

# **NPDES Phase II Stormwater Annual Report Town of Elon**

**Fiscal Year  
2019 – 2020**

Prepared by:

Josh Johnson, P.E.

And

Phil Ross  
Stormwater Program  
Coordinator



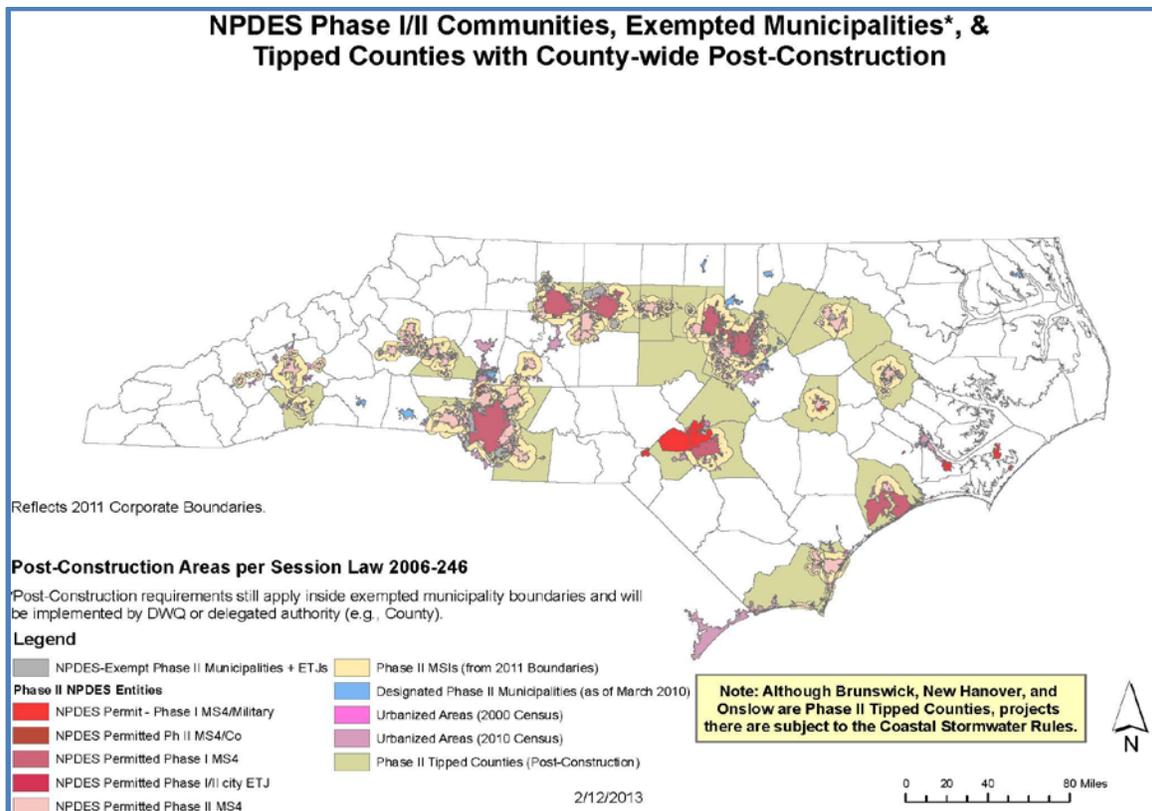
alley, williams, carmen & king, inc.  
engineers and architects  
740 chapel hill road - post office box 1179  
burlington, north carolina 27216-1179  
Phone: (336) 226-5534  
Fax: (336) 226-3034

## Report Outline

- Introduction
- NPDES Phase II
  - Minimum Control Measures
    - Public Education and Outreach
    - Public Involvement and Participation
    - Illicit Discharge Detection and Elimination
    - Construction Site Runoff Controls
    - Post Construction Stormwater Management
      - Elon University and Twin Lakes Master Plans
    - Pollution Prevention and Good Housekeeping
- Impaired Waters and TMDL Waters
  - Listing of Impaired Waters
    - Impairment Type
    - Timeline for Improvements
    - Current Status
- Jordan Lake Rules Compliance
  - Overview, Background, and Implementation Schedule
  - Riparian Buffer Protection Program
  - New Development Program
  - Existing Development Stage 1 Programs
  - Future Existing Development Stage 2 Programs
  - Jordan Lake One Water
- Stormwater and Storm Drainage Project and Maintenance Policy
- Stormwater Funding
- Future Issues
- Program Contacts

## Introduction

On July 1, 2005, The North Carolina Division of Water Quality (DWQ) in the Department of Environmental Quality, formerly DENR, began issuing Phase II stormwater permits to municipalities in North Carolina under the National Pollutant Discharge Elimination System Program (NPDES). At the time, the NPDES Phase II Program was the latest stormwater program stemming from the Federal Clean Water Act of 1972. Prior to the Phase II program, EPA and NC DEQ had issued NPDES Phase I Stormwater Permits to Cities larger than 100,000 persons. In North Carolina these cities were Raleigh, Charlotte, Fayetteville, Durham, Greensboro, and Winston Salem. The Phase II Program included distribution of Phase II permits to municipalities less than 100,000 residents and began with municipalities within Municipal Spheres of Influence (MSI) that were greater than 50,000 citizens. The Burlington Corridor represented a MSI of greater than 50,000 residents and each municipal separate storm sewer system (MS4) was given a Phase II permit.



The Phase II stormwater program was created with the intention of improving the quality of the nation’s waterways by reducing the quantity of pollutants that stormwater transports into stormwater systems and discharges to surface water bodies. The permit require permittees at a minimum to develop, implement, and enforce a stormwater program designed to reduce the discharge of pollutants from the municipal separate storm sewer system (MS4) to the maximum extent practicable.

**The stormwater program is composed of the following six management measures:**

- 1. Public Education and Outreach**
- 2. Public Involvement and Participation**
- 3. Illicit Discharge Detection and Elimination**
- 4. Construction Site Runoff Controls**
- 5. Post-Construction Site Runoff Controls**
- 6. Pollution Prevention and Good Housekeeping for Municipal Operations**

Each of these measures consists of required Best Management Practices (BMPs), measurable goals for each BMP and an implementation schedule for the 5 year permit cycle. Additionally, the Town of Elon has a Comprehensive Stormwater Management Plan and completes annual reporting about the NPDES Phase II Program. Because the NPDES Program concentrates on water quality it has limited provisions concerning water quantity and flooding controls. The Town's Storm Drainage Design Manual does include provisions for managing peak runoff from new development and the Town's Flood Damage Prevention Ordinance reduces flooding through limiting development in the FEMA regulated flood plains.

In February 2017, after several months of discussion, NC DWQ issued a renewal of the Town's NPDES Phase II Permit. This renewed permit is similar to the original permit with a few additional requirements included. A copy of the permit is available either through Josh Johnson, P.E. or through NC Division of Energy, Mineral, and Land Resources (NCDEMLR).

This Report is intended to complete the Annual Report specifying the Town's progression in implementing the NPDES Permit and Comprehensive Stormwater Management Plan. It is also intended to give readers a comprehensive idea of the Town's full Stormwater Program including the Town's Jordan Lake and Water Quantity Programs as well as the Town's current funding structure.

## **NPDES Phase II Minimum Control Measures**

Each of the 6 Minimum Control Measures (MCM's) has a set of best management practices (BMP's) that are intended to foster compliance with both the Town's Permit and CSWMP. These specific BMP's can be found in both the Permit and the CSWMP but highlights and specific actions will be noted in the report.

## **Public Education and Outreach**

The Town operates a Public Education and Outreach program that is designed to educate the general public about the need to improve water quality in stormwater. The general objectives are to distribute education materials to the community and/or to conduct equivalent outreach activities about the impacts of storm water discharges on surface waters and the steps the public can take to reduce

pollutants in stormwater runoff. These objectives have been further refined to target residents, school children, local businesses (specifically gas station owners and landscaping companies) and industry because these groups have the most impact on stormwater pollution prevention.

The education program targets total suspended solids (TSS and Sediment) and nutrient loading because turbidity, sedimentation, and nutrients are the pollutants of concern in downstream waters.

The Town partners with Stormwater SMART, an education and outreach organization hosted by the Piedmont Triad Regional Council (PTRC). Stormwater SMART is a cooperative group that is funded by several Piedmont municipalities. It was created in 2005 to provide education and outreach for the MS4 Permittees (like Elon) and concentrates on direct education of school children and residents.

Danica Heflin is the Stormwater Smart Outreach and Education Coordinator and a copy of Stormwater SMART’s Annual Report is available at <http://www.ptrc.org/services/regional-planning/planning-documents> . It provides a comprehensive outlook for the Fiscal Year 2019 - 2020 period. Pages 54 - 55 of the annual report provides specific details of outreach efforts within the Town of Elon. Danica Heflin can be contacted at [dheflin@ptrc.org](mailto:dheflin@ptrc.org) or at (336)904-0300.

**Due to the unprecedented COVID-19 pandemic causing statewide shutdowns of public events; programs and events that were being planned and that are typically held in the Spring of 2020 were cancelled.**

Elon 2019 - 2020			
Event/Location	Date	Program	# Participants/Contacts
Alamance Creek Week	March 28 – April 4, 2020	Outreach	Canceled due to COVID -19
iNaturalist Biothon	April – June, 2020	Virtual Outreach	97
<b>Total</b>			<b>97</b>

**Stormwater Education Efforts in Elon**

The Town also has handouts on display at the Town Hall as well as maintaining an education website located at: <https://www.townofelon.com/town-government/departments/public-works/stormwater/> This website also has a direct link to [www.stormwatersmart.org](http://www.stormwatersmart.org) for more stormwater educational information.

## Public Participation and Involvement

The Town has a responsibility to solicit and consider public opinion on all matters, including stormwater management. The Town originally involved the public with a public hearing in 2005 and created a citizen's committee during the first permit cycle but the committee had little interest in stormwater.

The Town is receptive to any questions from citizens and maintains a **Helpline - Town Hall at (336) 584-3601** and has worked with Stormwater Smart to educate the public but continues to struggle to establish effective Public Participation and Involvement. The Town held a Stormwater Public Meeting in 2017, but did not in 2019 due to COVID-19 restrictions. Future public meetings will seek input on the stormwater program and will provide both input to the Town as well as education to the citizens.

## Illicit Discharge Detection and Elimination

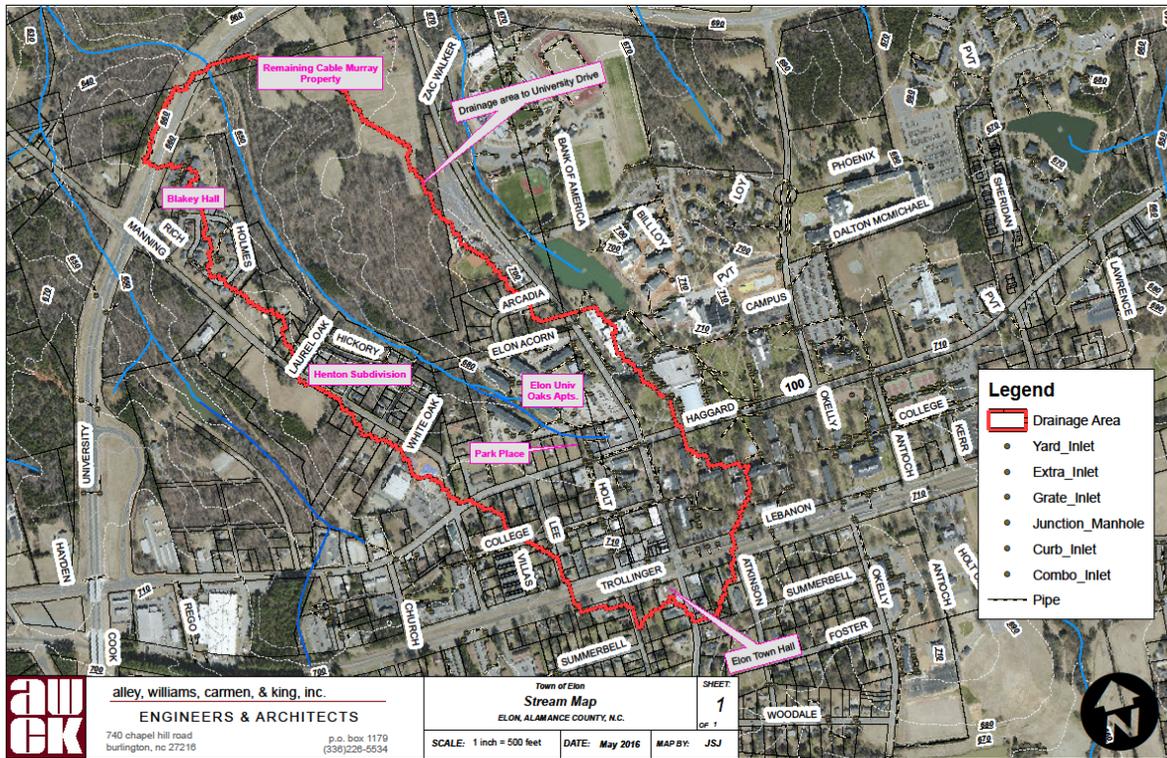
The Town of Elon has a full Illicit Discharge Detection and Elimination (IDDE) Program. The IDDE Program is intended to reduce discharges to the stormwater system that are not entirely composed of stormwater. There are a few permitted discharges and firefighting related discharges that are allowed.

An illicit discharge is typically dirt, soap, pet waste, litter, oil, fertilizer, pesticides, or raw sewage and often times comes from "generating sites." Generating sites are points of pollution that continue over a period and are recurring at regular or irregular intervals.

The backbone of the IDDE program is the IDDE Ordinance that the Town passed in March 2007 and that became effective in July 2007. The IDDE ordinance provides permits specific discharges into the MS4 as legal, provides legal authority to restrict illegal discharges, prohibits illicit connections, provides conditions for cleaning up and preventing polluted spills, provides for right of entry into property to investigate prohibited activities, and provides the Town with options for enforcing the Ordinance. The IDDE Ordinance is based on NC DWQ's Model Ordinance.

The second basis for the IDDE program is the Town's MS4 Map. The mapping program was completed in the first permit cycle by GPS mapping and is now usable in a GIS format. The map includes the entire MS4 system and provides for easy access to aid in the investigation of illicit discharges. An investigator with the map could find an illicit discharge and then easily follow the flow of the discharge upstream until finding a source of the discharge.

The map was originally published as a map book but generally is used on a watershed basis or through ArcGIS software. If a specific area is needed it can be printed by either Stormwater or Town Staff. The map is intended to be updated on a regular basis as new development happens.



Sample Stream Map and MS4 Maps

The IDDE program also includes dry weather testing of outfalls into the stream system. In the first permit cycle this was conducted in coordination with the mapping. Outfalls that had dry weather flows were reported and investigated. Since the first permit cycle, most dry weather flow testing has been done in conjunction with complaints or Town staff investigations.

There were no illicit connections found or reported and no illegal dumps reported in 2019. The Town also had no sanitary sewer overflows and no known rerouted connections were found in 2019. In 2019, 10% of the sewer and some stormwater areas were video inspected. These maintenance activities are intended to reduce Sanitary Sewer Overflows and therefore prevent illicit discharges to the MS4.

Town Staff are trained on an annual basis to identify illicit discharges and the reporting process for these discharges. This training is combined with the Pollution Prevention and Good Housekeeping training of public works, utilities, and planning staff. Ongoing training for new hires could be added and would be beneficial.

### **Construction Site Runoff Controls**

The Town of Elon delegates the Construction Site Runoff Controls to the NC DEQ Sediment and Erosion Control Program. The Town of Elon does not have a delegated erosion control program but does make sure that plans it approves that will disturb greater than 1.0 acres of land apply for, and receive, and erosion control plan. The Town of Elon also has the ability to call NC DEQ to report known sedimentation issues. A possible improvement could be NC DEQ's responsiveness to Town generated complaints, which has been less than effective in the past.

### **Post Construction Site Runoff Controls**

The Town of Elon has a typical NPDES Phase II Post Construction Program. This includes a Post Construction Ordinance, administrative forms that support it, and a review process. The Post Construction Program applies to projects that exceed 1 acre of disturbance or have a common plan of development that will cumulatively exceed 1.0 acres of disturbance. Projects that exceed 24% built-upon area are considered high density projects, projects that are less than 24% BUA are low density projects. High Density Projects are then required to meet the following requirements:

- Treat runoff from the first 1" of rain (the first flush).
- Treated Runoff is to be for 85% TSS removal.
- Discharge treated water at a rate less than or equal to the Predevelopment rate for the 1 year 24 hour storm.
- Discharge treated water between 48-120 hours.
- Stormwater Control Measures must be in easements and must have a recorded operation and maintenance agreement.
- Compliance with the Jordan Lake Riparian Buffer Protection Ordinance.

Stormwater Control Measures, as well as runoff calculations, are prepared based upon the NC DWQ BMP Manual and then reviewed by Josh Johnson, P.E.

Low Density projects are required to comply with the Jordan Lake Buffer Protection Ordinance that went into effect in fall 2011. Both Low and High Density Projects are required to comply with the Town's Storm Sewer Design Manual which governs storm drainage design as well as peak runoff rates and provides for evaluation of the 10 and 100 year design storms.

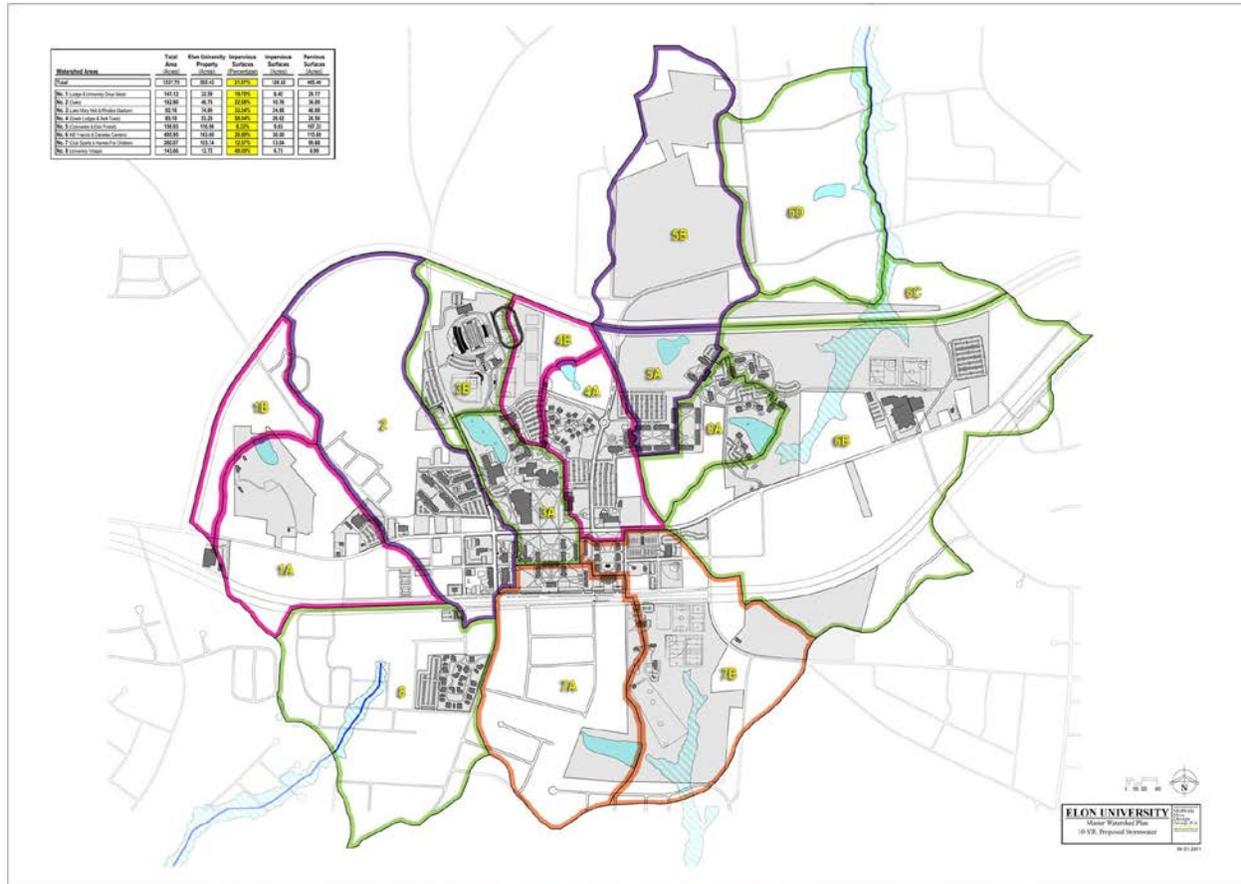
When a project is submitted to the Town, it goes through the Town Planning Department. Then the plans are distributed to a Technical Review Committee (TRC). The TRC includes Engineering and Stormwater Reviewers as well as assorted Town staff. At this point the project is determined to be subject to the Stormwater Ordinance and High Density or Low Density. At that point review comments are made about the project and addressed. After approval of the project, the owner is required to complete an Operation and Maintenance Agreement for the stormwater control measures. This O&M agreement is then recorded with the register of deeds so that it can reviewed at a later point in time.



**Bio-Retention Basin at Elon University's McDaniel Building Parking Lot**

### **Elon University and Twin Lakes Preliminary Plans**

The Town of Elon has two long standing approved planned developments in Elon University and Twin Lakes Retirement Homes. The Twin Lakes Retirement Home's preliminary plan predates the NPDES Phase II Stormwater Ordinance and therefore development in accordance with the plan does not require compliance with the Stormwater Ordinance nor the standards associated with it. Twin Lakes does have a section of future development along Church Street (US 70) and to the west of University Drive that is not included in the approved preliminary plan.



Elon University's 10-Year Master Plan

Elon University established a master stormwater plan in 2011. The master stormwater plan divided the University’s campus into 8 primary watershed areas. Most of the watershed areas are then divided into smaller sub watersheds. Elon University then put their 10 year plan into the watersheds and watersheds that are projected to go over 24% impervious are then required to install stormwater controls. Because ten year plans change, any watersheds that exceed the 24% impervious limit are required to treat all new post-2007 impervious areas. Water Quantity for projects is still evaluated on a project by project basis. Projects that may have an impact on non-University properties are often times required to comply with the Drainage Design Manual which includes matching of peak runoff rates between pre and post development.

The Town of Elon reviewed a total of three projects in 2019, two of which triggered the stormwater ordinance. No projects were completed in Elon in 2019.





### Highway 100 Pump Station

The Town operates a Town Hall/Police Station, Powerline Road Fire Station, Main Fire Station, Beth Schmidt Park, Highway 100 Pump Station, and a Public Works Facility. Each of these facilities is inspected annually and any new facilities will be added to the inspection list.

Town staff with the greatest exposure to stormwater are trained on PPGH once annually. The training is combined with illicit discharge detection and elimination training. The PPGH portion of the training concentrates on good housekeeping functions. This often includes identification of bad habits that can take place and how to fix the situation to reduce the risk of pollution to stormwater.

The Town of Elon sweeps streets on a regular basis, weekly through the fall and early winter, and quarterly throughout the rest of the year, the Town picks up 5000 cubic feet annually. The Town also picks up leaves from residents. Town staff past estimate that this will be 130 loads of leaves at 25 cubic yards of leaves per load for 3,250 cubic yards of leaf debris annually.

The Town of Elon also puts out road salt and brine prior to and during inclement weather, Elon used 500 lbs. of alternative road salt in 2019. The Town also recycled 250 gallons of oil through Noble Oil Company.

The Town cleans all storm drains annually and culverts on an as needed basis and uses jet trucks to clean storm drain pipes that have issues as well as cleaning some storm drain inlets by hand.

There are 8 pet waste stations at Beth Schmidt Park that are emptied twice weekly.

### Impaired Waters and Total Maximum Daily Loads (TMDL)

The Town of Elon does not have any impaired waters within its jurisdictional area.

## Jordan Lake Rules

The Town of Elon is within the Jordan Lake Watershed and is subject to the Jordan Lake Nutrient Strategy. The Jordan Lake Nutrient Strategy is composed of a set of regulatory rules enacted in 2009 that have since been augmented or replaced by a series of NC General Assembly Session Laws. The following rules are often referred to as the Jordan Lake Rules.:

[15A NCAC 02B .0262 - Purpose and Scope](#) (See #4 below.)

[15A NCAC 02B .0263 - Definitions](#)

[15A NCAC 02B .0264 - Agriculture](#)

[15A NCAC 02B .0265 - Stormwater Management for New Development](#) (See #2, #5 and #6 below.)

[15A NCAC 02B .0266 – Stormwater Management for Existing Development](#) (Replaced by #1 below.)

[15A NCAC 02B .0267 – Protection of Existing Riparian Buffers](#) (See #2 below.)

[15A NCAC 02B .0268 – Mitigation for Riparian Buffers](#)

[15A NCAC 02B .0269 – Riparian Buffer Mitigation Fees to NC EEP](#)

[15A NCAC 02B .0270 – Wastewater Discharge Requirements](#) (See #1 and #3 below.)

[15A NCAC 02B .0271 – Stormwater Requirements for State and Federal Entities](#) (See #2 below.)

[15A NCAC 02B .0272 - Fertilizer Management](#)

[15A NCAC 02B .0273 - Options for Offsetting Nutrient Loads](#)

[15A NCAC 02B .0311 - Cape Fear River Basin](#)

1. [Session Law 2009-216](#) signed into law June 30, 2009. (Disapproves the Jordan Stormwater Management for Existing Development Rule and establishes substitute requirements. Also delays the nitrogen compliance date by two years for existing dischargers under the Wastewater Discharge Requirements Rule.)
2. [Session Law 2009-484](#) was signed into law Aug. 26, 2009. (Part II revises three Jordan rules, including Stormwater Management for New Development, Stormwater Requirements for State and Federal Entities and Protection of Existing Riparian Buffers.)
3. [Session Law 2011-394](#) signed into law July 1, 2011. (Section 14 provides a further, conditional two-year delay of the nitrogen wastewater compliance date for existing dischargers under the Wastewater Discharge Requirements Rule.)
4. [Session Law 2012-187](#) signed into law July 16, 2012. (Section 12.1 creates a limitation affecting the Purpose and Scope Rule to narrow the applicability of certain surface water standards in WS-V waters.)
5. [Session Law 2012-200](#) signed into law Aug. 1, 2012. (Section 11.(c) extends the allowable local program implementation date of the New Development Stormwater Rule.)
6. [Session Law 2012-201](#) signed into law Aug. 1, 2012. (Section 9.(e) of this law revised the local program implementation date of the New Development Stormwater Rule by two years. Separate SL 2012-201 contains the same provision).
7. [Session Law 2013-395](#) signed into law Aug. 23, 2013 (SB 515 continues the current Jordan Lake water quality measures, including 15A NCAC 02B .0267 Protection of Existing Riparian Buffers Rule, but delays additional measures that were to be implemented July 1, 2013 or later, for three years. The law also

modifies existing Protection of Existing Riparian Buffers Rule to allow some exempt uses, including the permitted piping of streams by the U.S. Army Corps of Engineers and an expanded definition of "airport facilities." These changes are required to be adopted by the Environmental Management Commission in an amended rule. The delayed measures include the Jordan Lake Rules, 15A NCAC 02B .0262 - .0267, .0270 - .0272, .0311, as well as the Jordan Lake Session Laws.)

8. Session Law 2013-360 Effective July 26th, 2013 In-Lake Water Quality Improvement Demonstration Project: This lengthy session law has a three- page section (14.3A) that authorizes a 24 -month "Jordan Lake Water Quality Improvement Demonstration Project" funded by \$1.95 million from the Clean Water Management Trust Fund and the N.C. Department of Environment and Natural Resources (DENR.) The intent of the project is to improve water quality in the lake by suppressing phytoplankton activity such that chlorophyll-a, pH and turbidity measurements will meet state water quality standards within the project areas.

- The session law required DENR to contract with a third party that can deploy floating arrays of 36 in-lake, long-distance water circulators. Twenty-four circulators will be placed in the Morgan Creek arm of the lake and 12 in the Haw River arm.
- The department is required to monitor, evaluate, and report on the performance of the circulators in reducing the adverse impacts of harmful algal blooms and excessive chlorophyll in the lake by focusing on nutrient related physical, chemical and biological parameters. DENR shall submit an interim report on the findings of the demonstration project to the Environmental Review Commission and the Fiscal Research Division of the General Assembly by October 1, 2015. A final report shall be submitted by April 1, 2016.

Status: The U.S. Army Corps of Engineers' public comment period for the project's Environmental Assessment document ended on April 6, 2014. The Corps issued a Finding of No Significant Impact (FONSI) on July 10, 2014, and the circulators were deployed on July 21, 2014.

The Environmental Assessment can be found on the Corps' Jordan Lake website at:

<http://www.saw.usace.army.mil/Locations/DistrictLakesandDams/BEverettJordan.aspx>

Division monitoring reports and other information for the circulator project are being posted at

<http://portal.ncdenr.org/web/wq/jordancirculator>

9. Session Law 2014-90 Applies to state stormwater programs. Section 2 adds the following language to the definition of "development" in G.S. 143-214.7. ".When additional development occurs at a site that has existing development, the built-upon area of the existing development shall not be included in the density calculations for additional stormwater control requirements, and stormwater control requirements cannot be applied retroactively to existing development, unless otherwise required by federal law. The significance of this session law for the Jordan stormwater rules is being evaluated by NCDEQ.

10. Session Law 2015-241

Section 14.5(a): Two-year extension of the Jordan Lake In-Lake Water Quality Improvement Demonstration Project (aka Solar Bees)

Section 14.5(c): Three year delay for New Development Stormwater implementation.

11. Session Law 2015-246

Sections 2(a) & 2(b): Prohibits local governments from voluntarily implementing State rule

Section 13.1. (b): Riparian Buffer Reform

12. HB 1030/Session Law 2016-94 2016 Appropriations Act

Section 14.13:

- Senate version called for review of all the State’s Nutrient Management Strategies, and any other rules imposing riparian buffer requirement for the purpose of nutrient management. Final budget limited applicability of Jordan and Falls Lake Rules.
- Terminates Solar Bee Project
- Funds a UNC Study of nutrient rules focused on Jordan Lake and Falls Lake Rules, directs EMC to review and re-adopt those nutrient management rules based on recommendations from the study.
- Delayed implementation of Jordan Lake and Falls Lake Rules not currently in effect, no earlier than March 15, 2019.
- Includes further DEQ study of in-situ technologies to address nutrient-related water quality problems.
- Excludes areas within Jordan Lake watershed from stormwater requirements.
  - States new impervious surface added in the Jordan Lake watershed between July 31, 2013 and December 2020 should not be counted as built-upon area for the purposes of developing nutrient reduction targets under the Jordan Lake stormwater rules.
- Cross-reference to Chesapeake Bay stormwater measures
  - Allows stormwater measures approved to meet the Chesapeake bay TMDL to be used to meet the Jordan Lake and Falls Lake TMDL’s based on the same nutrient reduction credit allowed under the Chesapeake Bay Program.

## **Jordan Lake Background, Rules, and Implementation Schedules**

Jordan Lake was impounded in 1983 by damming the Haw River near its confluence with the Deep River. It was created to provide flood control, water supply, protection of water quality downstream, fish and wildlife conservation, and recreation.

The lake has had water quality issues from the beginning, with the North Carolina Environmental Management Commission declaring it as nutrient-sensitive waters (NSW) the same year it was impounded. Since that time, Jordan Lake has consistently rated as eutrophic or hyper-eutrophic, with excessive levels of nutrients present. “Eutrophic” is an over-abundance of nutrients in the lake, primarily nitrogen and phosphorus, which can result in algal blooms and poor water quality. Nutrients make their way to the lake from sources such as wastewater discharges, rainfall runoff from agriculture and stormwater runoff from new and existing developed lands throughout the watershed. Excessive nutrient inputs can drive excessive growth of microscopic algae, which imparts a greenish, murky appearance to the water, causes taste and odor problems in potable water, and robs the water of oxygen. This can then stress or kill fish and other aquatic life. Excess nutrients also favor the growth of undesirable algae

that does not support the food chain and can release toxins into the water. While not necessarily making the lake unfit for fishing, swimming or drinking uses, excessive nutrients can impact these uses and produce undesirable algae in the lake.

The Jordan Lake Rules are designed to protect and improve water quality in the lake. The rules were developed over several years through a process that involved extensive meetings, public hearings and negotiations between residents, environmental groups, local and state government agencies and other stakeholders in the watershed. Specific issues addressed by the rules include reducing pollution from wastewater discharges, stormwater runoff from new and existing development, agriculture and fertilizer application. The Rules continue to be discussed and amended through the NC General Assembly.

The primary rules that affect local governments (like the Town of Elon) are the Stormwater Management for New Development, Stormwater Management for Existing Development, Protection of Existing Riparian Buffers, Wastewater Discharge Requirements, Options for Offsetting Nutrients Loads, Session Law 2009-216, Session Law 2009-484, Session Law 2011-394 and to a lesser extent the Fertilizer Management Rule. The Protection of Existing Riparian Buffer Rules was implemented in 2011 after the Stage 1 Existing Development Programs were adopted in 2009 and Waste Water Treatment Plant compliance with Total Phosphorous limitations by January 1, 2010. The New Development Programs, Stage 2 Existing Development Program, and Wastewater Treatment Plant Compliance with Total Nitrogen Limitations have all been delayed several times. The current implementation schedule is cloudy because of delays that are contingent upon future monitoring results. This establishes the following compliance timeframes for these rules:

- New Development Programs – Delayed until at least 2020.
- Stage 2 Existing Development Programs – Delayed until at least 2023.
- Wastewater Treatment Total Nitrogen Limits – Enacted with 2016 Permit Renewals.

Additionally, Session Bill 2013-395 created a study to determine if “mechanical circulation” within Jordan Lake could reduce algal growth within the lake. This study was conducted by NDEQ and Medora Corporation for \$1.44 million and originally included the leasing of 36 Solar Bee Circulators (the study was expanded in 2014). The Solar Bee’s, similar to the ones in the Graham-Mebane Lake, are a relatively new technology and the study was extended several years. However, in the spring of 2016, NC DEQ announced that the Solar Bees had failed and would be removed from the lake. It is unclear how this will impact future regulation of the Lake.

In January 2014, a Legislative Jordan Lake Committee met and did not recommend any changes to the Rules. Despite this, additional rules have been implemented since 2014 with regards to Jordan Lake.

In 2016 the North Carolina General Assembly (NCGA) approved legislation directing UNC-Chapel Hill (UNC) to conduct a multi-year study and analysis of nutrient management strategies and compilation of existing water quality data specifically in the context of Jordan Lake and Falls Lake (Sections 14.13.(a) through (c) of Session Law 2016-94 as amended by Sections 13.8.(a) through (e) of Session Law 2018-5).

The legislation outlines two specific provisions that are to be included in the study:

- Review data collected by the Department of Environmental Quality and by other stakeholders from water sampling in the areas subject to the Jordan Lake or Falls Lake Water Supply Nutrient Strategies and compare trends in water quality to the implementation of the various elements of each of the Strategies; and
- Examine the costs and benefits of basin wide nutrient strategies in other states and the impact (or lack of impact) those strategies have had on water quality.

This Report was released In December of 2019. Considerations for actions are still ongoing.

### **Jordan Lake One Water**

As water quality and water supply challenges continue to increase from growing populations, there is an opportunity to reevaluate water resource management within the Jordan Lake Watershed and move towards a more collaborative, interdisciplinary, and innovative approach. Jordan Lake One Water (JLOW) is a partnership to facilitate cooperation and integrated water resource management in the Jordan Lake watershed. The group is comprised of local governments, conservation groups, universities, water utilities, agriculture, and private industry stakeholders interested in sharing the cost of water quality and quantity improvements in order to realize watershed-wide social, economic, and environmental benefits. In 2017, Triangle J Council of Governments (TJCOG) began holding meetings to discuss One Water management concepts in the Jordan Lake watershed. Interest was so high, among so many different groups, including elected officials, that a JLOW advisory committee was formed to develop a work plan and begin moving forward on collaborative planning efforts. The Advisory Committee, NCDWR, and numerous stakeholders will now be collaborating to develop a recommended One Water/Integrated Water Management framework for the Jordan Lake watershed as part of the Jordan Lake Nutrient Management Strategy Rules Readoption opportunity.

One Water is a transformative approach to how we view, value, and manage water. The One Water approach views all water – from the water resources in our ecosystems to our drinking water, wastewater, and stormwater – as resources that must be managed holistically and sustainably in order to secure a bright, prosperous future for our children, our communities, and our country. A One Water approach can take many different forms, but has some unifying characteristics:

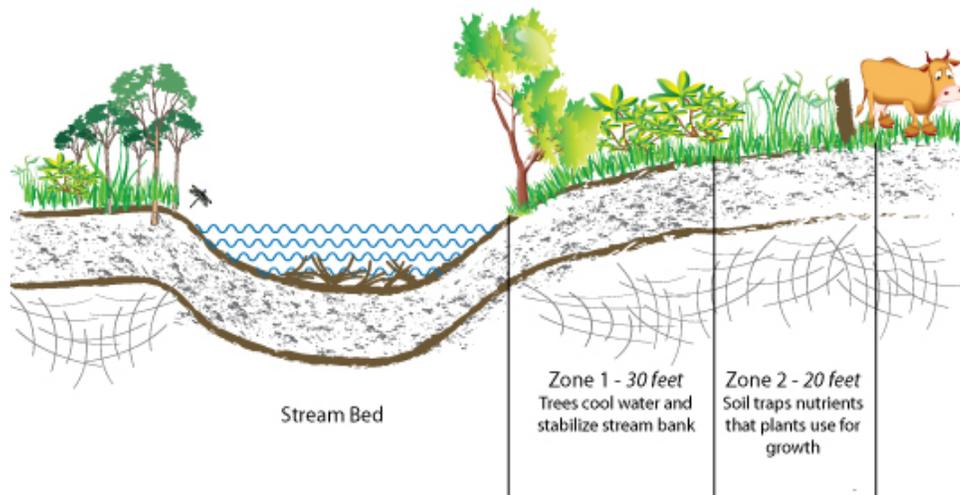
- A mindset that all water has value
- A focus on achieving multiple benefits - economic, environmental, & social
- Approaching decisions with a systems mindset
- Utilizing watershed-scale thinking & action
- Relying heavily on partnerships & inclusion

The Town is supportive of the JLOW process and is very interested in alternative compliance strategies for Jordan Lake. The Town has been represented in the JLOW process through their AWCK representatives Josh Johnson and Phil Ross.

### Riparian Buffer Protection Program

The Town's Riparian Buffer Protection Program was implemented in November 2010. The enforcement mechanism for the Buffer Protection Program is the Jordan Riparian Buffer Protection Ordinance that was approved by DWR. The Buffer Program establishes a protected buffer along surface waters (primarily perennial and intermittent streams but also ponds and other surface waters) shown on the USGS Quad maps or the NRCS Soil Survey Maps. The buffer has two different zones: Zone 1 is the closest 30' from the top of bank in all directions; Zone 2 is from 30' to 50' from the top of bank in all directions. Zone 1 is to remain undisturbed while Zone 2 is to remain vegetated.

The Buffer Ordinance is a change of use ordinance; therefore the regulations only apply if new development or a change in use takes place within the buffer. Changes in use can range from new development that goes through an approval process to clearing of the buffer for residential or commercial landscaping but any change of use within the buffer is subject to the buffer ordinance. The Buffer Ordinance also includes a Table of Uses that breaks down uses within the buffer to Exempt, Allowable, and Allowable with Mitigation. Any uses not in the Table of Uses are prohibited without a variance. Uses that fall in the Allowable or Allowable with Mitigation categories must submit a request to the Town for written authorization prior to disturbing the buffer. These uses also must show that there are no practical alternatives to the requested use. In showing the no practical alternatives, users must show how they are minimizing the impacts if possible.



The Town includes Riparian Buffer Protection Program training with its annual employee training but generally limits inspections of buffers to complaints about buffer clearing or Town Staff reporting of impacts. The Town tracks buffer impacts but tries to handle first time offenders by requiring

replacement of the buffer and education of the offender, rather than fining first time offenders. The Town's buffer program revised in the calendar year of 2016 to comply with Session Law 1015-246.

### **New Development Programs**

The Jordan Lake New Development Rule, 15A NCAC2B .0265, sets out standards that named communities are to incorporate into local stormwater programs, and requires the Division of Water Quality to develop a model local stormwater program for those communities to use to create a New Development Program that complies with the rule. The Jordan Lake New Development Ordinance is the legal mechanism that local governments will use to enforce these standards on new development projects greater than ½ acre in disturbed area (or 1 acre for single family residential).

Most communities within the Jordan Lake watershed are existing NPDES MS4 Phase II communities that have existing Phase II Stormwater Post-Construction Ordinances which are centered around 85% TSS treatment of the 1" storm for developments over 24% impervious and a 1 acre disturbance threshold. The Jordan Lake New Development Rule is centered on removal of Nitrogen and Phosphorous from stormwater and a ½ acre disturbance threshold. These two pollutants can be removed with many of the same processes as TSS but at differing removal rates and with a different calculation to determine the effectiveness of the treatment processes.

The Town of Elon will combine its NPDES Phase II and Jordan Lake New Development Standards into one comprehensive stormwater ordinance. This will reduce confusion between the two ordinances on the part of developers, designers, reviewers, staff, and the public by creating one set of standards for review.

The Town created, submitted, and had a full program approved in the summer of 2012. However, the Town chose to delay implementation until a future date (in accordance with legislation from 2012 and 2013). The Town's future study of the overall Jordan Lake Compliance Strategies may contain recommendations about early adoption of the Program. In order to gather data for future compliance, the Town will begin requiring new development to complete the Jordan/Falls Nutrient Load Accounting Tool in 2014. The tool will not be used for regulatory compliance at this time but will be used to educate the Town on future development.

### **Existing Development Stage 1 Programs**

The Town of Elon submitted a Stage 1 Adaptive Management Program to reduce existing nutrient loading to Jordan Lake in 2009. Often referred to as the Stage 1 Existing Development Program, the Program credits the NPDES Phase II Stormwater Program as the primary steps in the program along with requiring the Town to create a Retrofit Identification Program. The Existing Development Program requires annual updates but full reporting is only required for the Retrofit Program because of this annual NPDES Phase II Report.

This retrofit program is intended to provide a framework for identifying retrofit opportunities to reduce nutrient loading in the Jordan Lake Watershed. The program is intended to identify both structural and non-structural retrofits that seek to reduce pollution, and nutrients, from being carried downstream by

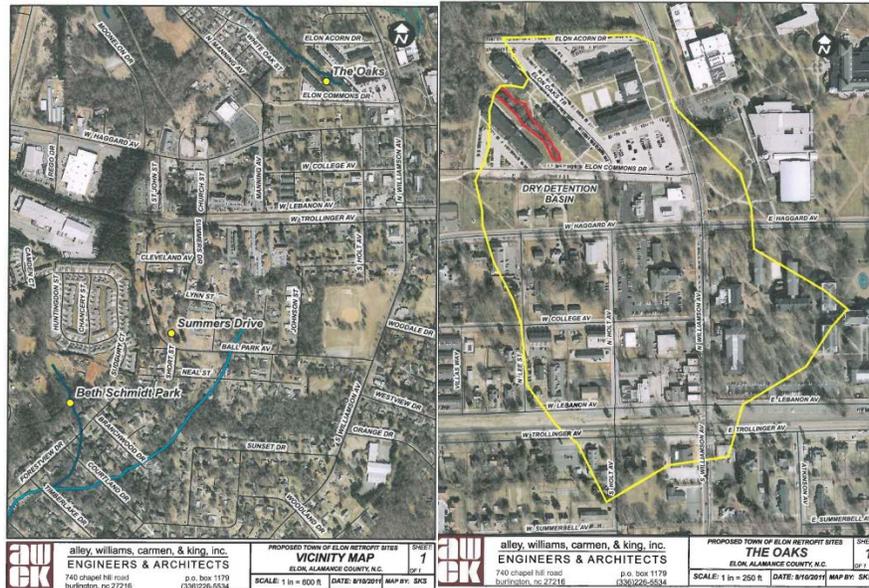
stormwater runoff. By either controlling stormwater runoff or reducing the pollution in the runoff, stormwater retrofits reduce downstream pollution in streams, rivers, and lakes. Typical structural stormwater retrofits are stormwater wetlands, bio-retention basins, water quality ponds, and other devices found in the NC Division of Water Quality Best Management Practices Manual (NC DWQ BMP Manual). Non-structural retrofits include but are not limited to fertilizer programs, reducing animal waste programs, urban forestry programs, and leaking septic tank replacement programs.

The Town of Elon will use this program annually in a review of the stormwater program that will include reviewing the public education program, reviewing the illicit discharge program, and using this program to have an accurate and up to date list of potential retrofit projects. The Town is required to select a number of projects based on the following chart:

**Table 1: Minimum Number of Existing Development Nutrient Load-Reducing Projects**

Population in the Jordan Lake Watershed	Minimum Number of Existing Development Load Reducing Activities to be Identified Annually
Less than 15,000	1
15,000-30,000	2
30,000-60,000	3
60,000+	4

In 2016, the Town of Elon identified three projects to pursue in the future. In 2019 these projects are still being considered. These three projects included the selected Oaks Dry Detention Basin, improvements to the BMP's at Beth Schmidt Park, and potential BMP's at Morgan Place Park. The potential improvements at the Oaks Student Housing rated the highest of the potential BMP's. The Oaks Student Housing is an Elon University project that has a partially functioning BMP that could be improved to achieve nutrient reductions as well as to reduce flooding of downstream non-University property.



The Town has also developed a draft stormwater project policy that included a draft stormwater capital improvement project list.

A future strategy for the Town to consider would to fund a full study of potential BMP's. The Town regularly responds to minor flooding and drainage complaints and could use a full study to prioritize small improvements that could be done to reduce flooding/drainage complaints while reducing nutrient loading. This could be addressed with future information on Compliance Strategies for Jordan Lake.

### Future Existing Development Stage 2 Programs

The Town of Elon will probably be required to establish a Stage 2 Adaptive Management Program in the future. This requirement will be based upon the future testing of the water quality within Jordan Lake. At this point in time we view this requirement as likely. The Stage 2 Existing Development Programs will be intended to eventually reduce 8% of Total Nitrogen Loads and 5% Total Phosphorous Loads from the 2001 Baseline Period along with all TN and TP Loads from the Baseline Period until adoption of the New Development Program.

NC DWQ, through a contract process that involved the Nutrient Scientific Advisory Board (NSAB), remodeled the Jordan Lake Watershed previously. The remodeling study, completed by Tetra Tech, provided nutrient loadings for individual jurisdictions for the baseline period and for the post baseline period through 2010. These jurisdictional loadings are the first jurisdictional modeled loads that have been produced for Jordan Lake and will allow for the most accurate estimate (to date) for the retrofits needed and the costs associated with reaching water quality standards within the lake. These loads have not been assigned at this point and the exact loading for each community is still unclear.

The Stage 2 Programs will also have additional nutrient reduction measures that credit will be available for. These nutrient credits were established through another contract from NC DWQ and the NSAB that established accounting a new crediting program for the following items:

- Remedy Malfunctioning Septic System.
- Remedy Discharging Sand Filters.
- Volume Pond Retrofits.
- Improved Street Sweeping.
- Stream Restoration/Enhancements.
- Diverting Impervious Runoff to Pervious Areas/Impervious Disconnection.

Crediting of these measures will greatly improve the flexibility that affected parties (like Municipalities) have in achieving the required load reductions. The cost of these load reductions will be substantially reduced by including these strategies into the overall compliance strategy.

The release of these recent studies will be included in an overall Compliance Strategy Study for the Town of Elon that will be completed after the loading is released. This study will evaluate the feasibility of all options for the Town of Elon, will include trading options, and will include the most comprehensive and accurate financial assessment of compliance for the Town to date.

## **Stormwater and Storm Drainage Project and Maintenance Policy**

As evidenced by the rest of this report, the Town of Elon's stormwater program is almost entirely centered on regulatory compliance. This is at odds with the most resident's specific issues. By far the most common concern from residents is localized storm flooding. These are primarily related to a lack of stormwater controls and a lack of sufficient stream buffers in residential developments. The Town's Phase 2 Stormwater Ordinance, Buffer Ordinance, and Storm Drainage Design Manual have improved this situation with new development but subdivisions developed prior to those standards are a significant issue. In an effort to address these issues, the Town of Elon created a formal Stormwater and Storm Drainage Project and Maintenance Policy in the fiscal year 2019-2020. The policy allows the Town to participate in local stormwater improvements in a partnership with property owners. These projects are centered on environmentally friendly projects that address flooding and erosion. The policy also clearly defines maintenance responsibilities for the storm drainage system between the Town and private property owners. The policy is a step in using stormwater fee funds to improve the daily lives of citizens within the town. Funding for the policy will be provided through the stormwater fund but will be in addition to regulatory centered funding.

## **Stormwater Funding**

The Town of Elon funds its Stormwater Programs through a Stormwater Fee. The Town collects a flat fee of \$2/month or \$4/bimonthly from utility all utility users. The total stormwater budget for 2019 – 2020 was \$55,000. The Town uses this fee to pay for its Water Quality Programs including its NPDES Phase II and Jordan Lake Programs.

In the future, the stormwater budget may need to be increased in order to cover additional expenses for the Jordan Lake Rules. These increases may be done through creation of an Existing Residential Unit (ERU) style fee. The ERU is based on an impervious area per property calculation and is considered an equitable fee for stormwater cost calculations. However, the ERU will have a substantially higher startup and maintenance costs than a flat fee does.

## The Future of Stormwater

Stormwater, and Water Quality in particular, is an evolving field of regulation. The Town of Elon is already involved in NPDES Phase II and Nutrient Sensitive Waters. Within the next decade the Town needs to plan for further regulation of these issues as well as several other outstanding issues. EPA continues to work on two potentially large future items that include a Numerical Nutrient Criteria for all surface waters and a National Stormwater Rule. The Numerical Nutrient Criteria is an EPA supported push towards establishing nutrient limits for all surface waters. Currently in North Carolina, generally only reservoirs have nutrient limits and the limits are based upon response indicators.

## Stormwater Program Contacts

Name	Position	Phone #	Email
Richard Roedner	Town Manager	336-584-3601	<a href="mailto:rroedner@elon.gov">rroedner@elon.gov</a>
Pamela Desoto	Assistant Town Manager/ Planning Director	336-584-3601	<a href="mailto:pdesoto@elon.gov">pdesoto@elon.gov</a>
Donnie Wood	Public Works Director	336-584-9600	<a href="mailto:dwood@elon.gov">dwood@elon.gov</a>
Josh Johnson	Town Engineer	336-226-5534	<a href="mailto:josh@awck.com">josh@awck.com</a>
Phil Ross	Stormwater Coordinator	336-226-5534	<a href="mailto:pross@awck.com">pross@awck.com</a>