

# Stormwater Management Program for Lands within the Neuse River Basin

Orange County, North Carolina

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## **INTRODUCTION AND PURPOSE**

The Neuse River Basin Nutrient Sensitive Waters Management Strategy is a set of rules adopted in August, 1998 by the Environmental Management Commission (EMC) with a goal of a 30% reduction in nitrogen output from each of the following sources: Wastewater Treatment, Urban Stormwater, Agriculture, and Nutrient Application. Included within the rule is the protection of Riparian Buffers due to their ability to aid in the removal of nitrogen from groundwater. The excess amounts of nitrogen currently entering into the Neuse River have been the primary cause of the recent fishkills in the coastal areas of the basin.

The Model Stormwater Program addresses the requirements of the Neuse River Basin Nutrient Sensitive Waters Management Strategy (also known as the “Neuse Rules”) as they apply to stormwater. The stormwater section of these rules applies only to the larger local governments within the basin, and includes Orange County. The main focus of the stormwater requirements is to reduce nitrogen loaded runoff from leaving urban areas and entering the streams and rivers of the basin.

## PROGRAM COMPONENTS

### New Development Nitrogen Control Program Components

- **Provisions for Protecting Riparian Areas in New Developments**

Orange County is requesting a delegated program to implement all applicable provisions of the Riparian Buffer Rule. Please see accompanying Ordinance.

The Neuse Stormwater Rule requires Orange County to ensure that riparian areas are protected on new developments in accordance with the Riparian Buffer Rule (15A NCAC 2B .0233). The Riparian Buffer Rule requires that 50-foot riparian buffers be maintained on all sides of intermittent and perennial streams, ponds, lakes and estuaries in the Neuse River basin. The rule includes some uses that are allowable within the riparian buffer, such as road and utility crossings.

- **Program for Calculating/Controlling TN Export from New Development**

New development would have to meet the 30% reduction goal by implementing planning considerations and best management practices, such as constructed wetlands. The rule imposes a 3.6 pounds per acre per year (lb/ac/yr) nitrogen loading limit on new development. Nitrogen load from new developments that exceeds this performance standard may be offset by payment of a fee to the Wetlands Restoration Fund provided, however, that no new residential development can exceed 6.0 lb/ac/yr and no new non-residential development can exceed 10.0 lb/ac/yr.

The nitrogen export from each new development must be calculated. This export will be calculated in pounds per acre per year (lbs/ac/yr). Model methodologies that may be used to make this calculation are presented below; however, local governments may propose alternative approaches where it can be demonstrated to be equivalent. There are two different methodologies proposed for calculating nitrogen export from new developments.

- **Program for Calculating/Attenuating Flow From New Development**

The Neuse Stormwater Rule requires there be no net increase in peak flow leaving the site from the predevelopment conditions for the 1-year, 24-hour storm. Orange County has specified that specific methodologies be followed when determining peak flows from new development activities. See the accompanying Ordinance for further information.

The flow control requirement is not required for developments that meet either of the two following requirements:

- The increase in peak flow between pre- and post-development conditions does not exceed ten percent (note that this exemption makes it easier to conduct redevelopment activities).
- The proposed new development meets all of the following criteria: overall impervious surface is less than fifteen percent, and the remaining pervious portions of the site are utilized to the maximum extent practical to convey and control the stormwater runoff.

It is recognized that in certain parts of drainage basins, stormwater detention can aggravate local flooding problems. Communities may need to tailor requirements or provide exemptions to those specific locations.

- **Program to Assure Long-Term Maintenance of BMP's**

If BMPs are implemented to achieve the nitrogen loading and flow attenuation requirements for a development, Orange County requires that a signed, and notarized maintenance agreement accompany them. An annual fee for inspection must be paid by the financially responsible parties, and failure to pay this fee or perform proper maintenance will be considered a violation of the Orange County Ordinance.

- **Approach for Considering Land- Use Planning/Design Techniques**

All feasible site design techniques that reduce impervious surface on new development should be utilized during the planning process. All plans submitted to Orange County shall be aimed at reducing impervious surfaces to reduce the need for BMPs to control nitrogen and peak stormwater flows and to reduce associated BMP maintenance concerns.

Orange County shall periodically review their local ordinances with regard to the topics outlined in the Stormwater Ordinance and show that they have provided adequate flexibility for developers to utilize planning measures to reduce impervious surfaces. This review is intended to look for opportunities where these measures could be allowed, or obstacles to their use could be removed.

- **Description of Any Proposed Jurisdiction-Wide and Interlocal Approach**

Not applicable at this time.

## **Illegal Discharges Program Components**

- **Approach to Collecting Jurisdiction-Wide Information**

Please see accompanying Ordinance.

Orange County shall compile a series of maps that show the following information. The maps shall be at a scale no greater than 1:24,000.

- Location of sanitary sewers in areas of the major stormwater collection systems and the location of areas that are not served by sanitary sewers.
- Waters that appear on the USDA – Natural Resources Conservation Service Soil Survey Maps and/or the U.S. Geological Survey 1:24,000 scale topographic maps.
- Land uses. Categories, at a minimum, should include undeveloped, residential, commercial, agriculture, industrial, institutional, publicly owned open space and others.
- Currently operating and known closed municipal landfills and other treatment, storage, and disposal facilities, including for hazardous materials.
- Major stormwater structural controls.
- Known NPDES permitted discharges to the stormwater collection system (this list can be obtained from the Division of Water Quality).

Written descriptions should be provided for the map components as follows:

- A summary table of municipal waste facilities that includes the names of the facilities, the status (open/closed), the types, and addresses.
- A summary table of the NPDES permitted dischargers that includes the name of the permit holder, the address of the facility, and permit number.
- A summary table of the major structural stormwater control structures that shows the type of structure, area served, party responsible for maintenance, and age of structure.
- A summary table of publicly owned open space that identifies size, location, and primary function of each open area.

Orange County shall complete this collection of jurisdiction-wide information by the time the second annual report is due (October 2002).

- **Approach to Mapping and Field Screening in High Priority Areas**

Beginning in the third year after implementation of the Orange County Stormwater Management Program, Orange County shall identify a high priority area of its jurisdiction for more detailed mapping and field screening. This high priority area shall comprise at least ten percent of the Orange County's jurisdiction within the Neuse River Basin. Each subsequent year, Orange County will select and screen other high priority area that comprise at least ten percent of its jurisdiction.

Orange County will determine each year's high priority area by assessing those areas which are considered to be at highest risk. Initially, this may focus on areas of older development, or on those areas with highest commercial development. By utilizing the GIS division within the Planning and Inspections Department, overlays of older development and commercial areas, along with high risk water quality areas will be created to help target preliminary high priority areas.

The first part of the screening process for the selected high priority area is mapping the stormwater system. At a minimum, the map that is produced shall include the following:

- Locations of the outfalls of any pipes from non-industrial areas that are greater than or equal to 36 inches.
- Locations of the outfalls of any pipes from industrial areas that are greater than or equal to 12 inches.
- Locations of drainage ditches that drain more than 50 acres of non-industrial lands.
- Locations of drainage ditches that drain more than 2 acres of industrial land.
- An accompanying summary table listing the outfalls that meet the above criteria that includes outfall ID numbers, location, primary and supplemental classification of receiving water, and use-support of receiving water.

The second part of the screening process for the selected high priority area is conducting a dry weather field screening of all outfalls that meet the above criteria to detect illegal discharges. The dry weather field screening shall not be conducted during or within 72 hours following a rain event of 0.1 inches or greater. In residential areas, it is recommended to conduct the field screening either before 9:00 am or after 5:00 pm, since these are the hours that citizens are most likely to be home and thus any illegal discharges are more likely to be evident.

Figure 1 illustrates a suggested process for conducting field screening sampling activities and following up with any findings of dry weather flow. As shown in the figure, if the field screening shows that an outfall is dry, then the outfall should be checked for intermittent flow at a later date.

If the field screening shows that an outfall has a dry weather flow, then the local government is required to complete a screening report for the outfall. The information that should be contained in the screening report is outlined in Table 1. Screening reports shall be kept on file for a minimum of five years. Screening report forms provided in Appendix 6 of the Ordinance will be utilized.

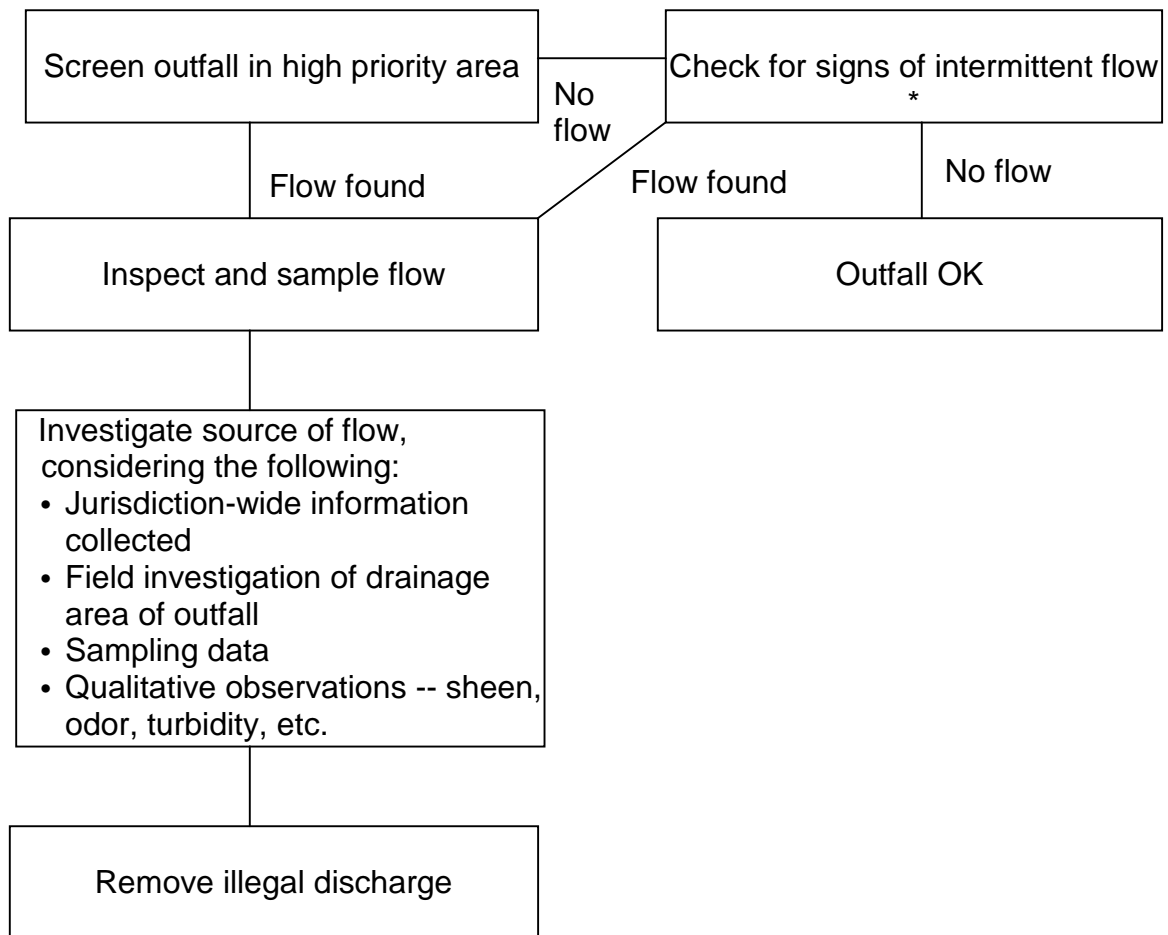
**Table 1: Field Screening Report Information**

General Information	Sheet Number Outfall ID Number Date Time Date, Time and Quantity of Last Rainfall Event	
Field Site Description	Location Type of Outfall Dominant Watershed Land Use(s)	
Visual Observations	Photograph Odor Color Clarity Floatables	Deposits/Stains Vegetation Condition Structural Condition Biological Flow Estimation
Sampling Analysis *	Temperature pH Nitrogen-Ammonia	Nitrogen-Nitrate/Nitrite Fluoride or Chlorine

\* Analytical monitoring is required only if an obvious source of the dry weather flow cannot be determined through an investigation of the upstream stormwater collection system.

Outfalls with flow will be screened again within 24 hours for the above parameters. The tests for ammonia and nitrate/nitrite that are purchased should be sensitive for 0.1 to 10 mg/L. The cities of Raleigh and Durham can be contacted for guidance on test kit information.

**Figure 1: Field Screening Process**



\* Checking for intermittent flow includes rechecking outfall at a later date as well as visual observations for evidence of intermittent flow.

Note: Analytical monitoring is required only if an obvious source of the dry weather flow cannot be determined through an investigation of the upstream stormwater collection system.

The purpose of the field screening is to provide clues as to the source of the illegal discharge. The characterization should be used in conjunction with the jurisdiction-wide information and a field investigation to identify the source of the illegal discharge. The process of identifying and removing illegal discharges is discussed in the next section.

- **Program for Identifying and Removing Illegal Discharges**

Please see accompanying Ordinance.

After the field screening is complete, Orange County will take measures to identify and remove illegal discharges. Identifying illegal discharges may require a combination of office and field work. After the field screening, Orange County staff will consult the jurisdiction-wide information they have compiled (see Section 3-D) to obtain information about the land uses, infrastructure, industries, potential sources and types of pollution that exist in the drainage area of the outfall.

After potential sources have been identified in the office, a systematic field investigation should be planned that minimizes the amount of resources required to identify the source. Listed below are several approaches that are recommended by Raleigh and Durham, starting with simple approaches and moving to more complex ones

- Site Investigation
- Additional Chemical Analysis (recommend testing for fecal coliform if the ammonia concentration was found to exceed 1.0 mg/L)
- Flow Monitoring (recommended to use multiple site visits rather than a depth indicator)
- Dye Testing (fluorescent dye is recommended)
- Smoke Testing
- Television Inspection

One tip on identifying illegal discharges is that outfalls that do not have flow during wet weather are likely to originate from floor drains.

Documentation of the results of the office and field investigations should be kept on file for five years with the screening report.

After a local government identifies the source of an illegal discharge, it is required to take enforcement action to have the source removed. The legal authority that was established for the illegal discharge program shall provide the means to accomplish this requirement. Enforcement should include requiring the person responsible for the discharge to remove or redirect it to the sanitary sewer. There should also be remedies to deal with cases of non-compliance. Records of all compliance actions shall be kept for five years with the screening report.

In addition to keeping all screening reports on file, each jurisdiction shall maintain a map that includes the following:

- Points of identified illegal discharges.
- Watershed boundaries of the outfalls where illegal discharges have been identified.
- An accompanying table that summarizes the illegal discharges that have been identified that includes location, a description of pollutant(s) identified, and removal status.

- **Program for Preventing Illegal Discharges and Establishing a Hotline**

Please see accompanying Ordinance.

Orange County will conduct a mailing to possible sources of illegal discharges within the County's jurisdiction to provide information on the new program. A second contact will be made via a field visit to determine if an illegal discharge is occurring on a site-by-site basis. Likely recipients of these letters include, but are not limited to, automotive sales, rental, repair and detailing establishments, lawn care companies, cleaners and certain types of contractors.

A sample letter to inform owners and operators about the requirements of the illegal discharge program is included in Appendix 5 of the accompanying Ordinance.

The experiences of Raleigh and Durham have shown that an illegal discharge hotline is a cost-effective way to identify illegal discharges. Part of the public education program (discussed in Chapter 5) will be to educate citizens about what types of discharges should not go to the stormwater collection system and make them aware of the hotline.

Local governments are responsible for establishing a hotline. The hotline will require them to either designate a new phone number or use an existing service. The hotline should include a recording advising citizens what to do if they call during non-business hours. There should be another number given in cases where the illegal discharge is perceived to be an emergency.

- **Implementation Schedule for Illegal Discharge Program Components**

Shown below is a phased implementation schedule for illegal discharges (Table 2). The schedule allows for collecting jurisdiction-wide information during the first year of implementation and then screening the high priority areas during future years. This

phased schedule is also intended to allow communities to evaluate and make improvements to their programs as they progress through high priority areas.

**Table 2: Implementation Schedule and Annual Reporting Requirements**

Year	Implementation Requirements	Annual Report Requirements
By February 2001	<ul style="list-style-type: none"> <li>• Establish legal authority to address illegal discharges</li> </ul>	<ul style="list-style-type: none"> <li>• Submit report identifying established legal authority to meet requirements.</li> </ul>
By October 2002	<ul style="list-style-type: none"> <li>• Collect jurisdiction-wide information.</li> <li>• Select high priority area for additional screening.</li> <li>• Initiate illegal discharge hotline.</li> </ul>	<ul style="list-style-type: none"> <li>• Report on completion of jurisdiction-wide information collection.</li> <li>• Submit map of high priority areas and reason for selection.</li> <li>• Report on initiation of illegal discharge hotline.</li> </ul>
Each subsequent year after 2002	<ul style="list-style-type: none"> <li>• Complete mapping and field screening for high priority area.</li> <li>• Select next high priority area.</li> <li>• Identify and remove illegal discharges as encountered.</li> <li>• Continue operating illegal discharge hotline.</li> </ul>	<ul style="list-style-type: none"> <li>• Submit map of stormwater collection system in high priority area upon request by DWQ.</li> <li>• Document illegal discharges found and resulting action.</li> <li>• Report on hotline usage and actions taken.</li> <li>• Submit map of next high priority area and reason for selection.</li> </ul>

- **Description of Any Proposed Jurisdiction-Wide and Interlocal Approach**  
Not applicable at this time. Provision is included in Ordinance for future approaches.

## **Public Education Program Components**

- **Description of Public Education Program**

Pursuant to the Neuse River Basin Nutrient Management Strategy rules adopted on December 11, 1997 by the North Carolina Environmental Management Commission, Orange County is required to adopt and implement a local program to control nitrogen runoff from new and existing development. One section of the required local program is a annual Public Education campaign with a Public Education Action Plan to be submitted by October 1 of each year (starting 2001).

Triangle J Council of Governments has proposed a coordinated mass media approach with an annual payment by each of the affected governments . After staff review of the requirements, County Planning and Erosion Control staff generated a sample education plan with anticipated costs for one year.

We believe that a Public Education campaign that is staff coordinated and locally focused will be more successful and cost-effective. Please see the following proposals from the Planning and Erosion Control staff.



## Proposed Education Action Plan for 2001

Activity Name	Category	Brief Description of Activity	Targeted Audience*	Preparation Needs	Anticipated Cost
Web Page	1	create Neuse page on County web site	all	staff time	
Quarterly newspaper articles <sup>1</sup>	1	News of Orange, Chapel Hill News, etc.	all	staff time + ad cost	1/2 page= \$425.70 \$425.70 @ 4/yr = <b>\$1,702.80</b>
Fertilizer tags	2	provide tags to local stores for proper application	residents, business	staff time + supplies	\$11.00/hr (intern) @ 40 hours = <b>\$440**</b>
Close out packages	2	provide information to new homeowners/builders	residents, business	staff time + supplies	\$11.00/hr (intern) @ 40 hours = <b>\$440**</b>
				Duplication	.015 @ 2000 = <b>\$30</b> .01 @ 2000 = <b>\$20</b>
				Total Anticipated Cost (staff time not included)	<b>\$2,632.80</b>

\*Note: Targeted audience includes children, residents, business/industry, and civic organizations.

\*\* This includes computer time, duplicating time, and distribution. Duplicating costs are .01 (single sided) and .015 (double sided) if run by the OC print shop.

<sup>1</sup> The Quarterly Newspaper Articles may be actual articles, which would be at no cost to the County. However, if during any quarter, they needed to be ads, the ½ page ad price is calculated.

## **Retrofits Program Components**

- **Approach to Data Collection and Notification**

Each retrofit opportunity that is identified shall be accompanied by information to describe the location of the retrofit, the type of retrofit being proposed, the property owner, as well as basic information about the watershed and the receiving water. Table 3 shows a suggested format for presenting this information for each retrofit opportunity.

The tables shall be submitted to the Division of Water Quality on October 30 of each year beginning in the year 2001 as part of the annual report.

The Division will take the responsibility for posting these retrofit opportunities on its Web Page and also for notifying, at a minimum, the following organizations of the opportunities for retrofitting within existing developed areas:

- ❖ Clean Water Management Trust Fund
- ❖ N.C. State University Cooperative Extension Service
- ❖ Triangle J Council of Governments
- ❖ Kerr-Tar Council of Governments
- ❖ Eastern Carolina Council of Governments
- ❖ Environmental programs at N.C. State University, Duke University, University of N.C., East Carolina University and others
- ❖ N.C. Sea Grant
- ❖ USDA – Natural Resources Conservation Service
- ❖ Upper Neuse Basin Association
- ❖ Lower Neuse Basin Association
- ❖ N.C. Wetlands Restoration Program

Orange County must identify a minimum of three retrofit opportunities per year. Selected sites may be carried over to meet the minimum requirements for up to two subsequent years provided that BMPs/retrofits have not been implemented and the site continues to meet the retrofit criteria on an annual basis.

- **Approach to Complying with Mapping Requirements**

Affected local governments are required to provide maps that show the locations of retrofit opportunities. Mapping may be accomplished by using computers or with existing hard copy maps. The scale of the map should be large enough to adequately identify the following required parameters:

- Drainage area to retrofit opportunity site.

- Land uses within the drainage area.
- Location of retrofit opportunity.
- Property boundaries in the vicinity of the retrofit opportunity.
- Significant hydrography (as depicted on U.S.G.S. topographic maps and/or USDA-NRCS Soil Survey maps).
- Roads.
- Environmentally sensitive areas (steep slopes, wetlands, riparian buffers, endangered/threatened species habitat – where available).
- Publicly owned parks, recreational areas, and other open lands.

**Table 3: Retrofit Opportunity Table**

Location description, including directions from a major highway	
Type and description of retrofit opportunity	
Current property owner	
Is the property owner willing to cooperate?	
Land area available for retrofit (sq. ft)	
Accessibility to retrofit site	
Drainage area size (acres)	
Land use in drainage area (percent of each type of land use)	
Average slope in drainage area (%)	
Environmentally sensitive areas in drainage area (steep slopes, wetlands, riparian buffers, endangered/ threatened species habitat)	
Approximate annual nitrogen loading from drainage area (lbs/acre/year) *	
Potential nitrogen reduction (lbs/ac/yr)	
Estimated cost of retrofit	
Receiving water	
DWQ classification of receiving water	
Use support rating for receiving water	
Other important information	

\* Suggested methodology: Use Figure 2b from Chapter 2 to compute nitrogen export from the drainage area based on the amount of impervious surface, landscaped area, and forested area in the watershed.

**• Description of Any Proposed Jurisdiction-Wide and Interlocal Approach**

There is no proposed jurisdiction-wide and interlocal approach for Orange County at this time.

## **Reporting Requirements**

- **Description of Proposed Report Contents/Format**

### **New Development Review/Approval**

Under the model program for new development review/approval, local governments are responsible for submitting the following information as part of the annual reporting requirement:

- Acres of new development and impervious surface based on plan approvals.
- Acres of new development and impervious surface based on certificates of occupancy.
- Summary of BMPs implemented and use of offset fees.
- Computed baseline and net change in nitrogen export from new development that year.
- Summary of maintenance activities conducted on BMPs.
- Summary of any BMP failures and how they were handled.
- Summary of results from jurisdictional review of planning issues.

### **Illegal Discharges**

Table 4 outlines the annual reporting requirements for illegal discharges.

**Table 4: Implementation Schedule and Annual Reporting Requirements**

Year	Implementation Requirements	Annual Report Requirements
By February 2001	<ul style="list-style-type: none"> <li>• Establish legal authority to address illegal discharges.</li> </ul>	<ul style="list-style-type: none"> <li>• Submit report identifying established legal authority to meet requirements.</li> </ul>
By October 2002	<ul style="list-style-type: none"> <li>• Collect jurisdiction-wide information.</li> <li>• Select high priority area for additional screening.</li> <li>• Initiate illegal discharge hotline.</li> </ul>	<ul style="list-style-type: none"> <li>• Report on completion of jurisdiction-wide information collection.</li> <li>• Submit map of high priority areas and reason for selection.</li> <li>• Report on initiation of illegal discharge hotline.</li> </ul>
Each subsequent year after 2002	<ul style="list-style-type: none"> <li>• Complete mapping and field screening for high priority area.</li> <li>• Select next high priority area.</li> <li>• Identify and remove illegal discharges as encountered.</li> <li>• Continue operating illegal discharge hotline.</li> </ul>	<ul style="list-style-type: none"> <li>• Submit map of stormwater collection system in high priority area upon request by DWQ.</li> <li>• Document illegal discharges found and resulting action.</li> <li>• Report on hotline usage and actions taken.</li> <li>• Submit map of next high priority area and reason for selection.</li> </ul>

**Retrofit Locations**

- Data on each retrofit opportunity (Table 3 or other equivalent format),
- Maps of potential retrofit sites as specified in Section 4-D, and
- The status of any retrofit efforts that have been undertaken within the jurisdiction.

**Public Education**

The Report will summarize the next years Action Plan and evaluate the implementation of the previous year's Action Plan (if applicable). The report should include goals, activities completed, realized education program costs, explanation of experienced shortfalls, and a plan as to how the locality will address shortfalls.

- **Description of Any Proposed Jurisdiction-Wide and Interlocal Approach**

There is no proposed jurisdiction-wide and interlocal approach for Orange County at this time.

## **Stormwater Ordinance**

The following Ordinance addresses all of those items requiring Ordinance Provisions by the NCDENR-DWQ Model Stormwater Plan. A copy of the Plan Submittal Checklist has been included as the last page of this document.