

NPDES Phase II Stormwater Annual Report City of Graham

**Fiscal Year
2019 – 2020**

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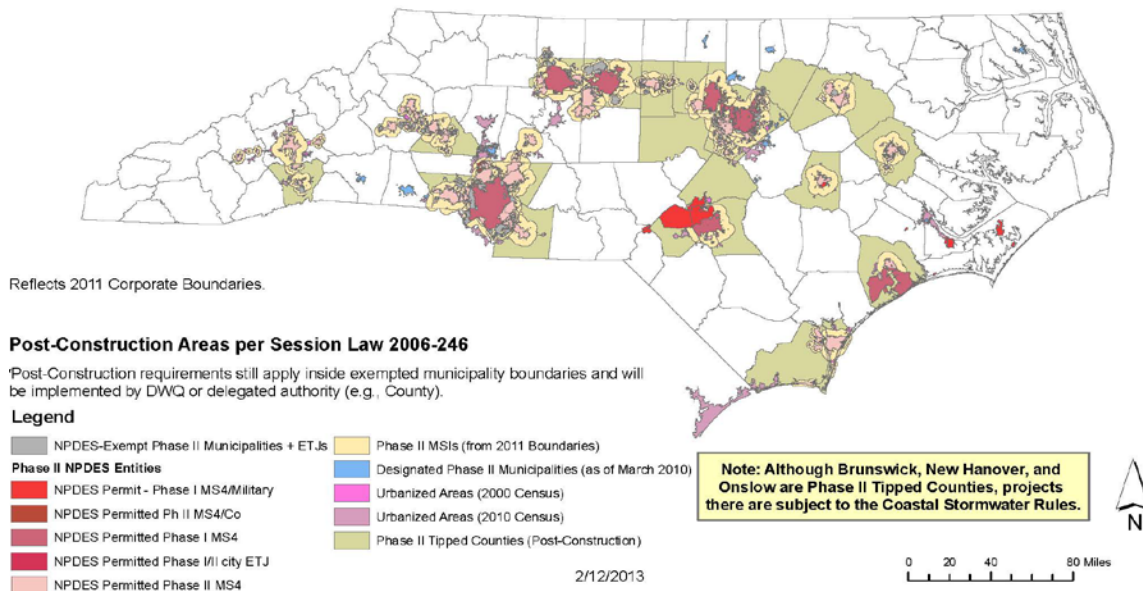
Report Outline

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Introduction

On July 1, 2005, The North Carolina Division of Water Quality (DWQ) in the Department of Environmental Quality (DEQ), 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.

NPDES Phase I/II Communities, Exempted Municipalities*, & Tipped Counties with County-wide Post-Construction



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 requires 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 City of Graham has a Comprehensive Stormwater Management Program 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 City's Storm Drainage Design Manual does include provisions for managing peak runoff from new development and the City'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 City'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 (NC DEMLR – which as of fall of 2013 now houses Stormwater Permitting).

This Report is intended to complete the Annual Report specifying the City's progression in implementing the NPDES Permit and Comprehensive Stormwater Management Plan. It is also intended to give readers a comprehensive idea of the City's full Stormwater Program including the City's Jordan Lake, Little Alamance Creek, and Water Quantity Programs as well as the City'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 City'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 City 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 stormwater 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 City 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 new MS4 Permittees (like Graham) 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 60 - 61 of the annual report provides specific details of outreach efforts within the City of Graham. Danica Heflin can be contacted at 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.

Graham 2019 - 2020			
Event / Location	Date	Program	#
Graham Recreation Center	July 9, 2019	Enviroscape, How Wet is Our Planet, NC Watershed Game	18
Graham Recreation Center	July 16, 2019	Enviroscape, Rain Garden in a Bottle	18
Graham Recreation Center	August 6, 2019	Water Quality-Ask the Bugs, Macro Mayhem	18
Haw River Assembly Learning Celebration	Sept 30 – Oct 3	Various school classes attended	173
Little Alamance Creek/ Boyd Creek Cleanup	March 28, 2020	Cancelled Due to COVID-19	
Alamance Creek Week Events	March 28- April 4, 2020	Cancelled Due to COVID-19	
iNaturalist - Biothon	April- June 2020	Virtual Event on Water Quality	115
Total			342

Stormwater Outreach Efforts in Graham

During the last few years the City of Graham partnered with other cities and businesses in Alamance County to sponsor Alamance Creek Week. A weeklong event to educate the public on keeping our local streams and rivers clean. The Week is kicked off with a Stream cleanup on Little Alamance Creek and in Graham, Bowden Branch (known locally as Boyd Creek). These events draw a significant amount of coverage and a good response from citizens and included participation from both City Staff and Local



residents. However in the spring of 2020 State Health orders did not allow public gatherings and even schools in the area were required to do virtual classes from home due to the outbreak of the COVID-19 pandemic that swept across the state. This pandemic continues even into the coming fiscal year.

Public Participation and Involvement

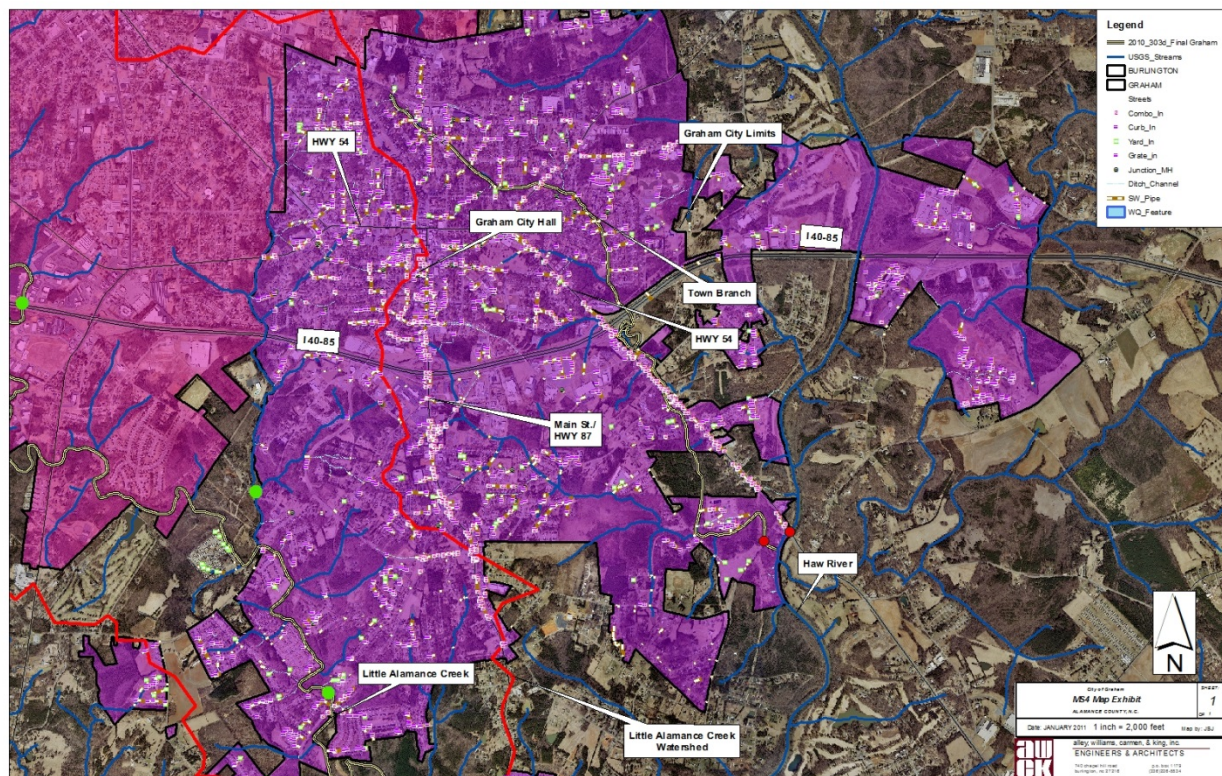
The City has a responsibility to solicit and consider public opinion on all matters, including stormwater management. The City originally involved the public with a public hearing in 2005 and tried to create a citizen's committee during the first permit cycle but little interest was shown from the public. The City has been receptive to any questions from citizens, maintains a **Helpline - City Hall at (336) 570-6700** and has worked with Stormwater Smart and the City of Burlington to educate the public but continues to struggle to establish effective Public Participation and Involvement. The City held a Stormwater Public Meeting in calendar year of 2017 and will hold one again as needed in the future. This public meeting will seek input on the stormwater program and will provide both input to the City as well as education to the citizens.

Illicit Discharge Detection and Elimination

The City of Graham 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 City passed in May 2008. 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 City 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 City'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 City Staff. The map is intended to be updated on a regular basis as new development happens but updates since the completion of the map have been sporadic.

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 City staff investigations.

The City has significantly reduced sanitary sewer overflows within the collection system in the last ten years. In Fiscal year 2019-2020 there were 3 reportable sanitary sewer overflows of 1000 gallons or more. .

The City of Graham has been granted funds from the Division of Water Infrastructure to replace the Boyd Creek pump station. Work on the pump station began in late 2019.

The City of Graham hydraulically cleans 10% of the collection system annually and chemically treats approximately \$35,000 of the system to prevent root intrusion. Additionally \$50,000 was spent on Manhole rehabilitation, \$100,000 on line repair Slip lining and \$90,000 on the I & I study for the Boyd Creek Outfall. These maintenance issues are intended to reduce Sanitary Sewer Overflows and therefore prevent illicit discharges to the MS4.

The City also utilizes smoke testing and closed circuit inspection for sanitary sewer related issues. In 2019 the city smoke tested 76,400 Linear Feet or 14.5 miles of the sanitary sewer system. After this a closed circuit inspection was done of several of the noted areas for closer viewing and inspection.

In 2018 City staff visited and mapped the location of all dumpsters (199 total) in the City. This inspection also looked at the status of the dumpsters (Good or Fair). Trash dumpsters can leak and cause direct discharge into the stormwater system. This inspection has become an annual event with the city looking at a percentage of the dumpsters each year to catch any problems on a timely basis.

City 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, recreation, planning, and administrative staff as well as some fire and police personnel. A possible future improvement would be multiple trainings annually and/or including more fire and police personnel. Training of new hires would also be a good addition.

Construction Site Runoff Controls

The City of Graham delegates the Construction Site Runoff Controls to the NC DEQ Division of Energy, Mineral, and Land Resources. The City of Graham 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 City of Graham also has the ability to call NC DEMLR to report known sedimentation issues. A possible improvement could be NC DEMLR's responsiveness to City generated complaints, which has been less than effective in the past.



Post Construction Site Runoff Controls

The City of Graham 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.

City of Graham STORMWATER WETLAND Engineer's Statement of Certification																																																					
<div> <div> </div> <div> City of Graham Planning Department Telephone: (336) 570-4700 Fax: (336) 570-4703 </div> <div> City of Graham 301 South Main St. Graham, NC 27233 City web site: www.cityofgraham.com </div> </div>																																																					
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P.O. Drawer 357 301 South Main Street Graham, NC 27233 (336) 570-4705 Fax (336) 570-4703 www.cityofgraham.com/planning																																																					
On _____ the City's Stormwater Administrator received a request to consider the following application: Project Name: _____ Property Owner(s): _____ Property Location: _____ Tax#: _____ GRN: _____ Total Site Acres: _____ <input type="checkbox"/> High Density Impervious Acres: _____ <input type="checkbox"/> Low Density Type and number of BMPs proposed: _____ _____ Permit Approval Stormwater Administrator _____ Date _____ NORTH CAROLINA, ALAMANCE COUNTY I, _____ a Notary Public of the aforesaid County and State, certify that _____ personally appeared before me and acknowledged that s/he is Stormwater Administrator of the City of Graham, North Carolina and pursuant to authority duly given, and as an act of the City, s/he executed this Agreement for the purpose herein expressed. WITNESS my hand and Official Seal this _____ day of _____, 20____. My Commission Expires _____ (Seal) NOTARY PUBLIC Permit # _____ DEVIDM continued on back of page...																																																					
Permit Information SECTION 1: APPROVAL. Therefore, the subject site and land used is hereby approved and subject to all applicable provisions of the City of Graham Phase II Stormwater Ordinance, Sections 3 and 4 of this permit, and the following condition(s) which the Stormwater Administrator finds necessary for the proposed development to meet the intent of the ordinance: 1. This permit shall be valid for a period of two years from the date of issuance unless a valid building permit has been issued and maintained for the site or the permit has been revoked by the City of Graham. If, after two years the permitted activity has not begun nor a valid building permit secured, this permit shall expire. 2. All land purchases and transfers necessary to secure the property for development shall be completed prior to recordation of this permit. 3. The development of the tract shall proceed in conformity to all plans, design features, and restrictions submitted as part of the stormwater permit application and kept on file by the Graham Planning Department except that the Graham Stormwater Administrator may approve minor changes to such plans as required by field conditions. 4. The petitioner shall complete all required off-site stormwater improvements and receive approval from the City for such improvements prior to the release of any certificates of occupancy. 5. The petitioner shall submit a Floodplain Development Permit Application and receive approval from the Graham Planning Department prior to any land disturbance or filling of and located within Special Flood Hazard Areas. 6. The petitioner shall submit a Sedimentation and Erosion Control Plan Application and receive approval from the North Carolina Department of Environment and Natural Resources, Land Quality Section prior to any land disturbance or filling of land.																																																					

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 City'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 City it goes through the City Planning Department. Then the plans are distributed to a Technical Review Committee (TRC). The TRC includes Engineering and Stormwater Reviewers as well as assorted City 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 be reviewed at a later point in time.



Stormwater Detention Pond in Graham

The City of Graham reviewed 10 projects that triggered the Stormwater Ordinance in 2019 - 2020 and reviewed 24 plans total. 2 projects were completed.

The City of Graham requires as-builts and annual inspection reports from new stormwater control measures (SCM) but has had trouble getting annual inspection reports submitted. In the coming year the City will inspect the existing stormwater control measures and then provide the property owners with the inspection report and the needed improvements. This letter will also contain information requiring SCM owners to provide future inspection reports to the City or face fines and/or assessments.

Pollution Prevention and Good Housekeeping

Pollution Prevention is an overall goal of the City's stormwater management plan and Good Housekeeping is a key to that goal. Municipalities, in general, conduct many activities that can pose a threat to water quality. Municipal facilities are the primary potential source of contamination but with good housekeeping habits this potential can be reduced or eliminated. The City attempts to minimize

stormwater pollution from municipal operations by complying with best management plans for each City facility. The BMP's are written into a City Facilities O&M Plan that is intended to reduce or eliminate stormwater exposure of oil, grease, pesticides, herbicides, fertilizers, sediment, and other materials used by the City. Each of the City facilities is inspected annually and any issues are noted, written into the Facility O&M Plan, and discussed with the facility supervisor.

The City operates a Fire Department, City Hall, Library, Police Department, Public Works Facility, Wastewater Plant, South Graham Park, Recreation Center, Maple Street Center for Performing Arts, Concession Stand for Apollo Field, Water Plant, Graham/Mebane Lake, Bill Cooke Park, and a Cemetery. Each of these facilities is inspected annually and any new facilities will be added to the inspection list.



Salt Storage at Public Works

City staff with the greatest exposure to stormwater are trained on PPGH once annually. 2020 training that was being planned was cancelled due to statewide COVID-19 restrictions. The training is typically 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.



PPGH Training

The City of Graham sweeps all of the town streets one per month, including the downtown area every three days. Approximately 520 cubic yards of material is picked up, primarily during leaf season. 59 miles are covered on a regular basis.

The City of Graham used no road salt or road salt alternatives (brine) prior to and during inclement weather in 2019 this is due to the mild winter in the area.

The City of Graham used 1,900 gallons of waste oil in 2019 in a waste oil heater to heat the City garage Area. The City maintains 6 pet waste stations at area parks around the City.

The City also maintains many culverts and the storm drains that are either in storm drainage easements or within City right of ways. The City has major culverts that are being designed and studied at this time. The Culverts are located near the intersection of Marshall Street and Travora Street and one on Albright Street.

The City also checks all storm drains quarterly and after major rainfall events, and once a month during leaf season, and cleans them as needed. Jet trucks are used to clean storm drain pipes and vacuum trucks are used to clean inlets when they are found to need maintenance during inspections.

The City of Graham has worked extensively on the wastewater collection system within the Boyd Creek watershed since 2009. The Boyd Creek watershed is within the impaired Little Alamance Creek watershed. This work is focused on reducing surface water and waste water interaction. This has included extensive I/I evaluation, improvements to the Boyd Creek Pump Station, CIPP relining of sewer outfall lines, manhole rehabilitation and smoke testing. This work is ongoing with the Pump Station and CIPP lining being funded by the Clean Water State Revolving Funds (CWSRF). The total construction projects completed to date are \$1.2 million with the Boyd Creek Pump Station under construction in fall 2019 for \$3.3 Million. By the end of 2020, the City of Graham expects to have spent at least \$4.5 million in collection system improvements within the watershed.

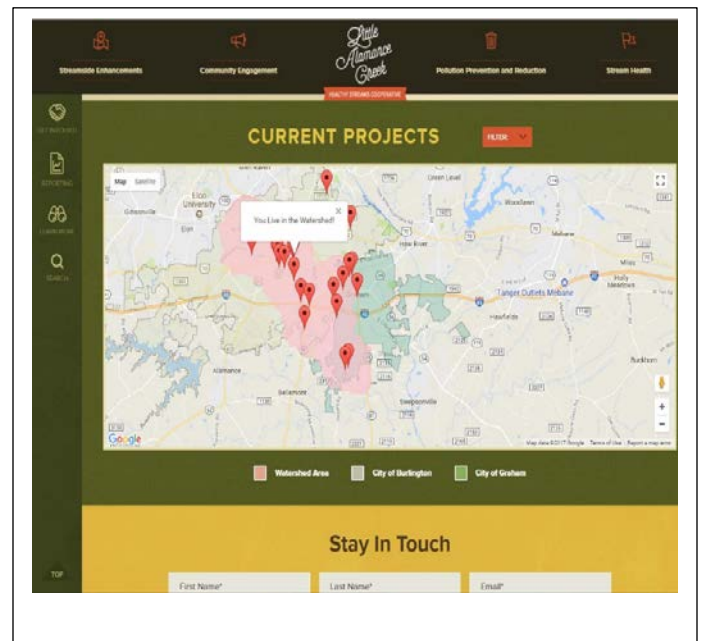
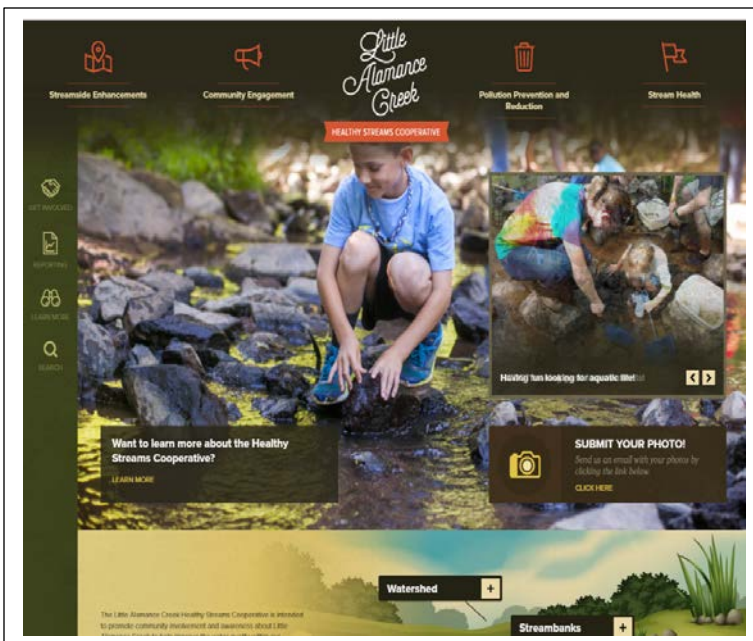
Impaired Waters and Total Maximum Daily Loads (TMDL)

The City of Graham discharges to three impaired waters. The impaired streams are the Haw River, Town Branch, and Little Alamance Creek. More details about the impaired streams are included below:

- Haw River (16-(1)d3) - A portion of the City discharges to the Haw River where it is impaired for fecal coliform. The Haw River has been impaired since 1998 for Fecal Coliform but only a small portion of Graham drains directly to the Haw in this impaired area.
- Town Branch (16-17) – Town Branch is impaired for Fecal Coliform and was originally listed on the 1998 NC DWQ 303d list and has had a TMDL for Fecal Coliform since August 2002. The TMDL specifically lists sanitary sewer overflows, failing septic systems, and other primarily point source pollutant loads. The City of Graham has spent a substantial amount of time, energy, and funding to reduce sanitary sewer overflows in the last 10 years including over \$800,000 on a 2009 project that rehabilitated over 17,000 lineal feet of sanitary sewer line in Town Branch and

Little Alamance Creek. A potential future project would be to apply for grant funding to fund rehabilitation of the manholes in the same outfall areas.

- Little Alamance Creek (16-19-11) – Little Alamance Creek is impaired for benthic macro-invertebrates and has been since 1998. Little Alamance Creek was the subject of a draft TMDL for Impervious Cover in 2010 that was not adopted; instead a Category 4b plan was written by the City of Graham and its partners in the watershed, the City of Burlington and NCDOT, and approved by EPA in January 2015. The Category 4b Plan is written with the goal of achieving water quality standards, fiscal year 2015-2016 is the first year of implementation. There is a phased implementation schedule spread out over the next several years. More information is available on the Little Alamance Creek project website at www.littlealamancecreek.com



Jordan Lake Rules

The City of Graham 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 SolarBee 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 City of Graham) 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

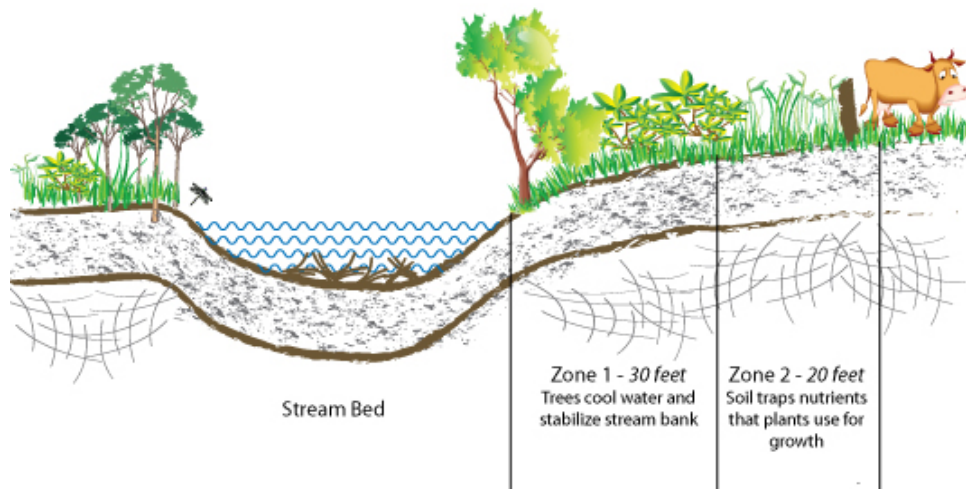
The City is supportive of the JLOW process and is very interested in alternative compliance strategies for Jordan Lake. The City has been represented in the JLOW process through their AWCK representatives Josh Johnson and Phil Ross.

Riparian Buffer Protection Program

The City's Riparian Buffer Protection Program was implemented in December 2010. The enforcement mechanism for the Buffer Protection Program is the Jordan Riparian Buffer Protection Ordinance that was approved by the City of Graham in December 2010. 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 City 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 City includes Riparian Buffer Protection Program training with its annual employee training but generally limits inspections of buffers to complaints about buffer clearing or City Staff reporting of impacts. The City 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 City's buffer program was revised in 2016 to comply with Session Law 2015-246, all changes are currently implemented.

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 City of Graham 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 City created, submitted, and had a full program approved in the summer of 2012. However, the City chose to delay implementation until a future date (in accordance with legislation from 2012 and 2013). The City's 2014 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 City 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 City on future development.

Existing Development Stage 1 Programs

The City of Graham 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 City 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.

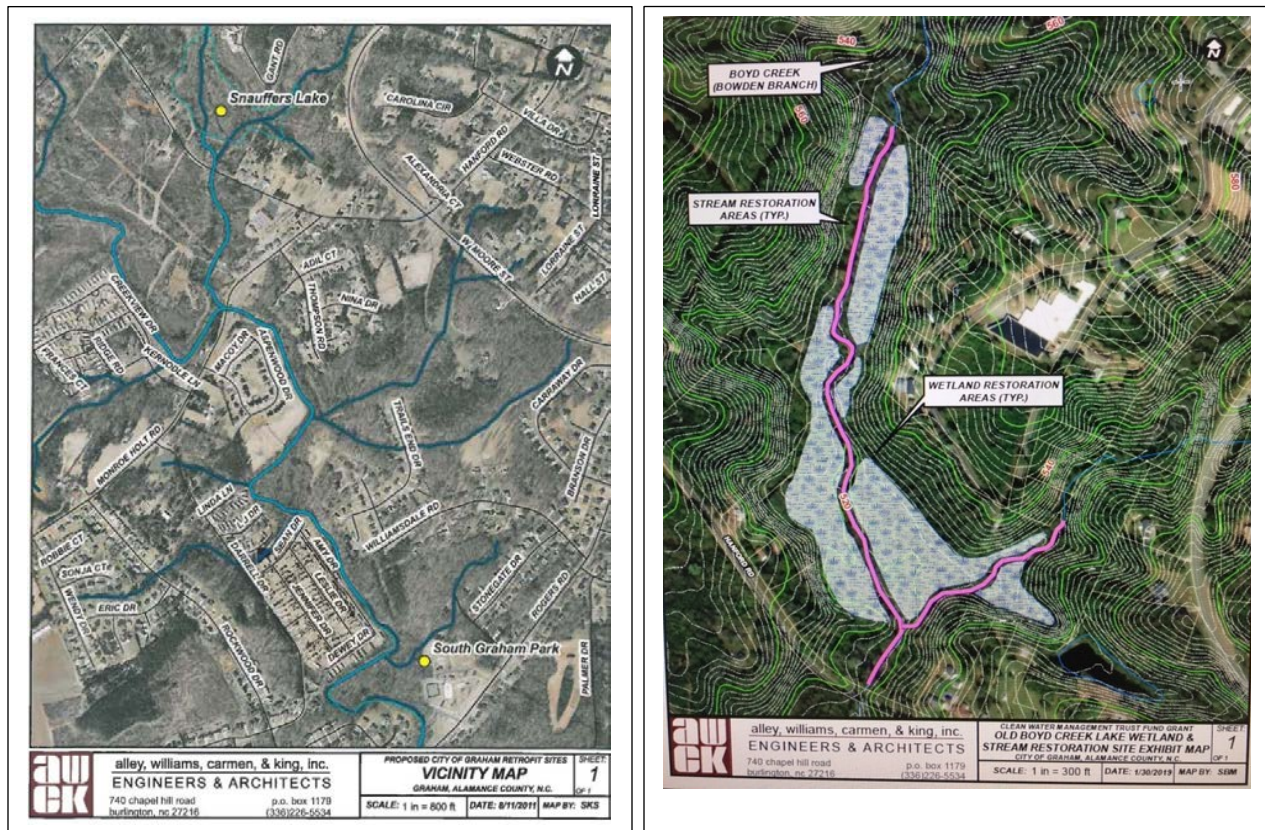
This retrofit program is intended to provide a framework for identifying retrofit opportunities to reduce nutrient loading in the Jordan Lake Watershed. The program is intended to identify both structural and non-structural retrofits that seek to reduce pollution, and nutrients, from being carried downstream 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 City of Graham 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 City 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 City of Graham first identified two projects to pursue in the future. In 2019 these projects are still under consideration. These two projects included the selected Old Boyd Creek Lake BMP and the backup BMP at South Graham Park. Old Boyd Creek Lake is a previously existing lake that had the dam breached several years ago but the potential exists to recreate a BMP that will treat a significant drainage area with a large amount of impervious area, has the space for a large structural stormwater control measure and is undevelopable land.



A future strategy for the City to consider would to fund a full study and construction of Old Boyd Creek Lake. Funding in the near future, before the 2020 requirement from the Jordan Lake Rules, could provide for additional grant funding and could make grant funding easier to obtain. Funding of any BMP's before legislative requirement represents some risk on the City's part but in this case would be within the Little Alamance Creek Watershed and credit would be applicable to both the Jordan Lake

Watershed and the Little Alamance Creek Watershed. (Future Information on Compliance Strategies for Jordan Lake will be completed once NC DEQ releases final existing development nutrient loadings.)

Future Existing Development Stage 2 Programs

The City of Graham 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 City of Graham that will be completed after the loading is released. This study will evaluate the feasibility of all options for the City of Graham, will include trading options, and will include the most comprehensive and accurate financial assessment of compliance for the City to date.

Stormwater Funding

The City of Graham had a total stormwater budget of \$70,000 for 2019 - 2020.

The City of Graham funds its Stormwater Programs through a Stormwater Fee. The City collects a flat fee of \$2/month from utility users within the City Limits. The City uses this fee to pay for its Water Quality Programs including its NPDES Phase II, Jordan Lake, and Little Alamance Creek Programs.

Historically, the City has also used general fund balance in order to fund capital storm drainage and stormwater needs.

Stormwater, and Water Quality in particular, is an evolving field of regulation. The City of Graham is already involved in NPDES Phase II, Biological Integrity within streams, and Nutrient Sensitive Waters. Within the next decade the City 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. The City of Graham's Little Alamance Creek 4b Plan will be an outline for how to prepare a comprehensive stormwater program.

Stormwater Program Contacts

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