

# Administrative Manual for Implementation of the Stormwater Management Ordinance



Developed by:  
City of Monroe  
Engineering Department

October 1, 2007

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## 1.0 Introduction

### 1.1. Purpose of Administrative Manual

The purpose of this administrative manual is to provide guidance and information to staff and general public for the effective and efficient implementation and administration of the Stormwater Management Ordinance (the Ordinance) for City of Monroe. The Administrative Manual includes application requirements and forms, submission schedules, fee schedule, inspection reports, the Stormwater Management Ordinance and Design Manual. A copy of the Administrative Manual is available at the City of Monroe – Engineering Department.

### 1.2. Impact of Stormwater on Water Quality

Stormwater runoff from urban and developing areas is a major source of water pollution and water quality degradation in City of Monroe. Oil, antifreeze and other automotive products deposited in parking lots, metals associated with tire and brake pad wear deposited along roadways, pesticides and fertilizers applied to lawns as well as a variety of other chemicals are picked up in stormwater runoff and carried to surface waters. The cumulative impact of these pollutants in an urban area is significant. In addition, urbanization results in an increase in the volume and velocity of stormwater runoff entering surface waters. This increased volume and velocity of stormwater runoff entering streams causes banks to erode and sediment to be discharged to surface waters, causing significant water quality degradation. The combined effect of increased pollutants due to urbanization, as well as increased stream channel erosion due to volume and velocity increases results in significant degradation of surface water resources. The increased volume and velocity of stormwater runoff can also cause significant downstream flooding problems. The Stormwater Management Ordinance is designed to control stormwater pollutants as well as increased stormwater volume and velocity from new development and redevelopment so that water quality is protected and downstream flooding is reduced. This Administrative Manual describes how the Ordinance shall be administered for the City of Monroe.

### 1.3. Stormwater Administrator

The person responsible for administering and enforcing the Ordinance is called the Stormwater Administrator. The powers and duties of the Stormwater Administrator as specified in the Stormwater Management Ordinance are as follows:

- 1) To review and approve or disapprove applications submitted pursuant to the Ordinance.
- 2) To make determinations and render interpretations of the Ordinance.
- 3) To establish application requirements and schedules for submittal and review of applications and appeals.
- 4) To enforce the Ordinance in accordance with its enforcement provisions.
- 5) To maintain records, maps, and official materials as relate to the adoption, amendment, enforcement, or administration of the Ordinance.
- 6) To provide expertise and technical assistance upon request to Environmental and Water Resources Committee.
- 7) To designate appropriate other person(s) who shall carry out the powers and duties of the Stormwater Administrator.
- 8) To provide information and recommendations relative to variances and information as requested by Environmental and Water Resources Committee in response to appeals.

- 9) To take any other action necessary to administer the provisions of the Ordinance.
- 10) To develop and implement the Administrative Manual prepared for the Ordinance.

The Stormwater Administrator has authority to determine the interpretation of the Stormwater Management Ordinance. Any person may request an interpretation by submitting a written request to the Stormwater Administrator who shall respond in writing within 30 days. The Stormwater Administrator shall keep on file a record of all written interpretations of the Ordinance.

The contact information for the Stormwater Administrators is:

City of Monroe – Engineering Department  
Engineering Director  
P. O. Box 69  
300 West Crowell Street  
Monroe, NC 28111-0069  
Phone: 704-282-4515  
Fax: 704-282-4735

## 2.0 Stormwater Management Ordinance

### 2.1. Purpose of Ordinance

The purpose of the Stormwater Management Ordinance is to protect, maintain and enhance the public health, safety, environment and general welfare by establishing minimum requirements and procedures to control the adverse effects of increased post-construction stormwater runoff and non-point source pollution associated with new development and redevelopment. It has been determined that proper management of construction-related and post-construction stormwater runoff will minimize damage to public and private property and infrastructure, safeguard the public health, safety, and general welfare, and protect water and aquatic resources.

### 2.2. Applicability

The standard applicability language in the Ordinance is as follows:

The Stormwater Management Ordinance shall apply to all developments and redevelopments within the corporate limits or in the extraterritorial jurisdictions of the City of Monroe, unless one of the following exceptions applies to the development or redevelopment as of the effective date of the Ordinance (October 1, 2007):

- 1) For residential development, preliminary subdivision plan application or in the case of minor subdivisions, construction plan for required improvements, submitted and accepted for review;
- 2) For nonresidential development, preliminary plan application submitted and accepted for review, provided that the water quality and quantity features required at the time of submittal are contained within the submittal and provided the plan is subsequently approved;
- 3) Zoning use application submitted and accepted for review for uses that do not require a building permit;
- 4) Certificate of Building Code Compliance issued by the proper governmental authority;
- 5) Valid building permit issued pursuant to G.S. § 153A-344 or G.S. § 160A-385(b)(i), so long as the permit remains valid, unexpired, and unrevoked;
- 6) Common law vested right established (e.g., the substantial expenditure of resources (time, labor, money) based on a good faith reliance upon having received a valid governmental approval to proceed with a project); and/or
- 7) A conditional zoning district (including those districts which previously were described variously as conditional district, conditional use district, parallel conditional district and parallel conditional use district) approved prior to the effective date of the Ordinance, provided formal plan submission has been made and accepted for review either prior to 5 years from the effective date of the Ordinance in the case of conditional zoning districts approved on or after the date. Any changes to a conditional zoning district necessary to comply with the requirements of the Ordinance shall be made through administrative amendment and not through a rezoning.

### 2.3. Standards

The Standards Section (Section 3) of the Stormwater Management Ordinance describes the specific criteria that all development and redevelopment must meet in order to control water quality, volume and velocity as required by the Ordinance. The following criteria are required:

- 1) Installation of structural best management practices (BMPs) when a built-upon area threshold is exceeded.
- 2) Maintaining buffers (no-build zones) adjacent to perennial and intermittent streams.
- 3) Installation of detention measures when a built-upon area threshold is exceeded. In addition, new development is encouraged by the Stormwater Management Ordinance to set aside open space as a form of non-structural BMP.

Provided below is a discussion of how each of the criteria function to control water quality, volume and velocity.

#### *Structural BMPs*

A structural BMP collects stormwater runoff from developed areas and provides water quality and quantity treatment to achieve water quality protection goals. Structural BMPs are designed and constructed in accordance with specifications contained in the Design Manual. By meeting these specifications, the BMP is presumed to meet the minimum water quality performance standards of the Stormwater Management Ordinance and the Phase II laws. Failure to construct BMPs in accordance with these specifications may subject the owner to civil penalties. The Stormwater Management Ordinance requires that BMPs be designed to achieve 85% average annual total suspended solids (TSS) removal or a combination of 85% TSS removal and 70% average annual total phosphorus removal based on watershed district. This removal efficiency must be achieved for runoff generated from the first inch of rainfall. The basic mechanisms of pollutant removal operating in structural BMPs are the gravitational settling of pollutants, infiltration of soluble nutrients through the soil profile, and to a lesser extent, biological and chemical stabilization of nutrients. The establishment of a temporary or permanent pool of water results in quiescent conditions, which can settle out particulate pollutants between storms. Infiltration relies heavily on filtration through the soil profile as pollutants are removed through aerobic decomposition and chemical precipitation. Removal of soluble pollutants is accomplished primarily through the mechanisms of chemical and biological stabilization of nutrients. Structural BMPs include: wet ponds, dry extended detention ponds, stormwater wetlands, bioretention filters (rain gardens), sand filters, infiltration trenches, grassed swales, level spreaders, and various manufactured BMPs such as Stormceptor™, StormTreat™ System, Vortechs™ Treatment System, and Downstream Defender™.

#### *Buffers*

Buffers are natural, vegetated areas (preferably forested) adjacent to lakes and creeks through which stormwater runoff flows in a diffuse manner to prevent channelization. Buffers serve to filter pollutants and absorb runoff, thereby reducing stormwater volume, velocity and pollutant loads. Buffers are effective at removing a variety of pollutants, including sediment, phosphorus, nitrate and some metals. Pollutants become trapped as surface flow passes through the buffer and slows down. Sediment settles out, phosphorus and metals are taken up by the root structure of buffer plants and nitrate is converted to nitrogen gas by microbes found in the underlying soil media. The slowing down of runoff also allows water to infiltrate through the soil and become groundwater recharge. In order for buffers to effectively filter pollutants, stormwater must sheet flow across the buffer and the buffer must be of sufficient width. A well-established buffer is generally self-perpetuating and requires little maintenance. Native trees and shrubs are recommended for their hardiness, effective canopy and root structure. Buffer canopies intercept

rainfall, thereby minimizing soil disturbance. Buffers also improve water quality by providing shade, which lowers water temperatures. Cool water carries more dissolved oxygen than warmer water and is essential to the survival of fish and other aquatic wildlife that are sensitive to changes in temperature. Buffers also provide woody debris for fish habitat.

#### *Detention*

Detention is the process of collecting and detaining stormwater runoff in engineering structures such as dry detention ponds to reduce volume and velocity and protect downstream areas from channel degradation and flooding. In many cases, water quality BMPs also serve to provide some degree of detention. As the amount of impervious area increases in a watershed so does the volume and velocity of stormwater runoff. Replacing an acre of trees with asphalt can result in stormwater runoff increasing by 27,000 gallons from an inch of rainfall. In addition, this runoff typically enters surface waters through the piped storm sewer system resulting in increased velocity. This increased volume and velocity of stormwater runoff entering streams causes significant downstream channel scour and flooding. The purpose of detention is to hold back this added water and release it over time to prevent negative impacts downstream. Like water quality BMPs, detention measures are designed and constructed in accordance with specifications contained in the Design Manual. By meeting these specifications, the detention measure is presumed to meet the minimum water quality performance standards of the Stormwater Management Ordinance and the Phase II laws.

#### *Undisturbed Open Space*

- Undisturbed open space is the setting aside of an area of a development site to be left undisturbed thus reducing the amount of impervious area and thereby reducing stormwater volume, velocity and pollutant load. This technique is considered a nonstructural BMP for controlling stormwater impacts.

### 3.0 Design Manual

#### 3.1. Purpose of the Design Manual

The purpose of the Design Manual is to provide the criteria, and information, including technical specifications and standards, for compliance with the requirements of the Stormwater Management Ordinance. The Design Manual includes approved stormwater treatment practices (also called best management practices or BMPs), including the specific design criteria for each stormwater practice. Stormwater treatment practices that are designed and constructed in accordance with the design and sizing criteria contained in the Design Manual shall be presumed to meet the minimum water quality performance standards of the Stormwater Management Ordinance and the Federal Phase II Stormwater Rules. Failure to construct stormwater treatment practices in accordance with these criteria may subject the violator to a civil penalty as described in the Stormwater Management Ordinance.

#### 3.2. Design Manual

The City of Monroe will utilize the criteria and information including technical specification and standards in the latest edition of N.C. Department of Environment and Natural Resources – Division of Water Quality (NCDENR-DWQ) “Stormwater Best Management Practices (BMP) Manual” and any relevant City of Monroe addenda, for the proper implementation of the Stormwater Management Ordinance. The Stormwater BMP Manual may be updated and expanded from time to time, based on advancements in technology and engineering, improved knowledge of local conditions, or local monitoring or maintenance experience. The design manual is available for download at the NCDEHR-DWQ web site [http://h2o.enr.state.nc.us/su/bmp\\_manual.htm](http://h2o.enr.state.nc.us/su/bmp_manual.htm). To be included on the contact list for BMP update to the design manual, email Kelly Johnson at [Kelly.p.Johnson@ncmail.net](mailto:Kelly.p.Johnson@ncmail.net)

The NCDENR-DWQ Design Manual was developed to serve as a tool box and/or guideline for application throughout North Carolina. Other BMP Manuals can be used as a supplement to NC DENR Design Manual. The following a list of shortcomings the designer should be aware when using the NC DENR Design Manual:

- includes BMPs that cannot be implemented in specific geographical areas;
- includes design standards/methods that cannot be readily implemented by the design community;
- does not consider designs of BMP treatment trains;
- does not consider methods to assess impacts of design parameters to overall BMP effectiveness;
- may not reach overall watershed goals;
- does not include examples; and
- does not include plans and specifications to assist the community in the construction phase.



#### 4.0 Application Requirements

##### 4.1. Purpose of Stormwater Management Permit Application

The purpose of the Stormwater Management Permit Application is to demonstrate how post-construction stormwater runoff shall be controlled and managed and how the proposed project shall meet the requirements of the Ordinance. A properly submitted, reviewed and approved Stormwater Management Permit Application is required for the issuance of a Stormwater Management Permit. The content and form of the Stormwater Management Permit Application shall be established by the Stormwater Administrator. All plans submitted with the application shall be prepared by a registered North Carolina professional engineer or landscape architect. The engineer or landscape architect shall perform services only in their area of competence, and shall verify that the design of all stormwater management facilities and practices meets the submittal requirements for complete applications, that the designs and plans are sufficient to comply with applicable standards and policies found in the Design Manual, and that the designs and plans ensure compliance with the Stormwater Management Ordinance.

##### 4.2. Stormwater Management Permit Application:

See Appendix 8.1 for blank copy of form

##### 4.3. Stormwater Checklist

See Appendix 8.2 for blank copy of form

##### 4.4. Final Watershed Pond Construction form

See Certification Form 1-04 in Appendix 8.3 or in the City of Monroe Standard Specifications and Detail Manual

##### 4.5. Watershed Post-Construction Checklist for Retention and Detention Ponds

See Appendix 8.4 or in Section 07.12 in the City of Monroe Standard Specifications and Detail Manual

##### 4.6. Post-Construction Checklist

See Appendix 8.5 or in Section 07.11 in the City of Monroe Standard Specifications and Detail Manual

## 5.0 Submittal Schedule

### 5.1. Stormwater Management Submittal

- (i) Applicant submits Stormwater Management Permit Application
- (ii) The intent of the Stormwater Administrative manual is to comply with the timeline as outlined in the *City of Monroe Code of Ordinance Section 156.23 Technical Review Committee (F) procedures. The Technical Review Committee shall meet every Wednesday of every month. Additional meetings may be held at the discretion of the Chairman or his or her designee. The deadline for applicants to submit proposals shall be twelve (12) days prior at 12:00 p.m. (noon) for standard (non conditional rezoning) review. The deadline for conditional rezoning review shall be two-weeks (14 days) prior at 12:00 p.m. (noon) and shall be subject to two (2) reviews (as amended to date).*
- (iii) Stormwater Administrator reviews submittal not to exceed 30 days and submits redlines/comments to applicant
- (iv) Applicant addresses redlines/comments and resubmits
- (v) Stormwater Administrator reviews resubmittal(s) within 10 working days (15 days max.) and approves Plans.
- (vi) Stormwater Administrator issues Stormwater Permit

6.0 Fee Schedule

Description	Fee
Stormwater Management Permit	
Administrative Manual	\$25
For the first 5 acres disturbed	\$600
Over 5 acres disturbed	\$600 plus \$50 per acre disturbed or portion there of disturbed over 5 acres
Post Construction Site BMP Inspection	
Administrative Fee for Annual Compliance Inspection by Third Party	\$300
Recordation fee of Maintenance Agreement	\$25

## 7.0 Operation and Maintenance Agreement

### 7.1. Purpose of the Operation and Maintenance Agreement

An Operation and Maintenance Agreement is required for all BMPs. The purpose of this agreement is to ensure that each BMP receives adequate maintenance so that it can satisfactorily perform its pollutant removal function. The agreement also designates the responsible party who shall be in charge of maintaining the BMP. It serves as a legal document to ensure maintenance and also outlines the routine maintenance schedule for each BMP.

### 7.2. Description of the Operation and Maintenance Agreement

Prior to final approval of any BMP design plans and the issuance of the Stormwater Management Permit, an Operation and Maintenance Agreement must be submitted and approved by the Stormwater Administrator for each BMP. The Operation and Maintenance Agreement form (Stormwater Maintenance Agreement) can be found in Appendix 8.6. The owner of the BMP has the discretion to modify this agreement provided the provisions listed below are included:

- 1) Acknowledgment that the Covenanter(s) shall continuously operate and maintain the stormwater control and management facilities.
- 2) Establishment of an escrow account, which can be spent solely for sediment removal, structural, biological or vegetative replacement, major repair, or reconstruction of the structural BMPs. If structural BMPs are not performing adequately or as intended or are not properly maintained, the City of Monroe, in its sole discretion, may remedy the situation, and in such instances the City of Monroe shall be fully reimbursed from the escrow account. Escrowed funds may be spent by the Covenanter(s) for sediment removal, structural, biological or vegetative replacement, major repair, and reconstruction of the structural BMPs, provided that the City of Monroe shall first consent to the expenditure.
- 3) Both developer contribution and annual sinking funds shall fund the escrow account. Prior to plat recordation or issuance of construction permits, whichever shall first occur, the developer shall pay into the escrow account an amount equal to fifteen (15) percent of the initial construction cost of the structural BMPs. Two-thirds (2/3) of the total amount of sinking fund budget shall be deposited into the escrow account within the first five (5) years and the full amount shall be deposited within ten (10) years following initial construction of the structural BMPs. Funds shall be deposited each year into the escrow account. A portion of the annual assessments of the Covenanter(s) shall include an allocation into the escrow account. Any funds drawn down from the escrow account shall be replaced in accordance with the schedule of anticipated work used to create the sinking fund budget.
- 4) The percent of developer contribution and lengths of time to fund the escrow account may be varied by the (name of local government) depending on the design and materials of the stormwater control and management facility.
- 5) Granting to the City of Monroe a right of entry to inspect, monitor, maintain, repair, and reconstruct structural BMPs.
- 6) Allowing the City of Monroe to recover from the Covenanter(s) and its members any and all costs the City of Monroe expends to maintain or repair the structural BMPs or to correct any operational deficiencies. Failure to pay the City of Monroe all of its expended costs, after forty-five days written notice, shall constitute a breach of the agreement. The City of Monroe shall thereafter be entitled to bring an action against the Covenanter(s) and its members to pay, or foreclose upon the lien hereby authorized by the agreement against the

property, or both, in case of a deficiency. Interest, collection costs, and attorney fees shall be added to the recovery.

- 7) A statement that this agreement shall not obligate the City of Monroe to maintain or repair any structural BMPs, and the City of Monroe shall not be liable to any person for the condition or operation of structural BMPs.
- 8) A statement that this agreement shall not in any way diminish, limit, or restrict the right of the City of Monroe to enforce any of its Ordinances as authorized by law.
- 9) A provision indemnifying and holding harmless the City of Monroe for any costs and injuries arising from or related to the structural BMP, unless the City of Monroe has agreed in writing to assume the maintenance responsibility for the BMP and has accepted dedication of any and all rights necessary to carry out that maintenance.

A BMP Maintenance Plan must be attached as an Addendum to the Operation and Maintenance Agreement which identifies the specific maintenance activities to be performed for each BMP. As part of the BMP Maintenance Plan submittal, a digital copy must include as part of the Addendum. The Maintenance Plan shall identify each BMP using the following naming convention: "Project or subdivision name – BMP Type – Number." For example, Stoneridge Phase I – Bioretention 1". This naming convention should also mirror the BMP naming convention used on the approved design plans. Following approval of the Operation and Maintenance Agreement and Maintenance Plan by the Stormwater Administrator, the document must be signed by the responsible party, notarized, and recorded at the Union County Register of Deeds Office with the corresponding approved Plat. A copy of the recorded document must be provided to the Stormwater Administrator for filing within fourteen (14) days of recordation. Receipt of this document shall be indicated in the Stormwater Management Ordinance Database and the document shall be placed in the project file.

### 7.3. Description of Maintenance Requirements

The Operation and Maintenance Agreement requires that each BMP be inspected by a qualified registered North Carolina professional engineer or landscape architect on an annual basis. An inspection report must be completed for each BMP indicating the status of each item inspected and any maintenance that was conducted. The inspection report must be completed on the form provided in City of Monroe Standard Specification and Detail Manual called the City of Monroe BMP Maintenance and Inspection Checklist. The first inspection report is due to the Stormwater Administrator within one (1) year from the date of as-built certification and each year thereafter. The inspector shall certify on the Maintenance and Inspection Checklist that the BMP has been inspected and that at the time of the inspection the BMP was performing properly and was in compliance with the terms and conditions of the approved Operation and Maintenance Agreement and Maintenance Plan required by the Stormwater Management Ordinance. Therefore, the inspector should allow enough time before the end of the one year time period to conduct the necessary inspections(s) and completed the necessary maintenance and repairs prior to submittal of the report.

Within two (2) weeks following the completion of inspection and maintenance activities, the owner of the BMP shall forward the signed and sealed Maintenance and Inspection Checklist to the Stormwater Administrator. Submitted inspection forms shall be entered into the BMP maintenance database to track inspections and maintenance activities and the hard copy shall be

placed in the file. The owner of the BMP shall keep records of inspections, maintenance, and repairs for at least five (5) years from the date of creation of the record and shall submit the same upon reasonable request to the Stormwater Administrator. All inspection forms should be mailed to:

City of Monroe  
Engineering Department  
Attention: Engineering Director  
PO Box 69  
Monroe, NC 28111-0069

#### 7.4. Transfer of Maintenance Responsibilities

City of Monroe shall not accept maintenance responsibility of structural BMPs that are installed pursuant to the Stormwater Management Ordinance. The owner will continue to own and maintain the pond until City of Monroe – Engineering Department is notified in writing of a transfer in ownership and maintenance responsibility. The notification will include a date for the transfer of responsibility and a letter of acceptance from the new owner. Notify the Department within 30 days of a proposed change in ownership.

Appendix 8.1  
Stormwater Management Permit Application

Appendix 8.2  
Stormwater Checklist



Appendix 8.3  
Final Watershed Pond Construction

Appendix 8.4  
Watershed Post-Construction Checklist for  
Retention and Detention Ponds

Appendix 8.5  
Post-Construction Checklist

Appendix 8.6  
Stormwater Maintenance Agreement

Appendix 8.7  
Stormwater Management Ordinance