, field personnel are required to carry signed copies of the public notification letter located in Appendix C. Unless otherwise approved by the Engineering Department, no field investigation shall be initiated without prior notification to land owners. During the dry weather field screening, all field workers shall wear safety vests, typically blaze orange, and shall clearly identify themselves and their purpose to any citizen, if questioned.

## 3.3 Field Data Collection

The following data should be collected for every outfall identified during the dry weather screening process. A location coordinate should be recorded by means of a GPS unit as described in the GIS/GPS Manual. A tablet with onboard ESRI GIS and GPS software can be used for data collection. Appendix C identifies the information included in the Data Dictionary developed for the County, consistent with the GIS/GPS Manual, which will be used to collect outfall screening information. Wherever possible this format should be followed. In situations where a handheld GPS data collector cannot be used to identify a location coordinate, the information below should be collected and the Illicit Discharge Inspection Form should be completed, at a minimum, and the site marked or identified in such a manner, with flagging, paint, or other identification means, such that the location of the outfall can be clearly identified and recorded in the future to be included in the outfall database.

- Site information should be collected during dry weather conditions. Where this is not possible, such as in cases where outfalls are located during other routine County inspection activities, the site should be identified and a follow-up IDDE investigation should be performed at a future date.

- The outfall type (pipe, culvert, channel, bridge, emergency spillway, etc.) along with its shape, dimensions, and material composition should be recorded in accordance with the requirements of the GIS/GPS Manual.

- Digital photographs of the outfall should be taken. This photograph should be taken from such a perspective as to identify the outfall and other prominent features in the area in order to easily identify the outfall in the future if follow-up IDDE investigation is necessary.

- The outfall should be labeled with a unique identifier or AssetID. Where the dry weather screening involves screening of an existing mapped outfall that is contained in the GIS database, field staff will utilize the same AssetID for all follow up investigations to the same outfall. Where a new outfall is to be investigated, the last recorded AssetID number, per the County's outfall numbering convention, should be obtained from the database prior to dry weather field investigation. This AssetID should be recorded in the GPS unit and labeled on any field identification forms. It should be noted that the IDDE function of the GIS database has been developed as a "one to many" relationship, meaning that multiple inspections can be performed for each outfall without overwriting the data. Therefore, it is important to utilize existing AssetIDs to accurately track the inspection history of an individual outfall.

- Note any flow or discharge from the outfall. If the outfall does exhibit flow conditions during dry weather investigation, this should be noted, and physical assessment performed in accordance with the sampling procedures outlined in Appendix B. If physical assessment indicates the potential presence of an illicit discharge, chemical sampling should be performed in accordance with the procedures in Appendix B.

- It should be noted that standing water or submergence are not necessarily indicators of discharge, nor does it exclude the site from having a potential illicit discharge. In accordance with the County's investigation procedures, physical assessment should be completed for these outfalls, and subsequent chemical sampling completed if the physical assessment indicates the potential presence of an illicit discharge.

- Where dry weather field screening is performed on outfalls draining to tidal receiving waters, screening and sampling must be completed at mid-tide levels or lower. Investigation of tidal outfalls during high tide is not valid.

### 3.4 Recording Outfall Screening Data in GIS

Data collection will be managed through use of the GIS Data Dictionary which contains a list of data to be collected at every outfall within the County. The GIS Data Dictionary describes the structure and content of the GIS database and provides details on what

data to collect, and how to collect it. The GPS unit allows for the approximate x, y location and elevation (if GPS unit provides proper level of accuracy in accordance with the GIS/GPS Manual - not required as a dry weather screening activity) of each outfall site to be stored along with other pertinent data. The purpose of using a Data Dictionary is to standardize the collection of data in the field as personnel walk all streams and channels to find outfalls, record their location, and physically mark them with spray paint or a flag. Walking the streams also allows field personnel to identify illicit discharges and connections, areas of severe bank erosion, dry weather flows, blockages, and restrictions that may hinder the flow of streams.

A custom Data Dictionary has been developed for the County as part of their GIS database revisions. The setup of the Data Dictionary requires that the first piece of data entered at each outfall be the ***swDischargePointType***. The sw***DischargePointTypes*** that will be encountered during this project include:

- Pipes
- Channels
- Bridges
- Culverts
- Emergency Spillways
- Other – If an outfall does not qualify as one of the above feature types, it should be classified as "other," and detailed notes added to the comment field should be taken describing its physical appearance and other characteristics. Photographs of the outfall should also be taken.

> ***Note:*** *Occasionally an Inlet may be the final piece of infrastructure prior to discharge. However, in GIS, an Inlet is defined as a structure where water enters the stormwater system, so it cannot also be defined as a discharge point where water exits the system. In reality, an Inlet may be functioning as both, so note "Other" as to the DischargePointType.*

Once the ***DischargePointType*** is entered, a list of the data to be collected, or verified, specific to that feature type is displayed, ensuring that all necessary information is collected at each site. Some of the information entered into the Data Dictionary includes the date of inspection, the type of outfall, the size of the outfall, weather conditions at the time of the inspection, and a description of the condition of the structure (this also allows County staff to address maintenance issues of that structure in an efficient manner if necessary). It should be noted that all outfalls are discharge points, but not all discharge points are outfalls. Field staff must enter NPDES yes/no in the Data Dictionary to identify the point as a regulated outfall.

# Section 4 Illicit Discharge Source Identification

The next step has four primary components: (1) illicit discharge tracing to identify the source, (2) dry weather field screening to determine if the discharge is truly an illicit discharge, and (3) source identification, and (4) implement illicit discharge elimination through notification or enforcement. These steps apply only to the instances in which the potential illicit discharge is flowing into the MS4 owned either by the County or a partner MS4. Figure 4.1 is a flowchart summarizing the illicit discharge source identification procedures.

## 4.1 Potential Illicit Discharge Tracing

The first step in the source identification process is to trace the discharge to the source. The source can either be the actual pollution causing event (e.g. sanitary sewer overflow or leak, illegal connection of car wash drain to storm system) or a system owned by another entity. If another entity is encountered, refer to Section 2.3 for notification procedures.

Field personnel will begin the tracing process at the potential illicit discharge during a dry weather condition. The procedure is the same regardless of how the discharge was discovered (outfall screening, internal reporting, or external observation).

The following steps should be generally followed:

1. At an outfall in which a dry weather flow was found or at the initial point of discovery of the discharge, field personnel will record physical data from visual inspections. Field personnel should note odor, color, turbidity, the presence of floatables, stains, vegetation, and structural condition. A detailed description of these physical parameters can be found in Appendix A.

2. If physical screening indicates the potential presence of an illicit discharge, field personnel will conduct field chemical sampling **within 72 hours of the initial physical screening** to further investigate the potential illicit discharge. Bacterial sampling is only required if physical screening indicates the presence of one or more bacterial indicators of adverse colors, odor or floatables. If field chemical sampling indicates the presence of an illicit discharge, through exceedance of chemical parameters as outlined in Appendix A, field staff should begin source tracing procedures as follows:

    a. If the discharge continues upstream and can be traced, move upstream in the direction of the discharge. Repeat step 1 at each drainage system junction until a) the source is found, b) the discharge can no longer be traced upstream (e.g. underground), or c) the discharge is determined to be originating from the jurisdiction of another MS4 or Federal Facility. No sample should be taken at any intermediate point if the discharge can be tracked further upstream.

    b. If physical and/or chemical screening determines that the source of the illicit discharge is raw sewage, field personnel should immediately alert

the County Engineering Department to the presence of raw sewage. If the source is a sanitary sewer system, the County Engineering Department shall contact the appropriate sewer provider as soon as possible after the reporting of the illicit sewage discharge. Below is a list of potential contacts.

**Berkeley County Water and Sanitation**
212 Oakley Plantation Drive PO Box 1529
Moncks Corner, SC 29461 (843) 761-8817
bcws.sc.gov

**Summerville CPW**
135 West Richardson Ave
Summerville, SC 29483
(843) 871-0810
www.summervillecpw.com

**Charleston Water Systems (CWS)**
6296 Rivers Avenue (Suite 104) North Charleston, SC 29418 (843) 727-6800
www.charlestoncpw.com

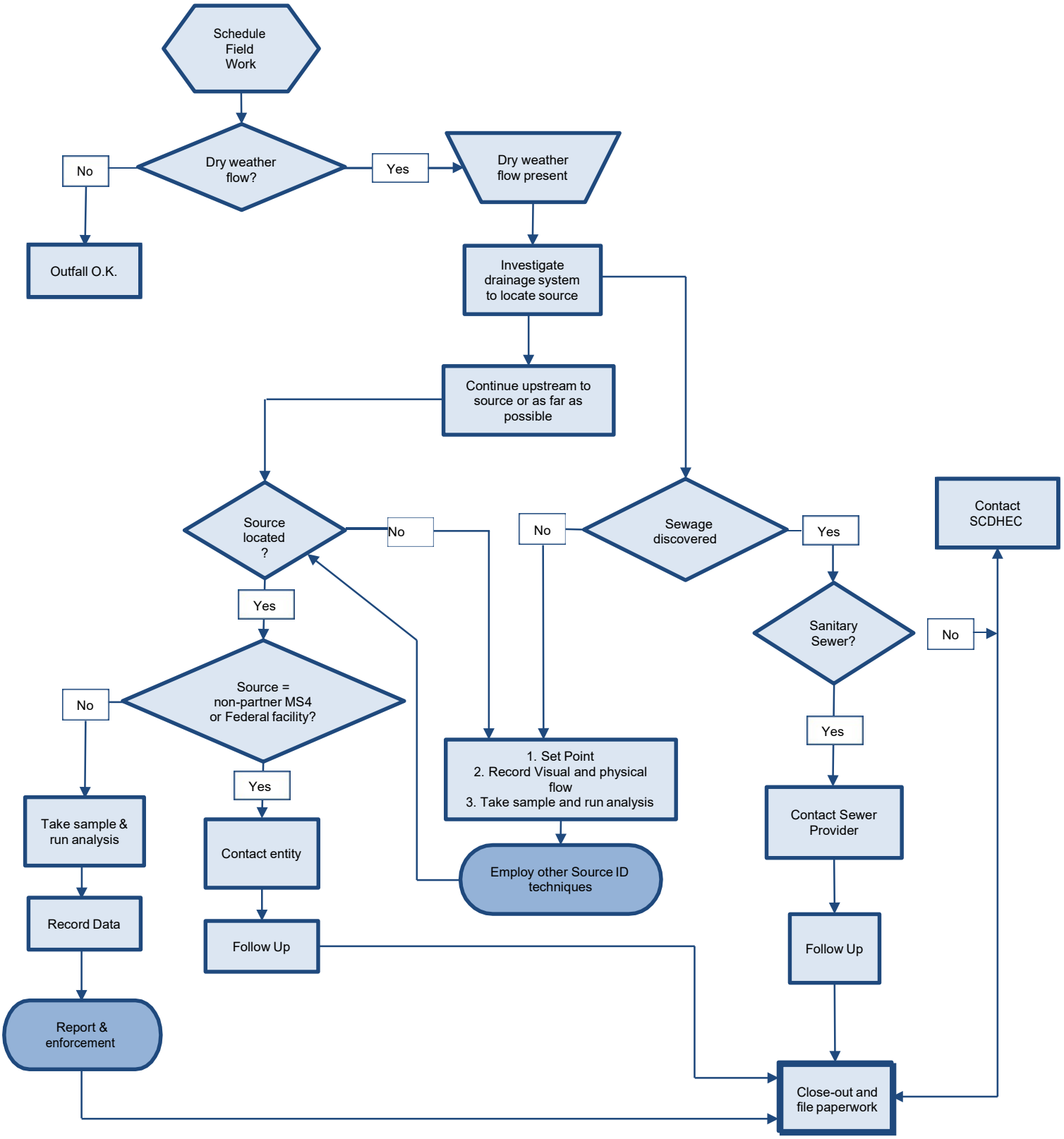
**Mount Pleasant Waterworks**
1619 Rifle Range Road
Mt. Pleasant, SC 29464 (843) 884-9626
www.mountpleasantwaterworks.com

**North Charleston Sewer District**
7225 Stall Rd.
North Charleston, SC 29406 (843) 764-3072
www.ncsd-sc.com

**Moncks Corner Water Works**
118 Carolina Avenue
Moncks Corner, SC 29461 (843) 719-7900

If the source is determined to be a septic system, the County Engineering Department shall contact SCDHEC as soon as possible after the identification of the illicit discharge source. See Section 2.3 for contact information.

**Figure 4.1 – Illicit Discharge Source Identification Flowchart**



## 4.2 Illicit Discharge Detection

Once a potential illicit discharge has been traced to the source or where no further visual evidence can be collected, field personnel must determine if the flow is an illicit discharge. Below is an overview of the illicit discharge investigation procedures.

1. Obtain appropriate equipment and data from office assessment.

2. Make sure less than 0.10 inches of rain has fallen in the last 72 hours and locations are inspected to the MEP during low to mid-incoming or mid-ebbing tides if the location is tidally influenced.

3. At the source of the illicit discharge or the most upstream stormwater infrastructure asset with dry weather flow, record visual inspection information and take a grab sample using a clean sample bottle and complete chemical field investigation to verify the source of the illicit discharge. If the discharge is suspected to be sewage, an additional bacterial sample shall be collected. Procedures for collecting the sample are provided in Appendix B.

4. Perform the analysis of the sample taken for pH, water temperature, Total Chlorine, Total Copper, Total Phenols, Surfactants/Detergents, and bacteria (if applicable). Procedures for collecting the sample are provided in Appendix B. Record all analysis results in GIS using the Data Dictionary.

5. Compare the analysis results to the allowable limits and note any exceedances of the limits of the various parameters set in Appendix A.

6. Record sampling results in the County GIS system.

7. If the set limits were observed for any one parameter, then the flow is considered illicit. Identify the property owner from tax maps. Begin enforcement procedures (see Section 2.3).

## 4.3 Additional Illicit Discharge Tracing Efforts

If a given discharge has been identified as an illicit discharge, some additional illicit discharge tracing options should be considered. These include the use of subsurface utility investigation, tracer dyes, or smoke tests.

## 4.4 Reporting and Enforcement

Reporting and enforcement are the final steps to removing illicit discharges. Once a discharge is known to be an illicit discharge and the source has been positively identified or the discharge was tracked as far as possible, the appropriate system owners should be notified to address the source of the illicit discharge. Procedures are split amongst the

receiving system owner(s) of the potential or determined illicit discharge as outlined in Figure
4.2 below. Template notification letters are provided in Appendix F.

**If the source is within the Berkeley County MS4 Area**

The following steps outline the procedures to be conducted if the source is from the County MS4 area.

1. Determine the owner(s) contact information and generate corrective action letter discussing County illicit discharge requirements.
2. Generate a report of sample analysis data (see Appendix C).
3. Submit letter and report to the owner(s).
4. Schedule a follow-up visit to the site approximately two weeks later to determine if the illicit discharge has been removed.
5. If flow is still present, issue a Notice of Violation (NOV) (see Appendix C) and schedule another follow-up visit.
6. If flow is still present after third visit, report case to County Code Enforcement Officer with all paperwork.
7. Once illicit discharge has been removed, file paperwork and close case.
8. Record case status and investigation status in County GIS system.

**If the source is within the Berkeley County Partner MS4 Area**

At the time of publication of this manual, the County has an IGA with Hanahan and Goose Creek. In accordance with the stipulations outlined in the IGA, the County shall proceed with illicit discharge reporting and enforcement consistent with procedures elsewhere in the unincorporated portions of the County. As the County has agreed to perform compliance activities for the partner MS4 to meet NPDES permit requirements, the enforcement of illicit discharge elimination does not vary between the County and partners of the IGA.

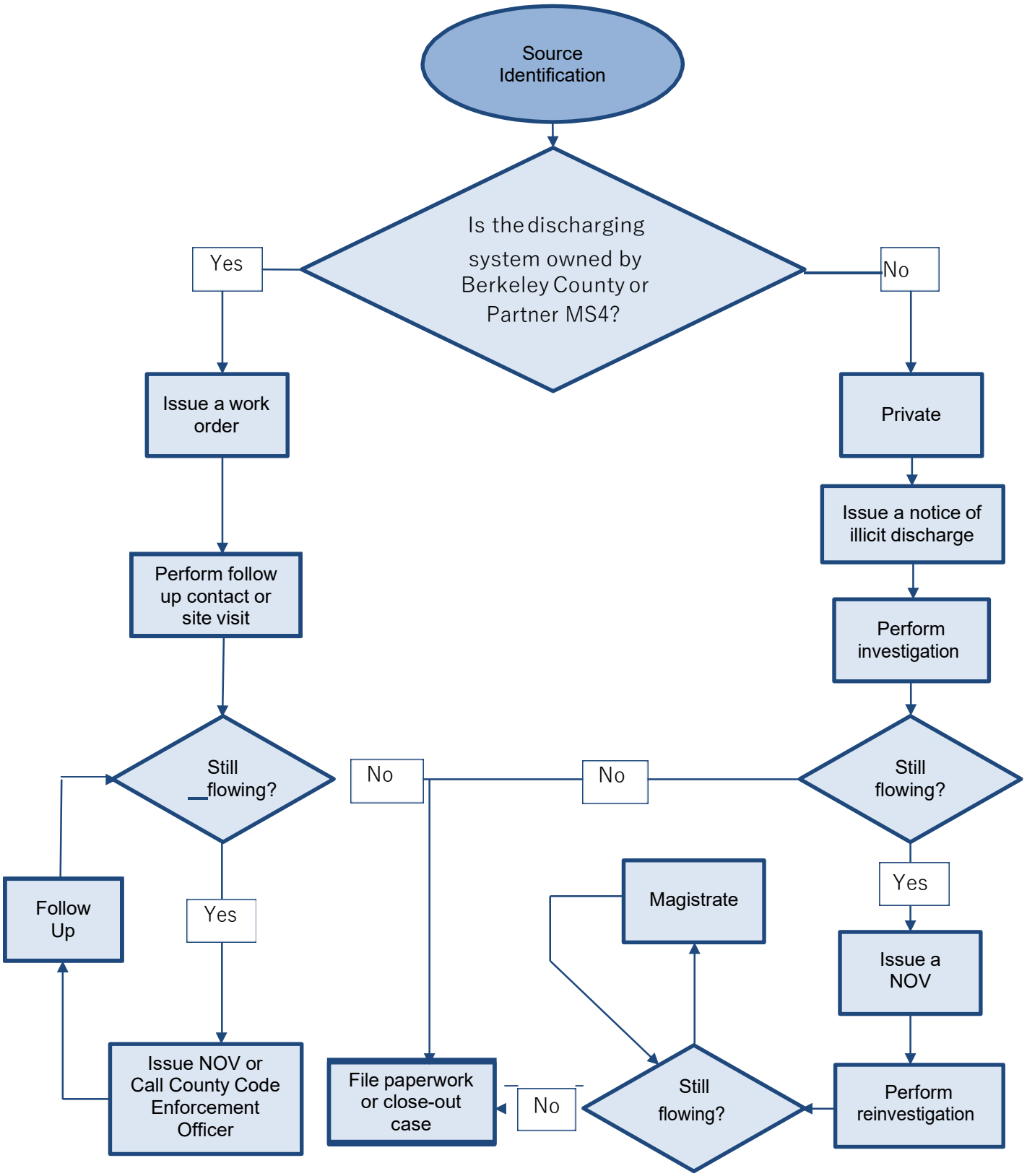
**If the source is an MS4 or Federal Facility outside of the Berkeley County or Partner MS4 Areas**

Enforcement procedures for illicit discharges determined to come from other entities will consist of notification and follow-up investigation and inspections. These are as follows:

1. Determine the owner(s) name and address and generate a corrective action letter discussing County or Partner MS4 illicit discharge requirements.
2. Generate a report of sample analysis data (see Appendices B and C).

3. Submit report to MS4 or Federal Facility. See Section 2.3 for contact information.
4. Schedule a follow-up phone call and/or site visit approximately two weeks later to determine if the illicit discharge has been removed.
5. Continue step 4 until the illicit discharge is resolved.
6. Once the illicit discharge has been removed, file paperwork and close case.

**Figure 4.2 – Flowchart of Reporting and Enforcement**



# Appendix A – Field Sampling and Observation Parameters

# Overview of Field Observations

Dry weather outfall screening and subsequent illicit discharge tracing, is a combination of physical and chemical analysis to accurately determine whether a dry weather flow is an illicit discharge and potential source identification. The following sections outline both physical and chemical parameters that should be tested for during dry weather field screening activities.

The parameters in this Appendix coincide with the Data Dictionary in Appendix C and as defined in the ***Berkeley County Stormwater GIS/GPS Procedures Manual (GIS/GPS Manual)***, February 2018. The physical and chemical parameters should be collected and recorded as part of each dry weather field screening and illicit discharge detection event. The GIS database has been developed to accept multiple events for each outfall. Therefore, each inspection, tracing event, and subsequent illicit discharge elimination activity should be recorded in accordance with the procedures outlined in this Appendix and the GIS/GPS Manual. Consistent data collection and recording in GIS allows for a history and sampling log of each outfall.

# Physical Parameters

Physical inspection during dry weather field screening is the first step in determining whether an illicit discharge may exist. Physical parameters include characteristics defined by sense of smell and visual observation. These parameters should always be evaluated, as many times illicit discharge sources can be identified by simple physical investigation of the outfall. The following physical parameters should be addressed during initial dry weather screening. They may also be important as part of illicit discharge source tracing activities depending on the type of discharge and composition of the storm drainage system. Appendix E includes a field inspection form for the physical parameters. This form is consistent with the Data Dictionary and is intended for use by the County staff when GPS data collection is unavailable. Where field inspection forms are used, the Engineering Department should conduct a follow-up inspection with GPS data collection to ensure that the GIS database accurately reflects all outfall inspections and identified potential illicit discharges.

## Weather

Dry weather field screening must be preceded by at least 72 hours (3 days) with no measurable rainfall. Current weather conditions and the number of hours since the last measurable rainfall greater than 0.10 inches should be recorded during outfall screening and inspections. When adverse weather conditions prevent collection of samples during a scheduled sampling event, the sampling event must be rescheduled at the next available opportunity. Adverse weather conditions are those that are dangerous or create inaccessibility, such as local flooding, high winds, electrical storms, or situations that otherwise make sampling impractical, such as extended frozen conditions.

## Tides

Where stormwater outfalls are located in tidally influenced areas, high tides may interfere with physical inspections and sampling for chemical analysis. Check the local tide tables prior to conducting field inspections to determine whether tides are rising or falling. The tide level observed in the field at the time of inspection (low, mid, high) should be recorded.

## Flow

Any flow from an outfall during dry weather screening indicates that there may be an illicit discharge to the system. Illicit discharges with pollutants of concern are easily identifiable in dry weather flow samples of smaller flows. Dry weather flows should be characterized at the time of screening (e.g., trickle, low, significant, submerged). The rate of flow should be estimated by recording the time it takes to fill a container of a known volume. The flow volume can be estimated by using a container of known volume, and measuring the volume of flow captured in the container per unit time. The flow rate may be used to estimate pollutant loading based on sampling results.

## Blockage

Improper disposal of non-stormwater discharges into stormwater inlets, channels and streams can cause inhibition or blockage of flow in the stormwater conveyance system. Field observations of conditions that cause blockages at outfalls should be noted for follow up maintenance by the County.

## Odor

The odor of stormwater discharges can vary significantly based on tidal fluctuations, seasonal changes as well as potential sources of illicit discharges. Odor can be a good indicator of the type of pollutant in the water. Stormwater discharges may smell like sewage, oil, gasoline, or may contain a chemical smell. Decomposition of organic materials can also cause a distinctive sulfur odor.

## Color

Color can also be an important factor in determining the source of an illicit discharge. The particular color should be noted and tracked upstream as far as possible. Sewage will typically have a gray or brown color, whereas industrial wastes may have a variety of colors. Bacteria colonies may appear as a thin film with a prism of colors.

## Turbidity

Turbidity is a measure of the amount of suspended matter in the water and affects the clarity of the discharge. Discharges from industrial facilities are often highly turbid. Although erosion can also create highly turbid water, this should not be the case during dry weather flows. Each inspection should note the relative degree of turbidity.

## Floatables

Floatables are solids and liquids that float on the surface of the water. Floatables may include substances such as animal fats, food products, trash, oils, plant materials, solvents, foams, or gasoline. Floatables can often lead directly to the manufacturing process or other source of the illicit discharge. A full description of the type and quantity of the floatables and a photograph of the discharge should be included in the report.

## Stains

Stains left on the conveyance system can be an indicator of an illicit discharge. Discoloration of the pipe or channel should be tracked upstream. It is also important to note the location and extent of the discoloration or stain within the conveyance system. Stains may also be apparent on soil, rocks or vegetation near the outfall.

## Scum

The presence of scum can be an indicator of an illicit discharge and should be noted. Surface algal scum may be caused by nutrients or fertilizers from stormwater runoff. Scum with a strong sewer odor may indicate a sewage leak or overflow. Reddish-orange or filmy scum may be caused by high concentrations of iron bacteria. The presence of algae often indicates a continuous source of water flow. This may be from a pipe break, air conditioning condensate, etc.

## Vegetation

Vegetation growing in the immediate discharge area should be noted in relation to vegetation growing in the general vicinity of the outlet. Certain discharges can cause substantial changes in plant growth. Some discharges may damage plants or visibly stunt plant growth. Discharges containing a high nutrient content may cause increased growth while discharges with severe changes in pH may cause a decrease in growth. Although vegetation patterns may serve as an indicator of non-stormwater discharges, they are also difficult to interpret. Time of year, rainfall patterns, and exposure to sun can all affect plant growth and may be contributing factors to the changes in vegetation patterns. Caution should be used when considering vegetation as an indicator of an illicit discharge.

## Structure Condition

Like staining, the condition of the outfall structure can be an indicator of an illicit discharge. Structural damage is typically more noticeable in concrete pipes. Acidic discharges may cause cracking, spalling, or deterioration of the concrete. The location of the damage within the pipe and the distance upstream will be important in determining the type of pollutant and the source of the discharge. The outfall condition is rated as: Excellent, Very Good, Good, Fair, Poor, Very Poor, or Needs Service.

## Temperature

Water temperature that varies greatly from the ambient air temperature is a good indicator that there is an illicit discharge to the system. Temperature should be recorded as part of the sampling activities described in Appendix B.

Table A.1 provides examples of sources associated with physical sampling parameters.

**Table A.1: Interpretations of Physical Observation Parameters and Potential Sources**

| Physical Parameter | Description |
|---|---|
| Odor–Typical obvious odors include: gasoline, oil, sanitary wastewater, industrial chemicals, decomposing organic wastes, etc. | |
| Sewage: | Smell associated with stale sanitary wastewater, especially in pools near outfall |
| Sulfide ("rotten eggs"): | Industries (e.g. meat packers, canneries, dairies, and stale sanitary wastewater) |
| Oil and gas: | Facilities associated with vehicle maintenance and operation or petroleum product storage |
| Rancid-sour: | Food preparation facilities (e.g. restaurants, hotels, etc.) |
| Color – Important indicator of inappropriate industrial sources. Industrial dry-weather discharges may be of various colors, but dark colors, such as brown, gray, or black, are most common. | |
| Yellow: | Chemical, textile, and tanning plants |
| Brown: | Meat packers, printing plants, metal works, stone and concrete works, fertilizer application, and petroleum storage facilities or facilities associated with vehicle maintenance |
| Green: | Chemical plants, and textile facilities |
| Red: | Meat packers |
| Gray: | Dairies |
| Turbidity –Dry weather industrial flows with moderate turbidity can be cloudy, while highly turbid flows can be opaque. High turbidity is often a characteristic of undiluted dry-weather industrial discharges. | |
| Cloudy: | Sanitary wastewater, concrete or stone operations, fertilizer facilities, and automotive dealers |
| Opaque: | Food processors, lumber mills, metal operations, and pigment plants |
| Deposits and Stains – Refer to any type of coating near the outfall and are usually of a dark color. Deposits and stains often will contain fragments of floatable substances. These situations are illustrated by the grayish-black deposits that contain fragments of animal flesh and hair which often are produced by leather tanneries or the white crystalline powder which commonly coats outfalls due to nitrogenous fertilizer wastes. | |
| Sediment: | Construction site erosion |
| Oily: | Petroleum storage facilities and vehicle maintenance facilities |
| Vegetation – Vegetation surrounding an outfall may show the effects of industrial pollutants. Decaying organic materials coming from various food product wastes would cause an increase in plant life, while the discharge of chemical dyes and inorganic pigments from textile mills could noticeably decrease vegetation. It is important not to confuse the adverse scouring effects of high stormwater flows on vegetation with highly toxic dry weather intermittent flows. | |
| Excessive growth: | Food product facilities |
| Inhibited growth: | High stormwater flows, beverage facilities, printing plants, metal product facilities, drug manufacturing, petroleum facilities, vehicle maintenance facilities and automobile dealers. |

| Physical Parameter | Description |
|---|---|
| Damage to Outfall Structures –Cracking, deterioration, and spalling of concrete or peeling of surface paint, occurring at an outfall can be caused by severely contaminated discharges, usually of industrial origin. Primary metal industries have a strong potential for causing outfall structural damage because their batch dumps are highly acidic. | |
| Concrete cracking: | Industrial flows |
| Concrete spalling: | Industrial flows |
| Peeling paint: | Industrial flows |
| Metal corrosion: | Industrial flows |

This table was modified from Pitt ***et al.***, 1993. ***Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems: A User's Guide.*** EPA Office of Research and Development, EPA/600/R-92/238.

### Outfall Classification

A preliminary assessment of illicit discharge potential should be performed for each outfall once the physical observations are complete. The following summary table provides descriptions of four (4) outfall designations, This assessment coupled with sampling for chemical parameters will aid in characterization of the discharge,

| Designation | Description |
|---|---|
| Obvious Discharge | Outfalls where there is an illicit discharge that doesn't even require sample collection for confirmation. |
| Suspect Discharge | Flowing outfalls with high severity on one or more physical indicators. |
| Potential Discharge | Flowing or non-flowing outfalls with presence of two or more physical indicators. |
| Unlikely Discharge | Non-flowing outfalls with no physical indicators of an illicit discharge. |

*Source: 2004 Center for Watershed Protection Illicit Discharge Detection and Elimination Guidance Manual*

## Chemical Parameters

When visual observation is not definitive in determining whether a dry weather flow is truly an illicit discharge, chemical sampling can be an important method for determining both the presence of illicit discharges, as well as potential sources that can be crucial in source tracing and identification. Where screening of physical parameters indicate the potential presence of an illicit discharge, sampling for chemical parameters should be initiated within 72 hours of the identification of the potential illicit discharge. This section defines these parameters and the typical sampling ranges that would indicate a potential illicit discharge. Appendix B outlines actual field sampling procedures for these parameters.

## pH

The South Carolina surface water quality standard for pH is a range from 6.0 to 8.5 (SC Reg. 61-68, Water Classifications & Standards). Values outside of this range are an indicator of an illicit discharge. Water with values less than 6.0 are acidic and may indicate discharges from textile mills, pharmaceutical manufacturers, metal fabricators, and companies that produce resins, fertilizers, or pesticides. Wastes containing sulfuric, hydrochloric, or nitric acids are a common source of contamination. Water with values greater than 8.5 may indicate discharges from industries such as the following: textile mills, metal plating facilities, steel mills, and producers of rubber and plastic. Wash water used to clean floors and industrial machinery may also produce alkaline wastewater.

| pH Range | Comment | Possible Causes |
|---|---|---|
| <6.0 | Acidic | Textile mills, pharmaceutical manufactures, metal fabricators and companies that produce resin, fertilizers, or pesticides |
| 6.0 – 8.5 | Normal | N/A |
| >8.5 | Alkaline | Textiles mills, metal plating facilities, steel mills, producers of rubber and plastic, and wash water used to clean floors or industrial machinery |

## Total Chlorine

The absence of chlorine may indicate a natural water source. However, due to chlorine's ability to quickly dissipate, caution should be used when making judgements based on its absence. Generally, only potable water sources will contain chlorine residual. Therefore, the presence of chlorine insures that the source is not a natural water source. Very high levels (above 5.0mg/l) of chlorine typically indicate discharge from a swimming pool or other potable water source.

| Total Chlorine Range (mg/L) | Comment | Possible Causes |
|---|---|---|
| >5.0 | High | Swimming pool or potable water sources |

## Total Copper

Elevated levels of copper may indicate discharges from cooling, boiler, or industrial re-circulation systems. Copper sulfate is typically used as an algaecide in all of these systems.

Copper can also be an indicator of discharges from an automobile manufacturing or maintenance facility from brake pads and other auto parts.

| Total Copper Range (mg/L) | Comment | Possible Causes |
|---|---|---|
| >0.5 | High | Manufacturing/Industrial discharges |

## Total Phenols

Phenols are defined as hydroxy derivatives of benzene and its condensed nuclei, and may occur in domestic and industrial wastewaters, natural waters, and potable water supplies. Chlorination of such waters may produce odorous and objectionable tasting chlorophenols. Phenols removal processes in water treatment include super chlorination, chlorine dioxide or chloramine treatment, ozonation, and activated carbon adsorption. Caution should be exercised, since phenols may also be present in other waste streams. Phenols should be considered in relation to other parameters in determining the potential source.

| Total Phenols Range (mg/L) | Comment | Possible Causes |
|---|---|---|
| >0.399 | High | Industrial process water/Rinse water |

## Surfactants/Detergents

Typically, the presence of surfactants and detergents will indicate a connection to either an automobile wash facility or a laundry facility. They may also occur from power washing buildings or paved surfaces. High surfactants/detergents and elevated temperatures are a good indicator of laundry facilities. Lower levels of surfactants/detergents may indicate a connection to a residential laundry or industrial facility. Per SCDHEC, normal ranges of surfactants/detergents are 0.0 to 5.0 mg/l.

| Surfactants/Detergents Range (mg/L) | Comment | Possible Causes |
|---|---|---|
| 0 – 5.0 | Normal | N/A |
| > 5.0 | High | Automobile wash or Laundry Facility |

# Biological Parameters

Enterococci, ***E. coli*** and fecal coliform are the three species of indicator bacteria used by the State of South Carolina to monitor the safety of its surface waters. These bacteria normally live in the intestines of warm-blooded animals, including humans. Most are harmless; however, detection of enterococci, ***E. coli*** or fecal coliform bacteria in surface waters is an indicator of the presence of a sanitary sewer or septic system discharge to the storm drainage system. SC Reg. 61-68, Water Classifications & Standards, establishes limits for indicator bacteria for salt waters, freshwaters and shellfish waters. These limits are presented in the bacteria tables below as a reference for gauging normal concentrations of indicator bacteria for stormwater outfall screening.

## Enterococci Bacteria

South Carolina's indicator bacteria for salt waters is enterococci. The stream limits for enterococci bacteria in Class SA tidal salt waters are 104 MPN/100 mL for a daily maximum and 35 MPN/100 mL as a 30-day average. The stream limits for enterococci bacteria in Class SB tidal salt waters are 501 MPN/100 mL for a daily maximum and 35 MPN/100 mL as a 30- day average.

| Enterococci Bacteria (MPN/100 mL) | Comment | Possible Causes |
|---|---|---|
| <104 | Normal | N/A |
| >104 | High | Sanitary Sewer or Septic System |

## *E. coli* Bacteria

South Carolina's indicator bacteria for freshwaters is ***E. coli***. The stream limits for ***E. coli*** bacteria in freshwaters are 349 MPN/100 mL for a daily maximum and 126 MPN/100 mL as a 30-day average.

| *E. coli* Bacteria (MPN/100 mL) | Comment | Possible Causes |
|---|---|---|
| <349 | Normal | N/A |
| >349 | High | Sanitary Sewer or Septic System |

## Fecal Coliform Bacteria

South Carolina's indicator bacteria for shellfish waters is fecal coliform. The stream limits for fecal coliform bacteria in shellfish waters are 43 MPN/100 mL for a daily maximum and 14 MPN/100 mL as a 30-day average.

| Fecal Coliform Bacteria (MPN/100 mL) | Comment | Possible Causes |
|---|---|---|
| <43 | Normal | N/A |
| >43 | High | Sanitary Sewer or Septic System |

## Common Sources of Illicit Discharges

The following section describes the most common sources of illicit discharges. These are typically associated directly with cross connections of potable water or sanitary sewers with the storm drainage system, system leaks entering the storm drainage system, or sanitary sewer overflows.

### Treated Potable Water (Chlorine)

A number of chemical indicators may be useful for distinguishing treated potable water from natural waters:

- Major ions or other chemical/physical characteristics of the flow components can vary substantially depending upon whether the water supply sources are groundwater or surface water and whether the sources are treated or not. Specific conductance may also serve as a rough indicator of the major water source.

- Fluoride can often be used to separate treated potable water from untreated water sources. Untreated water sources can include local springs, groundwater, regional surface flows, or non-potable industrial waters. If the treated water has no fluoride added, or if the natural water has fluoride concentrations close to potable water fluoride concentrations, then fluoride may not be an appropriate indicator.

- Hardness can also be used as an indicator if the potable water source and the baseflow are from different water sources. An example would be if the baseflow is from harder groundwater and the potable water is from softer surface supplies.

- If the concentration of chlorine is high, then a leak of disinfected potable water is likely to be close to the outfall. Because of the rapid dissipation of chlorine in water (especially if some organic contamination is present) it is not a good parameter for quantifying the amount of treated potable water observed at the outfall.

Water from potable water supplies (that test positive for fluorides, or other suitable tracers) can be relatively uncontaminated (e.g., potable waterline leakage or irrigation runoff) or heavily contaminated (e.g., sanitary wastewater).

## Sanitary Wastewater

In areas containing no industrial or commercial sources, sanitary wastewater is probably the most severe dry weather contaminating source of storm drain flows. The following parameters can be used for quantifying the sanitary wastewater components of the treated potable water portion:

- Surfactant analysis may be used in determining the presence of sanitary wastewaters. However, surfactants present in water originating from potable water sources could indicate sanitary wastewaters, laundry wastewaters, car washing wastewater, or any other waters containing surfactants. If surfactants are not present, then the potable water could be relatively uncontaminated (potable waterline leaks or irrigation runoff).

- The presence of fabric whiteners (as measured by fluorescence using a fluorometer in the laboratory or field) can also be used in distinguishing laundry and sanitary wastewaters.

- Sanitary wastewaters often exhibit predictable trends during the day in flow and quality. In order to maximize the ability to detect direct sanitary wastewater connections into the storm drainage system, it would be best to survey the outfalls during periods of highest sanitary wastewater flows (mid to late morning hours).

- The ratio of surfactants to ammonia or potassium concentrations may be an effective indicator of the presence of sanitary wastewaters or septic tank effluents. If the surfactant concentrations are high, but the ammonia and potassium concentrations are low, then the contaminated source may be laundry wastewaters. Conversely, if ammonia, potassium, and surfactant concentrations are all high, then sanitary wastewater is the likely source. Some researchers have reported low surfactants in septic tank effluents. Therefore, if surfactants are low, but potassium and ammonia are both high, septic tank effluent may be present.

- Obviously, odor and other physical characteristics such as turbidity, coarse and floating solids, foaming, color, and temperature would also be very useful in distinguishing sanitary wastewater from washwater or laundry wastewater sources. However, these indicators may not be obvious for small levels of sanitary wastewater contamination.

# Appendix B – Outfall Sampling Procedures

# Overview of Dry Weather Screening/Sampling Procedures

Upon arriving at an outfall, a physical inspection is performed. (See Appendix E, Illicit Discharge Inspection Form.) First record the inspection date, inspector name, Asset ID and background information as applicable. Then note the time since last rain, tide level and impending tide, structural condition, percent blockage, presence of scum, and estimated discharge rate. If no evidence of illicit discharge is present, the inspection is complete. If evidence of potential illicit discharge is found, continue with the inspection: A description of the flow rate, color, odor, turbidity, floatables, and stain observations are recorded on site. Additionally, adjacent vegetation is observed and recorded. Make a preliminary assessment of the illicit discharge potential based on the physical observations. A full description of the type and quantity of the discharge and a photograph of the discharge should be included in the record.

If physical screening indicates the presence of a potential illicit discharge, a grab sample shall be collected from the discharge point within 72 hours of the initial physical investigation. Temperature and pH are measured in the field using a Hach Sension pH/Temperature meter or equivalent immediately after the grab sample is taken. The samples should then be tested for Total Chlorine, Total Copper, Total Phenols, and Surfactants/Detergents using a Hach DR 1900 mobile Spectrophotometer or equivalent mobile laboratory. Where physical screening indicates the presence of potential sewage flow, field personnel shall take a second field sample for laboratory analysis, in accordance with the procedures outlined below.

After observing and recording outfall screening observations and sampling, proceed upstream if necessary, tracking the discharge up through the conveyance system. Look for continuing evidence of illicit discharge. Additional sampling may be taken and recorded while tracking the discharge. A confirmatory sampling may be taken at the upstream location of the source. Once the source has been identified, notify the Berkeley County Stormwater Management Program to initiate communication with the property owner, or enforcement as needed.

# Calibration

## Prior to Starting Point Collection

Prior to calibrating equipment or collecting any samples, the manufacturer of the selected pH/Temperature meter and spectrophotometer should be consulted to provide technical support and directions for operating the required equipment. Proper decontamination procedures are also vital to quality analysis and should be followed as recommended by the manufacturer.

At the beginning of each week, a calibration of the Hach Sension pH/Temperature meter and the Hach DR 1900 Spectrophotometer (or equivalents) should be performed. The calibration for the pH/Temperature meter and Spectrophotometer should be completed in accordance with the manufacturer provided User Manual or other technical resources from the manufacturer.

Each day prior to entering the field, a pH calibration check should be performed using either the pH 4.00 or pH 10.00 QC standard. Let the pH reading stabilize and when a lock is achieved the meter should read the pH of the known QC standard. If the reading does not match the pH QC standard then recalibrate the pH meter in accordance with the manufacturer provided User Manual or other technical resources from the manufacturer.

## Visual Observation

Safety is the first priority upon arriving at a site and when completing visual observations. A brief assessment of potential hazards should be completed to avoid unnecessary risk and ensure safety during dry weather screening and sampling. Communication between field personnel is vital and will lead to greater safety and more successful work.

Upon arriving at the outfall, a visual observation of the structure and structure flow is performed. The Data Dictionary outlines all of the visual parameters which will be recorded for each discharge point. A GPS unit will incorporate the Data Dictionary and will be used to record all visual observations and sampling data.

Record all parameters as prompted within the Data Dictionary. Visual parameters include: discharge rate, flow rate description, color, odor, turbidity, floatables, and stains. Additionally, the structure condition, percent blockage, and adjacent vegetation are observed and recorded. Other information, which appears in the Data Dictionary, including time since last rain and tide level are also recorded.

## Grab Sample Collection

Upon completion of the visual observation, a set of two (2) grab samples, sufficient in size to perform the below analysis, are to be collected from the outfall if flow is present with a minimum period of four (4) hours between the two samples. A clean & clear Nalgene bottle (sample bottle) is to be used for grab sample collection.

Prior to collecting the grab samples, the sample bottles should be rinsed 3 times with the stormwater flow from the discharge point. After properly rinsing, fill the sample bottle from the horizontal and vertical center of the stormwater stream, being careful not to pick up sediment from the bottom.

### Sampling Procedures

After collecting the grab sample, the first bottle should be used to collect field parameters. The parameters to be collected in the field include:

- Temperature
- pH
- Total Chlorine
- Total Copper
- Total Phenols
- Surfactants/Detergents

Temperature and pH should immediately be taken in the field using a Hach Sension pH/Temperature meter or equivalent. The samples should then be tested for Total Chlorine, Total Copper, Total Phenols, and Surfactants/Detergents using a Hach DR 1900 Spectrophotometer or equivalent in a mobile laboratory. These procedures are outlined below.

The second sample bottle should be stored on ice in a cooler for laboratory analysis. See **Bacteria Sampling Procedures** below for proper storage and sampling techniques for bacterial analysis.

## Sampling Parameters

### pH and Temperature

Using the pH/Temperature meter, pH and Temperature should immediately be taken after collecting the grab sample. Prior to collecting pH and Temperature, rinse the probe with DI water and dry gently by blotting with a tissue. The pH and Temperature parameters should be analyzed in accordance with the manufacturer's User Manual or other technical resources from the manufacturer. Record all analysis results in GIS using the Data Dictionary, or record the results on the Illicit Discharge Inspection Form in Appendix E and update the GIS data in the office.

### Total Chlorine

Using the Spectrophotometer, Total Chlorine should be analyzed next. The Total Chlorine parameter should be analyzed in accordance with the manufacturer's User Manual or other technical resources from the manufacturer. Record all analysis results in GIS using the Data Dictionary. Total Chlorine results greater than 5.0 mg/L are considered high and may be caused by swimming pools or potable water sources.

### Total Copper

Using the Spectrophotometer, Total Copper should be analyzed next. The Total Copper parameter should be analyzed in accordance with the manufacturer's User Manual or other technical resources from the manufacturer. Record all analysis results in GIS using the Data Dictionary. Total Copper results greater than 0.5 mg/L are considered high and may be caused by manufacturing or industrial discharges.

### Total Phenols

Using the Spectrophotometer, Total Phenols should be analyzed next. The Total Phenols parameter should be analyzed in accordance with the manufacturer's User Manual or other technical resources from the manufacturer. Record all analysis results in GIS using the Data Dictionary. Total Phenol results greater than 0.399 mg/L are considered high and may be caused by industrial process water or rinse water.

### Surfactants/Detergents

Using the Spectrophotometer, Surfactants/Detergents should be analyzed next. The Surfactants/Detergents parameter should be analyzed in accordance with the manufacturer's User Manual or other technical resources from the manufacturer. Record all analysis results in GIS using the Data Dictionary.

## End of Day

At the end of each work day, complete a pH/Temperature meter check by running a pH test with the pH 10.00 QC standard. Make sure all equipment has been cleaned (glassware with non-phosphate detergent) and set out to dry. Charge the batteries for all equipment. Make any required preparations for the next day sampling.

## Bacteria Sampling Procedures

The sampling outlined below is designed to enable the County to sample for bacteria as a potential pollutant of concern with respect to illicit discharges in the Coastal Zone of South Carolina. Enterococci, ***E. coli*** and fecal coliform are indicator bacteria and, if present in a dry weather field screening sample, can indicate the presence of an illicit discharge from septic systems or sanitary sewers. The following outlines sampling procedures, safe storage and chain of custody requirements to provide usable sampling results to the County. The bacteria parameter should be selected based on the South Carolina Water Quality Standards for the receiving water. Enterococci should be chosen for saltwater; ***E. coli*** for freshwaters; and fecal coliform for shellfish waters.

As previously stated, upon completion of the visual observation, in addition to the two (2) grab samples, sufficient in size to perform the analysis to be collected from the discharge point if flow is present. A clean & clear bottle (lab provided sample bottle with appropriate preservatives) is to be used for grab sample collection. This bacterial sample should be stored on ice for laboratory analysis. The following requirements and procedures must be in place to ensure accurate sampling results:

The samples will be collected by manual "grab" sampling as follows:

- Container Preparation and Labeling
    - Reused Sample Bottles: Prepare one-liter sample bottles. Reused sample bottles must be rinsed and sterilized at 121° C for 15 minutes using an autoclave before sampling. Sample bottles should have tape over the cap or a marking to indicate that they have been sterilized. Sample bottles shall be clearly marked.
    - Sample bottles/bags shall be clearly labeled with the following information:
        - Outfall location (e.g., address, nearest street or subdivision) and unique identifier from GIS

- Sample date
- Sample time
- Sampling team member's initials

- Direct Sampling Surface Water
  - Remove stopper/cap from bottle just before sampling. Be careful not to contaminate the cap, neck, or the inside of the bottle with your fingers, wind- blown particles, or dripping water from your clothes, body, or overhanging structures.
  - Place yourself facing the outfall flow.
  - Hold the bottle near its base, reach out in front of yourself as far as possible, and plunge it (mouth down) below the surface to a depth of 6 inches or more if the sediments will not be disturbed.
  - Keep the bottle submerged long enough for the bottle to fill.

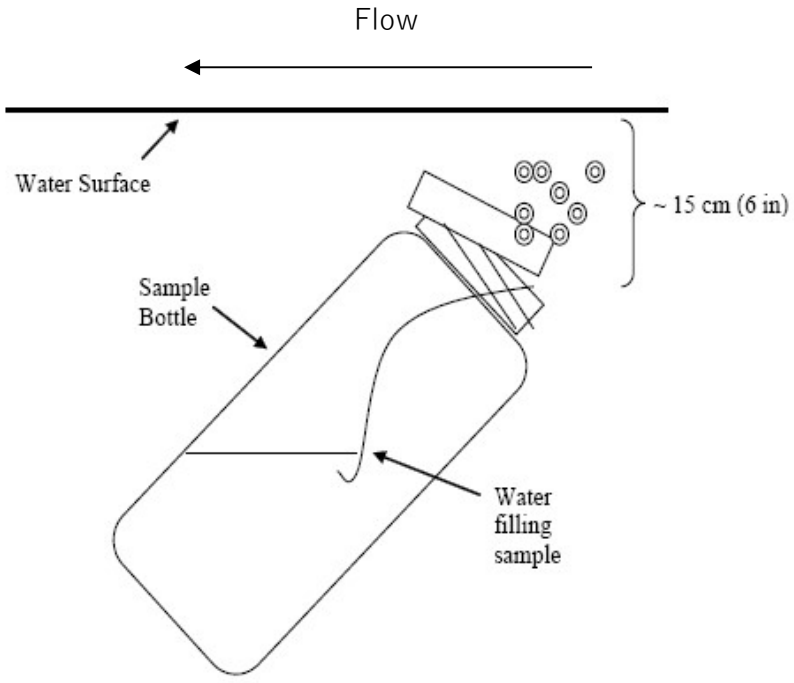



**Figure A-1: Sample Collection**

- If an extension pole is used from a bridge or streambank, securely attach the sample bottle (with its cap in place) to the holder with the clamps or bands. Remove the cap being careful not to contaminate the bottle and follow the above procedure.

- Tip out some of the water to allow for air space needed for proper mixing at the lab. Securely replace the cap of the bottle being careful not to touch the inside of the cap.

- Rinse any large amount of dirt or debris from the outside of the bottle after securing the cap.

- Sample Storage

  - After collecting the sample, immediately review the sample tag to ensure accurate location and analytical information. Record the time the sample was collected on the tag and enter relevant data into the Field Data Sheet/Chain of Custody using waterproof ink.

  - Immediately place labeled sample bottle on ice in a cooler with a tight-fitting lid. Use only enough ice to maintain the required preservation temperature of 6 ° C or less (and not frozen).

- Field Data Sheet/Chain of Custody Form (Appendix B below)

  - Sampling Information. Complete the field data for each sample collected.

  - Immediately following sample collection, complete the Chain of Custody for the samples collected from each monitoring station.

  - Upon delivery to the Lab, sign the Field Data Sheet/Chain of Custody Form to relinquish the samples to the Lab.

- Sample Delivery

  - Return the Field Data Sheet/Chain of Custody Form and the samples to the Laboratory or to a previously designated drop-off point as soon as possible. Samples must be analyzed within 8 hours of collection.

  - Samples must be analyzed at a laboratory certified by SCDHEC for the analysis of enterococci, ***E. coli*** or fecal coliform.

**BERKELEY COUNTY DRY WEATHER SCREENING SAMPLING**
**FIELD DATA SHEET/CHAIN OF CUSTODY**

*Form must be filled out and a copy retained at the County Engineering Department as part of the monitoring record. Fill out the following table completely.*

| Sampling Event No.: _____<br>Date of Sample Set: _____<br>Hours after Measured Rainfall Event (Greater than 0.1 inches): _____ (Must be a Min. 72 hours) | Outfall ID | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| Time of Sample | | | | | | |
| One-liter sampling bottle | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N |
| Bottles labeled with date and time | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N |
| Bottles labeled with sample location | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N |
| Samples put on ice after collection | Y / N | Y / N | Y / N | Y / N | Y / N | Y / N |
| Sample temperature / Blank temperature at collection | ___/___° C | ___/_ ° C | ___/_ ° C | ___/_ ° C | ___/___° C | ___/___° C |
| Temperature upon receipt at Lab | ____° C | _ ° | _ ° | _ ° | ____° C | ____° C |

Comments/General Field observations: _____

_____

_____

Field Monitor Name: _____ Field Monitor Signature: _____ Date: _____

**BERKELEY COUNTY DRY WEATHER SCREENING SAMPLING**
**FIELD DATA SHEET/CHAIN OF CUSTODY**

| | | | | | |
|---|---|---|---|---|---|
| Chain of Custody No.: | | | Project Point of Contact: | | |
| Destination Lab: | | | Phone Number: | | |
| Date | Time | Relinquished by | Date | Time | Received by |
| Date | Time | Relinquished by | Date | Time | Received by |
| Date | Time | Relinquished by | Date | Time | Received by |

| Sample ID | No. Bottles | PARAMETERS | Bacteria | | | Chemical | | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Enterococci | *E. Coli* | Fecal Coliform | Total Chlorine | Total Copper | Total Phenol | Surfactant | | | | |
| | | | | | | | | | | | | | |
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# Appendix C – Data Dictionary

# Introduction

The following tables represent the data dictionary for field collection parameters that complies with the GIS/GPS data structure for Berkeley County as defined in the ***Berkeley County Stormwater GIS/GPS Procedures Manual (GIS/GPS Manual)***, February 2018. This data dictionary is provided in this Appendix as a reference for field personnel completing outfall and illicit discharge data. Additional data collection parameters for stormwater infrastructure can be found in the GIS/GPS Manual.

# Outfall Screening Summary

| FEATURE CLASS | NOTES | TYPE |
|---|---|---|
| swDischargePoint | Subset is Outfalls. | Point |
| IDDETrack | Downstream location of potential illicit discharge. | Point |
| IllicitDischargeSource | Location of upstream source of illicit discharge. | Point |
| **TABLE** | **NOTES** | |
| NPDESScreen | Outfall screening visual observations and sampling results. Linked to swDischargePoint feature class. | -- |

# swDischargePoint (DISCHARGE_POINTS)

| FIELD NAME | FIELD DESCRIPTION | ADDITIONAL NOTES |
|---|---|---|
| **ASSETID** | ASSETID – unique identifier code | To be used within GIS as the primary linkage field. |
| **GISOBJID** | EAM ID - Enterprise Asset Management Servicer | Unique identifier for enterprise asset management system. |
| **LegacyID** | Legacy ID – former AssetIDs in County's database | Use in processing former data and tracking changes. |
| **GlobalID** | Global Identifier code | Primary identifier never changes. |
| **DISCHID** | Discharge Identifier | Assign as needed. |
| **PERMITID** | Unique permit identifier | County populate as needed. |
| **INSTALLDATE** | The date the asset was installed or constructed | Populate if known. |
| **LOCDESC** | Location Description | Street Address, HOA, Subdivision, or description of location of discharge point on the parcel. |
| **DISCHRGTYP** | The type of stormwater discharge - tied to ***swDischargePointType*** domain | Options are: Pipe, Culvert, Channel, Spillway, or Bridge. Bridge outfalls are identified using aerial image. |
| **OUTFALL** | OUTFALL - tied to ***BooleanDomain*** domain | Yes/No if discharge point is an MS4 outfall. May be determined in office using last feature at the downstream end of a drainage line. Upstream discharge points are not outfalls. |
| **MAINSHAPE** | Main Shape - tied to ***swPipeShape*** domain | Shape of asset where discharge point is located. |
| **SHAPECONFIG** | Channel cross-sectional shape – tied to ***swChannelShape*** domain | Identify as Trapezoidal, Rectangular, Parabolic/U-shaped, Triangular/V-shaped or Valley Gutter Roadway |
| **MATERIAL** | Material the asset is manufactured with - tied to ***swPipeMaterial*** domain | Identify the material at point of discharge. |
| **LiningType** | Material Bottom/Protection – tied | Identify material lining of discharge point. |
| **STRUCT_TYP** | STRUCT_TYP – end structure of asset at discharge point – tied to ***swStructTYP*** domain | If more than one, note in Comments. |
| **DIAMETER** | The diameter of the asset - tied to ***swPipeDiameter*** domain | Diameter of asset, if circular, where discharge point is located. |
| **WIDTH** | WIDTH – of asset | Dimension of asset, if rectangular, where discharge point is located. |
| **WIDTHBOT** | Bottom Width – of asset | Dimension of asset, if rectangular, where discharge point is located. |
| **HEIGHT** | HEIGHT – of asset | Dimension of asset, if rectangular, where discharge point is located. |

| FIELD NAME | FIELD DESCRIPTION | ADDITIONAL NOTES |
|---|---|---|
| **INVERTDEPTH** | Invert Depth – of discharge point | Depth to invert at point of discharge. |
| **INVERTELEV** | Invert Elevation – of discharge point | Elevation at point of discharge. |
| **BridgeWidth** | Width of Bridge – if bridge is also an outfall | Populate if discharge sheet flows from bridge into receiving water. Inlets/scuppers are mapped in the Inlets feature class. |
| **BridgeLength** | Length of Bridge – if bridge is also an outfall | Populate if discharge sheet flows from bridge into receiving water. Inlets/scuppers are mapped in the Inlets feature class. |
| **DischargeLoc** | The location of the discharge point – tied to ***swOutletLocation*** domain | Legacy field/data. |
| **BMP** | BMP - tied to the ***YesNo*** domain | Yes if discharge point is from BMP directly to waters. |
| **STENCIL** | Storm Drain Stencil – tied to ***YesNo*** domain | Identify points marked (with paint, sticker, sign or plate) "No Dumping - Drains to River" or similar |
| **COMMENTS** | Narrative field – describe unique circumstances in feature or attributes only. | Separate comments with # sign. |
| **ACTIVEFLAG** | Indicates if the feature is in use/active - tied to ***BooleanDomain*** domain | If as-built feature cannot be located in field, keep in database but mark ActiveFlag as "No". |
| **LIFECYCLESTATUS** | Indicates status/use of feature – tied to ***LifeCycleStatus*** domain. | Identify active, abandoned, under construction, etc. |
| **AncillaryRole** | Ancillary Role – tied to ***AncillaryRoleDomain*** domain | Options are: source, sink, none. |
| **NeedsMaintenance** | For use in field data collection – tied to ***swMaint*** domain | Document maintenance issues observed in the field. |
| **Accessible** | For use in field data collection – tied to ***swAccessibility*** domain | Document access difficulties observed in the field. |
| **OWNEDBY** | Owned by - Indicates which organization owns the asset - tied to ***swAgency*** domain | Identify Berkeley County, Goose Creek, Hanahan, etc.; update with annexation. |
| **MAINTBY** | Indicates which organization maintains the asset - tied to ***swAgency*** domain | Identify Berkeley County, Goose Creek, Hanahan, private, etc.; may be determined by maintenance agreement. |
| **LASTUPDATE** | The date the feature was last updated in the database | Date of most recent edits |
| **LASTEDITOR** | The user who performed the last update | Name of analyst |
| **SOURCE** | SOURCE - tied to ***uSource*** domain | As-built, GPS, aerial image, etc. |
| **SOURCEACC** | SOURCEACC - tied to ***uSourceAccuracy*** domain | Accuracy of GPS equipment |

| FIELD NAME | FIELD DESCRIPTION | ADDITIONAL NOTES |
|---|---|---|
| **SOURCEDATE** | SOURCEDATE – date of source data used to create GIS | Date of as-built, GPS survey, aerial image, etc. |
| **SOURCEDATUM** | SOURCEDATUM – tied to ***uSourceDatum*** domain | Datum used in as-built, survey, etc. |
| **HUC12** | Hydrologic Unit Code - from USGS | Identify the 12-digit hydrologic unit code for the subwatershed in which the discharge point is located. |
| **RECSTREAM** | Receiving Stream – receives discharge from feature | Identify the body of water directly downstream of the discharge point. |
| **WatshedName** | Watershed Name – assigned by Berkeley County | Identify the watershed in which the discharge point is located. |
| **PHOTO_FILENAME** | Photo filename and photo number | May use ***uattachment*** domain options (area, internal, issue, etc.) in filename. |
| **PHOTO_PATH** | Directory location where photo file is stored | Files are stored on a server separate from the GIS database. |
| **PHOTO_RELPATH** | Relative directory location where photo file is stored | // allows gdb to find the photo if server is mapped under a different letter. |
| **DimUOMElev** | Unit of Measure for Elevation – tied to ***uDimUOMElev*** domain | Elevations |
| **DimUOMLength** | Unit of Measure for Length Dimension – tied to ***uDimUOMLin*** domain | Linear dimension |
| **DimUOMWidth** | Unit of Measure for Width Dimension – tied to ***uDimUOMLin*** domain | Linear dimension |
| **DimUOMDepth** | Unit of Measure for Depth Dimension – tied to ***uDimUOMLin*** domain | Linear dimension |
| **DimUOMHeight** | Unit of Measure for Height Dimension – tied to ***uDimUOMLin*** domain | Linear dimension |
| **DimUOMDiameter** | Unit of Measure for Diameter Dimension – tied to ***uDimUOMLin*** domain | Linear dimension |
| **XCORD** | X-Coordinate from GPS | Calculate using survey grade GPS point |
| **YCORD** | Y-Coordinate from GPS | Calculate using survey grade GPS point |
| **ZCORD** | Z-Coordinate from GPS | Calculate using survey grade GPS point |
| **ROTATION** | ROTATION–of symbol | Use for symbology as needed. |
| **ENABLED** | Geometric Network - tied to ***EnabledDomain*** domain | True indicates geometric network has been built and feature can be traced. |
| **GRID** | Map Grid number where the feature is located | Custom grid for Berkeley County |

## Discharge Point Notes

→ Discharge Point Type domain: Pipe, Channel, Culvert, Bridge, Overflow Spillway, Other.

→ This feature class is intended to only store information specific to the point of discharge, with minimal attributes. The underlying asset where the discharge point is located should be mapped in the appropriate feature class (pipe, culvert, channel, etc.)

→ This feature class has legacy data which cannot be migrated to the appropriate underlying feature class because the data was collected as points rather than lines. These attributes should be made un-editable for the future in order to ensure new data collection occurs in the correct feature class.

→ New outfalls will be extracted from the ends of the flow network and copied to this feature class.

→ Other NPDES-related data is stored in the NPDESSCREEN table and linked by AssetID.

# IDDETrack

| Field Name | Field Description | Additional Notes |
|---|---|---|
| **ASSETID** | ASSETID – unique identifier code | To be used within GIS as the primary linkage field. |
| **GISOBJID** | EAM ID - Enterprise Asset Management Servicer | Unique identifier for enterprise asset management system. |
| **INVENTORY_DATE** | The date of outfall screening for illicit discharge | Field observations date. Should match NPDESScreen table Inspection Date. |
| **REPORTED** | Investigation trigger - tied to ***npdesReportHow*** domain. | Report may be verbal or written, from citizens or County personnel, or result from routine outfall |
| **REPORT_DESC** | Description of the reported illicit discharge at downstream location | Complaint or observations of potential illicit discharge |
| **REASON_TRACKED** | Reason for inspection – tied to ***npdesReason*** domain. | Reasons could be Random Selection of Outfalls, Citizen Complaint, Re-Inspection of previous illicit |
| **INVEST_STATUS** | Status of investigation for illicit discharge - tied to ***npdesIllnvest*** domain. | Enter status of investigation. Note details in Comments field. |
| **CASESTATUS** | Illicit Discharge tracking status – tied to ***npdesIDDE_Status*** domain. | Identify as Active or Closed |
| **COMMENTS** | Narrative field - unique circumstances | Separate comments with # sign. |
| **INSPECTOR** | Name of person conducting outfall screening | First and last name. |
| **HUC12** | Hydrologic Unit Code - from USGS | Identify the 12-digit hydrologic unit code for the subwatershed in which the illicit discharge outfall is located. |
| **WATERSHED_NAME** | Watershed Name – assigned by Berkeley County | Identify the watershed in which the illicit discharge outfall is located. |
| **PHOTO_FILENAME** | Photo filename and photo number | May use ***uattachment*** domain options (area, internal, issue, etc.) in filename |
| **PHOTO_PATH** | Directory location where photo file is stored | Files are stored on a server separate from the GIS database. |
| **PHOTO_RELPATH** | Relative directory location where photo file is stored | // allows gdb to find the photo if server is mapped under a different letter. |
| **XCORD** | X-Coordinate from GPS | Calculate using survey grade GPS point |
| **YCORD** | Y-Coordinate from GPS | Calculate using survey grade GPS point |
| **ZCORD** | Z-Coordinate from GPS | Calculate using survey grade GPS point |
| **GRID** | Map Grid number where the feature is located | Custom grid for Berkeley County |

## IDDETrack Notes

→ This feature class stores the downstream location of potential illicit discharges.

→ One to Many relationship with this feature class allows each outfall screening event to create a new record, all tied back to the AssetID.

# IllicitDischargeSource

| Field Name | Field Description | Additional Notes |
|---|---|---|
| **ASSETID** | ASSETID – unique identifier code | To be used within GIS as the primary linkage field. |
| **GISOBJID** | EAM ID - Enterprise Asset Management Servicer | Unique identifier for enterprise asset management system. |
| **INSPECTOR** | Name of person conducting outfall screening | First and last name. Should match inspector name in IDDETrack of downstream location. |
| **INVENTORY_DATE** | The date of illicit discharge tracking to upstream source. | Field observations date. Should match NPDESScreen table Inspection Date and IDDETrack Inspection Date. If dates do not match, note reason in Comments field. |
| **ILLICIT_DESC** | Description of identified source of discharge – tied to ***npdesIllicitDesc*** domain. | Options are: Obvious Discharge, Suspect Discharge, Potential Discharge, Unlikely Discharge |
| **SOURCE** | Upstream source of the illicit discharge – tied to ***npdesIllicitSource*** domain. | Identify source of pollutants. Options are: industrial facility, construction site, auto body repair/gas station, car wash, outdoor materials/wastes storage, restaurant/grease trap, sanitary sewer overflow, illicit sanitary sewer connection, residential area, septic tank, illegal dumping or Unknown |
| **CASESTATUS** | Illicit Discharge tracking status – tied to ***npdesIDDE_Status*** | Identify as Active or Closed |
| **OWNER** | Owner of parcel where upstream source is located. | Use County tax/property owner records. |
| **TAXMAP** | Parcel number where upstream source is located. | Use County tax/property owner records. |
| **ADDRESS_NO** | Street number where upstream source is located. | Use County tax/property owner records. |
| **ADDRESS_ST_PREFIX** | Street prefix where upstream source is located. | Use County tax/property owner records. |
| **ADDRESS_NAME** | Street name where upstream source is located. | Use County tax/property owner records. |
| **ADDRESS_SUFFIX** | Street suffix where upstream source is located. | Use County tax/property owner records. |
| **CITY** | City where upstream source is located. | Use County tax/property owner records. |
| **STATE** | State where upstream source is located. | Use County tax/property owner records. |
| **ZIPCODE** | Zip code where upstream source is located. | Use County tax/property owner records. |

| Field Name | Field Description | Additional Notes |
|---|---|---|
| **COMMENTS** | Narrative field - unique circumstances in feature or attributes only. | Note relevant details of source, or if source is determined to be an authorized nonstormwater discharge (i.e., air conditioner condensate, landscape sprinklers, ) |
| **HUC12** | Hydrologic Unit Code - from USGS | Identify the 12-digit hydrologic unit code for the subwatershed in which the illicit source is located. |
| **WATERSHED_NAME** | Watershed Name – assigned by Berkeley County | Identify the watershed in which the illicit discharge source is located. |
| **PHOTO_FILENAME** | Photo filename and photo number | May use ***uattachment*** domain options (area, internal, issue, etc.) in filename |
| **PHOTO_PATH** | Directory location where photo file is stored | Files are stored on a server separate from the GIS database. |
| **PHOTO_RELPATH** | Relative directory location where photo file is stored | // allows gdb to find the photo if server is mapped under a different letter. |
| **XCORD** | X-Coordinate from GPS | Calculate using survey grade GPS point |
| **YCORD** | Y-Coordinate from GPS | Calculate using survey grade GPS point |
| **ZCORD** | Z-Coordinate from GPS | Calculate using survey grade GPS point |
| **GRID** | Map Grid number where the feature is located | Custom grid for Berkeley County |

## Illicit Discharge Source Notes

→ This feature class stores the upstream location of illicit discharges which have been tracked to their source.

→ One to Many relationship with this feature class allows each outfall screening event to create a new record, all tied back to the AssetID.

# NPDESScreen - Table

| Field Name | Field Description | Additional Notes |
|---|---|---|
| **ASSETID** | ASSETID – unique identifier code | To be used within GIS as the primary linkage field. |
| **GISOBJID** | EAM ID - Enterprise Asset Management Servicer | Unique identifier for enterprise asset management system. |
| **LEGACYID** | Legacy ID – former AssetIDs in County's database | Use in processing former data and tracking changes. |
| **GlobalID** | Global Identifier code | Primary identifier never changes. |
| **NPDESID** | NPDES Permit Number | NPDES Permit number of MS4 (Berkeley County, Hanahan, Goose Creek) where outfall is located, or other NPDES permitted outfall. |
| **Inspector** | Name of person conducting outfall screening | First and last name. |
| **INSPECDATE** | Date of NPDES outfall screening | Inspection date should match with IDDETrack feature class Inventory Date. |
| **WEATHER** | Weather conditions at time of screening | Use local weather report. |
| **LASTRAIN** | Last rainfall event prior to screening - tied to ***npdesLastRain*** domain | Identify: less than 24 hrs, 24 to 48 hrs, 48 to 72 hrs, greater than 72 hrs. Use local weather report and rainfall data. |
| **TIDELEVEL** | Tide at time of screening - tied to ***npdesTideLevel*** domain | Check local tide table: low tide, mid tide or high tide. |
| **IMPENDING_TIDE** | Tide at time of screening – tied to ***npdesImpendingTide*** domain. | Check local tide table. Indicate Rising or Falling tide. |
| **FLOW** | Flow rate of discharge - tied to ***npdesFlow*** domain | Options are: dry, trickle, low steady flow, significant flow, or submerged. If dry, populate stains, scum, odor and/or vegetation. |
| **DischargeR** | Estimated flow rate at outfall at time of | Visual estimate based on pipe diameter. |
| **EvidIllicit** | Evidence of illicit discharge - tied to ***YesNo*** domain | If yes, populate observation and sampling fields. If no, populate Date, Inspector, Weather, LastRain, TideLevel and Condition. |
| **COLOR** | Color of discharge - tied to ***npdesColor*** domain | Options are: clear, slightly tinted, rust, intense, black, white, oily. Note identifying details in Comments |
| **ODOR** | Odor of discharge - tied to ***npdesOdor*** domain | Options are: none, sewage, chlorine, petroleum, chemical, sulfide, rancid/sour. |
| **TURBIDI** | Discharge turbidity - tied to ***npdesTurb*** domain | Options are: clear, slight cloudiness, cloudy. |

| Field Name | Field Description | Additional Notes |
|---|---|---|
| **FLOATAB** | Discharge floatables - tied to ***npdesFloatable*** domain | Identify: foam, sewage, petroleum, film, none. |
| **STAINS** | Stains or residue from the discharge left on the conveyance system - tied to ***npdesStains*** domain | Options are: powder, rust, petroleum, none. |
| **Scum** | Scum in discharge or on asset - tied to ***YesNo*** domain | Yes if scum line is visible on structure or vegetation. |
| **VEGETATION** | Vegetation growth in the immediate discharge area - tied to ***npdesVeg*** domain | Identify: normal, slight or excessive vegetation. |
| **CONDITION** | Structural or overall condition of the asset - tied to ***Condition*** domain | Blockage/obstruction of asset stored in separate attribute. |
| **BlckPrcntg** | Percent blockage at outfall – tied to ***npdesBlockPercent*** domain | Estimate blockage of cross-sectional area of flow in increments of 25%. |
| **BlckType** | Type of blockage | State what object or material is blocking the discharge point. |
| **BlckRsn** | Reason for blockage – tied to ***npdesBlockReason*** domain | Reasons may be structural (collapse), temporary (parked vehicle) or other. |
| **NumSmpl** | Sample number – tied to ***npdesNumSmpl*** domain | Options are: First Sample, Second Sample, No Sample-Assessment Only, Illicit Tracking/Sampling. |
| **pH** | pH of sample at time of collection | Use probe. |
| **Temp** | Temperature of sample at time of collection (° C). | Use probe. |
| **Chlorine** | Total Chlorine concentration of sample at time of collection (mg/L). | Use mobile sampler. |
| **Copper** | Total Copper concentration of sample | Use mobile sampler. |
| **Phenol** | Total Phenol concentration of sample at time of collection (mg/L). | Use mobile sampler. |
| **Surfact** | Surfactant concentration of sample at time of collection (mg/L). | Use mobile sampler. |
| **Enterococcus** | Concentration of Enterococcus indicator bacteria for saltwaters (MPN/100mL). | Collect grab sample and send to lab. |
| **E. Coli** | Concentration of E. Coli indicator bacteria for freshwaters (MPN/100mL). | Collect grab sample and send to lab. |
| **Fecal Coliform** | Concentration of Fecal Coliform indicator bacteria for shellfish harvesting (MPN/100mL). | Collect grab sample and send to lab. |

## NPDES Screen Notes

→ This table stores the outfall screening visual observations, measurements and sampling results performed at locations of potential illicit discharges.

→ Downstream location of illicit discharge is stored in IDDETRACK feature class.

→ Upstream location of pollutant source of illicit discharge is stored in IllicitDischargeSource feature class.

→ One to Many relationship with this feature class allows each outfall screening event to create a new record, all tied back to the AssetID.

# Outfall Screening Domains

| | |
|---|---|
| **npdesColor (DISCHARGE POINTS)**<br>• Clear<br>• Slightly Tinted<br>• Rust<br>• Intense<br>• Black<br>• White<br>• Oily<br>• Other (See Comment) | **npdesOdor (DISCHARGE POINTS)**<br>• None<br>• Sewage<br>• Chlorine<br>• Petroleum<br>• Chemical<br>• Other (See Comment)<br>• Sulfide<br>• Rancid/Sour |
| **npdesTurb (DISCHARGE POINTS)**<br>• Clear<br>• Cloudy<br>• Slight Cloudiness<br>• Other (See Comment) | **npdesFloatable (DISCHARGE POINTS)**<br>• None<br>• Foam<br>• Petroleum<br>• Sewage<br>• Film<br>• Other (See Comment) |
| **npdesFlow (DISCHARGE POINTS)**<br>• Dry<br>• Trickle<br>• Low Steady Flow<br>• Significant Flow<br>• Submerged | **npdesLastRain (DISCHARGE POINTS)**<br>• Greater than 72hrs<br>• 48 to 72 hrs<br>• 24 to 48 hrs<br>• Less than 24 hrs |
| **npdesTideLevel (DISCHARGE POINTS)**<br>• Low tide at time of inspection<br>• Mid tide at time of inspection<br>• High tide at time of inspection | **npdesImpendingTide (DISCHARGE POINTS)**<br>• Rising<br>• Falling |
| **npdesStains (DISCHARGE POINTS)**<br>• None<br>• Powder<br>• Rust<br>• Petroleum<br>• Other (See Comment) | **npdesVeg (DISCHARGE POINTS)**<br>• Normal<br>• Slight<br>• Excessive<br>• Other |

| | |
|---|---|
| **npdesBlockReason (DISCHARGE_POINTS)**<br>• Permanent (structural)<br>• Temporary<br>• Other | **npdesBlockPercent (DISCHARGE_POINTS)**<br>• Less than 25 percent<br>• 25 to 50 percent<br>• 50 to 75 percent<br>• More than 75 percent |
| **npdesReportHow (DISCHARGE_POINTS)**<br>• Complaint Call/Report<br>• Outfall Screening<br>• Other-Describe in Comments | **npdesReason (DISCHARGE_POINTS)**<br>• Random Selection of Outfalls<br>• Citizen Complaint<br>• Re-Inspection of previous illicit |
| **npdesIllInvest (DISCHARGE_POINTS)**<br>• No Illicit<br>• Possible Illicit-Investigation Needed<br>• Possible Illicit-On-Going investigation<br>• Possible Illicit-Return for Additional Sampling<br>• Illicit-Source Found<br>• Illicit-Enforcement in Progress<br>• Illicit-Investigation Closed | **npdesIllicitDesc (DISCHARGE_POINTS)**<br>• Obvious Discharge<br>• Suspect Discharge<br>• Potential Discharge<br>• Unlikely Discharge |
| **npdesNumSmpl (DISCHARGE_POINTS)**<br>• First Sample<br>• Second Sample<br>• No Sample-Assessment Only<br>• Illicit Tracking/Sampling | **npdesIDDE_Status (DISCHARGE_POINTS)**<br>• Active<br>• Closed |
| **npdesIllicitSource (DISCHARGE_POINTS)**<br>• Industrial facility<br>• Construction site<br>• Auto body repair/gas station<br>• Car wash<br>• Outdoor materials/wastes storage<br>• Restaurant/grease trap<br>• Residential area<br>• Sanitary sewer overflow<br>• Septic tank<br>• Illicit San Sewer Connection<br>• Illegal dumping<br>• Unknown | **Condition (DISCHARGE_POINTS)**<br>• Excellent<br>• Very Good<br>• Good<br>• Fair<br>• Poor<br>• Very Poor<br>• Unknown<br>• Needs Service |

# Appendix D – Desktop Outfall Assessment Procedures

# PRELIMINARY DESKTOP ASSESSMENT PROCEDURES

## Introduction

Berkeley County has completed outfall mapping for portions of its MS4 area and conducted dry weather field screenings of all outfalls in accordance with the County SWMP and IDDE Program. As the County population grows and the MS4 area expands, the County will continue development of its outfall mapping and screening program. The purpose of this Appendix is to describe procedures for completing a preliminary in-office study to identify areas of potential illicit discharge for further investigation in the field.

Illicit discharges are not uniformly distributed across a community, but tend to be clustered within certain land uses, subwatersheds, and sewage infrastructure areas. The office procedures recommended in this Appendix D are intended to help narrow the search for the most severe illicit discharge problems through rapid analysis of existing mapping and water quality monitoring data. Office procedures for IDDE are referred to as a Desktop Assessment. A simple Desktop Assessment method can rapidly determine the severity of illicit discharge problems in a community, and provide insight on how to narrow your illicit discharge search.

The Desktop Assessment Method* has five basic elements:

1. Delineate subwatersheds or other drainage units within your community.
2. Compile available mapping and data for each drainage unit (e.g., land use, age, outfalls, infrastructure history).
3. Derive subwatershed discharge screening factors using GIS analysis.
4. Screen and rank illicit discharge potential at the subwatershed and community level.
5. Generate maps to support field investigations.

* *Source: 2004 Center for Watershed Protection Illicit Discharge Detection and Elimination Guidance Manual*

For new watershed areas that are being brought into the County's outfall screening program, the Desktop Assessment is used to guide initial field screening, and support initial IDDE program decisions. Key outcomes include:

- Screening problem catchments or subwatersheds within the MS4 area.
- Creation of GIS or other database system to track outfalls.
- Gaining an overall assessment as to the severity of illicit discharge problems within the MS4 area.
- Generation of basic mapping for subsequent field work.

Stormwater system inventory and outfall maps created in GIS can help manage the entire IDDE program and demonstrate compliance in annual reports.

## Data Collection & Development

In order to narrow the illicit discharge search, certain GIS shapefiles or digital map data are needed to provide the necessary information to design an illicit discharge tracing system. Table 1 provides a list of data that is useful when performing the Desktop Assessment.

Each of the following layers should be imported into the data collector if possible for the use of field personnel when searching for or tracing illicit discharges to the water of the state.

**Table 1. Useful Data for the Desktop Assessment**

| | DATA | LIKELY FORMAT |
|---|---|---|
| Recommended | Aerial photos or orthophotos | Digital map |
| | Subwatershed or catchment boundaries | Digital or hardcopy map |
| | Hydrology including piped streams | Digital or hardcopy map |
| | Land use or zoning | Digital or hardcopy map |
| | NPDES stormwater permittees | Digital data or map |
| | Outfalls | Digital or hardcopy map |
| | Sewer system, 1" = 200' scale or better | Digital or hardcopy map |
| | Standard Industrial Classification codes for all industries | Digital or hardcopy data |
| | Storm drain system, 1" = 200' scale or better | Digital or hardcopy map |
| | Street map or equivalent GIS layers | Digital or hardcopy map |
| | Topography (5 ft contours or better) | Digital or hardcopy map |
| Optional | Age of development | Narrative data |
| | As-builts or construction drawings | Hardcopy map |
| | Condition of infrastructure | Narrative data |
| | Field inspection records | Hardcopy or digital data |
| | Depth to water table and groundwater quality | Digital data or maps |
| | Historical industrial uses or landfills | Narrative data or hardcopy map |
| | Known locations of illicit discharges (current and past) | Narrative data or digital map |
| | Outfall and stream monitoring data | Digital data |
| | Parcel boundaries | Digital or hardcopy map |
| | Pollution complaints | Narrative data |
| | Pre-development hydrology | Narrative data or hardcopy map |
| | Sanitary sewer infiltration and inflow surveys (I/I) | Hardcopy or digital data |
| | Septic tank locations or area served by septic | Hardcopy or digital map |
| | Sewer system evaluation surveys | Hardcopy or digital data |

*Source: 2004 Center for Watershed Protection Illicit Discharge Detection and Elimination Guidance Manual*

## Outfall Catchment Areas

The drainage area for each outfall must be delineated on all maps used in the illicit tracing process. Once subwatersheds or catchments are delineated, the County should begin to acquire and compile existing data for each drainage area which will allow the analyses and

manipulation of spatial data, update and creation of data layers, and attribute data with each map layer.

Adding the facility inventory information (e.g., locations of water and wastewater treatment plants, landfills, industries) to the drainage areas will enable potential pollutant source locations to be assigned to the correct outfall. Examples of sources of industrial non- stormwater entries into storm drainage systems can be found in Table 3.

Land use coverages can also be of use when determining which kind of pollutants can populate individual watershed areas. Examples of land uses with the potential to produce indirect pollutant discharges can be found in Table 2. Ultimately, maps should be produced having the following information:

- Drainage areas with complete descriptions
- Outfall locations
- NPDES permittees
- Critical land uses
- Drainage boundaries for each outfall
- Boundaries of the MS4 area
- City/County limits
- Major streets
- Streams

The data collected during this process is important as it forms the basis for the rest of the more detailed field investigations.

## Preliminary Watershed Mapping

Preliminary stormwater system inventory and outfall maps generated from existing data can be beneficial to field personnel and can be as simple as including the hydrological, land use, and road layers on the system/outfall map. Maps with information such as watershed boundaries and land usage also help to provide a basis to prioritize the outfalls and watersheds by potential to contribute non-stormwater entries into the storm drainage system. The receiving waters and stormwater drainage outfalls must be identified and accurately located on the appropriate maps. When preparing the maps, full advantage should be taken of any existing and available information, specifically data listed in Table 1, Appendix D. Additional sources of documented information include:

- County records, drainage maps, and storm drainage maps
- Previous surveys, e.g., sanitary sewer infiltration/inflow (I/I) and sewer system evaluation survey (SSES) studies
- Data collected in the field from previous outfall inventories, flood studies, etc.
- Topographic maps
- Existing GIS data

- Pre-development stream locations
- City/County department personnel having knowledge of the area
- Aerial surveys

Using data from the stormwater system inventory/outfall maps and Desktop Assessment, initial characterization of subwatersheds can allow field techs to prioritize their investigations.

## Preliminary Watershed Evaluation

A review of land uses in the watershed can assist in preliminary evaluation of illicit discharge potential within a watershed. The Land Use and Potential Generating Sites section includes guidance from the 2004 Center for Watershed Protection ***Illicit Discharge Detection and Elimination Guidance Manual*** for preliminary watershed evaluation by identification of potential pollutant generating sites based on land use.

A review of industrial sites present within the watershed should also be conducted to gauge the potential for non-stormwater discharges from industrial activities. The Industrial Categories and Potential Generating Sites section includes information useful for identifying the local industries most likely to contribute non-stormwater entries into the County's storm drainage system.

## Land Use and Potential Generating Sites

Land use can predict the potential for indirect discharges, which are often intermittent or transitory. Many indirect discharges can be identified and prevented using the concept of "generating sites," which are sites where common operations can generate indirect discharges in a community. Both research and program experiences indicate that a small subset of generating sites within a broader land use category can produce most of the indirect discharges. Consequently, the density of potential generating sites within a subwatershed may be a good indicator of the severity of local illicit discharge problems. Some common generating sites within major land use categories are listed in Table 2, and described below.

**Table 2. Land Uses, Generating Sites and Activities That Produce Indirect Discharges**

| LAND USE | GENERATING SITE | ACTIVITY THAT PRODUCES DISCHARGE |
|---|---|---|
| Residential | ☐ Apartments<br>☐ Multi-family<br>☐ Single Family Detached | ☐ Car Washing<br>☐ Driveway Cleaning<br>☐ Dumping / Spills (e.g. leaf litter and RV/boat holding tank effluent<br>☐ Equipment Washdowns<br>☐ Lawn/Landscape Watering<br>☐ Septic System Maintenance/Overflow<br>☐ Swimming Pool Discharges |
| Institutional | ☐ Cemeteries<br>☐ Churches<br>☐ Corporate Campuses<br>☐ Hospitals<br>☐ Schools and Universities | ☐ Building Maintenance (e.g. power washing)<br>☐ Dumping/Spills<br>☐ Landscaping/Grounds Care (irrigation)<br>☐ Parking Lot Maintenance (power washing)<br>☐ Vehicle Washing |
| Municipal | ☐ Airports<br>☐ Landfills<br>☐ Maintenance Depots<br>☐ Municipal Fleet Storage Areas<br>☐ Ports<br>☐ Public Works Yards<br>☐ Streets and Highways | ☐ Building Maintenance (e.g. power washing)<br>☐ Dumping/Spills<br>☐ Landscaping/Grounds Care (irrigation)<br>☐ Outdoor Fluid Storage<br>☐ Parking Lot Maintenance (power washing)<br>☐ Road Maintenance<br>☐ Spill Prevention/Response<br>☐ Vehicle Fueling<br>☐ Vehicle Maintenance/Repair<br>☐ Vehicle Washing |
| Commercial | ☐ Campgrounds/RV parks<br>☐ Car Dealers/Rental Car Companies<br>☐ Car Washes<br>☐ Commercial Laundry / Dry Cleaning<br>☐ Gas Stations/ Auto Repair Shops<br>☐ Marinas<br>☐ Nurseries and Garden Centers<br>☐ Oil Change Shops<br>☐ Restaurants<br>☐ Swimming Pools | ☐ Building Maintenance (power washing)<br>☐ Dumping/Spills<br>☐ Landscaping/Grounds Care (irrigation)<br>☐ Outdoor Fluid Storage<br>☐ Parking Lot Maintenance (power washing)<br>☐ Vehicle Fueling<br>☐ Vehicle Maintenance / Repair<br>☐ Vehicle Washing<br>☐ Washdown of greasy equipment and grease traps |
| Industrial | ☐ Auto recyclers<br>☐ Beverages and brewing<br>☐ Construction vehicle washouts<br>☐ Distribution Centers<br>☐ Food processing<br>☐ Garbage truck washouts<br>☐ Marinas, boat building and repair<br>☐ Metal plating operations<br>☐ Paper and wood products<br>☐ Petroleum storage and refining<br>☐ Printing | ☐ All commercial activities<br>☐ Industrial process water or rinse water<br>☐ Loading and un-loading area washdowns<br>☐ Outdoor material storage (fluids) |

Residential Generating Sites: Failing septic systems were the most common residential discharge reported in 33% of IDDE programs surveyed (CWP, 2002). In addition, indirect residential discharges were also frequently detected in 20% of the IDDE programs surveyed, which consisted of oil dumping, irrigation overflows, swimming pool discharges, and car washing. Many indirect discharges are caused by common residential behaviors and may not be classified as "illicit" even though they can contribute to water quality problems. With the exception of failing septic systems and oil dumping, most communities have chosen education rather than enforcement as the primary tool to prevent illicit discharges from residential areas.

Institutional Generating Sites: Institutions such as hospitals, corporate campuses, colleges, churches, and cemeteries can be generating sites if routine maintenance practices/ operations create discharges from parking lots and other areas. Many large institutional sites have their own areas for fleet maintenance, fueling, outdoor storage, and loading/unloading that can produce indirect discharges.

Municipal Generating Sites: Municipal generating sites include operations that handle solid waste, water, wastewater, street and storm drain maintenance, fleet washing, and yard waste disposal. Transport-related areas such as streets and highways, airports, rail yards, and ports can also generate indirect discharges from spills, accidents and dumping.

Commercial Generating Sites: Illicit discharges from commercial sites were reported as frequent in almost 20% of local IDDE programs surveyed (CWP, 2002). Typical commercial discharge generators included operations such as outdoor washing; disposal of food wastes; car fueling, repair, and washing; parking lot power washing; and poor dumpster management. Recreational areas, such as marinas and campgrounds, were also reported to be a notable source of sewage discharges. It is important to note that not all businesses within a generating category produce illicit discharges; generally, only a relatively small fraction do. Consequently, on-site inspections of individual businesses are needed to confirm whether a property is actually a generating site.

Industrial Generating Sites: Industrial sites produce a wide range of flows that can cause illicit discharges. The most common continuous discharges are operations involving the disposal of rinse water, process water, wash water, and contaminated, noncontact cooling water. Spills and leaks, ruptured pipes, and leaking underground storage tanks are also a source of indirect discharges. Illicit discharges from industry were detected in nearly 25% of the local IDDE programs surveyed (CWP, 2002). Industries are classified according to hundreds of different standard Industrial Classification (SIC) codes. The SIC coding system also includes commercial, institutional and municipal operations. Many industries are required to have stormwater pollution prevention and spill response plans under EPA's Industrial Stormwater NPDES Permit Program.

## Industrial Categories and Potential Generating Sites

Table 3, below, can be used to identify the industries in each drainage area most likely to contribute non-stormwater discharge into the storm drainage system. The table provides the physical properties of the discharge expected based on industrial categories and classifications. The categories were defined according to the 1987 Standard Industrial Classification Manual codes (SIC code). Since 1997, Federal agencies including EPA have used the North American Industry Classification System (NAICS) as the industry classification system for federal economic study; however, SIC codes are still used by some organizations and government agencies for non-statistical purposes.

## Table 3. Chemical and Physical Properties of Industrial Non-Stormwater Discharges

| Industrial Categories Major Classifications *SIC Group Numbers* | Odor | Color | Turbidity | Floatables | Debris and Stains | Structural Damage | Vegetation | pH | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|---|
| **Primary Industries** | | | | | | | | | |
| 20: Food and Kindred Products | | | | | | | | | |
| *201 Meat Products* | Spoiled Meats, Rotten Eggs and Flesh | Brown to Reddish-Brown | High | Animal Fats, Byproducts, Pieces of Processed Meats | Brown to Black | High | Flourish | Normal | High |
| *202 Dairy Products* | Spoiled Milk, Rancid Butter | Gray to White | High | Animal Fats, Spoiled Milk Products | Gray to Light Brown | High | Flourish | Acidic | High |
| *203 Canned and Preserved Fruits and Vegetables* | Decaying Products Compost Pile | Various | High | Vegetable Waxes, Seeds, Skins, Cores, Leaves | Brown | Low | Normal | Wide Range | High |
| *204 Grain Mill Products* | Slightly Sweet & Musty, Grainy | Brown to Reddish Brown | High | Grain Hulls and Skins, Straw & Plant Fragments | Light Brown | Low | Normal | Normal | High |
| *205 Bakery Products* | Sweet and or Spoiled | Brown to Black | High | Cooking Oils, Lard, Flour, Sugar | Gray to Light Brown | Low | Normal | Normal | High |
| *206 Sugar and Confectionary Products* | NA | NA | Low | Low Potential | White Crystals | Low | Normal | Normal | High |
| *207 Fats and Oils* | Spoiled Meats, Lard or Grease | Brown to Black | High | Animal Fats, Lard | Gray to Light Brown | Low | Normal | Normal | High |
| *208 Beverages* | Flat Soda, Beer or Wine, Alcohol, Yeast | Various | Mod. | Grains, Hops, Broken Glass, Discarded Canning Items | Light Brown | High | Inhibited | Wide Range | High |
| 21: Tobacco Manufactures | Dried Tobacco, Cigars, Cigarettes | Brown to Black | Low | Tobacco Stems & Leaves, Papers and Fillers | Brown | Low | Normal | Normal | Low |
| 22: Textile Mill Products | Wet Burlap, Bleach, Soap, Detergents | Various | High | Fibers, Oils, Grease | Gray to Black | Low | Inhibited | Basic | High |
| 23: Apparel and Other Finished Products | NA | Various | Low | Some Fabric Particles | NA | Low | Normal | Normal | Low |
| **Material Manufacture** | | | | | | | | | |
| 24: Lumber & Wood Products | NA | NA | Low | Some Sawdust | Light Brown | Low | Normal | Normal | Low |
| 25: Furniture & Fixtures | Various | Various | Low | Some Sawdust, Solvents | Light Brown | Low | Normal | Normal | Low |

| Industrial Categories Major Classifications *SIC Group Numbers* | Odor | Color | Turbidity | Floatables | Debris and Stains | Structural Damage | Vegetation | pH | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|---|
| 26: Paper & Allied Products | Bleach, Various Chemicals | Various | Mod. | Sawdust, Pulp Paper, Waxes, Oils | Light Brown | Low | Normal | Wide Range | Low |
| 27: Printing, Publishing, and Allied Industries | Ink, Solvents | Brown to Black | Mod. | Paper Dust, Solvents | Gray to Light Brown | Low | Inhibited | Normal | High |
| 31: Leather & Leather Products | Leather, Bleach, Rotten Eggs or Flesh | Various | High | Animal Flesh & Hair, Oils, Grease | Gray to Black, Salt Crystals | High | Highly Inhibited | Wide Range | High |
| 33: Primary Metal Industries | Various | Brown to Black | Mod. | Ore, Coke, Limestone, Millscale, Oils | Gray to Black | High | Inhibited | Acidic | High |
| 34: Fabricated Metal Products | Detergents, Rotten Eggs | Brown to Black | High | Dirt, Grease, Oils, Sand, Clay Dust | Gray to Black | Low | Inhibited | Wide Range | High |
| 32: Stone, Clay, Glass, and Concrete Products | Wet Clay, Mud, Detergents | Brown to Reddish-Brown | Mod. | Glass Particles Dust from Clay or Stone | Gray to Light Brown | Low | Normal | Basic | Low |
| **Chemical Manufacture** | | | | | | | | | |
| 28: Chemicals & Allied Products | | | | | | | | | |
| *2812 Alkalies and Chlorine* | Strong Halogen or Chlorine, Pungent, Burning | Alkalies – NA; Chlorine - Yellow to Green | Low | NA | Alkalies – White Carbonate Scale Chlorine - NA | High | Highly Inhibited | Basic | High |
| *2816 Inorganic Pigments* | NA | Various | High | Low Potential | Various | Low | Highly Inhibited | Wide Range | High |
| *282 Plastic Materials and Synthetics* | Pungent, Fishy | Various | High | Plastic Fragments, Pieces of Synthetic | Various | Low | Inhibited | Wide Range | High |
| *283 Drugs* | NA | Various | High | Gelatin Byproducts for Capsulating Drugs | Various | Low | Highly Inhibited | Normal | High |
| *284 Soap, Detergents & Cleaning Preparations* | Sweet or Flowery | Various | High | Oils, Grease | Gray to Black | Low | Inhibited | Basic | High |
| *285 Paints, Varnishes, Lacquers, Enamels and Allied Products (SB - Solvent Base)* | Latex - Ammonia SB - Dependent Upon Solvent (Paint Thinner, Mineral Spirits) | Various | High | Latex - NA SB - All Solvents | Gray to Black | Low | Inhibited | Latex - Basic SB - Normal | High |

| Industrial Categories Major Classifications *SIC Group Numbers* | Odor | Color | Turbidity | Floatables | Debris and Stains | Structural Damage | Vegetation | pH | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|---|
| *286 Indust. Organic Chemicals* | | | | | | | | | |
| *2861 Gum and Wood Chemicals* | Pine Spirits | Brown to Black | High | Rosins and Pine Tars | Gray to Black | Low | Inhibited | Acidic | High |
| *2865 Cyclic Crudes, & Cyclic Intermediates Dyes, & Organic Pigments* | Sweet Organic Smell | NA | Low | Translucent Sheen | NA | Low | Highly Inhibited | Normal | Low |
| *287 Agricultural Chemicals* | | | | | | | | | |
| *2873 Nitrogenous Fertilizers* | NA | NA | Low | NA | White Crystalline Powder | High | Inhibited | Acidic | High |
| *2874 Phosphatic Fertilizers* | Pungent Sweet | Milky White | High | NA | White Emorphous Powder | High | Inhibited | Acidic | High |
| *2875 Fertilizers, Mixing Only* | Various | Brown to Black | High | Pelletized Fertilizers | Brown Emorphous Powder | Low | Normal | Normal | High |
| 29: Petroleum Refining and Related Industries | | | | | | | | | |
| *291 Petroleum Refining* | Rotten Eggs, Kerosene, Gasoline | Brown to Black | High | Any Crude or Processed Fuel | Black Salt Crystals | Low | Inhibited | Wide Range | High |
| 30: Rubber & Miscellaneous Plastic Products | Rotten Eggs, Chlorine, Peroxide | Brown to Black | Mod. | Shredded Rubber Pieces of Fabric or Metal | Gray to Black | Low | Inhibited | Wide Range | High |
| **Transportation & Construction** | | | | | | | | | |
| 15: Building Construction | Various | Brown to Black | High | Oils, Grease, Fuels | Gray to Black | Low | Normal | Normal | High |
| 16: Heavy Construction | Various | Brown to Black | High | Oils, Grease, Fuels, Diluted Asphalt or Cement | Gray to Black | Low | Normal | Normal | High |
| **Retail** | | | | | | | | | |
| 52: Building Materials, Hardware, Garden Supply, and Mobil Home Dealers | NA | Brown to Black | Low | Some Seeds, Plant Parts, Dirt, Sawdust, or Oil | Light Brown | Low | Normal | Normal | Low |
| 53: Gen. Merchandise Stores | NA | NA | NA | NA | NA | Low | Normal | Normal | Low |
| 54: Food Stores | Spoiled Produce, Rancid, Sour | Various | Low | Fragments of Food, Decaying Produce | Light Brown | Low | Flourish | Normal | Low |

| Industrial Categories Major Classifications *SIC Group Numbers* | Odor | Color | Turbidity | Floatables | Debris and Stains | Structural Damage | Vegetation | pH | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|---|
| 55: Automotive Dealers & Gasoline Service Stations | Oil or Gasoline | Brown to Black | Mod. | Oil or Gasoline | Brown | Low | Inhibited | Normal | Low |
| 56: Apparel & Accessory Stores | NA | NA | Low | NA | NA | Low | Normal | Normal | Low |
| 57: Home Furniture, Furnishings, & Equip. Stores | NA | NA | Low | NA | NA | Low | Normal | Normal | Low |
| 58: Eating & Drinking Places | Spoiled Foods Oil & Grease | Brown to Black | Low | Spoiled or Leftover Foods | Brown | Low | Normal | Normal | Low |
| **Coal Steam Electric Power** | NA | Brown to Black | High | Coal Dust | Black Emorphous Powder | Low | Normal | Slightly Acidic | Low |
| **Nuclear Steam Electric Power** | NA | Light | Low | Oils, Lubricants | Light Brown | Low | Normal | Normal | Low |

*Source: 2004 Center for Watershed Protection Illicit Discharge Detection and Elimination Guidance Manual, Appendix K: Specific Considerations for Industrial Sources of Inappropriate Pollutant Entries to the Storm Drainage System (Adapted from Pitt, 2001)*

The category for "Primary Industries" includes facilities involved in the production of food products and other basic goods. The category of "Material Manufacturing" includes those industries producing materials such as lumber, paper, glass, and leather. Similarly, the "Chemical Manufacturing" category includes those industries making products such as plastics, paints, detergents, fertilizers, pesticides, and other related substances. "Transportation and Construction" primarily concerns the discharge of contaminants from building or other types of outdoor development. The "Retail" category includes establishments engaged in the selling of merchandise or offering merchandise related services.

## Prioritization

The Desktop Assessment Method draws on existing background data and anecdotal information to initially characterize illicit discharge potential at the subwatershed level. The information gathered in the Desktop Assessment can be used to rank the illicit discharge potential throughout the subwatershed based on a composite score, or diagnosed as having a low, medium or high risk.

| | |
|---|---|
| **Low Risk:** | No known illicit discharge problems in the subwatershed. |
| **Medium Risk:** | Problems are confined to a few stream reaches, outfalls, or specific generating sites in the subwatershed. |
| **High Risk:** | Problems are suspected to be severe throughout the subwatershed. |

The rankings provide the County a means for prioritizing its dry weather outfall screening activities.

## Conclusion

The Desktop Assessment can shape the overall direction of the IDDE program. For example, if the Desktop Assessment reveals significant potential for severe discharges in a particular MS4 area, this information would allow the County to target its resources toward locating, identifying and resolving these illicit discharge problems. By contrast, if the Desktop Assessment indicated low risk of illicit discharge, the County could shift its resources to higher risk areas or other minimum control measures outlined in the SWMP.

# Appendix E – Visual Inspection and Complaint Forms

**BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM**
1003 Hwy 52 Moncks Corner,
SC 29461-5036 Main Line:
843.723.3800
843.719.4195

# ILLICIT DISCHARGE INSPECTION FORM

**Inspection Date:** _____

**Inspected By:** _____

**CAA# (If applicable):** _____

**Asset ID or EAM ID #:** _____

**Background Information:**

Reason for Inspection/Tracking: ☐ Complaint Call/Report ☐ Outfall Screening ☐ Re-Inspection ☐ Other (See Comment)

Location/Address of the Discharge: _____

**Observed Conditions:**

Weather: _____

| Time Since Last Rain? | Tide Level |
|---|---|
| ☐ Greater than 72hrs<br>☐ 48 to 72 hrs<br>☐ 24 to 48 hrs<br>☐ Less than 24 hrs | ☐ Low Tide at Time of Inspection<br>☐ Mid Tide at Time of Inspection<br>☐ High Tide at Time of Inspection |
| **Structural/Overall Condition** | **Impending Tide** |
| ☐ Excellent ☐ Poor<br>☐ Very Good ☐ Very Poor<br>☐ Good ☐ Unknown<br>☐ Fair ☐ Needs Service | ☐ Rising<br>☐ Falling |
| **Percent Blockage at Outfall** | **Reason for Blockage** |
| ☐ < 25% ☐ 50 to 75%<br>☐ 25 to 50% ☐ > 75% | ☐ Permanent (structural)<br>☐ Temporary<br>☐ Other |
| Type of Blockage (e.g., object/material): _____ | |
| Photos Taken? ☐ Yes ☐ No | Scum? ☐ Yes ☐ No |
| Evidence of Illicit Discharge? ☐ Yes ☐ No | Sample collected? ☐ Yes ☐ No |
| Estimated Discharge Rate : _____ (cfs) | |

**If NO evidence of Illicit Discharge, inspection is complete. If YES, complete Parts II -V.**

**Nature of Discharge – Physical Indicators**

| Flow | Color | Odor |
|---|---|---|
| ☐ Dry<br>☐ Trickle<br>☐ Low Steady Flow<br>☐ Significant Flow<br>☐ Submerged | ☐ Clear<br>☐ Slightly Tinted<br>☐ Rust<br>☐ Intense<br>☐ Black<br>☐ White<br>☐ Other (Add Comment) | ☐ None<br>☐ Sewage<br>☐ Chlorine<br>☐ Petroleum<br>☐ Chemical<br>☐ Sulfide<br>☐ Rancid/Sour<br>☐ Other (Add Comment) |
| **Floatable** | **Stains** | **Turbidity** |
| ☐ None<br>☐ Foam<br>☐ Petroleum<br>☐ Sewage<br>☐ Film<br>☐ Other (Add Comment) | ☐ None<br>☐ Powder<br>☐ Rust<br>☐ Petroleum<br>☐ Other (Add Comment) | ☐ Clear<br>☐ Cloudy<br>☐ Slight Cloudiness<br>☐ Other (Add Comment) |
| **Vegetation Around Structure** | **Illicit Discharge Description** *(Based on Physical Indicators)* | |
| ☐ Normal<br>☐ Slight<br>☐ Excessive<br>☐ Other | ☐ Obvious Discharge<br>☐ Suspect Discharge | ☐ Potential Discharge<br>☐ Unlikely Discharge |

**Nature of Discharge – Sampling** *(record additional samples, if applicable, on separate form)*

| pH | Temperature | Total Chlorine |
|---|---|---|
| _____ | _____ ° C | _____ mg/L |
| **Total Copper** | **Total Phenols** | **Surfactants** |
| _____ mg/L | _____ mg/L | _____ mg/L |

**Bacteria Sample (Select Type)**

| | |
|---|---|
| ☐ Enterococci (Saltwater) | _____ MPN/100 mL |
| ☐ *E. Coli* (Freshwater) | _____ MPN/100 mL |
| ☐ Fecal Coliform (Shellfish Waters) | _____ MPN/100 mL |

**Nearest Waterbody (If known):** _____

**Source of Discharge Identified:**

| | |
|---|---|
| ☐ Industrial Facility | ☐ Residential Area |
| ☐ Construction Site | ☐ Sanitary Sewer Overflow |
| ☐ Outdoor Materials/ Wastes Storage | ☐ Septic Tank |
| ☐ Auto Body Repair/Gas Station | ☐ Illicit Sanitary Sewer Connection |
| ☐ Car Wash | ☐ Illegal Dumping |
| ☐ Restaurant/Grease Trap | ☐ Unknown |

**Comments:** _____

_____

_____

**BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM**
1003 Hwy 52 Moncks Corner,
SC 29461-5036 Main Line:
843.723.3800
843.719.4195

# COMPLAINT FORM

**Date:** _____

| **Complaint's Information** | |
|---|---|
| **Name of person reporting problem:** | |
| **Address:** | |
| **Phone Number:** | |
| **Email:** | |

**Location of Problem (address, subdivision, etc.):** _____

_____

**Description of Problem:** _____

_____

_____

**For Inspector's Use Only**

Inspector Name: _____

Location Checked? ☐ Yes ☐ No Date: _____
Pictures Taken**? ☐ Yes ☐ No
Problem Observed? ☐ Yes ☐ No If yes, briefly explain:

_____

_____

_____

**Actions Taken:**

Follow Up Inspection Scheduled? ☐ Yes ☐ No ☐ N/A Date: _____
Contact Property Owner? ☐ Yes ☐ No ☐ N/A
Enforcement Action Needed? ☐ Yes ☐ No ☐ N/A

** ***Inspection is invalid without pictures***

# Appendix F – Dry Weather Screening and IDDE Notification Letters

**BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM**
1003 Hwy 52 Moncks
Corner, SC 29461
843.719.4195
Charleston: 843.572.4400 (ext. 4195)
St. Stephens: 843.567.2061 (ext. 4195)
webswmp@berkeleycountysc.gov

## PUBLIC NOTIFICATION LETTER

Month DD, YYYY

Dear Property Owner,

Berkeley County is conducting an outfall inventory of the County's stormwater management system to meet the requirements of our National Pollutant Discharge Elimination System (NPDES) stormwater permit, as required by EPA and SCDHEC. (Insert Company Name) has been contracted by the County to perform stormwater system data collection for this permit. The data collected will include features related to the storm drainage system, including manholes, inlets, pipes, culverts, ponds, channels, and outfalls to creeks and streams throughout the County. Please allow (Insert Company Name)'s field personnel access to stormwater system components on your property for the purpose of data collection.

(Insert Company Name) personnel are part of the stormwater data collection team. Field personnel will be identified by name badges, safety vests and/or other items of identification. Each will carry identification and can provide additional site specific information if necessary. Field personnel will take measurements and will use GPS or survey equipment and cameras in order to collect data.

Berkeley County and (Insert Company Name) appreciate your cooperation and understanding. If you have any questions or would like any further information please contact Berkeley County Stormwater at (Phone Number).

Sincerely,

County

Engineer

**BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM**
1003 Hwy 52 Moncks
Corner, SC 29461

## NOTICE OF ILLICIT DISCHARGE

*Date:*

Re: Illicit Discharge Removal Letter

Dear _____:

The purpose of this letter is to inform you that Berkeley County has determined that an illicit discharge is occurring into your stormwater system at (insert address or other positional information). This location is beyond the scope of the County's Stormwater Management Ordinance, and the County cannot therefore enforce its removal. However, the illicit discharge must be removed since it eventually finds its way into the Berkeley County system. Please find the attached report that provides greater detail on the investigation and/or results of water sample analyses. A copy of this letter and investigation report has also been sent to SCDHEC.

If you have questions concerning this violation, you can contact our office at 843-719-4195.
Sincerely,

Name

Title

**BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM**
1003 Hwy 52 Moncks
Corner, SC 29461

## SECONDARY NOTICE OF ILLICIT DISCHARGE

Date:

Re: Illicit Discharge Removal

Letter Dear _____:

The purpose of this letter is to inform you that Berkeley County has determined that an illicit discharge is occurring at (insert address or other positional information). This location is beyond the scope of the County's Stormwater Management Ordinance, and the County cannot therefore enforce its removal. The County is hereby releasing responsibility of removing this illicit discharge to you or another entity that you identify.

Please find the attached report that provides greater detail on the investigation and/or results of water sample analyses. A copy of this letter and investigation report has also been sent to (insert municipal name).

If you have questions concerning this violation, you can contact our office at 843-719-4195.

Add additional text as necessary. Sincerely,

Name

Title

**BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM**
1003 Hwy 52 Moncks
Corner, SC 29461

## NOTICE OF VIOLATION

Date:

Re: Illicit Discharge Corrective

Order Dear _:

The purpose of this letter is to serve notice that you are in violation of Berkeley County's Stormwater Management Ordinance at (list address or other positional information) due to an illicit discharge. Add text.

This violation is a first offense based on an inspection conducted on X/X/20XX. The Berkeley County Stormwater Department requests that you promptly remove the illicit discharge before additional action is necessary. Berkeley County Stormwater personnel will revisit the referenced site location in approximately two weeks (or sooner if a hazardous condition warrants it) to see if you have removed the illicit discharge.

Failure to comply with this Corrective Order may result in a court proceeding issued to you and/or a **civil penalty of up to $1,000/day for each deficiency.**

If you have questions concerning this violation, you can contact our office at 843-719-4195.

Add additional text as necessary

Sincerely,

Name

Title

**BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM**
1003 Hwy 52 Moncks
Corner, SC 29461

## SECONDARY NOTICE OF VIOLATION

Date:

Re: Notice of

Violation Dear _____:

The purpose of this letter is to serve notice that you are in violation of Berkeley County's Stormwater Management Ordinance at (list address or other positional information) due to an illicit discharge. Add text.

This violation is due to failure to comply with a past corrective order resulting from an inspection conducted on X/X/20XX. The Berkeley County Stormwater Department requests that you promptly remove the illicit discharge before additional action is necessary. Berkeley County Stormwater personnel will revisit the referenced site location in approximately two weeks to see if you have removed the illicit discharge.

Failure to comply with this Notice of Violation prior to the re-inspection will result in an immediate report to the Magistrate's office and/or a **civil penalty of up to $1,000/day for each deficiency.**

If you have questions concerning this violation, you can contact our office at 843-719-4195.

Add additional text

Sincerely,

Name

Title

# Appendix F: Enforcement Response Plan

# *ENFORCEMENT RESPONSE PLAN (ERP)*

## *Berkeley County, Goose Creek, and Hanahan*

## *South Carolina*

### *December 2019*

*ENFORCEMENT RESPONSE PLAN*
*Berkeley County, Goose Creek, and Hanahan*
*South Carolina*

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# I. INTRODUCTION

This Enforcement Response Plan (ERP) document was developed as a guidance manual for identifying specific violation types, defining Berkeley County's response to violations, and noncompliance of the Stormwater Management Ordinance of Berkeley County, SC (Ordinance No. 14-11-36), the Berkeley County Stormwater Design Standards Manual, site specific stormwater management plans, and meet the requirements of the SCDHEC Small Municipal Separate Storm Sewer System (SMS4) Permit. The ERP also specifies criteria by which Berkeley County personnel can determine the enforcement response within the City of Goose Creek and the City of Hanahan per the amended Stormwater Management Ordinances of Goose Creek (Ordinance No. 18-024) and Hanahan (Ordinance No. 5-2018). The goals of the Enforcement Response Plan are to:

1) Prevent pollutants from entering the Municipal Separate Storm Sewer System (MS4) and causing environmental harm.

2) Define criteria for noncompliance.

3) Deter future noncompliance by the violator and other members of the regulated community.

4) Ensure that violators do not obtain economic benefit or advantage over competitors through noncompliance.

5) Apply fair and consistent enforcement actions to the regulated community throughout the County, the City of Goose Creek, and the City of Hanahan.

Upon determination that a violation of any provisions referenced above have occurred, the County will notify the responsible party(s) and may choose to assess and make a written demand for payment of a Civil Penalty. In addition to any applicable Civil Penalties (See Stormwater Management Ordinance Div. 6):

- Any person(s) or entity that negligently or intentionally violates any provision of the above with wanton disregard shall be guilty of a misdemeanor and punished within the jurisdictional limits of the magistrate's court.

- Berkeley County may withhold the release of permanent electric power to the site.

- Berkeley County may withhold, or revoke permits related to the site.

- If Berkeley County performs corrective action due to continued non-compliance, then the costs incurred as a result of such action shall be reimbursed to Berkeley County by the owner or operator.

- If Berkeley County, City of Goose Creek, or City of Hanahan is fined and/or placed under a compliance schedule by the state or federal government for a violation(s) of its NPDES permit and can identify the person(s) or entity who caused such violation(s) to occur, then Berkeley County, City of Goose Creek, or City of Hanahan may pass through the penalty and cost of compliance to that person(s) or entity.

Violations can be categorized as either minor, moderate, or major. The severity of the violation can be based on but not limited to the degree of harm or potential for harm to the public health, safety, private property, or the environment, the extent of deviation from the requirements of the regulation, standard, or permit, the frequency or duration of the violation, the economic benefit as a result of noncompliance, the cost of restoration of the environment or abatement of the environmental harm, the past performance record or past history of noncompliance, or the degree of willfulness or negligence.

**Minor Violations** - typically have not caused an immediate threat to the environment or SMS4 and most often only require a verbal or written warning.

**Moderate Violations** - dependent upon the extent of deviation from the requirements of the regulation, standard, or permit and the frequency or duration of the violation after issued notice to comply.

**Major Violations** - assessed when the operator has failed to comply with the above referenced stormwater management program ordinances or has not complied with violation notices, and such negligence has caused an immediate or significant impact on the environment or SMS4.

Berkeley County may determine the severity of a violation at its discretion. This Enforcement Response Plan (ERP) document is for the use of Berkeley County personnel. Berkeley County reserves the right to change this document at any time, without prior notice, or to act at variance to this document. This document does not create any rights, implied or otherwise, to any third parties.

# II. ENFORCEMENT ACTION DEFINITIONS

## Correction Order:

(Stormwater Design Standards Manual Sec. 4.3.1)

The Correction Order is a **written or verbal** notice for first offenses of non-compliance with the County Stormwater Management Ordinance or the approved stormwater management plan. The purpose of the Correction Order is to give notice of the deficiencies, identify expected corrective results and provide a reasonable timeframe to the contractor prior to the County taking further action to get a problem resolved. Correction Orders shall be submitted in writing, but a **verbal notice** may be given if the deficiency needs immediate correction to prevent offsite or downstream impacts.

## Notice of Violation (NOV):

(Stormwater Management Ordinance Sec. 6.1.b and Stormwater Design Standards Manual Sec. 4.3.2)

The Notice of Violation is a written notice which serves as a legal requirement to remove the violation(s), of the County Stormwater Management Ordinance or the approved stormwater management plan. The NOV shall be provided to the owner or the person(s) deemed responsible for violations of the County Stormwater Management Ordinance or the approved stormwater management plan, stating the nature of the violation, the amount of time in which to correct deficiencies, the date on which an inspection will be made to make sure that corrective action has been performed, and the proposed penalty structure if corrective action is not taken by the inspection date. The NOV may address the entire site or a specific portion of the site.

## Stop Work Order:

(Stormwater Management Ordinance Sec. 6.6 and Stormwater Design Standards Manual Sec. 4.3.3)

The Stop Work Order may allow or require correction of Notice of Violation (NOV) issues but shall otherwise stop all other construction related activities. A Stop Work Order may carry with it, Civil Penalties as well. Any person in violation of a Stop Work Order is subject to payment of all fees, bonds, and penalties prior to the lifting of the Stop Work Order.

## Civil Penalty:

(Stormwater Management Ordinance Sec. 6.2 and Stormwater Design Standards Manual Sec. 4.3.3)

Any person violating any provision of the Stormwater Management Ordinance or approved stormwater management plan shall be subject to a Civil Penalty of not more than one thousand dollars ($1000) for each violation. Each separate day of a violation constitutes a new and separate violation. Notice of Civil Penalty shall be provided via the issuance of a uniform summons.

## Criminal Penalty:

(Stormwater Management Ordinance Sec. 6.4)

In addition to any applicable Civil Penalties, any person who willfully, with wanton disregard, or intentionally violates any provision of the Stormwater Management Ordinance or approved stormwater management plan shall be guilty of a misdemeanor and upon conviction shall pay a fine of not more than $500.00 or imprisoned for not more than thirty (30) days. Each day of violation shall constitute a new and separate offense.

## Denial of Certificate of Occupancy

(Stormwater Management Ordinance Sec. 6.1.c.3)

After the issuance of the NOV, the County Engineer or his designee is given the authority to proceed with enforcement actions that include withholding the release of permanent power to the site or certificate of occupancy.

## Permit Block

(Stormwater Management Ordinance Sec. 6.1.c.4)

Permit Blocks shall be issued if non-compliance continues after issuance of the NOV or non-payment of issued penalties. Persons who have been found to be in violation of any provision of Stormwater Management Program Ordinance or approved stormwater management plan may have other permits related to their site withheld or revoked.

## III. ENFORCEMENT RESPONSE LEVELS/PROCEDURE

Violations can vary from site to site and the corrective action taken will be on a case by case basis. Generally, the following levels can be used as guidance on determining the best course of action to take for the different types of violations.

**Minor Violations** — Administrative issues with relatively low environmental risk and an infrequent record of violation by the operator should cause the following enforcement sequence: Verbal Notice ➡ Written Correction Order ➡ Notice of Violation ➡ Stop Work Order ➡ Citation ➡ Civil Litigation**.**

**Moderate Violations** — Record keeping and site conditions that pose a relatively moderate/significant environmental risk to discharge pollutants into the SMS4 or adjacent receiving waterbody should cause the following enforcement sequence: Correction Order ➡ Notice of Violation ➡ Stop Work Order ➡ Citation ➡ Permit Block/Denial of C/O ➡ Civil Litigation**.**

**Major Violations** — Any immediate threat to human health and/or the environment or demonstrated willful noncompliance by an operator should cause the following enforcement sequence: Notice of Violation & Stop Work Order ➡ Citation ➡ Civil Litigation**.**

# IV. VIOLATION CATEGORIES

## A. Construction/Permitting Violations

Berkeley County has identified areas for focus as high priority elements of the construction site stormwater compliance program. Specifically, Berkeley County inspectors may refer the following situations to Berkeley County Codes Enforcement for Citation after the compliance deadline or for the third NOV that has been issued for any of the following violations:

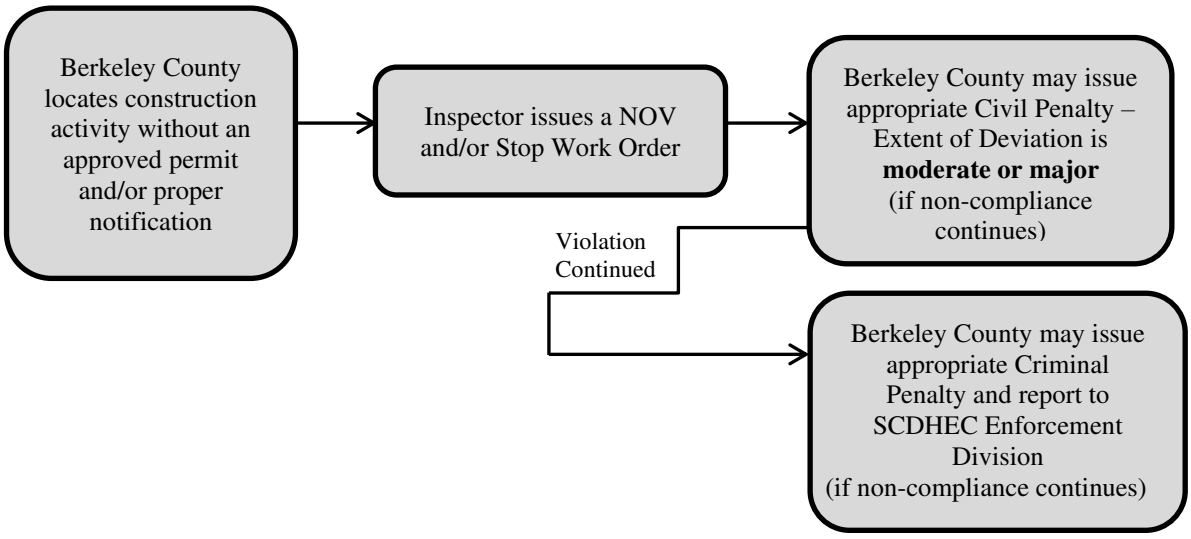
- Failure to obtain a Land Disturbance Permit before initiating land disturbance activities
- Failure to install BMPs before beginning land disturbance activities
- Failure to renew the Land Disturbance Permit upon expiration
- Failure to conduct inspections of BMPs and complete inspection reports

Special focus will be on chronic violators, i.e., individuals, businesses, organizations, or related entities who have received three or more NOVs for the below violations within the previous twelve (12) months, regardless of the site location. Additional guidance is provided to Berkeley County inspectors in the below flow chart scenarios, regarding which violations should result in Correction Orders (Written or Verbal), which should be subject to Notices of Violation, and when Civil Citations should be administered.

1. **Initiation of construction activity without an approved site development/land disturbing permit and/or proper notification.**

**Berkeley County response:**

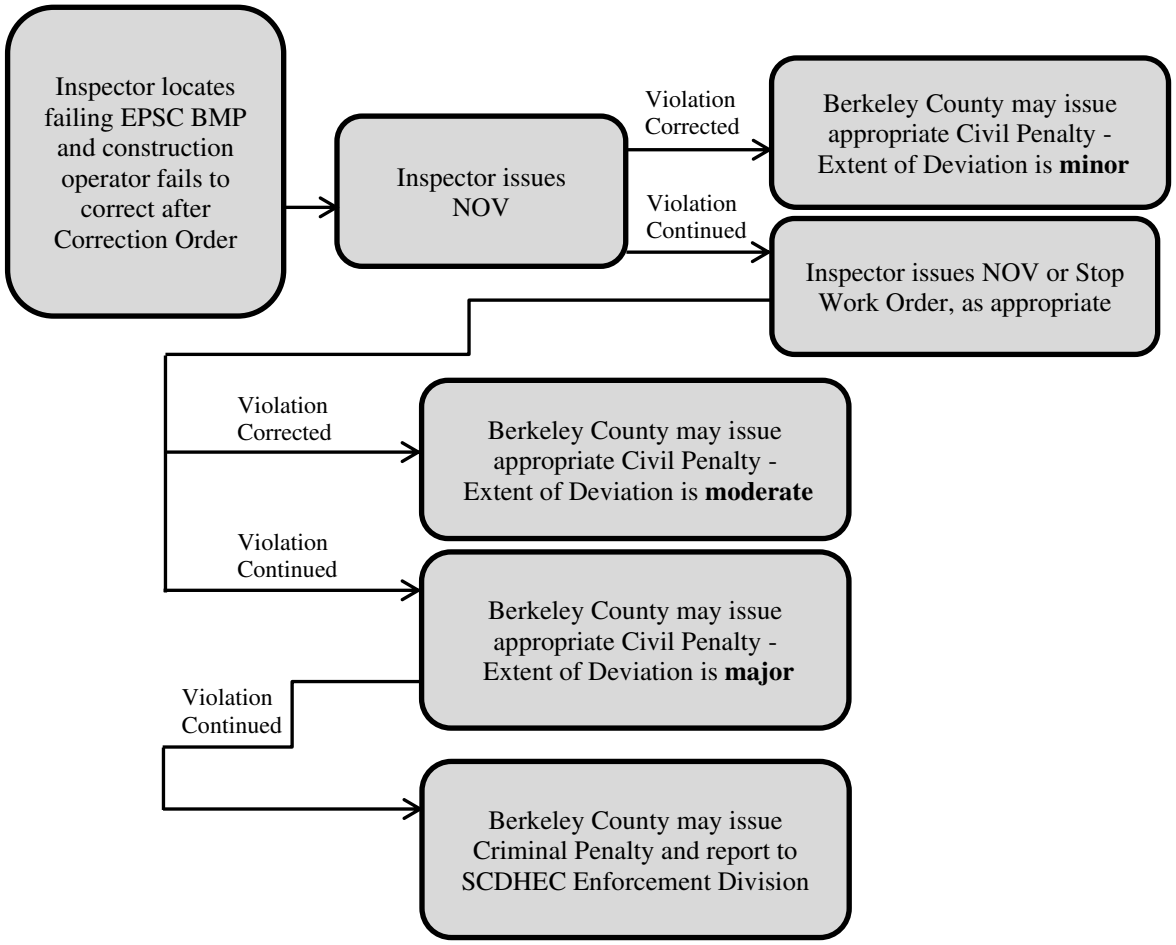
Berkeley County may issue a NOV and/or Stop Work Order, as appropriate, for all violations involving initiation of construction activity without an approved site development/land disturbing permit and proper notification. Appropriate Civil or Criminal Penalties may be issued. A repeat offense of failure to obtain the correct permit and notify the County prior to beginning construction will be considered a major offense. If non-compliance continues, the County may report the violation to SCDHEC Enforcement Division.



2. **Failure to properly operate and/or maintain all BMPs, components, facilities, and equipment associated with site Erosion Prevention and Sediment Control (EPSC).**

**Berkeley County response:**

In cases of minor violations for operation and maintenance of EPSC BMPs, the inspector may issue a verbal Correction Order prior to issuing written notifications. Berkeley County may issue a NOV if the construction operator fails to correct deficiency after a Correction Order. Berkeley County will conduct follow-up inspections to ensure corrective action is provided. A Stop Work Order or additional NOV may be issued if corrective action is not provided. Appropriate Civil or Criminal Penalties may be issued. If non-compliance continues, the County may report the violation to SCDHEC Enforcement Division.



## B. Illicit Discharge/ Illicit Connection/ Improper Waste Disposal

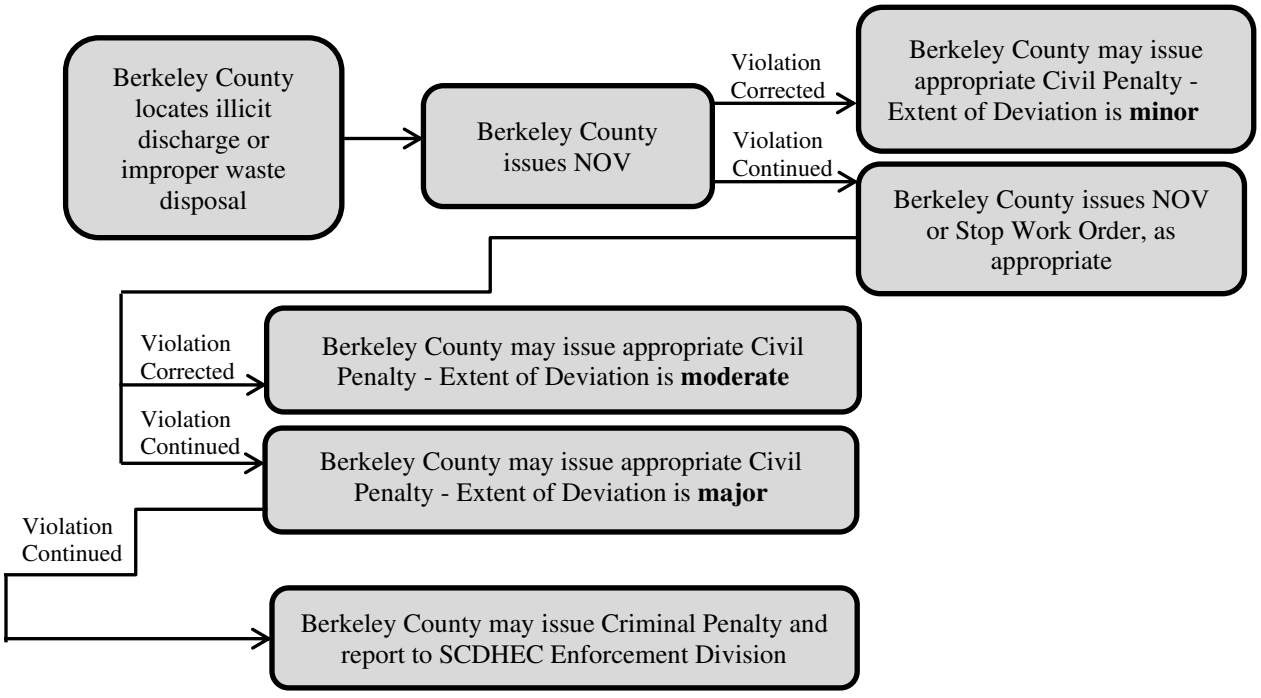
**Berkeley County response:**

Berkeley County must report immediately the occurrence of any dry weather flows believed to be an immediate threat to human health or the environment to SCDHEC Emergency Response, 1-**888-481-0125**.

If the source of the suspected illicit discharge is found to be a suspected non-compliance with an NPDES permit, the appropriate SCDHEC Regional Office must be notified.

Once the source of the illicit discharge has been determined, Berkeley County will notify the responsible party of the discharge, via NOV or stop work order, within twenty-four (24) hours to three (3) days after that determination, dependent upon the severity of the discharge. The County will require the responsible party(s) to conduct all necessary corrective actions to eliminate the non-stormwater discharge within five (5) business days to thirty (30) business days, dependent upon the severity of the discharge. If the elimination of the discharge will or does take longer than thirty (30) business days, Berkeley County will require responsible parties to submit an action plan with a schedule for elimination. Berkeley County will conduct a follow-up investigation to verify that the discharge has been eliminated upon being notified by responsible parties that the discharge has been eliminated.

Berkeley County may issue a Correction Order prior to the initial NOV. Berkeley County will issue an additional NOV or Stop Work Order, as appropriate, after thirty (30) business days if the illicit discharge has not been eliminated and no schedule for elimination has been submitted. Berkeley County will conduct follow-up inspections to ensure corrective action is provided. Appropriate Civil or Criminal Penalties may be issued. If non-compliance continues, the County may report the violation to SCDHEC Enforcement Division.

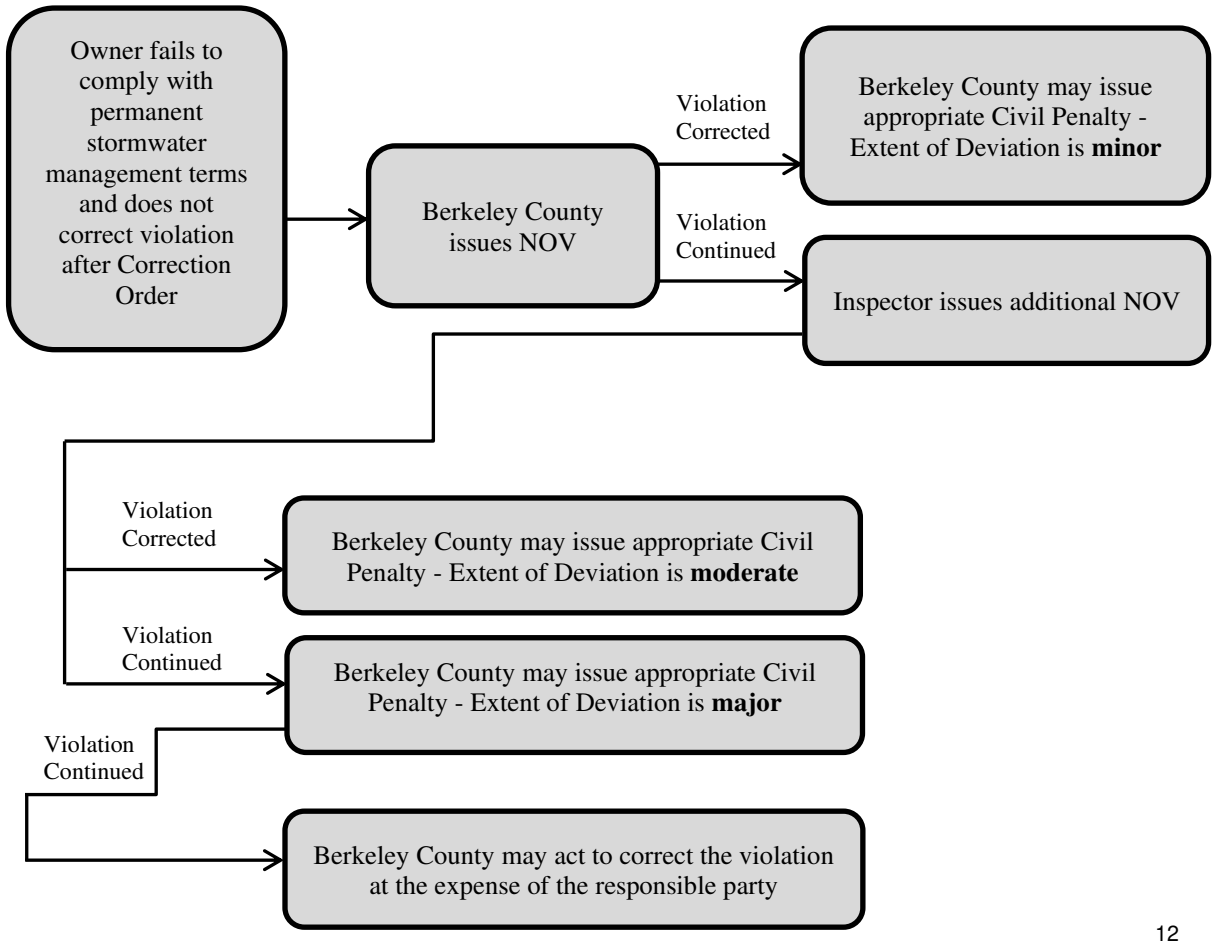


## C. Failure to Comply with Permanent Stormwater Management Requirements & Stormwater Maintenance Covenant

**Berkeley County response:**

The County requires all developers of new and re-development projects to sign a Maintenance Covenant which designates the developer or designee/owner as the responsible party for maintaining and ensuring the proper function of all post construction BMPs. As per Berkeley County's, City of Goose Creek, and City of Hanahan SMS4 NPDES Permit, each respective entity is responsible for inspecting all post construction BMPs permitted, after the effective date of the Permit, at least once during the Permit cycle. Following the County's inspection, an inspection report will be generated and sent to the Permanent Stormwater Management Structure owner.

Berkeley County may issue a verbal Correction Order upon initial discovery of a permanent stormwater management violation. Berkeley County may issue a NOV if the operator fails to correct deficiency after a Correction Order. Berkeley County will conduct follow-up inspections to ensure corrective action is provided. An additional NOV may be issued if corrective action is not provided. Appropriate Civil or Criminal Penalties may be issued if necessary.

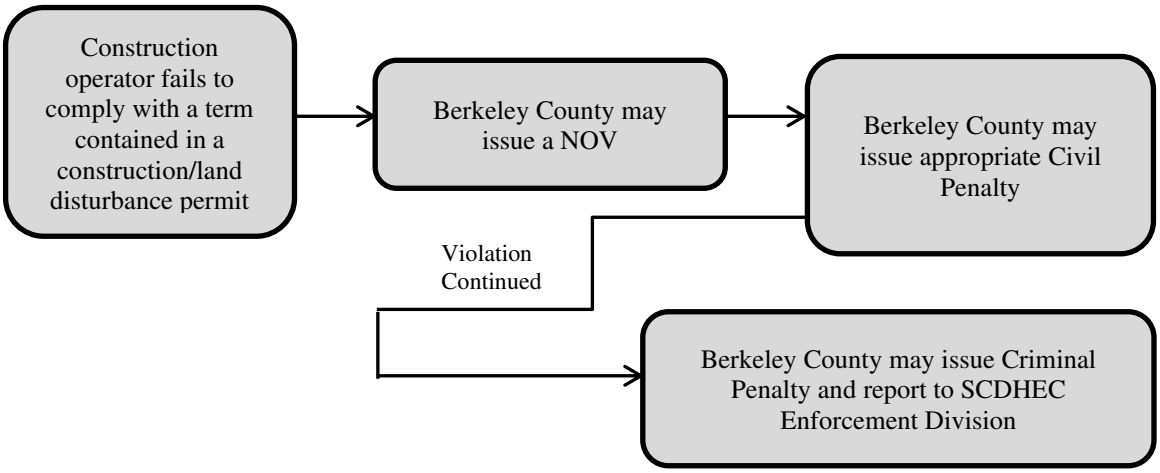


## D. Failure to Comply with Permit

Failure to comply with a requirement, condition, or term contained in a construction permit, site development, land disturbance, or grading permit.

**Berkeley County response:**

Berkeley County may issue Notice of Violation (NOV) upon initial discovery of violation. Berkeley County will conduct follow-up inspections to ensure corrective action is provided. Appropriate Civil or Criminal Penalties may be issued. If non-compliance continues, the County may report the violation to SCDHEC Enforcement Division.

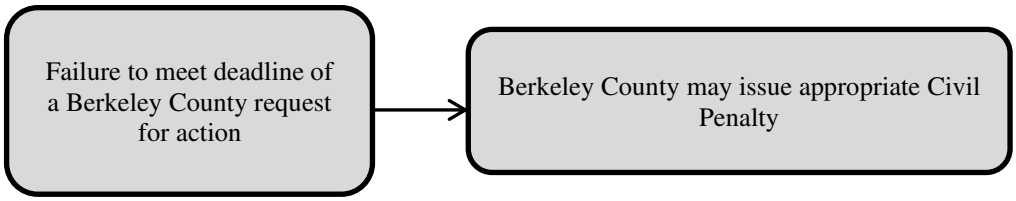



## E. Failure to Comply with a County Request

Failure to comply with each requirement, term, or condition of a County request for action.

**Berkeley County response:**

For instances in which there is a failure to comply with a condition of a County request for action, Berkeley County may issue Civil Penalties when deadlines are not met.



# V. PENALTY CALCULATION RATIONALE

The total penalty calculation will include consideration of the following factors at the discretion of Berkeley County:

1) Degree of harm or potential for harm to the public health, safety, private property, or the environment.

2) Extent of Deviation* from the requirements of the regulation, standard, or permit.

3) Frequency or duration of the violation.

4) Economic benefit as a result of noncompliance.

5) Cost of restoration of the environment or abatement of the environmental harm.

6) Past performance record or past history of noncompliance.

7) Degree of willfulness or negligence.

*Extent of Deviation for Civil Penalty comes from flow charts for each violation category. When not specified, the maximum Civil Penalty is to be determined by Berkeley County. Suggested Civil Penalties are as follow:

| Extent of Deviation | Suggested Maximum Civil Penalty (per day) |
|---|---|
| Minor | $500 |
| Moderate | $750 |
| Major | $1000 |

When a violation is determined to involve criminal action, an additional Criminal Penalty of $500 per day may be assessed.

A total penalty assessment rationale will be developed and outlined in writing for each enforcement action for which a penalty is assessed. Penalties for long-lasting and/or continuing violations (such as, but not limited to, unauthorized discharges or poor operation and maintenance) and recovery of economic benefit may be assessed per occurrence, per month, or per week.

# Appendix G: Clemson University/Carolina Clear Contract

**CONTRACTUAL AGREEMENT BETWEEN BERKELEY COUNTY GOVERNMENT AND CLEMSON UNIVERSITY through its Cooperative Extension Program**

**THIS AGREEMENT** (the "Agreement") is made this 1st day of July, 2022, by and between Berkeley County Government (hereinafter referred to as "Berkeley County") and the Clemson Cooperative Extension (hereinafter referred to as "Clemson Extension"). This Agreement shall consist of all the terms, conditions, specifications and provisions required to deliver the Scope of Services defined heretofore.

WITNESSETH:

**WHEREAS,** Berkeley County is seeking to implement stormwater public education and outreach and public involvement/participation programming; and

**WHEREAS,** Clemson Extension holds in its Extension faculty and staff various levels of expertise concerning stormwater compliance requirements as promulgated by South Carolina Department of Environment and Health (SCDHEC) and U.S. Environmental Protection Agency (USEPA); and

**WHEREAS,** Clemson University Cooperative Extension has developed an environmental outreach program (Carolina Clear), portions of which apply to the impact of stormwater on natural resources; and

**WHEREAS,** Berkeley County and Clemson Extension desire to enter into an agreement relating to Clemson University's requirement to implement strategic stormwater outreach and involvement programming, subject to the terms, specifications, conditions and provisions of the contract as heretofore mentioned.

**THEREFORE,** be it resolved that since Carolina Clear, a program within Clemson Extension, seeks to educate citizens about the impacts of stormwater and means to improve stormwater management and since this program provides outreach opportunities to address a broad range of water quality issues including the impact of stormwater on natural resources, Clemson Extension and Berkeley County will collaborate to address stormwater public education and outreach and public involvement/participation within Berkeley County. Carolina Clear is a comprehensive approach developed by Clemson University Cooperative Extension Service (CUCES) to inform and educate communities about, among other issues, water quality, water quantity, and the cumulative effects of stormwater. Carolina Clear addresses the special significance of South Carolina's water resources and the role these resources play in enhancing the state's economy, environmental health, and overall quality of life.

**NOW, THEREFORE,** Clemson Extension and Berkeley County agree to all of these terms, conditions, specifications, provisions and the special provisions as listed below:

A. This Agreement is deemed to be under and shall be governed by and construed according to the laws of the State of South Carolina.

B. This Agreement, including the terms, conditions, specifications and provisions listed herein makes up the entire agreement between the Clemson Extension and Berkeley County. No other Agreement, oral or otherwise, regarding the subject matter of this Agreement shall be deemed to exist or bind either party hereto.

**NOW, THEREFORE**, in consideration of mutual covenants contained herein, the parties agree as follows:

## ARTICLE 1
## DESCRIPTION

Because each agreement is unique to the requirements of the circumstances, Clemson Extension and Berkeley County agree that the specific metrics of each task shall be individually negotiated and delineated in the Scope of Services. Neither party has any responsibility for any performance obligations except as indicated within the Scope of Services.

Clemson Extension does hereby offer to Berkeley County services for the purpose of providing stormwater-related public education and involvement programs and documentation of activities for Clemson University, as contained and described in the Scope of Services.

SCOPE OF SERVICES

PUBLIC awareness and education about natural resources is crucial to the process of protecting and restoring water quality. Clemson Extension and Berkeley County will collaborate to deliver public education and outreach and public involvement/participation programming to general and targeted audiences, within Berkeley County, towards achieving compliance with the public education and outreach and public involvement/participation requirements of the NPDES Phase II Stormwater Program.

In general, Clemson Extension will lead a regional effort, inclusive of Berkeley County, that includes strategic identification of behaviors and pollutants that can be addressed through stormwater education programming; implementation of an outreach campaign that seeks to address target behaviors, pollutants, and audiences; website presence and information made available to the public about pollution prevention; annual data report regarding program activities.

In order to assist Berkeley County in satisfying the Public Education and Outreach Minimum Control Measure, as required by the NPDES Phase II Stormwater Program, Clemson Extension proposes to utilize selected components of the Carolina Clear program in order to:

- Coordinate and lead a regional body, inclusive of Berkeley County participants, including community representatives joined together by a shared interest in watershed restoration, protection, and improved stormwater management.

- Determine the appropriate public awareness campaign with Berkeley County and the community's guidance on target behaviors, audiences, pollutants and established venues and modes for outreach. Some program implementation approaches, BMPs (i.e., the program actions/activities), and measurable goals are contained in the individual agreement and seek to
    - Form collaborative working groups,
    - Use and develop education materials and strategies, and
    - Reach diverse audiences.

- Implement a strategic public education program with Berkeley County, or conduct equivalent outreach activities addressing the awareness of stormwater pollution and its effects on natural resources and the specific activities and safe alternatives to improve stormwater management.

In order to satisfy the Public Involvement/Participation Minimum Control Measure, as required by the NPDES Phase II Stormwater Program, Clemson Extension proposes to:

- Provide opportunities for citizens and various audiences, within Berkeley County, to become active in stormwater management.

- Provide program accountability measures, within Berkeley County, including estimated number of people contacted, publications produced and distributed, and measures of outreach impacts and possible behavior change, and other specifics as appropriate considering SCDHEC and USEPA guidance.

- Other programs and measures as specified in the Contractual Agreement.

NOW, the parties specifically agree as follows:

1. Clemson Extension will deliver public education and outreach and public involvement/participation with a goal to influence a more aware and involved public in regards to stormwater management decisions. The educational programs will include components designed for various residential and commercial audiences and others targeted for their impact to stormwater and nonpoint source pollution. This effort will be delivered through various means, as detailed below in items 4 and 5. Events will be held at available facilities, within Berkeley County, in such a way to reach diverse and regionally distributed audiences. Such instruction may include the furnishing of informational handouts, instructional manuals, promotional materials, webpages, logos, slogan, symbols, and similar such materials, as deemed appropriate by Clemson Extension and Berkeley County.

2. Berkeley County will participate in a regional decision-making process to define regional priorities in regards to behaviors, pollutants, and audiences to be targeted for outreach. Additionally, Berkeley County shall provide input as available on audience demographics, behaviors based on staff observations, residential and commercial impacts related to stormwater management that may lead to compliance and enforcement actions, and other input based on stormwater operations.

3. Berkeley County shall provide information regarding readily available delivery modes for education and involvement programming (e.g., newsletters, community calendars, government access channels, community meetings, Council meetings, tax or water bills, etc.).

4. Clemson Extension will strive to raise public awareness, within Berkeley County, using a mass media approach. Billboard and television public service announcements, radio broadcasts and interviews, newspaper articles, stories and advertisements, and publications are among the outlets considered for use in this effort.

5. Each of the public-related activities described below will be part of the core program on an annual basis and will target a specific audience, within Berkeley County, all subject to modification with the approval of Berkeley County and Clemson Extension, as well as acknowledging regulatory direction and interpretation by SCDHEC.

   Clemson University Extension will:

   *LEAD*

   5.1. Work with the Ashley Cooper Stormwater Education Consortium, regional association of **stormwater managers, and local decision-makers** to update, plan, and determine regional public education and outreach and public involvement/participation priorities as part of a multi-year strategic plan with benchmarks of activities and measures of success annually.

   5.2. Explore, pilot (as needed), and initiate strategic approaches to educating target audiences towards the goal of adopting improved behaviors and practices towards better stormwater management.

   *COMMUNICATE*

   5.3. Maintain webpage(s) with content specific to the regional outreach programs. Utilize tools to monitor website visits and other related statistics.

   *5.4.* Maintain communication among regional collaborators through meetings, newsletters/e-news, one-on-one meetings, or other means established as best practice for the collaborative working groups.

   *IMPLEMENT*

   5.5. Plan, develop, present, and be a participant in at least three (3) **community** and **public** programs per year with emphasis on stormwater education. Provide resources to encourage continued learning and practice adoption.

   5.6. Create at least three (3) news articles per year for the **area's residents and/or target audiences.**

   5.7. Plan and present homeowner and yard owner program(s) for **individuals** and **families.** Distribute or provide materials for distribution as part of workshops and/or provide resources to encourage continued learning and practice adoption.

   5.8. Provide at least one (1) **youth** program per year within the region such as

i. Adopt-A-Watershed which uses a local watershed,
ii. Storm Drain Marking,
iii. 4-H Wetlands Project explores estuaries, marshes, and swamps,
iv. $4H_2O$ Pontoon Classroom,
v. Engaging teachers in new watershed and stormwater curriculum meeting SC Standards, and
vi. EnviroScape®.

5.9. Present at least one (1) program per year that addresses pollution prevention and alternatives for a **target audience, as per the region's priorities.**

5.10. Develop and provide for the **general public,** within means, items such as banners and promotional giveaways to serve as a way to attract audiences and increase regional consortium visibility.

5.11. Utilize mass media outlets to provide statewide education at an increased cost-effectiveness; as needed, locally utilize mass media such as newspapers, radio, interviews and advertisements to address specific needs.

*INVOLVE*

5.12. Provide at least one (1) opportunity to involve an audience (**general public** or **commercial**) in improved watershed management and stormwater awareness.

5.13. Promote and expand web-based tools to encourage learning about and adoption of low impact development techniques (SC LID Atlas) and furthering involvement from citizens in watershed-focused volunteer opportunities (Watershed Stewardship Map) and through the use of demonstration sites as warranted appropriate.

*REPORT*

5.14. Provide and manage a user-friendly database to track each year's activities.

5.15. Annually, produce a document summarizing the year's efforts, successes, decision-making processes, partnerships and regional priorities.

5.16. On request and based on current regulatory guidance, provide data for public education and outreach and public involvement/participation measures of the Annual Report Checklist (or alternative document) required by DHEC of all Small Multiple Separate Storm Sewer Systems (MS4s).

6. Clemson Extension will provide accountability statistics for each of the activities as best can be estimated. The statistics will include the following accomplishment indicators:
   6.1. Number of educational programs and activities conducted.
   6.2. Number of people reached through educational programs or involved by outreach programs according to method, audience or targeted behavior.
   6.3. Number of people receiving information through "non-program" contacts such as telephone, office, visits, website contacts, visual and print media.
   6.4. Evaluation of activities and the pollutant or behavior targeted.
   6.5. As available, feedback on programs and anecdotal evidence of successful program implementation.

7. Accountability statistics shall be provided at a minimum of *once per permit cycle* (anticipated as no less than 3 years and no more than 5 years), and on the Carolina Clear statewide schedule so as to gain regional comparison information, implement statistically relevant survey instruments to gain insight on the awareness, knowledge and behaviors of the general public related to stormwater and watershed management, as well as regional effort awareness.

A mutually agreeable estimated delivery schedule shall provide activities distributed through each year in an Annual Activity Plan (as default) or on an otherwise agreed upon multi-year activity plan, which will be noted as a regional decision documented in writing for the regional entity.

## ARTICLE 2
## LIABILITY

Berkeley County and Clemson Extension shall not be responsible to each other for any incidental, indirect or consequential damages incurred by either Berkeley County or Extension or for which either party may be liable to any third party which damages have been or are occasioned by services performed or reports prepared or other work performed hereunder.

## ARTICLE 3
## ASSIGNMENT

Clemson Extension shall not assign or subcontract any rights or duties of this Agreement, except to an affiliated company, without the expressed written consent of Berkeley County, which consent shall not be unreasonably withheld, conditioned or delayed. Any assignment or subcontract without the written consent of Berkeley County shall be void and this Agreement shall terminate at the option of the Berkeley County.

## ARTICLE 4
## TERM

The term of this Agreement shall be for five (5) years beginning on the date of the last signature of this contract agreement. The contract may be extended an additional one (1) year term , for a for a total of three (3) additional years beyond the initial term, at the written mutual agreement of both parties, provided such agreement is executed no later than 30 days prior to the expiration of this contract. No amendments, changes or modifications will be effective until and unless reduced to writing and signed by the parties.

## ARTICLE 5
## COMPENSATION

Berkeley County shall provide payment in the amount of Fourty-Eight Thousand Dollars ($48,000), annually for the core program subject to the terms and conditions of this Agreement, unless additional services are amended to this Agreement. Fees for additional services will be negotiated based on cost.

## ARTICLE 6
## LIABILITY COVERAGE

Each party agrees to carry and provide insurance coverage in the amount of $1 million for general liability, as well as carrying statutory amounts of workers compensation and auto insurance.

## ARTICLE 7
## DEFAULT

The remedies herein given to Berkeley County shall be cumulative, and the exercise of any one remedy by Berkeley County shall not be to the exclusion of any other remedy.

## ARTICLE 8
## TERMINATION

In the event that Clemson Extension fails to perform (or fails to commence the cure of any breach, which shall be diligently prosecuted in good faith) the services described within fifteen (15) business days of its receipt of a written demand from Berkeley County, Berkeley County may terminate the Contract immediately upon notice provided such notice is at least thirty (30) business days following Berkeley County's notice of non-performance. In the event that Berkeley County breaches any of the terms of this Agreement including, but not limited to, non-payment, and fails to cure such breach within fifteen (15) business days of its receipt of a written demand from Clemson Extension, Clemson Extension may terminate the Contract immediately upon notice, provided such notice is at least thirty (30) business days following the Clemson Extension's notice of breach. Upon such termination, the Berkeley County has the right to award the Contract to an alternate contractor.

## ARTICLE 9
## COUNTY RESPONSIBILITIES

Berkeley County will be responsible to provide Clemson Extension reasonable access to its locations when necessary, ensure cooperation of Berkeley County employees in activities reasonable and appropriate under the project, as well as obtaining authorization for access to third party sites, if required.

## ARTICLE 10
## FORCE MAJEURE

Should performance of Clemson Extension services be materially affected by causes beyond its reasonable control, a Force Majeure results. Force Majeure includes, but is not restricted to, acts of God, acts of a legislative, administrative or judicial entity, acts of contractors other than subcontractors of Clemson Extension, fires, floods, labor disturbances, and unusually severe weather. Clemson Extension will be granted a time extension and the parties will negotiate

an adjustment to the fee, where appropriate, based upon the effect of the Force Majeure upon Clemson Extension's performance.

## ARTICLE 11
## SEVERABILITY

Every term or provision of this Agreement is severable from others. Notwithstanding any possible future finding by a duly constituted authority that a particular term or provision is invalid, void, or unenforceable, this Agreement has been made with the clear intention that the validity and enforceability of the remaining parts, terms and provisions shall not be affected thereby.

## ARTICLE 12
## INDEPENDENT CONTRACTOR

Clemson Extension shall be fully independent in performing the services and shall not act as an agent or employee of the Berkeley County. As such, Clemson Extension shall be solely responsible for its employees, subcontractors, and agents and for their compensation, benefits, contributions and taxes, if any.

## ARTICLE 13
## NOTICE

Clemson Extension and Berkeley County shall notify each other of service of any notice of violation of any law, regulation, permit or license relating to the services; initiation of any proceedings to revoke any permits or licenses which relate to such services; revocation of any permits, licenses or other governmental authorizations relating to such services; or commencement of any litigation that could affect such services. Such notice shall be delivered by U. S. mail with proper postage affixed thereto and addressed as follows:

Berkeley County: Engineering Department – Stormwater Management Program
ATTN: Thurman Simmons
Stormwater Program Manager
1003 US Highway 52, Suite 120, Moncks Corner, SC 29461

Clemson: Clemson Extension Service
Attn: Kimberly C. Morganello
Carolina Clear Program Coordinator,
Clemson Cooperative Extension
259 Meeting Street
Charleston, SC 29401

## ARTICLE 14
## TOTAL AGREEMENT

This Agreement constitutes the entire agreement between the parties hereto. No representations, warranties or promises pertaining to this Agreement have been made or shall be binding upon any of the parties, except as expressly stated herein. This contract is subject to the terms and conditions of the Memorandum of Understanding between Clemson and Berkeley County, dated July 1, 2022 which are fully incorporated herin by reference.

**IN WITNESS WHEREOF**, the parties hereto have executed this Agreement on the day and year first above written.

**WITNESSES:**

Berkeley County Government

Signature: _____
Name: Johnny Cribb
County Supervisor
Address: Berkeley County

**WITNESSES:**

Clemson University Cooperative Extension Service

Signature: _____ 3/2/22
Name: George Askew, Vice President for Public Service & Agriculture
Address: Clemson University

# Memorandum of Understanding

**between**

**CLEMSON UNIVERSITY**

**and**

**BERKELEY COUNTY**

WHEREAS, Clemson University (hereinafter, CLEMSON) holds in its Extension faculty and staff various levels of expertise concerning stormwater compliance requirements as promulgated by South Carolina Department of Health & Environmental Control (SC DHEC) and U.S. Environmental Protection Agency (USEPA), and

WHEREAS, BERKELEY COUNTY will represent the CITY OF GOOSE CREEK, and the CITY OF HANAHAN via established Inter-Governmental Agreements (IGAs), and will henceforth be referred to as BERKELEY COUNTY. BERKELEY COUNTY is seeking to collaborate with another entity to implement stormwater public education and outreach and public involvement/participation programming; and

WHEREAS, Clemson University has developed an environmental outreach program (Carolina Clear), portions of which apply to the impact of stormwater on natural resources;

THEREFORE, be it resolved that since Carolina Clear seeks to educate citizens about the impacts of stormwater and means to improve stormwater management and since this program provides outreach opportunities to address a broad range of water quality issues including the impact of stormwater on natural resources, Clemson and BERKELEY COUNTY will collaborate to address stormwater public education and outreach and public involvement/participation. Carolina Clear is a comprehensive approach developed by Clemson University Cooperative Extension Service (CU CES) to inform and educate communities about, among other issues, water quality, water quantity, and the cumulative effects of stormwater. Carolina Clear addresses the special significance of South Carolina's water resources and the role these resources play in enhancing the state's economy, environmental health, and overall quality of life.

In order to assist BERKELEY COUNTY in satisfying the Public Education and Outreach Minimum Control Measure, as required by the NPDES Phase II Stormwater Program, CUCES proposes to utilize selected components of the Carolina Clear program in order to

- Coordinate and lead a regional body of partners including community representatives joined together by a shared interest in watershed restoration, protection, and improved stormwater management.
- Determine the appropriate public awareness campaign with BERKELEY COUNTY and the community's guidance on target behaviors, audiences, pollutants and established venues and modes for outreach. Some program implementation approaches, BMPs (*i.e.*, the program actions/activities), and measurable goals are contained in the individual agreement and seek to
    - Form partnerships,
    - Use and develop education materials and strategies, and
    - Reach diverse audiences.
- Implement a strategic public education program with BERKELEY COUNTY, or conduct equivalent outreach activities addressing the awareness of stormwater pollution and its effects on natural resources and the specific activities and safe alternatives to improve stormwater management.

In order to satisfy the Public Involvement/Participation Minimum Control Measure, as required by the NPDES Phase II Stormwater Program, CUCES proposes to:

- Provide opportunities for citizens and various audiences to become active in stormwater management.
- Provide program accountability measures including estimated number of people contacted, publications produced and distributed, and measures of outreach impacts and possible behavior change, and other specifics as appropriate considering SCDHEC and USEPA guidance.
- Other programs and measures as specified in the forthcoming Contractual Agreement.

Because each agreement is unique to the requirements of the circumstances, Clemson and BERKELEY COUNTY agree that the specific metrics of each contract shall be individually negotiated and delineated in the Contractual Agreement. Neither party has any responsibility for any performance obligations except as indicated in a subsequently negotiated Contractual Agreement.

This Memorandum of Understanding will commence upon the date of July 01, 2022 and coincide with the terms and conditions of *CONTRACTUAL AGREEMENT BETWEEN BERKELEY COUNTY GOVERNMENT AND CLEMSON UNIVERSITY through its Cooperative Extension Program*. The parties may agree in writing to extend this agreement for an additional 5-year period, provided such agreement is executed no later than 30 days prior to the expiration of this contract. No amendments, changes or modifications will be effective until and unless reduced to writing and signed by the parties.

Either party may terminate this agreement by providing thirty (30) days written notice to the other party.

Dr. George Askew, Vice President

Clemson University

3/7/22

Date

Johnny Cribb, County Supervisor

Berkeley County

3/21/22

Date

# Appendix H: Intergovernmental Agreements

# BERKELEY COUNTY
SUPERVISOR'S OFFICE

William W. Peagler, III
SUPERVISOR

RECEIVED
NOV 16 2015
from Thomas 1:30pm
BY: SHONDA BAGGETT

October 20, 2015

Dennis Harmon, City Administrator
City of Goose Creek
PO Drawer 1768
Goose Creek, South Carolina 29445-1768

Dear Dennis,

Enclosed please find the Intergovernmental Agreement regarding the NPDES stormwater discharge and other stormwater related services.

We look forward to partnering with the City of Goose Creek in this program.

Sincerely,

William W. Peagler, III
County Supervisor

WWP, III/bwm
Encl: as stated
cc: John O Williams
Tom Lewis
Chad Busby

RECEIVED
NOV 05 2015
BERKELEY COUNTY
ENGINEERING DEPARTMENT

| | | |
|---|---|---|
| STATE OF SOUTH CAROLINA | ) | INTERGOVERNMENTAL |
| | ) | AGREEMENT – NPDES STORMWATER |
| | ) | DISCHARGE PERMIT COMPLIANCE |
| | ) | AND OTHER STORMWATER RELATED |
| COUNTY OF BERKELEY | ) | SERVICES |

THIS AGREEMENT (Agreement) is made and entered into as of this 15th day of October, 2015, by and between the County of Berkeley, S.C. (the County) and the City of Goose Creek, S. C. (the City).

WHEREAS, the County and the City are required by law to establish a stormwater management program pursuant to a National Pollutant Discharge Elimination System (NPDES) Permit (SCR030000) (the Permit) issued by the South Carolina Department of Health and Environmental Control (DHEC), the purpose of which is to protect, maintain and enhance the environment of the County and City and the short-term and long-term public health, safety and general welfare of the citizens of the County and City by addressing discharges of pollutants to the stormwater drainage system; and

WHEREAS, the County has developed a Stormwater Management Program (the SWMP) for the unincorporated areas of the County; and

WHEREAS, the County has developed a Stormwater Management Utility for the purpose of implementing the Berkeley County SWMP and satisfying the regulatory requirements of the Permit; planning, designing, constructing, funding, and maintaining stormwater management, sediment control, and flood control programs, projects and facilities; and reviewing and approving stormwater management and sediment control plan for land disturbing activities; and providing for the administration and enforcement thereof; and

WHEREAS, the County and City believe it is in the best interest of their citizens to avoid duplication of services with respect to stormwater management by entering into an agreement for the County to administer and enforce a SWMP for the City in order to provide for the effective and efficient handling of stormwater in the City and within as much of the County as possible;

NOW THEREFORE, in consideration of the foregoing premises and other good and valuable consideration, the sufficiency and receipt of which are hereby acknowledged, the County and the City hereby agree as follows:

A. Mutual Protections for the City and County

The City and County hereby mutually covenant and agree to take, use, provide and make, all proper necessary and sufficient precautions, safeguards and protections against the occurrence of any accidents, injuries, or damages to any person or property in performing or failing to perform any actions under this Agreement, and to be responsible for and save harmless the other party from the payment of all sums of money by reason of all or any accidents, injuries, or damages that may occur in the progress of any work (or arising out of the alleged failure to perform work) performed under this Agreement and arising out of or in connection with intentional, willful, wanton, reckless, or negligent conduct of the responsible party. This payment obligation shall include, but not be limited to, losses

incurred under this Agreement for or by reason of the violation of any ordinance or regulation, or the laws of the State of South Carolina or of the United States. The City and County agree that the responsible party shall have the authority to control any litigation that arises from the responsible party's related activities under this section, provided that the parties are not adverse in such litigation.

B. Obligations of the City

1. The City authorizes the County to administer the SWMP within the municipal limits of the City. This agreement and the SWMP shall authorize enforcement by City and County representatives. The City agrees that Berkeley County shall utilize the Berkeley County Stormwater Design Standards Manual in the administration of the SWMP. All costs of defending the ordinances adopted by the City shall be borne by the City.

2. The City agrees to cooperate with the County to enable the County to implement the SWMP, the Manual, Permit, and stormwater utility fees within the City. The City agrees to educate its staff regarding the provisions of each, and will implement the operational measures necessary for compliance for City property and operations.

3. The City hereby delegates to the County the duties of development, implementation and enforcement of the SWMP, and the efforts of monitoring, recordkeeping and reporting which may be imposed by the Permit, subject to Section 4.4 thereof (as may be amended from time to time). The City shall make available to the County necessary documentation related to annual reporting associated with the Permit.

4. The City shall provide the County with documentation of easements and rights-of-way as needed to operate and maintain the drainage system. In those cases where easements or rights-of-way have not been obtained, but are needed, the City agrees to assist the County in obtaining an appropriate easement or right-of-way.

C. Obligations of the County

1. The County agrees to fulfill the responsibilities granted it by the City pursuant to this Agreement.

2. The County shall be responsible for the day to day operation and maintenance activities as well as the long-term management of the City's storm drainage system.

3. The methodology for determining fees or charges for this program shall be determined by the County. The County shall bill and collect stormwater management utility user fees from property owners, tenants, and other appropriate parties within the City using the same methods contained in the County's Stormwater Management Utility Ordinance.

4. The County shall implement and operate all six (6) of the minimum control measures as identified in the Permit, to include the Program Description of Elements, Measures and Services attached to this Agreement as Exhibit A and made part hereof by reference, within the City. While the County will be responsible for conducting and ensuring

compliance with the Permit, this does not exclude the City from assisting in these activities when deemed necessary or appropriate by the City and County.

5. The County hereby assumes the duties of development, implementation and enforcement of the SWMP, and the efforts of monitoring, recordkeeping and reporting which may be imposed by the Permit, subject to Section 4.4 thereof (as may be amended from time to time).

6. The City agrees to assist with information and non-legal advice regarding defense of any challenges to the County's Ordinances and program compliance.

D. Miscellaneous

1. This Agreement will become effective upon execution by authorized representatives of both parties.

2. This Agreement may not be revised or modified except by written mutual agreement of the City and the County.

3. The City and County reserve the right to challenge any of the terms, conditions, or provisions of the Permit, its enabling laws, rules and regulations and/or interpretations thereof by authorities asserting jurisdiction.

4. If any section, subsection, sentence, clause, phrase, or portion of this Agreement is for any reason held invalid or unconstitutional by any court or competent jurisdiction, such provision and such holding shall not affect the validity of the remaining portion of this Agreement.

5. Those rights and obligations under this Contract, which, by their nature should survive, shall remain in effect after termination, suspension or expiration hereof.

6. The failure of either Party to enforce at any time any of the provisions of this Contract shall in no way be construed as a waiver of such provision nor in any way affect the right of either Party thereafter to enforce each and every provision of this Contract. There can be no assignment by either party of any rights or responsibilities hereunder without the consent of the other party.

7. All parties acknowledge that nothing under this agreement creates a right of action for any person or entity, and that this contract does not create or otherwise permit third party beneficiary rights or related causes of action. It is further acknowledged that the parties hereto are governmental entities providing these services in a governmental capacity. Accordingly, it is agreed that the parties are sovereigns that are, to the extent permitted by the South Carolina Tort Claims Act, and other applicable law, protected by sovereign immunity with respect to all acts and omissions related hereto.

8. The City and County agree to enact, follow and enforce such ordinances, rules, policies, and regulations as may be necessary to carry out the terms of this Agreement.

9. Any notices which may be permitted or required hereunder shall be in writing and shall be deemed to have been duly given as of the date and time the same are personally delivered or are deposited with the United States Postal Service, postage prepaid, and addressed as follows:

   **If to the County:**
   Attn: Stormwater Management Program, Berkeley County Engineering, PO Box 6122 Moncks Corner, SC 29461

   **If to the City:**
   Attn: Director of Public Works, City of Goose Creek, P.O. Drawer 1768, Goose Creek, SC 29445

10. This agreement shall be effective as of the date listed above, and shall continue from year to year unless terminated. Either party may terminate this agreement by delivering 12 months' advance written notice of termination to the other Party's address listed above.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals, by and through the undersigned agents, this 15th day of October, 2015.

SIGNED, SEALED & DELIVERED
IN THE PRESENCE OF:

BERKELEY COUNTY

By: _____

Its: County Supervisor

THE CITY OF GOOSE CREEK

By: _____

Its: Mayor

# Exhibit A

Program Description of Elements, Measures and Services Berkeley County will provide to the City in association with the Intergovernmental Agreement (IGA) for NPDES Strormwater Discharge Permit Compliance and Other Stormwater Related Services.

**Notice of Intent (NOI):**

- The County will review and update the City's NOI for consistency with the County's NOI and update the NOI as necessary for compliance with SCDHEC NPDES MS4 Permit NOI submittal requirements.

**Stormwater Management Program (SWMP):**

- The County will review, update and manage the City's SWMP and all associated documents for consistency with the County's SWMP and for compliance with the NPDES MS4 Permit requirements.
- The County will provide necessary updates to the SWMP and all associated documents as required by the NPDES MS4 Permit requirements.
- The County will implement the City's SWMP.
- The County will review and update the City's Stormwater Management Ordinance for consistency with the County Stormwater Management Ordinance.

**Enforcement Response Plan (ERP):**

- The County will review and update the City's ERP for consistency with the County's ERP.
- The County will implement the ERP within the City.
- The County will perform all necessary stormwater inspections, generate inspection reports and initiate enforcement actions for all stormwater violations within the City.
- The County will notify and coordinate any and all enforcement actions taken within the City with appropriate City personnel.
- The County will maintain records of all inspections and enforcement actions performed within the City.

**Discharges to Sensitive Waters:**

- The County will assess the City's receiving water conditions and impacts.

- The County will determine whether the City's MS4 discharges to receiving waters within a TMDL watershed, to impaired waters from the most current 303d list of impaired waters or to other Source Water Protection Areas (SWPA).
- The County will develop and implement TMDL assessment and monitoring plans as required by the NPDES MS4 Permit for all discharges where a Wasteload Allocation (WLA) is assigned.
- The County will assess all City MS4 discharges to 303d waters for cause/contribution of Pollutants of Concern (POCs).
- The County will program and implement Best Management Practices (BMPs) as necessary to address TMDLs and discharges to impaired waters as required by the NPDES MS4 Permit.

**Public Education and Outreach on Stormwater Impacts:**

- The County will implement, manage and maintain the partnership and contract with Clemson's Carolina Clear program for the City as necessary to satisfy the NPDES MS4 Permit Public Education and Outreach requirements.
- The County will maintain the partnership with the Ashley Cooper Stormwater Education Consortium.
- The County will maintain the partnership with the South Carolina Stormwater Managers Association.

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- The County will identify and map all City stormwater outfalls to receiving waters.
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- The County will initiate enforcement actions as necessary to eliminate illicit discharges in accordance with the ERP for all illicit discharges found during outfall dry weather screening.
- The County will inventory and update the City's stormwater system and establish a GIS map of the City's stormwater system.

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- The County will develop and perform illicit discharge training of all appropriate municipal staff as required by the NPDES MS4 Permit.
- The County will establish a hotline for citizens of the City to report illicit discharges.

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- The County will review and update the City's Stormwater Construction Design Standards for consistency with the County Stormwater Design Standards.
- The County will review stormwater, erosion & sediment control, pollution prevention, site prep and grading plans for all residential, commercial, and industrial development and other construction projects within the City for compliance with County and state requirements as required by the NPDES MS4 Permit.
- The County will track all active construction projects within the City and maintain a database of all active construction projects.
- The County will perform stormwater and erosion and sediment control inspections of all residential, commercial and industrial construction projects within the City as required by the NPDES MS4 Permit.
- The County will track all active construction projects and maintain a database of all inspection reports from start of construction through construction completion and site stabilization.
- The County will initiate and manage enforcement actions for all non-compliant and deficient stormwater construction in accordance with the ERP.
- The County will provide staff training as required by the NPDES MS4 Permit.

**Post-Construction Stormwater Management for New Development and Redevelopment:**

- The County will review and update the City's Stormwater Post-Construction Design Standards for consistency with the County Stormwater Design Standards.
- The County will review stormwater plans for site performance post-construction stormwater control measures as required by the NPDES MS4 Permit.
- The County will review for and ensure long-term maintenance of post-construction stormwater control measures installed to meet site performance standards.
- The County will establish and maintain an inventory of all installed post-construction stormwater control measures.
- The County will inspect all post-construction stormwater control measures installed during construction, upon completion of construction and after construction as required by the NPDES MS4 Permit.
- The County will maintain a database of all post-construction inspection reports and enforcement actions in accordance with the NPDES Permit and ERP.

**Pollution Prevention/Good Housekeeping for Municipal Operations:**

- The County will establish and maintain an inventory of all municipally owned facilities within the City.
- The County will establish and maintain an inventory of all municipally owned stormwater controls within the City.
- The County will develop and perform Pollution Prevention/Good Housekeeping training of all appropriate municipal staff as required by the NPDES MS4 Permit.
- The County will perform a comprehensive assessment of all municipally owned facilities and maintain a database of assessment results.
- The County will identify all municipal High-Priority facilities within the City and perform facility specific inspections of all High Priority facilities as required by the NPDES MS4 Permit.
- The County will inventory and prioritize the municipally owned or operated stormwater system structures and catch basins within the City and implement a maintenance plan and schedule for the stormwater system structures and catch basins.
- The County will implement pollution prevention measures for all operation and maintenance activities performed within the City.
- The County will inspect and maintain all municipally owned or operated stormwater controls as required by the NPDES MS4 Permit.

**Reviewing and Updating the SWMP:**

- The County will perform an annual review of the City's SWMP.
- The County will update the City's SWMP as necessary to add or modify selected BMPs and comply with the NPDES MS4 Permit.

**Monitoring, Record Keeping and Reporting:**

- The County will maintain records of all outfall water quality screening, monitoring and testing data associated with TMDLs and discharges to impaired waters within the City.
- The County will maintain records of all illicit discharge inspection reports and enforcement actions within the City.
- The County will maintain records and track all active stormwater construction projects within the City.
- The County will maintain records of all stormwater construction inspections, post-construction inspections and enforcement actions associated with construction activity within the City.
- The County will maintain records of all post-construction BMPs and BMP inspections with the City.

- The County will maintain records of illicit discharge and good housekeeping training of municipal staff.
- The County will maintain records of all municipal facility assessments and high priority inspections within the City.
- The County will maintain records of all stormwater system maintenance, catch basin maintenance, stormwater control maintenance and street sweeping within the City.
- The County will prepare all annual reports to be submitted to SCDHEC in accordance with the NPDES MS4 Permit.

**Stormwater Management Utility:**

- The County will implement the Stormwater Management Utility Ordinance within the City.
- The County will manage the Stormwater Management Utility within the City.
- The County will bill and collect Stormwater Management Utility fees on parcels and users within the City.
- The County will perform, update and maintain impervious surface area calculation data within the City in association with the Stormwater Management Utility Rate Study.
- The County will incorporate parcels and users within the City in the Stormwater Management Utility Rate Study.
- The County will maintain records of all stormwater utility fees collected and stormwater utility revenues spent within the City.

**Stormwater Capital Improvements:**

- The County and the City will establish a Stormwater Advisory Board consisting of representatives of the both the County and City.
- The Stormwater Advisory Board will program, schedule and fund stormwater capital improvement projects and stormwater BMPs utilizing Stormwater Utility fees collected from parcels and users within the County and City.
- The County will implement, manage and construct stormwater capital improvement projects and stormwater BMPs under the oversight of the Stormwater Advisory Board and in accordance with the Stormwater Management Utility Ordinance.

# BERKELEY COUNTY
SUPERVISOR'S OFFICE

William W. Peagler, III
SUPERVISOR

November 3, 2015

Tom
For your
files

Johnny Cribb, City Administrator
City of Hanahan
1255 Yeamans Hall Road
Hanahan, South Carolina 29410

Dear Johnny,

Enclosed please find the Intergovernmental Agreement regarding the NPDES stormwater discharge and other stormwater related services.

We look forward to partnering with the City of Hanahan in this program.

Sincerely,

William W. Peagler, III

William W. Peagler, III
County Supervisor

WWP, III/bwm
Encl: as stated
cc: John O Williams
Tom Lewis

BERKELEY COUNTY
SEP 16 2015
LEGAL DEPARTMENT

| | | |
|---|---|---|
| STATE OF SOUTH CAROLINA | ) | INTERGOVERNMENTAL AGREEMENT – NPDES STORMWATER DISCHARGE PERMIT COMPLIANCE AND OTHER STORMWATER RELATED SERVICES |
| | ) | |
| | ) | |
| | ) | |
| COUNTY OF BERKELEY | ) | |

THIS AGREEMENT (Agreement) is made and entered into as of this 9th day of October, 2015, by and between the County of Berkeley, S.C. (the County) and the City of Hanahan (the City).

WHEREAS, the County and the City are required by law to establish a stormwater management program pursuant to a National Pollutant Discharge Elimination System (NPDES) Permit (SCR030000) (the Permit) issued by the South Carolina Department of Health and Environmental Control (DHEC), the purpose of which is to protect, maintain and enhance the environment of the County and City and the short-term and long-term public health, safety and general welfare of the citizens of the County and City by addressing discharges of pollutants to the stormwater drainage system; and

WHEREAS, the County has developed a Stormwater Management Program (the SWMP) for the unincorporated areas of the County; and

WHEREAS, the County has developed a Stormwater Management Utility for the purpose of implementing the Berkeley County SWMP and satisfying the regulatory requirements of the Permit; planning, designing, constructing, funding, and maintaining stormwater management, sediment control, and flood control programs, projects and facilities; and reviewing and approving stormwater management and sediment control plan for land disturbing activities; and providing for the administration and enforcement thereof; and

WHEREAS, the County and City believe it is in the best interest of their citizens to avoid duplication of services with respect to stormwater management by entering into an agreement for the County to administer and enforce a SWMP for the City in order to provide for the effective and efficient handling of stormwater in the City and within as much of the County as possible;

NOW THEREFORE, in consideration of the foregoing premises and other good and valuable consideration, the sufficiency and receipt of which are hereby acknowledged, the County and the City hereby agree as follows:

A. Mutual Protections for the City and County

The City and County hereby mutually covenant and agree to take, use, provide and make, all proper necessary and sufficient precautions, safeguards and protections against the occurrence of any accidents, injuries, or damages to any person or property in performing or failing to perform any actions under this Agreement, and to be responsible for and save harmless the other party from the payment of all sums of money by reason of all or any accidents, injuries, or damages that may occur in the progress of any work (or arising out of the alleged failure to perform work) performed under this Agreement and arising out of or in connection with intentional, willful, wanton, reckless, or negligent conduct of the responsible party. This payment obligation shall include, but not be limited to, losses

incurred under this Agreement for or by reason of the violation of any ordinance or regulation, or the laws of the State of South Carolina or of the United States. The City and County agree that the responsible party shall have the authority to control any litigation that arises from the responsible party's related activities under this section, provided that the parties are not adverse in such litigation.

B. Obligations of the City

1. The City authorizes the County to administer the SWMP within the municipal limits of the City. This agreement and the SWMP shall authorize enforcement by City and County representatives. The City agrees that Berkeley County shall utilize the Berkeley County Stormwater Design Standards Manual in the administration of the SWMP. All costs of defending the ordinances adopted by the City shall be borne by the City.

2. The City agrees to cooperate with the County to enable the County to implement the SWMP, the Manual, Permit, and stormwater utility fees within the City. The City agrees to educate its staff regarding the provisions of each, and will implement the operational measures necessary for compliance for City property and operations.

3. The City hereby delegates to the County the duties of development, implementation and enforcement of the SWMP, and the efforts of monitoring, recordkeeping and reporting which may be imposed by the Permit, subject to Section 4.4 thereof (as may be amended from time to time). The City shall make available to the County necessary documentation related to annual reporting associated with the Permit.

4. The City shall provide the County with documentation of easements and rights-of-way as needed to operate and maintain the drainage system. In those cases where easements or rights-of-way have not been obtained, but are needed, the City agrees to assist the County in obtaining an appropriate easement or right-of-way.

C. Obligations of the County

1. The County agrees to fulfill the responsibilities granted it by the City pursuant to this Agreement.

2. The County shall be responsible for the day to day operation and maintenance activities as well as the long-term management of the City's storm drainage system.

3. The methodology for determining fees or charges for this program shall be determined by the County. The County shall bill and collect stormwater management utility user fees from property owners, tenants, and other appropriate parties within the City using the same methods contained in the County's Stormwater Management Utility Ordinance.

4. The County shall implement and operate all six (6) of the minimum control measures as identified in the Permit, to include the Program Description of Elements, Measures and Services attached to this Agreement as Exhibit A and made part hereof by reference, within the City. While the County will be responsible for conducting

and ensuring compliance with the Permit, this does not exclude the City from assisting in these activities when deemed necessary or appropriate by the City and County.

5. The County hereby assumes the duties of development, implementation and enforcement of the SWMP, and the efforts of monitoring, recordkeeping and reporting which may be imposed by the Permit, subject to Section 4.4 thereof (as may be amended from time to time).

6. The City agrees to assist with information and non-legal advice regarding defense of any challenges to the County's Ordinances and program compliance.

D. Miscellaneous

1. This Agreement will become effective upon execution by authorized representatives of both parties.

2. This Agreement may not be revised or modified except by written mutual agreement of the City and the County.

3. The City and County reserve the right to challenge any of the terms, conditions, or provisions of the Permit, its enabling laws, rules and regulations and/or interpretations thereof by authorities asserting jurisdiction.

4. If any section, subsection, sentence, clause, phrase, or portion of this Agreement is for any reason held invalid or unconstitutional by any court or competent jurisdiction, such provision and such holding shall not affect the validity of the remaining portion of this Agreement.

5. Those rights and obligations under this Contract, which, by their nature should survive, shall remain in effect after termination, suspension or expiration hereof.

6. The failure of either Party to enforce at any time any of the provisions of this Contract shall in no way be construed as a waiver of such provision nor in any way affect the right of either Party thereafter to enforce each and every provision of this Contract. There can be no assignment by either party of any rights or responsibilities hereunder without the consent of the other party.

7. All parties acknowledge that nothing under this agreement creates a right of action for any person or entity, and that this contract does not create or otherwise permit third party beneficiary rights or related causes of action. It is further acknowledged that the parties hereto are governmental entities providing these services in a governmental capacity. Accordingly, it is agreed that the parties are sovereigns that are, to the extent permitted by the South Carolina Tort Claims Act, and other applicable law, protected by sovereign immunity with respect to all acts and omissions related hereto.

8. The City and County agree to enact, follow and enforce such ordinances, rules, policies, and regulations as may be necessary to carry out the terms of this Agreement.

9. Any notices which may be permitted or required hereunder shall be in writing and shall be deemed to have been duly given as of the date and time the same are personally delivered or are deposited with the United States Postal Service, postage prepaid, and addressed as follows:

   **If to the County:**
   Attn: Stormwater Management Program, Berkeley County Engineering, PO Box 6122 Moncks Corner, SC 29461

   **If to the City:**
   Attn: City Administrator, City of Hanahan, 1255 Yeamans Hall Road, Hanahan, SC 29410

10. This agreement shall be effective as of the date listed above, and shall continue from year to year unless terminated. Either party may terminate this agreement by delivering 12 months' advance written notice of termination to the other Party's address listed above.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals, by and through the undersigned agents, this 9th day of October, 2015.

SIGNED, SEALED & DELIVERED
IN THE PRESENCE OF:

Myra K. Dip

BERKELEY COUNTY

By: _____

Its: County Supervisor

Kimberly C. Peters
Clerk of Council

THE CITY OF HANAHAN

By: _____

Its: City Administrator

# Exhibit A

Program Description of Elements, Measures and Services Berkeley County will provide to the City in association with the Intergovernmental Agreement (IGA) for NPDES Strormwater Discharge Permit Compliance and Other Stormwater Related Services.

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**Reviewing and Updating the SWMP:**

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**Monitoring, Record Keeping and Reporting:**

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- The County will maintain records of all illicit discharge inspection reports and enforcement actions within the City.
- The County will maintain records and track all active stormwater construction projects within the City.
- The County will maintain records of all stormwater construction inspections, post-construction inspections and enforcement actions associated with construction activity within the City.
- The County will maintain records of all post-construction BMPs and BMP inspections with the City.

- The County will maintain records of illicit discharge and good housekeeping training of municipal staff.
- The County will maintain records of all municipal facility assessments and high priority inspections within the City.
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- The County will perform, update and maintain impervious surface area calculation data within the City in association with the Stormwater Management Utility Rate Study.
- The County will incorporate parcels and users within the City in the Stormwater Management Utility Rate Study.
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- The County and the City will establish a Stormwater Advisory Board consisting of representatives of the both the County and City.
- The Stormwater Advisory Board will program, schedule and fund stormwater capital improvement projects and stormwater BMPs utilizing Stormwater Utility fees collected from parcels and users within the County and City.
- The County will implement, manage and construct stormwater capital improvement projects and stormwater BMPs under the oversight of the Stormwater Advisory Board and in accordance with the Stormwater Management Utility Ordinance.

# Appendix I: Pollution Prevention and Good Housekeeping Manual

# BERKELEY COUNTY
# STORMWATER MANAGEMENT PROGRAM

## POLLUTION PREVENTION/GOOD HOUSEKEEPING MANUAL

**Adopted February 23, 2011**
**Revised April 2023**

**212 Oakley Plantation Drive**
**Moncks Corner, SC 29461**
**Telephone: 843.719.4195**

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# 1.0 INTRODUCTION

Berkeley County has developed and is implementing a program for pollution prevention/good housekeeping to meet conditions of their National Pollutant Discharge Elimination System (NPDES) Phase II Small Municipal Separate Storm Sewer Systems (MS4) permit. Minimum Control Measure number six (6) of the County's MS4 permit states that Berkeley County must 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 County operations as an integral part of their Stormwater Management Program (SWMP). The Program includes employee training to prevent and reduce stormwater pollution from activities such as park and open space maintenance, fleet, and building maintenance, new construction and land disturbances, and stormwater system maintenance.

According to the NPDES Phase II regulations, the operator of a regulated MS4 community must develop a pollution prevention/good housekeeping program to:

- Prevent or reduce the amount of stormwater pollution generated by county/municipal operations and conveyed into receiving waters,
- Train employees on how to incorporate pollution prevention/good housekeeping techniques into county/municipal operations,
- Identify appropriate best management practices and measurable goals for preventing or reducing the amount of stormwater pollution generated by county/municipal operations.
- Prioritize County owned and/or operated storm water management systems/structures and implement a maintenance schedule.
- Develop a set of pollution prevention measures that, when applied during municipal O&M activities, will reduce the discharge of pollutants in stormwater Municipal operation and maintenance activities to be considered include but are not limited to pavement and rights-of-way maintenance, bridge maintenance, cold weather operations, and municipally sponsored events.
- Inspect and maintain, wherever and whenever necessary, all municipally-owned or maintained structural stromwater controls.
- Maintain all municipally owned green infrastructure practices through regularly scheduled maintenance activities.

This good housekeeping/pollution control manual is designed to assist Berkeley County staff in addressing potential stormwater runoff issues from County owned and/or operated facilities. A list of County and City owned, and/or operated facilities can be found in Appendix A. This manual includes information from the Berkeley County staff and the Urban Subwatershed Restoration Manual No. 9: Municipal Pollution Prevention/ Good Housekeeping Practices Version 1.0 produced by the Center for Watershed Protection.

Berkeley County entered into an Inter-Governmental Agreement (IGA) with the Cities of Hanahan and Goose Creek in October 2015. This IGA makes the County responsible for ensuring compliance with all six (6) minimum measures of the NPDES Phase II MS4 Permit, including development and implementation of the pollution prevention/good housekeeping program. Throughout this manual, wherever there is a reference to Berkeley County facilities, operations or projects, it also applies to the municipalities of Hanahan and Goose Creek.

# 2.0 BASICS OF COUNTY/MUNICIPAL POLLUTION PREVENTION/GOOD HOUSEKEEPING PROGRAMS

Every day, Berkeley County employees engage in a variety of activities that influence water quality. Some activities, such as County facility management, construction project management, and street repair and maintenance can negatively impact water quality, while others, such as storm drain maintenance and employee training, can help improve it. Whether a pollution prevention/good housekeeping program is designed to reduce the influence of activities that negatively impact water quality (Figure 2-1), or increase the influence of activities that help improve it (Figure 2-2), it should be carefully designed to address local water quality issues. A specific pollution prevention program activity that Berkeley County has recently undertaken to improve water quality is implementation of a catch basin maintenance program. Utilization of a vacuum truck and crew has allowed the County to remove debris, trash and sediment (with attached pollutants) from catch basins prior to potentially impacting downstream waterbodies.

**Construction Site with No Erosion or Sediment Controls**



**Animal Shelter Pet Waste Washed into Ditch**



**Uncovered Storage Barrels at Public Works Yard**



**Figure 2-1: County/Municipal Activities Negatively Impacting Water Quality**

**Stormwater System Cleanout**



**Pet Waste Pick-Up Station**



**Covered/Contained Fuel Tanks**



**Figure 2-2: County/Municipal Activities Improving Water Quality**

## 3.1 COUNTY/MUNICIPAL OPERATIONS AND ACTIVITIES AFFECTING WATER QUALITY

Pollution prevention/good housekeeping involves identifying county/municipal operations and/or activities that may affect stormwater runoff in a community and improving them to better support water quality goals. County/municipal operations and/or activities should be systematically evaluated to determine where improvements can be made in the following areas, at a minimum:

- Hotspot facility management
- Construction project management
- Post-construction stormwater management
- Street repair and maintenance
- Storm drain maintenance
- Park and landscape maintenance
- Employee training

These county/municipal operations/activities can generate or reduce a variety of stormwater pollutants, including sediment, nutrients, metals, hydrocarbons, pesticides, chlorides, bacteria and trash. Typical pollutants expected to be affected by these operations and/or activities are included in Table 3-1.

**Table 3-1: Stormwater Pollutants Associated with County/Municipal Operations and Activities**

| County/Municipal Operations | Sediment | Nutrients | Metals | Hydro-carbons | Toxins | Others |
|---|---|---|---|---|---|---|
| Hotspot Facility Management | ● | ● | ● | ● | ● | Trash, Organic Matter, Pesticides, Chlorine |
| Construction Project Management | ● | ◘ | ○ | ◘ | ◘ | Trash |
| Street Repair and Maintenance | ● | ◘ | ◘ | ● | ◘ | Trash |
| Storm Drain Maintenance | ◘ | ○ | ○ | ○ | ○ | Trash, Organic Matter |
| Park and Landscape Maintenance | ◘ | ● | ○ | ○ | ◘ | Pesticides |
| Post-construction Stormwater Management | ◘ | ◘ | ◘ | ○ | ○ | Bacteria |
| Animal Shelters | ● | ● | ○ | ○ | ○ | Bacteria |
| Employee Training | ● | ● | ● | ● | ● | Chloride, Trash |

Key
● = frequently associated with operation
◘ = infrequently associated with operation
○ = rarely associated with operation

Developing an effective pollution prevention/good housekeeping program involves determining which of these operations and/or activities are conducted in Berkeley County and designing a program that will increase or reduce their influence, depending on whether they have a positive or negative impact on water quality. One program that Berkeley County has initiated to address this issue is an aggressive stormwater system maintenance program. The County has identified and prioritized County owned/operated facilities and is systematically performing cleaning/vacuuming as necessary to meet schedules identified in a ranking matrix. A list of Berkeley County, City of Goose Creek and City of Hanahan owned/operated facilities can be found in Appendix A. The prioritization matrix used by the County to identify necessary maintenance frequencies is locate in Appendix B.

## 3.2 HOTSPOT FACILITY MANAGEMENT

County/municipal hotspot facilities are publicly owned and/or operated facilities that produce higher levels of stormwater pollutants and/or present a higher potential risk for spills, leaks or illicit discharges. Common county/municipal hotspot facilities include facilities that handle solid waste, wastewater, road and vehicle maintenance, and yard waste, such as:

- Equipment Storage and Maintenance Yards
- Hazardous Waste Disposal Facilities
- Hazardous Waste Handling and Transfer Facilities
- Landfills
- Materials Storage Yards
- Public Buildings (e.g. Libraries, Police and Fire Departments)
- Public Works Yards
- Solid Waste Handling and Transfer Facilities
- Vehicle Storage and Maintenance Yards
- Water and Wastewater Treatment Facilities
- Facilities such as morgue, mosquito abatement facility, fueling area, etc.
- Boat Landings
- Convenience Sites
- Animal Shelters

If not carefully managed, the activities conducted at county/municipal hotspot facilities can generate a wide variety of stormwater pollutants, including nutrients, hydrocarbons, metals, chlorides, pesticides, bacteria and trash. A summary of the pollution-generating activities typically conducted at county/municipal hotspot facilities and the pollutants associated with those activities are presented in Tables 3-2 and Table 3-3 below.

**Table 3-2: Pollution Generating Activities Associated with County/Municipal Hotspot Facilities**

| County/Municipal Hotspot Facility | Pollution Generating Activities |
|---|---|
| Public Works Yards | Vehicle Maintenance and Repair, Vehicle Fueling, Vehicle Washing, Vehicle Storage, Outdoor Loading and Unloading, Outdoor Storage, Dumpster/Waste Management, Building Repair, Building Maintenance, Parking Lot Maintenance, Turf Management, Landscaping |
| Vehicle Storage and Maintenance Yards | Vehicle Maintenance and Repair, Vehicle Fueling, Vehicle Washing, Vehicle Storage, Outdoor Loading and Unloading, Outdoor Storage, Dumpster/Waste Management, Building Repair, Building Maintenance, Parking Lot Maintenance |
| Equipment Storage and Maintenance Yards | |
| Materials Storage Yards | Outdoor Loading and Unloading, Outdoor Storage, Dumpster/Waste Management, Parking Lot Maintenance |
| Water and Wastewater Treatment Facilities | Vehicle Storage, Outdoor Loading and Unloading, Outdoor Storage, Dumpster/Waste Management, Building Repair, Building Maintenance, Parking Lot Maintenance, Turf Management, Landscaping |
| Landfills | Vehicle Fueling, Vehicle Storage, Outdoor Loading and Unloading, Outdoor Storage, Dumpster/Waste Management |
| Solid Waste Handling and Transfer Facilities | |
| Hazardous Waste Disposal Facilities | |
| Hazardous Waste Handling and Transfer Facilities | |
| Composting Facilities | |

| County/Municipal Hotspot Facility | Pollution Generating Activities |
|---|---|
| Public Buildings | Outdoor Loading and Unloading, Outdoor Storage, Dumpster/Waste Management, Building Repair, Building Maintenance, Parking Lot Maintenance, Turf Management, Landscaping |
| Public Golf Course | Vehicle Maintenance and Repair, Vehicle Fueling, Vehicle Washing, Vehicle Storage, Outdoor Loading and Unloading, Outdoor Storage, Dumpster/Waste Management, Building Repair, Building Maintenance, Parking Lot Maintenance, Turf Management, Landscaping |
| Public Swimming Pool | Building Repair, Building Maintenance, Parking Lot Maintenance, Swimming Pool Discharges |
| Animal Shelters | Animal Washing/Handling, Lawn/Turf Maintenances, Waste Management |

**Table 3-3: Stormwater Pollutants Associated with Activities Conducted at Hotspot Facilities**

| Hotspot Operation or Activity | Sediment | Nutrients | Metals | Hydro-carbons | Toxins | Others |
|---|---|---|---|---|---|---|
| Vehicle Repair | ○ | ○ | ● | ● | ● | |
| Vehicle Fueling | X | ○ | ● | ● | ● | |
| Vehicle Washing | ● | ● | ◘ | ◘ | ● | |
| Vehicle Storage | ○ | X | ◘ | ● | ○ | Trash |
| Outdoor Loading | ● | ◘ | ◘ | ○ | ○ | Organic Matter |
| Outdoor Storage | ● | ◘ | ◘ | ◘ | ◘ | |
| Waste Management | ○ | ◘ | ◘ | ◘ | ● | Trash |
| Building Repair | ● | ○ | ◘ | ◘ | ◘ | |
| Building Maintenance | ● | X | ● | ○ | ◘ | |
| Parking Lot Maintenance | ● | ○ | ◘ | ● | ◘ | |
| Turf Management | ◘ | ● | X | X | ● | Pesticides |
| Landscaping | ○ | ● | X | X | ● | Pesticides |
| Swimming Pool Discharges | X | X | X | X | X | Chlorine |
| Animal Shelters | ○ | ● | X | X | X | Bacteria |

Key
X = not a pollutant source
○ = minor pollutant contribution
◘ = moderate pollutant contribution
● = major pollutant contribution

Of the hotspot facilities listed above, public works yards are often one of the most severe potential pollutant contributors (Figure 3-1). Several stormwater pollutants are often stored or handled at these facilities and they should be one of the first hotspot facilities to be investigated during the development of a pollution prevention/good housekeeping program. While animal shelters do not typically have the potential for a number of pollutants associated with other hotspot facilities, they can be a major contributor of bacteria and nutrients if proper best management practices are not used.




**Figure 3-1: Public Works Yards - Typical Severe Hotspot Facilities in a Community**

Inspecting Berkeley County owned, and/or operated facilities is necessary to identify potential causes of stormwater pollution. These investigations can be used to systematically evaluate the typical major categories of pollution-generating activities illustrated in Figure 3-2 that commonly contribute to stormwater quality problems at county/municipal facilities:

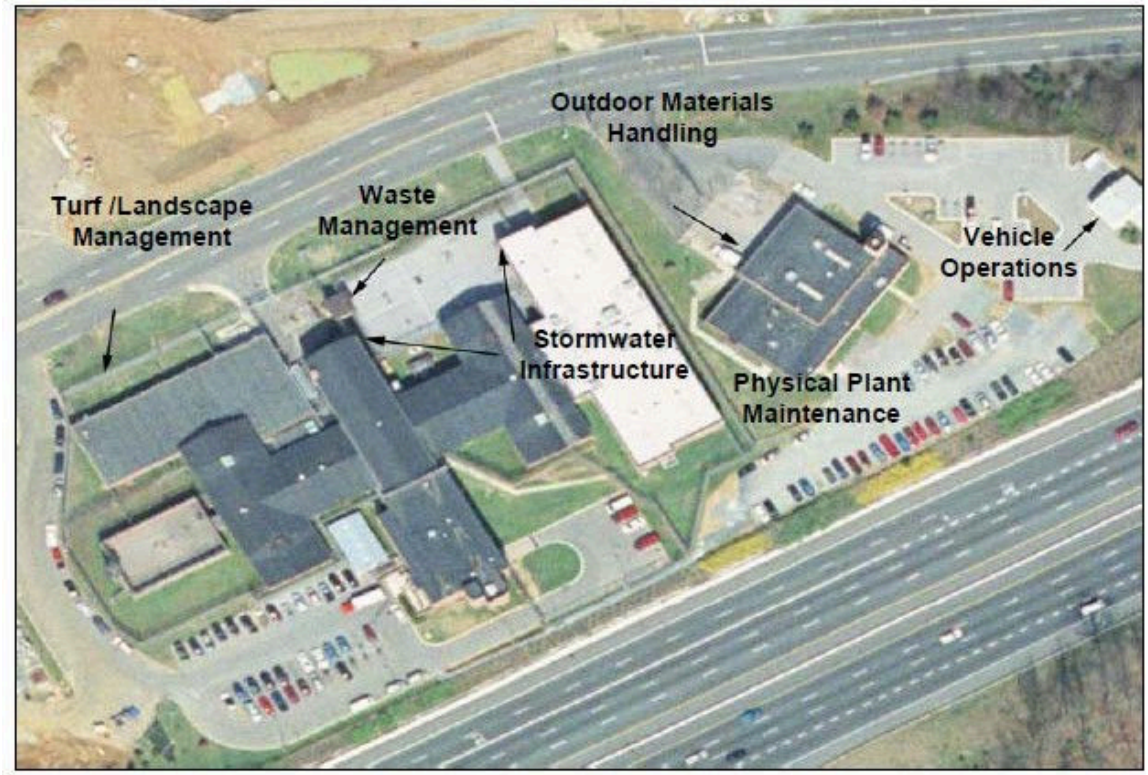



**Figure 3-2: Typical Categories of Pollution-Generating Activities to Assess at Hotspot Facilities**

Ideally, the individuals who manage or oversee each of the facilities will be present during a site inspection. They should be able to answer questions about the activities that are conducted at their facility and explain any pollution prevention/good housekeeping practices that may already be in place. Participation during site inspections is also an opportunity for facility managers/operators to learn more about the county/municipality's pollution prevention/good housekeeping efforts and how the activities conducted at their facility can influence stormwater quality.

During a county/municipal facility site inspection it is helpful to have an aerial photograph or site plan on which the locations of proposed pollution prevention/good housekeeping practices or stormwater retrofits can be marked. Digital photos should be taken during any facility inspection to document areas that need improvement and in the identification of stormwater management and pollution prevention/good housekeeping practices. The pictures can also be used to educate the facility manager and other county/municipal staff during employee training sessions.

Berkeley County's pollution prevention and good housekeeping inspection program was initiated in 2010 and has been executed in two main phases. The first phase of the program, conducted in 2010, included an initial audit of select municipal activities. These audit results were used to provide a baseline assessment of the pollutant potential at municipal sites and to guide the development of good housekeeping practices by County personnel.

The second phase of the County's program was initiated in 2015, when the County developed a comprehensive list of all County owned municipal facilities and any activities at each location which might harm the water quality of stormwater runoff. This list of identified municipal facilities with any pollution potential was selected for a thorough inspection to determine whether each constituted the designation of a "high priority" facility. A custom inspection form was developed and utilized to document all inspection findings at each listed facility and inspections were conducted in June of 2015.

A new “high priority” facility list was generated using the inspection results conducted in June 2015, as well as new facilities owned and operated by the co-permittees, City of Goose Creek and City of Hanahan. The facilities on this new comprehensive list were inspected in September 2016 and November 2017 utilizing the customized assessment forms to document all inspection findings.

A wide range of pollution prevention/good housekeeping practices can be used to address the pollution-generating activities conducted at county/municipal hotspot facilities. Some of the most commonly used practices are listed in Table 3-4.

**Table 3-4: Pollution Prevention/Good Housekeeping Practices Commonly Used to Control Stormwater Pollution at County/Municipal Hotspot Facilities**

| Hotspot Operation or Activity | Pollution Prevention/Good Housekeeping Practices |
|---|---|
| Vehicle Maintenance and Repair | Drip pans, traps, covered outdoor storage areas, secondary containment, discharge of wash water to sanitary sewer system, proper disposal of used fluids, disconnected storm drains, automatic shutoff nozzles, signs, spill response plans, spill cleanup materials, dry cleanup methods, employee training, stormwater retrofits |
| Vehicle Fueling | |
| Vehicle Washing | |
| Vehicle Storage | |
| Outdoor Loading and Unloading | Covered loading and unloading areas, secondary containment, storm drain disconnection or treatment, inventory control, spill response plans, spill cleanup materials, dry cleanup methods, employee training, stormwater retrofits |
| Outdoor Storage | |
| Dumpster/Waste Management | Dumpster/Waste Management, secondary containment, storm drain disconnection or treatment, liquid separation/containment, employee training |
| Building Repair | Temporary covers/traps, employee training, contractor training, proper cleanup and disposal procedures, disconnected storm drains, dry cleaning methods, stormwater retrofits |
| Building Maintenance | |
| Parking Lot Maintenance | |
| Turf & Vegetation Management | Integrated pest management, reduced non-target irrigation, careful applications, proper disposal and landscaping water, avoid blowing and hosing to storm drain, employee training, stormwater retrofits |
| Landscaping | |
| Stormwater System Maintenance & Repair | Prioritization of stormwater systems with high potential for negative impacts if unmaintained, routine cleaning/vacuuming of catch basins, identification of damaged or deficient systems and repair/replacement |
| Spill Prevention and Response Plans | Identification of spills that require special cleanup, materials, inventory, maximum cleanup amount, facility map, spill kit inventory and associated labeling, employee training log. |

In many cases, the pollution prevention/good housekeeping practices that can be used to address the pollution-generating activities associated with a county/municipal hotspot facility save time and money, reduce liability and do not greatly interfere with normal operations. For example, the pollution prevention/good housekeeping practices applied at a vehicle storage and maintenance yard might include the use of drip pans under vehicles, tarps for covering disabled vehicles, dry clean-up methods for spills, proper disposal of used fluids and covering and providing secondary containment for any outdoor storage area (Figure 3-3). In some cases, however, costlier on-site stormwater retrofit practices may be needed to control and treat stormwater runoff, especially when the facility is rated as a severe hotspot.



**Figure 3-3: Pollution Prevention/Good Housekeeping Practices Commonly Used at County/Municipal Hotspot Facilities**

Once the inspection is done a brief implementation plan should be developed. The plan should summarize the results of the assessment of the current County pollution prevention/good housekeeping practices and the practices that will be used to reduce the stormwater pollution generated by hotspot facilities. The plan should also include a schedule that describes when the prescribed pollution prevention/good housekeeping practices will be implemented. The contents of the implementation plan should be reviewed with the individual who manages the hotspot facility. A spill prevention and response plan should be incorporated for hotspot facilities (i.e. fleet maintenance). A sample Berkeley County plan is located in Appendix D.

## 3.3 CONSTRUCTION PROJECT MANAGEMENT

Berkeley County performs several capital improvement, development and redevelopment construction projects, which can generate a wide range of stormwater pollutants, including sediment, nutrients, hydrocarbons, pesticides, trash and construction debris.

Common county/municipal construction projects include:

- Public works facilities.
- Road construction and widening.
- Utility construction and repair.
- Water and wastewater treatment facilities.
- Public buildings (e.g. libraries, police and fire departments).

These County funded construction projects can have several negative impacts on water quality both during and after construction. From a water quality standpoint, the construction phase is often considered the most damaging phase of the land development cycle particularly regarding sediment impacts.

County construction project erosion/sediment control plans and procedures should include the following practices, at a minimum:

**3.5.1.** Minimize Clearing;
**3.5.2.** Protect Waterways;
**3.5.3.** Phase Construction;
**3.5.4.** Implement Rapid Soil Stabilization;
**3.5.5.** Protect Steep Slopes;
**3.5.6.** Install Perimeter Controls;
**3.5.7.** Adjust Erosion and Sediment Control Plan for Site Conditions; and
**3.5.8.** Assess Erosion and Sediment Control Plan After Storm Events.

All of these practices will be part of any County construction project and Berkeley County Ordinance 14-11-36 will ensure that necessary sediment/erosion control practices adequately apply to County projects. Some of the practices most commonly used to improve the way that county/municipal construction projects are managed are listed in Table 3-5.

**Table 3-5: Pollution Prevention/Good Housekeeping Practices Commonly Used to Improve County/Municipal Construction Project Management**

| Existing Conditions | Recommended Improvements |
|---|---|
| • No local erosion and sediment control and/or stormwater ordinance in place | • Develop a local erosion and sediment control and/or stormwater management ordinance<br>• Ensure that county/municipal construction sites are required to meet the provisions of each ordinance |
| • County/municipal construction projects are not subject to the requirements of the local erosion and sediment control and/or stormwater management ordinance | • Revise the local erosion and sediment control and/or stormwater management ordinance to ensure that county/municipal construction sites are required to meet the provisions of each ordinance |
| • County/municipal construction projects are not subject to local plan review and site inspection procedures | • Revise the local development review process to ensure that county/municipal construction sites are subject to local plan review and site inspection procedures |
| • Existing contractor selection and procurement procedures do not consider erosion and sediment control and/or stormwater management | • Revise the selection and procurement procedures to ensure that erosion and sediment control and stormwater management are considered during the selection process |
| • Innovative sediment/erosion control practices are not used on county/municipal construction projects | • Revise the local sediment/erosion control ordinance to ensure these practices are allowed<br>• Promote the use of innovative sediment/erosion control practices on all county/municipal construction projects<br>• Provide training to design engineers and contractors on the design and installation of innovative sediment/erosion control practices |

## 3.4 POST-CONSTRUCTION STORMWATER MANAGEMENT

Stormwater Best Management Practices (BMPs) are engineered facilities designed to treat or otherwise manage post-construction stormwater runoff and mitigate the negative impacts of land development. These practices, which include dry detention ponds, wet detention ponds, stormwater wetlands, bioretention areas, swales, filtration practices and infiltration practices (Figure 3-4), provide many water quality and water quantity benefits and, if carefully designed, can provide several other benefits to the community (e.g. aesthetics, wildlife habitat, etc.).



**Figure 3-4: Stormwater Best Management Practices (BMPs): (Clockwise from Top Left) Dry Detention Ponds, Wet Detention Ponds, Bioretention Area and Swales**

Under the NPDES Phase II regulations, Berkeley County must ensure adequate long-term operation and maintenance of post-construction stormwater BMPs. Within many communities, the county/municipality as well as homeowners' associations and private landowners are responsible for the maintenance and upkeep of stormwater BMPs. Regulated communities can help to ensure that privately owned and -operated facilities are maintained by including enforceable provisions within the local stormwater management ordinance that require regular maintenance of these facilities.

Although not necessary, it is often helpful to create a map showing the location of each publicly owned and/or operated stormwater BMPs. A list of all Berkeley County, City of Goose Creek, and City of Hanahan owned/operated facilities, and their associated BMPs, has been created and can be found in Appendix A. It is important to conduct a site assessment of all county/municipal owned and/or operated stormwater BMPs to determine how well each practice is being maintained. An inspection checklist should be used to compile information during the assessment. Once inspected the County owned/operated facilities should be prioritized regarding the facilities which need most attention for routine maintenance activities. Berkeley County's stormwater system maintenance prioritization matrix for catch basins in public systems is contained in Appendix B.

After county/municipal owned/operated post-development stormwater BMPs are assessed, a comparison of the inspection results to determine which stormwater treatment practices are in the worst condition should be formulated. At the completion of each inspection, the local stormwater manager should make a note of any maintenance tasks that need to be performed and how urgent those tasks appear to be. If there are any urgent maintenance needs, the local stormwater manager should immediately notify the individual responsible for the upkeep and maintenance of the stormwater BMPs. These improvements, especially those that are needed to alleviate a safety hazard, should be made as soon as possible.

This process should also help to identify any common problems with maintenance, which can result in recommended changes to the county/municipality's inspection and maintenance procedures. Some of the most commonly used practices to improve post-construction stormwater BMPs are listed in Table 3-6.

**Table 3-6: Pollution Prevention/Good Housekeeping Practices Commonly Used to Improve Post-Construction Stormwater BMPs**

| Post-Construction Stormwater BMPs | Recommended Practices |
|---|---|
| Dry Detention Ponds | • Mow side slopes monthly.<br>• Repair undercut or eroded areas as necessary.<br>• Pesticide/ nutrient management.<br>• Remove litter/ debris as necessary.<br>• Inspect for erosion of pond banks or bottom semi-annually.<br>• Seed or sod to restore dead or damaged ground annually (as needed).<br>• Inspect for damage to the embankment annually.<br>• Monitor for sediment accumulation in the facility and forebay annually.<br>• Inspect monthly to ensure that inlet and outlet devices are free of debris and operational.<br>• Removal of sediment from the forebay every 5 to 7 years<br>• Monitor sediment accumulations and remove sediment when the pond volume has been reduced by 25%. |
| Wet Detention Ponds | • Mow side slopes of the pond monthly.<br>• Since decomposing vegetation captured in the wet pond can release pollutants, especially nutrients, it may be necessary to harvest dead vegetation annually. Otherwise the decaying vegetation can export pollutants out of the pond and also can cause nuisance conditions to occur.<br>• Clear debris from all inlet and outlet structures monthly.<br>• Repair all eroded or undercut areas as needed.<br>• Place a sediment marker in the forebay to determine when sediment removal is required.<br>• Monitor sediment accumulations in the main pond area and remove sediment when the permanent pool volume has been significantly filled and/or the pond becomes eutrophic. |
| Bioretention Area | • Pruning and weeding as needed<br>• Remove trash and debris as needed<br>• Inspect inflow points for clogging semi-annually (every 6-months).<br>• Remove any sediment semi-annually (every 6-months).<br>• Repair eroded areas. Re-seed or sod as necessary semi-annually (every 6-months).<br>• Mulch void areas semi-annually (every 6-months).<br>• Inspect trees and shrubs to evaluate their health semi-annually (every 6-months).<br>• Remove and replace dead or severely diseased vegetation semi-annually (every 6-months).<br>• Remove evasive vegetation semi-annually (every 6-months).<br>• Nutrient and pesticide management. Annual, or as needed.<br>• Water vegetation, shrubs and trees semi-annually (every 6-months).<br>• Remove mulch, reapply new layer annually<br>• Test planting mix for pH annually.<br>• Apply lime if pH < 5.2. as needed.<br>• Add iron sulfate + sulfur if pH > 8.0 as needed.<br>• Place fresh mulch over entire area as needed.<br>• Replace pea gravel diaphragm every 2 to 3 years if needed. |

| | |
|---|---|
| Swales | • Mow grass to maintain design height and remove clippings as needed (frequent/seasonally).<br>• Nutrient and pesticide management annually, or as needed<br>• Inspect side slopes for erosion and repair annually, or as needed<br>• Inspect channel bottom for erosion and repair annually, or as needed<br>• Remove trash and debris accumulated in forebay annually.<br>• Annual (semi-annually first year) inspection of vegetation. Plant an alternative grass species if original cover is not established.<br>• Annual inspection for clogging and correct the problem.<br>• Roto-till or cultivate the surface of the bed if swale does not draw down in 48 hours as needed.<br>• Remove sediment build-up within the bottom of the swale as needed, after 25% of the original design volume has filled. |
| Stormwater Wetlands | • Monitor wetlands after all storm events greater than 2-inches of rainfall during the first year to assess erosion, flow channelization and sediment accumulation. Inspection should be made at least once every six months during the first three years of establishment.<br>• Place a sediment cleanout stake in the forebay area to determine when sediment removal is required.<br>• Debris should be removed from the inlet and outlet structures monthly.<br>• Monitor wetland vegetation and replaced as necessary once every 6-months during the first three years of establishment.<br>• Annually inspect and maintain the depth of the zones within the wetland.<br>• Annually remove invasive vegetation.<br>• Repair all eroded or undercut areas as needed. |
| Vegetated Filter Strip | • Inspect vegetation for rills and gullies annually and correct. Seed or sod bare areas.<br>• Inspect grass after installation to ensure it has established. If not replace with an alternative species.<br>• Inspect to ensure that grass has established annually. If not, replace with an alternative species.<br>• Mow grass to maintain a height of 3- to 4-inches.<br>• Remove sediment build-up from the bottom when it has accumulated to 25% of the original capacity. |

## 3.5 STREET REPAIR AND MAINTENANCE

Public streets and roadways in Berkeley County make up a significant percentage of the urban infrastructure and require regular maintenance to keep them in good condition. Regular County street repair and maintenance activities, such as pavement marking, repair, patching, resurfacing, sealing and right-of-way maintenance, can generate a range of stormwater pollutants, including metals, chlorides, hydrocarbons, nutrients, sediment and trash. If not properly managed, these activities can negatively impact water quality (Figure 3-5).



**Figure 3-5: Roadway Repairs and Maintenance Generating Significant Amounts of Sediment**

There are three primary county/municipal street repair and maintenance activities that can influence stormwater quality:

- Routine road and bridge maintenance: Re-chipping, grinding, pothole repair, pavement striping, asphalt re-paving, saw cutting.
  - Potential pollutants: Sediment, chloride, cyanide, and phosphorus.

- Winter operations: Sanding, application of deicing compounds.
  - Potential pollutants: Fine particles, creosote and PAH.

- Right-of-way maintenance: Herbicide and pesticide application, vegetation selection.
  - Potential pollutants: Nutrients, herbicides, pesticides.

All streets and roadways have routine maintenance needs such as mowing and sweeping, with other maintenance needs dictated by age, traffic volume or climatic conditions. Recommended pollution prevention/good housekeeping techniques for roadways are applied through county/municipal employee, utility employee and contractor training, as well as county contracting specifications.

Improving the way that county/municipal street repair and maintenance activities are conducted within the community can reduce the amount of stormwater pollution that is conveyed into receiving waters. Some of the practices most commonly used to improve the way that county/municipal street repair and maintenance activities are conducted are listed in Table 3-7.

**Table 3-7: Pollution Prevention/Good Housekeeping Practices Commonly Used to Improve County/Municipal Street Repair and Maintenance Activities**

| Street Repair or Maintenance Activity | Recommended Improvements |
|---|---|
| Routine Roads and Bridges Maintenance | • Prevent paving materials and wastes from entering the storm drain system<br>• Minimize the area of soils left exposed or graded<br>• Collect any loose sand, gravel, asphalt, or other material as soon as possible after construction activities<br>• When placing chip seals, limit spreading aggregate to the sealed surface and sweep up excess aggregate once cured and each day thereafter until aggregate loss is insignificant<br>• Mix road stabilization materials during periods of calm, dry weather, and seal as soon as possible after dressing<br>• Fill and compact soil, gravel, and asphalt in layers<br>• Reuse road spoil in repairs if possible and sweep up and dispose of properly<br>• Eliminate 'edge break' by fully sealing road shoulders<br>• When striping, use water-based paints or thermoplastics rather than solvent based ones<br>• Avoid striping operations while the pavement is wet, during humid conditions, or if rain is likely<br>• Avoid applying thermoplastics at low temperatures, i.e. below 54°F<br>• When possible, use portable drip trays under equipment to catch spills<br>• Use a skirt around the blaster to minimize the spraying of material away from the work site<br>• Coordinate street-sweeping with line removal, so that waste material is picked up before it can be transported by rain, wind, and traffic<br>• Use dry cutting techniques when saw cutting and sweep or vacuum up residue<br>• Construct runoff barriers to protect storm drains from wet saw-cut runoff<br>• Place drip pans or absorbent materials under saw-cut equipment when not in use<br>• Use as little cooling water as possible and switch the water off when the saw is not in use |

| | |
|---|---|
| Vegetative Maintenance | • Use mechanical methods of vegetation removal rather than herbicides<br>• Dispose of lawn clippings at a landfill; clippings should not be disposed of in streams or storm drains<br>• Avoid applying herbicides and pesticides if rain is expected<br>• Calibrate equipment to avoid over application |

A field investigation should regularly be done to assess current County pollution prevention/good housekeeping practices for street repair and maintenance activities. Once the investigations are done a brief implementation plan should be created if practices/activities are deemed to be causative of pollution. The plan will summarize the results of the assessment as it relates to the current County pollution prevention/good housekeeping practices and the practices that will be used to reduce the stormwater pollution generated by County street repair and maintenance activities. The plan will also include a schedule that describes when the prescribed pollution prevention/good housekeeping practices will be implemented. The contents of the implementation plan will be reviewed with the individual who manages the street repair and maintenance activities.

### 3.5.1. Street Sweeping

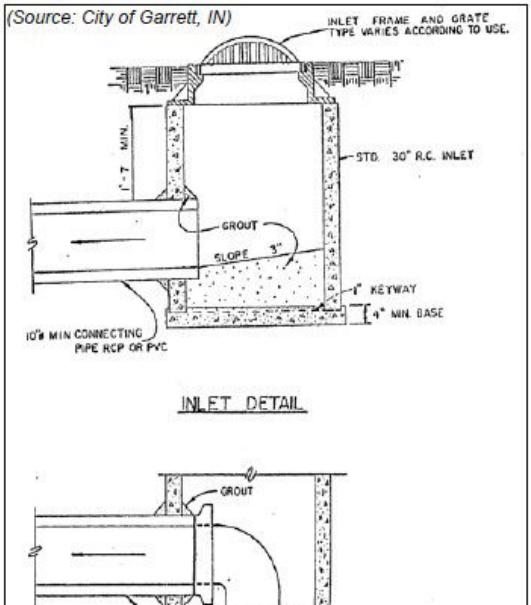
The public streets and roadways in Berkeley County under Berkeley County's maintenance responsibility require regular maintenance to keep them in good condition. Regular County street maintenance activity, via street sweeping maintenance, can generate a range of stormwater pollutant removals including Total Solids, Total Phosphorous, and Total Nitrogen, sediment and trash. However, if not properly managed, these activities can negatively impact water quality.

Using a conceptual model, it is expected that pollutant removal rates from street sweeping for TS, TP, and TN are: 9 %, 3% and 3%, respectively. The presented value is representative of mechanical, monthly street sweeping. All values presented are dependent upon the Street Particulate Matter (SPaM) that is available to be captured by pick-up of a street sweeper.

Berkeley County's and Municipality's solid waste programs includes a curb-side leaf litter pick-up that is able to maximize the reduction of leaf litter and prevent it from entering the storm drains. This is important for two reasons, 1) Berkeley County's street sweepers may also emulsify leafy debris and make it more easily entrained by runoff, and 2) the decomposition of leaves and other organic debris in storm drain inlets or catch basins can create an environment suitable for the release of inorganic nitrogen and transport to receiving waters.

## 3.6 STORM DRAIN MAINTENANCE

Storm drain maintenance is often the last opportunity to remove pollutants before they enter the storm drain system. The effectiveness of this pollution prevention/ good housekeeping practice depends on the basic design of the stormwater conveyance in a subwatershed. Most systems have a catch basin (Figure 3-6) or sump pit located in the storm drain inlet to trap sediment and organic matter and prevent clogging. In some areas, however, conveyance systems were designed to be self-cleansing and thus have no storage. Each catch basin or sump pit tends to be unique in how quickly it fills up, and whether the trapped material is liquid, solid or organic. To this extent, each reflects the conditions and behaviors that occur within the few hundred feet of street it serves.



The Berkeley County Stormwater Design Standards Manual (2009) contains additional information in regard to catch basins that may be encountered during the County's maintenance process. Materials and construction of storm drainage structures (catch basins, junction boxes, control structures, etc.) are as specified in Section 719 of the SCDOT specifications (2013). Roadway catch basins are typically SCDOT Type 9, Type 16, Type 17 or Type 18 Catch Basins based on the specific application.

**Figure 3-6: Catch Basin Detail**

Storm drain maintenance can be an effective strategy in urban subwatersheds that have few other feasible options to remove pollutants. For many communities, storm drain maintenance is reactive and conducted in response to complaints from residents. Water quality is not a commonly cited reason for a storm drain cleanout program. When performed properly, regular maintenance can improve water quality and prevent clogging and flooding.

Storm drain cleanout effectiveness is impacted by both the frequency and method of cleanout. Table 3-8 provides estimated pollutant removal rates for catch basin cleanouts.

**Table 3-8: Expected Pollutant Removal Rates for Catch Basin Cleanouts (Law et al., 2008)**

| Frequency | Total Suspended Solids | Total Phosphorus | Total Nitrogen |
|---|---|---|---|
| Annual | 18% | <1% | 3% |
| Semi-Annual | 35% | 2% | 6% |

A storm drain maintenance program should address the following:

- *Tracking* – the location and maintenance of storm drains is tracked using a database and spatial referencing system (e.g., Global Positioning System, Geographic Information System) as well as with a project management/asset management software. Additionally, knowing the type and era of the storm drain system may be of use since some inlets/catch basins are designed to be self-cleaning while others have some trapping capacity.

- *Frequency* – Catch basins should be inspected and cleaned out according to their priority (see priority matrix in Appendix B):

    - Priority A – Catch basins to be cleaned annually.
    - Priority B – Catch basins to be cleaned at least once every two years.
    - Priority C – Catch basins to be cleaned less frequently than A & B.

- *Technology* – the four common methods of cleaning catch basins are described in Table 3-9.

- *Staff Training* - operators need to be properly trained in catch basin maintenance including waste collection and disposal methods. Staff should also be trained to report water quality problems and illicit discharges.

- *Material Disposal* - since catch basin waste may contain hazardous material, it should be tested and disposed of accordingly. Maintenance personnel should keep a log of the amount of sediment collected and the removal date at the catch basin.

**Table 3-9: Equipment Used for Catch Basin and Inlet Cleaning**

| Equipment | Description |
|---|---|
| Manual cleaning | Bail out sediment-laden water and shovel into street then truck. Or crew enters catch basin and fill buckets with sediment that are then carried to a dump truck. Clean water is used to refill the catch basin. |
| Eductor cleaning | Eductor truck evacuates the catchment of the sediment-laden water into a settling tank. |
| Vacuum cleaning | Air blower of the vacuum truck is used to create a vacuum and the air-solid-liquid material is separated in the vacuum truck unit by gravity separation and baffles. |
| Vacuum combination jet cleaning (e.g. Vaccon) | A vacuum assisted truck that uses a combination of air, water and hydraulic suction. Suction is used to extract material from storm inlets. Water is used to clear material from storm drain pipes that is not removed by the vacuum. The material is stored in the truck holding tank and transported for disposal. This type of vacuum combination jet cleaning equipment is what is being utilized by Berkeley County for stormwater system maintenance (see following photograph). |

The County initiated a comprehensive catch basin/stormwater system cleaning program in April 2017 utilizing a vacuum truck previously owned and operated by the Berkeley County Water and Sanitation Department. This catch basin/stormwater system maintenance program is based on the assessment and prioritization of County owned facilities (as required by the County's NPDES Phase II MS4 Permit) as well as in response to service requests. A summary of the catch basin prioritization matrix for public systems is contained in Appendix B. This summary includes the established rating system with descriptions, criteria for rating and recommendations on the number of suggested scheduled cleanings.




**Figure 3-7: Catch Basin Maintenance Operation**

## 3.7 PARK AND LANDSCAPE MAINTENANCE

A community may own or control as much as 10% of all the land within a subwatershed, when all the parks, schools, golf courses, rights-of-way, easements, open space and county/municipal buildings are combined. It is not uncommon for these areas to be managed as vast expanses of turf. The maintenance of these areas frequently includes mowing, fertilization, pesticide application, and supplemental irrigation. Poor turf management and landscaping practices have the potential to create stormwater pollution, particularly in urban areas where soils are compacted, and infiltration is minimized. Potential pollutants generated by landscape and park maintenance include nutrients, herbicides, organic debris, and sediment. Because of their large size and ownership, county/municipal lands are good candidates for pollution prevention/good housekeeping techniques such as riparian reforestation and integrated pest management.

A wide range of pollution prevention/good housekeeping practices can be used to improve the way that park and landscape maintenance activities are conducted within a community. Some of the most commonly used practices are listed in Table 3-10.

**Table 3-10: Pollution Prevention/Good Housekeeping Practices Commonly Used to Improve County/Municipal Park and Landscape Maintenance Activities**

| Activity | Pollution Prevention/Good Housekeeping Practices |
|---|---|
| Turf Reduction | • Plant trees and/or other native vegetation in suitable areas<br>• Consider turf alternatives, such as native or low-water, cool-season turf grass<br>• Allow natural regeneration in suitable areas |
| Turf Management | • Sweep any grass clippings away from paved surfaces after mowing<br>• Use mulching type mowers or dispose of at local composting facility<br>• Use erosion control measures when soils are exposed<br>• Place stockpiled materials away from storm drains |
| Native Plantings | • Provide native and naturalized landscaping guidance and plant lists<br>• Require use of appropriate native and naturalized landscaping on municipally-owned properties |
| Landscape Management | • Collect landscape waste (including grass clippings) and dispose of at a local yard waste recycling/composting facility<br>• Do not use leaf blowers to blow waste into streets, storm drains or ditches |
| Pesticide/Herbicide Application | • Develop an integrated pest management plan that uses pesticides only as a last resort<br>• Apply only when rain is not expected<br>• Do not prepare herbicides or pesticides for application near storm drains<br>• Use manual and/or mechanical methods to remove weeds rather than herbicides<br>• Consider a low or no pesticide approach to maintaining landscaped areas |
| Fertilizer Application | • Never apply fertilizers or pesticides within five feet of pavement, 25 feet of a storm drain inlet, or 50 feet of a stream or water body<br>• Consider a low or no fertilizer approach to maintain turf<br>• Apply only when rain is not expected<br>• Perform a soil test to determine actual fertilization needs and application rate<br>• Calibrate fertilizer spreaders to avoid excessive application Irrigation<br>• Employ shutoff devices to prevent irrigation after precipitation |
| Irrigation | • Employ shutoff devices to prevent irrigation after precipitation or if a pressure drop occurs due to broken sprinkler heads or lines<br>• Design irrigation systems specific to each landscaped area's water requirements<br>• Select native plant species whenever possible and group together plants with similar water requirements in order to reduce excess irrigation<br>• Use soaker hoses not sprinklers and irrigate in the morning or evening to conserve water |
| Employee Training | • Train employees on the use and appropriate application of pesticides, herbicides and fertilizers<br>• Ensure that designated no mow areas are well advertised<br>• Educate staff on the benefits of trees and native and naturalized species |

A field investigation should regularly be done to assess current County pollution prevention/good housekeeping practices for park and landscape maintenance activities. Once the investigation is done a brief implementation plan should be created if it is found that the activities are thought to be causative of pollution.

The plan will summarize the results of the assessment as it relates to the current County pollution prevention/good housekeeping practices and the practices that will be used to reduce any stormwater pollution generated by the park and landscape maintenance activities. The plan will also include a schedule that describes when the prescribed pollution prevention/good housekeeping practices will be implemented. The contents of the implementation plan will be reviewed with the individual who manages the park and landscape maintenance activities.

## 3.8 ANIMAL SHELTERS

**Animal Care and Handling Facilities**
Since Berkeley County is currently responsible for an animal shelter on Cypress Gardens Road, included in this Manual is information on pollution prevention practices for these types of facilities. This animal shelter houses small animals (i.e. cats and dogs) as well as occasionally horses and other farm animals.

Pollutant sources at the animal shelter include, but are not limited to, the following:

- Animal washing
- Feeding / grazing
- Urine / feces and manure deposits
- Unpaved or non-vegetated areas

Pollutants can include:

- Coliform bacteria
- Nutrients
- Sediment

**Approach**
Minimize exposure of rain and runoff to animal care and handling areas by using cover and containment. In and around these areas, use good housekeeping to minimize the generation of pollutants. Make stormwater pollution prevention BMPs a part of standard operating procedures and the employee training program.

**Source Control BMPs**
Proposed best management practices are listed by activity.

**Table 3-11: Pollution Prevention/Good Housekeeping Practices Commonly Used for Animal Handling Facilities**

| Activity | Pollution Prevention/Good Housekeeping Practices |
|---|---|
| Animal Handling/Washing | • Use dry cleaning methods (i.e. sweeping or vacuuming) to clean animal handling areas regularly.<br>• Properly dispose of droppings, uneaten food, and other potential contaminants.<br>• Do not discharge wash water to storm water drains or other conveyances.<br>• Block the storm drain and contain the runoff for proper disposal.<br>• Wash water should be collected and pumped to the sanitary sewer, do not allow wash water to enter storm drains. DO NOT discharge wash water to sanitary sewer until contacting the local sewer authority to find out if pretreatment is required.<br>• Keep animals in paved and covered areas, if feasible.<br>• If keeping animals in covered areas is not feasible, cover the ground with vegetation or some other type of ground cover such as mulch.<br>• Prevent animals from moving away from controlled areas where BMPs are in use (e.g. fencing, leashing, etc.). |

| | |
|---|---|
| Horse Management | • Site Layout Considerations<br>  o Site barns, manure storage, and other high-use areas on higher ground when possible or on the portion of property that drains away from storm drains, conveyances, or waterways.<br>• Use grassed ditches, berms, or subsurface drains and properly sized roof gutters and downspouts to divert clean runoff around barnyard manure and sediment.<br>• Divert contaminated runoff from manured areas away from storm drains or conveyances.<br>• Focus on protecting the handling area's soil and vegetative cover. Prevent bare areas from forming.<br>• Keep animals away from wet fields when possible.<br>• During heavy rainfall, consider indoor feeding.<br>• Clean up manure and soiled bedding regularly, especially during wet weather.<br>• After cleanup, during the arid summer, water the areas where horses frequently deposit manure to promote decomposition.<br>• Store horse waste in sturdy, insect-resistant, and seepage-free units that have an impervious surface bottom and a cover to prevent leaching and runoff, such as:<br>  o Plastic garbage cans with lids<br>  o Fly-tight wooden or concrete storage sheds<br>  o Composters<br>• Compost. Keep compost piles moist, and well aerated to promote decomposition.<br>• Give away composted material to local greenhouses, nurseries and botanical gardens.<br>• Transport manure to topsoil companies or composting centers. |
| Maintenance | • Clean storm drain inlets on a regular schedule and after large storms.<br>• Maintain BMPs to reduce potential sediment runoff from outside exposed areas and any unpaved parking lot(s). |
| Training | • Install and alert employees to no dumping stencils on storms drains/inlets.<br>• Train employees on BMPs, stormwater discharge prohibitions, and wastewater discharge requirements.<br>• Train employees on proper spill containment and cleanup.<br>• Establish a regular training schedule, train all new employees, and conduct annual refresher training.<br>• Use a training log or similar method to document training. |
| Chemical Management | • Use Integrated Pest Management (IPM) or less-toxic methods for insect and weed control.<br>• Use chemical insecticides and herbicides as a last resort. Always properly store and dispose of chemical pesticides. |

## 3.9 EMPLOYEE TRAINING

County/municipal employees that are educated about the link between their work and stormwater quality can assist in reducing the amount of stormwater pollution that is conveyed into receiving waters. In order for county/municipal pollution prevention/good housekeeping programs to achieve success, employees must be trained on how to incorporate pollution prevention/good housekeeping practices into their everyday activities.

County/municipal employees must be provided with specific information about the actions they can take to prevent or reduce stormwater pollution. Table 3-11 presents the range of training topics that can be provided for each county/municipal operation. If they are not already familiar with the requirements of the NPDES Phase II permit, a general training session is a good opportunity to educate employees about them.

The most effective pollution prevention/good housekeeping training programs are the ones that provide the right information to the right employees. For example, employees engaged in landscape and park maintenance should be trained in landscaping techniques that use less fertilizer and pesticides, while employees responsible for maintaining fleet vehicles should be trained in the proper disposal of waste automotive fluids and how to correctly deal with leaky or disabled vehicles. Any County employees that are frequently in the field should be trained on how to identify and report any suspected illicit discharges.

There are a variety of methods that can be used to educate county/municipal employees on stormwater pollution prevention/good housekeeping practices, including:

- Annual Performance Reviews
- Brochures
- Conferences
- Meetings
- Training Sessions
- Videos
- Walkthroughs
- Workplace Posters
- Workshops

Employee turnover is an important consideration when developing an employee training and education program. The key to an effective program is to ensure that institutional knowledge about pollution prevention/good housekeeping practices is maintained over time. A tracking system, such as a sign in sheet that identifies the county/municipal staff members that have received training is critical to ensure the effectiveness of a pollution prevention/good housekeeping employee training program.

**Table 3-12: Employee Training Programs – Presenting the Right Information to the Right Audience**

| County/Municipal Operation | Training Targets | Training Topics |
|---|---|---|
| Hotspot Facility Management | • Facility managers<br>• Building maintenance staff<br>• Fleet maintenance staff | • Vehicle maintenance and repair procedures<br>• Vehicle washing procedures<br>• Materials loading and unloading procedures<br>• Materials storage procedures (outdoor storage)<br>• Spill prevention and response<br>• Dumpster management<br>• Building repair and maintenance procedures |
| Construction Project Management | • Contract administration staff<br>• Building services staff<br>• Plan review staff<br>• Site inspection staff | • Considering erosion and sediment control<br>• and stormwater management during contractor selection<br>• Plan review techniques<br>• Erosion and sediment control practices<br>• Ordinance enforcement procedures |
| Post-Construction Stormwater Management | • Storm drain staff<br>• Site inspection staff<br>• Maintenance staff | • Post-Construction stormwater BMP inspection procedures<br>• Post-Construction stormwater BMP maintenance procedures |

| | | |
|---|---|---|
| Street Repair and Maintenance | • Street maintenance staff<br>• Vehicle operators | • Road maintenance procedures<br>• Winter road maintenance procedures<br>• Handling and application of pesticides and other chemicals |
| Storm Drain Maintenance | • Storm drain staff<br>• Street maintenance staff<br>• Vehicle operators | • Storm drain maintenance procedures<br>• Materials disposal<br>• Vacuum truck maintenance |
| Park and Landscape Maintenance | • Parks and recreation staff<br>• Community forestry staff<br>• Landscaping staff<br>• Mowing staff | • Use an appropriate application of pesticides, herbicides and fertilizers<br>• No mow areas<br>• Benefits of trees, native and naturalized species |
| Animal Shelters | • Animal shelter staff<br>• Landscaping staff | • Animal handling and washing<br>• Waste management<br>• Maintenance<br>• Chemical management |

Berkeley County has implemented a progressive pollution prevention/good housekeeping employee training program that now includes participants from the Cities of Goose Creek and Hanahan. The training program has historically consisted of workshops that includes Powerpoint presentations, videos, question and answer sessions and occasionally a short quiz on good housekeeping as well illicit discharge detection and elimination (IDDE).

The training workshops target key County and municipal personnel to include stormwater staff, roads and bridges, maintenance garage, fleet management, facilities and grounds, mosquito abatement, and building and codes. A template of an agenda and sample completion certification utilized by Berkeley County for the pollution prevention/good housekeeping training workshops can be found in Appendix E.

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# Appendix A
# List of Berkeley County, Cities of Goose Creek and Hanahan Owned/Operated Facilities

# BERKELEY COUNTY FACILITIES

**Facility Occupied By----------** **C=County**
**S=State**
**O=Other**

| Berkeley County Facilities | Address | Berkeley County is the: | Occupied By: | C | S | O | NPDES Permit # (if applicable) |
|---|---|---|---|---|---|---|---|
| **223 North Live Oak Bldg.** | 223 North Live Oak Dr., Moncks Corner, SC29461 | Owner | **See (a) thru (e)** | | | | |
| (a) Sheriff | ***Complete Bldg Renovated in 2007-8*** | | Sheriff's staff | X | | | |
| (b) Central Summary Court | | | Magistrate's staff | X | | | |
| Lower Level | | | Emergency Operations Center | X | | | |
| Mech. Rm/Data/Bath Rm.Space | | | Mech,Data,Bath. Rm, stairwell etc. | X | | | |
| (e) I.T./ Back up 911 | | | I.T. staff /Back up call center | X | | | |
| Training/Sheriff | | | Sheriff training Media room | X | | | |
| **Sheriff Annex Bldgs.** | ***202 Factory St. M.C. Aquired 2018*** | | Marine Rescue, K-9 | X | | | |
| | | | | | | | |
| **EMS Logistics Building** | 223 North Live Oak Dr., Moncks Corner, SC29461 | Owner | 911 Communications staff | X | | | |
| **Former Guardian AD LITEM** | 111 Pine Street, Moncks Corner, SC 29461 | Owner | Contractor | | | | |
| **Facilities & Grounds** | 223 North Live Oak Dr., Moncks Corner, SC29461 | Owner | F&G Employees | X | | | |
| **Portable Storage Unit** | 2 units 320sqft. Each | | F&G Employees | X | | | |
| **Portable Storage Unit** | | | In use/Admin Services/Records Storage | X | | | |
| **Public Works Building** | 223 North Live Oak Dr., Moncks Corner, SC29461 | Owner | **See (a) thru (d)** | | | | |
| (a) Roads & Bridges | | | Roads and Bridges staff | X | | | |
| (b) Fleet | | | Fleet | X | | | |
| (c) Garage | | | Garage staff | X | | | |
| *Garage Portable Storage Unit* | | | Vehicle/Equipment Parts Storage | X | | | |
| (d) EMS Storage | | | Public Works staff | X | | | |
| **Hoover Building-PWD/Radio Shop** | 223 North Live Oak Dr., Moncks Corner, SC29461 | Owner | Small engine repair shop | X | | | |
| **Mosquito Abatement Office Bldg** | 223 North Live Oak Dr., Moncks Corner, SC29461 | Owner | Mosquito Abatement staff | X | | | SCG160000 |
| **Mosquito Abatement Storage** | 223 North Live Oak Dr., Moncks Corner, SC29461 | Owner | Chemicals, Trucks | X | | | |
| **Maude Callen Building** | Belt Drive, Moncks Corner, SC 29461 | Owner | **See (a) thru (d)** | | | | |
| (a) DSS | 4 Belt Drive, Moncks Corner, SC 29461 | Owner | Unoccupied/ Records Storage | | | | |
| (b) D.S.S. | 2 Belt Drive, Moncks Corner, SC 29461 | Lessor | D.S.S. staff | | X | | |
| (c) Admin. Services | 6 Belt Drive, Moncks Corner, SC 29461 | | Election Commission staff | X | | | |
| (d) Administrative Services | Belt Drive, Moncks Corner, SC 29461 | | Admin. Services staff | X | | | |
| **Guard House** | 223 North Live Oak Dr., Moncks Corner, SC29461 | Owner | Security Guards | | | X | |
| **Upfit Shop** | 223 North Live Oak Dr., Moncks Corner,SC29461 | Owner | Radio Shop | X | | | |
| **Training Center** | 474 Reid Hill Road, Moncks Corner, SC 29461 | Bldg. Owner | Land leased from Santee Cooper | X | | | |
| **Records Storage Building** | 223 North Live Oak Dr., Moncks Corner, SC29461 | Owner | Records Storage | X | | | |
| **EMS Headquarters Bldg** | 223 North Live Oak Dr., Moncks Corner, SC29461 | Owner | EMS Administrative staff | X | | | |
| **Animal Shelter** | 131 Central Berkeley Drive | Owner | | X | | | |
| **Berkeley Admin. Bldg.** | 1003 Highway 52, Moncks Corner, SC 29461 | Owner | Office space/New roof over entrance 2017 | X | | | |
| Home Telephone | **Complete Bldg renovation in 2004/2005** | | Leases 312 Sq. ft. for Sub Station | | | | |
| Suite A | | | County Supervisor Suite | X | | | |
| Suite B | | | Finance Dept. | X | | | |
| Suite C | | | Human Resources Dept. | X | | | |
| Suite D | | | Legal Dept. | X | | | |
| Suite E | | | Del. Tax Collector Dept. | X | | | |
| Suite F | | | Planning, Permits, B&C, Animal Control | X | | | |
| Suite G | | | GIS, 911 Addressing | X | | | |
| Suite H | | | Real Property Services Dept. | X | | | |
| Suite J | | | Auditor Dept. | X | | | |
| Suite K | | | Clerk to Council, Assembly Room | X | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Suite L | | | Procurement | X | | | |
| Old Engineering | | | Temp. Offices | X | | | |
| Suite M | | | Information Technology Dept. Server Rm. | X | | | |
| Suite N | | | Treasurer Dept. | X | | | |
| Suite P | | | Register Of Deeds | X | | | |
| **Admin. Expansion** | Hwy 52 & 52 Bypass, Moncks Corner, SC 29461 | Owner | *DMV-Finance -Engineering-Voters-EOC/911* | x | x | | |
| **Nesbitt House** | 1004 Old Hwy 52, Moncks Corner, SC 29461 | Owner | Wecome Center,Tourism, Parks & Rec | X | | | |
| **Moncks Corner Health Dept.** | 109 West Main St, Moncks Corner, SC 29461 | Owner | **New roof 2018** | | | | |
| (a) Health Dept. employees | ***Complete Bldg renovated in 1999*** | | Dept.of Health & Human Services | | X | | |
| (b) Berkeley County D.J.J. | | | Dept. of DJJ | | X | | |
| (d) Probation & Parole | | | Probation & Parole staff | | X | | |
| **Court House Annex** | 300-B California Ave, Moncks Corner, SC 29461 | Owner | **See (a) thru (e)** | | | | |
| (a) Clerk of Court | | | Clerk of Court/Family Court staff | X | | | |
| (b) Solicitor | | | Solicitor's staff | X | | | |
| (c) Master-in-Equity | | | Master-in-Equity staff | X | | | |
| (d) Probate Court | | | Probate Judge & staff | X | | | |
| **Old Court House** | 300 California Ave, Moncks Corner, SC 29461 | Owner | **See (a) thru (d)** | | | | |
| (a) Sheriff | ***Added on to in 1966 and renovated*** | | Sheriff's staff | X | | | |
| (b) Clerk of Court | ***Windows, soffit & trim upgraded 2002/03*** | | Clerk of Court/Family Court staff | X | | | |
| (c) Probation & Parole | ***Roof Replacement 2002/03*** | | Probation & Parole staff | | X | | |
| (d) I.T. | | | I.T. staff | X | | | |
| (e) COC Finance | | | COC | X | | | |
| (f) PTI Solicitor | | | Pre-Trial Interv. Staff- Solicitor | X | | | |
| **Hill Finklea Detention Center** | 300 California Ave, Moncks Corner, SC 29461 | Owner | Addition 2008/New roof 2018 | X | | | |
| **Jail Storage Buildings** | 111 Pine St. Moncks Corner, SC 29461 | Owner | Storage in use | | | | |
| **Narcotic's New building** | 182 Dog Pound Road, Moncks Corner, SC 29461 | Owner | Sheriff Staff | X | | | |
| **Narcotic's Trailer Storage Bldg** | | Owner | | X | | | |
| **Forensics' Building** | 233 N. Live Oak Dr. Moncks Corner, SC 29461 | Owner | Sheriff Staff | X | | | |
| **Morgue Building** | 223 North Live Oak Dr., Moncks Corner, SC29461 | Owner | Coroner & staff | X | | | |
| Morgue itself | | | | | | | |
| Morgue Storage | | | Storage | | | | |
| **Airport/Terminal Building** | 616 Whitesville Rd, Moncks Corner, SC 29461 | Owner | FBO Charleston Aviation Authority | | | x | SCR000000 |
| Shade Hangar Bldg #1 | | Owner | | | | | |
| Shade Hangar Bldg. #2 | | Owner | | | | | |
| Shade Hangar Bldg. #3 | | Owner | | | | | |
| T-Hangar Building | | Owner | | | | | |
| Corporate Hangar | | Owner | | | | | |
| Maintenance Hangar | | Owner/Lessor | Leesed/New roof 2018 | | | X | |
| Runway Light Vault | | Owner | | | | | |
| **Moncks Corner Senior Center** | 222 Heatley St, Moncks Corner, SC 29461 | Owner | New roof 2018 | | | X | |
| **Moncks Corner Library** | 1003 Highway 52, Moncks Corner, SC 29461 | Owner | New roof partial 2018 | X | | | |
| **Library Admin. Building** | 100 Library St, Moncks Corner, SC 29461 | Owner | Library staff | X | | | |
| **Goose Creek Library** | 325 Old Moncks Corner Rd, Goose Creek SC | Owner | Needs new roof | X | | | |
| **Sangaree Library** | 595 Sangaree Parkway, Summerville, SC 29483 | Owner | Library staff | X | | | |
| **Daniel's Island Library** | 2301 Daniels Island Dr, Charleston, SC 29492 | Owner | Library staff | X | | | |
| **Public Defender** | 105 Gulledge St.Purchased 2023 | Owner | Public Defender staff | X | | | |
| **Hanahan Library** | 1216 Old Murray Ct. Hanahan SC | Owner | Library staff | X | | | |
| **Cainhoy Community Center** | 2442 Cainhoy Rd, Cainhoy SC | Owner | Community use/New roof 2019 | | | X | |
| **Spiers Landing** | 1505 Spiers Landing Road, Cross SC 29436 | Lease 1975 | Open to Public, Management Contract | | | | |
| | | | | | | | |
| **St. Stephen Senior Center** | 1266 Russellville Rd, St. Stephens SC | Lessee | Senior Center staff | | | X | |
| Building A | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Building B | | | | | | | |
| **Goose Creek Mag, EMS,** | 653 Redbank Rd, Goose Creek SC | Owner | *Cleaning Contracted* | | | | |
| Sheriff Substation. | | | Magistrate, EMS, Sheriff staff | X | | | |
| **Goose Creek Health Dept.** | 106 West View Drive, Goose Creek, SC | Owner | Health Dept staff | | X | | |
| **St. Stephen Magistrate/Library** | 113 Ravenell St. St. Stephen S.C. 29479 | Owner | Demolished building in 2025 | X | | | |
| **Cypress Gardens** | 3030 Cypress Gardens Road, Goose Creek SC | Owner | Cypress Garden's staff/open to Public | X | | | |
| Visitors Center | | | | | | | |
| Nature Center | | | | | | | |
| Environmental Classroom | Gate house Demo March 2019 | | | | | | |
| Butterfly House | | | | | | | |
| Aquarium | | | | | | | |
| Heritage Room | | | | | | | |
| Dean Hall | | | | | | | |
| Conference Cottage | | | | | | | |
| Double Gazebos | | | | | | | |
| Restrooms (2) | | | | | | | |
| Maint. Office/Supply Storage Bldg. | | | | | | | |
| Maintenance Shop | | | | | | | |
| Maintenance Tool Shed | | | | | | | |
| Horticulture Supply Shed | | | | | | | |
| Green House | | | | | | | |
| Storage Containers (3) | | | | | | | |
| Horticulture Trailer | | | | | | | |
| Gift Shop Storage Trailer | | | | | | | |
| **Sangaree Sheriff's Sub Station** | 345 Sangaree Parkway | Agreement BCWS | Sheriff agreement with BCWS for use | X | | | |
| **Goose Creek Senior Center** | 103 Thurgood Rd. Goose Creek, S.C. | Owner | New Roof 2019 | | | X | |
| **Medic 1 - Goose Creek** | 653 Redbank Rd, Goose Creek SC | | Included in cell 110 | X | | | |
| **Medic 2 - Summerville** | 137 Farmington Rd, Summerville, SC | Owner | EMS | X | | | |
| **Medic 3 - Moncks Corner** | 223 North Live Oak Dr., Moncks Corner, SC29461 | Owner | EMS | X | | | |
| **Medic 4 - Cross** | 1659 Old Hwy 6 Cross SC 29436 | Owner | EMS/Sheriff Sub-station | X | | | |
| **Medic 5 - St. Stephens** | 336 Ravenell Dr, St. Stephens, SC | Owner | EMS | X | | | |
| **Medic 6 - Jamestown** | 1052 Bee Drive, Jamestown, SC | Owner Oct. 2014 | EMS | X | | | |
| **Medic 7 - Cainhoy** | 1501 Rec Road, Cainhoy SC | Owner | EMS | X | | | |
| **Medic 8 - Daniel's Island** | 235 Seven Farms Dr, Charleston, SC | Agreement | EMS/City of Chas. Fire Dept. | X | | X | |
| **Medic 9 Fire station** | Myers Rd. Summerville | Agreement | Ambulance & Crew, Pine Ridge FD | | | X | |
| **Medic 10 - Highway 176** | 2355 State Rd, Summerville, SC | Owner | EMS | X | | | |
| **Communications Towers:** | | | 911-Communication Radio Equipment | | | | |
| **Cainhoy Tower Building** | 2167 Cainhoy Rd. Cainhoy, SC BCWS | | Communication Equipment | | | | |
| **Sandridge Tower Building** | 4594 State Rd. Ridgeville, SC | | Communication Equipment | | | | |
| **Hwy 17A & 45 Tower Building** | 3659 N. Hwy 17A Jamestown, SC | | Communication Equipment | | | | |
| **Hwy 27 Tower Building** | 1516 Old Gilliard Rd. Ridgeville/ Not in use | | Communication Equipment | | | | |
| **Hwy 52 Tower Building** | 441 Drive In Lane Walmart Site | | Communication Equipment | | | | |
| **Hwy 41 Tower Building** | 4796 HWY 41 BEC Huger Site | | Communication Equipment | | | | |
| **Solid Waste Management Facility** | 555 Oakley Rd. Moncks Corner, SC | | Landfill Staff | X | | | SCR000000 |
| **Landfill Tower Building** | 555 Oakley Rd. Moncks Corner, SC | Owner | Communication Equipment | | | | |
| **Cross Tower Building** | 1338 Ranger Dr.- BCWS Water Tower | | Communication Equipment | | | | |
| **Shulerville Tower Building** | 2115 Sulerville Rd. Jamestown, SC | | Communication Equipment | | | | |
| **Russellville Site** | 138 Broadcast Lane- RCC Tower | | Communication Equipment | | | | |
| **BC Central Communications** | 223 North Live Oak Dr. | Owner | Communication Equipment | | | | |
| **New Hope Site** | 1046 Jedburg Rd. Summerville, SC | Owner | Communication Equipment | | | | |
| **RCC Shop GC** | 102 Farm Rd. GC | | Communication Equipment | | | | |
| **Goose Creek Site** | Water Tower Rd. G.C. | | Communication Equipment | | | | |
| **Live Oak Tower Site** | 223 North Live Oak Dr. | | Communication Equipment | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Cordesville Tower Site** | 411 Zee Lane Cordesville, SC | | Communication Equipment | | | | |
| **M.C. Fairgrounds Property** | 327 Rembert C. Dennis Boulevard | Owner | | | | | |
| **Coroner New Office** | 102 Gulledge St. | Owner | Coroner Staff | X | | | |
| **Central Berkeley WWTP** | 158 Central Berkeley Drive, Moncks Corner, SC | Owner | | X | | | SC0039764 |
| **Lower Berkeley WWTP** | 2111 Red Bank Road, Goose Creek, SC | Owner-BCWSA | | X | | | SC0046060 |
| **Upper Berkeley WWTP** | 1401 Hickory Street, St. Stephen, SC | Owner-BCWSA | | X | | | SC0025259 |

| CITY OF GOOSE CREEK GOVERNMENT OWNED PROPERTY | |
|---|---|
| City of Goose Creek Facilities | Address |
| Fire Station II | 950 Crowfield Boulevard |
| Berkeley Seniors Center | 103 Thurgood Road |
| Municipal Complex - Offices, Administration, Court, Police, IT | 519 N Goose Creek Boulevard |
| Goose Creek Community Center - Gym | 519 N Goose Creek Boulevard |
| Felkel Field - Baseball, Softball, Concession, Playground, Restrooms, Equipment Maintenance TMS # 235-13-08-017 | 101 Lucy Drive |
| Crowfield Golf and Country Club - Golf Course, Clubhouse, Pool, Tennis Courts, Golf Cart Maintenance | 301 Hamlet Circle |
| Fire Station I | 101 Button Hall Avenue |
| Department of Public Works - Water, Sanitation, Maintenance, Garage, Vehicle & Equipment Maintenance | 200 Button Hall Avenue |
| Central Creek Park (Eubanks Park) | 147 Old Moncks Corner Road |
| John McCants Veterans Park | 351 Anita Drive |
| Dogwood Park - Picnic, Football, Grill, Playground, Soccer | 460 Liberty Hall Road |
| Etling Park - Basketball, Picnic, Playground | 100 Ellen Street |
| Fairfax Park - Grill, Picnic, Playground | 13 Waterford Place |
| Forest Lawn Park - Grill, Picnic, Playground | 181 Giles Drive |
| Foster Creek Park - Concession, Picnic, Playground, Soccer | 224 Foster Creek Road |
| Lake Greenview Park - Picnic, Grill, Playground, Trails | 1 East Pandora Drive |
| Oak Creek Park - Picnic, Grill, Playground | 100 Persimmon Circle |
| Ryan Creek Park - Benches, Playground | Janice Street |
| Shannon Park - Picnic, Playground | 101 Old Moncks Corner Road |
| Fire Station HQ & Meeting Facility | 201 Button Hall Avenue |
| Fire Station III | 535 Old Mount Holly Road |
| St. James III Park - Picnic, Grill, Playground | 1084 Willowood Avenue |
| St. James Park - Picnic, Playground, Tennis | 188 Westminister Boulevard |
| Santee Cooper/Goose Creek Water Tower | 634 Saint James Avenue |
| Municipal Complex Park, Walking Trails | No site address. TMS # 235-00-00-037. Adjoining 519 N Goose Creek Boulevard |

**LIST OF CITY OF HANAHAN GOVERNMENT OWNED PROPERTY**

| City of Hanahan Facilities | Address |
|---|---|
| 2511200098 - Vacant Parcel | NO SITE ADDRESS |
| 2521303035- Park Adjoining Goose Creek Reservoir | NO SITE ADDRESS - End of VENICE AVENUE |
| 2590000059- City of Hanahan Recs & Parks Grounds | 3000 RAILROAD AVE. |
| 2590000065 - Tennis Court & Recycling | S. BASILICA AVE. |
| 2590000087- Fire Station 2 | 1200 S. BASILICA AVE. |
| 2590000092- City of Hanahan Recs & Parks Grounds & Bettis Boat Landing | BETTIS BOAT LANDING RD. |
| 2590000093- City of Hanahan Recs & Parks Bldg, Senior Center, & Amphitheater | 3100 & 3102 MABELINE RD. |
| 2590000105- Fire Station #3 & Public Works Department | 1101 WILLIAMS LN. |
| 2590000149- Vacant Parcel | NO SITE ADDRESS/EAGLE LANDING |
| 2650200026- Vacant Parcel | NO SITE ADDRESS |
| 2650702053- Vacant Parcel | NO SITE ADDRESS |
| 2650803058 - Old Public Works Facility | 5920 STEWARD ST. |
| 2650804016 - Old Public Works Facility | 5920 STEWARD ST. |
| 2651201020 - Vacant Parcel | NO SITE ADDRESS |
| 2651208001 - Vacant Parcel/ SW Drainage | NO SITE ADDRESS |
| 2651208021 - Vacant Parcel/ SW Drainage | NO SITE ADDRESS |
| 2651503060- City of Hanahan Gym Parking | 5821 & 5823 ROBINSON ST. |
| 2651602055 - Rhodes Pond/Park | NO SITE ADDRESS |
| 2651503059 - Municipal Complex, Fire Station #1, and Gym | 5826 CAMPBELL ST |
| | 1265 YEAMANS HALL RD |
| | 1255 YEAMANS HALL RD |
| 2590000150- Vacant Parcel | NO SITE ADDRESS/EAGLE LANDING |
| 2590000104- Bowens Corner Elem. School | 1173 WILLIAMS LN. |
| 2660503071- Effluent Pump Station | Corner of EAST LAKESIDE DRIVE & WEST LAKE SIDE DRIVE |
| 2651205030- Park | Corner of YEAMANS HALL RD. & PARK RD. |

# Appendix B
# Prioritization Matrix for Catch Basins in Public Systems

| Rating (A, B, or C) | Discription of Rating | Criteria for Rating | Number of Suggested Scheduled Cleanings |
|---|---|---|---|
| C | Moderate to Significant Need for Maintenance | Pipe size of less than fifteen (15) inches associated with Catch Basin, but basin made of solid material | Once every two years |
| B | High Need for Maintenance | Has a deficient material but pipe size is greater than fifteen (15) inches | Once every year |
| A | Very High Need for Maintenance | Basin is of deficient material and pipe size is less than fifteen (15)inches | Twice every year |

# Appendix C
# Spill Prevention and Response Plan

**BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM**
212 Oakley Plantation Drive
Moncks Corner, SC 29461-5036
843.719.2697 843.723.3800 843.412.7313
843.719.4695 fax

**SPILL PREVENTION & RESPONSE PLAN**

# Spill Prevention & Response Plan For

_____

*(enter facility name and address)*

Berkeley County Stormwater Management recommends our fleet maintenance, facilities fueling, vehicle washing, and vehicle storage areas and operations develop and implement a spill prevention and response plan that includes an employee training component and has the ultimate goal of preventing or reducing pollutant runoff from our municipally controlled and operated facilities, and to promote good housekeeping practices within each facility. Even with the best preventative efforts in place, spills may still occur. When spills do occur, it is up to facility personnel to respond quickly and effectively to clean-up any spilled material or notify someone who can. This Spill Prevention and Response Plan is designed as a template for Fleet Maintenance facilities and fueling operations to develop site-specific individual Spill Prevention and Response Plans. The plan should be kept in a central location that is easily accessible for employees and updated as site-specific operations change.

## INSTRUCTIONS

Each facility can use this template by filling in the blanks and completing the attached:

_____Spills that require Special Cleanup
_____Materials Inventory
_____Maximum Cleanup Amounts
_____Facility Map
_____Spill Kit Inventory and associated labeling
_____Employee Training Log

Once completed, this Plan becomes the facility's individual Plan and must be properly implemented and maintained. The finished Plan should be reviewed and updated at least annually and or as site specific changes occur.

Plan Implementation Date:_____

Plan Revision Date(s):_____

**Facility's Responsible Person(s)** in charge of spill response planning, implementation and maintenance of the Plan:

Name Phone #

_____
_____

## RESPONSIBILITIES

- Each "**Facility Responsible Person"** has the primary responsibility for coordinating the response to emergencies, this will include hazardous material spills.

- All **Supervisors** should ensure that their respective employees are familiar with these spill prevention and response procedures and receive the necessary training deemed appropriate for their role in spill prevention and spill response.

- **All employees** should follow these procedures in the event of a chemicalspill.

## EMERGENCY CONTACT NUMBERS

The following telephone numbers should be posted near telephones and any other obvious locations near high potential spill locations:

- Outside emergency services (police, fire department, ambulance service): 911
- National Response Center: 800-424-8802
- South Carolina Department of Health and Environmental Control: 1-888-481-
- 0125
- South Carolina Emergency Management Division: 803-737-8500
  Berkeley County Emergency Preparedness: 843-719-4166
    - Safety Department: (if applicable): _____

## CLEAN-UP PROCEDURES

Spilled hazardous materials should be quickly contained and effectively cleaned up. Employees should clean up spills themselves, ***only if properly trained and protected.*** Employees who are NOT trained in spill cleanup procedures should immediately report the spill to the Responsible Person(s) listed above, warn other employees in the area, and leave the area as soon as possible and if necessary.

The Maximum Cleanup Amounts that properly trained employees can cleanup **are listed on pages 8.** In the event of spills greater than the amounts listed on pages 8, contact the aforementioned appropriate responders listed in the Emergency Contact Numbers.

Berkeley County Stormwater recommends that the following generalized guidelines should be followed for evacuation of areas where hazardous material spills have occurred, spill control and containment, notification of proper authorities, and general emergency response procedures in the event of a spill incident in which there is potential for a significant release of hazardous materials:

1. **Evacuation**
   Personnel in the immediate vicinity of a spill should *immediately evacuate* the premises (except for employees with training in spill response for specific circumstances described below) if the material poses an immediate health hazard. If the spill is of "medium" or "large" size, or if the spill seems hazardous, immediately notify emergency response personnel.

2. **Spill Control Techniques**
   Once a spill has occurred, the properly trained personnel needs to decide whether the spill is small enough to handle without outside assistance. Only employees with training in spill response should attempt to contain or clean up a spill.

   NOTE: If you are properly trained for cleaning up a spill yourself, make sure you are aware of the hazards associated with the material spilled by referencing the on-site MSDS, make sure you have adequate ventilation, and make sure you have proper personal protective equipment on prior to initiating any cleaning activities. Treat all residual chemical and clean-up materials used throughout the course of the spill as a hazardous waste.

   Spill control equipment should be located wherever significant quantities of hazardous materials are received, stored, or used. MSDSs, absorbents, over-pack container, container patch kits, spill dams, shovels, floor dry, acid/base neutralizers, and "caution-keep out" signs are common items to be utilized during a spill response.

### 3. Spill Responses and Cleanup

Most hazardous material spills can be divided into three categories: Small, Medium and Large. Response and cleanup procedures can vary depending on the size of a spill. Using the information below, determine the extent and type of spill. If the spill is large, if there has been a release to the environment or if there is no one knowledgeable about spill clean-up available, contact the Facility Responsible Person or 911. Additionally, always refer to page 8 for the maximum clean-up amounts associated with each specific type of material.

**Small Spills:** Any spill where the major dimensions are less than 18 inches in diameter. Small spills are generally handled by properly trained internal personnel and usually do not require an emergency response by police or fire department HAZMAT teams.

- Quickly control the spill by stopping or securing the spill source. This could be as simple as up righting a container and using floor-dry or absorbent pads to soak up the spilled material. Be sure to wear gloves and protective clothing if necessary.
- Put spill material and absorbents in secure containers if any are available.
- Consult the Facility Responsible Person and the MSDS for the spill and waste disposal procedures.
- In most instances, the area of the spill should NOT be washed with water. Use Dry Cleanup Methods and **never** wash spills down the drain, onto a storm drain or onto the driveway or parking lot.
- Both the spilled material and the absorbent may be considered hazardous waste and must be disposed of in compliance with state and federal environmental regulations.

**Medium Spills:** Spills where the majority of the dimensions exceed 18 inches, but are less than 6 feet. Outside emergency response personnel

(police and fire department HAZMAT teams) may need to be called for medium sized spills. However, common sense and a certain degree of caution should dictate when it is necessary to call them.

- Immediately attempt to contain the spill at its original source by simple measures. Simple measures consist of quickly up-righting a container, or putting a lid on a container, if possible. Only use absorbents if they are immediately available. If you have made an attempt to contain the spill, and you have quickly determined you cannot take any short-term containment measures, leave the area and alert Emergency Responders. Closing doors behind you while leaving will help contain the fumes occurring from the spill(s). Give Emergency Responders accurate enough information that they are aware of the exact location, chemical, and estimated amount of the spill.

- Immediately assess the area surrounding the spill. Engines and electrical equipment near the spill area need to be turned off. This will minimize potential sources of ignition in the area. If engines and electrical sources can't be turned off prior to leaving, advise Emergency Responders of such. Furthermore, advise them on how to turn off engines or electrical sources. Do not attempt to go back into the area of the spill once you have left. Assist emergency responders by helping them determine where and how to shut off heating, air conditioning equipment, or air circulating equipment, if necessary.

- Be sure to follow all Emergency Responder instructions.

- Be prepared to assist Emergency Responders with any other information that may be necessary, such as MSDSs, questions about the facility, and appropriate Berkeley County personnel. Emergency Responders or trained personnel with proper personal protective equipment will then clean up the spill residue once it has been contained. Do not attempt to re-enter the area of the spill until the responder in charge says the area is acceptable for occupancy.

- All appropriate reports must be filed with proper authorities. It is the responsibility of the spiller to inform both his/her supervisor and the emergency responders as to what caused the spill. The response for large spills is similar to the procedures for medium spills, except that the exposure danger is greater.

**Large Spills:** Any spill involving flammable liquid where the major dimension exceeds 6 feet in diameter; and or any "running" spill, where the source of the spill has not been contained or flow has not been stopped.

- Immediately leave the area of the spill and notify Emergency Responders. Give the operator the spill location, chemical name, and approximate amount.

- Attempt to get MSDS information for the spilled chemical for the Emergency Responders to use, only if the MSDS information is located in a safe area away from the spill. Furthermore, be prepared to advise responders as to any ignition sources, engines, electrical power, or air conditioning/ventilation systems that are still running. Provide responders of any absorbents, containers, or spill control equipment that may be available. This should be done in a remote area, because the evacuation should place the spiller far away from the spill. Radios or phones can be used to assist from a distance, if necessary.

- Emergency Response personnel, in accordance with their own established procedures, should be the only personnel that handle any spills greater than 6 feet in any dimension or that are continuous or running. Once the Emergency Responders or HAZMAT team are on-site cleaning up spills and or putting out fires, the entire area will be under their control and no one may reenter the area until the responder in charge says the area is acceptable for occupancy.

- Provide information for reports to supervisors and responders, just as indicted in the medium spills.

## REPORTING SPILLS

All hazardous material spills, regardless of their size, should be reported immediately to the **Facility Responsible Person**. It will be the responsibility of the Facility Responsible Person to determine if the spill has the potential for any environmental impacts outside of the facility and those that must be reported to 911, the National Response Center at 800-424-8802, the South Carolina Department of Health and Environmental Control at 1-888-481-0125, the South Carolina Emergency Management Division at 803-737-8500, and the Berkeley County Emergency Preparedness at 843-719-4166.

South Carolina Law requires reports of spills & releases that may impact the environment. Do not delay reporting! Calling a local DHEC office DOES NOT COUNT legally as reporting a spill. You must call the 24-hour SCDHEC Emergency Response number at 1-888-481-0125.

## MAXIMUM CLEANUP AMOUNTS

Identify the maximum volume of spill that may be cleaned up by the facility employees or contractors based on material (use 1 qt or 1 lb unless other information is available). Also identify how wastes from a spill of material will be disposed (for example, absorbed and placed in dumpster) and the name and address of the offsite facility to which clean- up wastes will be sent for hazardous waste disposal, if applicable. A list of hazardous substances and reportable quantities (RQ), can be found at http://www.ecfr.gov/cgi-bin/text-idx?node=se40.28.302_14&rgn=div8.

| MATERIAL | Max. Volume | Disposal Method/Location |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

## SPILLED MATERIALS THAT REQUIRE SPECIAL CLEANUP

Describe any material used in your facility that requires special materials and procedures for cleanup beyond those listed above. Provide details regarding hazards associated with these.

| Material | Hazards |
|---|---|
| | |
| | |
| | |
| | |
| | |

## MATERIAL INVENTORY

List all materials or waste that may require clean up. List the average and maximum amounts on site and their storage locations. *(Ignore any that do not apply and add other materials of concern that are onsite. Use additional sheets if necessary).*

| Material | Amount (avg./max) | Location(s) |
|---|---|---|
| Antifreeze | | |
| Used Oil | | |
| Motor Oil | | |
| Degreaser | | |
| Hydraulic Oil | | |
| Solvents | | |
| Brake Cleaner | | |
| Diesel Fuel | | |
| Fuel Additive | | |
| Unleaded Fuel | | |
| Other | | |

## Spill Kits

- Label each spill kit prominently with the words „SPILL KIT" or "Absorbent" etc.
- Label or stencil the necessary emergency telephone number(s) or pager of the persons to be contacted in case of a spill or leak that is beyond the training and equipment available on or near each spill kit location.

**Facility Responsible Person/Phone Number:_____/ ( ) -_____**

**Spill Response Contractor (if any)/Phone Number:_____/ ( ) -_____**

**State Emergency Release and Incident Hotline: 1-(888)-481-0125**

## Spill Kit Inventory

List all response equipment that will be maintained in each spill kit location (refer to MSDSs to determine recommended clean-up methods PPE and supplies):

| LOCATION | ABSORBENTS (bags or loose absorbent, pigs, neutralizing agent, etc. | TOOLS (shovels, brooms, waste containers, etc. | PERSONAL PROTECTIVE EQUIPMENT (impervious gloves, goggles, aprons, boots, | OTHER SUPPLIES (warning tape, labels, markers, MSDSs, etc.) |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

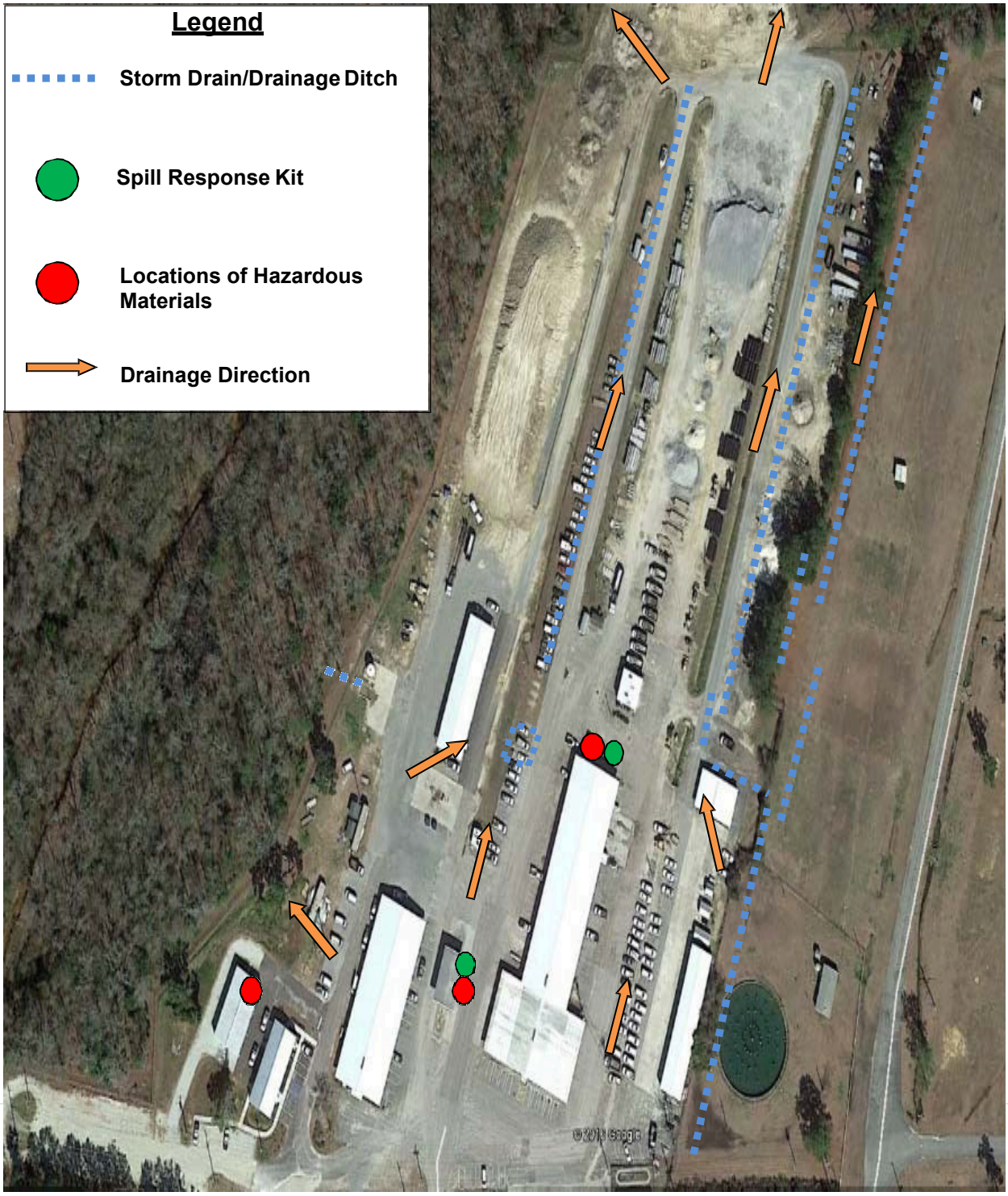
PERSON RESPONSIBLE FOR MAINTAINING THIS INVENTORY:

_____

## FACILITY MAP

Attach a map or sketch of the facility showing:

(a) the locations of each spill response kit.
(b) the locations where the material identified on page 8 are normally stored or used.
(c) the location of each storm drain or drainage ditch.



# Appendix D
# Good Housekeeping/IDDE Training Template and Example Certificate

Stormwater Management Program
212 Oakley Plantation Drive
Moncks Corner, SC 29461
berkeleycountysc.gov
843.719.4195

**AGENDA**
**Event: Illicit Discharge Detection and Elimination Training – Good Housekeeping Training**
**Date:**
**Time:**
**Location: Assembly Room, 1003 US-52, Moncks Corner, SC 29461**
**Attendees:** **Stormwater Management Program:**

**Roads & Bridges:**

**Maintenance Garage:**

**Fleet Management:**

**City Staff:**

| | |
|---|---|
| **8:00am – 8:45am** | **Introduction & Program Descriptions**<br>I. Sign-in.<br>II. SWMP introduction and program description.<br>III. Introduction of attendees and a description of daily activities as it relates to stormwater. |
| **8:45am – 10:15am** | **Good Housekeeping**<br>I. A presentation about good housekeeping practices.<br>II. A few short videos about good housekeeping practices.<br>III. Question and answer session.<br>IV. A short quiz to be taken about the material just covered. |
| **10:15am – 10:30am** | **Break** |
| **10:30am – 12:00pm** | **Illicit Discharge Detection and Elimination**<br>I. A presentation about how to detect illicit discharges and how to report.<br>II. A few short videos about illicit discharges and how to detect them.<br>III. Question and answer session.<br>IV. A short quiz to be taken about materials just covered. |
| **12:00pm** | **Adjourn** |

# CERTIFICATE OF ATTENDANCE

**BERKELEY COUNTY**
in cooperation with
Berkeley County Stormwater Management Program

This certifies that

XXXXXX

BERKELEY COUNTY (DEPARTMENT)

Attended the *Stormwater Employee Training for*
*Illicit Discharge Detection & Elimination – Good Housekeeping Workshop*
MM/DD/YYYY




Instructor: XXXXXX
Berkeley County Stormwater Management Program

# Appendix J: Stormwater Design Standards Manual

# BERKELEY COUNTY
# STORMWATER MANAGEMENT PROGRAM

# STORMWATER DESIGN STANDARDS MANUAL

**Adopted December 1, 2009; Updated March 3, 2020**

**1003 Highway 52**
**Post Office Box 6122**
**Moncks Corner, SC 29461-6120**
**Telephone: 843.719.4127**

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# CHAPTER 1 – GENERAL INFORMATION

## 1.1 PURPOSE

It is the purpose of this Manual and the Stormwater Management Ordinance to protect, maintain, and enhance water quality and the environment of Berkeley County and the short-term and long-term public health, safety, and general welfare of the citizens of Berkeley County. This Manual is also designed to minimize property damage by establishing requirements and procedures to control the potential adverse effects of increased stormwater runoff and related pollutant loads associated with both future development and existing developed land. Proper management of stormwater runoff will further the purpose of this Manual and the Stormwater Management Ordinance to ensure a functional drainage system, reduce the effects of development on land and stream channel erosion, attain and maintain water quality standards, enhance the local environment associated with the drainage system, reduce local flooding, maintain where necessary pre-developed runoff characteristics of the area in terms of flow rate, volume and pollutant concentration, and facilitate economic development while mitigating associated pollutant, flooding, erosion, and drainage impacts.

This Manual describes the policies and procedures used by the County Engineer to implement the Stormwater Management Ordinance and elements of the County's Stormwater Management Program (SWMP). These standards and procedures will:

1. Clearly describe the stormwater management plan and Construction Activity Application requirements and approval process as it relates to stormwater management;

2. Convey the technical design standards to the engineering community, to include standards which address flow rates, runoff volume, and pollutant load/concentration, as well as specific standards during construction and for long-term performance;

3. Provide general information on approaches to improve water quality, prevent illicit discharges, and minimize stormwater runoff impacts due to development and re- development;

4. Convey other protection provisions related to stormwater discharges such as wetlands and watercourse conservation;

Every effort has been made throughout this Manual to cover the common conditions and information needed by those involved in construction activities, however, these design standards and the County ordinances should be reviewed carefully to ensure that all requirements are being met. Developments may also be impacted by State and Federal requirements to include, but not be limited to, the NPDES Phase II Construction General Permit for Stormwater Discharges from Large and Small Construction Activities (CGP). Those projects not subject to NPDES requirements must still comply with applicable County ordinances and standards.

## 1.2 SCOPE

The scope of this Manual is limited to the requirements related to stormwater management as reviewed and approved by the Berkeley County Engineer. This Manual is not intended as a textbook or a comprehensive engineering design reference. It was instead developed under the assumption that the user possesses a basic understanding of stormwater control design, construction, or land development depending on the user's particular area of expertise. References to guidance documents from Federal,

State, and local agencies, as well as commercial products are given throughout this Manual to provide additional information to users. Two common examples are the Natural Resources Conservation Service's (NRCS) TR-55 and SCDHEC's Best Management Practices (BMP) Manual.

The design standards are not intended to restrain or inhibit engineering creativity, freedom of design, or the need for engineering judgment. When shown to be applicable, it is encouraged that new methods, techniques, and innovative stormwater BMPs be submitted with supporting documentation. However, the use of such approaches should be substantiated with submitted documentation by design professionals showing that the proposed design is equal to, or exceeds the traditional procedures in terms of performance and economic feasibility.

On projects that require site specific designs pertaining to stormwater management and water quality, site plans, details, calculations, construction specifications, and other technical documents must be signed and sealed by a professional engineer licensed in the state of South Carolina, with sufficient knowledge and experience to accomplish all design elements of the site plan. Users who are not justly qualified by education or experience in the fields of stormwater management design, construction, or land development should consult with a qualified professional in one or more of these areas prior to planning for construction activities.

## 1.3 MANUAL ORGANIZATION

The design standards are divided into five (5) chapters, organized to present recommended technical and engineering procedures along with criteria obtained from local, State, and Federal regulations. The remainder of this chapter provides information on the County's authority to develop and enforce design requirements along with several legal matters, some background information on stormwater management and its importance, and definitions for terms used throughout this Manual. Chapter 2 describes the process for obtaining stormwater approval. Chapter 3 contains specific design requirements and criteria. Chapter 4 describes the inspection and enforcement process. Chapter 5 contains references for designing components of the stormwater management system.

## 1.4 AUTHORIZATION

This Manual has been prepared under the direction of the County Engineer, who has been granted the authority to develop engineering design standards and enact programs and policies to ensure compliance with the NPDES Phase II General Permit for Stormwater Discharges from Regulated Small Municipal Separate Storm Sewer Systems (MS4s), SCR030000, and the County's pertinent ordinances.

### 1.4.1 NPDES MS4 GENERAL PERMIT SCR030000

Berkeley County, like many other counties and municipalities across the United States, is required to have an NPDES MS4 permit to discharge stormwater. Because construction activities contribute to the discharge of pollutants, the NPDES MS4 permit requires that Berkeley County encourage, promote, and implement certain practices, programs, and procedures for the purpose of reducing or limiting discharge of pollutants to waters of the State. The permit requires that Berkeley County develop and implement a Stormwater Management Program to control the discharge of pollutants from its MS4 to the maximum extent practicable (MEP). The SWMP has several components that must be met and this Manual provides partial compliance with several, including construction and post-construction management, illicit discharge detection, and public education. The MS4 permit can be found at: http://www.scdhec.net/environment/water/docs/scs000000.pdf.

### 1.4.2 BERKELEY COUNTY ORDINANCES, REGULATIONS, AND STANDARDS

Berkeley County has developed and adopted ordinances and standards, largely based on State and Federal regulations, specifically to address concerns associated with uncontrolled stormwater runoff. The principal ordinances and standards for the County that affect the land development selection of stormwater control measures are:

1. Stormwater Management Ordinance: Established the engineering design standards and procedures for obtaining a stormwater approval within Berkeley County. The County Engineer was authorized by this Ordinance to develop all necessary regulations, as detailed in this Manual for properly controlling stormwater runoff and mitigating existing and future impacts;

2. Zoning and Land Development Regulations Ordinances: Issues that may be impacted by these Ordinances when designing stormwater management systems include but are not limited to: limits on building density, buffer and setback requirements, parking lot islands, required parking spaces, tree protection, planting species selection, and screening requirements for ponds and other BMPs. Applicants should specifically check to make sure a desired development type is allowed in the planned location;

3. Building & Codes and Floodplain Ordinances: These Ordinances implement and enforce all applicable provisions of the building codes and floodplain management regulations.

## 1.5 UPDATES TO THE DESIGN STANDARDS

This Manual is subject to updates. As design technology and criteria evolve or change or it becomes evident that additional measures are needed to ensure the public general welfare, the Manual will be updated as needed. Updates will be approved by the County Engineer. Users of this manual are encouraged to provide comments on the content of this manual at anytime in writing to the County Engineer. The comments shall include proposed changes, reasoning, and justification (including any supporting technical documents supporting the changes). All comments will be considered during manual updates. This Manual can also be found on the Berkeley County website at http://www.berkeleycountysc.gov/.

## 1.6 STORMWATER MANAGEMENT

Development has the potential to alter the natural drainage patterns, flow rates and volumes, and quality of the County's water resources. Traditional solutions have removed stormwater as efficiently as possible, while maintaining runoff quantity controls. The following sections discuss these impacts and the design considerations that are available and encouraged.

### 1.6.1 EFFECTS OF DEVELOPMENT ON WATERSHED HYDROLOGY

Development and urbanization have the following impacts on receiving waterbodies:

- Changes to Stream Flow;
  - Increased runoff volumes;
  - Increased peak runoff discharges;
  - Greater runoff velocities;

- Increased flooding frequency;

  Lower dry weather flows (base flow);

- Increase in floodplain elevation;

- Changes to Stream Geometry;
  - Stream channel enlargement;
  - Stream down cutting;
  - Changes in channel bed due to sedimentation;
- Degradation of Aquatic Habitat;
  - Degradation of habitat structure;
  - Decline in stream biological functions;
- Water Quality Impacts;
  - Reduced oxygen in streams;
  - Microbial contamination;
  - Hydrocarbons and toxic materials;
  - Sedimentation;
- Property damage and safety concerns;
- Unsightly aesthetic stream channel conditions and restricted use of recreational waters.

### 1.6.2 STEPS TO SUCCESSFUL STORMWATER MANAGEMENT PLANS

Proper planning is necessary to ensure that stormwater management is considered and fully integrated at the various stages of the site-development process. This involves a comprehensive approach to site planning and a thorough understanding of the physical characteristics and resources associated with the project site. This planning includes addressing each of the following categories:

- Stormwater quantity controls;
- Erosion and sediment controls;
- Stormwater quality controls;
- Stormwater conveyance controls;
- Maintenance plans and schedules for construction and post construction activities.

The design of successful stormwater management plans involves adhering to the following principles, where applicable:

- Pre-submittal site meeting/site visit;
- Review of site development requirements;
- Detailed site analysis and supporting calculations;
- A thorough knowledge of the impacts the stormwater system may have on the watershed:
- Creation of a Stormwater Master Plan;
- Design aspects of the stormwater management plans;
- Approval and completion of the Construction Activity Application.

In Chapter 2, the procedure for including the necessary documentation for a complete stormwater management plan and Construction Activity Application is provided.

### 1.6.3 INNOVATIVE DESIGN APPROACH

Innovative approaches to site design focus on source control for stormwater runoff that limit the amount of runoff generated for a BMP to control. When designing for land disturbance activities, the design must address the following four categories of control: water quantity (flood control), design storm control (rate and volume), erosion prevention and sediment control, and pollution control (water quality standards). If an innovative stormwater design approach is to be used, the design professional should take the following considerations in mind, in addition to meeting these categories of control:

- Stormwater quantity and quality are best controlled at the source of the problem by reducing the potential maximum amount of runoff and pollutants. Source control will typically be more economical in order to treat the first flush of a storm event since a simple BMP for a large area will only treat the first flush from the closest portions of the site;
- Best management practices (BMPs) address stormwater management by using simple, structural and nonstructural methods along with or in place of traditional stormwater management structures when applicable;
- Equaling or exceeding traditional stormwater management designs in terms of performance (rate/volume attenuation, pollutant removal) and economic feasibility (long-term) are essential to a proposed concept's eventual approval.

### 1.6.4 BEST MANAGEMENT PRACTICES AND SITE PLANNING PROCESS

The first step in addressing stormwater management begins in the site planning and design stage of the development project. By implementing BMPs during the site planning process, the amount of runoff and pollutants generated from a site can be reduced by minimizing the amount of impervious area and utilizing natural on-site treatments. The minimizing of adverse stormwater runoff impacts by the use of BMPs and site planning should be a major consideration for a design professional.

The reduction of runoff volumes and stormwater pollutants decreases the total number and size of stormwater management controls that must be implemented under the guidelines set forth in this Manual.

BMPs reduce the amount of total post-development impervious areas and maintain natural characteristics of the pre-development site conditions. Therefore, the post-development curve numbers and time of concentrations are maintained more closely to the pre-development conditions. This reduces the overall hydrologic and hydraulic impact of the development.

### 1.6.4.1 MAINTAINING SITE RESOURCES AND NATURAL UNDISTURBED AREAS

Conservation of site resources and natural undisturbed areas helps to reduce the post development runoff volume and provides areas for natural stormwater management. Some natural site resources that should be maintained include, but are not limited to:

- Natural drainageways;
- Vegetated buffer areas along natural waterways;
- Floodplains;
- Areas of undisturbed vegetation;
- Low areas within the site terrain;
- Natural forested infiltration areas;
- Wetlands.

### 1.6.4.2 LOWER IMPACT SITE LAYOUT TECHNIQUES

Lower impact site layout techniques involve identifying and analyzing the location and configuration of structures on the site to be developed. Where applicable, the following options that create lower impact layouts should be used:

- Fit the design layout to follow the natural contours of the site to minimize clearing and grading and preserve natural drainage ways and patterns;
- Limit the amount of clearing and grading by identifying the smallest possible area on the site that would require land disturbance;
- Place development areas on the least sensitive areas of the site and avoid steeply sloped areas when possible;
- Utilize nontraditional designs to reduce the overall imperviousness of the site by providing more undisturbed open space and minimizing clear-cutting;
- Consider the utilization of cisterns and rain barrels to collect stormwater for reuse;
- Level spreaders or other energy dissipation devices should be used at all discharge points including discharge points into ponds and other basin-type BMPs. More information on these devices is provided in Chapter 3.

### 1.6.4.3 MINIMIZATION OF IMPERVIOUS COVER

The minimization of total impervious area directly relates to a reduction in stormwater runoff volume and the associated pollutants from a development site. The amount of impervious cover on a site can be reduced by the following techniques where applicable:

- Reduce building footprints by constructing some buildings as multi-story;
- Reduce parking lot areas and use porous/pervious pavement surfaces for desired overflow parking where feasible;
- Increase the amount of vegetated parking lot "islands" that can also be utilized for stormwater management practices such as bioretention areas;
- Disconnect impervious surfaces by directing runoff to adjacent pervious areas so that runoff can be filtered and infiltrated.

### 1.6.4.4 UTILIZATION OF NATURAL FEATURES FOR STORMWATER MANAGEMENT

Structural stormwater drainage controls are traditionally designed to quickly remove stormwater runoff from the site without utilizing any of the natural storage areas. These natural drainage areas should be considered as potential stormwater drainage systems. These natural areas can be utilized in the following ways where applicable:

- Vegetated buffers and undisturbed areas on the site are useful to control sheet flow (not concentrated flows) by providing infiltration, runoff velocity reduction, and pollutant removal;
- Various natural drainageways should be maintained and not disturbed to provide a natural stormwater drainage system to carry runoff to an existing outlet. The use of natural drainageways allows for more storage of stormwater runoff, lower peak flow rates, a reduction in erosive runoff velocities, and the capture and treatment of pollutants;
- Use vegetated swales where appropriate;
- Curb and gutter systems may be combined with vegetated swales at outfalls to provide added water quality benefits versus the traditional piped outfall designs;
- When applicable, direct rooftop runoff to pervious natural areas for water quality treatment and infiltration instead of connecting rooftop drains to roadways and other structural stormwater conveyance systems.

### 1.6.4.5 ENGINEERED/PROPRIETARY DEVICES

Berkeley County is aware of the potential benefit in using a number of stormwater engineered devices currently available on the market, such as baffle boxes, cartridge filters, bioretention, and sock and tube erosion control devices. The County Engineer will evaluate any and all such devices specified for a given product and require appropriate drawings, specifications, and discussions as to the applicability of the product, expected performance, and required maintenance. The County Engineer reserves the right to request that certain devices be installed and maintained.

## 1.7 ENGINEERING DESIGN ACCOUNTABILITY

This Manual will assist engineers, plan reviewers, inspectors, and contractors in the design and layout of most land disturbance projects. However, this Manual does not replace or otherwise excuse the need for professional engineering judgment and knowledge. The user of this Manual is hereby cautioned that many aspects of engineering design must be considered, including but not limited to:

- Public health and safety;
- Site-specific conditions or unusual features of a project site that warrant special designs;
- Current versions of design texts, manuals, technical documents, and research.

The design engineer (with assistance from other design professionals as needed) is expected to thoroughly investigate field conditions and coordinate all design efforts with Berkeley County.
For applicable projects, construction plans must be stamped and signed by a professional engineer licensed in the state of South Carolina, unless otherwise stated in this Manual. The design professional must have sufficient education and experience to perform a complete and thorough design of each element shown on the construction plans, and must also have complete control to change or alter plans during the design phase. The professional's stamp is a public guarantee that his design has the highest regard for health and safety, protects the environment (air, soil, water) to the maximum degree possible, and serves the interests of the general public within Berkeley County. A Certificate of Authorization (COA) is required on the construction plans in addition to the design professional's certification.

Berkeley County requires a certain level of design expertise for stormwater calculations and flooding analyses. Stormwater design criteria are based upon current scientific knowledge and engineering judgment. It should be realized by engineering designers that floods and flooding may occur at any time due to any number of factors beyond the reasonable control of Berkeley County, such as: greater amounts of precipitation or different rainfall patterns than used in design storms, wet soil conditions, debris or blockage of key stormwater channels, high groundwater tables, etc.

## 1.8 LEGAL ASPECTS

If any portion of this Manual is ruled to be invalid or unconstitutional by any court with adequate jurisdiction over Berkeley County, then such portion shall be considered to have been selectively removed from the design standards without affecting this Manual's overall applicability and legal standing to the land disturbance process. This Manual will be revised on a periodic basis to reflect known changes to laws and regulations. All local, State, and Federal laws and regulations shall be considered in regards to this Manual. In each instance, the more restrictive requirement shall govern unless sound engineering judgment can determine and prove that the more restrictive requirement would be otherwise unnecessary. In most instances, laws and regulations that are phrased more explicitly shall apply over those items that are described in general terms.

## 1.9 CONTACT INFORMATION

The following Berkeley County personnel should be contacted for any questions, clarifications, or other information related to stormwater management and this Manual.

**Primary contact for stormwater issues:**
Mr. Frank Carson
Berkeley County Engineer
PO Box 6122
Moncks Corner, S.C. 29461-6120
(843) 719-4179
fcarson@berkeleycountysc.gov

## 1.10 DEFINITIONS

Words used in this Manual shall have their customary meanings as determined by the standard dictionary definition except for the following specific words and terms which are herein defined or are otherwise defined in the Berkeley County Stormwater Management Ordinance. In any case, the County Engineer shall have the right to define or interpret any other word or term contained within this Manual. The rules of verbal construction found in the Stormwater Management Ordinance apply to this Manual.

1. Applicant: "Applicant" is a person, firm, governmental agency, partnership, or any other entity who seeks to obtain approval under the requirements of this Ordinance and who will be responsible for the land disturbing activity and related maintenance thereof.

2. Building: (1) a relatively permanent enclosed structure over a plot of land, having a roof and usually windows and often more than one level, used for any of a wide variety of activities, as living, entertaining, or manufacturing; (2) anything built or constructed; (3) the act, business, or practice of constructing houses, office buildings, etc.

3. Construction Activity: activity involving clearing, grading, transporting, filling, or any other activity which results in a change in the natural cover or topography that may cause erosion and contribute to sediment and alter the quality and quantity of stormwater runoff.

4. Construction Activity Application: means the set of drawings, specifications, design calculations, and other documents necessary to demonstrate compliance with the Stormwater Management Ordinance.

5. Contour: an imaginary line, or its representation on a contour (topographic) map, joining points of equal elevation.

6. Control/Outlet structure: stormwater management facility designed to regulate the elevation, rate, and volume of stormwater discharge from detention facilities.

7. Culvert: any structure not classified as a bridge which provides an opening under any roadway, including pipe culverts, and any structure so named in the plans.

8. Detention: the collection and storage of stormwater runoff in a surface or sub-surface facility for subsequent controlled discharge to a watercourse or water body.

9. Developer: any person, or others who act in his own behalf, that is required to submit an application for approval to disturb land or encroachment and is thereafter responsible for maintaining compliance with this Ordinance and conditions of the approved application.

10. Ditch: a drainage channel in earth created by natural or artificial means to convey surface and/or subsurface water, flowing continuously or intermittently.

11. Drainage: a general term applied to the removal of surface or subsurface water from a given area either by gravity via natural means or by systems constructed so to remove water, and is commonly applied herein to surface water.

12. Elevation: height in feet above a given known datum, such as mean sea level.

13. Embankment or Fill: a deposit of soil, rock or other material placed by man.

14. Grading: any displacement of soil by stripping, excavating, filling, stockpiling, or any combination thereof, including the land in its excavated or filled state.

15. Impervious surface: a surface which has been compacted or covered with a layer of material so that it is highly resistant to infiltration by water. The term includes most conventionally surfaced streets, roofs, sidewalks, parking lots, and other similar structures.

16. Mean sea level (MSL): the average (mean) height of the sea or ocean, in reference to NAVD88.

17. New-Development: any of the following actions undertaken by any person, including, without limitation, any public or private individual or entity:

    (a) division of a lot, tract, or parcels or other divisions by plat or deed;
    (b) the construction, installation, or alteration of land, a structure, impervious surface or drainage facility;
    (c) clearing, scraping, grubbing or otherwise significantly disturbing the soil, vegetation, mud, sand or rock of a site; or
    (d) adding, removing, exposing, excavating, leveling, grading, digging, burrowing, dumping, piling, dredging, or otherwise disturbing the soil, vegetation, mud, sand or rock of a site.

18. Operator: means the person who is operating the property, including an operator or person who is in charge of any activity related to land disturbance, construction or post construction stormwater quality or quantity.

19. Owner: means the property owner, or any person who acts in his own behalf, that submits an application for approval to disturb land or vegetation or for encroachment, and the person, if so designated by default or on legal documents, as the responsible party for maintenance of a stormwater management system(s) and/or facility(s).

20. Post-Development Conditions: those conditions which are expected to exist, or do exist, after alteration, of the natural topography, vegetation, and rate, volume or direction of stormwater runoff, (resulting from development activity).

21. Pre-Development Conditions: those conditions, in terms of the existing topography, vegetation and rate, volume or direction of stormwater runoff, which exist at the time the applicant submits an application form for a construction activity or variance.

22. Project: improvements and structures proposed by the applicant to be constructed on a defined site as part of a common plan of development.

23. Rate: volume of water passing a point per unit of times, generally expressed in cubic feet per second (cfs).

24. Re-Development: see New-Development.

25. Retention: the collection and storage of stormwater runoff without subsequent discharge to surface waters.

26. Retrofit: the process of altering an existing drainage system to function properly or more efficiently than currently exists. Retrofitting will be a common method used by the County to address Total Maximum Daily Loads (TMDLs) to include installation of water quality/runoff treatment devices.

27. Runoff: that part of rainfall that is not absorbed into the sites but flows over the site as surface waters.

28. Sediment: fine, particulate material, whether mineral or organic, that is in suspension and is being transported, or has been transported, from its site of origin by water or air.

29. Sedimentation: the process which operates at or near the surface of the ground, or deposits soils, debris and other materials either on other ground surfaces or in the waterbody.

30. Sedimentation Facility: any structure or area which is designed to retain suspended sediments from collected stormwater runoff, to include sediment basins.

31. Site: any tract, lot, or parcel of land or combination of tracts, lots, or parcels of land which are in common ownership, or are contiguous and in diverse ownership where development is to be performed as part of a unit, subdivision, or project.

32. Site Construction: the act or process of altering the natural cover or topography and alters the quality or quantity of stormwater runoff.

33. Special Protection Areas: designated areas within the County within which more stringent design standards have been established to address an existing problem, such as flooding or water quality. Construction activities occurring within these areas will be required to comply with the additional or more stringent design criteria.

34. Storm Frequency: rate of likely recurrence of a rainstorm over a period of specified time.

35. Stormwater Management Plan: the plan to manage stormwater in terms of collection, conveyance, storage, treatment and disposal of stormwater runoff in a manner to meet the objectives of the County Stormwater Management Ordinance, the Manual and their terms, including, but not limited to, measures that control the increased volume and rate of stormwater runoff and water quality impacts caused by man-made changes to the land. This plan is approved as detailed in this document and includes the engineering calculations and construction drawings.

36. Structures: anything constructed or erected, the use of which requires a location on the ground, or attached to something having a location on the ground, including, but not limited to, tennis courts, swimming pools, fences, and buildings.

37. Subdivision: all divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, whether immediate or future, of sale, lease, or building development, and includes all division of land involving a new street or change in existing streets, and includes re-subdivision which would involve the further division or relocation of lot lines of any lot or lots within a subdivision previously made and approved or recorded according to law; or, the alteration of any streets or the establishment of any new streets within any subdivision previously made and approved or recorded according to law, and includes combination of lots of record

38. Vegetation: all plant growth, especially trees, shrubs, mosses, and grasses.

39. Wetlands: those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions and delineated as freshwater wetlands by the U.S. Army Corps of Engineers.

# CHAPTER 2 – STORMWATER APPROVAL PROCEDURES

This chapter provides developers, owners, engineers, contractors, and others with the information needed to obtain approval from the County Engineer as required for certain construction activities within the Berkeley County Regulated Area and encompassed municipalities as authorized under intergovernmental agreements. This section describes conditions when stormwater management plan approval is required, when Construction Activity Application (CAA) approval is required, and the procedures that apply to different situations, application package requirements, and when and if waivers of such requirements are applicable for certain activities.

## 2.1 DUTY TO COMPLY

Stormwater management plan approval is required for all construction activities within the Regulated Area, other than Single Family Residential (SFR) disturbing less than one-half (1/2) acre. In addition, CAA approval is required for all construction activities within the Regulated Area disturbing one-half (1/2) acre or more. Unless otherwise allowed by the Stormwater Management Ordinance or this Manual, the surface of land in Berkeley County shall not be disturbed or altered for any purpose whatsoever, nor any major drainage channel or component of the stormwater system impeded or encroached upon without approval from the County Engineer.

## 2.2 STORMWATER APPROVAL AND CONSTRUCTION ACTIVITY CLOSEOUT PROCEDURES

Stormwater management plans and Construction Activity Applications (CAAs) must be submitted to the Berkeley County Engineering Department (see the contact information in Chapter 1, Section 1.9) for approval. Stormwater management plans and applications that require other permit/certification coverage (such as but not limited to Coastal Zone Consistency Determination, 401 Water Quality certification and Navigable waters permit) from any State or Federal agency, can be processed simultaneously during County stormwater management plan review. The remainder of this Manual describes the procedures and application requirements of the County Engineer.

The County Engineer has established three (3) categories of Construction Activity:

1. Construction Activity for sites disturbing one-half (1/2) acre or more (Section 2.2.1).

2. Construction Activity for sites disturbing less than one-half (1/2) acre (Section 2.2.2).

3. Single Family Residential (SFR) disturbing less than one-half (1/2) acre (Section 2.2.3).

Stormwater management plans and applications required in this Manual shall be considered complete only if they are submitted in the required format, include all applicable information, and are accompanied by the established fee(s). Any stormwater management plan or application that is determined to be incomplete shall be returned to the applicant along with an explanation of the application's deficiencies. Fees shall not be refunded. No further processing of the stormwater management plan or application shall occur until the deficiencies are corrected. Once the deficiencies are corrected, the stormwater management plan or application may be resubmitted without the payment of additional fees, provided that it is resubmitted within six (6) months of the date that the stormwater management plan or application was returned to the applicant. A stormwater management plan and application resubmitted more than six (6) months after the date that the plan and application was returned as incomplete shall require repayment of applicable fees.

Whenever the procedures of the County expressly state that applications are to be submitted after a "pre-application conference," applicants shall be responsible for scheduling and attending such meetings. When pre-application conferences are required, an application shall not be accepted until the pre-application conference has been conducted, and any errors or omissions noted in review of the application for completeness have been addressed by the applicant.

### 2.2.1 CONSTRUCTION ACTIVITY FOR SITES DISTURBING ONE-HALF (1/2) ACRE OR MORE

All construction activity disturbing one-half (1/2) acre or more must submit a stormwater management plan and Construction Activity Application (CAA) to the Berkeley County Engineering Department. Construction shall not commence until the County approves the CAA. The approval process for CAA is shown in Appendix D. Submittal requirements are detailed below.

#### 2.2.1.1 SUBMITTAL REQUIREMENTS

The following submittal requirements must be provided as part of a complete CAA to receive Berkeley County stormwater approval.

1. Application Form: The CAA is provided in Appendix A.

2. Technical Report: One (1) copy of the technical report should be prepared and submitted as part of the application package, prepared by a registered professional engineer. This report shall consist of maps, and supporting design calculations for the proposed stormwater system and erosion measures used during construction, to include, but not limited to, the following, when applicable:

    a. Map: A map of the project area containing the following:

        i. Site location drawing of the proposed project showing project location in relation to roadways, jurisdictional boundaries, streams, rivers, and lakes, and the boundary lines of the site to be developed,
        ii. Identification of all areas within the site that will be included in the construction activities,
        iii. Location of temporary and permanent stormwater management controls.

    b. Site Narrative: A narrative should be submitted with the application which includes, but is not limited to, the following:

        i. General description of the site,
        ii. Purpose of the construction activity,
        iii. Summary table(s) of existing and proposed runoff flows, volumes, and pollutant loads,
        iv. Topographic and soil information,
        v. Adjacent properties and owners,
        vi. Waterbodies receiving stormwater runoff (existing and proposed),
        vii. Water quality and flooding issues, and anticipated potential impacts (quality, downstream structures, etc.) and benefits (open space, treatment, maintenance, etc.),
        viii. Anticipated starting and completion dates of the various stages of the construction activities and the expected date of final stabilization,
        ix. If applicable, the narrative should also contain justification for variances, waivers, or other special conditions of the site,

x. Also, if applicable, wetland and water body disturbance issues should be discussed along with details on the status of necessary permit application to the USACOE,
xi. If a TMDL(S) is in place for the receiving waterbody, the narrative must describe how the project will comply with the TMDL(s).

c. Pre-development and post-development hydrologic analysis that determines the existing stormwater peak flow rates, flow velocities, and pollutant loads for all delineated sub basins/discharge points. The natural or historic condition will be the standard by which the stormwater plan for a construction project is evaluated. The stormwater plan must demonstrate control of runoff quantity and quality in accordance with design criteria provided in Chapter 3;

d. Hydraulic design calculations for all conveyances showing the ability to handle anticipated flows and volumes. Provide calculations showing that the project does not cause or increase any negative impact on downstream structures, and the upstream and downstream stormwater drainage system. The following computations should be included as necessary: hydrographs, routing of hydrographs through system components, pipe and open channel capacity, velocity calculations, and water surface elevations. Calculations and discussion shall be provided for energy dissipation and inlet/outlet protection devices. All system components should have standard details and specifications;

e. If the project is located in a Special Protection Area, a comprehensive evaluation of engineering calculations and analysis should be included that demonstrate that the project will not negatively impact current drainage conditions and/or comply with State and Federal regulations on stormwater discharges. More information is provided in Chapter 3;

f. Erosion and sediment control plan to include:
    i. A description of the erosion and sediment control facilities selected,
    ii. Plan showing the location of all erosion and sediment control facilities,
    iii. Design calculations of each measure, including trapping efficiencies. Each measure should also have a standard detail and specification,
    iv. Explanation/discussion of models used in the design.

g. Downstream analysis calculations showing the effect of post-development design flows on downstream storm water conveyance systems and channels. More details on this analysis and where it is applicable covered in Chapter 3;

h. Watershed delineation maps with consistent sequential notations;

i. Location map showing topography and waters of the state in relation to proposed project;

j. Discussion and calculation of any wetlands issues;

k. Map showing type and classification of all soils expected to be encountered or used at the development site;

l. Presentation of existing and proposed contours at the development site;

m. General description of the adjacent property and description of existing structures, buildings, and other fixed improvements located on surrounding properties;

n. Discussion of site access issues and easements to be obtained and provided to the County.

3. Construction Plans:

One complete set of certified and signed construction plans are to be included as part of the CAA. The information required on the construction plans shall include, but are not limited to the following list. Other items may be requested by the County Engineer on a case-by-case basis. Some items may be included in other components of the CAA application package, but should be adequately noted. Size D (24" X 36") Plan sheets/drawings are preferred.

a. North arrow and scale,

b. Property lines, bearings and distances, adjacent landowners' names, and land use conditions,

c. Legend,

d. Registered engineer's seal and signature,

e. Certificate of Authorization seal, as appropriate,

f. Existing and proposed contours (one foot contours) and land uses,

g. Limits of disturbed area,

h. Delineation of wetlands and/or waters of the state,

i. Location of any and all FEMA floodplains,

j. Easements,

k. Stormwater system profiles with existing and proposed ground elevations,

l. Construction sequence (include implementation of all stormwater and sediment controls in the first phase of construction),

m. Locations of all temporary and permanent control measures,

n. Details for all temporary and permanent control measures,

o. Grassing and stabilization specifications and schedule,

p. Maintenance requirements (for temporary and permanent controls, grassing, etc.),

q. Construction entrance/exit,

r. Tree protection, preservation, and overall landscaping plan with appropriate species selection and screening for ponds and other components required by the Zoning Ordinance,

s. Details and specifications of all necessary construction components,

t. Location map,

u. The cover sheet shall contain, at a minimum, the following items:

   i. Project name,

   ii. Engineers contact information (name, mailing address, telephone, fax),

   iii. Contact information (name, mailing, address, telephone, fax) of the owner, operator or designated party,

   iv. Vicinity map, and

   v. Table of contents.

v. All drawing elevations shall be based on the NAVD 88 and projected in the state plane coordinate system.

w. The following standard notes shall be shown on the plans. This list is not meant to be exhaustive and other notes should be included as necessary:

   i. If necessary, slopes which exceed eight (8) vertical feet should be stabilized with synthetic or vegetative mats, in addition to hydroseeding. It may be necessary to install temporary slope drains during construction. Temporary berms may be needed until the slope is brought to grade;

   ii. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen days (14) after work has ceased, unless activity in that portion of the site will resume within twenty-one (21) days;

   iii. All sediment and erosion control devices shall be routinely inspected every seven (7) days or every fourteen (14) days and after each rainfall occurrence that exceeds one-half inch. Damaged or ineffective devices shall be repaired or replaced, as necessary;

   iv. Provide silt fence and/or other control devices, as may be required, to control soil erosion during utility construction. All disturbed areas shall be cleaned, graded, and stabilized with grassing as soon as practicable after the utility installation;

   v. All erosion control devices shall be properly maintained during all phases of construction until the completion of all construction activities and all disturbed areas have been stabilized. Additional control devices may be required during construction in order to control erosion and/or offsite sedimentation. All temporary control devices shall be removed once construction is complete and the site is stabilized;

   vi. The contractor must take necessary action to minimize the tracking of mud onto the paved roadway construction areas. The contractor shall daily remove mud/soil from pavement, as may be required;

vii. Residential subdivisions require erosion control features for infrastructure as well as for individual lot construction. Individual property owners shall follow these plans during construction.

viii. Temporary diversion berms and/or ditches will be provided as needed during construction to protect work areas from upslope runoff and/or to divert sediment laden water to appropriate traps or stable outlets.

ix. Litter, construction debris, oils, fuels and building products with significant potential for impact (such as stockpiles of freshly treated lumber) and construction chemicals (concrete washdown areas, paint brush cleaners, etc.) that could be exposed to stormwater must be prevented from becoming a pollutant source in stormwater discharges.

x. Provide written proof that all off-site easements have been obtained.

4. Subdivision projects disturbing one-half (1/2) acre or more must have a complete set of plans and specifications to include, but not be limited to, the following items, as appropriate: lot layout/site plan and staking, acreage, limits of disturbance, road plan/profiles, storm drainage plan/profile, pre and post development drainage areas (both on and off-site), sediment and erosion control plans and details, construction waste management, utilities (water and sanitary sewer), post-construction stormwater management facilities, and traffic patterns with temporary (construction) and permanent traffic signage. Plans shall provide existing and proposed contours with intervals of not more than one (1) foot. Where possible and as needed, contour lines should be extended beyond the site boundary lines. While some of these items lend themselves to combining information on a single sheet/drawing, care should be taken to ensure that plans are not overcrowded/cluttered. The lot layout sheet should show a tie distance from the primary entrance of the proposed project to the nearest existing intersection.

5. All available or used bench marks shall be shown on this or other applicable sheet. At least one bench mark shall be available or established on/near (within survey instrument sight distance) the site. The bench mark shall be referenced to North American Datum (NAVD) 1988.

6. The applicant will provide a tentative construction time schedule for the development. Sediment and erosion control measures will be some of the first work at a site and such implementation will be demonstrated. The schedule will also provide for coordination with the responsibilities of all parties, including those installing utilities.

7. Specifications for all components of construction activities related to grading, utilities, sediment and erosion control, temporary and permanent vegetation, water quality BMPs, etc.

8. Fees: No plan review or inspection fees are required at this time but it is anticipated that review/inspection fees will be adopted by the County.

9. Covenants for Permanent Maintenance of Stormwater Systems and Maintenance Plans and Schedules: When stormwater management facilities and system components are to be maintained by an owner, operator, or other designated party, Berkeley County must be given assurance that such activities will be conducted. This is to be established using Berkeley County Covenants for Permanent Maintenance of Stormwater Systems (Covenants) to ensure that the stormwater management facilities are constructed, operated, and maintained by the owner, its successors and assigns, in accordance with the approved stormwater management plan and specifications identified

in the stormwater management plan. The Covenants must be recorded prior to the approval of the CAA in the Office of the Berkeley County Register of Deeds. If someone other than the owner is the responsible party for maintenance activities of stormwater management systems, a maintenance agreement between the operator and owner shall be included with the Covenants. The maintenance plan and schedules must be included in the stormwater management plan for all the activities to be conducted during and after construction for all stormwater system components.

#### 2.2.1.2 PRE-SUBMITTAL MEETING

A pre-submittal meeting may be required for projects located in Special Protection Areas. Special Protection Areas are areas within the County that require some additional stormwater management controls due to existing problems. Such problems can include but are not limited to flooding and State recognized water quality impairments. The County Engineer may waive the pre-submittal meeting requirement on a case by case basis.

#### 2.2.1.3 STORMWATER MASTER PLAN

For sites located in Special Protection Areas, a Stormwater Master Plan is required to be submitted prior to the submittal of the complete package as detailed below. This Master Plan is to be created to give the design professional the opportunity to propose a site layout and proposed stormwater controls to the County Engineer. The Master Plan should be submitted by hand or mail, and can be incorporated for discussion at the pre-submittal meeting. The County Engineer may waive the requirement for a master plan on a case by case basis.

The Master Plan can be a preliminary sketch of the site and shall contain the following items, when applicable:

1. Site layout showing buildings, roads, parking areas, utilities, and grassed or landscaped areas;
2. Vicinity map;
3. Pre- and post-development primary runoff patterns and discharge points;
4. Location/distances to Waters of the State and all other existing natural features such as wetlands, ponds, lakes, floodplains, and stream buffers;

In addition, the applicant should be prepared to discuss the following items, when applicable:

5. All modeling methodologies to be used;
6. Methods to show compliance with any adopted Total Maximum Daily Loads (TMDLs) or other waterbody impairments that may limit the allowable pollutant load that can be discharged;
7. Preliminary waiver or variance requests;
8. Others as requested by the County Engineer.

Upon submittal and discussion of the Master Plan and related concerns, the applicant can submit the complete CAA (items 1-11 in Section 2.2.2.1).

### 2.2.2 CONSTRUCTION ACTIVITY FOR SITES DISTURBING LESS THAN ONE-HALF (1/2) ACRE

All construction activities, other than SFR, disturbing less than one-half (1/2) acre must submit a stormwater management plan to the Berkeley County Engineering Department. A Construction Activity Application (CAA) is not required for this category of construction activity. Construction shall not commence until the County approves the stormwater management plan. Following is the submittal requirements for a stormwater management plan:

As a minimum the plan must include: location of property lines; existing and proposed structures; parking areas; buffer areas; wetlands; limits of disturbed areas; existing and proposed stormwater runoff patterns; location of 100-year flood plain; sediment and erosion control measures (silt fence, riprap, inlet protection, etc.); measures for construction waste management; location of existing and proposed stormwater management facilities. In addition, the construction activity shall implement and comply with the Minimum Stormwater Management BMPs (See Appendix E). Further guidance on selecting necessary erosion and sediment control measure controls is provided in http://www.scdhec.gov/environment/ocrm/pubs/tech_docs_water.htm#bmp. The County Engineer may require additional stormwater BMPs and/or a stormwater management plan prepared by a registered engineer.

When stormwater management facilities and system components are to be maintained by an owner, operator, or other designated party, Berkeley County must be given assurance that such activities will be conducted. This is to be established using Berkeley County Covenants for Permanent Maintenance of Stormwater Systems (Covenants) to ensure that the stormwater management facilities are constructed, operated, and maintained by the owner, its successors and assigns, in accordance with the approved stormwater management plan and specifications identified in the stormwater management plan. The Covenants must be recorded prior to the approval of the stormwater management plan in the Office of the Berkeley County Register of Deeds. If someone other than the owner is the responsible party for maintenance activities of stormwater management systems, a maintenance agreement between the operator and owner shall be included with the Covenants. The maintenance plan and schedules must be included in the stormwater management plan for all the activities to be conducted during and after construction for all stormwater system components.

No plan review or inspection fees are required at this time but it is anticipated that review/inspection fees will be adopted by the County.

### 2.2.3 SINGLE FAMILY RESIDENTIAL CONSTRUCTION ACTIVITY FOR SITES DISTURBING LESS THAN ONE-HALF (1/2) ACRE.

Submittal of a stormwater management plan or a CAA is not required for single family residential (SFR) construction activities that disturb less than one-half (1/2) acre. However, stormwater BMPs must be implemented on all SFR sites. SFR construction activity shall implement and comply with the Minimum Stormwater Management BMPs (See Appendix E). In addition, if the site is part of a larger common plan of development, stormwater management requirements and BMPs specified in the approved CAA for the larger common plan of development must be implemented. Any deviations and/or modifications to the BMPs must be approved by the County Engineer.

### 2.2.4 FINAL APPROVAL

Stormwater management plans and CAAs shall be submitted to the Berkeley County Engineering Department either via mail or hand delivery (see contact information in Section 1.9) along with required components and fees. Failure to provide all of the required information shall be considered an incomplete submittal. The applicant will be notified that further information is needed to complete the submittal. In some cases, a new stormwater management plan or CAA package will have to be resubmitted.

Once the stormwater management plan and CAA are deemed complete, the County's review shall be accomplished and an approval, denial, review comments, or request for further information shall be transmitted to the applicant. A stormwater plan review checklist for sites disturbing one-half (1/2) acre or more is provided in Appendix C.

SCDHEC may request additional information from the applicant for NPDES permit compliance, which may result in changes to the stormwater management plan or CAA. Any such changes shall be provided to the County Engineer as well. The County Engineer reserves the right to deny approval if a submittal fails to conform to the provisions of the Stormwater Management Ordinance and this Manual.

### 2.2.5 CONSTRUCTION ACTIVITY AND CLOSEOUT PROCEDURE

Site construction shall not commence until the stormwater management plan and CAA is approved by the County Engineer. Construction activities must adhere to the provisions and requirement of the stormwater management plan and CAA. Any substantial revisions to the approved stormwater management plan or CAA should be submitted in writing to the County Engineer along with any subsequent fees for review. Such changes shall not be implemented until approval is given. Substantial revisions for stormwater management issues may include, but are not limited to pipe size and grade alterations that affect hydraulic capacity, changes to easement boundary due to changes in the stormwater system components, or changes to the general grading plan of the site that affect the flow direction, rate, volume, or quality of stormwater runoff.

The owner is required to maintain at least one copy of the approved stormwater management plan on site. The County Engineer, or his designee, will conduct inspections during the construction phase. Frequency and specific times and dates of these inspections will be done at the discretion of the County Engineer or his designee. More information on inspections is given in Chapter 4. During construction, the owner or his designated representative must conduct inspections of all temporary erosion and sediment controls, construction waste control, and permanent stabilization on site in accordance with the submitted and approved plans and maintenance schedule.

#### 2.2.5.1 TRANSFER OF OWNERSHIP

In certain cases and as requested by an applicant, the CAA may be transferred from one applicant to another. The most obvious example of this is when a developer prepares a piece of property for a new neighborhood by performing grading activities, utility installation, the building of roads, and then turns the property over to a homebuilder(s). In such cases, the applicant must make Berkeley County aware of plans to transfer ownership of the CAA and associated stormwater management issues through completion of the CAA transfer form in Appendix F. A transfer of ownership is also allowed for phases within a project. If a CAA transfer is not requested using the appropriate form, the current owner will continue to be held responsible for stormwater management issues at the site.

### 2.2.5.2 CONSTRUCTION ACTIVITY CLOSEOUT

At the conclusion of construction, the owner is responsible for making sure a site is permanently stabilized with vegetation established, paved areas and stormwater conveyances clean of debris and sediment/stormwater controls (including permanent best management practices) are working properly. Additionally, the owner is responsible for notifying the County, in writing, at least 30-days prior to final inspection, that the previous conditions have been met. Proof of these conditions will be determined by a County inspector and any problems found must be corrected by the owner prior to closing out a construction activity. As-built/record drawings must be submitted in Computer Aided Design (CAD) software and electronic file prior to the final inspection to aid the County in the final inspection process. All drawing elevations shall be based on the NAVD 88 and projected in the state plane coordinate system. All As-built/record drawings must stipulate, if construction plan data was collected in NGVD 29. Upon confirming any such corrections are completed and the site is ready, the County Engineer will release any remaining bonds. The County Engineer may require additional items on a case by case basis in order to closeout a construction activity.

## 2.2.6 EXEMPTIONS

Per the Stormwater Management Ordinance, the provisions of this Manual shall not apply to:

- Land disturbing activities undertaken on forestland for the production and harvesting of timber and timber products and conducted in accordance with best management practices and minimum erosion protection measures established by the South Carolina Forestry Commission pursuant to Section 48-18-70 of the 1976 Code of Laws of South Carolina, as amended.

- Land disturbing activities on agricultural land for production of plants and animals, including but not limited to: forages and sod crops, grains and feed crops, tobacco, cotton, and peanuts; dairy animals and dairy products; poultry and poultry products; livestock, including beef cattle, sheep, swine, horses, ponies, mules, or goats, including the breeding and grazing of these animals; bees, fur animals, and aquaculture. The construction of an agricultural structure that requires the disturbance of one or more acres, such as, but not limited to, broiler houses, machine sheds, repair shops, coops, barns, and other major buildings shall require the submittal and approval.

- Linear utility installation activities that are covered under their own DHEC approved utility general permit requiring associated assurance of proper stormwater management.

## 2.2.7 EXPIRATION OF STORMWATER APPROVAL

Stormwater management plan approval and CAA approval will remain valid for up to five (5) years from the date of approval, provided that the project is in compliance with the Stormwater Management Ordinance and this Manual and is not inactive for a period of twelve (12) consecutive months. For sites disturbing less than one-half (1/2) acre, construction activity must be initiated within twelve (12) months of stormwater management plan approval and for sites disturbing one-half (1/2) acre or more, construction activity must be initiated within twelve (12) months of CAA approval. Failure to initiate construction will render all approvals invalid at the end of the twelfth month.

## 2.2.8 RESPONSIBILITY OF OWNER/OPERATOR

During any construction operation, the owner/operator shall be responsible for carrying out the proposed work in accordance with the approved plan, specifications, time schedule, and all requirements of the

Stormwater Management Ordinance and this Manual.

### 2.2.9 VARIANCES

The County Engineer may grant variances from the requirements of this Manual for construction activities if there are exceptional circumstances applicable to the site such that strict adherence to these provisions will result in unnecessary hardship and not fulfill the purpose of this Manual and the Berkeley County Stormwater Management Ordinance.

A written request for variance must be provided to the County Engineer stating the specific variance(s) sought and the reason(s) with supporting data including descriptions, drawings, and any other information that is necessary to evaluate the proposed variance.

A separate written variance request shall be required if there are subsequent additions, extensions, or modifications which would alter a previously approved variance. A project may be eligible for a variance if the applicant can demonstrate the following:

1. The variance will not conflict with the purpose of this Manual, all pertinent Berkeley County ordinances or local, State or Federal requirements.

2. The proposed project will have no significant adverse impact on the receiving water or upstream, downstream or adjacent properties; or

3. The imposition of peak or volume control requirements of stormwater runoff would aggravate downstream flooding.

### 2.2.10 ENCROACHMENT PERMITS

All applicable encroachment permit(s) must be obtained from the SCDOT and/or the Berkeley County Roads & Bridges Department before construction begins. Applicants should be aware of Berkeley County requirements which may differ from SCDOT's.

It is the applicant's responsibility to comply with all SCDOT and Berkeley County Encroachment Permit application requirements. Approved encroachment permits are required prior to stormwater approval from the County Engineer.

### 2.2.11 EASEMENTS

The following section provides the required easement widths for various components of the stormwater management system(s). In all cases, there will be an allowance for offset easements, in which the pipe, channel, or other stormwater system component does not necessarily have to be in the middle of the easement width, but may be offset to allow for certain construction needs. Proposed offset easements will be identified and additional width may be required as prescribed by the County Engineer.

#### 2.2.11.1 STORM DRAIN PIPE

Drainage easements shall provide adequate room for maintenance equipment to operate. Table 2.1 provides required minimum drainage easement widths for some of the more typical situations:

**Table 2.1-Storm Drain Pipe Easements**

| Pipe size (in) | Maximum depth to invert (ft) | Minimum Width of drainage easement (ft) |
|---|---|---|
| 18 | 3.5 | 20 |
| 24 | 5.0 | 20 |
| 42 | 7.0 | 25 |
| 54 | 7.0 | 30 |

Notes: (1) For depths greater than shown, pipe easement width shall be as determined by the County Engineer.
(2) For pipe sizes not specifically listed above, the easement width and depth to invert shall be that of the next size up, i.e. the easement width for a 36 inch pipe is the same as those for a 42 inch pipe.
(3) For larger pipe sizes and/or multiple lines of pipe easement width shall be as determined by the County Engineer.

### 2.2.11.2 DITCHES AND SWALES

The minimum drainage easement width for ditches shall be top of bank width of the ditch plus twenty (20) feet. The ditch shall be located in the easement maintaining five feet (5) shoulder area on one side of the ditch and fifteen feet (15) maintenance shelf on the other side of the ditch. The drainage easement for swales shall not be less than twenty feet (20).

### 2.2.11.3 DETENTION PONDS

A minimum access easement of twenty feet (20) shall be provided to all detention ponds. The drainage easement for the detention pond shall incorporate and include the pond area plus a minimum fifteen feet (15) around the perimeter of the pond for maintenance access beyond the top of the pond bank. While the County shall not accept responsibility for pond maintenance, unless agreed to in writing, the County may utilize the easement for necessary emergency repairs.

### 2.2.11.4 OTHER STORMWATER FACILITIES & BMPS

All other structures used for the control of stormwater runoff (quantity or quality) not otherwise covered above, shall have an easement for access and maintenance that is a minimum of twenty (20) feet beyond the boundary of any such structure. The County Engineer may request or allow other easement widths on a case-by-case basis given site constraints or special conditions. While the County shall not accept responsibility for stormwater facility maintenance, unless agreed to in writing, the County may utilize the easement for necessary emergency repairs.

### 2.2.11.5 OFFSITE EASEMENTS

Any required off-site easements should be obtained prior to stormwater approval which would impact upon that area. Any work done without a proper and adequate easement(s) shall be at the owner's own risk. Non-subdivision projects shall provide validation of necessary easements before a stormwater management plan and CAA is approved.

## 2.2.12 STORMWATER FACILITY OWNERSHIP AND MAINTENANCE

### 2.2.12.1 OWNERSHIP

The owner of a portion or the entire stormwater system, as the case may be, shall be clearly designated before a stormwater approval will be issued. Ownership shall also be recorded on the final plat. Ownership shall imply responsibility for maintaining the stormwater system, including all ponds and other BMPs used for controlling runoff quantity and quality. Ownership does not imply that the owner(s) may in any way alter the size, or function of any component of the stormwater system without consent from the County Engineer. Owners found altering such components will be required to remove any alterations.

### 2.2.12.2 MAINTENANCE

Each component of the stormwater management system (pipes, inlets, BMPs) shall have a maintenance plan (activities and associated schedule) as part of stormwater management plan and CAA package. The plan shall also cover temporary measures used during construction in addition to the long term maintenance of the system. Suggested maintenance activities and recurrence intervals for water quality BMPs are discussed and referenced in Chapter 3.

In addition, Covenants for Permanent Maintenance of Stormwater Systems must be recorded in the permanent land records with the Berkeley County Register of Deeds. The Covenants is provided in Appendix B. The Covenants must be signed and executed prior to the issuance of a stormwater approval.

# CHAPTER 3 - DESIGN REQUIREMENTS

This chapter provides engineers, designers, developers, and others with the necessary information needed to design adequate systems that will control the rate, volume, and pollutant loads released from a new or re-development project where the County Engineer has been authorized by law or agreement to enforce engineering standards. These design requirements have been developed based on common engineering practice and reference State and Federal requirements, engineering publications, and other municipal and academic guidance.

It is the goal of this Chapter to provide a minimum set of design standards that will result in effective stormwater management to mitigate the impact of land development on existing/natural hydrologic and hydraulic processes, as well as attempt to prevent further degradation of the water resources in Berkeley County through proper planning, design, installation, and maintenance. The design professional shall use all means necessary to develop land in a manner consistent with all County ordinances and this Manual. Specific methods and applications not covered in this section can and should be discussed with the County Engineer for applicability prior to the submission of site plans and drainage calculations. The following section details the criteria that shall be followed in the absence of designated specific watershed master plan criteria.

## 3.1 GENERAL DESIGN STANDARDS

General requirements for all stormwater systems and facilities will include, but not be limited to, the following:

1. Site designers shall minimize the generation of stormwater and maximize pervious areas by:

    a. Selecting portions of the site where the drainage pattern, topography, and soils are favorable for the intended use.

    b. Exposing the smallest practical area of land for the least possible time during development. This includes maintaining or creating buffers and preserving natural areas.

    c. Limiting the drainage area to all BMPs. Specific maximum contributing areas to BMPs are provided in this chapter.

    d. When feasible, retaining and protecting natural vegetation and saving topsoil, for replacing on graded areas.

    e. Using plant cover, mulching, hydroseeding, or other stabilization methods to control runoff and protect areas subject to erosion during and after construction.

2. Annual groundwater recharge rates should be maintained to the maximum extent practical by promoting infiltration through the use of structural and non-structural methods.

3. Stormwater runoff generated from development shall be controlled to predevelopment and/or natural rates. The method for computing adequate control shall be based on several design storms. Greater detail is provided in this chapter.

4. Stormwater runoff generated from development shall be treated through the use of structural and/or non-structural practices. It is presumed that sufficient treatment is provided by the

proposed BMPs if they are:

a. Designed according to the specific performance criteria outlined in this Manual,

b. Constructed properly, and

c. Maintained regularly.

5. Stormwater discharges to special protection areas with sensitive resources or that have existing flooding or water quality problems [e.g., cold water fisheries, recharge areas, water supply reservoirs, Total Maximum Daily Loads (TMDLs), and 303(d) listings] are subject to additional performance criteria. Section 3.9 contains more specific information and design requirements on the areas that will receive this additional set of protection criteria.

6. All BMPs shall have an enforceable operation and maintenance plan and schedule to ensure the system functions as designed.

7. Sediment basins and other BMPs shall be used during construction to remove heavy sediment loads from runoff waters leaving the disturbed area. Design criteria are provided in this chapter.

8. Permanent vegetative cover and the long-term erosion protection structures shall be installed as soon as practical in the development process.

9. If wetlands are suspected to exist on the property, they should be investigated and delineated by a qualified professional. The US Army Corps of Engineers (USACOE) must make a determination as to whether or not the wetlands fall under their jurisdiction. All efforts should be made to reduce or eliminate impacts such as using a buffer and/or installing a silt fence around wetlands. If the wetlands fall under the jurisdiction of the USACOE, a Section 404 permit is needed before any disturbance of the wetlands is allowed. In addition, the DHEC-OCRM Coastal Zone Consistency Determination will address any proposed wetland impacts. Berkeley County will accept certified delineations from qualified consultants if the USACOE is unable to issue a verification on the jurisdictional determination.

10. Where existing wetlands are intended as a component of an overall stormwater management system, the approved plan for stormwater management shall not be implemented until all necessary State and Federal permits have been obtained.

11. All stormwater management and sediment control practices shall be designed, constructed, and maintained with consideration for the proper control of mosquitoes and other vectors. Specific design criteria are provided in this chapter.

12. For the purposes of hydraulic design, capacity of a system to transport stormwater runoff, shall be based on the size of the contributing drainage basin or subwatershed, as outlined below:

a. Major Drainage Channels:

All channels which drain an accumulation of primary and/or secondary drainage channels. These channels shall be the natural drainage channels of the watershed or man-made channels draining an area of one (1) square mile or more.

b. Primary Drainage Channels

All drainage channels which drain an area of two hundred (200) acres or more.

c. Secondary Drainage Channels

All drainage channels which drain an area of less than two hundred 200 acres and the primary benefit is to the development.

14. All development sites disturbing one-half (1/2) acre or more shall have an analysis performed of the drainage system to ascertain the function of the system during the 100-year storm event (precipitation only) or more specifically, determine that the project will not:

a. Increase the likelihood of dwelling flooding and property damage.

b. Increase water surface elevations or reduce system capacity in stormwater system and facilities upstream or downstream of the project.

c. Impose any new or additional increase in stormwater runoff velocity on adjacent properties, discharge points, or downstream areas.

d. Impose any new or additional increase in erosion and pollutant loads that would adversely impact waters of the state.

If a master plan exists for the area/watershed which encompasses the project, criteria set by that plan shall be used for determining the extent of this analysis. Without a master plan, analysis shall extend up to the top of the watershed and down to a Water of the State or to a point in which the project comprises 10% of the total contributing area, whichever occurs first. In these cases, the analysis criteria may include, but is not limited to:

a. Utilization of existing land use curve numbers for all areas,

b. Routing the flows using an accepted hydrologic and hydraulic method, and

c. Providing hydraulic step-backwater calculations using USACE's HEC-2 or HEC-RAS models or equivalent. Other calculations may be required by the County Engineer based on severity of potential impact and location of the project.

If the downstream analysis determines that the development of a particular site does contribute to flooding, pollution, or erosion problems, then the system design shall be changed or additional controls shall be included.

15. Watersheds that have documented water quantity problems may have more stringent or modified design criteria as determined from Berkeley County master plan studies or as dictated by State and Federal regulations. The County Engineer reserves the right to impose additional design requirements, such as the examples listed below:

a. Post-development discharge rates from the entire development area not exceeding pre-development discharge rates for storm frequencies greater than the 25-year frequency 24-hour duration storm event,

b. Post-development discharge volumes from the entire development area not exceeding pre-development discharge volumes for storm frequencies smaller than the 1-year frequency 24-hour duration storm event,

c. Reduction of peak flow rates below pre-development levels,

d. Downstream channel, culvert, or property improvements.

## 3.2 HYDROLOGIC COMPUTATION METHODS

All hydrologic computations shall be completed using volume-based hydrograph methods acceptable to the County Engineer. The design storm duration for these computations shall be the 24-hour storm event utilizing a SCS Type III distribution with a 0.1-hour duration time increment. Typical hydrologic inputs include, but are not limited to the following:

- Rainfall depth or intensity,
- NRCS soil classification and hydrologic soil group,
- Land use,
- Time of concentration, and
- Initial abstraction/surface storage.

The remainder of this section will provide basic information for the hydrologic calculations. As discussed, the intent of the Manual is not to provide detail on every aspect of hydrologic computations, their limitations, assumptions, appropriateness of use, but rather general guidance on generally accepted standards. This Manual does, however, reference suggested materials as necessary for detailed discussion of related topics.

### 3.2.1 INPUTS

The precipitation depths corresponding to various return periods to be used for projects in Berkeley County are shown in Table 3.1.

**Table 3.1: Design Storm Precipitation Data (in Inches) for Berkeley County**

| Area | 1-yr | 2-yr | 5-yr | 10-yr | 25-yr | 50-yr | 100-yr |
|---|---|---|---|---|---|---|---|
| Berkeley (North) | 3.5 | 3.8 | 5.0 | 5.9 | 7.2 | 8.2 | 9.4 |
| Berkeley (South) | 3.6 | 4.0 | 5.2 | 6.2 | 7.5 | 8.6 | 9.8 |

Source: SCDHEC 2003

Soil types in Berkeley County range from sands to sandy clays. Existing land use and corresponding runoff potential factors should be obtained from the site visit and other appropriate sources. Appropriate runoff potential factors can be found in several of the references listed in Chapter 5.

### 3.2.2 STORMWATER MANAGEMENT DESIGN METHODOLOGIES

Berkeley County recommended methods and corresponding design circumstances are listed in Table 3.2 and 3.3 below. If other methods are used, approval must first be given by the County Engineer. Complete source documentation must be submitted for approval.

**Table 3.2: Recommended Methodologies Based on Land Disturbance Area**

| Method | Size Limitations* | Comments |
|---|---|---|
| (Modified) Rational Method | 0 – < 1 Acres | Acceptable for sizing individual culverts or storm drains that are not part of a pipe network or system. Not to be used for storage design. |
| "SCS Method" (TR-55) | 0 – 2000 Acres | Used for estimating peak flows from urban areas. |

*Size limitations refer to the subwatershed size to the point where a stormwater system component (i.e., culvert, inlet, BMP) is located.

Details of Rational Method and Modified Rational Method can be found in Chow (1988), ASCE (1996), USDA (1996), and Mays (2001). Documentation on the commonly used SCS (or NRCS) Method can be found on the US Department of Agriculture website (http://www.wcc.nrcs.usda.gov/hydro/hydro-tools-models-tr55.html). The USGS regression equations for South Carolina can be obtained from the US Geological Survey website (http://water.usgs.gov/osw/programs/nffpubs.html). Haan, C. T., Barfield, B. J., and Hayes, J. C. (1995) and USDT (1996, 2001) can also be referenced for greater detail on hydrology calculations and assumptions.

**Table 3.3: Recommended Hydrologic Methods for Designing Various Stormwater Management Systems and Controls**

| Method | Rational Method | SCS Method |
|---|---|---|
| Extreme Flood Protection | | + |
| Storage/Sedimentation Facilities | | + |
| Outlet Structures | | + |
| Gutter Flow and Inlets | + | |
| Storm Drain Pipes | + | + |
| Culverts | + | + |
| Small Ditches | | + |
| Open Channels | | + |
| Energy Dissipation | | + |

Methods for calculating the time of concentration and abstraction are numerous. However, a minimum time of concentration of six (6) minutes shall be used for all hydrologic calculations. See references given above for the suggested methodologies for information on these calculations.

### 3.2.3 HYDROGRAPHS

Hydrographs should be used to evaluate entire systems by routing storm events through pipe or storage systems. The use of a hydrograph will provide better insight into system performance than simply using the peak discharge. The County Engineer will accept computer models commonly used in the industry as well as newer models with appropriate documentation.

## 3.3 WATER QUANTITY CONTROL STANDARDS

Water quantity control is an integral component of overall stormwater management. Quantity control is effectively flood control, reducing potential damages and health risks, but because uncontrolled runoff can cause erosion, it can also be a form of water quality control. The following design criteria are established for water quantity control. All designs of storage facilities utilized for stormwater quantity control and required downstream analyses shall be submitted as part of the engineering calculations for obtaining a Berkeley County stormwater approval.

### 3.3.1 GENERAL WATER QUANTITY CRITERIA

1. Controls shall be designed by a traditional reservoir routing procedure.

2. All ponds shall have an emergency spillway designed to pass the 100-year storm event if the storage capacity is exceeded.

3. All quantity controls that are also used for quality control shall have a forebay or screening vault for removal of debris and coarse sediments.

    a. Forebays shall be placed upstream of the main pond storage area.

    b. Unless a separate vault is to be used for the forebay, the forebay shall be separated from the larger detention area by barriers or baffles that may be constructed of earth, stones, riprap, gabions, or geo-textiles. The barrier and/or baffles act as a trap for coarse sediments and minimize their movement into the main pond.

    c. Maintenance of forebays will be needed more frequently than the main storage area and all designs should consider this need.

### 3.3.2 DETENTION PONDS/RESERVOIRS

1. Ponds with vegetated embankments shall be less than 15-feet in height and shall have side slopes no steeper than 3H:1V. Embankments protected with Turf Reinforcement Matting or other methods (if approved by County Engineer) shall be no steeper than 2H:1V.

2. Access inside a pond shall be provided with at least one side slope at 3H:1V or flatter. Geotechnical slope stability analysis is required for embankments greater than 10-feet in height and have steeper slope than those indicated above.

2. A minimum freeboard of 1-foot above the design storm high water elevation shall be provided for all impoundments.

### 3.3.2.1 WET DETENTION PONDS

1. The maximum depth of permanent storage facilities with a permanent pool shall be determined by site conditions, design constraints, and environmental needs. The facility should provide a permanent pool of water with a depth sufficient to discourage weed and mosquito growth without creating undue potential for anaerobic bottom conditions. A minimum depth of four (4) feet is reasonable unless the Berkeley County Mosquito Abatement Department requirements dictate otherwise. In addition, the pond bottom shall be a minimum of two (2') below the invert to allow for sediment build-up.

2. Aeration or other means shall be used as necessary to prevent anaerobic conditions.

### 3.3.2.2 DRY DETENTION PONDS

1. The bottom of dry detention structures shall be graded towards the outlet structure(s) to prevent standing water conditions with a minimum 0.5% bottom slope. Provide a low flow channel to allow the pond to drain dry and prevent standing water.

2. Pond slopes and bottom to be grassed according to the seeding schedule in Section 3.5.1.5

3. Do not use dry detention ponds in areas with high water tables.

### 3.3.3 UNDERGROUND DETENTION DEVICES

1. Underground detention facilities shall be designed using the following criteria:

    a. Underground detention systems shall be located downstream of other stormwater controls providing treatment of the water quality volume.

    b. The maximum contributing drainage area to be served by a single underground detention vault or tank is five (5) acres.

    c. All systems shall be designed and located to facilitate maintenance. Systems should be cleaned out (sediment removal) as directed by the approved maintenance plan, but more frequently if necessary.

    d. The minimum pipe diameter for underground detention tanks is thirty-six (36) inches or equivalent.

    e. Underground detention systems must meet structural requirements for overburden support and traffic loading if appropriate.

    f. Access must be provided over the inlet pipe and outflow structure. Access openings can consist of a standard frame, grate and solid cover, or preferably a removable panel.

    g. All underground detention systems should accommodate at least six (6) inches of sediment storage in the volume calculations.

    h. The feasibility of these devices for a given situation shall be evaluated by a soil scientist, geotechnical engineer, or other individual certified by the State of South Carolina in water table estimation.

i. Water table estimation shall be based on first occurrence of two chroma features.

1. Any development that uses a parking area or other feature for detention storage capacity shall clearly identify the limits and depths of the proposed detention pool.

2. Basin configurations which create stagnant water conditions shall be avoided.

3. Post-development discharge rates shall not exceed pre-development discharge rates for the 2-year, 10-year, (and in some cases 25-year) frequency 24-hour duration storm events. The same hydrologic procedures shall be used in determining both the pre-development and post-development peak flow rates.

4. Post-development discharge velocities shall be reduced to provide non-erosive flow velocities from structures, channels or other control measures, or equal the pre-development 10-year 24-hour storm event flow velocities, whichever is less.

5. The volume within any structure used for water quantity control shall be drained from the structure within 72 hours.

### 3.3.4 INFILTRATION DEVICES

1. Infiltration devices shall be required on those sites which do not currently discharge stormwater runoff or have no existing outlet. In such cases, in the post-development condition, devices shall be designed to infiltrate the runoff volume equivalent to the 5-year storm event. For evaluating the 10-year and 25-year storm events, the discharge rate from the site shall be limited to (not exceed) that of a site of equivalent size and slope with a SCS Curve Number equal to 39. As with detention ponds, an emergency spillway shall be designed to pass the 100-year storm event if the storage capacity is exceeded. The system must be analyzed, but only to the extent that no structure flooding or damage results. The following other criteria, based primarily on SC Code of Regulation Section 72-307.C requirements, shall be followed in the design of infiltration systems:

    a. Infiltration device design shall be based on soils characteristics of the first twelve (12) inches below the proposed bottom of the device (not necessarily the first twelve (12) inches below ground surface).

    b. Areas draining to these practices must be stabilized and vegetative filters established prior to runoff entering the system. Infiltration practices shall not be used if a suspended solids filter system does not accompany the practice. If vegetation is the intended filter, there shall be, at least a twenty (20) foot length of vegetative filter prior to stormwater runoff entering the infiltration practice. Forebays or other engineered devices for sediment removal may be prudent.

    c. Each system shall be designed to prevent clogging by fine material and for ease of maintenance.

       The bottom of the infiltration practice shall be at least 0.25 feet above the “zone of seasonal saturation” and infiltration interface.

    d. The infiltration practice shall be designed to completely drain of water within 72 hours.

e. Soils must have adequate permeability to allow water to infiltrate. Infiltration practices are limited to soils having an infiltration rate of at least 0.30 inches per hour. If the infiltration rate is greater than 0.3 but less than 2.0 inches/hour, then an underdrain system must be installed. Initial consideration will be based on a review of the appropriate soil survey, and proposed depths of excavation. The survey may serve as a basis for rejection. On-site soil borings and textural classifications must be accomplished to verify the actual site and seasonal high water table conditions when infiltration is to be utilized.

f. Infiltration practices greater than three (3) feet deep shall be located at least twenty-five (25) feet from basement walls.

g. Infiltration practices designed to handle runoff from areas with a high runoff potential shall be a minimum of one hundred fifty (150) feet from any public or private water supply well.

h. The design of an infiltration practice shall have a properly sized overflow or bypass for larger storm events. Measures to provide a non-erosive velocity of flow along its length and at the outfall shall also be included as necessary. Additional control devices will typically be necessary prior to a release to a watercourse to meet water quality requirements.

i. The slope of the bottom of the infiltration practice shall not exceed five (5) percent. Also, the practice shall not be installed in fill material as piping along the fill/natural ground interface may cause slope failure.

j. An infiltration practice shall not be installed on or atop a slope whose natural or existing angle of incline exceeds twenty (20) percent.

k. If an underdrain system is required, clean outs will be provided at a minimum, every one hundred (100) feet along the infiltration practice to allow for access and maintenance.

2. In cases where such criteria or limitations make the use of infiltration devices inappropriate, but no discharge currently leaves a given site, runoff control must be provided by some other measure. The County Engineer shall be contacted for guidance on the appropriate controls to employ or other mutually accepted best management practices.

### 3.3.5 WATER QUANTITY VARIANCE AND DESIGN/CONSTRUCTION REFERENCES

The County Engineer may grant a variance from the requirements of the Stormwater Management Ordinance and this Manual for individual construction activities if there are exceptional circumstances applicable to the site such that strict adherence to these provisions will result in unnecessary hardship and not fulfill their intent. A written request from the applicant shall contain descriptions, drawings, and any other information that is necessary to evaluate the proposed variance. A separate written variance request shall be required if there are subsequent additions, extensions, or modifications which would alter a previously approved variance. A project may be eligible for a variance of stormwater management for water quantity if the applicant can demonstrate that:

1. The proposed project will have no significant adverse impact on the receiving natural waterway or upstream, downstream or adjacent properties; or

2. Attenuation of the runoff within the subject basin will alter the release rate such that downstream systems will be adversely impacted by storing the regulated storm event (i.e. it can be shown that the time of concentration of the basins will coincide, leading to an increase of the peak at an already vulnerable point downstream).

The imposition of peak or volume control requirements of stormwater runoff would aggravate downstream flooding. An example of this situation would be when an overall analysis has indicated that imposing restrictions in the upstream watershed of the proposed project would cause the timing of the peak of the routed hydrograph to coincide with the peak flow from another contributing watershed at a certain point downstream.

### 3.3.6 ACCEPTED WATER QUANTITY CONTROLS

Detention structural controls are used for providing water quantity control and are typically used downstream of other minor structural controls. These structures are designed to provide channel protection, overbank flood protection, and protection against adverse downstream impacts that are related to the increase in peak flow rates and flow volumes from a land disturbing activity development. Structural detention stormwater controls accepted by Berkeley County are shown in Table 3.4.

**Table 3.4: Accepted Water Quantity Controls**

| General Structural Control | Description |
|---|---|
| **Dry Detention/Dry Extended Basins** | Dry detention basins and dry extended detention basins are surface storage facilities intended to provide temporary storage of stormwater runoff and releasing it at a designed flow rate to reduce downstream water quantity impacts. These structures are designed to completely drain to a dry condition within 72 hours. |
| **Wet Storm Water Detention Basins**<br>• Wet Pond<br>• Wet Extended Detention Pond<br>• Micropool Extended Detention Pond<br>• Multiple Pond System | Wet detention basins are constructed stormwater basins that have a permanent pool or micropool of water. Runoff from each rain event is detained above the permanent pool and released at a designed flow rate to reduce downstream water quantity impacts. Permanent pool depths must be $\geq$4 feet to prevent mosquito breeding. |
| **Multi-purpose Detention Areas** | Multi-purpose detention areas are used for one or more specific activities such as parking areas and rooftops. These areas are used to provide temporary storage of runoff. Some of the multi-purpose areas such as infiltration trenches or bio-retention cells may also be used for water quality purposes. |
| **Underground Detention** | Underground detention is used as an alternative to surface dry-detention basins. They are used in areas that are space-limited where there is not enough adequate land to provide the required detention volume. Underground storage utilizes tanks, vaults, and buried pipes to supply the required storage volume. |
| **Infiltration Basins** | Infiltration basins are used to remove runoff from the flow path into the ground. They are used in areas that currently do not discharge stormwater or create runoff only during large storm events. |

### 3.3.7 STANDARD WATER QUANTITY DESIGN PROCEDURES

This section provides the general procedures for the design of stormwater quantity structures. The following items shall be required for the design of these structures and routing flows through them:

1. Compute the inflow hydrograph for the structure for the 2-year, 10-year, 25-year, 50-year, and 100-year 24-hour storm events for both the existing and proposed conditions. From this, determine peak flow rates for each storm.

2. Compute a stage-storage relationship for the proposed structure. A stage storage-curve defines the relationship between the depth of water and storage volume within the detention facility.

3. Compute stage-discharge relationship of the outlet control structure(s). A stage-discharge curve defines the flow capacity of a structure at a given stage or elevation.

4. Perform routing calculations for the 2-year, 10-year, and in some cases 25-year 24-hour storm events. Calculations may be done by hand, or may be done by using a storage routing computer model.

5. Determine the cumulative volume at the 24-hour point released from the facility.

6. Compare the two volumes and two peak discharges. The volume released from the pond after 24 hours should be at or below that for pre-development conditions. The peak discharge rate from the pond should be at or below the peak discharge rate for the pre-development condition for the 2-year, 10-year and in some cases 25-year storm events. Check to make sure the discharge hydrograph from the 100-year storm event does not overtop the banks of the facility.

7. Evaluate the control structure outlet flow velocity and provide velocity control and channel stabilization if needed. Drawings and details should be provided for outlet structures and basins.

8. Repeat Steps 1-7 for post-development condition until peak, volume, and velocity criteria are met.

9. Provide all calculations in submittal package in a cohesive, organized, and easy to follow format.

Stage-storage and stage-discharge calculations should be included in the engineering calculations. Common methodologies for stage-storage curves include the double end area method and the pyramid frustum method. Other methods will be accepted upon justification.

Hand calculations are available for routing hydrographs through detention structures, however they are time consuming and inefficient when multiple designs are required to be evaluated. For this Manual, it is assumed that the design professional will be using one of the many computer software packages available to perform storage routing calculations. All models/methodologies used must be approved by Berkeley County. A list of accepted models to date includes, but is not necessarily limited to:

- ICPR
- Drain:Edge
- PondPack/Civil Storm
- HEC-HMS
- HYDRAFLOW
- HydroCad
- SWMM

## 3.4 WATER QUALITY CONTROL STANDARDS

Water quality control is an integral and required component of overall stormwater management systems. New development and redevelopment projects must now include controls that treat or otherwise limit the discharge of pollutants. These requirements have been added due to new State and Federal requirements, but also due to the need to improve and preserve the water resources in Berkeley County. Because this is a requirement of stormwater design, some background information and references are provided in the sections below, followed by the design standards for addressing water quality.

### 3.4.1 CHARACTERIZATION OF URBAN STORM WATER RUNOFF QUALITY

This section provides some background information on the major sources of pollutants commonly found in stormwater flows and those that impact County waterbodies. In Table 3.5, these sources and the pollutants most commonly associated with them are presented. This is followed by a detailed discussion of the most common pollutants found in stormwater discharges.

**Table 3.5: Typical Stormwater Pollutants and Sources**

| Pollutant Source | Pollutants of Concern |
|---|---|
| **Erosion** | Sediments and attached soil nutrients (numerous nitrogen and phosphorus forms), organic matter, and other adsorbed pollutants. |
| **Atmospheric Deposition** | Hydrocarbons emitted from automobiles, dust, metals, nutrients, and other chemicals released from industrial and commercial activities. |
| **Roadways/Transportation related areas** | Hydrocarbons emitted from automobiles, dust, metals, |
| **Construction Sites** | Sediment, metals, paint, and wood preservatives. |
| **Manufactured Products (Industrial land uses)** | Heavy metals, phenols, and oils from automobiles, Zinc and Cadmium from tire wear. |
| **Lawn and Landscape Maintenance** | Fertilizer and pesticides. |
| **Plants and Animals** | Plant debris, animal excrement. |
| **Septic Tanks** | Coliform bacteria, nitrogen, $NO_3$. |
| **Non-Storm Water Connections** | Sanitary sewage, industrial wastewater, commercial discharge, and construction activities. |
| **Accidental Spills** | Pollutants of concern depend on the nature of the spill. |
| **Animal Waste Management** | Coliform bacteria, nitrates, and phosphorus. |

| Pollutant Source | Pollutants of Concern |
|---|---|
| **Pesticide Applications** | Pollutants of concern depend on the pesticide being used and the type of crop or pest being treated. |
| **Land Disturbance Agriculture** | Sediment and attached soil nutrients, organic matter, and other adsorbed pollutants. |
| **Fertilizer Applications** | Nitrogen and phosphorus. |

Source: U.S. Environmental Protection Agency, June 1992.

#### 3.4.1.1 SUSPENDED SOLIDS

The most prevalent form of stormwater pollution is the presence of suspended matter that is either eroded by stormwater or washed off paved surfaces by stormwater. Suspended solids increase the turbidity of the receiving water, thereby reducing the penetration of light, resulting in decreased activity and growth of photosynthetic organisms. The increased turbidity also detracts from the aesthetics of natural waters. In addition, the clogging of fish gills has been attributed to the presence of suspended solids. Combined sewer overflows typically contain high suspended solids concentrations. The solids that settle in the receiving water pose long-term threats resulting from their oxygen demand and gradual accumulation of toxic substances (Moffa, 1990), as well as reducing primary production. Sedimentation and other forms of physical separation are often an effective means of removing suspended solids from stormwater.

Sediment is derived from a variety of sources, including erosion from disturbed areas, washoff of sediment deposited on impervious areas, and detachment of sediment due to the increased stream power that comes from increased flow rates and flow durations with urbanization. A significant number of models are available to predict total suspended solids (TSS) contributions from "clean" sediment, but few of the models have parameters specific to urbanized areas. Most of the models were developed to deal with agricultural soils, and their application to urban areas is limited.

Models that do have capabilities that have been used for predicting urban sediment include SWMM, SWAT, SEDPRO, and IDEAL models. For the models to be effectively utilized in sizing BMPs, predictions must be made of time varying quantities as well as the size distribution. Those distributions must be of the aggregated particles, not just the primary particles.

#### 3.4.1.2 OXYGEN DEMANDING MATTER AND BACTERIA

Sufficient levels of dissolved oxygen (DO) in the water column are necessary to maintain aquatic life, growth, and reproductive activity, as well as to maintain aerobic conditions. The introduction of stormwater containing oxygen-demanding organic matter can impair the receiving water quality by reducing the DO levels such that it is unable to sustain certain forms of aquatic life and can further cause the water to become foul. Bacteria enter the stormwater drainage systems typically from the runoff of animal feces and organic matter from the catchment surface, possibly even disturbed soil. Bacteria also may enter the stormwater system and ultimately natural waters through leaking sewer systems (lateral connections, manholes, and industrial or commercial drains, etc.) and malfunctioning septic systems, all of which are termed illicit discharges and illegal by Berkeley County Stormwater Management Ordinance. Organic matter, usually in the form of vegetation and detritus, is carried through the conveyance system by the stormwater. Pathogenic bacteria and viruses in stormwater discharges pose

human health threats. The removal of pathogenic bacteria is achieved primarily through the process of biological decay and physical-chemical disinfection where practiced. Presence of such bacteria is assumed based on the detection of indicator bacteria such as fecal coliforms or E-coli. The reduction of bacteria in waters of the State has been the focus of TMDL efforts by SCHDEC to date.

#### 3.4.1.3 NUTRIENTS

Nitrogen and phosphorus are plant nutrients that promote the growth of plants such as algae, and are the second leading stressor of impaired rivers and streams and the leading source of pollution in impaired lakes (US EPA, 1997). Such nutrients contribute to the eutrophication of water bodies which can result in decreased oxygen supply, alteration of aquatic life and decreased recreational value (Novotny, 1985).

Nutrients are typically derived from agricultural runoff as well as runoff from chemicals applied to lawns in urbanized areas, runoff from industrial sites, municipal wastewaters (of more concern for combined sewer overflows), or atmospheric deposition onto impervious surfaces that is later washed into stormwater. Model studies indicate that the increase in nutrient loading due to increased imperviousness will be dramatic. For example, the increase in the Maryland Chesapeake Bay watershed due to increased urbanization is expected to range from 2 to 20 times the current load, depending on whether residential development is highly restricted or unrestricted (Houlahan, 1992). Nutrients can be removed from stormwater prior to discharge through biological uptake such as by plantings in stormwater quality control ponds.

Most models of nutrient loadings that have an extensive data base included have been based on agricultural and forest operations. These have applicability to washoff from fertilized lawns and forested areas but not to the impervious areas. Models of nutrient loading in urban runoff are typically based on washoff type calculations or user-defined loadings and concentrations, all of which require user-defined constants and are relatively simplistic. A relatively new model called IDEAL, has additional treatment procedures for nutrient loads and removal using isothermic relationships that define adsorbed to dissolved nutrient ratios.

### 3.4.2 ACCEPTED WATER QUALITY BMPS

In selecting a BMP(s), it is most important to know what pollutants need to be removed, how to remove them, and what degree of removal is needed to meet water quality goals. There are many other project-specific considerations, however, with the proper planning, installation, and maintenance, BMPs are expected to reduce pollutant loads to receiving waters, reduce erosion, provide health and safety benefits, and be cost effective.

The varieties of water quality BMPs are numerous and are typically considered either structural or non-structural. Berkeley County's current approved list of stormwater quality BMPs, listed in Table 3.7, are based on literature reviews and experience. Some references to BMP selection, effectiveness, and design can be found in SCDHEC (2005), Agricultural Resource Council (2001), Schueler (1987), and Water Environment Foundation (WEF) & American Society of Civil Engineers (ASCE) (1998). Guidance on applying BMPs into Low Impact Development (LID) approaches can be found in Prince George County (1999 a and b).

**Table 3.6. Average Pollutant Concentrations for Various Land Uses (mg/l)**

| | Pollutant Concentration (mg/l) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Land Use** | **BOD** | **COD** | **TSS** | **TDS** | **TP** | **DP** | **TKN** | **NO2/ NO3** | **Pb** | **Cu** | **Zn** | **Cd** |
| **Forest/ Rural Open** | 3 | 27 | 51 | 415 | 0.11 | 0.03 | 0.94 | 0.80 | 0.000 | 0.000 | 0.000 | 0.000 |
| **Urban** | 3 | 27 | 51 | 415 | 0.11 | 0.03 | 0.94 | 0.80 | 0.014 | 0.000 | 0.040 | 0.001 |
| **Agricultural/ Pasture** | 3 | 53 | 145 | 415 | 0.37 | 0.09 | 1.92 | 4.06 | 0.000 | 0.000 | 0.000 | 0.000 |
| **Low Density Residential** | 38 | 124 | 70 | 144 | 0.52 | 0.27 | 3.32 | 1.83 | 0.057 | 0.026 | 0.161 | 0.004 |
| **Medium Density Residential** | 38 | 124 | 70 | 144 | 0.52 | 0.27 | 3.32 | 1.83 | 0.180 | 0.047 | 0.176 | 0.004 |
| **High Density Residential** | 14 | 79 | 97 | 189 | 0.24 | 0.08 | 1.17 | 2.12 | 0.041 | 0.033 | 0.218 | 0.003 |
| **Commercial** | 21 | 80 | 77 | 294 | 0.33 | 0.17 | 1.74 | 1.23 | 0.049 | 0.037 | 0.156 | 0.003 |
| **Industrial** | 24 | 85 | 149 | 202 | 0.32 | 0.11 | 2.08 | 1.89 | 0.072 | 0.058 | 0.671 | 0.005 |
| **Highways** | 24 | 103 | 141 | 294 | 0.43 | 0.22 | 1.82 | 0.83 | 0.049 | 0.037 | 0.156 | 0.003 |
| **Water/ Wetlands** | 4 | 6 | 6 | 12 | 0.08 | 0.04 | 0.79 | 0.59 | 0.011 | 0.007 | 0.003 | 0.001 |

Adapted from NURP (1983), Horner et. al (1994), and Cave et. Al. (1994)

BOD = Biochemical Oxygen Demand
COD = Chemical Oxygen Demand
TSS = Total Suspended Solids
TDS = Total Dissolved Solids
TP = Total Phosphorus
DP = Dissolved Phosphorus
TKN = Total Kjeldahl Nitrogen
$NO_2/NO_3$ = Nitrates / Nitrites
Pb = Lead
Cu = Copper
Zn = Zinc
Cd = Cadmium

Fecal coliform (FC) concentrations were not provided in the table above due to the large variability. Guidance from SCHDEC and NURP (1983) should be sought when estimating existing and post-development bacteria loads and the reduction requirements.

**Table 3.7: Accepted Water Quality Controls**

| General Structural Control | Description |
|---|---|
| **Wet Ponds** | Wet stormwater ponds are constructed stormwater basins that have a permanent pool or micropool of water. Runoff from each rain event is detained and treated in the pool, and released at a designed rate. |
| **Storm Water Wetlands** | Stormwater wetlands are natural or constructed systems used for stormwater management. Stormwater wetlands consist of a combination of shallow marsh areas, open water and semi-wet areas above the permanent water surface. |
| **Bioretention Areas** | Bioretention areas are shallow stormwater basins or landscaped areas that utilize engineered soils and vegetation to capture and treat stormwater runoff. Runoff may be returned to the conveyance system or partially exfiltrate into the soil. |
| **Sand Filters** | Sand filters are multi-chamber structures designed to treat stormwater runoff through filtration, using a sand bed as its primary filter media. Filtered runoff may be returned to the conveyance system or partially exfiltrated into the soil. |
| **Infiltration Trenches** | An infiltration trench is an excavated trench filled with stone aggregate used to capture and allow infiltration of stormwater runoff into the surrounding soils from the bottom and sides of the trench. |
| **Enhanced Grassed Swales** | Enhanced swales are vegetated open channels that are explicitly designed and constructed to capture and treat stormwater runoff within dry or wet cells formed by check dams or other structures. |
| **Engineered Devices**<br>• Vortex Separator<br>• Baffles<br>• Cartridges<br>• Skimmers<br>• Bioretention<br>• Gravity Oil-Grit Separator<br>• Filter Material<br>• Inlet inserts | Pre-fabricated controls use the movement of stormwater runoff through a specially designed structure to remove target pollutants. They are typically used on smaller commercial sites and urban hotspots. There are numerous commercial vendors of these structures, but there is limited data on the performance of these structures. Until further research is done and substantial removal efficiencies are published, these structures may require monitoring. Some of the popular vendors/products include, but are not limited to, Crystal Stream, Vortechnics, Aquashield, Filterra, Stormceptor, Stormfilter, CDS, BaySaver, and Downstream Defender[1]. This is by no means a complete list and the County Engineer will evaluate any such device if included in designs, provided evidence is submitted as to their effectiveness. Such evidence must include applicability and proof of third-party testing on trapping efficiencies. |

[1] This list is not intended as preference for these devices nor to exclude others.

Some structural BMPs have limited applications and are recommended to be used in conjunction with other BMPs. Limited application controls may be used within a system of water quality controls and are very effective pre-treatment structures for the controls listed in Table 3.7. Limited application structural controls should be designed and used only in development situations where regular maintenance is guaranteed. Some popular limited stormwater controls are shown in Table 3.8.

**Table 3.8: Limited Structural Controls**

| Limited Structural Control | Description |
|---|---|
| **Vegetated Filters**<br>• Filter Strip<br>• Grassed Channels and Swales | Both filter strips and grassed channels provide filtering of stormwater runoff as it flows across the vegetation. However, by themselves these controls do not consistently obtain adequate sediment and pollutant removal. Both filter strips and vegetated channels shall be used as pretreatment measures or part of a treatment system approach. |
| **Submerged Gravel Wetland Systems** | Submerged gravel wetlands use wetland plants in a submerged gravel or crushed rock media to remove stormwater runoff pollutants. These systems should only be used in mid- to high- density environments where other structural controls will be utilized. |
| **Small Sand Filters**<br>• Surface Sand Filter<br>• Perimeter Sand Filter | Sand filters are multi-chamber structures designed to treat stormwater runoff through filtration, using a sand bed as its primary filter media. Filtered runoff may be returned to the conveyance system or partially exfiltrated into the soil. |
| **Porous Paver Systems** | Porous paver systems consist of open void paver units laid on gravel subgrade to promote stormwater infiltration. Porous pavers provide water quality and quantity benefits. |

Regardless of the type of control, maintenance plan and schedules should be included for each BMP proposed.

Listed below are some non-structural BMPs that should be considered for use in larger construction activities and re-development projects.

1. Buffers: an area along a shoreline, wetland, or stream where development is restricted or prohibited. The primary function of the buffer is to physically protect and separate a stream, lake, or wetland from future disturbance or encroachment.

2. Disconnected roof drains/impervious areas: directing stormwater runoff from rooftops towards pervious areas where it is allowed to filter through vegetation and other landscaped material and infiltrate into the soil.

3. Grass/Porous pavements: allows for the reduction of paved areas by implementing areas that are infrequently used, providing water quality benefits through increased infiltration. Should be avoided in high traffic areas

4. Cluster development: concentrate development away from environmentally sensitive areas such as streams, wetlands, mature wooded areas, and steep slopes.

5. Literature for owners, and Homeowners Associations (HOAs) to educate and train themselves on the impact they can have on water quality and the activities necessary to maintain structural controls. These efforts are particularly critical in Low Impact Development (LID) designs.

## 3.4.3 WATER QUALITY DESIGN STANDARDS

### 3.4.3.1 GENERAL STANDARDS

The following design criteria are established for water quality control and must be incorporated in one or more BMPs for a given subbasin unless a specific quality variance is granted by the County Engineer. Incorporation of these requirements shall constitute adequate control of the discharge of pollutants.

1. All sites which disturb one-half (1/2) acre or greater shall have permanent BMP installed.

2. Permanent water quality addressed (all projects or LCP that disturb 5 or more acres)

2.1 All permanent water quality ponds having a permanent pool shall be designed to catch the water quality volume (WQV) defined as the first ½" of runoff from the entire area draining to the pond and release it over at least a 24-hour period.

2.2 Permanent water quality ponds, not having a permanent pool, shall be designed to catch the first 1" of runoff from the entire area draining to the pond and release it over at least a 24-hour period.

2.3 For areas not draining to a pond, show how permanent water quality requirements were addressed.

3. Projects disturbing less than five (5) acres but within one-half (1/2) mile of a receiving water body in the Coastal Zone must meet Section III.C.3.XIII.A of the Coastal Zone Management Program Refinements. Designs must show that the first ½ inch of runoff from the entire site or the first one (1) inch of runoff from the built upon area, whichever is greater, can be stored onsite.

4. Waters of the U.S./State are not used for permanent water quality control (alternative means of treatment must be used if an existing pond is to be used for water quantity control).

5. A variance of the WQV requirement may be approved if treatment is instead provided by engineered devices. Applicability of such waivers will be based on submitted information showing that the device(s) has a design pollutant removal efficiency equivalent to a "dry" pond with a WQV of 1-inch. If the project is located within one thousand feet (1000') of shellfish beds, the pollutant removal equivalency must match a WQV of the first one and one-half inches (1 ½") of runoff.

6. BMPs used strictly for water quality that will be capturing one (1) or more acres shall have a pretreatment device as part of the BMP or treatment system, such as a forebay or vault, to remove debris and coarser sediments.

7. All BMPs must have a maintenance plan and schedule for construction site and post construction. Suggested schedules and routine activities are provided in the SCDHEC BMP Manual (2005).

8. Projects that discharge either directly or indirectly into an impaired waterbody as determined by the existence of an adopted TMDL by SCDHEC or through SCDHEC's listing of the waterbody on the most current 303(d) list shall be required to reduce pollutant loads so as to meet applicable water quality standards. More background information is covered in Section 3.8 – Special Protection Areas. This will require the installation and implementation of measures (structural or non-structural BMPs) which are expected to adequately reduce pollutant loads to levels required by the TMDL (currently expressed as % reductions) or to prevent further impairment. A list of approved water quality devices was provided in the previous section.

9. The County Engineer reserves the right to require specific effluent limits for any pollutant from a site if necessary to ensure the water quality standards and other State and federal water quality regulations are met

### 3.4.3.2 TYPICAL WATER QUALITY DESIGN PROCEDURES

1. Determine an appropriate, accepted BMP(s) needed for the site, considering the land use, pollutants of concern (Table 3.5), soils, maintenance requirements, and location in relation to waters of the State and any impairments that may exist.

2. If the receiving water of the project is impaired or has an adopted TMDL, the applicant must show that water quality standards are being met and designated uses are not impacted. This proof must be quantitative and qualitative for sites which disturb greater than 25 acres (see Section 3.4.3.1.6). The appropriate steps include

    a. Calculate the estimated load for the pollutant(s) of concern. The IDEAL model may be used for all water quality calculations. Another, less preferred option is the Schuler Simple Method (Schueler 1987). This method is based on an extensive database obtained in Washington, D.C. for the National Urban Runoff Program (NURP). The Simple Method estimates pollutant loads from urban development by the following equation:

$$L = 0.227(Q\ P_j\ R_v\ C\ A) \qquad \text{Equation 1}$$

Where:

**L** = Pollutant load in pounds per desired time interval,
**Q** = Runoff depth,
½-inch for wet ponds, some wetlands,
1-inch for all other BMPs,
**$P_j$** = Fraction of rainfall events over the time intervals that produce runoff
$P_j$ = 1 for a single event
$P_j$ = 0.9 for larger time intervals (months, years),
**$R_v$** = Volumetric runoff coefficient expressing the fraction of rainfall converted to runoff (See Equation 2),
**C** = Event mean pollutant concentration in mg/l (See Table 3.6),
**A** = Total area of site in acres (areas < 640 acres are recommended for this method).

The most important factor affecting the volumetric runoff coefficient (**$R_v$**) is the imperviousness of the watershed, **I**, in percent. An empirical relationship was developed that relates **$R_v$** and I as:

$$R_v = 0.05 + 0.09(I \qquad \text{Equation 2}$$

The rainfall depth, P, was chosen such that a large percentage of storm events will be captured, with larger events only partially captured or bypassed. Greater than 85% of the average annual rainfall amount in Berkeley County occurs from storm events with a

total depth equal to or greater than 1-inch. The 1-inch of runoff from pervious areas is the result of approximately 4.5-inches of total rainfall, but it only takes a rainfall of 1.2 inches on impervious surfaces.

Other loading modules, such as in SEDPRO and SEDCAD for eroded particles or common buildup and washoff equations may be used.

b. Select appropriate BMPs from Tables 3.7 and the BMP Uses tables in Appendix G. The use of an engineered device would require documentation to demonstrate its equivalency in meeting water quality criteria.

c. Compute BMP effectiveness for removing pollutants of concern, showing at a minimum that the concentration of the pollutants of concern from the last BMP meets applicable water quality standards.

3. If the BMP is to capture runoff from 5 or more acres, design a forebay or vault. Guidance on this aspect can be found in SCDHEC (2005) and ARC (2001).

4. Calculate the water quality volume using the following equation.

$$WQV = \frac{Q * DA}{12} \qquad \text{Equation 3}$$

Where:

**WQV** = water quality volume (acre-feet)
**Q** = runoff depth inches (one-half inch for permanent pool ("wet") structures, one inch for dry structures, one and one-half inches if project is within 1,000 feet of a shellfish bed)
**DA** = drainage area to water quality BMP (acres). Runoff from the entire site must be captured in a water quality BMP, unless otherwise allowed by the County Engineer.

5. Compute the inflow hydrograph for the structure for one inch (1") or one-half inch (1/2"), 24-hour storm event, as necessary, for the proposed condition. Note – this is the one inch (1") **runoff** event.

6. Unless already known from the quantity calculations detailed in section 3.3.2, compute stage-storage and stage-discharge relationships of the outlet control structure(s).

7. Perform routing calculations for the one inch (1") or one-half inch (1/2"), 24-hour storm event through the BMP. These may be done by hand, or may be done by using a storage routing computer model.

8. Determine if the entire volume from the one inch (1") or one-half inch (1/2"), 24-hour storm event was released before the 24-hour point. If it does, the outlet is too large. Resize outlet structure.

9. Repeat steps 4-8 until entire volume is not released prior to 24-hours. This procedure is commonly accomplished using a low-flow orifice and the two-year discharge level is not reached.

10. For engineered devices, alternative calculations other than detailed here should be provided. SCDHEC has accepted some such devices as providing adequate treatment as compared to capturing and detaining the one inch (1") storm event.

11. Provide all calculations in the submittal package in a cohesive, organized, and easy to follow format.

## 3.5 EROSION PREVENTION AND SEDIMENT CONTROL STANDARDS

Berkeley County requires that an erosion prevention and sediment control (EPSC) plan be submitted and approved for construction activities that result in land disturbance of one-half (1/2) acre or more. This plan shall describe the practices and controls that will be used during and after construction to meet the following goals:

1. Minimization of the extent and duration of disturbed soil exposure,

2. Prompt stabilization of disturbed areas,

3. Protection of off-site and downstream locations, drainage systems and natural waterways from the impacts of erosion and sedimentation,

4. Limitation of the exit velocities of the flow leaving the site to non-erosive or pre-development conditions, and

5. Design and implementation of an ongoing inspection and maintenance plan.

### 3.5.1 ACCEPTED EPSC BMPS

The various types of EPSC BMPs that are acceptable for use in Berkeley County are presented below. These generally fall into three categories: erosion prevention measures, temporary sediment controls, and runoff control and conveyance measures. Runoff from sites should contain controls that fall into at least one of these categories.

#### 3.5.1.1 EROSION PREVENTION MEASURES

Erosion prevention measures shall be used during and after construction site preparation to avert the discharge of runoff highly concentrated with sediment and other associated pollutants. One or more measures are typically needed on a given site. Measures that fall into this category along with their preferred application are provided in Table 3.9. Details on each of these measures are not discussed inthis Manual. Guidance documents that should be referenced as necessary include: SCDHEC (2003), Haan, C. T., Barfield, B. J., and Hayes, J. C. (1995) and Shwab, Glenn O. and Richard K. Frevert (1985). Other practices, such as engineered devices, will be allowed as long as sufficient evidence is presented as to their effectiveness. Standard details can be found at:
http://www.scdhec.gov/environment/ocrm/pubs/tech_docs_water.htm.

**Table 3.9 Erosion Prevention BMP Suggested Uses**

| BMP | Slope Protection | Waterway Protection | Surface Protection | Enclosed Drainage | Large Flat Areas | Borrow Areas | Adjacent Properties |
|---|---|---|---|---|---|---|---|
| Erosion Prevention Measures | X | X | X | X | X | X | X |
| Surface Roughening | X | | X | | | | |
| Bench Terracing | X | | X | | | | |
| Temporary Seeding | X | | X | | X | X | X |
| Mulching | X | | | | X | X | |
| Erosion Control Blankets (ECB) and Turf Reinforcement Mats (TRM) | X | X | X | | | X | |
| Final Stabilization | X | | X | | X | | X |
| Topsoiling | | | X | | X | | |
| Permanent Seeding and Planting of Grasses | X | | X | | X | | X |
| Permanent Ground Cover Plants | X | | X | | | | X |
| Sodding | X | | X | | X | | X |
| Riprap or Aggregate | X | X | X | | | | |
| Outlet Protection | | X | | X | | | X |
| Dust Control | | | | | X | X | X |
| Polyacrylamide (PAMs) | X | | X | X | X | X | X |

### 3.5.1.2 TEMPORARY SEDIMENT CONTROL MEASURES

Berkeley County emphasizes preventative measures as the main control to protect against erosion, both during and following construction. However, there are typically instances where erosion prevention measures alone do not provide sufficient control. For these situations, temporary sediment controls shall be implemented to control the migration of eroded sediment off site. The sediment control measures are typically only applicable as practices for use during construction. One or more of the measures should be utilized as appropriate during the project's construction phase. Table 3.10 contains a list of some of the suggested controls of this type along with their intended use. Details on these and others measures are again not discussed in detail in the Manual, however, an excellent reference is Haan, Barfield, and Hayes (1995) and SCDHEC's BMP Manual. Other practices, such as engineered devices, will be allowed as long as sufficient evidence is presented as to their effectiveness. Standard details can be found at http://www.scdhec.gov/environment/ocrm/pubs/tech_docs_water.htm

**Table 3.10 Temporary Sediment Control BMP Suggested Uses**

| BMP | Slope Protection | Waterway Protection | Surface Protection | Enclosed Drainage | Large Flat Areas | Borrow Areas | Adjacent Properties |
|---|---|---|---|---|---|---|---|
| Temporary Sediment Control Structures | X | X | X | X | X | X | X |
| Storage Volumes and Maintenance Schedules | | X | | X | | | X |
| Temporary Sediment Basin | | X | X | X | | | X |
| Multipurpose Basin | | X | X | X | | | X |
| Temporary Sediment Trap | | X | X | | | | X |
| Silt Fence | X | X | | | | | X |
| Rock Ditch Check | | | X | | | | X |
| Stabilized Construction Entrance | | | | | X | | X |
| Storm Drain Inlet Protection | | X | | X | | | X |
| Vegetated Filter Strips | | X | | | | | X |
| Rock Sediment Dike | | X | X | | | | X |

### 3.5.1.3 RUNOFF CONTROL AND CONVEYANCE MEASURES

This category of EPSC BMPs should be used as necessary during and following construction. Suggested varieties and their corresponding uses are provided in Table 3.11.

**Table 3.11 Runoff Control and Conveyance Measure BMP Suggested Uses**

| BMP | Slope Protection | Waterway Protection | Surface Protection | Enclosed Drainage | Large Flat Areas | Borrow Areas | Adjacent Properties |
|---|---|---|---|---|---|---|---|
| Pipe Slope Drains | X | | X | | | | |
| Temporary Stream Crossing | | X | X | | | | X |
| Runoff Conveyance Measures | X | | | | | X | X |
| Construction De-watering | | X | | X | X | X | |
| Level Spreader | | | X | | X | | X |
| Subsurface Drains | | | X | | X | | |

### 3.5.1.4 TEMPORARY VEGETATION/SEEDING

Description
The purpose of temporary seeding is to reduce erosion and sedimentation by stabilizing disturbed areas that would otherwise lay bare for long periods of time before they are worked or stabilized. Temporary seeding is also used where permanent vegetation growth is not necessary or appropriate.

When and Where to Use
Temporary seeding is used on exposed soil surfaces such as denuded areas, soil stockpiles, dikes, dams, banks of sediment basins, banks of sediment traps and temporary road banks. Temporary seeding prevents and limits costly maintenance operations on sediment control devices. Cleanout requirements for sediment basins, sediment traps and silt fence is reduced if the drainage area is seeded when grading and construction operations are not taking place.

Temporary stabilization is required within fourteen (14) days after construction activity is complete. Cover seeded areas with an appropriate mulch to provide protection from the weather. When the temporary vegetation does not grow quickly or thick enough to prevent erosion, re-seed as soon as possible. Keep seeded areas adequately moist. Irrigate the seeded areas if normal rainfall is not adequate for germination and growth of seedlings. Water seeded areas at controlled rates that are less than the rate at which the soil can absorb water to prevent runoff. Runoff of irrigation water wastes water and can cause erosion.

Plant Selection
Plant seed selection should be based on the type of soil and the season of the year in which the planting is to be done. Tables 3.12 and 3.13 should be used if you plan to use conventional tillage methods (plowing, seedbed preparation, hydroseeding, etc). If you need a fast growing crop to nurse your permanent species, then use the mix rate. Failure to carefully follow agronomic recommendations often results in an inadequate stand of temporary vegetation that provides little or no erosion control.

Tillage
If the area has been recently plowed, no tillage is required other than raking or surface roughening to break any crust that has formed and to leave a textured surface. If the soil is compacted less than 6-inches, it should be disked for optimal germination.

Soil Testing
Information on soil testing is available from the Soil and Water Conservation District Office.

Lime
Lime is not required for temporary seeding unless a soil test shows that the soil pH is below 5.0. It may be desirable to apply lime during the temporary seeding operation to benefit the long-term permanent seeding. Apply a minimum of 1.5 tons of Lime/acre (70 pounds per 1000 square feet) if it is to be used.

Fertilizer
A minimum of 500 pounds per acre of 10-10-10 fertilizer (11.5 pounds per 1000 square feet) or equivalent should be applied during temporary seeding unless a soil test indicates a different requirement. Fertilizer and lime (if used) should be incorporated into the top 4-6 inches of the soil by disking or other means where conditions allow.

Seeding

The surface of the soil should be loosened just before broadcasting the seed. Seed should be applied evenly by the most convenient method available for the type of seed to be used and the location of the temporary seeding. Typical application methods include but are not limited to cyclone seeders, rotary spreaders, drop spreaders, broadcast spreaders, hand spreaders, cultipacker seeder, and hydro-seeders. Cover applied seed by raking or dragging a chain, and then lightly firming the area with a roller or cultipacker.

Mulching

Mulch should be used in seeded areas to retain soil moisture and reduce erosion during establishment of vegetation. The most commonly accepted mulch used in conjunction with temporary seeding is small grain straw. This straw should be dry and free from mold damage and noxious weeds. The straw may need to be anchored with netting or emulsions to prevent it from being blown or washed away. The straw mulch may be applied by hand or machine at the rate of 1.5 - 2 tons per acre (90 pounds per 1000 square feet). Frequent inspections are necessary to check that conditions for growth are good.

Irrigation

Seeded areas should be kept adequately moist. Irrigate the seeded area if normal rainfall is not adequate for the germination and growth of seedlings. Water seeded areas at controlled rates that are less than the rate at which the soil can absorb water to prevent runoff. Runoff of irrigation water wastes water and can cause erosion.

Re-seeding

Areas where the plants do not grow quickly, thick enough, or adequately to prevent erosion should be re-seeded with temporary grasses as soon as such areas are identified.

**Table 3.12 Temporary Vegetation Schedule**

| Species | Rates (lbs/acre) | Optimum Dates to Plant | Remarks |
|---|---|---|---|
| Browntop Millet (Alone) | 40 | April 20 - August 15 | Quick, Dense Cover |
| Browntop Millet (Mix)* | 10 | April 20 - August 15 | Quick, Dense Cover |
| Rye Grain (Alone) | 56 | February - March,<br>August 15 - November 20 | Quick Cover |
| Rye Grain (Mix)* | 10 | February - March,<br>August 15 - November 20 | Quick Cover |
| Rye Grass (Alone) | 50 | August 10 - October 10 | Competitive, Dense |
| Rye Grass (Mix) | 8 | August 10 - October 10 | Competitive, Dense |

* For details on mixes consult Clemson University Home and Garden Information Center at (888) 656-9988 or at http://hgic.clemson.edu.

**Table 3.13 Temporary Vegetation for Steep Slopes/Cut Slopes**

| Species | Rates (lbs/acre) | Optimum Dates to Plant | Remarks |
|---|---|---|---|
| Weeping Lovegrass (Alone) | 4 | April - July 20 | Quick cover, deep roots, likes dry sites, seldom used alone, clumps |
| Weeping Lovegrass (Mix) | 2 | April - July 20 | Quick cover, deep roots, likes dry sites, seldom used alone, clumps |

* For details on mixes consult Clemson University Home and Garden Information Center at (888) 656-9988

### 3.5.1.5 PERMANENT VEGETATION/SEEDING

Plant Selection

Plant seed selection should be based on the type of soil, the season of the year in which the planting is to be done, and the needs and desires of the permanent land user. Tables 3.14 and 3.15 should be used to select the desired species to be planted. Failure to carefully follow agronomic recommendations often results in an inadequate stand of permanent vegetation that provides little or no erosion control. The rates in Tables 3.14 and 3.15 are based on purity and germination standards required for certification.

The following notes apply to Tables 3.14 and 3.15.

1. In mixtures with temporary cover, the full seeding rate of permanent cover shall be used.

2. Mix means 2 or more long term species plus short term species. For dates other than optimum, call the Soil and Water Conservation District, (843) 719-4146.

3. A legume, such as a clover, crown vetch, and serecia should be used where it is possible.

4. The appropriate inoculants should be used.

Topsoil

If the surface soil of the seedbed is not adequate for plant growth, topsoil should be applied.

Tillage

If the area has been recently plowed, no tillage is required other than raking or surface roughening to break any crust that has formed and to leave a textured surface. If the soil is compacted less than 6-inches, it should be disked for optimal germination. If the soil is compacted more than 6-inches, it should be sub-soiled and disked.

Soil Testing

Information on soil testing is available from the Soil and Water Conservation District Office.

Lime

Unless a specific soil test indicates otherwise, apply 1½ tons of ground course textured agricultural limestone per acre (70 pounds per 1000 square feet).

Fertilizer

A minimum of 1000 pounds per acre of a complete 10-10-10 fertilizer (23 pounds per 1000 square feet) or equivalent should be applied during permanent seeding of grasses unless a soil test indicates a different requirement. Fertilizer and lime (if used) should be incorporated into the top 4-6 inches of the soil by disking or other means where conditions allow. Do not mix the lime and the fertilizer prior to the field application.

Seeding

The surface of the soil should be loosened just before broadcasting the seed. Seed should be evenly applied by the most convenient method available for the type of seed to be applied and the location of the temporary seeding. Typical application methods include but are not limited to cyclone seeders, rotary spreaders, drop spreaders, broadcast spreaders, hand spreaders, cultipacker seeder, and hydro-seeders. Cover applied seed by raking or dragging a chain or brush mat, and then lightly firming the area with a roller or cultipacker. Do not roll seed that is applied with a hydro-seeder and hydro-mulch.

Mulching

All permanent seeded areas should be covered with mulch immediately upon completion of the seeding application to retain soil moisture and reduce erosion during establishment of vegetation. The mulch should be applied evenly in such a manner that it provides a minimum of 75% coverage. Typical mulch applications include straw, wood chips, bark, wood fiber, and hydro-mulches. The most commonly accepted mulch used in conjunction with permanent seeding is small grain straw. This straw should be dry and free from mold damage and noxious weeds. The straw may need to be anchored with netting or asphalt emulsions to prevent it from being blown or washed away. The straw mulch may be applied by hand or machine at the rate of 2 tons per acre (90 pounds per 1000 square feet). Frequent inspections are necessary to check that conditions for growth are good.

Irrigation

Permanent seeded areas should be kept adequately moist, especially late in the specific growing season. Irrigate the seeded area if normal rainfall is not adequate for the germination and growth of seedlings. Water seeded areas at controlled rates that are less than the rate at which the soil can absorb water to prevent runoff. Runoff of irrigation water wastes water and can cause erosion.

Re-seeding

Inspect permanently seeded areas for failure, make necessary repairs and re-seed or overseed within the same growing season if possible. If the grass cover is sparse or patchy, re-evaluate the choice of grass and quantities of lime and fertilizer applied. If the permanent seeding has less than 40% cover, have the soil tested to determine any acidity or nutrient deficiency problems.

Final stabilization by permanent seeding of the site requires that it be covered by a 70% coverage rate.

Post-Stabilization

Once areas are stabilized they can be converted to native species or for establishing on non-critical, level sites. Table 3.16 lists some native species of Berkeley County that can be used.

**Table 3.14 Permanent Vegetation Schedule**

| Species | Rates (lbs/acre) | Optimum Dates to Plant | Remarks |
|---|---|---|---|
| Bahia Grass (Alone) | 40 | March 20 - June 15 | Slow to become established |
| Bahia Grass (Mix)* | 30 | March 20 - June 15 | Slow to become established |
| Bermuda Grass (Hulled) (Alone) | 8-12 | April - July 15 | Quick cover, Sod forming, partial winter kill |
| Bermuda Grass (Hulled) (Mix)* | 4-6 | April - July 15 | Quick cover, Sod forming, partial winter kill |
| Fescue, Tall (KY31) Alone | 40 | August 15 - October | Seldom seeded alone, not for dry or wet sites |
| Fescue, Tall (KY31) Mix* | 20 | August 15 - October | Seldom seeded alone, not for dry or wet sites |
| Sericea Lespedeza (Scarified) Alone or Mix*, (Inoculate with EL Inoculant) | 40 | April - June | Good for slopes, cuts, and fills that require low maintenance |
| Ladino Clover (Mix* only), (Inoculate with AB Inoculant) | 2 | August 20 - October | Naturally adds nitrogen |

* For details on mixes consult Clemson University Home and Garden Information Center at (888) 656-9988 or at http://hgic.clemson.edu.

**Table 3.15 Permanent Vegetation Schedule for Steep Slopes/Cut Slopes**

| Species | Rates (lbs/acre) | Optimum Dates to Plant | Remarks |
|---|---|---|---|
| Weeping Lovegrass (Alone) | 4 | April – July 20 | Quick cover, deep roots, likes dry sites, seldom used alone, clumps |
| Weeping Lovegrass (Mix)* | 2 | April – July 20 | Quick cover, deep roots, likes dry sites, seldom used alone, clumps |
| Crownvetch (Mix*) (Inoculate with Type M Inoculant) | 8-10 | March - April | 2 years to establish, no mowing, green all year, 20” maximum height |

* For details on mixes consult Clemson University Home and Garden Information Center at (888) 656-9988 or at http://hgic.clemson.edu.

## 3.5.2 EPSC DESIGN STANDARDS

### 3.5.2.1 GENERAL STANDARDS

1. BMPs should be properly placed (silt fence, inlet protection, construction entrance, rip-rap at outfalls, check dams etc.).

2. EPSC plans shall be developed to achieve an eighty (80) percent design sediment removal efficiency goal, if more than 10 disturbed acres drain to a common point (stream, lake, etc.). Simply applied, when a site is completely denuded of vegetation, the structural and nonstructural EPSC measures shall be designed to trap 80 percent of the total suspended solids (TSS) that are generated by the site. The design storm event associated with this level of control is the 10-year, 24-hour SCS Type III storm event. Calculations using models, such as SEDPRO or SEDCAD, or SCDHEC design aids shall be provided to show adherence to this criteria.

3. SCS procedures should be used to determine runoff amounts. It is important to note that when a BMP is designed for the 10-year, 24-hour storm event, the BMP will have a greater trapping efficiency for more frequent events such as the 2-year 24-hour storm event.

4. Sediment basins must be provided for storage for the 10-year, 24-hour storm event for disturbed conditions or 3600 $ft^3$/ acre draining to the basin, if more than 10 disturbed acres drain to a common point (stream, lake, property line, etc.).

5. Activities that disturb between one (1) and ten (10) acres of land area that do not drain to a single outlet point may incorporate practices other than a sediment basin to achieve an equivalent removal efficiency.

6. Sediment traps only used for drainage areas of less than 5 acres.

7. Sediment trap storage calculations, showing that 1800 $ft^3$/ total acre draining to each trap is provided below the spillway.

8. If trapping efficiency calculations are required for sediment traps, then provide peak outflow, ($q_{po}$), calculations; the 10-year, 24-hour storm event for construction conditions cannot overtop the trap's spillway.

9. Sediment basins and traps designed for total area draining to them.

10. Drainage area map outlining the area draining to each sediment basin/ trap.

11. Copies of figures used to determine $V_{15}$ (SV-1) and trapping efficiency (ST-1, SB-1, SB-2), if Design Aids from SCDHEC BMP Manual (2005) are used to determine trapping efficiencies.

12. Silt fencing shall be placed at the toe of all fill slopes and soil berms and below disturbed areas where the size of the area is no more than ¼-acre per one hundred (100) feet of silt fence length. The maximum slope length behind the fence is 100 feet and the maximum gradient behind the fence is 2H:1V.

13. The following nonstructural site management practices shall be utilized on the plans where applicable:

    a. Minimize site disturbance to preserve and maintain existing vegetative cover,

    b. Limit the number of temporary access points to the site for land disturbing activities,

    c. Protect off-site and downstream locations, drainage systems and natural waterways from the impacts of erosion and sedimentation,

    d. Phase and sequence construction activities to minimize the extent and duration of disturbed soil exposure, and

    e. Implement an ongoing inspection and maintenance plan. Suggested maintenance schedules are given in SCDHEC (2005).

14. Sediment storage volumes shall be calculated for all sediment controls to determine the required clean-out frequencies and maintenance schedules. The Universal Soil Loss Equation (USLE) and subsequent modifications or other acceptable methods that determine sediment yield may be used to predict the required sediment storage volumes for specific sediment control structures.

15. To encourage the development and testing of innovative alternative EPSC BMPs, alternative management practices that are not included in the Manual may be allowed upon review and approval by the County Engineer. To use an alternative BMP, the design professional shall submit substantial evidence that the proposed measure will perform at least equivalent to currently approved BMPs contained in the Manual. Evidence may include, but is not limited to:

    a. Supporting hydraulic and trapping efficiency calculations.

    b. Peer review by a panel of registered professional engineers.

    c. Research results as reported in professional journals.

    d. Manufacturer's literature.

16. Detailed EPSC plans shall comply to the maximum extent practicable with the following specific standards and review criteria:

    a. Sediment tracking control shall be implemented using stabilized construction entrances that are to be located and utilized at all points of ingress/egress on a construction site. The contractor must take necessary action to minimize the tracking of mud onto the paved roadway construction areas. The contractor shall daily remove mud/soil from pavement, as may be required.

    b. Crossings of waterways during construction should be minimized and must be approved by the County Engineer and possibly the U. S. Army Corps of Engineers (USACOE). Encroachment into stream buffers, riparian areas and wetlands should be avoided when possible.

    c. Topsoil shall be stockpiled and preserved from erosion or dispersal both during and after site grading operations when applicable.

d. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen days (14) after work has ceased, unless activity in that portion of the site will resume within twenty-one (21) days. Hydroseeding as often as possible is encouraged. Stabilization of disturbed areas is one of the best approaches for erosion prevention and sediment control.

e. All slopes must be stabilized though grassing, hydroseeding, synthetic or vegetative matting, diversion berms, temporary slope drains, etc. and must be performed within two (2) working days after the necessary grading (temporary or permanent) has been achieved.

f. A site is considered stabilized once the entire disturbed area has a vegetative cover with a density of 70%. Seeding should be accompanied or replaced with erosion control mats as necessary to achieve this density. Final or permanent stabilization is considered achieved once the entire disturbed area has a permanent vegetative cover with a density of 70%. Final stabilization shall be implemented within fourteen (14) days of completion of all construction activities. After final stabilization is achieved, all control measures shall be removed from the site

g. Temporary structural controls installed during construction shall be designed to accomplish maximum stabilization and control of erosion and sedimentation, and shall be installed, maintained, and removed according to the specifications set forth in the Manual and project specifics developed as part of the stormwater management plan. All temporary structural controls shall be designed to control the peak runoff resulting from the ten (10) year storm event.

h. All permanent structural controls, including drainage facilities such as channels, storm sewer inlets, and detention basins, shall be cleaned out as part of the project closeout process.

i. Linear projects (utility lines, road construction) over, under, or along a water body shall include measures and controls which adequately protect the water body from undue impact. Such work should be coordinated with the installation of erosion prevention and sediment control measures so that disruption is minimized. Every effort should be made to install utilities during the initial construction phases. Trench sharing is encouraged to the extent practicable.

17. The grading plan should include the following general measures at a minimum:

a. The finished cut and fill slopes to be vegetated should not be steeper than 3H:1V. The finished grades of cut and fill slopes to be vegetated with vines and/or groundcovers should not be steeper than 1H:1V.

b. Cuts or fills should not be so close to property lines as to endanger adjoining property without adequately protecting such properties against erosion, sedimentation, slippage, settlement, subsidence, or other damages.

c. Subsurface drainage should be provided in areas having a high water table to intercept seepage that would affect slope stability, bearing strength or create undesirable wetness.

d. No fill shall be placed where it can slide or wash onto another property.

e. Fill shall not be placed adjacent to channel banks where it can create bank failure, reduce the capacity of the stream, or result in downstream sediment deposition.

f. All borrow and disposal areas should be included as part of the grading plan.

g. Adequate channels and floodways should be provided to safely convey increased runoff from the developed area to an adequate outlet without causing significant channel degradation, or increased off-site flooding.

h. The site should be graded to direct flows to appropriate controls.

18. EPSC plan shall have the following information contained in a cohesive, organized, and easy to follow format:

a. Location of all erosion and sediment control structures on construction documents;

b. Delineation of all sensitive features (wetlands, streams, ponds, existing stormwater structures, etc.) and potential sediment sources;

c. Installation sequencing and maintenance plan and schedules for all EPSC BMPs during and after construction;

d. Provisions to preserve topsoil and limit the amount of total disturbed area;

e. Details of site grading;

f. Design details and calculations for all EPSC structures;

g. Protection of all storm drain inlets and outlets;

h. Explanation of any computer models or software used with highlights of and/or notes on the output data;

i. Locate temporary and permanent soil disposal areas, haul roads, and construction staging areas to minimize erosion, sediment transport, and disturbance to existing vegetation;

j. All necessary certifications by the person responsible for the activity. This includes the stormwater management plan, CAA and Covenants. Proper preparation of the EPSC Plan if necessary, by a registered engineer.

### 3.5.2.2 TYPICAL EPSC DESIGN PROCEDURES

The design procedures will vary depending on the EPSC BMP. Many of the BMPs listed in Tables 3.9 – 3.16 do not need to be "designed" using calculations, such as surface roughening or dust control. Others require the use of equations or design aids to properly design. SCDHEC has two handbooks, the BMP Handbook (SCDHEC 2005) and the Stormwater Management and Sediment Control Handbook (SCDHEC 2003) that provide the procedures and equations needed to design some of the EPSC BMPs listed in Tables 3.9 – 3.15. Example problems are given for most types. As with the design of any BMP, engineering judgment will be needed on most applications. Proper design must be complemented with proper installation and routine maintenance in order for BMPs to be effective and to adhere to the provisions of this section.

## 3.6 STORMWATER DRAINAGE SYSTEM DESIGN STANDARDS

This section provides the design requirements for various storm sewer drainage/collection system components including: design storms, velocities; and, pipe and inlet sizes. Storm drainage systems shall include all storm drainage structures and pipes that convey runoff. These systems are commonly referred to as lateral closed systems.

1. Storm drain pipes:

    a. Storm drainage lines shall be staked at each box or at intervals that would be sufficient to check alignment and grade of the construction with the approved plans. The use of lasers to augment control is encouraged.

        - The minimum size storm drainage pipe allowable shall be fifteen (15) inches in diameter. The minimum size pipe allowed under a public roadway, within the public right-of-way, and/or downstream of public right-of-ways shall be 18". Only concrete pipes are allowed in the County right-of-ways.

    b. The minimum allowable slope for storm drainage pipe shall be one-half of one (1) percent [0.005 ft/ft] or a minimum flow velocity of three (3) feet per second at all flow levels. Maximum allowable slope for storm drainage pipe is twenty (20) percent.

    c. Drainage system installation must be such that stormwater discharge is not concentrated on adjacent property owners and that the velocity is less than erosive limits for the site soils. At pipe outfalls, this normally requires the use of a rip-rap apron, placed on filter fabric and lightly grouted, for a minimum distance equal to or greater than six (6) pipe diameters.

    d. Type and class of storm drainage pipe, as well as the construction of pipe culverts, shall be in accordance with Sections 714 of the SCDOT specifications. The proposed use of any type of storm drainage pipes other than reinforced concrete pipe (RCP) shall be considered on a case by case basis.

    e. A minimum of one (1) foot of cover shall be provided for all RCP storm drainage pipes under unpaved roads or any other situation in which no roadway or other structure is to cover the pipe. For pipe under any paved surface, the minimum cover is twelve (12) inches. Contact the County Engineer for minimum depths in other situations (e.g. other pipe types).

f. Storm drainage pipe shall be placed to minimize length running under pavement. Where it is necessary for a pipe to cross the roadway, it preferably shall be placed at a ninety (90) degree angle, and in no case at less than forty-five (45) degrees. All cross lines in the roadway shall be compacted in twelve (12) inches lifts to ninety-five (95) percent Standard Proctor maximum density and to one hundred (100) percent Standard on the last twelve (12) inches.

g. Any "open" storm drainage cross line pipe shall extend out to the toe of the roadway embankment; in no case will the end of the pipe be within the five foot roadway shoulder.

h. Storm drainage pipe discharging into a drainage channel shall intersect the channel in a manner such that the interior angles measured from their centerlines of flow, is greater than, or at most equal to ninety (90) degrees. Rip-rap, or other suitable protection, is required from the outlet point to the bottom of the channel and on the opposite channel bank to prevent scour and erosion.

i. Storm drainage pipe discharging into a wet pond or lake shall have the discharge invert above the permanent pool elevation and rip-rap or other energy dissipation structures shall be placed from the outlet point to pool level. Submerged systems should be avoided.

j. If submerged systems cannot be avoided, o-ring jointed pipe is required.

k. A maintenance access point shall be available within every 200 feet for 15-18" diameter pipe, every 400 feet for 24" pipe and every 500 feet for larger storm drainage lines.

l. The 100-year, 24-hour storm event shall be used to check all drainage designs in Special Protection Areas for flood hazards at adjacent structures and/or property.

m. Hydraulic grade line and head loss calculations for determining water surface elevations shall be performed for all systems connections.

n. Calculations should be performed for the appropriate design storm event (see General requirements section above).

o. For storm drainage systems with less than five (5) connections, Manning's Equation shall be acceptable for sizing the capacity of drain pipes for non-submerged conditions where the free water surface elevation is below the crown of the pipes. The Saint-Venant equations (full dynamic wave), which are used in many common engineering programs, shall be employed in larger design situations.

p. Storm drain profile plots should be included in the set of construction plans.

q. Storm drainage systems shall be designed to convey stormwater runoff by gravity flow unless otherwise approved.

r. For very flat flow lines, flow velocities shall increase progressively throughout the system. Upper reaches of the pipe system may have flatter slopes than the lower end of the system.

2. Ditches and Swales:

   Open ditch drainage may be used, provided that such ditches are "V" or trapezoidal ditches with side slopes not exceeding the following requirements based upon maximum depth:

   a. Depths up to and including five (5) feet – Side slope ratio of 1.5:1 (1.5 horizontal to 1 vertical).

   b. Depths greater than five (5) feet but no more than seven (7) feet – Side slope ratio of 3:1 (3 horizontal to 1 vertical).

   c. At the option of the developer any open ditch may be piped in lieu of these requirements. As a minimum the drainage system must be piped from the right of way to the rear property line on residential lots.
   d. No drainage ditch shall exceed a maximum depth of seven (7) feet.

   e. Swales shall have side slopes of 4:1 (4 horizontal to 1 vertical) or flatter.

3. Culverts:

   a. Proper consideration of inlet and outlet control shall be given in the design of culverts and outlets.

   b. The pipe, appurtenant entrance and outlet structure should properly account for water, bed-load, and floating debris at all stages of flow.

   c. There should be no unnecessary or excessive cause of property damage.

   d. The outlet should be designed to resist undermining and washout.

   e. Culvert design shall include all cross drainage facilities that transport stormwater runoff under roadways. Culvert selection techniques can range from solving empirical formulas, to using nomographs and charts, to comprehensive mathematical analysis for specific hydraulic conditions. The models used for these calculations are listed below. Other widely accepted models may be used, but must be approved by the County Engineer. Designs shall be based upon SCDOT requirements where applicable.

   f. Culverts under roadways shall be designed using the twenty five (25) year storm event as a minimum, but critical roadways shall be designed using a higher storm event. Ponding on the upstream end of the culvert is acceptable as long as the roadway is not overtopped during the precipitation event. Ponding or backwater effects shall not impact any new or existing structures and recede after the storm event in a time period acceptable to the County Engineer.

   g. Additional hydraulic capacity shall be required as necessary to prevent backwater effects that may adversely impact upstream property or structures.

   h. Acceptable models for designing culverts include, but are not limited to:

   - ICPR
   - HY8
   - Pond Pack

- HEC-RAS
- Flow Master
- HydroCad

All natural primary and/or major drainage channels which are located within, or along the property line of an improvement, development or subdivision shall be protected by the developer as follows:

a. The existing channel lying within or along the property line of a subdivision or parcel of land proposed for development or redevelopment shall be straightened, widened, and improved to the extent required to prevent overflow, resulting from a fifty (50) year frequency rainfall.

b. Site improvement shall provide for the grading of all building pads to an elevation where all building pads will not be subject to overflow from the one hundred (100) year frequency flood and in a manner that will provide for a rapid runoff of stormwater.

c. Whenever channel improvements are carried out, sodding, backsloping, cribbing, and other bank protection practices shall be designed and constructed to control erosion from the anticipated conditions and flow resulting from a fifty (50) year frequency rainfall.

d. An existing natural drainage channel shall not be located in a street easement unless it is placed in an enclosed storm sewer except under the following conditions:

    1. Where a paved street surface at least two (2) lanes wide is provided on both sides of a paved or stabilized bank channel so as to provide access to abutting properties.
    2. When a condition exists as outlined above, adequate space shall be dedicated as right-of-way to provide for maintenance of the paved drainage channel.

e. Culverts, bridges, and other drainage structures shall be constructed in accordance with the specifications and design criteria of Berkeley County when the County shall have present or future maintenance responsibility.

f. No open natural storm drainage course shall be permitted within seventy-five (75) feet of the rear or side of a building to the top of the edge of the drainage facility or vice versa, or 35' from impervious parking areas unless exceptional site planning opportunity is afforded and the improvement will not be jeopardized by flooding or erosion.

All secondary drainage channels which are within, or immediately adjacent to an improvement or subdivision shall be protected and improved by the developer as follows:

a. Secondary drainage channels which have a primary function of collecting surface water from adjacent properties or intercepting and diverting side hill drainage shall be sodded, bank stablized or piped.

b. Developments-

    1. In single-family residential, duplex or apartment-townhouse-condominium development, site grading shall be carried out in such a manner that surface water from each dwelling lot will flow directly to a storm sewer, sodded swale, or paved street with storm drainage without crossing more than (4) adjacent lots in overland flow and with no adverse effects to adjacent property.

2. In commercial, industrial and institutional development, roofs, paved area, yards, courts and courtyards shall be drained into a storm drainage facility.

c. Surface water collected on roadways shall be diverted to a drainage facility at satisfactory intervals to prevent overtopping the centerline of the road during a ten-year frequency rain for minor residential roadways and during the twenty-five year frequency for collector roadways. Design frequency may vary with the classification of street, highway, or land use in the area. Drainage areas allowed for surface flow on streets at the point of diversion shall not exceed twenty (20) acres, regardless of flow.

4. Headwalls and Outlets:

All exposed ends of pipes shall be protected by a flared end section (limited to pipes 36" or less in diameter) or one of the following type headwalls:

a. A concrete or brick plastered with grout, headwall is preferred; it is required on culverts located in major defined drainage channels. An acceptable design detail is provided at http://www.scdhec.gov/environment/ocrm/pubs/tech_docs_water.htm

b. A rip-rap headwall is acceptable for pipes 24" or less in a number of situations; if used, it should conform to the standard details provided at: http://www.scdhec.gov/environment/ocrm/pubs/tech_docs_water.htm. Note that this technique requires the use of both filter fabric and grout.

c. Storm drainage or pond outfalls must be carried to an existing drainage outfall such as a pipe, ditch, etc.

d. No new point discharge onto adjacent property, where there was not an existing point discharge, is allowed without the property owner's written permission. Discharge points created with new development shall connect to an existing drainage system, whether natural or man-made. The new outlet may not cause flooding or in any way degrade the existing drainage system and proof of such shall be provided. In some cases, conveyance must be constructed from the new development to a point of discharge into the existing system and shall be done at the owner's expense. In these cases, the owner is responsible for obtaining all necessary easements and agreements to construct such drainage improvements.

e. Outlets will not be allowed to discharge on fill slopes.

5. Energy Dissipation:

a. All outlets should be sufficiently stabilized. Calculations shall be provided justifying the design and material used (e.g. riprap aprons geometry and diameter).

b. If riprap aprons are used, filter fabric is to be installed beneath all riprap.

c. Level spreaders, plunge pools, etc. shall be properly designed and installed at the proposed outlet(s).

6. Storm drainage structures
(Catch basins, yard inlets, manholes, and junction boxes, control structures, etc.):

a. Materials and construction shall be as specified in Section 719 of the SCDOT (2007) specifications.

b. When the depth of a storm drainage structure exceeds four and one-half (4-1/2) feet, rungs/steps shall be provided for ascent and descent. (Steps are to be ASTM-C-478, or equivalent.)

c. The inside dimension of all the storm drainage structures shall be a minimum of three (3) feet by three (3) feet. Sides shall be plastered with grout.

d. All pipes entering or leaving shall not protrude more than four (4) inches into the box.

e. All roadway catch basins shall be SCDOT Type 9, Type 16, Type 17 or Type 18 Catch Basins based on the application.

f. Maximum roadway catch basin inlet capacity for an inlet shall be determined based on the following:

For inlets at sag, capacity shall be based on weir flow (unsubmerged). The depth flow shall be limited to the curb depth, but may be further limited by the allowed spread, detailed below. In sag conditions, a 15% factor of safety shall be used to account for debris/clogging. Ponding at the sag location shall be limited to 24 hours after the storm event.

For inlet on grade, theoretical capacity shall be considered in the design the longitudinal and cross slopes, and gutter depression. The length of the gutter opening must be such that the gutter efficiency is 80% of the theoretical capacity. Several equations and nomographs are available in the literature for determining the theoretical capacity. Maximum flow depth shall be limited to the depth of curb.

g. Catch basins and yard inlets shall be designed to accommodate a given flow such that ponded water is removed within 24 hours and does not cause flooding to adjacent buildings or other structures.

h. Storm drainage structures will be located outside curve radii.

i. Storm drainage structures shall contain a minimum drop of 0.2 feet from invert in to invert out.

j. Floors of Storm drainage structures shall be of concrete and contain "formed troughs" to help channel flow.

k. Storm drainage structures, the elevation at the crown of any inlet pipe shall be equal to or greater than the crown of the outlet pipe.

l. Area around all catch basins shall be backfilled in six (6) inch to eight (8) inch lifts, compacted to ninety-five (95) percent Standard Proctor maximum density.

m. Inlet protection shall be provided at all inlets into the stormwater system during construction and until project closure procedures have been completed or notification from the County Engineer has been given stating that an acceptable level of stabilization has been achieved. Guidance on design, installation and maintenance of inlet protection can be found in SCDOT (2007).

n. Roadway inlet spacing shall be based partly on the maximum spread of water into the roadway. For the appropriate design storm, at least one full travel lane width must be available during the rain event for all roads. Inlets up-gradient of a road intersection, sag inlets, or the last inlet for a given system must be designed with sufficient capacity to handle the entire flow, such that there is no flow through/bypass.

o. Maximum depth in which the water may pond above or around an inlet must not threaten surrounding permanent structures or facilities including vehicular or pedestrian traffic.

p. Inlets placed in collector roadway gutter lines must be spaced to prevent flow from entering road intersections and to not exceed a maximum spread of 6-feet, or one-half of a travel lane, whichever is greater, and based on maximum inlet capacity.

q. In depth design procedures for inlet and storm sewer design may be referenced in AASHTO (1999), USDT (2001b), Mays, L., (2001), and Yen (2001). Culvert design guidance is found in USDT (2001a).

r. All manhole lids and catch basins shall contain the Berkeley County water quality logo or an alternate design approved by the County Engineer. Contact the County Engineer for information on how to obtain logos.

## 3.7 OPEN CHANNEL HYDRAULICS

Open channels shall include all permanent storm drainage channels including swales, culverts, and diversions. These storm drainage systems shall be designed based upon the following criteria:

1. All open channels shall be uniform and shall be stabilized to prevent erosion in a manner approved by the County Engineer. A number of acceptable techniques are shown in the current version of the SCDHEC (2005).

2. The design of open channels shall be based on Manning's Formula where backwater effects from obstructions and/or tailwater is not present. Flow velocities for the 10-year storm event must be less than five (5) ft/sec (two and one-half (2.5) ft/sec in bare sandy soils) or the channel surfaces must be adequately lined, e.g., rip-rap, concrete.

3. The minimum channel grade shall be 0.005 ft/ft, unless supporting calculations show that there will be no pools or standing water areas formed in the channels at smaller slopes.

4. Design conditions can be assumed to be steady, uniform flow.

5. Except for roadside ditches, the side slopes of grassed lined channels without Erosion Control Blankets or Turf Reinforcement Matting shall be no steeper than 3H to 1V.

6. Channels may be designed with multiple stage levels with a low flow section to carry the 2-year storm event and a high flow section to carry storms of larger frequencies.

7. Berkeley County allows vegetated channels. Guidance on the design of these type channels can be found in Haan et. al. (1995) or by using computer software that is capable of calculating channel stability and capacity.

8. Additional hydraulic capacity shall be required as necessary to prevent backwater effects that may adversely impact upstream property or structures.

9. Acceptable models for designing open channels include, but are not limited to:

    - ICPR
    - HY8
    - Pond Pack
    - HEC-RAS
    - Flow Master
    - HydroCAD

**Table 3.16 Maximum Permissible Velocities for Vegetated Channels**

| Cover | Permissible Velocity (ft./sec.)* | | | | | |
|---|---|---|---|---|---|---|
| | Erosion Resistant Soils % Slope | | | Easily Eroded Soils % Slope | | |
| | 0-5 | 5-10 | > 10 | 0-5 | 5-10 | > 10 |
| Bermuda Grass | 8 | 7 | 6 | 6 | 5 | 4 |
| Bahia<br>Buffalo Grass<br>Blue Gamma<br>Centipede Grass<br>Tall Fescue<br>Kentucky Bluegrass<br>Red Canary Grass | 7 | 6 | 5 | 5 | 4 | 3 |
| Grass-legume Mixture | 5 | 4 | NR | 4 | 3 | NR |
| Lespedeza Sericea<br>Weeping Lovegrass<br>Kudzu<br>Alfalfa<br>Small Grains<br>Temporary Vegetation | 3.5 | NR | NR | 2.5 | NR | NR |

*Allow velocities over 5 ft/sec only where good cover and maintenance will be provided. If poor vegetation exists due to shade, climate, soils or other factors, the permissible velocity shall be reduced by 50 percent.
NR = Not Recommended
Sources: Elementary Soil and Water Engineering, Shwab et. al. and Hann et. al. (1995)

General guidance on open channel design can be found in USDT (1996, 2001).

## 3.8 SPECIAL PROTECTION AREAS

In an effort to address some of the most critical water resource problems that exist in the County, Special Protection Areas have been established. Those wishing to develop or redevelop lands within these protected areas will be required to comply with the minimum standards listed in the preceding sections as well as a more stringent set of design criteria detailed below. These generally focus on either a water quantity (reduce or prevent frequent and/or extreme flooding) or a water quality problem (prevent or reduce degradation of riverine, estuarine, coastal ecosystems or maintain a designated use(s). At such times that maps are made available to the public, the County Engineer will inform applicants on whether or not a proposed project is required to comply with additional design criteria listed in the following sections. The maps are not included in the manual due to expected changes in the designated areas, particularly those associated with TMDLs.

### 3.8.1 WATER QUANTITY ISSUES

Flooding problem areas exist in many locations around the County to the point that stormwater controls have become overwhelmed, or where controls were never adequately designed or installed to control runoff. The ability to maintain a system is also suspected to be contributing to some of the frequent flooding. In an effort to relieve existing flooding problems, the following list of design criteria will be required in designated areas. The requirement in conjunction with the enforcement of other design criteria listed in the sections above, are required to provide the necessary controls.

1. The post-development, peak discharge rates are restricted to half (½) the pre-development rates for the 2 and 10-year storm event or to the downstream system capacity, whichever is less.

2. The post-development runoff volumes for the 2-year frequency 24-hour duration storm events above the pre-development level shall be stored for a period of 24-hours on average before release.

Additional criteria may be established on a case by case basis.

### 3.8.2 WATER QUALITY ISSUES

In conjunction with the NPDES permitting program, SCDHEC, through delegated responsibility from EPA, must identify and mitigate impaired waterbodies. Impaired waterbodies are identified through a monitoring program, the results of which are compared against water quality standards developed to protect designated uses of individual waterbodies. Impaired waterbodies are those that do not meet these standards and cannot be used for their designated purposes, such as fishing, swimming, recreation, and/or support of aquatic life. In accordance with Section 303 of the Clean Water Act, states must release a bi-annual report of the impaired waterbodies. Waters listed on the 303(d) list will eventually have a TMDL developed, which represents the daily amount of a particular pollutant that a waterbody can receive and still meet the water quality standard for its designated use(s). A list of the 303(d) waterbodies can be found at http://www.scdhec.gov/environment/water/tmdl/index.htm.

1. List the nearest SCDHEC Water Quality Monitoring Station (WQMS) that the site's stormwater discharges drain to and the waterbody on which it is located.

2. If nearest WQMS is listed on the most current 303(d) List of Impaired Waters and if site's stormwater construction discharges contain the pollutant of impairment and if the site disturbance 25 or more acres, qualitative and quantitative assessment (described in Section 3.4C of SCR100000) shall be provided and include at a minimum, calculations that show:

- a sites pollutant load for all pollutants of concern (see Table 3.5),
- the trapping effectiveness of the chosen BMPs, and
- that the runoff discharged through the last water quality BMP has a water quality level equal to or better than the in-stream standard or as required by an applicable TMDL.

3. Evaluation of selected BMPs if nearest WQMS listed on the most current 303(d) List of Impaired Waters and if site's stormwater construction discharges contain the pollutant of impairment and if site disturbance less than 25 acres. Such evaluations may reference published values on BMP effectiveness.

4. If a TMDL has been developed for the nearest WQMS and if the site's stormwater construction discharges contain the pollutant of impairment, show that measures and controls meet assumptions and requirements of TMDL (may need to contact SCDHEC Watershed Manager for assistance).

# CHAPTER 4 - INSPECTIONS & ENFORCEMENT

This chapter establishes inspection and enforcement guidelines to be followed by the County.

## 4.1 BERKELEY COUNTY STORMWATER MANAGEMENT INSPECTIONS

The County will inspect applicable construction sites from initial land clearing to final stabilization. The purpose of these inspections will be to check for compliance with the stormwater management plan approved by the County Engineer and County Stormwater Management Ordinance. Maintenance inspections will also be performed on stormwater management systems and facilities throughout their useful life. For each system or facility installed or retrofitted during an approved construction project, the applicant must have submitted a maintenance schedule and plan. County Inspector will be checking for adherence to this plan and any necessary changes that may arise after installation. County inspections are not to be construed as a relaxation of the requirements on owners/operators to conduct self-inspection in accordance with any applicable local, State or Federal stormwater requirements.

### 4.1.1 STORMWATER MANAGEMENT INSPECTOR DUTIES/RESPONSIBILITIES

Berkeley County Inspector shall inspect and enforce the requirements of the County Stormwater Management Ordinance. The job duties/responsibilities of a County Inspector shall include, but not be limited to, the following:

1. Conduct and document site inspections during construction to ensure compliance with the approved stormwater management plan. Frequency of inspections will be determined by County staff on an as needed basis.

2. Ensure that the approved stormwater management plan, and the construction plans are on the project site and are properly being followed and implemented.

3. Conduct post-construction inspections to ensure that permanent maintenance is being performed in accordance with the maintenance schedules and Covenants of Permanent Maintenance of Stormwater Systems (Covenants) for the various stormwater management facilities in the approved stormwater management plan at the final inspection for closeout and at all other subsequent dates to ensure continued conformance with permanent maintenance requirements.

4. Issue enforcement orders, as necessary, to the owner/operator when any portion of the work does not comply with the approved stormwater management plan or work is occurring without appropriate approval or permitting. The enforcement process and types of orders is detailed in Section 4.3.

5. Perform a final inspection upon the completion of the stormwater system to determine if the system is constructed in accordance with the approved stormwater management plan.

6. Take immediate action if the owner/operator fails to comply with the approved stormwater management plan and an imminent hazard exists as a result. The County Inspector should address the situation and notify any applicable local, State and Federal agencies.

7. Maintain accurate and comprehensive project inspection files ensuring all relevant information is entered in the files to be maintained in the County Engineering Department.

### 4.1.2 INSPECTION PROCESS AND PROCEDURES

As per Berkeley County's Stormwater Management Ordinance, the County Engineer or an authorized representative/designee (County Inspector) may enter upon all properties for regular inspections, periodic investigations, enforcement and to effectuate the provisions of the Ordinance. Upon refusal by any owner/operator to permit a County Inspector to enter upon the property or continue an inspection, the County Inspector shall terminate the inspection or confine the inspection to portions of the property to which no objection is raised. The County Engineer or his designee shall document the refusal and the grounds for such and promptly seek appropriate compulsory process.

Upon completion of a during construction site inspection, the County Inspector should, at a minimum, include the following in his inspection report:

1. Date and location of the site inspection.

2. Whether the approved stormwater management plan, and construction plans have been properly implemented and maintained.

3. Identification of any approved plan or BMP deficiencies.

4. Any corrective actions needed.

Upon completion of a post-construction maintenance inspection, the County Inspector should, at a minimum, include the following in this inspection report:

1. Date and location of the site inspection.

2. Whether the activities identified in the approved maintenance plan and schedule and Covenants have been properly implemented, completed, and maintained.

3. Identification of any maintenance deficiencies.

4. Any corrective actions needed.

## 4.2 PERMITTEE INSPECTION RESPONSIBILITIES

In accordance with any applicable local, State and Federal stormwater requirements including, but not limited to, the NPDES Construction General Permit (CGP), owner/operators are responsible for conducting during construction and post-construction site inspections. Records of such inspections should be kept for a minimum of five (5) years and must be made available to Berkeley County upon request.

## 4.3 ENFORCEMENT

If the County determines that a project is in non-compliance with the County's Stormwater Management Ordinance, then the County Inspector may direct conformity by proceeding with the appropriate enforcement action. The types of enforcement tools available to the County include a Correction Order, Notice of Violation (NOV), Stop Work Order and Civil/Criminal Penalties. The enforcement mechanism to be utilized will depend on the circumstances as described in the following sections.

### 4.3.1 CORRECTION ORDERS

The County Engineer typically issues a Correction Order for first offenses of non-compliance with the County Stormwater Management Ordinance and the approved stormwater management plan. The purpose of the Correction Order is to give notice of the deficiencies, identify expected corrective results and provide a reasonable timeframe to the contractor prior to the County taking further action to get a problem resolved. Correction Orders shall be submitted in writing, but a verbal notice may be given if the deficiency needs immediate correction to prevent offsite or downstream impacts. The County Engineer shall issue Correction Orders within five (5) working days of an inspection. All Correction Orders, verbal or written, shall be noted in the project file.

Correction Orders may be issued in such cases, but not be limited to, when there is:

1. Failure to comply with the approved stormwater management plans to include failure to have properly installed and/or maintained BMP measures.

2. Failure to properly maintain permanent stormwater management structures.

3. Failure to notify the County Engineer before beginning work on a phase of an approved project.

4. Failure to call for a final site inspection.

A Correction Order should at a minimum include, but not be limited to, the following:

1. Nature of the violation(s).

2. Proposed penalty.

3. Required corrective actions.

4. The time period for correcting the violation(s).

### 4.3.2 NOTICES OF VIOLATION (NOV)

If a Correction Order has been previously issued and there are either subsequent non-compliance issues or failure to complete the items on the Correction Order within a specified time period, then a Notice of Violation may be issued. In addition, for violations that do not involve a safety issue or an imminent threat of serious damage to the environment and/or public or private property, a Notice of Violation may be issued for, but are not limited to, the following:

1. If construction activities have been initiated and no BMP measures are in place, or are not working to prevent sediment from leaving the site.

2. Failure to have work inspected and approved before restarting construction activities after a stoppage of work.

A Notice of Violation (NOV) should at a minimum include, but not be limited to, the following:

1. Nature of the violation(s).

2. Proposed penalty.

3. Notification that a Stop Work Order may be issued or that permits for the site may be suspended or revoked if there is continued non-compliance.

4. Required corrective actions.

5. The time period for correcting the violation(s).

### 4.3.3 STOP WORK ORDER

A Stop Work Order may be issued for, but are not limited to, the following:

1. Construction activities are occurring without an approved stormwater management plan.

2. Past enforcement actions taken by the County (Correction Orders, Notice of Violations) to remedy a situation(s) have not been properly addressed with appropriate and prompt action to the satisfaction of the County Engineer.

3. Non-compliance with the plans has resulted in a health or safety issue.

4. Offsite sedimentation resulting from non-compliance with the approved stormwater plan has eliminated or severely degraded a use in a downstream waterbody or that such degradation is imminent.

5. Offsite sedimentation resulting from non-compliance with the approved stormwater management plan has caused severe damage to adjacent, downstream or upstream property.

A Stop Work Order may allow or require correction of violations, but no other construction activities may occur. The Stop Work Order shall state that failure to comply may result in the suspension or revocation of any remaining permits issued for the site and/or civil penalties being issued.

### 4.3.4 CIVIL PENALTIES

The County may issue a Civil Penalty if a Notice of Violation and/or Stop Work Order has not been complied with or there has not been substantial progress in complying with the Notice of Violation and/or Stop Work Order. In addition, a Civil Penalty may be issued when there are repeated, recurring violations at the same site or when there are repeated, recurring violations by the same responsible party. Violations may subject the owner/operator to Civil Penalties of not more than $1,000 for each violation. Each separate day of a violation constitutes a new and separate violation.

### 4.3.5 CRIMINAL PENALTIES

In addition to any applicable civil penalties, any person who negligently, willfully, or intentionally violates any provision of the Stormwater Management Ordinance shall be guilty of a misdemeanor and shall be punished within the jurisdictional limits of the magistrate's court. The County may issue a uniform summons citation for a violation of this Ordinance. Fines imposed under the NOV may not exceed $500.00 per violation and/or thirty (30) days in jail. Each day of a violation shall constitute a new and separate violation.

# CHAPTER 5 - REFERENCES

This chapter lists the various references used in the manual and if available, websites where they can be retrieved.


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# Appendix A
# Construction Activity Application (CAA)

## BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM

## CONSTRUCTION ACTIVITY APPLICATION

Sites within Regulated Area and disturbing one-half (1/2) acre or more

| **For Official Use Only** | |
|---|---|
| Date Received: _____<br><br>Application No: _____ | |

**I. Owner Information**

Owner (Company or person): _____

Contact Person: _____ Company EIN: - __

Address: _____

City: _____ State: _____ Zip: _____

Phone: (Day) - -_____ (Mobile) - -_____ (Fax) - -_____

Email address: _____

**II. Operator Information**

Company or person: _____

Contact Person: _____ Company EIN: - __

Address: _____

City: _____ State: _____ Zip: _____

Phone: (Day) - -_____ (Mobile) - -_____ (Fax) - __-_____

Email address: _____

**III. Contractor Information**

Company or person: _____

License #: _____

City: _____ State: _____ Zip: _____

Phone: (Day) - -_____ (Mobile) - -_____ (Fax) - -_____

Email address: _____

**IV. Plan Preparer Information**

Plan Preparer: _____ S.C. Registration #:

Company/ Firm: _____ S.C. COA #:

Mailing Address: _____

City: _____ State: _____ Zip: _____

Phone: (Day) - -_____ (Mobile) - -_____ (Fax) - -_____

Email address: _____

**V. Project Information**

**A.** Project Name: _____

Location (street address, nearest intersection, etc.): _____

_____

Tax map # (list all): _____

_____

Disturbed area (to the nearest tenth of an acre): __ __ __ __ __. __

Total area: __ __ __ __ __. __ Impervious area: __ __ __ __ __. __

**B.** Is this project part of a Larger Common Plan for Development or Sale (LCP)? ☐ Yes ☐ No

LCP/Overall Development Name: _____

Check here if this is the first phase. ☐

Previous state permit/file no.? - - - Previous NPDES coverage number: SCR10 _____

**C.** Type of Construction Activity (check all that apply):

☐ Commercial ☐ Residential: Single-family ☐ Linear (Roads, utility lines, etc.)

☐ Institutional ☐ Residential: Multi-family ☐ Site Preparation (No new impervious)

☐ Industrial ☐ Re-development ☐ Other: _____

**VI. Waterbody Information**

**A.** Nearest receiving waterbody(s): _____ Distance to this waterbody (feet): _____

Next/Nearest named receiving waterbody(s): _____

**B. Wetlands/ Waters of the State**

| Waters of the U.S./ State | On the site? | If yes, delineated/ identified? | Impacts? | Amount of impacts |
|---|---|---|---|---|
| a. Jurisdictional wetlands | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | Ac Feet |
| b. Non-jurisdictional wetlands | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | _____Ac_____Feet |
| c. Other (List): _____ | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | Ac Feet |

If yes for delineation, has documentation of the delineation from the USACOE been provided? ☐ Yes ☐ No ☐ N/A

If yes for impacts, has a USACOE permit been applied for or obtained for those impacts? ☐ Yes ☐ No ☐ N/A
If yes, provide copy of the approved USACOE permit.

**C. Special Protection Areas***

1. Are there any flooding problems downstream of or adjacent to this site? ☐ Yes ☐ No
   If yes, see attached instruction.

2. Are any portions of the site located in a designated floodplain? ☐ Yes ☐ No
   If yes, what are the FIRM Numbers? _____

3. List the nearest DHEC water quality monitoring station(s) [WQMS(s)] to which stormwater (SW) discharges will drain and the corresponding waterbody(s). _____

   3.1. Is this WQMS listed on the most current 303(d) List for Impaired Waters? ☐ Yes ☐ No
   a. If yes for (3.1), list the impairment(s). _____
   b. If yes for (3.1) will SW discharges from your site contain the pollutant(s) of impairment? ☐ Yes ☐ No
   c. If yes for (b) will use of the proposed BMPs ensure that the site's discharges will not contribute to or cause further water quality standard violations? ☐ Yes ☐ No

   3.2. Has a TMDL(s) been developed? ☐ Yes ☐ No
   a. If yes for (3.2), list the waterbody _____
   list the impairment(s). _____
   b. Has the standard been attained for the impairment(s)? ☐ Yes ☐ No

c. If no for (b), will SW discharges from your site contain the pollutant of impairment? ☐ Yes ☐ No
d. If yes for (c), are your discharges consistent with the assumptions and requirements of the TMDL(s)? ☐ Yes ☐ No
e. If no for (d), will use of the selected BMPs ensure that the site's discharges will not contribute to or cause further water quality standard violations? ☐ Yes ☐ No

*Projects located in the Special Protection Areas may require a pre-submittal meeting.

**VII. Signatures and Certifications**

A. One copy of the stormwater plan, all specifications and supporting calculations, forms, and reports are herewith submitted and made a part of this application. I have placed my signature and seal on the design documents submitted signifying that I accept responsibility for the design of the system. Further, I certify to the best of my knowledge and belief that the design is consistent with the requirements of the Berkeley County Stormwater Management Ordinance and the Berkeley County Stormwater Design Standards. (This should be the person identified in Section IV)

| **Printed name of Plan Preparer** | **Signature of Plan Preparer** | **S.C. Registration #** |
|---|---|---|

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

I hereby certify that all construction and associated activity pertaining to this site shall be accomplished pursuant to and in keeping with the terms and conditions of the approved plans. I also certify that a responsible person will be assigned to the project for day-to-day control. I hereby grant authorization to Berkeley County the right of access to the site at all times for the purpose of on site inspections during the course of construction and to perform maintenance inspections following the completion of the land-disturbing activity.

| **Printed name of Owner/Operator**** | **Signature of Owner/Operator** | **Title/ Position** |
|---|---|---|

**In such cases where an operator signs the certification, a copy of the maintenance agreement between the owner and operator as required by the Stormwater Management Ordinance must be submitted with this application.

## Instructions

### Completing the Application:

You must type or print legibly. You must include the original, signed application form, one copy of the stormwater plan, and one copy of all other supporting documentation with the initial submittal. A checklist of all the documents necessary to obtain Construction Activity Application approval is available online.

### Who Must Submit an Application:

Any construction project located within "Regulated Area" as defined in the Stormwater Management Ordinance and disturbing one (1) acre or more unless exempted in the Ordinance and/or Manual.
"**Regulated Area**" is defined in the Stormwater Management Ordinance as "the boundaries of Berkeley County's urbanized areas as determined by Decennial Census Data from the United States Bureau of the Census. Regulated Area also includes any portion of the County that is so designated by Berkeley County Council. The Regulated Area designated by Berkeley County Council coincides with the area defined as "Service Zone 1" by the "Transportation Impact Fee Ordinance for Unincorporated Berkeley County" (Ordinance No. 06-11-75)". The Regulated Area can be viewed from Berkley County Website: http://gis.co.berkeley.sc.us/map.htm GIS Mapping → GIS Internet Mapping (MS4 Regulated Area)

### Projects located in the Berkeley County Regulated Area submit to:

Berkeley County Engineering
1003 Highway 52
Post Office Box 6122
Moncks Corner, S. C. 29461-6120
843.719.4127

### I. Owner Information

- The official or legal name of the owner shall be listed. If the owner is a company, then a Permit Contact person shall be listed. This can be someone other than the person that has signatory authority for the company. All correspondence regarding this permit application will be sent to Permit Contact at the address listed.
- Owner is defined in the Stormwater Management Ordinance as the "property owner, or any person who acts in his own behalf, that submits an application for approval to disturb land or vegetation or encroachment and the person, if so designated by default or on legal documents, as the responsible party for maintenance of a stormwater system(s) and facility(s)".
- The Company EIN is the Employer Identification Number as established by the U.S. Internal Revenue Service.

### II. Operator Information

- The official or legal name of the operator should be listed. If the operator is a company, then a Permit Contact person shall be listed. This can be someone other than the person that has signatory authority for the company. All correspondence regarding this permit application will be sent to Permit Contact at the address listed.
- Operator is defined in the Stormwater Management Ordinance as the "the person who is operating the property, including an operator or person who is in charge of any activity related to land disturbance, construction or post construction stormwater quality or quantity".
- The Company EIN is the Employer Identification Number as established by the U.S. Internal Revenue Service.

### III. Contractor Information

- The name of the Company shall be listed.
- The Company License # is the License number as established by the State.

### IV. Plan Preparer Information

- Enter the name and registration number of the stormwater plan preparer. S.C. COA is the company's S.C. Certificate of Authorization. Enter N/A for S.C. COA if the firm does not have a COA or the preparer is an individual. If an email address is entered, the County Engineer may contact the plan preparer via email.

Note: Typically, the plan preparer must be an engineer licensed in the State of South Carolina. For certain construction activity, the plan preparer may be someone other than a licensed engineer. However, this must be approved in advance by the County Engineer.

## V. Project Information

A. The Project/ Site Name should be a unique or distinguishing name (e.g., not Proposed Subdivision). The Department should be notified in writing if the Project/ Site Name changes.
County: If the project is in multiple counties, list all counties and indicate in which county the majority of the project will be.

The total and disturbed areas should be rounded to the nearest tenth of an acre. For subdivisions, if the exact build-out is not known, the disturbed area can be estimated using the following equation: Disturbed area = 2(Maximum Footprint of House)(# of lots) + Road/ Right-of-Way areas + Other easements/ disturbance. Please note that the County must be notified if the actual disturbed area is greater than the disturbed area listed on the application.

B. Institutional includes schools and other publicly owned projects, except linear projects. Site Preparation includes clearing, grubbing, and grading only; no new impervious areas shall be proposed if this activity type is checked.

## VI. Waterbody Information

A. The nearest receiving waterbody is the nearest waters of the State to which the site's stormwater will discharge. If this waterbody is unnamed, then provide a description that references the nearest, named waterbody (e.g., tributary to Grove Creek). If the site's stormwater discharges to multiple waterbodies, then list all such waterbodies and attach additional sheets, if necessary.

C. Special Protection Areas: If yes for (2), then the extent of the flooding problems and the effect of this project on those problems must be explained in the checklist under Project Narrative. For design criteria, see checklist under Special Protection Areas.

## VII. Certifications

A. The same licensed professional must sign and seal the application, drawings, calculations, and supporting documentation.
B. A person with signatory authority for the project owner/ operator must sign the application. The plan preparer cannot sign the application for the project owner/ operator. The plans, all reports, including monthly reports, and any information requested by the Engineering Department must be signed by a person with signatory authority for the project owner/ operator or a duly authorized representative.
   - Corporation: A responsible corporate officer (e.g., president, vice-president, certain managers)
   - Partnership or Sole Proprietorship: A general partner or the proprietor, respectively
   - Municipality, State, Federal or Other Public Agency: Principal executive officer or ranking elected official

## Office Mechanics and Filing

This form and supporting documentation will be kept in the Engineering Department files.

# Appendix B
# Covenants for Permanent Maintenance of Stormwater Systems

# BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM

## COVENANTS FOR PERMANENT MAINTENANCE OF STORMWATER SYSTEMS

THE TERM STORMWATER SYSTEMS MAY REFER TO WATER QUANTITY AND/OR WATER QUALITY FACILITIES, AND BEST MANAGEMENT PRACTICES, BMPS (i.e., detention basins, retention basins, stormwater ponds, stormwater wetlands, water quality buffers, swales, ditches, pipes, inlets, separators, filtering devices, water quality structures, etc.)

THIS Covenant made and entered into this_____day of_____, 20_____, by

and between (Insert Full Name of property owner) _____ hereinafter called the "Owner", and Berkeley County, South Carolina hereinafter called the "County".

WHEREAS, the Property Owner is the owner of certain real property described as Berkeley County Tax Map Number, (TMS#)_____as recorded by deed in the Berkeley County Register of Deeds (ROD), Deed Book_____Page_____, hereinafter called the "Property;" and

WHEREAS, the Owner is proceeding to, or has, made improvements on the Property; and

WHEREAS, the Site Plan/Subdivision Plan known as (Name of Plan/Development) _____

_____

hereinafter called the "Plan," which is expressly incorporated herein by reference, as approved, or to be approved, by the County, provides for the construction and maintenance of stormwater facilities, BMPs, and improvements within the confines of the Property; and

WHEREAS, the County requires that on-site stormwater facilities, BMPs, and improvements as shown on the Plan be constructed and adequately maintained by the Owner, its successors and assigns, including any homeowners association;

WHEREAS, the Owner, its successors and assigns, understands that the execution and adherence to the provisions of this Covenant is a condition precedent to the County's permitting, and/or approving the Site Plan, Storm Water Management Plan, and/or Subdivision Plan for the Property and the development located thereon;

NOW, THEREFORE, in consideration of the foregoing premises and mutual covenants the parties hereby agree as follows:

1. The on-site stormwater facilities, BMPs, and, improvements shall be constructed, operated, and maintained by the Owner, its successors and assigns, in accordance with the approved Plan and specifications identified in the Plan, as well as in accordance with State and federal requirements, the Berkeley County Stormwater Management Ordinance and Stormwater Design Standards Manual, and any and all other applicable County ordinances.

2. The Owner, its successors and assigns, including any homeowners association, shall adequately maintain the stormwater facilities, BMPs, and improvements on the Property. Adequate maintenance required by this Covenant shall include, but is not limited to, scheduled and corrective maintenance as described on/in the approved Plan and/or as described in the Berkeley County Stormwater Design Standards Manual for all stormwater facilities, BMPs, and improvements intended to manage and/or control stormwater on the Property, with such facilities, BMPs, and improvements to expressly include, but not be limited to pipes, drainage structures, ditches, swales, vegetation, berms, pond areas, outlet structures, maintenance shelf(s) and access roads, or any other improvement associated with stormwater on the Property but excluding any such improvements located on, under, or within any publicly owned or dedicated rights-of-way in which State or County has accepted maintenance of the roadways and/or drainage facilities. Adequate maintenance is herein defined as keeping such stormwater facilities, BMPs, and improvements in good working condition such that they satisfactorily perform their intended design functions.

3. The Owner, its successors and assigns, shall inspect the stormwater facilities, BMPs, and improvements as described on/in the approved Plan and/or as described in the Berkeley County Stormwater Design Standards Manual to assure safe and proper functioning of the stormwater facilities, BMPs, and improvements located on the Property. Any and all deficiencies identified during such inspections shall be repaired as necessary at the Owner's expense. A detailed repair plan may be required to be prepared by a professional engineer, licensed in the State of South Carolina.

4. The Owner, its successors and assigns, hereby grants permission to the County, its authorized agents and employees, to enter upon the Property and to inspect the stormwater facilities, BMPs, and improvements as deemed necessary by the County for purposes of protecting the public health, safety or welfare, for purposes of investigating or inspecting any reported or suspected deficiencies in the stormwater facilities, BMPs, and improvements on the Property, for purposes of responding to or investigating citizens' complaints relating to the management or control of stormwater on the Property, or for any other purpose deemed necessary by the County. The County shall provide the Owner, its successors and assigns, with a copy of any inspection findings, as well as a directive to commence with any required repairs. To the extent that the County does not agree with or to the contemplated repairs proposed by the Owner, the County may submit an alternate repair plan to the Owner or require the Owner to submit a detailed repair plan prepared by a professional engineer, licensed in the State of South Carolina.

5. In the event the Owner, its successors and assigns, fails to maintain the stormwater facilities, BMPs, and improvements on the Property in good working condition acceptable to the County, or fails to make repairs as specified in the inspection report within a reasonable time frame as established by the County, with such time frame not to be shorter than thirty (30) days, the County may enter upon the Property and take any and all action necessary to correct deficiencies identified in the inspection report. The Owner, its successors and assigns, shall be responsible for any and all expenses incurred by the County in taking such corrective action. This provision shall not be construed to allow the County to erect any structure of a permanent nature on the land of the Owner outside the easement for the stormwater management/BMP facilities. It is expressly understood and agreed that this Covenant imposes no obligation or responsibility on the County to routinely maintain or repair any stormwater facilities, BMPs, and improvements located on the property.

6. In the event that the County performs or undertakes work of any kind pursuant to this Covenant or expends any funds or resources in performance of said work for labor, use of equipment, supplies, material, and the like, the Owner, its successors and assigns, shall reimburse the County upon demand, within thirty (30) days of receipt of same.

7. This Covenant shall impose no liability on the County with respect to the maintenance or repair of any stormwater facilities, BMPs, and improvements on the Property, nor does the County assume any obligation

or duty to undertake or perform any action allowed for, or permitted by, this Covenant. The Owner, its successors and assigns, further agrees to indemnify and hold the County harmless from any liability arising out of the management, operation, maintenance, or failure of any stormwater facilities, BMPs, and improvement subject to this Covenant.

8. Notwithstanding any right extended to the County pursuant to this Covenant, it is expressly recognized and acknowledged that the County retains all prosecutorial rights and remedies available to it, including the enforcement of any and all applicable County ordinances, against the Owner, its successors and assigns, relating to the operation, maintenance, and/or repair of stormwater facilities, BMPs, and improvements located on the Property.

9. This Covenant shall be recorded among the land records of Berkeley County, South Carolina, and shall constitute running with the land, and shall be binding on the Owner, its administrators, executors, assigns, heirs and any other successors in interests, including homeowners association.

IN WITNESS WHEROF the undersigned have caused this Covenant to be executed on the date first written above.

WITNESSES: OWNER:

_____ _____
Witness: Individual/Company/Corporation/Partnership Name

_____ By: _____
Witness: Title:

STATE OF SOUTH CAROLINA )
) ACKNOWLEDGEMENT
COUNTY OF BERKELEY )

I, the undersigned Notary Public, do hereby certify that _____

_____, personally appeared before me this day and acknowledged the due execution of the foregoing instrument

WITNESS my hand and seal this_____day of_____, 20_____.

_____(SEAL)
Notary Public for South Carolina
My Commission Expires:_____

# Appendix C
# Checklist for CAA

# BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM

## CHECKLIST
## FOR
## CONSTRUCTION ACTIVITY APPLICATION

The following checklist shows the components that must be provided by the applicant with the completed Construction Activity Application.

The submitted information typically includes three parts: the application, the technical engineering calculations and discussions, and the construction documents (plans, details, specifications).

### I. APPLICATION FORM

- All application items must be completed and answered sufficiently.
- Signatory authority (original signatures) must be provided where requested.

### II. TECHNICAL REPORT/ENGINEERING CALCULATIONS

**1 REPORT COMPOSITION:**

1.1 Table of Contents
1.2 Report should be put together in a manner that facilitates review
1.3 Report prepared by licensed professional
1.4 One copy to be submitted.

**2 MAP(S):**

2.1 Include north arrow and scale on all maps.
2.2 Outlined project location.
2.3 Labeled road names.
2.4 Nearest waterbodies, discharge points, and waters of the State.
2.5 Location of any nearby protected areas (waters, wetlands, etc.)
2.6 Topographic information showing runoff patterns/overland flow paths.
2.7 Soil types.
2.8 100-year floodplain contours, location of floodway.
2.9 Wetlands.

**3 PROJECT NARRATIVE:**

3.1 A description of the site in general, purposes of the construction activity, issues with upstream, downstream, and adjacent properties, waterbodies receiving stormwater runoff, issues with site soils, existing water quality and flooding issues, anticipated impacts (quality, upstream/downstream structures, etc.) and benefits (open space, treatment, maintenance, etc.), and reasons for waiver request.
3.2 A summary table to include at least the following:
- Total and disturbed area
- Soil Type(s)
- Nearest receiving water body(s)

- List of BMPs for water quality and quantity & the rationale for BMP selection, to include how the selected controls will protect waterways and/or stormwater conveyances.
- 10-year & 100-year flood elevation if located in flood plain.

3.3 A summary table of existing and proposed runoff flows, volumes, and pollutant loads.
3.4 A discussion of issues relating to other State and federal permits needed or regulations to be followed.
3.5 A summary of the maintenance plan and schedule of the stormwater facilities, BMPs, and any improvements on the property for construction site and post-construction, and arrangements for construction site and post-construction maintenance responsibility.

**4 WATERS OF THE STATE, INCLUDING WETLANDS:**

4.1 Delineation of all waters of the State (WoS) located on the site, including wetlands, shown and labeled on plans.
4.2 If impacts to WoS, outlined areas of impacts and labeled that no work can begin in this area until all necessary USACOE permits and SCDHEC 401 certifications have been obtained.
4.3 Double row of silt fence provided in all areas where a 50' undisturbed buffer cannot be maintained between the disturbed area and the WoS.
4.4 Minimum 10' maintenance buffer provided between last row of silt fence and WoS; or, if buffer not provided, then statement from P.E. on plans indicating how silt fence will be installed and maintained without impacts to WoS.

Note: If there are proposed impacts to WoS, then applicant must contact the USACOE and/or S.C. DHEC Water Quality Certification, Standards & Wetlands Programs Section to determine additional requirements before submitting this NOI.
Note: If WoS are to be impacted, work cannot be performed in these designated areas until all necessary permits have been acquired.
Note: If USACOE permit is required for construction of a permanent stormwater management structure, County final approval cannot be granted until all applicable State and federal permits have been obtained. A preliminary approval is issued instead.
Note: A 50-foot buffer between a sediment trap/basin and WoS and wetland areas is recommended.

**5 HYDROLOGIC ANALYSIS:**

5.1 Drainage area maps clearly delineating the sub basins/watersheds for pre and post developed conditions. The sub basins/watersheds must correspond to the pre and post developed calculations.
5.2 Pre and post developed hydrologic analysis calculations for the 2-year, 10-year, 25-year, 50-year, and 100- year storm events, at each outfall point. Analysis should be performed at the same points and with the same drainage area for both pre and post developed conditions. The analysis must correspond to the delineated drainage area maps for pre and post developed conditions.
5.3 Analysis performed using SCS 24-hour storm (Rational Method not acceptable) or other if acceptable to the County Engineer.
5.4 Use rainfall data from South Carolina DHEC Storm Water Management BMP Handbook.

**6 DETENTION ANALYSIS/DESIGN:**

**6.1 Analysis**

6.1.1 Pond routing using a volume based hydrograph for the 2-year, 10-year, 25-year, 50-year and 100-year SCS 24-hour rainfall event (Drain:Edge, ICPR, HEC-1, SedCAD, HYDRAFLOW, etc. perform full pond routings: TR55 does not perform a full pond routing; rational method cannot be used).
6.1.2 Hydrologic and hydraulic calculations necessary to determine the impact of hydrograph timing modifications of the proposed land disturbing activity, with and without the pond (results of analysis will determine the need to modify the pond design or eliminate the pond requirement, see note below).
6.1.3 Inputs and outputs from analysis program.

6.1.4 Summary table of the peak inflows, peak outflows, and maximum water surface elevations (WSE) for the 2-year, 10-year, 25-year, 50-year and 100-year storm events for each pond.
6.1.5 Stage-storage-discharge relationship for the outlet structure of each detention structure.
6.1.6 If a rating curve for the outlet structure must be generated externally from the analysis program (Drain:Edge, HEC-1, HydroCAD), data and equations used to rate the outlet structure.

Note: The 10% rule in performing analysis is recommended. The hydrologic analysis should be conducted for the larger drainage area, where the site in question encompasses 10% of the total drainage area. For example, if your site is 10 acres, then the hydrologic analysis should be performed at the point downstream where the contributing drainage area, including your 10-acre site, is approximately 100 acres.

**6.2 Design**

6.2.1 The post-development discharges rates should be less than pre-development discharge rates for each outfall point for the 2-year and 10-year (and in some cases 25-year) storm events. If not, then a detention waiver must be requested.
6.2.2 Detail of outlet structure and cross-section of the dam/berm or pond bank, including elevations and dimensions that correspond to the calculations.
6.2.3 Orifice constructability considered (do not specify orifice diameters with increments of less than ¼").
6.2.4 Maximum WSE for the 10-year storm event below the emergency spillway with 0.5-ft of freeboard between maximum WSE for the 10-year storm and the emergency spillway.
6.2.5 Maximum WSE for the 100-year storm event below the embankment with 0.5-ft of freeboard between maximum WSE for the 100-year storm and the embankment.
6.2.6 The volume within any structure (i.e., dry ponds etc.) used for water quantity control shall be drained from the structure within 72 hours.
6.2.7 Bottom of all detention and retention ponds graded to have a slope of not less than 0.5% and side slopes no steeper than 3:1.
6.2.8 If the pond is to be used for sediment control during construction, outlet structure should be sufficiently protected.
6.2.9 Permanent maintenance access to all permanent detention structures (easements may be needed for structures surrounded by lots).
6.2.10 As a minimum, infiltration systems must be designed in accordance with S.C. Reg. 72-307.C(11) [specify how items a-j have been addressed]

Note: Emergency spillways should not be built on fill slopes.
Note: Installation of a trash rack or other debris-screening device is recommended on all pond risers.
Note: Installation of sediment forebays is recommended at each outfall into the detention/ sediment basin.

**7 HYDRAULIC DESIGN:**

7.1 Design calculations for all conveyances, inlets, and outlets based on the contributing area, allowable velocities, and upstream and downstream conditions.
7.2 Upstream and downstream analysis showing the project will not impact new and existing structures or reduce downstream system capacity.
7.3 Check to make sure the proper design storms were used at the appropriate design points.

**8 WATER QUALITY REQUIREMENTS:**

8.1 All sites which disturb one-half (1/2) acre or greater shall have permanent BMP installed.
8.2 Permanent water quality addressed (all projects or LCP that disturb 5 or more acres)
8.2.1 Wet ponds designed to catch the first ½" of runoff from the entire area draining to the pond and release it over at least a 24-hour period.

8.2.2 Dry ponds designed to catch the first 1" of runoff from the entire area draining to the pond and release it over at least a 24-hour period.

8.2.3 For areas not draining to a pond, show how permanent water quality requirements were addressed

8.3 Projects disturbing less than five (5) acres but within one-half (1/2) mile of a receiving water body in the Coastal Zone must meet Section III.C.3.XIII.A of the Coastal Zone Management Program Refinements. Designs must show that the first ½ inch of runoff from the entire site or the first one (1) inch of runoff from the built upon area, whichever is greater, can be stored onsite.

8.4 Waters of the U.S./State are not used for permanent water quality control (alternative means of treatment must be used if an existing pond is to be used for water quantity control).

8.5 The WQV requirement may be waived if treatment is instead provided by engineered devices. Applicability of such waivers will be based on submitted information showing that the device(s) has a design pollutant removal efficiency equivalent to a "dry" pond with a WQV of 1-inch. If the project is located within one thousand feet (1000') of shellfish beds, the pollutant removal equivalency must match a WQV of the first one and one-half inches (1 ½") of runoff.

8.6 BMPs used strictly for water quality that will be capturing one (1) or more acres shall have a pretreatment device as part of the BMP or treatment system, such as a forebay or vault, to remove debris and coarser sediments.

8.7 All BMPs must have a maintenance plan and schedule for construction site and post construction. Suggested schedules and routine activities are provided in the SCDHEC BMP Manual (2005).

8.8 For projects that discharge either directly or indirectly into an impaired waterbody as determined through SCDHEC's listing of the waterbody on the most current 303(d) list or by the existence of an adopted TMDL by SCDHEC is discussed in section below (Section II.9) under Special Protection Areas.

The County Engineer reserves the right to require specific effluent limits for any pollutant from a site if necessary to ensure the water quality standards and other State and federal water quality regulations are met

**9 SPECIAL PROTECTION AREAS:**

9.1 List the nearest S.C.DHEC Water Quality Monitoring Station (WQMS) that the site's stormwater discharges drain to and the waterbody on which it is located.

9.2 Qualitative and quantitative assessment (described in Section 3.4C of SCR100000), if nearest WQMS is listed on the most current 303(d) List of Impaired Waters and if site's stormwater construction discharges contain the pollutant of impairment and if the site disturbance 25 or more acres.

9.3 Evaluation of selected BMPs if nearest WQMS listed on the most current 303(d) List of Impaired Waters and if site's stormwater construction discharges contain the pollutant of impairment and if site disturbance less than 25 acres.

9.4 If a TMDL has been developed for the nearest WQMS and if the site's stormwater construction discharges contain the pollutant of impairment, show that measures and controls meet assumptions and requirements of TMDL (may need to contact DHEC Watershed Manager for assistance).

9.5 Where flooding problems exist, explain any anticipated impacts of this project on the adjacent properties and downstream structures. In an effort to relieve existing flooding problems downstream of or adjacent to this site, the following list of design criteria will be required:

- The post-development, peak discharge rates are restricted to half (½) the pre-development rates for the 2-year and 10-year storm event or to the downstream system capacity, whichever is less.
- The post-development runoff volumes for the 2-year frequency 24-hour duration storm events above the predevelopment level shall be stored for a period of 24-hours on average before release.

**10 SEDIMENTOLOGY:**

10.1 BMPs should be properly placed (silt fence, inlet protection, construction entrance, rip-rap at outfalls, check dams etc.).

10.2 Trapping efficiency calculations showing that all sediment basins/ traps are capable of achieving a sediment

trapping efficiency of at least 80% for the 10-year, 24-hour storm event, if more than 10 disturbed acres drain to a common point (stream, lake, etc.)

10.3 Sediment basins must be provided for storage for the 10-year, 24-hour storm event for disturbed conditions or 3600 $ft^3$/ acre draining to the basin, if more than 10 disturbed acres drain to a common point (stream, lake, property line, etc.).

10.4 Sediment traps only used for drainage areas of less than 5 acres.

10.5 Sediment trap storage calculations, showing that 1800 $ft^3$/ total acre draining to each trap is provided below the spillway.

10.6 If trapping efficiency calculations are required for sediment traps, then provide peak outflow, ($q_{po}$), calculations; the 10-year, 24-hour storm event for construction conditions cannot overtop the trap's spillway.

10.7 Sediment basins and traps designed for total area draining to them.

10.8 Drainage area map outlining the area draining to each sediment basin/ trap.

10.9 Copies of figures used to determine $V_{15}$ (SV-1) and trapping efficiency (ST-1, SB-1, SB-2), if Design Aids from SCDHEC BMP Manual (2005) are used to determine trapping efficiencies.

10.10 Silt fence only used in areas with drainage areas of less than ¼ acre per 100 linear foot of fence and not used in areas with concentrated flows.

10.11 Clean-out stake, marked at ½ the designed sediment storage depth, provided in all sediment basins/ sediment traps.

Note: Consult the SCDHEC OCRM STORMWATER BMP Handbook for information on the design of these and other devices.

Note: The Design Aids in the SCDHEC OCRM STORMWATER BMP Handbook cannot be used to determine trapping efficiencies for structures in series. If the flow for the10-year, 24-hour storm for construction conditions overtops the structure or the structure's spillway, then the Design Aids cannot be used. If multiple soil types are in the area draining to the structure, then the soil type with the smallest $D_{15}$ for the appropriate depth should be used to determine the settling velocity, $V_{15}$; an average $D_{15}$ should not be used.

**11 INLET PROTECTION:**

11.1 Provided at all inlets (no hay bales).

11.2 Steel posts and buried fabric shown for filter fabric inlet protection.

11.3 Inlet protection details provided for pre-paving and after roadways have been paved.

**12 SLOPE AND/OR CHANNEL STABILIZATION:**

12.1 All slopes designed and stabilized properly.

12.2 All channels and diversion ditches must be able to handle the 10-year storm event with non-erosive velocities during construction and design storm event for post-construction.

12.3 Rock check dams provided in temporary diversion.

12.4 Installation detail for erosion control blanket (ECB) or turf reinforcement matting (TRM) if ECBs or TRMs to be used.

12.5 Slope drains provided where concentrated flows discharge onto a fill slope.

**13 DISCHARGE POINTS:**

13.1 Storm drainage or pond outfalls are carried to an existing drainage outfall such as a pipe, ditch, easement, etc.

13.2 No new point discharges onto adjacent property where there was not a point discharge previously without providing the adjacent property owner's written permission.

13.3 Level spreaders, plunge pools, etc. provided when the proposed outlet is near the property line.

13.4 Provided a 20-foot minimum buffer between the property line and the end of all pipes or energy dissipation measures are installed.

13.5 Outfalls shall not discharge on fill slopes.
13.6 All outfalls must be stabilized.
13.7 Riprap aprons sized appropriately.
13.8 Riprap detail shows apron dimensions and stone sizes.
13.9 Filter fabric installed beneath all riprap.

**14 UTILITY/LINEAR PROJECTS:**

14.1 Limits of disturbance include areas disturbed for utility line(s) installation.
14.2 Inlet protection provided at all existing inlets that receive flows from the disturbed areas; also add this as a note on the plans.
14.3 For all utility lines crossing WoS, narrative and detail showing sediment and erosion control measures provided on plans.
14.4 Note for construction entrances to be provided at all locations where construction traffic accesses a paved roadway.

**15 POST-CONSTRUCTION MAINTENANCE PLAN AND SCHEDULE:**

15.1 Description of maintenance plan to be used
15.2 Schedule of maintenance procedures (e.g., every 6 months)
15.3 Detailed or manufacturer-specific maintenance items for proprietary control devices (oil-water separators, etc.), underground detention structures, exfiltration systems and non-traditional stormwater controls (constructed wetlands, bioretention, etc.)
15.4 Typical maintenance items to be addressed
- Ditches and swales to be cleaned (for sediments, debris, vegetative growth, etc), inspected and repaired.
- Stormwater drainage pipes, catch basins to be cleaned, inspected and repaired. Clean-out must include the removal and legal disposal of any accumulated sediment and debris.
- Grass to be mowed.
- Trees to be removed from within the pond and on the embankment.
- Trash and sediment to be removed from inside of and around the pond outlet structure.
- Orifices to be cleaned and unclogged.
- Outfall pipe to be cleaned, inspected, and repaired.
- Sediment accumulation to be removed from pond.
- Pond bottom to be regraded to provide proper drainage towards the outlet discharge point.
- Energy dissipator to be cleaned and repaired.
- Emergency spillway, if applicable, to be inspected and repaired.
- Erosion on side slopes, if present, to be addressed.

15.5 Specific maintenance items particular to more complex structures.

**16 ACCESS:**

Project layout has considered access for maintenance and inspection of stormwater facilities during and after construction.

**17 DETENTION WAIVER:**

17.1 If the 2-year and 10-year post development flow rates exceed the pre-development rates, waivers from detention may be granted on a case-by-case basis.
17.2 Justification shall be provided in a separate written request and demonstrate that:
- The proposed project will have no adverse impact on the receiving natural waterway or upstream, downstream or adjacent properties; or

- The imposition of peak control requirement for rates of stormwater runoff would aggravate downstream flooding.

17.3 Waiver request signed by the project's Professional Engineer.

17.4 Waiver from water quality criteria is not allowed. However, another equivalent method or criteria will be reviewed (applicant should provide all the necessary information to make a decision).

## III. CONSTRUCTION PLANS

- One complete set of plans and one complete set of technical report/engineering calculations for review.
- Once review is complete and comments are satisfied the following plans must be submitted to Engineering Department for stamping:
    - Four sets of full size plans
    - One set of half size plans
    - One set of technical report/engineering calculations
    - An electronic copy of the plans in pdf format on a CD-ROM
    - Additional sets if needed by the owner/project engineer

Note: One set of the approved and stamped plans must be on-site at all times during construction.

### 1. GENERAL ITEMS:

1.1 All sheets 24" x 36".
1.2 Engineer stamp and signature on every sheet.
1.3 Correct Scale and North Arrow.
1.4 Location map.
1.5 Property lines, adjacent landowners' names, and existing site conditions (locate buildings, structures, driveways, etc. onsite/offsite), critical or protected area.
1.6 Legend.
1.7 Existing elevations and contours for the entire site. Contours are to be tied to a known datum (for example, NAVD 88 datum), no **assumed** elevations, (1' interval is the minimum).
1.8 Limits of the disturbed area.
1.9 Lot Layout.
1.10 Delineation of WoS, including wetlands with letter from US Army Corps of Engineers, if applicable.
1.11 All existing and proposed easements.
1.12 Construction sequence & details (include implementation of all stormwater, erosion and sediment controls).
1.13 Locations and details of all temporary and permanent erosion and sediment control measures.
1.14 Construction entrance/exit.
1.15 Grassing and stabilization details and specifications.
1.16 Individual lot erosion control plan (applicable to all subdivisions).
1.17 Roadway plan and profiles with existing and proposed ground elevations.
1.18 Revision block utilized.

### 2. STORMWATER DRAINAGE SHEETS

2.1 Drainage area maps for existing and proposed conditions, outlining delineated sub basins, sub basin characteristics (watershed identifier, Curve Number, Tc, Area length, Slope), and the areas draining to all BMPs on site. Off-site drainage areas must be included on the map.
2.2 Labeling must be consistent with Technical Report/Engineering Calculations.
2.3 Proposed grading plan for the entire disturbed area.
2.4 Catch basin locations must be outside intersection curve radii.
2.5 Adequate drainage easements for any and all drainage structures located outside the road rights-of-way.
2.6 Adequate maintenance shelf around the entire pond(s) and along ditch(s) must be provided.

2.7 Label all storm drainage structures.
2.8 Water surface elevation in ponds and basins for all design storm events.
2.9 Storm drainage at roadway crossings to have one foot of cover minimum.
2.10 Minimum 18-inch RCP pipe under roadway (no decreases in pipe size in the downstream direction).
2.11 Crown elevation of inlet pipes equal or greater than crown elevation of outlet pipe.
2.12 Steps must be provided for all stormwater drainage boxes greater than 4.5 feet deep.
2.13 A minimum of 3'X3' size box is required for all storm drain boxes/inlets.
2.14 A table with calculated design flows for each pipe.
2.15 Hydraulic grade lines on profiles of storm pipe.
2.16 Existing and proposed grade on profiles of storm pipe.
2.17 Details of all stormwater drainage facilities and BMPs (catch basins, manholes, junctions boxes, detention basins, retention basins, ponds, pond outfall structures, emergency spillways, ditches, swales, stormwater wetlands, headwalls, rip-rap aprons, water quality buffers, oil/water separators, sand filtering devices, water quality structures, curb and gutter, etc.).
2.18 Typical roadway cross section(s), roadway cross sections(s) at wetland crossing

**3. UTILITY SHEETS**

3.1 Water and sewer plans including horizontal alignment of all lines and structures within rights-of-way and easements.
3.2 Pipe sizes and materials.
3.3 Invert elevations of all sanitary sewer pipes entering and exiting the manholes.
3.4 Bottom elevation, top elevation and/or rim elevation of all sanitary sewer manholes.
3.5 Water and sewer details.
3.6 Utility main(s) and service(s) at roadway crossings to have minimum three feet of cover.
3.7 Utility service(s) at ditch crossing to have minimum 18" of separation from the ditch design flow line elevation.
3.8 All fire hydrants must be located at/near the right-of-way line.
3.9 Manholes, valves or utility boxes must not be located within the curb and gutter section and/or within the roadway pavement section.
3.10 No conflict box.

**4. STANDARD NOTES:**

Notes as required by State and federal agencies and any additional notes for compliance with Berkeley County requirements.

## IV. DOCUMENTS:

Following additional documents are needed prior approval of Construction Activity Application:

- A Berkeley County Encroachment Permit Application if applicable.
- A copy of the approved SCDOT Encroachment Permit Application if applicable.
- A copy of a geotechnical report when needed.
- A copy of the recorded Covenants for Permanent Maintenance of Stormwater Systems by the property owner.
- A copy of the maintenance agreement between the operator and property owner where an operator other than the property owner is the responsible party for maintenance activities of stormwater systems.
- A copy of the approved Notice of Intent (NOI) for Stormwater Discharges from Large and Small Construction Activity.
- A copy of SCDHEC's Certificate of Coverage under the Construction General Permit (CGP).

# Appendix D
# Approval Process for CAA

## BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM

## APPROVAL PROCESS FOR CONSTRUCTION ACTIVITY APPLICATION

For projects (including subdivision plan, site/stormwater management plan, and encroachment permit application plan) located within **regulated area** (can be viewed from Berkeley County GIS Mapping Service: http://gis.co.berkeley.sc.us/disclaimer.htm - MS4 Regulated Area) **and** disturbing **1/2 acre** or more:

1. Documents necessary to submit to Berkeley County Engineering (BCE) for stormwater management plan approval:
   i. Completed "Construction Activity Application" (CAA)
   ii. One complete set of plans
   iii. One set of technical report/engineering calculations
   iv. **Copy** of the SCDHEC-OCRM Notice of Intent (NOI)
   v. Encroachment permit application if applicable
   vi. Covenants for Permanent Maintenance of Stormwater Systems (Covenants) signed and notarized. If someone other than the owner is the responsible party for maintenance activities of stormwater systems, a maintenance agreement between the operator and owner must be submitted along with the Covenants.

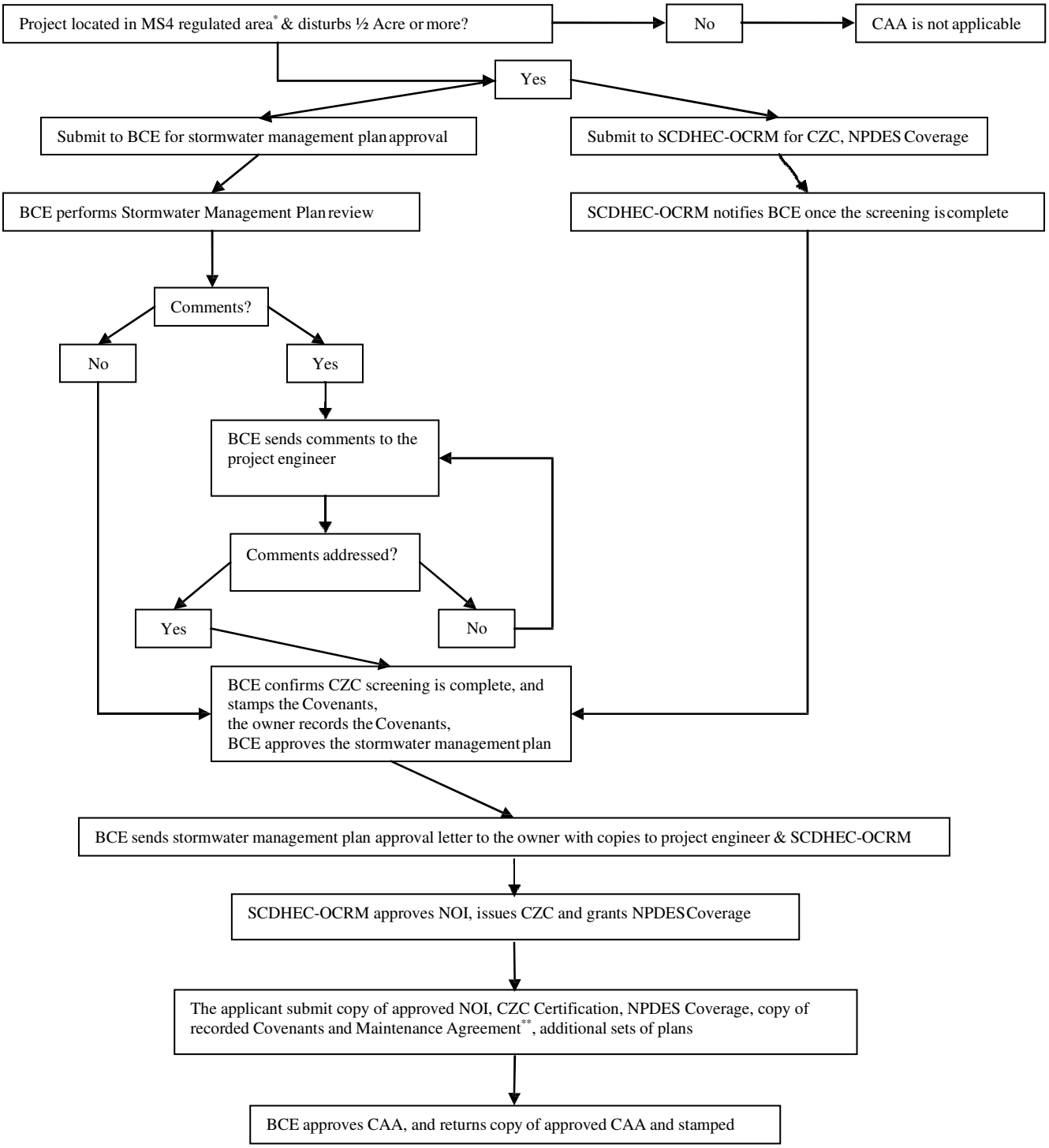
2. Once all BCE comments are addressed and review is complete, and BCE receives notification from SCDHEC-OCRM that Coastal Zone Consistency (CZC) screening is complete:
   i. BCE stamps the Covenants and returns the Covenants to the owner.
   ii. The owner records the Covenants in the Office of the Berkeley County Register of Deeds.
   iii. BCE approves the stormwater management plan.
   iv. BCE sends the approval letter to the applicant with copies to the project engineer and SCDHEC-OCRM. This **approval of the stormwater management plan does not constitute, in any way, the right to start construction**.

3. SCDHEC-OCRM approves NOI, issues CZC Certification and, authorizes coverage under the NPDES Phase II Construction General Permit (NPDES CGP).

4. Once the above steps are completed, the applicant submits:
   i. A copy of SCDHEC-OCRM's approved NOI
   ii. A copy of CZC Certification
   iii. A copy of SCDHEC's letter authorizing coverage under NPDES CGP
   iv. A copy of the recorded Covenants and maintenance agreement where applicable
   v. Additional sets of the approved stormwater management plans based on the type of construction activity:
      a. Subdivision (residential/commercial/industrial) with roads and drainage system to be accepted by the County: three sets of full size plans, one set of half size plan
      b. Site/stormwater management plan associated with building permits – three sets of full size plans.
      c. Linear (roads, utility lines, etc.)/encroachment permits/site preparation – two sets of full size plans.

      Note: Additional sets if needed by the owner/project engineer.
   vi. BCE approves CAA and returns a copy of the approved CAA and the stamped plans. **One set of the approved and stamped plans must be on-site at all times during construction**.

## Construction Activity Application Review and Approval Flow Chart




BCE: Berkeley County Engineering
CAA: Construction Activity Application
CZC: Coastal Zone Consistency
NPDES Coverage: NPDES Phase II Construction General Permit Coverage
*Regulated area can be viewed from Berkeley County GIS Mapping Service: http://gis.co.berkeley.sc.us/disclaimer.htm - MS4 Regulated Area
**If someone other than the owner is the responsible party for maintenance activities of stormwater systems, maintenance agreement between the operator and owner must be submitted along with the Covenants

# Appendix E
# Minimum Stormwater Management BMPs

## BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM

## MINIMUM STORMWATER MANAGEMENT BEST MANAGEMENT PRACTICES (BMPS)

All construction activity disturbing less than one-half (½) acre, including single family residential, shall implement and comply with the following requirements. In addition, if the site is part of a larger common plan of development, stormwater management requirements and BMPs specified in the approved CAA for the larger common plan of development must be implemented.

1. The site shall have adequate erosion and sediment control measures as necessary to prevent the movement of sediment off the property, into wetlands, and receiving waters. These measures shall be installed within 24-hours of land disturbance and maintained until the project is stabilized. Proper construction of these measures can be found in SCDHEC's BMP Manual. Manufacturers recommended installation and maintenance procedures shall be followed as applicable.

    - The maximum distance from the crest of a hill to a section of silt fence is 100 feet. When the distance from a crest to the property boundary is greater than 100 feet, an intermediate row of silt fence shall be used or another control measure shall be employed.
    - The maximum slope steepness (perpendicular to silt fence line) is 2H:1V. When exceeded, slope drains shall be employed.
    - A maximum of ¼ acre drainage per 100 linear feet of silt fence should be used. When this is exceeded, an intermediate row of silt fence shall be used or another control measure shall be employed.
    - Sediment accumulated along silt fence shall be removed when it reaches 1/3 the height of the fence.

2. Nearby stormwater inlets, manholes, etc. in the street or on this or adjacent property shall be protected through the use of sediment tubes, check dams, or inlet protection devices. These measures will be maintained throughout the construction process until the site is stabilized as detailed below.

3. Construction entrances shall be provided at entrances/exits (maximum of 2) as necessary. The stone in the entrance/exit shall be maintained throughout the construction process until the site is stabilized as detailed below. Sediment tracked onto streets shall be removed immediately for proper disposal.

4. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen days (14) after work has ceased, unless activity in that portion of the site will resume within twenty-one days. Existing/natural vegetation should be preserved as much as possible.

5. A site is considered stabilized once the entire disturbed area has a vegetative cover with a density of 70%. Seeding should be accompanied or replaced with erosion control mats as necessary to achieve this density. Final or permanent stabilization is considered achieved once the entire disturbed area has a permanent vegetative cover with a density of 70%. Final stabilization shall be implemented within fourteen (14) days of completion of all construction activities. After final stabilization is achieved, all control measures shall be removed from the site.

6. Site must be graded to achieve positive drainage away from the building(s). Positive yard drainage must be achieved as well.

7. Site must be graded to accommodate any existing offsite stormwater runoff and shall not block any existing runoff onto and throughout the site.

8. The construction activity will not cause or contribute in altering the natural drainage flow pattern of the site or adjacent properties. If the site is part of a larger common plan of development, the drainage must be constructed in accordance with the approved stormwater management plan.

9. The existing ground elevations at the property lines of a site must remain undisturbed and not altered unless a written agreement with the adjacent property owners has been obtained. If the site is part of a larger common plan of development, the site must be graded in accordance with the approved stormwater management plan.

10. Ensure good house keeping for proper use, storage, clean up and disposal of the various materials used during construction activities. Construction materials include concrete, cement, paint products, solvents, gas, oils, fertilizers, etc.

    - Construction debris and other waste shall be contained in a dumpster or covered with plastic. Covers that prevent exposure to precipitation shall also be used for stockpiles of soil.

    - Chemicals, paints, solvents, gas, oils and other materials shall be stored properly to prevent leaks and low exposure risk to precipitation and stormwater runoff. They must be disposed properly. Never clean brushes or rinse paint containers into a street, gutter or storm drainage structures. Clean up leaks/spills immediately. Never hose down pavement of surfaces where materials or chemicals have spilled. Use dry up method whenever possible.

    - Never dispose or dump concrete or washout from the mixing of concrete onto driveways, streets, gutters, or storm drainage structures. Concrete wash water shall be disposed in an area of soil away from surface waters where soil can act as a filter or evaporate the water. Remaining concrete shall be disposed of in a dumpster or otherwise removed from the site. Be aware that this water can kill vegetation. Store bags of cement and plaster in a dry place to protect from rainfall/sprinklers/wind and away from gutters/storm drainage structures.

    - De-watering water shall be disposed of in a pervious area. Discharge of sediment from dewatering operations shall be prevented from entering into storm sewers and surface waters.

11. Any and all on-site stormwater facilities, BMPs, and improvements must be adequately maintained by the owner, its successors and assigns in good working condition such that they satisfactorily perform their intended design functions.

# Appendix F
# Transfer of Ownership Application

**BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM**
1003 Highway 52 Post Office Box 6122
Moncks Corner, SC 29461-6120
843.719.4127 843.723.3800 843.567.3136
843.719.4695 fax

# TRANSFER OF OWNERSHIP APPLICATION

A. Project Name: _____

B. CAA Number: _____

C. NPDES Permit Coverage Number (if applicable): SCR10 _____

D. New Applicant Name: _____
Address: _____
City: _____, State: _____
Zip: _____
Phone: _ _ _ - _ _ _ - _ _ _ _ Mobile: _ _ _ - _ _ _ - _ _ _ _ Fax: _ _ _ - _ _ _ - _ _ _ _
Email Address (optional): _____

E. Property Info: ☐ Check Box if same as above
Address: _____
City: _____, South Carolina
Zip: _____
Tax Map Number(s): _____

F. Original Applicant Name: _____
Address: _____
City: _____, State: _____
Zip: _____
Phone: _ _ _ - _ _ _ - _ _ _ _ Mobile: _ _ _ - _ _ _ - _ _ _ _ Fax: _ _ _ - _ _ _ - _ _ _ _
Email Address (optional): _____

G. Transfer Information: Transfer Date (MM/DD/YYYY): / /_____
   a. Is the entire CAA being transferred to a new owner? ☐Yes ☐No
   b. Is this a subdivision where only a lot or a group of lots are being transferred? ☐Yes ☐No
   c. If Yes to Item G.b., list the lot, or group of lots being transferred.

   _____

H. Other Information:
   a. If there are no modifications being made to the plans, include five (5) sets of plans with signed Designer and Applicant's certification statements.
   b. If this is a subdivision where a lot or group of lots are being transferred, include a plat sheet with the lot or group of lots that are being transferred clearly outlined.

**Original Applicant's Certification**
I hereby relinquish the responsibility and ownership of the CAA listed in Item B above. I realize that the construction responsibility for the identified project/lots/group of lots now belongs to the new applicant.

_____ _____ _____
Original Applicant's Printed Name | Original Applicant's Signature | Date

**New Applicant's Certification**
I hereby certify that all construction and/or development will be done pursuant to this plan and I am responsible for the construction activities and related maintenance thereof. Berkeley County authorities will be allowed to enter the project site for the purpose of on-site inspections.

_____ _____ _____
New Applicant's Printed Name | New Applicant's Signature | Date

# Appendix G
# Table of BMP Suggested Uses

# EROSION PREVENTION BMP SUGGESTED USES

| BMP | Slope Protection | Waterway Protection | Surface Protection | Enclosed Drainage | Large Flat Areas | Borrow Areas | Adjacent Properties |
|---|---|---|---|---|---|---|---|
| **Erosion Prevention Measures** | X | X | X | X | X | X | X |
| Surface Roughening | X | | X | | | | |
| Bench Terracing | X | | X | | | | |
| Temporary Seeding | X | | X | | X | X | X |
| Mulching | X | | | | X | X | |
| Erosion Control Blankets and Turf Reinforcement Mats | X | X | X | | | X | |
| Final Stabilization | X | | X | | X | | X |
| Topsoiling | | | X | | X | | |
| Permanent Seeding and Planting of Grasses | X | | X | | X | | X |
| Permanent Ground Cover Plants | X | | X | | | | X |
| Sodding | X | | X | | X | | X |
| Riprap or Aggregate | X | X | X | | | | |
| Outlet Protection | | X | | X | | | X |
| Dust Control | | | | | X | X | X |
| Polyacrylamide (PAMs) | X | | X | X | X | X | X |

# TEMPORARY SEDIMENT CONTROL BMP SUGGESTED USES

| BMP | Slope Protection | Waterway Protection | Surface Protection | Enclosed Drainage | Large Flat Areas | Borrow Areas | Adjacent Properties |
|---|---|---|---|---|---|---|---|
| **Temporary Sediment Control Structures** | X | X | X | X | X | X | X |
| Storage Volumes and Maintenance Schedules | | X | | X | | | X |
| Temporary Sediment Basin | | X | X | X | | | X |
| Multipurpose Basin | | X | X | .X | | | X |
| Temporary Sediment Trap | | X | X | | | | X |
| Silt Fence | X | X | | | | | X |
| Rock Ditch Check | | | X | | | | X |
| Stabilized Construction Entrance | | | | | X | | X |
| Storm Drain Inlet Protection | | X | | X | | | X |
| Vegetated Filter Strips | | X | | | | | X |
| Rock Sediment Dike | | X | X | | | | X |

# RUNOFF CONTROL AND CONVEYANCE BMP SUGGESTED USES

| BMP | Slope Protection | Waterway Protection | Surface Protection | Enclosed Drainage | Large Flat Areas | Borrow Areas | Adjacent Properties |
|---|---|---|---|---|---|---|---|
| Pipe Slope Drains | X | | X | | | | |
| Temporary Stream Crossing | | X | X | | | | X |
| Runoff Conveyance Measures | X | | | | | X | X |
| Construction De-watering | | X | | X | X | X | |
| Level Spreader | | | X | | X | | X |
| Subsurface Drains | | | X | | X | | |

# STRUCTURAL STORMWATER QUALITY BMP SUGGESTED USES

| BMP | Land Requirement | Single Family | Multi Family | Low Density Commercial | High Density Commercial | Low Density Industrial | High Density Industrial |
|---|---|---|---|---|---|---|---|
| Wet Storm Water Ponds | MODERATE - HIGH | X | X | X | X | X | X |
| Wet Extended Pond | MODERATE - HIGH | X | X | X | X | X | X |
| Micropool Extended Pond | MODERATE - HIGH | X | X | X | | X | |
| Shallow Wetland | MODERATE - HIGH | X | X | X | | X | |
| Extended Detention Shallow Wetland | MODERATE - HIGH | X | X | X | | X | |
| Pond/Wetland System | MODERATE - HIGH | X | X | X | | X | |
| Pocket Wetland | MODERATE | X | X | | X | | X |
| Bioretention Areas | MODERATE | X | X | X | X | X | X |
| Sand Filtration Facilities | LOW | | | X | X | X | X |
| Infiltration Trenches | MODERATE | X | X | X | X | X | X |
| Enhanced Dry Swales | HIGH | X | X | X | | X | |
| Pre-Fabricated Control Devices | LOW | | X | X | X | X | X |

# STRUCTURAL STORMWATER QUALITY BMP CHARACTERISTICS

| BMP | Maintenance Burden | Costs | Aesthetically Pleasing | Provide Habitat | Drainage Area (Acres) | Soils |
|---|---|---|---|---|---|---|
| Wet Storm Water Pond | LOW | LOW | X | X | 10 MIN<br>25 PREFERRED | HSG A SOILS MAY REQUIRE POND LINER<br><br>HSG B SOILS MAY REQUIRE INFILTRATION TESTING |
| Wet Extended Pond with Aquatic Bench | LOW | LOW | X | X | 10 MIN<br>25 PREFERRED | |
| Micropool Extended Pond | MODERATE | LOW | X | X | 10 MIN | |
| Shallow Wetland | MODERATE | MODERATE | X | X | 20 MIN | HSG A AND B SOILS MAY REQUIRE LINER |
| Extended Detention Shallow Wetland | MODERATE | MODERATE | X | X | 20 MIN | |
| Pond/Wetland System | MODERATE | MODERATE | X | X | 20 MIN | |
| Pocket Wetland | HIGH | MODERATE | X | X | 5 MIN | |
| Bioretention Areas | LOW | MODERATE | X | X | 5 MAX | CLAY OR SILTY SOILS MAY |
| Sand Filtration Facilities | HIGH | HIGH | | | 5 MAX<br>2 PREFFERED | REQUIRE PRETREATMENT |
| Infiltration Trenches | HIGH | HIGH | | | 5 MAX | INFILTRATION RATE > 0.5 IN/HR |
| Enhanced Dry Swales | LOW | MODERATE | | | 5 MAX | PERMEABLE SOIL |
| Pre-Fabricated Control Devices | HIGH | HIGH | X (HIDDEN) | | VARIES | NO REQUIREMENT |

# STRUCTURAL STORMWATER QUALITY BMP SUGGESTED USES

| BMP | Water Quality | Channel Protection | Flood Protection | TSS Removal | Nutrient Removal | Metal Removal | Bacterial Removal |
|---|---|---|---|---|---|---|---|
| Wet Stormwater Pond | X | X | X | HIGH | MODERATE | MODERATE | MODERATE |
| Wet Extended Pond with Aquatic Bench | X | X | X | HIGH | HIGH | MODERATE | MODERATE |
| Micropool Extended Pond | X | X | X | HIGH | MODERATE | MODERATE | NO DATA |
| Shallow Wetland | X | X | X | HIGH | HIGH | MODERATE | HIGH |
| Extended Detention Shallow Wetland | X | X | X | HIGH | HIGH | MODERATE | HIGH |
| Pond/Wetland System | X | X | X | HIGH | HIGH | MODERATE | HIGH |
| Pocket Wetland | X | X | | HIGH | HIGH | MODERATE | HIGH |
| Bioretention Areas | X | | | HIGH | MODERATE | MODERATE | NO DATA |
| Sand Filtration Facilities | X | | | HIGH | MODERATE | MODERATE | MODERATE |
| Infiltration Trenches | X | | | HIGH | MODERATE | HIGH | HIGH |
| Enhanced Dry Swales | X | | | HIGH | MODERATE | MODERATE | LOW |
| Pre-Fabricated Control Devices | X | | | HIGH | LOW-HIGH | LOW-HIGH | LOW-HIGH |

# STRUCTURAL STORMWATER QUALITY BMP TRAPPING EFFICIENCY

| BMP | Monitoring | Pollutant Removal Efficiency % TSS | TP | TN | Nitrate Nitrogen | Other |
|---|---|---|---|---|---|---|
| **Surface Sand Filters** | Yes | 85 | 55 | 35 | Neg | Bacteria 40-80<br>Metals 35-90 |
| **Perimeter Sand Filters** | Yes | 80 | 65 | 45 | Neg | Hydrocarbons 80 |
| **Organic Sand Filter** | Yes | 95 | 40 | 35 | Neg | Hydrocarbons 80<br>Soluble P Neg<br>Metals 85 |
| **Gravel Filter** | Yes | 80 | 80 | 65 | 75 | Hydrocarbons 85<br>Metals 50-75 |
| **Dry Enhanced Swales** | Yes | 90 | 65 | 50 | 80 | Metals 80-90 |
| **Wet Enhanced Swales** | Yes | 80 | 20 | 40 | 50 | Metals 40-70 |
| **Plain Drainage Channel** | Yes | 30 | 10 | 0 | 0 | Bacteria Neg |
| **Vegetated Drainage Channel** | Yes | 65 | 25 | 15 | Neg | Hydrocarbons 65<br>Metals 20-50<br>Bacteria Neg |
| **Vegetated Filter Strip** | Yes | 70 | 10 | 30 | 0 | Metals 40-50 |

Should be used as a general guide to expected effectiveness and not for design purposes.

# Appendix H
# Inspection Checklist

**BERKELEY COUNTY STORMWATER MANAGEMENT PROGRAM**
1003 Highway 52 Post Office Box 6122
Moncks Corner, SC 29461-6120
843.719.4127 843.723.3800 843.567.3136
843.719.4695 fax

# INSPECTION CHECKLIST

Below are the items that County Inspectors will address during each site inspection.

1. Are contractor's maintenance logs available?
2. Are contractor's set of plans available on-site?
3. What is the current status of construction: beginning, middle, nearing completion, complete?
4. Have areas been clear cutting? If so, does the total area exceed the 10-acre limit?
5. Are there any waterbody impacts (sediment, oil, grease, etc)?
6. Are there any roadway impacts (sediments, damaged asphalt, etc.)?
7. Have any adjacent properties been negatively impacted? If so, what is the extent of the impacts?
8. Are there any air/dust impacts?
9. Are all tree protections in place and maintained? Enter any additional comments on tree protection.
10. Are all channels stabilized? Enter any additional comments on stabilized channels.
11. Is there any evidence of channel erosion? Enter any additional comments on channel erosion.
12. Are all inactive areas stabilized?
13. Are all inactive slopes stabilized?
14. Are all inactive stock piles stabilized?
15. Enter any additional comments on stabilization needs.
16. Are all erosion prevention and sediment control (EPSC) devices properly installed and maintained?
17. Do the EPSC devices provide adequate protection?
18. Are there any unneeded controls or are there any that need to be removed (closeout)?
19. Enter any additional comments on EPSC devices.
20. Are there any instances of erosion across the site? If so, what is the percentage?
21. Enter the re-inspection date based on condition of the site and offsite impact.
22. Enter any additional comments as necessary.
23. Is any enforcement action necessary?

# Appendix I
# Enforcement Forms

Stormwater Management Program
1003 US Hwy 52, Suite 120
Moncks Corner, SC 29461
berkeleycountysc.gov
843.719.4195

# CORRECTION ORDER

Date: Date

Name
Address
City, St Zip
Project # or TMS
CAA No. /Stormwater Management Plan No.: Plan Case

This correction order serves as a warning concerning activities on your above-mentioned site.

This warning is based on the results of a Berkeley County inspection on Enter Date.
A verbal warning was also given to Person receiving Verbal at the time of the inspection. A copy of our inspection report detailing the deficiencies is enclosed with this warning.

You have until Enter Date to correct the deficiencies noted on the inspection report. At that time a County Inspector will re-visit your site. Failure to comply with this warning is considered a violation of the Berkeley County Stormwater Management Ordinance 14-11-36 and will result in the issuance of a **Notice of Violation and/or Stop Work Order**.

If you have any questions concerning this warning you may contact our office at 843-719-4195.

Signed by: _____

Printed Name: Name

Stormwater Management Program
1003 US Hwy 52, Suite 120
Moncks Corner, SC 29461
berkeleycountysc.gov
843.719.4195

# NOTICE OF VIOLATION

Date: Tuesday, October 7, 2025

| | |
|---|---|
| Owner Name<br>123 Main Street<br>Moncks Corner, SC 29461 | Registered Agent<br>PO Box 456<br>North Charleston, SC 29418 |

CAA No. /Stormwater Management Plan No.: PLSP-00000-0000
TMS 000-00-00-000

Re: Project Name Here

You are hereby served notice that you are in violation of Berkeley County's Stormwater Management Ordinance 14-11-36 at the above-mentioned site. This violation is the results of a Berkeley County inspection completed on Monday, October 6, 2025. A copy of the inspection report is enclosed with this violation.

**Violation:**

**Corrective Action(s):**

The corrective actions must be completed within **five (5) working days** of the date of this letter. Berkeley County will conduct a follow-up inspection on Wednesday, October 15, 2025 for corrective actions. Failure to comply with this Notice of Violation issued for your site may result in a **Stop Work Order and/or civil penalty in the amount of $1,000/day for each deficiency.**

If you have questions concerning this violation you can contact our office at 843-719-4299.

Signed by: _____ Printed Name:

Stormwater Management Program
1003 US Hwy 52, Suite 120
Moncks Corner, SC 29461
berkeleycountysc.gov
843.719.4195

# STOP WORK ORDER

Date: Friday, December 19, 2025

| | |
|---|---|
| Owner Name<br>123 Main Street<br>Moncks Corner, SC 29461 | Registered Agent<br>PO Box 456<br>North Charleston, SC 29418 |

CAA No. /Stormwater Management Plan No.: PLSP-00000-0000
TMS 000-00-00-000

Re: Project Name Here

You are hereby served notice that you are in violation of Berkeley County's Stormwater Management Ordinance 14-11-36 at the above referenced site. A "**STOP WORK**" order is being posted on this property effective **IMMEDIATELY.**

This violation is due to the results a Berkeley County inspection completed on Friday, December 19, 2025. A copy of our inspection report is enclosed with this violation.

Your site must be inspected by a County Inspector prior to resuming any construction activity. Any activity other than work leading to compliance with this Stop Work Order can result in the issuance of a civil penalty in the amount of **$1,000/day for each deficiency and/or 30 days in jail**.

If you have any questions concerning this warning you may contact our office at 843-719-4127.

Signed by: _____

Printed Name: _____