Town of Smithfield

Stormwater Management Program Action Plan

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Executive Summary

Regulatory requirements for stormwater management within Smithfield were examined in the *Stormwater Management Program Action Plan* project along with initial public outreach and public input to begin to define the extent and level of needed and desired future municipal stormwater services. In light of stormwater-related challenges and opportunities facing Smithfield, this report provides a summary of findings and recommendations regarding the current and potential future Town of Smithfield Stormwater Management Program for managers and officials to consider for development and implementation going forward.

The *Stormwater Management Program Action Plan* was facilitated and prepared by JEWELL Engineering Consultants, an LJB, Inc. company (JEWELL-LJB) in support of the Town of Smithfield. The JEWELL-LJB Team expresses sincere appreciation to Town Manager Mike Scott, Town Staff including Stephen Wensman (Planning Director), Lenny Branch (Public Works Director), Gary Siler (Finance Director), Tim Kerigan (Human Resources Director/PIO/EDL), Gary Johnson (Parks and Recreation Director), John Blanton (Fire Chief), Keith Powell (Police Chief), Ted Credle (Public Utilities Director), Bill Dreitzler (Town Engineer) and many others, the Honorable Mayor Andy Moore and Town Council Members, and many citizens for their support and involvement in the project.

Following are major findings and recommendations from the Smithfield Stormwater Management Program Action Plan project. The findings and recommendations are focused on programmatic topics. More detail on key components of the Action Planning project is found within the body of the report.

1. The Town of Smithfield is required by state law to develop and implement a stormwater program to comply with the State of North Carolina's Neuse River Basin – Nutrient Sensitive Waters Management Strategy (NSWMS). The stormwater portion of this strategy is known as the Neuse Stormwater Rule (NSR). The Town's stormwater program was effective February 1, 2001 and continues in force. Current requirements are:
    a. New development review and approval
    b. Protect and maintain riparian areas
    c. Implement a public education program
    d. Identify and remove illegal discharges
    e. Identify suitable locations for potential stormwater retrofits
    f. Submit an annual report documenting progress on and net changes to nitrogen load from Smithfield's planning jurisdiction.

2. In general, the NSR requires that Smithfield develop and implement stormwater management programs to protect the Neuse River and other surface receiving waters by reducing nitrogen discharges from the Municipal Separate Storm Sewer System (MS4) to 70% of 1995 (baseline) levels.

3. In a letter dated March 22, 2010, the NC Environmental Management Commission (EMC) notified Smithfield that it had considered the Town for inclusion in the National Pollutant Discharge Elimination System (NPDES), Phase II, and had determined not to include Smithfield at that time. The EMC may consider including Smithfield in the NPDES program in the future. It is expected that Smithfield will be re-considered for inclusion in the NPDES Ph II program when new population numbers are determined from the coming 2020 census.

4. In February 2019, NC Department of Environmental Quality (NCDEQ) published notice that the EMC plans to revise the NSR program with revised rules to go into effect November 1, 2019. Proposed rule changes include updates to the following aspects of the NSR program:
    a. New development plan review and approval
    b. Stormwater control measure (SCM) maintenance
    c. Rule enforcement procedures
    d. Public education
    e. Storm sewer system mapping
    f. Illegal discharge removal

    Additional development project requirements are proposed to limit flow of nutrients from new development and to demonstrate compliance with riparian buffer protection requirements. More information concerning proposed rule changes can be found on the NC DEQ website in the section Division of Water Resources/Water Planning/Non-Point Source Planning/Nutrient Rules Readoption.

5. Sound Rivers is a private, non-profit organization dedicated to monitor, protect, and preserve the Neuse and Tar/Pamlico rivers and their watersheds. Smithfield is located in the Upper section of the Neuse (above the Wayne/Lenoir county line) and a Riverkeeper is assigned to this section of the Neuse. Sound Rivers provides a valuable resource to Smithfield and its citizens as a local stakeholder group to support clean water initiatives and protect the Neuse River. The Sound Rivers organization website can be found at www.soundrivers.org.

6. The Town currently provides the following stormwater-related programs and services by Department/Division at an approximate annual general fund cost of approximately $70,250 (including leaf collection and street sweeping[1]):

    a. Stormwater program administration (Planning)
    b. Stormwater drainage system operation and maintenance (Public Works)
    c. Stormwater engineering, plan review, and NSR program support (Engineering)
    d. Stormwater public education and outreach (Engineering & Manager's Office)

7. The local Erosion and Sediment Control (E&SC) program is administered and provided by the NC DEQ, Division of Environment, Minerals and Land Resources (DEMLR) (Raleigh Regional Office). The Town does not provide any supplemental funding to the E&SC program for services within Smithfield.

8. The current stormwater system maintenance program in Smithfield may be described as reactive and comparable to similar-sized municipal programs in North Carolina that are funded by the general fund. The traditional and current focus of stormwater management and infrastructure maintenance in Smithfield is within the street system right-of-way. A more comprehensive stormwater program could satisfy the Neuse Stormwater Rule (NSR) requirements, better maintain and replace aging public drainage infrastructure, plan for needed stormwater and stream system improvements on an objective and prioritized basis, help reduce drainage and flooding hazards, further protect the Neuse River and receiving water quality, and enable enhanced stormwater services for Smithfield residents and property owners.

[1] Municipalities vary in consideration of leaf collection and street sweeping as a stormwater management service. For the purposes of this analysis, 50% of the costs of leaf collection and street sweeping was used as a suitable cost to the stormwater program.

9. Input from Town officials, administrators, staff (see Appendix 1), and the interested public (see Appendix 2), during the action planning project support development of a more comprehensive stormwater management program for Smithfield, building the program in a logical stepwise manner over the next several years. It is recommended that the Town first create a *Stormwater Program Manager* position to administer the overall municipal stormwater program for Smithfield, including NSR requirements.

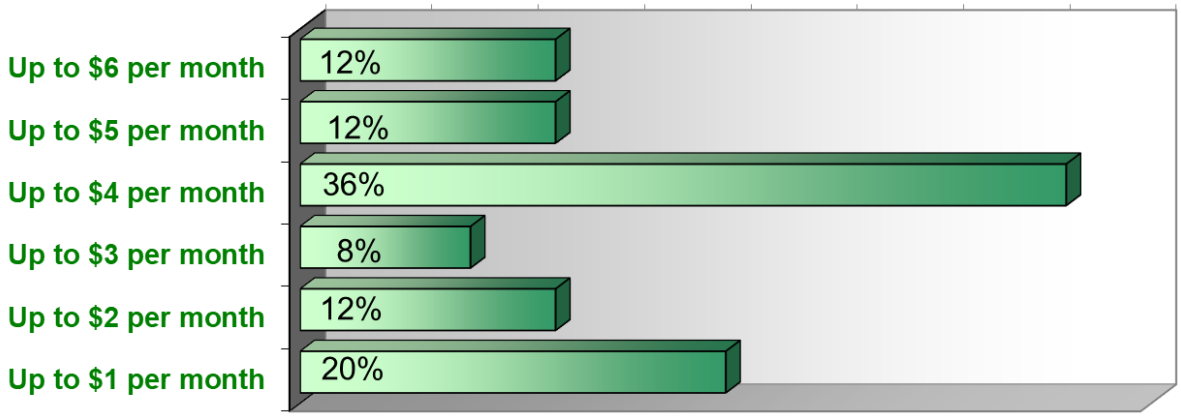
10. A key component of the *Action Planning* project was a Public Meeting held on November 13, 2018 at Sarah Yard Community Center. The Town recognizes the importance of making its citizens and property owners aware of the state and federal regulatory requirements as well as continuing to satisfy needs for other municipal stormwater services. Citizens are often most concerned with the "visible" problems caused by unmanaged stormwater runoff – such as minor or major flooding, land and streambank erosion, clogged or undersized storm drainage infrastructure, and increased runoff from nearby properties.

11. Water quality problems in surface waters are generally not as visible and are often more chronic in nature than drainage or flooding-related problems. It is important to understand and remember that surface water quality is important to the health of the overall environment and aquatic environment in particular. Also, Neuse River is a critical drinking water supply and must be protected by law and for the good of the citizens.

12. Direct input was received from citizens attending the Public Meeting and also through a *Stormwater Services Survey* (see Appendix 2) that was made available to interested residents. Highlights from preliminary survey feedback received from 29 citizens included the following.

    a. Approximately 93% own their residence and almost 80% rate overall quality of life in Smithfield as "excellent" or "good".
    b. 85% rated the importance of Smithfield's natural environment either 1 or 2 on a declining scale of 1 to 5 where 1 is "Very Important".
    c. 86% rated the importance that Smithfield provide programs and services to minimize runoff pollution either 1 or 2 on a declining scale of 1 to 5 where 1 is "Very Important".
    d. 82% believe that the drainage system does not always work well. Of the 82%, 32% responded that the drainage system often fails to work well and presents a major public safety concern.
    e. 70% claimed that their property or neighborhood has drainage problems.
    f. 96% noted the importance of the Town providing services that help reduce drainage and flooding problems.
    g. 64% were aware of the existence of Neuse River Stormwater Rule regulations prior to the public stormwater survey.
    h. 62% of respondents reported contacting the Town within the last two years for stormwater-related assistance. 40% of those who contacted the Town were not satisfied with the outcome of their inquiries.
    i. 53% of respondents claimed they would be willing to pay for improved Town services to help reduce drainage and water pollution concerns in Smithfield. Of the 53% who would be willing

to pay for improved stormwater services, the following chart shows how much they would be willing to pay per month:



13. The Town of Smithfield does not currently have a dedicated fund for MS4 and other stormwater-related Capital Improvement Projects (CIP). While there will always be a need to react to acute system failures and short-term drainage maintenance problems, increased resources would allow the Town to repair and replace MS4 assets on a more predictable and proactive basis, thereby increasing cost effectiveness in many cases by avoiding costs associated with catastrophic system failures.

14. Additional detailed work beyond the *Action Planning* project is required to fully define the needed and desired future municipal stormwater program, including the level to which regulatory programs are developed and advanced. The NSR regulations require Smithfield to develop new programs and services to minimize pollutants in stormwater runoff from the MS4, but there are different approaches and corresponding funding levels that may be used to develop, implement, and advance these programs and practices.

15. In the next phase of Smithfield's stormwater program development, it is recommended that Town Management and Town Council establish a Stormwater Advisory Committee (SWAC) that is representative of the varied community interests. Establishing an Advisory Committee will also help satisfy a requirement of the NSR program to educate the public. Working with a group facilitator, the SWAC would be given a charge to review and discuss a range of municipal stormwater services including regulatory programs and make advisory-level recommendations to Town Management and Council regarding the extent and level of the Town's future stormwater program(s). On behalf of the citizens, elected Council would then make the final decision on the needed and desired future municipal stormwater management program that best fits Smithfield. (See Appendix 3 for details on the recommended Smithfield SWAC)

16. It is recommended that the Town of Smithfield evaluate potential development of a stormwater utility to fund the needed and desired future stormwater program as an integral mandate to the representative Stormwater Advisory Committee (SWAC). Once the extent and level of the future stormwater management program is determined, the committee can then thoughtfully evaluate and develop recommendations for how best to pay for the program, including continued general tax-based funding and/or a stormwater utility public enterprise fund (dedicated fee-based funding). A potential stormwater management utility would also be consistent with the Town's strategy of moving more towards a fee-based budget.

17. According to a 2018 survey performed by the UNC School of Government, Environmental Finance Center, over 80 cities and towns along with several counties in North Carolina faced with similar stormwater regulatory requirements and other stormwater-related challenges have chosen to develop and implement a dedicated and equitable stormwater utility fee. From the SoG, EFC survey, monthly stormwater fee rates for 2,000 square feet of impervious area on residential properties ranged from $.50 (Person County) to $13.50 (Carolina Beach)[2].

18. Following early stormwater utilities in the 1970's, hundreds of local governments across the nation have developed stormwater utilities to provide an appropriate level of financial resources for needed municipal stormwater programs. The stormwater utility is typically established as a public enterprise fund for stormwater management generally comparable to water and sewer enterprise funds. A municipal stormwater utility public enterprise is fully authorized under North Carolina state law and statutes. The state of North Carolina requires that all revenue from a stormwater utility be used solely for stormwater management.

19. If and when resources allow, the Town should also consider development of watershed-based stormwater master plans that would include design for improvements of specific drainage and water quality problem areas, both current and future.

20. Three preliminary planning levels of an enhanced future municipal stormwater program for Smithfield are described within the Action Plan.

21. The following table summarizes the key *Stormwater Management Program Action Plan* recommendations:

Recommended Priority Order	Recommended Actions
Step 1	Budget Additional Resources for NSR Program Requirements
Step 2	Create a full-time Stormwater Program Manager Position
Step 3	Charter a Smithfield Stormwater Advisory Committee (SWAC)
Step 4	Perform a Representative Town-Wide Stormwater Services Survey
Step 5	Evaluate Options to Fund the Future Municipal Stormwater Program

[2] https://efc.sog.unc.edu/sites/default/files/2019/NC2018_19_StormwaterFeeTables_0.pdf

Introduction and Overview

Smithfield is the county seat and largest community in Johnston County, North Carolina. With a population documented of 11,342[3] and land area of approximately 12.1[4] square miles situated astraddle the Neuse River, Smithfield offers residents and businesses a high quality of life and a wide range of municipal services.

The focus of this report is on the Town's stormwater management program and services. Smithfield receives an average of 47.8 inches of rainfall and 2 inches of snowfall each year[5]. While rainfall provides life-sustaining benefits, the negative impacts of stormwater runoff must be comprehensively managed to protect quality of life for the community. Like many growing cities around the state and nation, Smithfield is faced today with a wide variety of stormwater-related impacts, challenges, issues, and regulatory requirements to address issues such as:

- the need to satisfy state and federal stormwater quality regulatory mandates including State of North Carolina's Neuse River Basin – Nutrient Sensitive Waters Management Strategy (NSWMS),
- the need to reduce land erosion, flooding hazards, and property damage from increased stormwater runoff,
- the need to protect the quality of the Neuse River as a vital public drinking water supply source,
- the need to repair, replace, clean, and maintain public drainage infrastructure,
- the desire to be responsive to citizen concerns, complaints, and damages resulting from stormwater runoff,
- the need to manage floodplains and mitigate flooding hazards without stifling growth and prosperity,
- the need to educate and involve the public in the local stormwater management program,
- the desire to protect, stabilize, and restore degraded local streams, and
- the need to identify dedicated funding and other resources to implement the required and desired municipal stormwater management programs and services.

Stormwater management requirements placed on Smithfield to comply with the Neuse NSWMS are placing demands for more comprehensive stormwater services to minimize pollution conveyed to receiving waters from the Municipal Separate Storm Sewer System (MS4). NSWMS and other regulatory requirements are only expected to increase in coming years as actions are expanded to further reduce pollution into receiving waters from both point and non-point sources. It is likely that in the future Smithfield will be designated to participate in the EPA/NCDEQ National Pollutant Discharge Elimination System (NPDES) program. Such designation will require Smithfield to obtain an NPDES permit that will place additional responsibilities on the Town for stormwater management. State officials indicate the Town may be considered for inclusion in the NPDES program once population figures from the 2020 census are available.

[6]NPDES Phase II (applies to municipalities with populations less than 100,000) requirements include the following six Minimum Measures:

[3] Correspondence, Michael Cline, NC Office of State Budget and Management, August 27, 2018
[4] https://en.wikipedia.org/wiki/Smithfield,_North_Carolina
[5] https://www.usclimatedata.com/climate/smithfield/north-carolina/united-states/usnc0636
[6] https://deq.nc.gov/about/divisions/energy-mineral-land-resources/energy-mineral-land-permits/stormwater-permits/npdes-ms4

- Public Education & Outreach
- Public Involvement & Participation
- Illicit Discharge Detection & Elimination
- Construction Site Runoff Controls
- Post-Construction Site Runoff Controls
- Pollution Prevention & Good Housekeeping for Municipal Operations

Participation in the NPDES MS4 program will require that Smithfield increase its level of responsibility and activity over what is currently required under the NSR program. Most notably, will be an increased Public Education and Outreach program, a new Public Involvement and Participation program, enhanced Post-Construction Site Runoff Controls, and a new Pollution Prevention and Good Housekeeping program. NPDES will require additional resources to meet program requirements over what is now available from the Town's general fund.

This *Stormwater Management Program Action Plan*, developed in cooperation with Town officials and administrators, Town staff, citizens, and local stakeholders, provides an outline and framework for further development of Smithfield's Stormwater Management Program. In accordance with its vision, the Town of Smithfield desires to efficiently and effectively satisfy regulatory requirements while also considering new or improved stormwater services for its residents. Enhanced municipal stormwater programs and services will require additional funding and resources, which should be developed in an equitable, sufficient, and reliable manner. Equitable in the sense that the cost burden of program enhancements should be shared equitably by the entities who contribute to the problem and benefit from the solution. Sufficient in that adequate resources are provided for the Town to perform the desired and needed stormwater management functions. Reliable in that the source of funds can be relied upon to enable the Town to plan its program and activities for multiple years out. The stormwater problems which Smithfield faces have taken decades and generations to develop and the solutions will require decades or generations to fully implement.

This report provides summary information, findings, and recommendations from tasks utilized by the Town of Smithfield and JEWELL Engineering Consultants, an LJB, Inc. company (JEWELL-LJB), to develop the *Stormwater Management Program Action Plan*. Key tasks involved in developing Smithfield's Stormwater Action Plan are summarized below in Table 1.

Table 1 – Key Tasks in Developing the Stormwater Management Program Action Plan

Action Planning Task	Key Outcome(s)
Town Staff Workshop June 27, 2018	• Education on NSWMS stormwater program requirements for Town staff • Collaborative discussions on existing municipal stormwater program, services, and annual estimated expenditures including system maintenance • Discussions of probable needs for future stormwater program and services • Preliminary discussions of equitable ways and means to fund future stormwater program and services
Town Staff Survey June 2018	• Survey Town management and staff understanding and perception of stormwater quality and stormwater quantity problems and issues in Smithfield

	• Identify and engage multiple departments and staff involved in stormwater program and service delivery • Survey probable needs for future stormwater services based on collective staff experiences within the municipality and community
Field Review Drainage & Stream System June 27, 2018	• Observe and document representative existing conditions of the local public storm drainage system and receiving surface waters including Neuse River
Public Workshop November 13, 2018	• Education for citizens on NSWMS stormwater program for Smithfield • Public discussion on existing municipal stormwater services along with potential needs and desires for future stormwater services • Early opportunity for elected officials and Town staff to interact with and involve citizens and local stakeholder groups in development of the Town's stormwater program action plan
Citizen Survey November 2018	• Preliminary gauge of citizens' understanding and perception of stormwater quality and stormwater quantity problems and issues in Smithfield • Preliminary gauge of probable needs for future stormwater services based on collective public experiences • Preliminary gauge of public willingness to pay for municipal stormwater services
Charter for Stormwater Advisory Committee June 2019	• Develop recommended representation, purpose, goals, objectives, and process for future Smithfield Stormwater Advisory Committee (SWAC)
Public Education & Outreach November 2018 (Press release)	• Press release in advance of November 13, 2018, public workshop and survey to invite and encourage public input and participation in the Action Plan
Action Plan Report & Presentation(s) July 9, 2019	• Smithfield's Stormwater Management Program Action Plan presentation to Council

Existing Municipal Stormwater Program and Services

The Town of Smithfield provides a wide range of public services including police and fire protection, emergency management, traffic and transportation management, street maintenance and construction, planning and zoning, community development and economic assistance, engineering, building inspections and code enforcement, libraries (in partnership with Johnston County), cemeteries, solid waste collection, recycling, parks and recreation, water supply and distribution, sanitary sewer collection and treatment, and electricity supply and distribution. The Town's most recent annual budget to provide these important municipal services totals approximately $13.7 million.[7] Figure 1 gives an overview of the Town of Smithfield's organizational structure.

Smithfield's Planning Department is responsible for the Town's adherence to regulations related to Neuse Stormwater Rule (NSR) requirements and for development and implementation of ordinances and regulations related to stormwater management. The Planning Department also tracks statistics and data related to stormwater management and reports that information in its annual report to the North Carolina Department of Environmental Quality in accordance with NSR requirements.

Maintenance and repair of the Town's drainage system is performed on an as-needed basis by the Drainage/Streets Division of the Public Works Department. Reporting to the Town Manager, the Public Works Department Director has overall responsibility for the maintenance of the Town's drainage system within the right-of-way and on Town property. The Town has traditionally not performed work on private property, however, work off the right-of-way is allowed if there is a demonstrated public need or value to work on private property. As such, ditch maintenance is occasionally performed off the right-of-way to promote positive and adequate drainage.

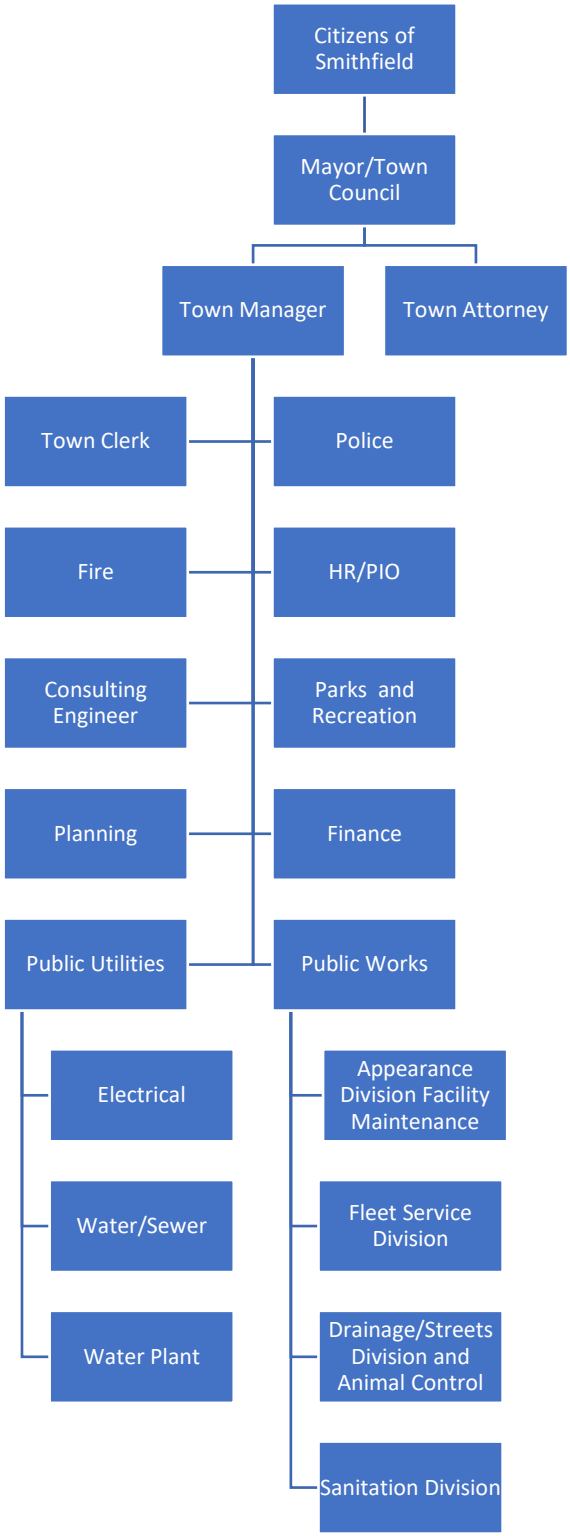
Smithfield performs a robust seasonal program to remove leaves and limbs from Town right-of-way. Removal and disposal of this material benefits stormwater quality by not allowing this organic matter to enter and degrade surface waters. Decaying organic matter releases harmful nutrients and depletes oxygen in surface waters. In the same manner, the Town also has a strong street-sweeper program to remove trash and debris from Town streets. This program also enhances surface water quality by removing trash, debris, and other pollutants that would otherwise impair lakes, streams, and the Neuse River.

Smithfield utilizes the contracted services of a Professional Engineer to perform stormwater management plan review and to ensure compliance with the Town's stormwater and flood control ordinances. The engineer also prepares the Town's annual NSR report in cooperation with the Planning and Public Works departments. The Town's contracted engineer reports to the Town Manager and coordinates his work with the Planning and Public Works departments. Smithfield's Unified Development Ordinance requires that owners of new development and re-development projects submit a stormwater management plan and obtain a stormwater permit before construction. These plans and permits help the Town ensure compliance with the Neuse Stormwater Rule (NSR) requirements.

The Town relies on the Clean Water Education Partnership (CWEP), a program of the Triangle J Council of Governments, to provide educational materials and resources that carry the message of stormwater quality into the community. By funding the work of the CWEP, Smithfield can take advantage of the resources provided by CWEP and satisfy the NSR requirement to provide public education resources to the community. Coordination between the Town and CWEP is handled through the Smithfield Planning Department.

[7] Reference to Town of Smithfield Fiscal Year 2018-2019 Adopted Budget Document

Figure 1 – Town of Smithfield Organizational Chart



Smithfield is required by the NSR to identify and remove illegal discharges to the environment. The Town performs this function by receiving reports of illegal discharges (from citizens, Town staff, etc.) and following up to ensure discharges are stopped. In the case of spills and emergency discharges, the Town fire department handles such events.

Erosion and sediment minimization is a major factor in the health of an aquatic eco-system and thus an effective Erosion and Sediment Control (E&SC) program not only will enhance water quality but is also required by the State of North Carolina. The E&SC program in Smithfield is handled by the NC Department of Environmental Quality office in Raleigh. That office performs plan review/approval functions and inspects construction sites for compliance with approved plans. They also follow up on reported violations of E&SC regulations.

Smithfield does not maintain a dedicated fund for stormwater management in its annual budget. Stormwater-related costs are covered in the Town's departmental general operating budgets. Smithfield currently spends approximately $70,250 annually on stormwater programs and services. These functions and estimated costs are broken down by department as follows:

- Planning ($9,000) – plan review, SCM tracking and inspections, public education and outreach, annual NSR report
- Engineering ($7,500) – plan review
- Public Works ($53,750) – drainage maintenance and repair within right-of-way, leaf/limb collection (50% of estimated costs), street sweeping (50% of estimated costs)

To help understand the existing municipal stormwater program and services, an interactive workshop with Town Managers and Town Staff was an early component of the Stormwater Management Program Action Planning Project. The Town Departments and staff best know the Smithfield community and priority public issues based on years of dedicated experience serving Smithfield residents. Table 2 highlights the current municipal stormwater services provided by Smithfield by each department/division.

Staff supporting the delivery of stormwater services in Smithfield has over 350 years of cumulative municipal experience with the Town of Smithfield. 29% of the staff stakeholders are also residents of Smithfield. This valuable staff and community experience lends itself to establishing a "stormwater program baseline" for the Town to evaluate as it considers building a more comprehensive stormwater management program over the next several years as regulatory requirements and stormwater service needs of citizens grow. A key policy question for Town officials and administrators to answer is, *"Do the existing levels of municipal stormwater programs and services adequately satisfy regulatory requirements, public infrastructure and drainage system needs, and community needs?"* To help answer this important question, the Town's baseline stormwater program will be compared to three enhanced levels of service and corresponding preliminary program funding estimates in the recommendations section of this report.

Table 2 – Delivery of Stormwater Services by Department within Smithfield

	Office Administration	Planning / Engineering	Public Works / Sanitation	Finance	Parks & Recreation	IT	Police / Fire
Maintenance and repairs - storm drainage system			✓		✓		
Review of stormwater/ watershed/floodplain plans for site development and redevelopment		✓	✓				
Response to citizen's drainage inquiries and complaints		✓	✓				
Public information and educational services		✓	✓		✓	✓	
Emergency response services for floods and/or hazardous spills		✓	✓				✓
Street cleaning, street sweeping, litter collection, and leaf collection			✓		✓		
Planning & engineering of stormwater/ drainage capital improvement projects		✓	✓				
Providing drainage, floodplain, and/or watershed information to citizens and businesses		✓	✓			✓	
Reviewing zoning and re-zoning requests for potential stormwater impacts		✓	✓				
Developing planning standards that include stormwater management		✓					
Preparing the Town's Neuse Stormwater Rule annual report		✓	✓				
Helping implement the Town's Neuse Regulations stormwater program		✓	✓				
Working with citizen/stakeholder groups on stormwater-related issues		✓	✓				
Administration of the local water-supply watershed protection ordinance		✓	✓				
Administration of the local floodplain management ordinance		✓	✓				
Inspection of private development and/or Town construction projects		✓	✓				
Town administrative services (Management, Budget/Finance, HR, MIS, etc.)	✓	✓	✓	✓			

The primary municipal stormwater services currently provided by the Town of Smithfield may also be described and classified under major stormwater program functions shown in Table 3 (below).

Table 3 – Current Municipal Stormwater Services by Major Function

Stormwater Program Function (Department or Division)
Stormwater Program Administration (Planning) **Stormwater Planning and Engineering (Planning)** >Development of stormwater management program guidelines, technical criteria for drainage system design standards, management of professional services contracts. >Responsible for stormwater management plan review for proposed new site development and redevelopment >Administration of water-supply watershed protection **Neuse Stormwater Rule (NSR) Program (Planning)** >New development review and approval >Illegal discharge detection and elimination >Retrofit location identification >Public education **Stormwater System Operation & Maintenance (Public Works)** >Public R/W drainage infrastructure cleaning, maintenance, repair, and replacement >Ditch cleaning and maintenance >Street cleaning, street sweeping, litter collection, and leaf collection **Stormwater Capital Improvements** >Currently no dedicated funds for stormwater capital improvement projects

The existing municipal stormwater program and stormwater services are funded under the Town's general fund. The general fund annual budget totals about $13.7 million and is the largest fund within the Town of Smithfield. General funding covers a wide range of local governmental services including public safety, transportation, parks and recreation, economic and community development, and general governmental administration. Revenue for the general fund is largely tax-based. Ad valorem taxes generate over $6 million in revenue for the general fund. An issue that a number of municipalities in North Carolina have discovered, however, is that the costs (expenditures) to operate a stormwater management program are often not commensurate with or fully equitable based upon revenue generated from property taxes.

Yearly costs to provide Smithfield's stormwater programs and services are estimated and summarized in Table 4. It should be noted that costs may vary somewhat from year to year depending upon actual needs, expenditures, and Council appropriations. The estimates in Table 4 serve to provide approximate costs for Smithfield's existing (baseline) stormwater programs and services and to aid in planning-level decision making regarding potential enhanced future programs and services.

Table 4 – Current Stormwater Program Expenditures by Function

Stormwater Program Function	Annual Estimated Expenditures
Program Administration	**$3,500**
Engineering, Plan Review	$7,500 (contracted engineering services)
Public Education & Outreach	$2,500 (CWEP)
NSR / Water Quality	**$3,000** (Annual Report)
Drainage System Operation & Maintenance	**$24,000**
Leaf/Limb Collection (50% of cost)	$26,000
Street Sweeping (50% of cost)	$3,750
Capital Improvement Program (CIP)	**$0**

Existing stormwater programs and services offered by Smithfield are comparable to other similar-sized municipalities in North Carolina that fund stormwater activities under the municipal general fund. However, cities and towns that have developed a dedicated stormwater utility fee generally have a greater extent and level of public stormwater services than currently provided by Smithfield. An advantage of a stormwater utility enterprise is that it equitably generates revenue required for stormwater services based on a properties' respective contribution to stormwater runoff. General Fund revenue (tax based) does not correlate to a property's contribution to stormwater runoff.

Stormwater Problems, Issues, and Program Needs

This section focuses on strategically defining Smithfield's stormwater-related problems, issues, and probable municipal stormwater program needs. At this early stage in the planning process, the scope of the project does not include a detailed assessment of specific water quality and drainage-related problems and technical solutions. Integrating feedback from Town staff, elected officials, and interested citizens, the report paints a broad picture of the major challenges and opportunities facing the Town's stormwater program. Town officials will then have a framework to help evaluate the existing (baseline) and future municipal stormwater program in light of problems, issues, and needs.

Under a separate contract, JEWELL-LJB and its partner firm Woolpert, Inc., assessed the stormwater capital improvement needs of Smithfield and determined that fifteen projects have been identified and are justified. This assessment was performed by reviewing previous studies and reports from work prepared by other consultants. A rating/ranking process was developed and applied to the fifteen projects to establish a prioritized list of stormwater capital improvement projects. An example CIP plan was developed based on assumed adequate funding that is not currently available. This work indicates that significant stormwater capital improvement work is needed in Smithfield and that the cost for this work will be very high. The Town will require a major source of dedicated revenue to plan and construct these needed CIP projects. Note that the current example plan is not a specific roadmap to perform these projects, but rather provides insight into the magnitude of need and a potential execution scenario. Appendix 4 contains background information on this assessment.

Smithfield's Quality of Life and Natural Environment

Stormwater management has a key role in protecting quality of life for citizens and the natural environment in Smithfield. In general, Smithfield provides a high-quality environment in which to live and work. Figure 2 shows how interested citizens and Town staff stakeholders rate the overall quality of life in Smithfield.

Figure 2 – Staff and Citizen Ratings of Smithfield's Quality of Life

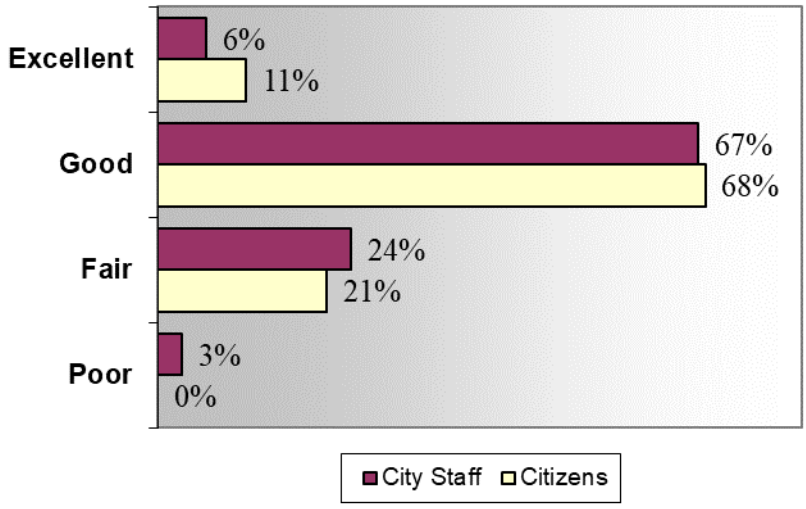
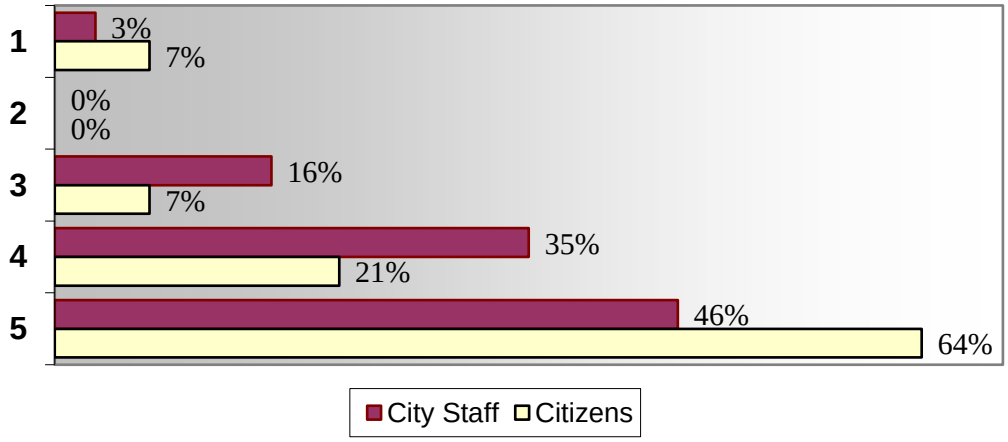


Figure 3 indicates the importance of the natural environment to overall quality of life in Smithfield. Without a comprehensive stormwater management program, however, the increasingly negative impacts from stormwater runoff will degrade both overall quality of life and the natural environment. It is beneficial and

cost-effective to deal with stormwater proactively rather than reactively. Significant public safety and physical impacts from unmanaged stormwater runoff include:

- increased hazardous flooding that affects public safety and/or causes significant public street or property damage,
- increased minor or nuisance flooding that may affect public safety and/or damage property,
- increased land and streambank erosion that may affect public streets and/or properties, and
- increased non-point source pollutants entering local streams and lakes that may impair receiving water quality including that of the Neuse River (public drinking water supply).

Figure 3 – Staff and Citizen Ratings of Importance of Smithfield's Natural Environment



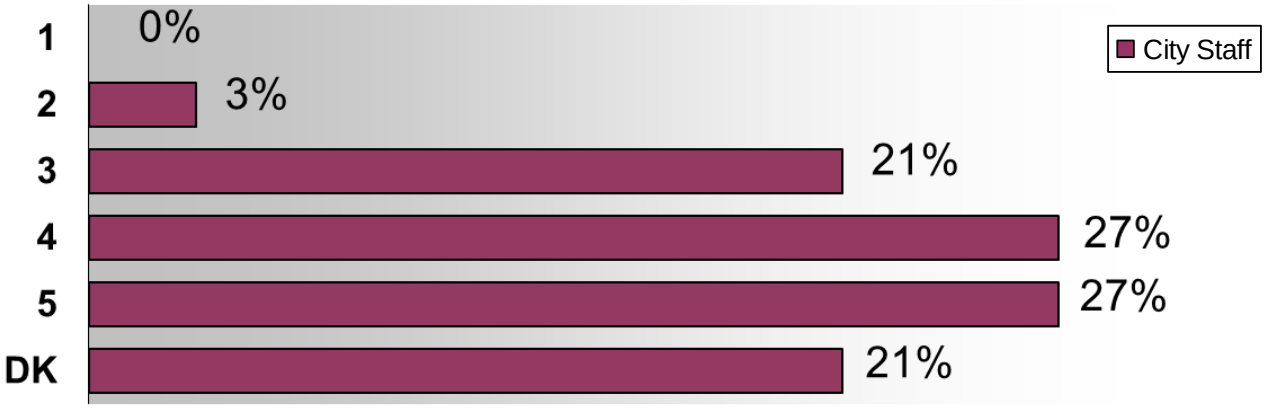
(On a scale from 1 to 5 where 1 = "not important" and 5 = "very important")

Drainage and Flooding Problems

The most obvious and potentially hazardous impact from stormwater runoff is flooding. While even an advanced municipal stormwater program cannot prevent floods that may occur from extreme and/or intense rainfall events, local stormwater programs can help mitigate flooding hazards over time as drainage system capital improvement projects are planned and implemented, as public awareness increases, and as watershed and floodplain management plans are prepared and implemented. As a broad gauge of existing conditions in Smithfield, experienced Town staff were asked to rate the severity of drainage and flooding problems Town wide (see Figure 4).

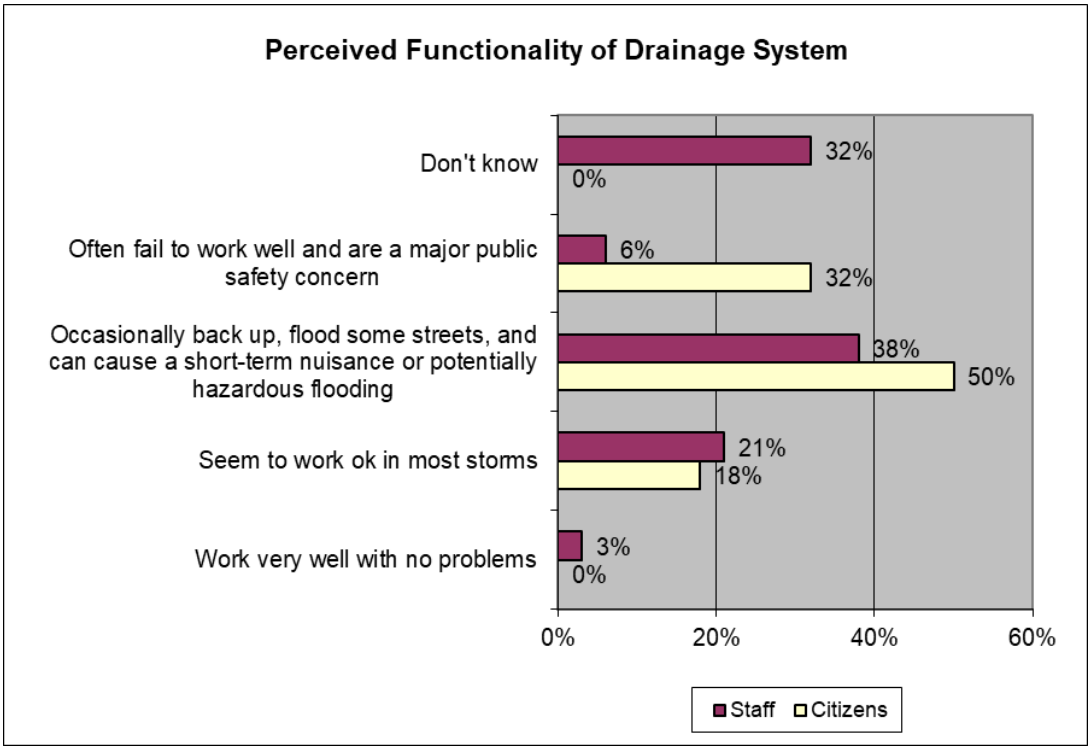
Figure 4 – Staff Assessment of Town-wide Drainage and Flooding Problems

(On a scale from 1 to 5 where 1 = "Not a Serious Problem", 5 = "Very Serious Problem" and "DK" = Don't know)



How do residents perceive the severity of drainage and flooding problems Town wide? Citizens attending the November 13, 2018 Public Workshop on Stormwater Services, and others, were asked in a survey to rate the functionality of storm drains, culverts under roadways, and drainage channels within Smithfield. Figure 5 compares both interested citizen and staff perceptions of the general functionality of the municipal drainage system.

Figure 5 – Staff and Citizen Assessment of Local Drainage System Functionality



Twenty citizens attended a public meeting to discuss stormwater issues held November 13, 2018 at the Sarah Yard Community Center. The general sentiment of those attending the meeting is that the Town has numerous drainage problems, many of which are long-standing, and some are beyond the Town's control. Local flooding is often seen in road over toppings and standing water on streets and private property. New and increased development upstream of flooding trouble spots is often blamed for increased flooding and water quality problems. It was a general consensus that the citizens feel the Town can and should do more to resolve flooding problems. Note that the primary focus of citizens is on water quantity problems over water quality problems.

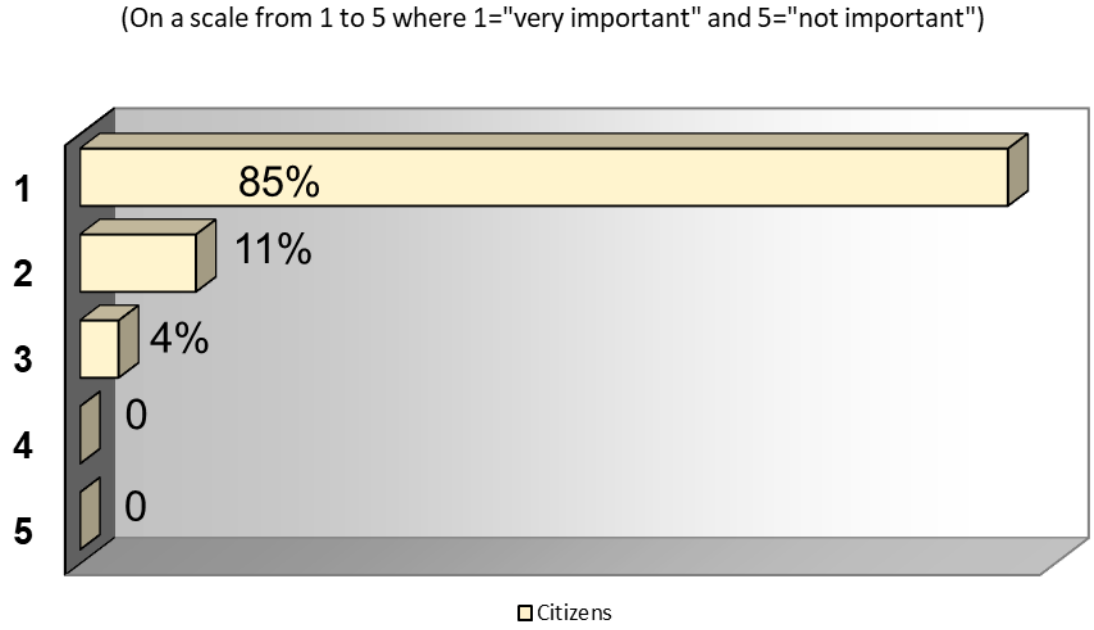
Twenty-nine citizens responded to the Town's stormwater action planning survey. (Complete results from the initial citizen survey are provided in Appendix 2). Residents who completed the stormwater survey have lived in Smithfield an average of over 33 years. Comments from citizens echoed a theme that drainage-related problems have gotten progressively worse. Decades of increasingly higher rates and volumes of stormwater runoff have caused stream banks to erode, widen, and deepen resulting in losses to adjacent properties and higher sediment loads causing drainage and water quality impairments over time.

This trend of eroding and degrading local streams is typical of many growing municipalities' experiences. As a component of watershed planning and management, stream stabilization and restoration projects are needed for many urbanizing areas of North Carolina including Smithfield. While well-funded local stormwater programs may include major stream restoration projects within their current scope of services for capital improvement projects, the State of North Carolina has historically taken the lead in stream restoration to date through the Ecosystem Enhancement Program (NC EEP). Formal stream restoration projects are expensive, often costing in the hundreds of dollars per linear foot of stream depending on stream conditions, utilities, easements, and other requirements. Currently the State mitigation fee is more than $507 per linear foot. Millions of dollars have been and more will be spent on stream stabilization and restoration projects across the state.

While resources to help with needed stream restoration projects could be a component of a future municipal stormwater program, interested citizens who responded to the stormwater survey overwhelmingly believe that it is important for the Town to provide stormwater services that help reduce local drainage problems. The Town currently manages and maintains stormwater infrastructure within the street right-of-way while offering technical advice to private property owners for problems outside the public right-of-way. Solutions to drainage problems can take many forms depending on the specific situation. Some solutions could involve shoring up an eroding section of stream bank to protect property. In other cases improvements or new storm drainage infrastructure may solve or reduce the severity of localized drainage problems. In yet other cases a combination of major capital improvements or acquisitions to benefit the public throughout a local watershed may be required to reduce drainage and flood-related problems. Detailed watershed master plan studies are required to answer these questions.

Whatever form drainage improvements may take, Figure 6 indicates that 85% of citizen survey respondents think it is "very important" for the Town to help reduce drainage problems. Unless the situation only involves stormwater runoff from private property, the local municipal government is often the best and most significant resource to help residents with drainage problems.

Figure 6 – Citizen Ratings of Importance of Town Drainage Improvement Services



Town staff reports that common drainage-related complaints and inquiries include the following:

- Complaints that the Town's in-stream utility lines collect debris and cause flooding.
- Asking the Town to fix and/or maintain storm drainage systems on private property?
- Increased runoff from construction and new development upstream causing problems for downstream properties.
- Storm drain inlets and basins that are clogged requiring clean-out and maintenance.
- Drainage problems caused by runoff from private property to private property.
- Minor flooding problems, along streets and in yards.
- Need for repairs or upgrades to legacy storm drainage infrastructure.
- Trash and debris in streams and lakes.
- Drainage channel and stream bank erosion causing impacts to property.
- Erosion and sediment from sites under construction.

Water Quality Problems

The water quality of the Neuse River and selected water bodies in Smithfield are monitored by the NC Department of Environmental Quality, Division of Water Resources. The status of this monitoring can be found at https://deq.nc.gov/about/divisions/water-resources/water-resources-science-data . Currently only two water bodies are listed with potential water quality problems: Neuse River and Swift Creek are listed as "Grey". NCDEQ's Grey listing means "There are only data inconclusive assessments or at least one pathogen assessment is data inconclusive (except for Mercury in Fish Tissue)." In layman terms this means there are indications from sampling efforts that pollutants (in addition to mercury. Note all NC waters are considered impaired by State for mercury.[8]) may be present in the water body, but no conclusive evidence of such has yet been determined. This assessment has not been performed on all water bodies in Smithfield, thus there may be pollution present in other locations that has not been identified.

[8] https://deq.nc.gov/about/divisions/water-resources/planning/modeling-assessment/special-studies/mercury-tmdl

Water quality problems in streams and lakes are often not as obvious as drainage and flooding-related problems. Perhaps residents have seen a creek, pond, or lake with green algal blooms on the water surface resulting from high levels of nutrients such as nitrogen and phosphorus. In many cases, however, water quality impairments are not readily visible to the lay public. Some water quality problems are also acute, such as may be caused by oil or chemical spills into streams and lakes. The majority of water quality problems in surface waters are more chronic in nature.

Throughout North Carolina polluted stormwater runoff from non-point sources is the leading cause of water quality impairment for receiving surface waters.[9] A major goal of stormwater management programs is to develop and implement Stormwater Control Measures (SCMs) (formerly Best Management Practices) to reduce pollution from varied non-point sources such as commercial and industrial areas, residential neighborhoods, institutional areas, agricultural areas, public streets, and other types of land uses and activities.

The primary pollutant that was observed during limited field reconnaissance throughout Smithfield for the current planning project was sediment along with some debris in receiving surface waters. Sediment is a primary pollutant throughout the state as well. The most preventable water pollutant is trash and debris. Increased public awareness and involvement will play a key role in helping reduce trash that runs off streets and other land surfaces into storm drains and streams.

State and federal regulatory requirements are typically the primary drivers for stormwater quality management at local municipal levels. Water-supply watershed protection, erosion and sediment control during construction, and Neuse Stormwater regulations require that Smithfield develop and implement a stormwater quality management program. Whereas most water quality programs are regulatory-driven, interested citizens in Smithfield agree that it is important for the Town to provide stormwater services that help reduce pollution entering local streams and lakes (see Figure 7).

Figure 7 – Citizen Ratings of Importance of Reducing Stormwater Pollution

(Rated from 1 to 5, with **1 = "Very Important"** and **5 = "Not Important"**)

Looking at Smithfield's local watersheds, 100% of the Town's land area drains to the Neuse River either directly or through one of many tributary streams, channels, ditches, swales, or pipes. A smaller percentage of surface runoff passes through various natural swamps or man-made impoundments on its way to the Neuse. Water-supply watershed protection has been mandated by the State of North Carolina since the early 1990's and includes stream buffers and permanent structural stormwater controls (such as ponds) for high-density development with greater than 24% built-upon area (impervious area). Above Smithfield's

[9] https://deq.nc.gov/about/divisions/water-resources/planning/nonpoint-source-management

raw water intake, the Neuse River is classified as WS-IV and below that point the River is classified WS-V.

The following table gives the classifications of the larger streams in Smithfield.

Stream	Classification
Neuse River (above water plant intake)	WS-IV, NSW, CA, PA
Neuse River (below water plant intake)	WS-V, NSW
Poplar Creek	WS-IV, NSW
Buffalo Creek	C, NSW
Swift Creek	C, NSW
Spring Branch	Not classified, too small
Black Creek	C, NSW

Following are descriptions of the various classifications.

Water Supply IV (WS-IV)
Waters used as sources of water supply for drinking, culinary, or food processing purposes where a WS-I, II or III classification is not feasible. These waters are also protected for Class C uses. WS-IV waters are generally in moderately to highly developed watersheds or Protected Areas.

Water Supply V (WS-V)
Waters protected as water supplies which are generally upstream and draining to Class WS-IV waters or waters used by industry to supply their employees with drinking water or as waters formerly used as water supply. These waters are also protected for Class C uses.

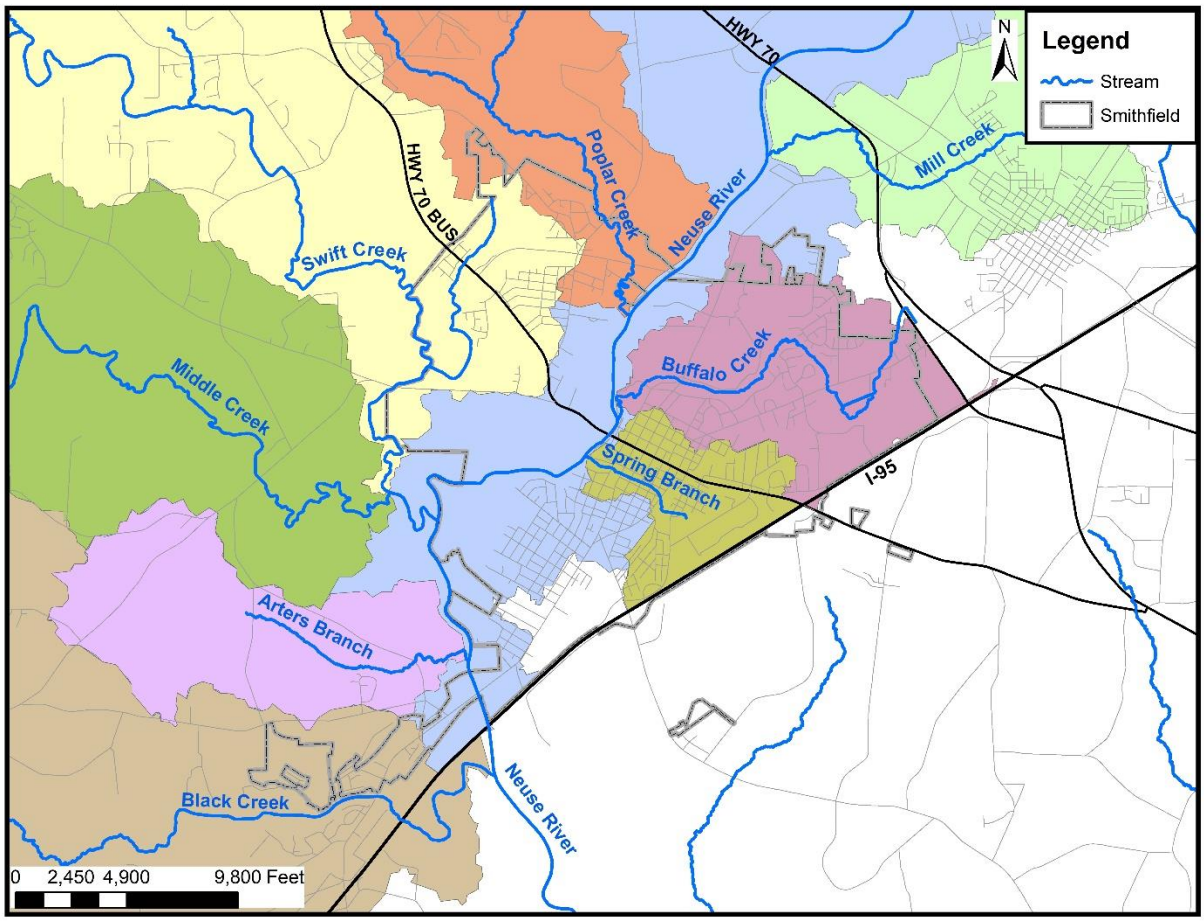
Class C (C)
Waters protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner.

Nutrient Sensitive Waters (NSW)
Supplemental classification intended for waters needing additional nutrient management due to being subject to excessive growth of microscopic or macroscopic vegetation.

Critical Area (CA)
Land adjacent to a water supply intake where risk associated with pollution is greater than from remaining portions of the watershed. Critical area is defined as land within one-half mile upstream and draining to a river intake or within one-half mile and draining to the normal pool elevation of water supply reservoirs. Critical areas are more restrictive than areas outside this area.

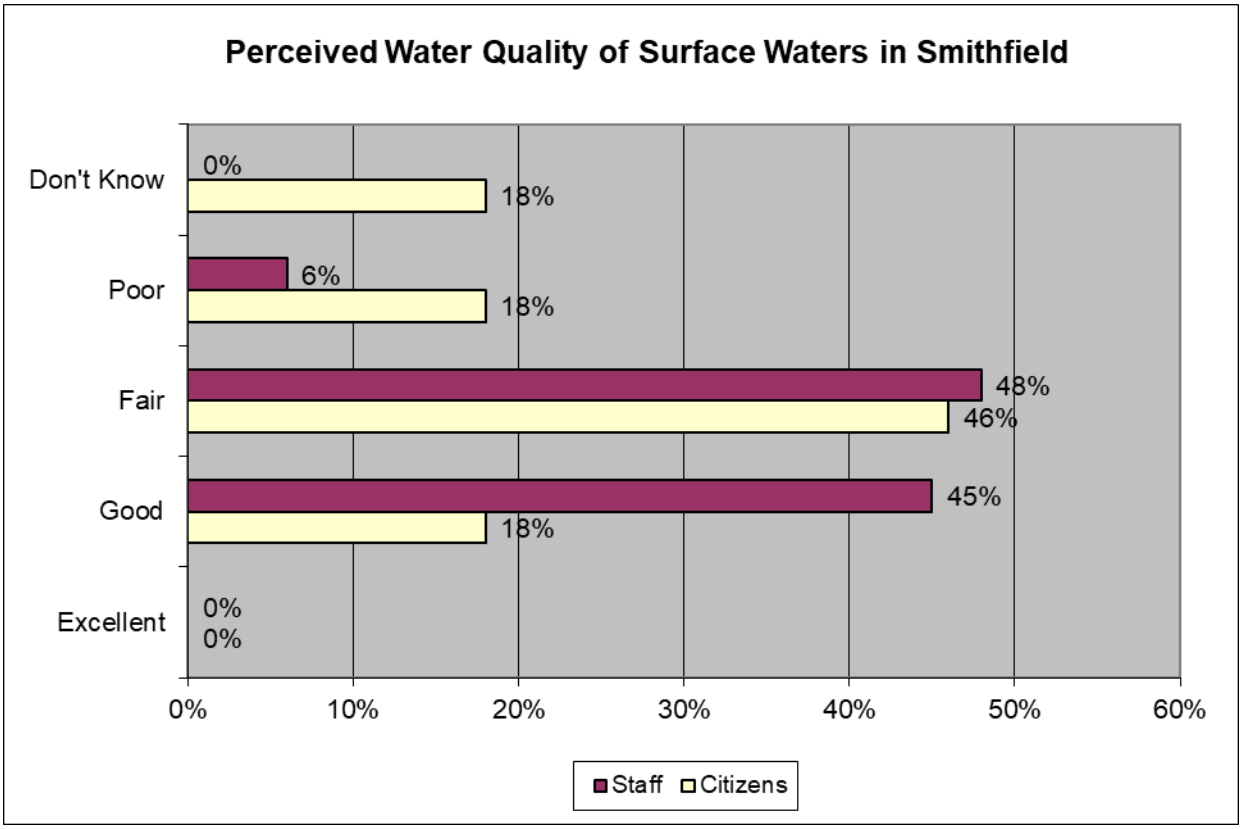
Protected Area (PA)
Protected areas are only located within WS-IV watersheds. A protected area is defined as land within five miles and draining to the normal pool elevation of water supplies/reservoirs or within ten miles upstream and draining to a river intake.

Figure 8 – Smithfield's Major Streams and Watersheds



How do experienced staff and involved long-time residents perceive the current water quality of Smithfield's streams and other surface waters? Figure 9 portrays the perceived water quality of creeks, streams, and ponds in Smithfield based on staff and resident knowledge and opinion.

Figure 9 – Citizen and Staff Ratings of Surface Water Quality in Smithfield



What does the available monitoring data indicate regarding the water quality of Smithfield's streams? The North Carolina Division of Water Quality (DWQ) monitors and rates representative streams, lakes, and rivers throughout the state to determine if they are meeting their intended uses such as public drinking water supply, support for aquatic life, outstanding resource waters, or other. Currently, no surface waters in Smithfield are listed on the State's 303(d) list of impaired waters.

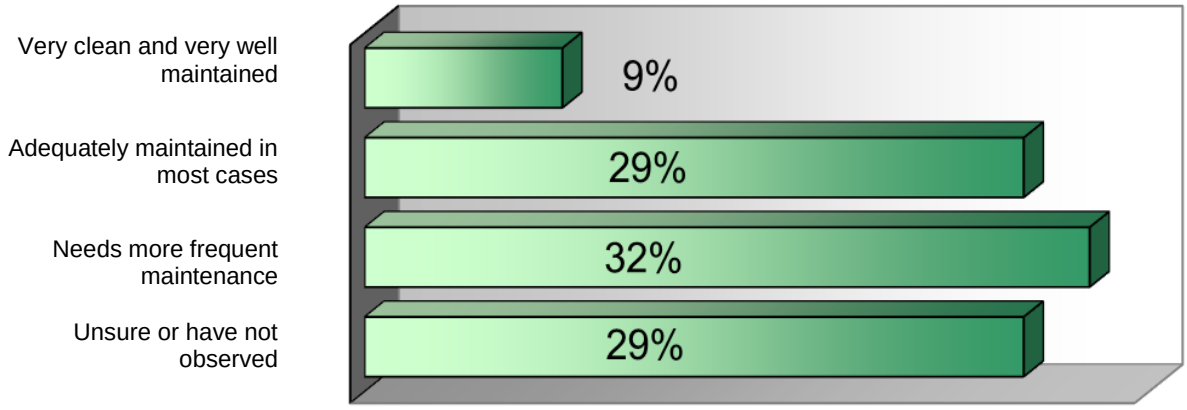
Municipal Separate Storm Sewer System (MS4) Maintenance and Replacement

There are hundreds of Municipal Separate Storm Sewer System (MS4) components within Smithfield, including yard inlets, curb inlets, catch basins, junction boxes, outfalls, stormwater control measures (SCMs) (formerly BMPs), pipes, culverts, ditches, swales, creeks, and other conveyances. The storm drainage system is separate from the sanitary sewer system. Only 29% of Smithfield's citizen participants in the action planning survey understand that stormwater runoff goes untreated directly into nearby river, streams, and lakes. This relatively low level of understanding indicates a need for additional education so that citizens will understand the direct links between stormwater runoff, drainage infrastructure, and potential downstream impacts.

The Town of Smithfield is tasked by NSR to develop an inventory of its MS4. Although a formal valuation and condition assessment of the MS4 is not currently available, tens of millions of dollars would likely be required to replace and upgrade the public drainage system. The MS4 is a significant and important public asset to Smithfield.

Like the extensive water and sanitary sewer system, much of the MS4 is located underground and often out of sight unless a problem occurs. The MS4 is generally comprised of drainage inlets along streets, drainage catch basins of varying types and sizes, miles of different sizes and materials of pipes that convey runoff from streets and discharge into receiving waters, many different types and sizes of culverts under roadways, open stream channels, and junction boxes to connect and help the Town maintain underground pieces of the system. As is the case with any type of public infrastructure, the MS4 must be maintained, repaired, and replaced over time. Smithfield has been maintaining its MS4 for decades to the extent and level available through general funding. Figure 10 provides a preliminary assessment of existing MS4 maintenance services from the perspective of experienced Town staff.

Figure 10 – Staff Ratings of Current MS4 Maintenance Services



Smithfield is not unlike other similar-sized cities in North Carolina that provide general-funded resources to routinely sweep public streets, perform routine inspections and replacements of drainage system infrastructure, and repair drainage system failures, all within public rights-of-way.

Future Stormwater Program Recommendations

Protecting and enhancing quality of life with a comprehensive stormwater management program will result in enhanced protection of water quality in local streams and the Neuse River, reduced nuisance and problematic flooding, well- maintained and upgraded drainage systems, desired sustainable economic development with reduced stormwater impacts, and contribute to protection of drinking water supplies as well as valuable natural resources within the community.

Based on preliminary reviews of the existing municipal stormwater program in Smithfield, initial observations of representative local stormwater issues and probable program needs, surveys and interviews with experienced staff, involved elected officials, and interested citizens, this section provides a summary of recommended next steps and actions in developing a more comprehensive future municipal stormwater management program.

Actions are recommended in order of highest importance based on current Neuse Stormwater Rule requirements and probable near-term stormwater program needs. It should also be noted that key steps in the program development process may run in parallel. For example, the Town may budget additional resources to satisfy immediate NSR requirements and designate or create a Stormwater Program Manager position while chartering and beginning an Advisory Committee process. Based on experiences of other cities in North Carolina, the process of building a comprehensive municipal stormwater management program often takes a number of years.

While it is recommended that an Advisory Committee be created by Council to help develop final recommendations for the future Smithfield Stormwater Management Program, the report also provides three (3) preliminary estimates for potential program enhancements and corresponding broad funding levels by major stormwater functions. The most significant issue facing the Town of Smithfield's Stormwater Management Program is the need for dedicated additional funding and resources.

Based on experience in other locales and observing the growing stormwater management challenges across the state, Smithfield's Town leaders and administrators are to be commended for moving forward with the stormwater action plan and establishing the framework for a comprehensive stormwater program to meet today's needs while planning for the future.

Step 1 – Budget Designated Resources for NSR Requirements

As stated before, the Town of Smithfield operates under the Neuse Stormwater Rule as mandated by 15A NCAC 02B .0235. As stormwater requirements are anticipated to grow in the future, it is recommended that the Town budget additional resources to satisfy the baseline requirements to comply with the Neuse Stormwater Rule. The following Table 6 provides information and recommendations specific the NSR requirements.

Table 6 – Recommendations to Support Implementation of the Neuse Stormwater Rule (NSR)

Neuse Stormwater Rule Program	Action Plan Recommendations (Bold)
Stormwater management plans for new development.	• The Town is mandated to review and ensure plans for new development include measures limiting discharges of nitrogen to set standards. The Rule also limits peak discharge rates of flow in the 1-year, 24-hour event. These review and approval activities are performed by the contracted Town Engineer.
Riparian Buffer Protection	• The Town is mandated to protect riparian buffers. Development plans for riparian buffer areas are reviewed for approval by the contracted Town Engineer and Planning Department. • **Recommend inspecting and approving new construction to ensure compliance with approved plans.** • **Recommend establishing a process with Johnston County by which Occupancy Certificates will not be issued until all inspections are satisfactorily completed.**
Public education, program	• The Town participates in the Clean Water Education Partnership, a program of Triangle J Council of Governments. • **Recommend developing an enhanced public education program that includes an increased participation in CWEP.** • **Recommend developing and implementing education initiatives directly benefitting the citizens of Smithfield to involve citizens in stormwater quality educational activities (e.g. Clean Sweep, inlet stenciling, utility billing flyers, public school activities, pollution prevention materials, etc.)**
Illegal discharges	• The Town currently will respond to illegal discharges if reported to Town staff. • **Recommend developing and implementing technical procedures to detect, track, and eliminate illicit discharges.** • **Recommend educating business and citizens about illegal discharges and the process for remedy.** • **Recommend mapping the Town's primary outfalls so that emergency response can be made quickly to illegal discharges.**
Annual report	• The Planning Department is charged with preparing and submitting the Annual NSR Report. • **Recommend enhancing and automating the reporting process through the use of GIS and templates to manage and report required data.**

Step 2 – Create a full-time Stormwater Program Manager (SPM) Position

The NSR rule and other stormwater program functions provides a full-time workload for a position to be created within the Town to serve as Stormwater Program Manager (SPM). In addition to helping carry out the required NSR requirements, the new SPM may oversee or perform the following: (Certain functions are currently carried out by Planning and the Town's contracted engineer.)

- overall responsibility for the Town's Stormwater Management Program
- serve as a management-level liaison to Public Works on drainage system maintenance services
- coordinate contracted engineer services to review and inspect new development stormwater plans and construction
- manage the watershed protection and floodplain management programs
- track public and private stormwater SCM implementation, maintenance and annual inspections
- develop and facilitate a StormWater Advisory Committee (SWAC) in reviewing the extent and level of future stormwater programs and funding
- work with and manage consultants supporting the Town in stormwater program development and implementation
- work with and manage consultants designing drainage improvements as a part of a comprehensive Capital Improvement Program

- manage construction of Capital Improvement Projects
- track data and prepare and submit annual reports as required by NCDEQ
- coordinate with partnering agencies to benefit Smithfield's Stormwater Management Program
- represent the Smithfield Stormwater Management Program at State and regional level conferences and meetings
- coordinate the Town's Public Awareness program for stormwater
- oversee the Town's illicit discharge detection and elimination program
- meet with and respond to citizen inquiries and complaints related to stormwater
- represent the Stormwater Management Program before elected officials

Following is a preliminary job description for the Smithfield SPM position. Additional stormwater staff may be required in future years, but it is recommended that the Town begin building its future municipal stormwater program with creation of the SPM position and hiring of the SPM.

> *Preliminary Job Description*
> The well-qualified Stormwater Program Manager (SPM) for the Town of Smithfield will be responsible for managing growth, implementation, and reporting of the Town's NSR program. The SPM will work closely with the Town Manager's Office, Planning Department, Town Engineer, and Public Works Department, with responsible roles in stormwater service delivery to fully implement the Town's Neuse River Rule stormwater regulatory requirements, watershed protection programs, and other municipal stormwater services. The SPM will work closely with the Public Works Department to ensure municipal drainage system maintenance programs and practices meet regulatory requirements and citizen needs for stormwater services. The SPM will work closely with the proposed Stormwater Advisory Committee and manage any funding initiatives that are directed by City Council. The SPM will develop and manage a Stormwater Capital Improvement Program to implement needed large CIP projects. The SPM will manage a funding mechanism to provide needed finances for the Stormwater Program.

Step 3 – Charter a Town of Smithfield Stormwater Advisory Committee (SWAC) to Develop Recommendations for a Future Stormwater Management Program and Funding

Development of the Town of Smithfield's future stormwater management program will be best accomplished by means of working with an officially appointed StormWater Advisory Committee (SWAC) with members who are representative of various local community interests such as homeowner associations, developers, business owners, manufacturers, environmentalists, etc. The purpose of the SWAC is to provide Town Management and Town Council with advisory-level feedback and counsel on the range of key stormwater policy issues that comprise the extent and level of service for the future municipal stormwater management program.

Policy issues range from extent and level of stormwater maintenance services to desired level of stormwater system master planning and stormwater capital improvement projects to how the Town implements different components of its NSR program in compliance with regulatory requirements. With recommendations for the needed and desired future stormwater program, the SWAC can then carefully review potential ways and means to pay for the stormwater program and services.

With Town Management review and approval, SWAC recommendations regarding the future stormwater program and how it may be equitably funded would then be presented to the elected Town Council for final review and decision making on behalf of the Smithfield community. An enhanced future municipal stormwater program would help protect and improve quality of life in the Smithfield community.

Appendix 3 provides further recommended details for the Smithfield SWAC.

Step 4 – Perform a Town-wide Representative Stormwater Services Survey

A representative survey of Smithfield's residents would be an effective tool to help determine the level of public interest and willingness to pay for a more comprehensive future stormwater program. The current action planning project received survey feedback from 29 interested and involved citizens. For a Town-wide survey, a random sample designed to generate feedback from around 200 residents should be adequate to provide statistically representative results. The representative survey would include questions about stormwater awareness and the need and desire for enhanced stormwater services from the Town. From this baseline survey, future periodic surveys could also be performed to help measure the effectiveness of public education and public involvement programs.

Step 5 – Continue and Expand Stormwater Program Collaboration with Local Governments in the Smithfield Region

Efficiencies in certain components of the stormwater program may be gained through developing collaborative programs with other affected local governments in the Smithfield and Greater Johnston County region. For example, many public education program components can be effectively and efficiently administered at sub-regional levels. Local governments in the Triangle and Piedmont Triad regions of North Carolina have implemented successful regional education programs in recent years.

Similar post-construction stormwater ordinances and enforcement programs amongst the local governments near Smithfield will also benefit both the Town of Smithfield and the regional community. While well-beyond the scope of the current action planning project, a regional stormwater utility would be a very proactive approach to generating the needed financial resources to fund both individual and regional stormwater programs.

In whatever partnering forms it may take, it is recommended that Smithfield establish, continue, and further expand its stormwater program collaboration with nearby Clayton, Benson, Selma and Johnston County.

Step 6 – Evaluate Options to Fund the Future Municipal Stormwater Program

As it works to review and develop final advisory-level recommendations for the future stormwater program, it is further recommended that the Smithfield SWAC (identified in Step 3) process be used to develop a recommendation for the best way to fund the desired future program and services. Eighty-five, or more, local governments in North Carolina and hundreds more across the nation faced with similar regulatory requirements and other stormwater-related challenges have chosen to develop and implement a dedicated and equitable stormwater utility fee to provide an appropriate level of financial resources for needed municipal stormwater programs. Cities relatively close to Smithfield that have developed stormwater utilities and more comprehensive stormwater programs include Raleigh, Zebulon, Knightdale, Wilson, and Dunn. Other major North Carolina cities with stormwater utilities include Durham, Fayetteville, Wilmington, Rocky Mount, Chapel Hill, Burlington, Greenville, and Jacksonville (see Figure 11). The stormwater utility is typically a public enterprise fund for stormwater management generally comparable to water and sewer enterprise funds. A municipal stormwater utility public enterprise is fully authorized under North Carolina state law and statutes.

While there are a number of supplementary funding vehicles such as plan review fees or development impact fees, experience shows that there are two primary ways to fund a municipal stormwater management

program – through tax-based revenues from a general fund or through fee-based revenues from a stormwater utility enterprise fund.

As the Town of Smithfield currently funds stormwater activities through its general fund, it is recommended that the Town evaluate potential development of a stormwater utility fee to fund the needed and desired stormwater program as an integral part of the representative SWAC process going forward. Once the extent and level of the stormwater management program is determined, the committee can then thoughtfully evaluate and develop recommendations for how best to pay for the program, including continued general tax-based funding and/or a stormwater utility public enterprise fund (dedicated fee-based funding).

Figure 11 – Local Governments in North Carolina with Stormwater Utilities

-Archdale
-Asheville
-Atlantic Beach
-Ayden
-Beaufort
-Belmont
-Bessemer City
-Burlington
-Carrboro
-Carolina Beach
-Chadbourn
-Chapel Hill
-Charlotte & Mecklenburg Co.
-Clemmons
-Concord
-Cornelius
-Cramerton
-Creedmoor
-Dallas
-Davidson
-Dunn
-Durham
-Elizabeth City
-Elon
-Fayetteville & Cumberland Co.
-Gastonia
-Gibsonville
-Graham
-Granville County
-Greensboro
-Greenville
-Grifton
-Harrisburg
-Hendersonville
-High Point
-Hillsborough
-Holly Springs
-Hope Mills
-Huntersville
-Indian Trail
-Jacksonville
-Kannapolis
-Kernersville
-Kings Mountain
-Kinston
-Knightdale
-Kure Beach
-Lake Park
-Landis
-Lumberton
-Matthews
-Mint Hill
-Monroe
-Mooresville
-Morrisville
-Mount Holly
-Nags Head
-New Bern
-Oak Island
-Oxford
-Person County
-Pineville
-Plymouth
-Raleigh
-Ranlo
-Rocky Mount
-Salisbury
-Shelby
-Spring Lake
-Stallings
-Stem
-Swansboro
-Thomasville
-Wallace
-Washington
-Whitakers
-Wilmington
-Wilson
-Winston-Salem
-Winterville
-Wrightsville Beach
-Zebulon

Step 7 – Apply for Available State/Federal Stormwater Quality Grant(s) Funding

As the Town's stormwater program develops, one of the best ways to demonstrate value to citizens and the local community is to pursue and leverage outside funding resources. In North Carolina the Clean Water Management Trust Fund (CWMTF) encourages interested local governments and non-profit organizations to apply for funding of water quality protection and improvement projects including stormwater

management projects. Since matching funds are often required by the CWMTF and other external grant agencies it is recommended that the Town of Smithfield first determine how it will develop its primary source of funding for the required and desired municipal stormwater program. The NC Ecosystem Enhancement Program, mentioned earlier in the report, is also an excellent outside resource for performing stream restoration projects by partnering with local governments. Note that funding of an ongoing stormwater program is not feasible through one-time grants.

Preliminary Options for Enhanced Municipal Stormwater Program and Services

As part of the Stormwater Program Action Plan, the Town of Smithfield requested a preliminary estimate of the potential costs to meet minimum NSR requirements as well as potential costs for stormwater services associated with three enhanced levels of service. Table 7 provides a concise summary of three potential future options and broad cost estimates for the Town's Stormwater Management Program.

Table 7 – Preliminary Options for Enhanced Smithfield Stormwater Program

Stormwater Program Function	Existing / Baseline Program GF Funding	Level 1 Enhanced Program SW Fee $1/ERU	Level 2 Enhanced Program SW Fee $3/ERU	Level 3 Enhanced Program SW Fee $5/ERU
Program Administration & Engineering	$13,500	$120,000	$158,000	$263,000
NSR / Water Quality	$3,000 (annual report)	$10,000	$32,000	$53,000
Drainage System Operation & Maintenance	$53,750 (includes 50% of leaf/limb, street sweeping)	$80,000	$182,000	$384,000
Capital Improvement Program (CIP)	$0	$0	$258,000	$350,000
Totals	$70,250	$210,000	$630,000	$1,050,000

The envisioned **Level 1 Enhanced Program** would allow the Town to create the position and fund a full-time Stormwater Program Manager. Dedicated funds to initiate a mapping program to meet NSR IDDE requirements could be added. There could be an increased allocation of funds for stormwater maintenance services. Level 1 also assumes the Town moves forward with the chartered SWAC process.

The preliminary **Level 2 Enhanced Program** should include the enhancements identified in Level 1. It would allow the Town to begin initial watershed studies and initiate development of stormwater master plans in addition to an improved level of maintenance services. The stormwater system inventory can be developed faster and with several potential applications (asset management, maintenance, system modeling, etc.) under Level 2 funding. Maintenance capabilities could be enhanced with additional staff and/or equipment. Level 2 may also provide resources to initiate a stormwater CIP and the opportunity to develop

a stormwater improvement program for residents and property owners dealing with drainage problems from public runoff. Level 2 can also provide a higher level of public education and outreach activities along with a heightened focus on implementing and enforcing NSR programs. A new part-time stormwater technician could also be funded under a Level 2 program. Level 2 also assumes the Town moves forward with the chartered SWAC process.

The preliminary Level 3 Enhanced Program should include the enhancements identified in Levels 1 and 2. It would provide a significantly improved extent and level of stormwater services to operate and maintain the drainage system than currently offered by the Town of Smithfield. Highlights of Level 3 could include additional dedicated stormwater program staff over Level 2, system-wide drainage basin studies and master plans over a handful of years, a complete storm system inventory with multiple municipal applications, improved and expanded MS4 maintenance programs including a dedicated drainage maintenance crew, moderately advanced public education and public involvement programs, and a stormwater CIP that would provide more visible results for Smithfield's residents. Level 3 also assumes the Town moves forward with the chartered SWAC process.

Appendix 1 – Staff Workshop Survey Results

Survey Participants by Town Department/ Division:

(36 Total Staff Participants)

Office Admin (1)
Public Works/Sanitation/Streets (20)
Planning & Development (5)
Finance (3)
Parks & Recreation/SRAC (6)
IT (1)

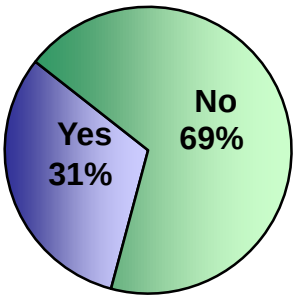
1. What is the length of your service as an employee of the town of Smithfield?

	Office Administration	Public Works/ Sanitation/Streets	Planning/Development	Finance	Parks & Recreation/SRAC	IT	**Overall**
Surveyed Employees per Department	**1**	**20**	**4**	**3**	**6**	**1**	**35**
Average Number Years of Service	**1**	**9.5**	**6.5**	**10**	**16**	**1.5**	**10.25**

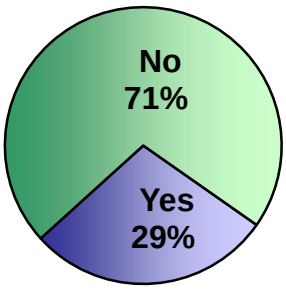
2. Have you worked in other Departments during your employment with Smithfield?

If yes, which other departments?

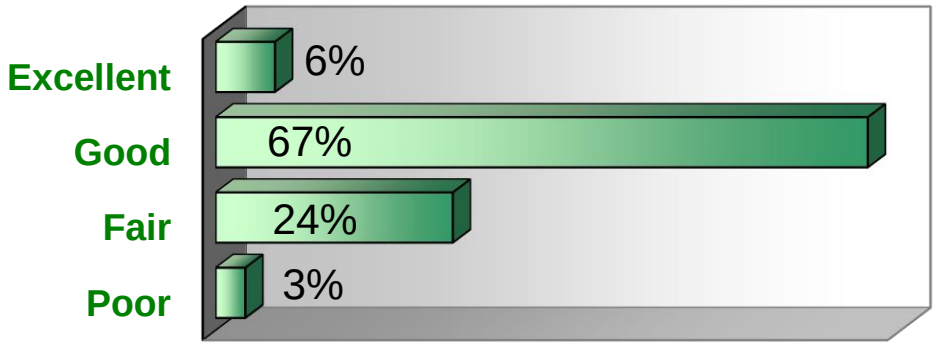
Public Works/Sanitation
Park & Recreation/SRAC
Customer Service
Planning
Street
Facility Maintenance
Fire/Police
Meter Department



3. Are you a resident of Smithfield?

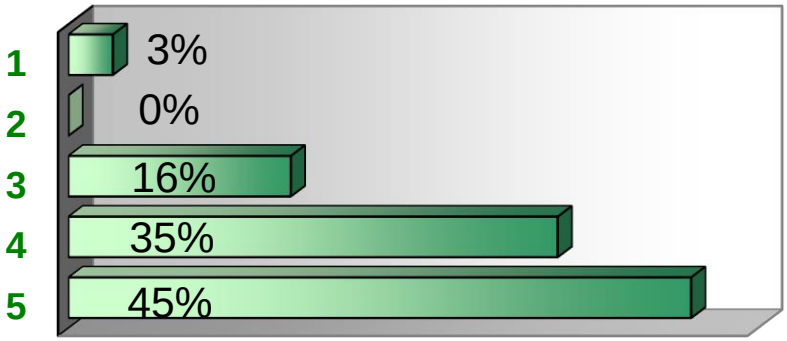


4. How would you rate the overall quality of life in Smithfield?

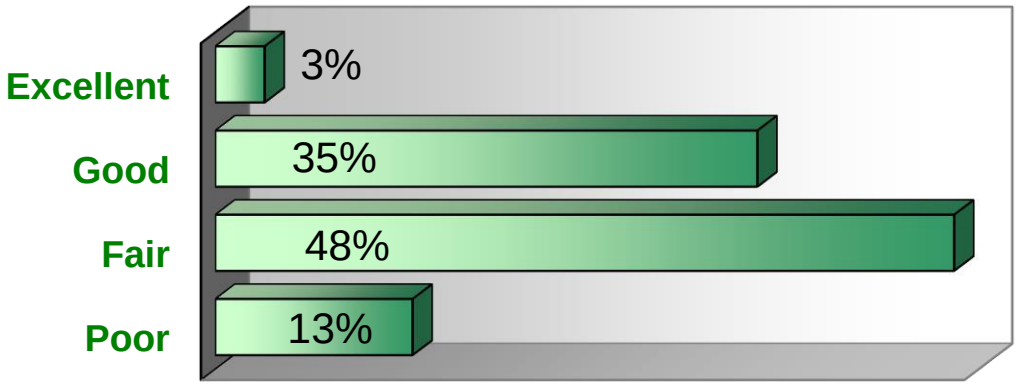


5. How Important is the natural environment in your measure of quality of life in the Smithfield community?

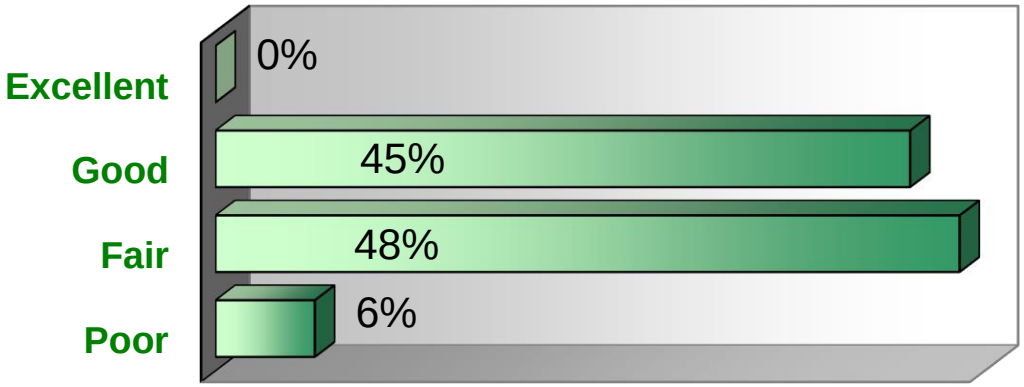
(On a scale from **1** to **5,** where **1 = "Not Important"** and **5 = "Very Important"**)



6. To the best of your knowledge, rate the overall water quality of the Neuse River in Smithfield.

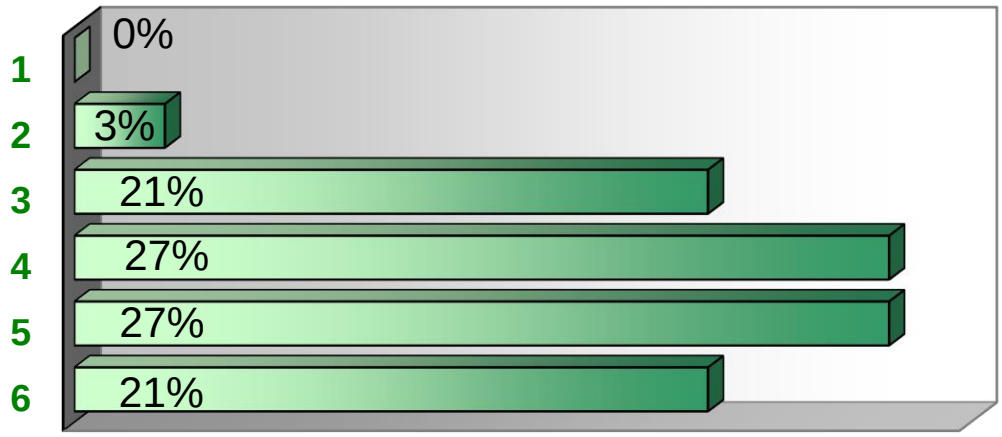


7. To the best of your knowledge, rate the overall water quality of creeks, streams, and lakes within Smithfield? (Not including the Neuse River)



8. Town-wide, how serious are drainage and flooding problems from stormwater runoff?

(On a scale where 1 = "**Not a Serious Problem**" and 5 = "**Very Serious Problem**", 6 = Don't know)



9. What are the most common types of stormwater-related inquiries from citizens and property owners that you are aware of, if any?

-Full ditches and water standing in streets and yards
-Yards/ditches being flooded/standing water
-Flooding
-Flooding during heavy rains in low-lying areas
-Poor water runoff

10. Which municipal stormwater programs and services do you think are most important and valued by Smithfield's citizens and property owners?

-Residential storm drainage systems and regional ponds for commercial developments
-Street and drainage

11. What drainage and stormwater-related activities, programs, and services have your Department and/or Division provided for Smithfield to date?

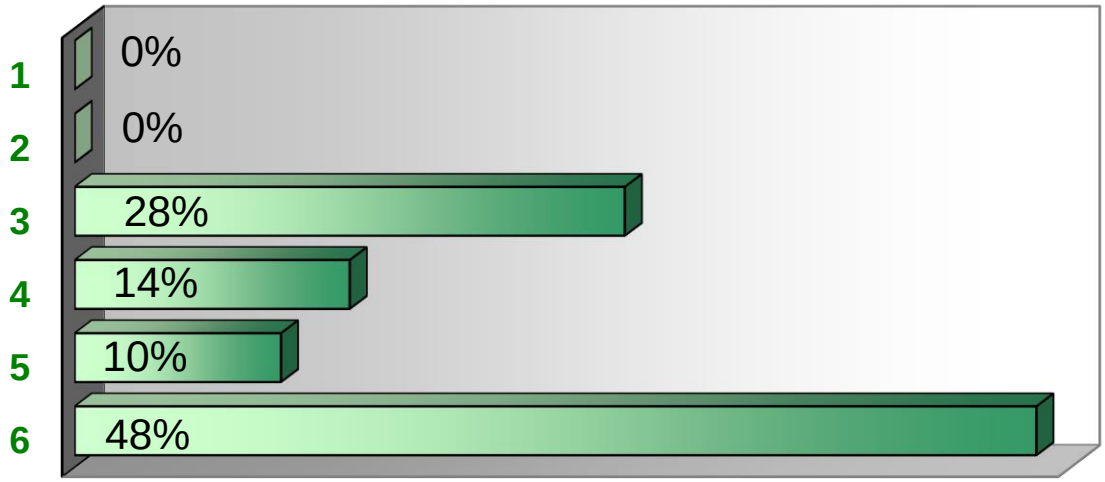
	Office Administration	Planning / Engineering	Public Works / Sanitation	Finance	Parks & Recreation	IT	Police / Fire
Maintenance and repairs of the storm drainage system			✓		✓		
Review of stormwater/ watershed/floodplain plans for site development and redevelopment		✓	✓				
Response to citizen's drainage inquiries and complaints		✓	✓				
Public information and educational services		✓	✓		✓	✓	
Emergency response services for floods and/or hazardous spills		✓	✓				✓
Street cleaning, street sweeping, litter collection, and leaf collection			✓		✓		
Planning & engineering of stormwater/ drainage capital improvement projects		✓	✓				
Providing drainage, floodplain, and/or watershed information to citizens and businesses		✓	✓			✓	
Reviewing zoning and re-zoning requests for potential stormwater impacts		✓	✓				
Developing planning standards that include stormwater management		✓					
Preparing the Town's Neuse Regulations stormwater permit application		✓	✓				
Helping implement the Town's Neuse Regulations stormwater permit and program		✓	✓				
Working with citizen/stakeholder groups on stormwater-related issues		✓	✓				
Administration of the local water-supply watershed protection ordinance		✓	✓				
Administration of the local floodplain management ordinance		✓	✓				
Inspection of private development and/or Town construction projects		✓	✓				
Town administrative services (Management, Budget/Finance, HR, MIS, etc.)	✓	✓	✓	✓			

Other current Town services related to or in support of stormwater management? Please describe:

-working on stormwater BMP O&M compliance for commercial properties
-updating the Town's stormwater management regulations

12. To what degree do the Town's stormwater programs and services have an impact or bearing upon the programs and services of <u>your Department</u>?

(Please use scale & circle 1 to 5, where 1 = "No Impact" and 5 = "Very High Impact", 6 – Don't know)



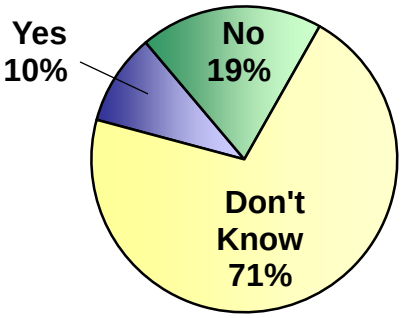
In what ways?

- A stormwater management plan should make administering stormwater regulations much easier
- Unable to access meters for reading/billing. Water meters under water. Sometimes EL meters due to yards with standing water. Example—Pine Acres area
- Flooding of Greenway/ball fields
- We are in the business of flooding and helping the community
- Determine approval for new or existing business which includes stormwater plan to manage stormwater problems
- Only when water covers the greenway near bridge
- If flooding occurs, facilities (ex. greenway, Town, Commons) are flooded

13. On average, about how many hours per regular work week do YOU spend on or in support of the Town's stormwater-related activities, programs, and services?

	Office Administration	Public Works/Sanitation	Planning/Development	Finance	Parks & Recreation/SRAC	IT	Totals
Less than 4 hours per week	1	6	2	2	4		15
Between 4 and 8 hours per week		3	1				4
Between 8 and 16 hours per week		1	1				2
Between 16 and 24 hours per week		1					1
Between 24 and 32 hours per week		3					3
Up to 40 hours per week		2				1	3

14. Do you think the Town has adequate current resources (staff and budget) to satisfy stormwater management regulatory requirements and other public needs for stormwater services?

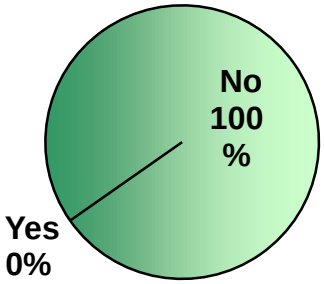


15. Please rank the significance of each of the following <u>potential sources of water pollution</u> to water quality of creeks, streams, lakes, and the Neuse River within Smithfield?

<u>Please check one for each below</u>. ("Runoff" is the rainfall or snow melt that runs off the ground, roofs, roads, lawns, fields, and other land surfaces in Smithfield. Smithfield receives an average of about 48 inches of rainfall and 2 inches of snowfall each year.)

Potential Sources of Water Pollution	Very Significant	Significant	Not Significant	Don't Know
a. Sewage treatment plants	16%	16%	6%	63%
b. Pollutants (like acid rain) that fall from the sky	0%	26%	26%	48%
c. Runoff from parking areas and streets	16%	35%	3%	45%
d. Runoff from farms	7%	27%	23%	43%
e. Runoff from forested or undeveloped land	0%	27%	27%	47%
f. Runoff from residential development	0%	45%	10%	45%
g. Runoff from commercial development	6%	42%	6%	45%
h. Runoff from construction sites	3%	42%	15%	39%
i. Stream bank erosion	0%	45%	7%	48%
j. Oil, chemicals, trash, and other wastes illegally dumped in storm drains or ditches	19%	19%	16%	45%
k. Fuel or chemical spills	19%	13%	16%	52%
l. Leaks from septic systems	16%	13%	10%	61%
m. Leaks or spills from sanitary sewer systems	16%	13%	10%	61%
n. Improperly applied fertilizers and pesticides	13%	13%	13%	61%

16. Are you aware of any other <u>potential sources</u> of water pollution to surface waters in Smithfield not listed above (in #15)?



17. Construction sites in Smithfield are _____?

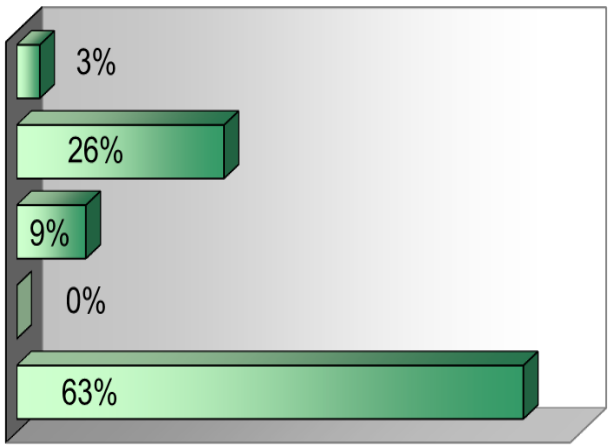
Always well-protected with no dirt or mud leaving the sites.

Usually well-protected with only minor amounts of dirt or mud leaving the sites.

Sometimes unprotected with large amounts of dirt or mud leaving the sites.

Often unprotected with large amounts of dirt or mud leaving the sites.

Don't know



18. How well does the <u>storm drainage system</u> (catch basins, drainage pipes, drainage culverts under roadways, drainage ditches and channels, etc.) generally function in Smithfield?

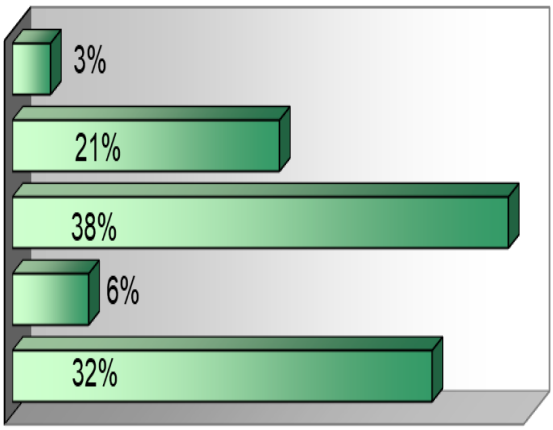
Works very well with no problems.

Seems to work ok in most storms.

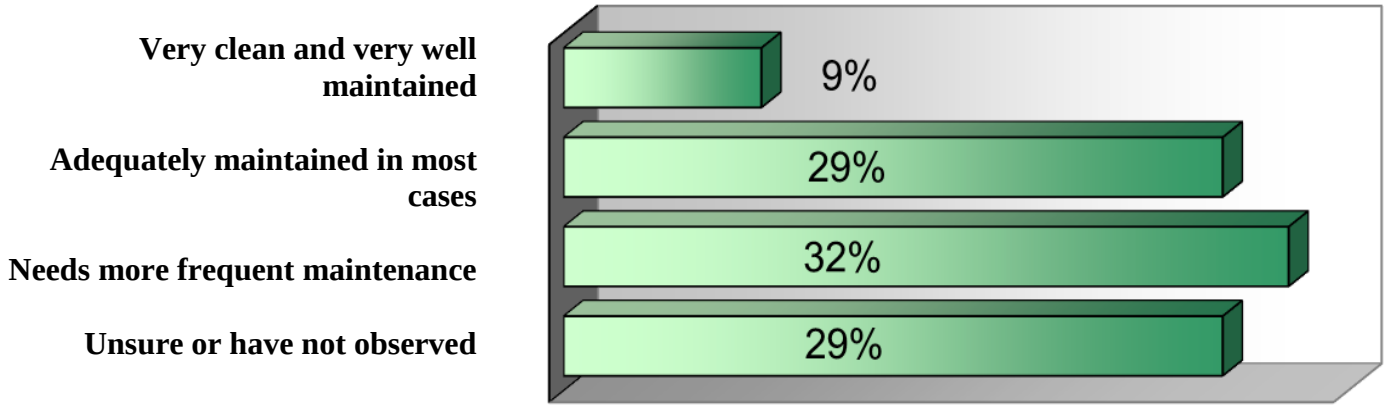
Occasionally backs up water, floods some streets; can cause either a short-term nuisance or potentially dangerous flooding

Often fails to work well and is a major public safety concern.

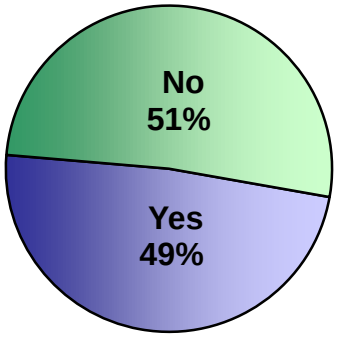
Don't know



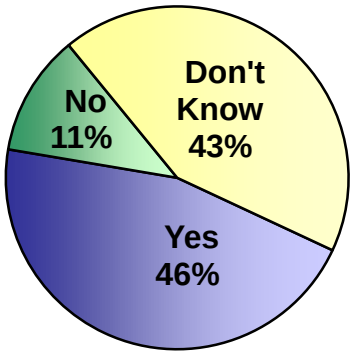
19. How would you generally rate the maintenance of the storm drainage system (includes catch basins, drainage pipes, drainage culverts under roadways, drainage swales and channels, etc.) in Smithfield?



20. Prior to this survey, were you aware that the Town of Smithfield must comply with increased stormwater regulations from the state and federal governments?



21. Do you think it would be helpful for Town employees to receive more information and training on the stormwater regulations, requirements, and programs?



If yes, what type of stormwater information and training would be most helpful for your department?

Planning

-Planning department could use more training

-Knowledge of basic regulations and requirements for employees who are not familiar with stormwater information

Parks & Recreation/SRAC

-Regulation information/training

-If it relates to the job

Public Works/Sanitation

-Flooding and prevention and spreading the word

-More info.

22. Please share any other *comments, suggestions, questions, observations, etc.* regarding the Town of Smithfield's stormwater management permit and/or program(s):

Planning

-The Town is supposed to provide education as part of our program and has done little. Assistance with the Educational component would be helpful. Updating our website to provide information on our stormwater program is being worked on by the Planning Department, and assistance might be helpful.

Public Works/Sanitation

-Town residents should know not to put debris in roadway which causes drains to get stopped up. That would solve a lot of problems.

-Survey totally out of my knowledge

-Hire more workers/people

Appendix 2 – Public Workshop & Survey Results

Smithfield provided notice to citizens in advance of the November 13, 2018 Stormwater Action Planning Workshop though use of its local governmental website and press releases to local media. A *2018 Stormwater Services Survey* (results below) was also prepared and provided to citizens attending the public workshop.

The public was provided an introduction to stormwater quality and stormwater quantity management issues, an overview of the Neuse River Rules requirements in effect for Smithfield, a description of the wide range of programs and services that a municipal stormwater program may provide residents, and initial public input was sought for the future Smithfield stormwater program.

Initial comments and feedback from citizens included requests for additional support from the Town with localized drainage concerns, support for the Town developing a more proactive stormwater management program, and early indications of potential public willingness to pay for improved stormwater services.

The survey was available to citizens attending the public meeting and to the general public on the Town's website (www.smithfield-nc.com). Citizens could also obtain a copy of the survey at Town Hall. The Town's Public Information Office issued a press release to local news media in advance of the public meeting and survey.

The survey was not designed nor intended to provide statistically inferential results.

Completed surveys were requested by December 15, 2018. A total of 29 completed surveys were received and included within the analysis and summary of results presented herein.

The 17-question survey is followed by an analysis and summary of survey results.

Introduction & Overview

"Thank you for your interest and participation in this important citizen survey on local stormwater management. Smithfield is reviewing its current level of public services in stormwater management and needs your input to help determine how the Town is doing. The Town is responsible for implementing state and federal stormwater regulations related to the Neuse River Nutrient Management Strategy, as well as maintaining existing drainage infrastructure within public rights-of-way and reviewing proposed development plans to require appropriate stormwater management. In addition to helping assess public satisfaction with current municipal stormwater services, the survey will help us understand if residents and property owners may desire any new or expanded services in the future."

-Stephen Wensman, Planning Director

Please return completed surveys by December 15th to:

Smithfield Planning Director
350 East Market Street
P.O. Box 761
Smithfield, NC 27577

Please answer the following questions:

1. Are you a resident of the Town of Smithfield? ☐ Yes ☐ No

If Yes, how long have you been a resident? _____ year(s)

2. Do you rent or own your residence? ☐ Rent ☐ Own

3. How would you rate the overall quality of life in Smithfield?
☐ Excellent ☐ Good ☐ Fair ☐ Poor

4. How important is Smithfield's natural environment in your measure of the quality of life?
(Circle a number from 1 to 5, with **1 = "Very Important"** and **5 = "Not Important"**)

Very Important **1** **2** **3** **4** **5** **Not Important**

5. Where does stormwater go after it enters storm drains in Smithfield?
☐ To the Johnston County wastewater treatment plant
☐ To a separate stormwater treatment plant
☐ To a creek, stream, or lake
☐ Don't know

6. Based on your current knowledge and opinion, please rate the water quality of the Neuse River in Smithfield.
☐ Excellent ☐ Good ☐ Fair ☐ Poor ☐ Don't know

7. Based on your current knowledge and opinion, please rate the water quality of creeks, streams, and lakes in Smithfield.
☐ Excellent ☐ Good ☐ Fair ☐ Poor ☐ Don't know

8. **How important is it to you for the Town to provide stormwater services that help reduce the amount of pollution entering local creeks, streams, and lakes?**
(Circle a number from 1 to 5**,** with **1 = "Very Important"** and **5 = "Not Important"**)

Very Important **1** **2** **3** **4** **5** **Not Important**

9. **From your observations, how well do storm drains, drainage culverts under roadways, drainage ditches and channels generally function within Smithfield? They…**
- ☐ work very well with no problems
- ☐ seem to work ok in most storms
- ☐ occasionally back up, flood some streets, and can cause either a short-term nuisance or potentially dangerous flooding
- ☐ often fail to work well and are a major public safety concern
- ☐ Don't know

10. **Does your property or neighborhood have drainage or flooding problems?**
☐ Yes ☐ No ☐ Don't know

11. **How important is it to you for the Town to provide stormwater services to help reduce drainage and flooding problems within Smithfield?**
(Circle a number from 1 to 5**,** with **1 = "Very Important"** and **5 = "Not Important"**)

Very Important **1** **2** **3** **4** **5** **Not Important**

12. **Have you contacted the Town <u>within the last two years</u> for assistance with a stormwater-related issue (such as drainage, flooding, erosion, water pollution, or request for information)?**
☐ Yes ☐ No

13. **If YES to # 12, were you satisfied with the response and service you received from the Town?**
☐ Yes ☐ No ☐ Not applicable

If No, please explain why._____

14. **Construction sites you have seen in Smithfield are _____?**

always well-protected with no dirt or mud leaving the sites.

usually well-protected with only minor amounts of dirt or mud leaving the sites.

- ☐ sometimes unprotected with large amounts of dirt or mud leaving the sites.
- ☐ often unprotected with large amounts of dirt or mud leaving the sites.
- ☐ Don't know

15. **Prior to this survey, were you aware that the Town of Smithfield must comply with stormwater regulations from the state and federal governments?**
    ☐ Yes ☐ No

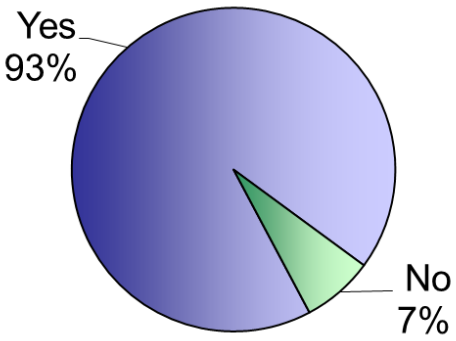
16. **Would you be willing to pay for improved services to help minimize drainage, flooding, and water pollution concerns within your neighborhood and throughout Smithfield?**
    ☐ Yes ☐ No ☐ Don't know

    If Yes, how much would you be willing to pay for improved Town stormwater services?
    ☐ Up to $1 per month ☐ Up to $2 per month ☐ Up to $3 per month
    ☐ Up to $4 per month ☐ Up to $5 per month ☐ Up to $6 per month

17. **Please share any comments, concerns, questions, or suggestions that you may have regarding the Town of Smithfield's stormwater management programs and services:**

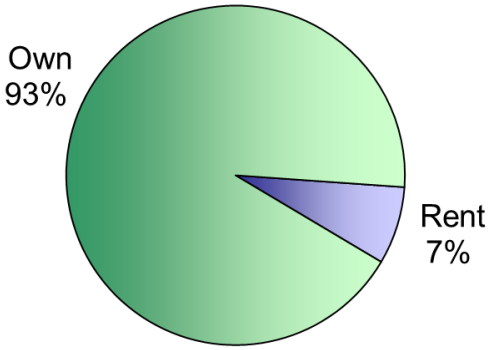
Town of Smithfield Stormwater Services Survey Results

1. Are you a resident of the Town of Smithfield?

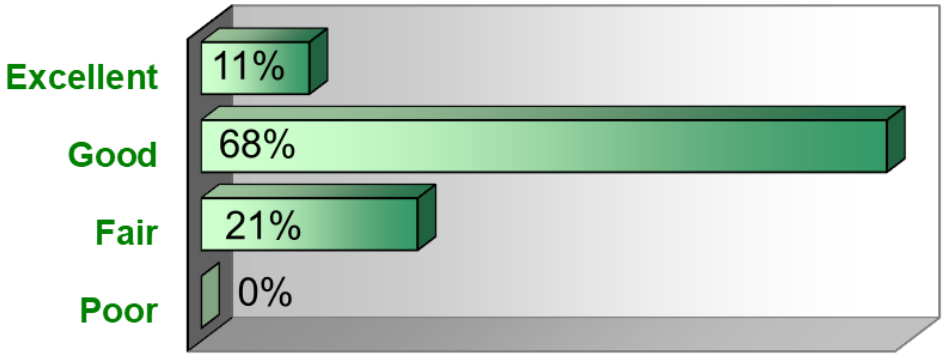


If Yes, how long have you been a resident?
Average: 33.2 years

2. Do you rent or own your residence?

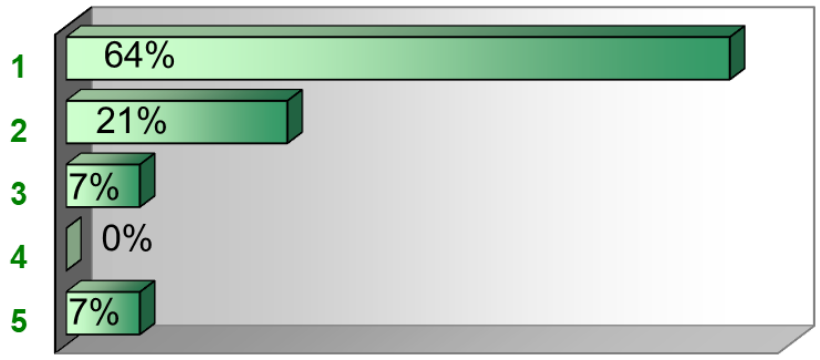


3. How would you rate the overall quality of life in Smithfield?

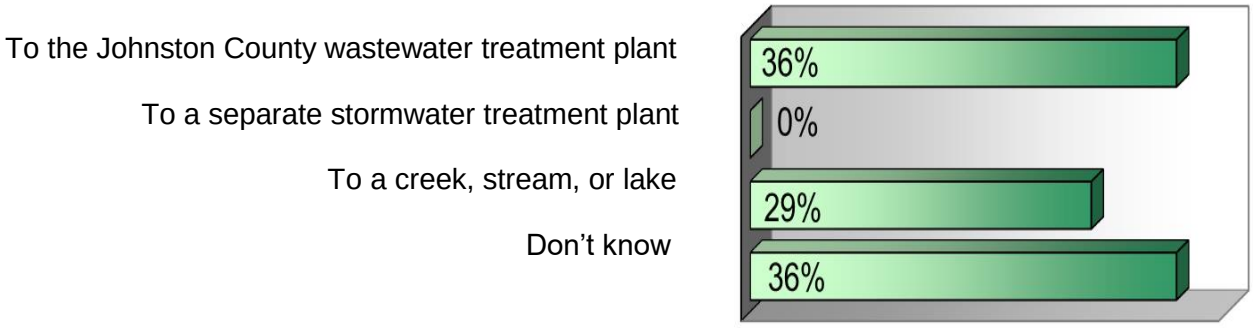


4. How important is Smithfield's natural environment in your measure of the quality of life?

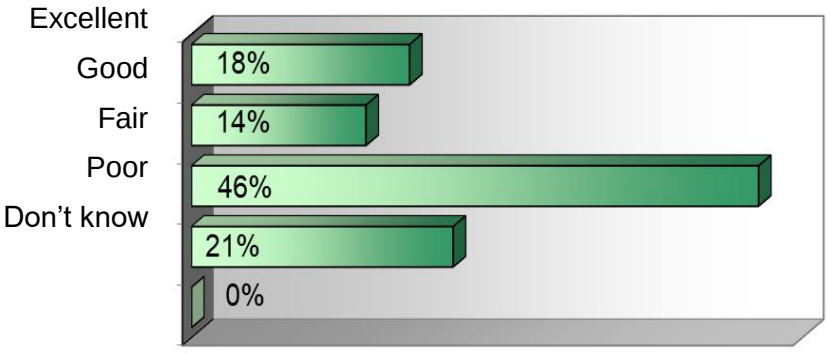
(Rated from 1 to 5**,** with **1 = "Very Important"** and **5 = "Not Important"**)



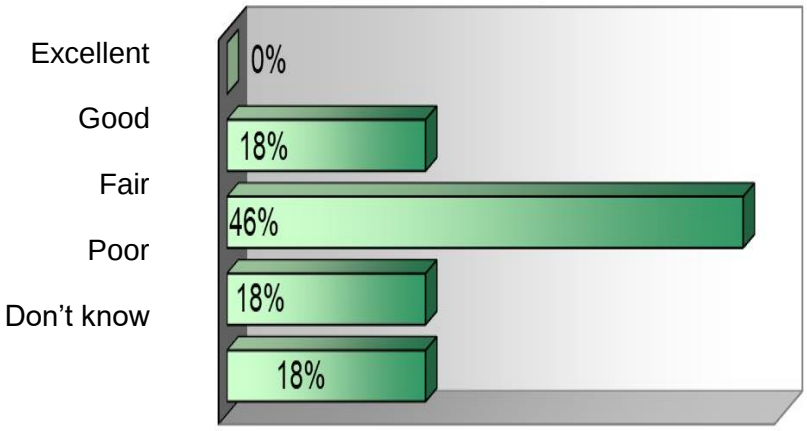
5. Where does stormwater go after it enters storm drains in Smithfield?



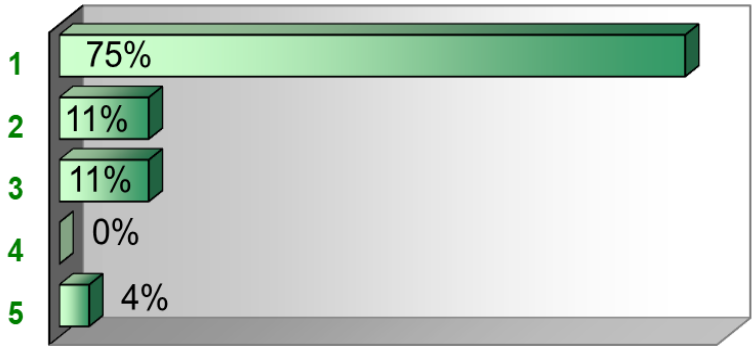
6. Based on your current knowledge and opinion, rate the water quality of the *Neuse River* in Smithfield.



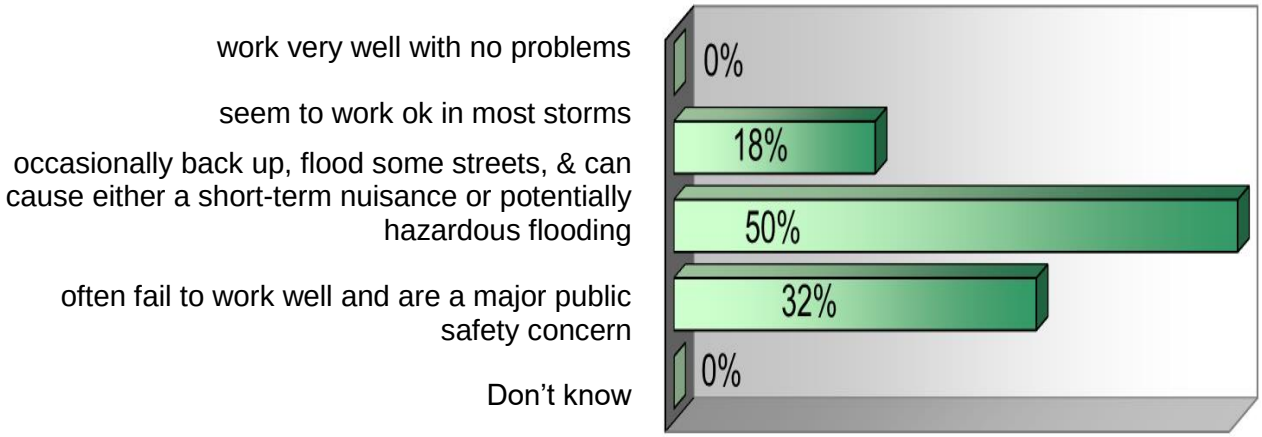
7. Based on your current knowledge and opinion, rate the water quality of creeks, streams, and lakes in Smithfield.



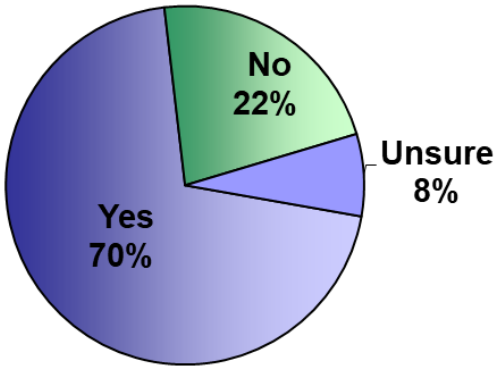
8. How important is it for the Town to provide stormwater services that help reduce the amount of pollution entering local creeks, streams, and lakes?
(Rated from 1 to 5**,** with **1 = "Very Important"** and **5 = "Not Important"**)



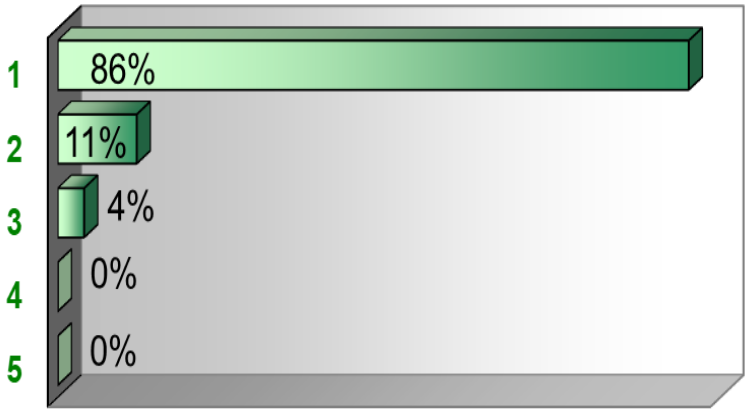
9. How well do storm drains along public streets, drainage culverts under roadways, and open drainage channels generally function within Smithfield? They…



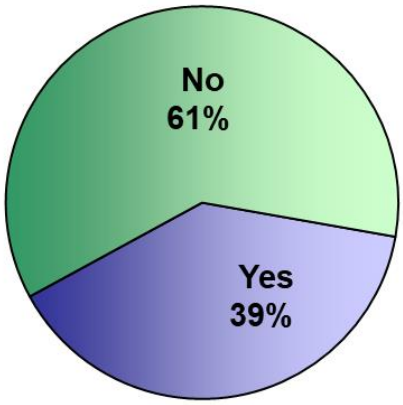
10. Does your property or neighborhood have drainage problems?



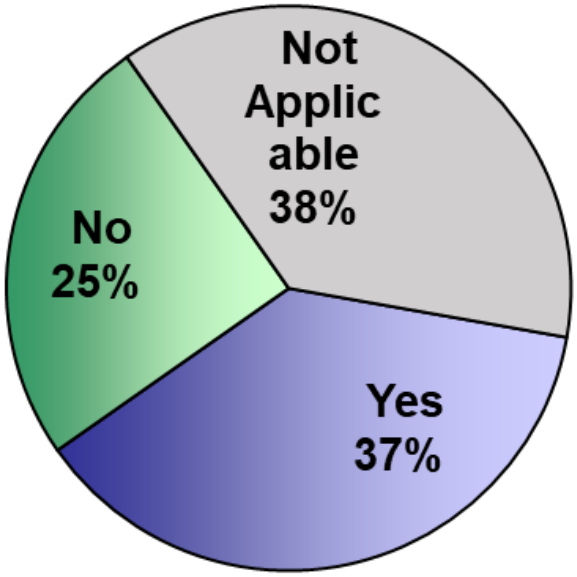
11. How important is it for the Town to provide stormwater services that help reduce drainage problems within Smithfield?
(Rated from 1 to 5**,** with **1 = "Very Important"** and **5 = "Not Important"**)



12. Have you contacted the Town <u>within the last two years</u> for assistance with a stormwater-related issue (such as drainage, flooding, erosion, water pollution, or request for information)?



13. If Yes to # 12, were you satisfied with the response and service you received from the Town? If No, please explain why:



Comments:

* Always get great service but no improvements.
* A temporary fix
* 1014 North Street. Road-front always holds water but not a nuisance. All town services brilliant for me.
* Haven't had an issue.
* My end of Birch St is lower and the town will not build up this end of street so water can run off, drainage pipe do not go all the way to my end of street. I have complained more than once about the water issue.
* Not enough people to do work needed, Services have been outsourced so work is done infrequently

14. Construction sites you have seen in Smithfield are _____?

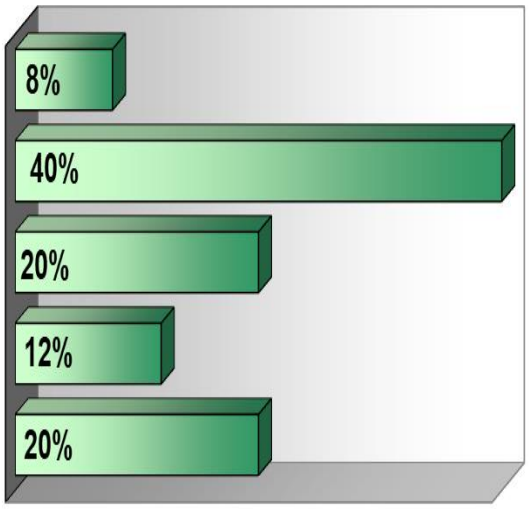
Always well-protected with no dirt or mud leaving the sites.

Usually well-protected with only minor amounts of dirt or mud leaving the sites.

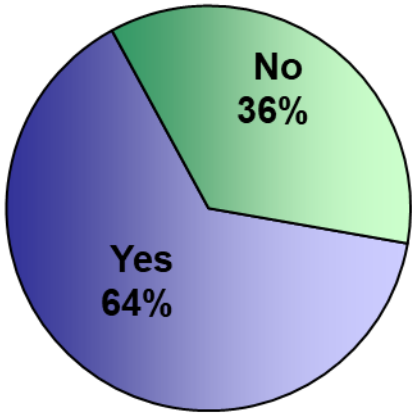
Sometimes unprotected with large amounts of dirt or mud leaving the sites.

Often unprotected with large amounts of dirt or mud leaving the sites.

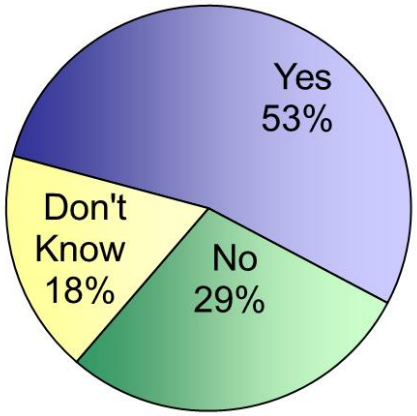
Don't know



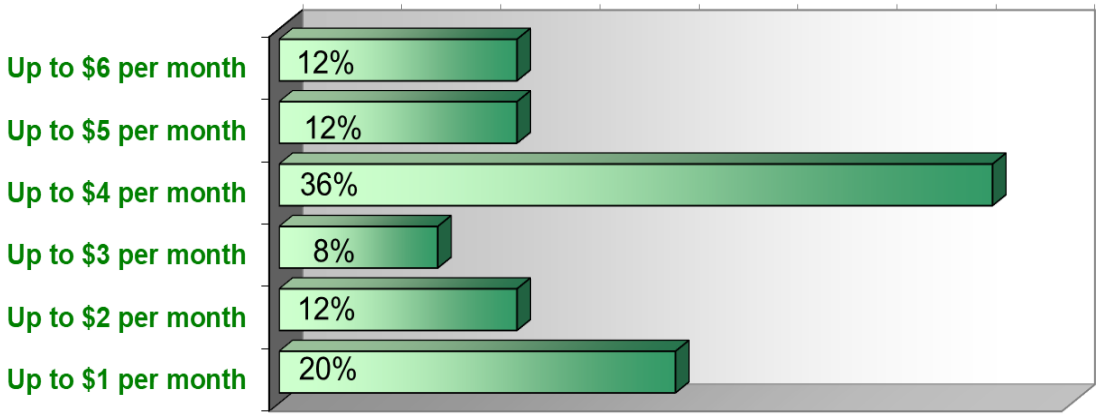
15. Prior to this survey, were you aware that the Town of Smithfield must comply with new stormwater regulations from the state and federal governments?



16. Would you be willing to pay for improved services to help minimize drainage, flooding, and water pollution concerns within your neighborhood and throughout Smithfield?



If Yes to #16, how much would you be willing to pay for improved Town stormwater services?



17. Please share any comments, concerns, questions, or suggestions regarding the Town of Smithfield's stormwater management programs and services:

- During Hurricane Matthew, we saw a lot of flooding in some places and didn't typically flood. While this was a major event, stormwater management maybe could have alleviated flooding from some of these areas.
- Establish District meetings to discuss the most concerns for each area and rank strategies to address each within a time period of years.
- I spoke at the meeting, so I won't waste your time again.
- If problems are not fixed, I will be moving.

- The infrastructure is aged and inadequate. As with other towns, growth has not been well managed.
- What happened to the 100 yr. pond that was constructed across College Road from JCC? Does it have a purpose now?
- Taxes in Smithfield are already the highest around. It is difficult to understand that this issue is not properly addressed at present.
- Former Neuse River Keeper volunteer. Cleaned Hwy 42 bridge near Clayton Elem. School. See water, in general, as critical issue for 21st century, all phases. We only have one mother earth to love and respect. Think global warming is valid. Was KJCB volunteer years ago.
- This survey is a good beginning for correcting existing problems.
- For our future generation, use the funds to fix the problems.
- Until finding takes place, we must implement very aggressive preventative maintenance, leaf awareness for citizens via mailings on trash receptacles or social media.
- Check sanitary sewage in the stormwater drain behind library to the river. Somebody is dumping sewage in the stormwater culvert.
- With all the taxes that homeowners have to pay, should take care of the stormwater services.

Appendix 3 – Charter for Smithfield Stormwater Advisory Committee

Charter for the Smithfield Stormwater Advisory Committee (SWAC)

It is recommended that the Smithfield SWAC be created and charged with five key goals:

Goal 1 - Assess current and future required municipal stormwater extents and levels of service

Goal 2 - Identify citizen needs and expectations for municipal stormwater services

Goal 3 - Review and develop strategic-level recommendations for the Town's future stormwater management program

Goal 4 - Review and develop program funding recommendations

Goal 5 - Develop a program implementation plan

Recommended Makeup of the SWAC

The SWAC should be comprised of an adequate number of appointed members to cover the key stakeholder interests in Smithfield. The SWAC should be officially established and its members appointed by the Smithfield Mayor and Town Council. Experience in other North Carolina local governments indicates that a balanced and representative SWAC ranging from 10 to 18 members, with a target of around 12 to 14 often works well. A larger advisory committee of more than 20 members, for example, may require significantly more time and effort to reach a clear or majority consensus on stormwater policy issues. Groups larger than 30 members have been used to develop stormwater program advisory recommendations, but large groups are often only required for large cities and/or multi-jurisdictional or regional stakeholder efforts.

While Town Management and Town Council should review and make final decisions regarding number of members and specific representation of the Smithfield SWAC, following is an initial framework for consideration.

Smithfield SWAC

Up to 14 members total

- 1 member from Smithfield Town Council

- 1 member from Smithfield Town Management

- 2 members representing single-family residential property owners / neighborhood interests

- 1 member representing multi-family, apartment complexes, and/or public housing interests

- 3 members representing major businesses / industries / economic development interests

-1 member representing retail / commercial interests
-1 member representing industrial interests
-1 member representing development interests

- 3 members representing natural resource, conservation, and/or environmental protection interests

- 1 member representing faith-based and other non-profit organizations

- 1 member representing the educational / academic sector

- 1 member representing county and/or regional interests that directly relate to the municipal stormwater management program

Volunteer SWAC members should be committed, willing, and able to serve for up to a year.

Anticipate monthly meetings, at a minimum, to develop future program and funding recommendations. A future, permanent SWAC (if desired by the Town of Smithfield) could meet on a quarterly or less frequent basis.

Preliminary Stormwater Program Policy Issues for SWAC Review

The following municipal stormwater program policy topics may serve as a starting point for consideration by the SWAC over a series of defined meetings. In the next phase of the project these topics can be reviewed further and a final listing of issues will be developed by the Town of Smithfield for the SWAC.

Building upon work and findings from the Stormwater Management Program Action Plan, the SWAC will be asked to consider and respond to five key questions:

1. What stormwater programs and services does the Town of Smithfield currently provide?
2. What are the stormwater-related problems, issues, and needs in Smithfield?
3. What are the key priorities to guide the future stormwater program in Smithfield?
4. What are the key components of the future stormwater program and what will the program and services cost?
5. What is the best way to pay for the required and desired future stormwater program in Smithfield?

As an integral part of the SWAC process, it will be appropriate to provide concise informational and educational materials for members on each topic so they will be prepared to make sound and objective recommendations regarding the extent and level of future municipal stormwater program that best fits Smithfield.

A tentative listing of specific meeting topics for the Smithfield SWAC follows:

1. SWAC Kickoff Meeting

    a. Review municipal stormwater program purpose
    b. Review strategic goals
    c. Review for the stormwater advisory committee
    d. Include an educational primer on stormwater issues

2. Review existing Town stormwater programs, services, and ordinances – define current program extent and level of service

3. Review stormwater-related problems along with citizen needs and expectations for municipal stormwater services

4. Review and recommend major priorities for future municipal stormwater program

5. Review integrated public education, outreach, and public involvement programs

6. Review construction, post-construction stormwater management programs, and public and private stormwater control measures (SCMs)

7. Review stormwater system master planning, capital improvement, and drainage assistance programs for property owners

8. Review stormwater system operation and maintenance programs

9. Develop cumulative stormwater management program recommendations

10. Review program funding options relative program extent and levels of service

11. Complete review of program funding options

12. Develop final recommendations

    a. stormwater management program,
    b. program funding strategy, and
    c. program implementation recommendations

Suggested Process for SWAC Policy Recommendation Development

1. Kickoff meeting with SWAC to discuss purpose and strategic vision for Smithfield stormwater management program (as noted above)

2. Kickoff meeting will also present envisioned "roadmap of key issues" and policy recommendation development process for SWAC.

3. Provide up-front background information for SWAC members.

4. The envisioned municipal stormwater program policy recommendation development process with the SWAC is as follows:

    a. Plan for 12 key topics/issues to be discussed with SWAC (drawing upon their official charge from Town Council)

    b. Town staff & consultant team (as needed) develop draft policy and suggested alternatives/approaches for topic/issue of interest based on research & analysis, review of regulatory requirements and other, and collective experience
        [Program and/or Funding Topic/Issues #1 – 12, for example]

    c. Send draft policy paper/issue #1 analysis and background information to SWAC members at least one week in advance of meeting

    d. Present issue #1 to SWAC. Discuss and receive comments/feedback on issue #1 from SWAC members.

    e. Working with Town staff, develop draft policy recommendation statement for issue #1. Send draft policy recommendation statement for issue #1 to SWAC members.

    f. Returning to step 4-b, staff & consultant team (as needed) develop draft policy and suggested alternative/approaches for issue #2. Send draft policy paper/issue #2 analysis to SWAC at least one week prior to next meeting.

    g. At next scheduled SWAC meeting, briefly review resulting draft policy recommendation statement for issue #1 and then move into presentation and discussion of issue #2.

    h. Stepwise process continues until key topics/issues are covered that collectively will define the Smithfield municipal stormwater program and corresponding funding recommendation(s).

5. Town staff and Consultant team (as needed) develops draft and final reports of findings and recommendations for the extent and level of needed and desired stormwater management program and funding strategy for Smithfield.

6. Findings and recommendations are presented to Town Managers and elected Officials for review and potential implementation.

Some Keys for the Smithfield SWAC

> The SWAC should have a clear up-front definition of their purpose and a defined roadmap for the task force discussions.

> The Town may wish to create a permanent SWAC for the future stormwater management program once it is defined and established.

> It is recommended that the SWAC be defined by Council as advisory-level only in development of recommendations that will be later reviewed and considered for implementation by Town Managers and elected Town Officials.

> The SWAC facilitator should encourage program policy recommendation development process to be based on principles and objective criteria, avoiding individual and disparate positions within the group.

> A schedule for the SWAC meetings should be established up-front. In setting the meeting schedule it is appropriate to include several breaks for holidays and other busy periods as SWAC members are volunteering their time.

> Understand that certain topics may require more than one meeting so plan for scheduling flexibility as required.

> The facilitator(s) should have an experienced understanding of the range, extent, and level of potential outcomes for the Town's stormwater program.

Appendix 4 – Stormwater Capital Improvement Projects Assessment

The following memoranda describe work done to assess the status of stormwater capital improvement projects that have been identified and studied in previous work by various Town consultants. This effort did not re-perform the previous studies, rather the focus was to collect and re-visit the previous work in order to validate the needs addressed and to develop and implement a process to rate and rank the projects for better use in an overall Stormwater Capital Improvement Program. The work herein described also gives a better picture of the funds that will be needed to support a viable Stormwater Capital Improvement Program.

The rating/ranking matrix used to prioritize the projects is included.

RATING/RANKING MATRIX

Criteria	Weight	Score			
		0	1	2	3
Public Safety	3	No positive impact on public safety or Causes a public safety concern that does not currently exist	Reduces flooding on 1-2 lightly traveled roadways Or Other projects depend on implementation for success	Addresses existing minor safety concern Fewer roadway closures	Addresses existing safety concern that could cause loss of life Or Improves access to critical facilities or critical routes
Availability of Funding Source	2	No known funding source available/ Requires outside funding for entire project	Funding may be available for part of project; requires capital improvement planning (CIP)	CIP completed, awaiting budget consideration And Meets other Town objectives	Within existing Town budget Part of previously identified Town objective Grant Available
Potential for Flood Reduction	2	Does not reduce flooding	Reduces yard and nuisance flooding Or Other projects depend on implementation for success	Reduces structural flooding for 1-2 homes Or Reduces minor street flooding	Reduces flooding for multiple structures and/or major roadways
Cost Effectiveness	1	Completely unaffordable Or Relies on the implementation of multiple other projects	High project cost per structure/ roadway impacted (benefit to cost ratio less than 0.5) Or Project would be more effective if implemented with other projects	Moderate project cost per structure/ roadway impacted (benefit to cost ratio less than 1.0)	Low project cost per structure/ roadway impacted (benefit to cost ratio equal to or greater than 1.0) And Improved conditions without other projects being implemented
Access/ Existing Easements	1	On Railroad ROW Or On private property with no easements	Some easements or encroachment permits required and difficult to obtain	On private property, entirely within easements' Or On easily obtained easements	Entirely within Town roadways or Town property
Water Quality Improvements	1	No water quality improvements	Minor water quality improvements	Moderate water quality improvements	Significant water quality improvements
Public Perception/ Aesthetics	1	Public would likely oppose project Or Long construction timeline	Public would not have an opinion on the project	Public would support project Or Provide the Town with positive PR	Public would support project And Opportunity for economic redevelopment

WOOLPERT
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Memo

To:	Smithfield, NC
From:	Crystal Muller, PE
Date:	June 13, 2018
Subject:	Smithfield, NC Stormwater Drainage Capital Improvement Study Potential Capital Improvement Projects

Introduction

The Town of Smithfield, NC is located in the Neuse River basin and experienced severe flooding during Hurricane Matthew in 2016. The Town also experiences nuisance flooding during smaller storm events in certain areas, as shown on the attached Flooding Areas of Concern figure. In an effort to improve public safety, water quality, and quality of life for the residents, the Town would like to identify and prioritize potential stormwater capital improvement projects (SWCIP) within the Town. Multiple drainage studies have been conducted to evaluate the drainage system for potential solutions. Woolpert reviewed the following drainage studies and publicly available data related to flooding in Smithfield.

1. Spring Branch Stormwater Basin Drainage Study, Phase 1 Preliminary Report, May 2012; Withers and Ravenel
2. Spring Branch Stormwater Basin Drainage Study, Phase 2 Report, July 2013; Withers and Ravenel
3. Town of Smithfield Storm Drainage Study, October 1985, Ragsdale Consultants
4. Smithfield Storm Drainage, Volume I, October 1985, Ragsdale Consultants
5. Smithfield Storm Drainage, Volume II, October 1985, Ragsdale Consultants
6. Current Effective FEMA Flood Insurance Rate Maps, revised 2005 and 2007

Following a review of the documents, Woolpert and Jewell Engineering met with the Town on May 1, 2018 for a project kick-off meeting. Town staff led a quick field trip around the Town to highlight known areas of nuisance flooding. Woolpert spent two days on-site verifying drainage patterns, evaluating the potential projects identified in the previous studies, and identifying potential new projects to alleviate the flooding in the Town. This memo summarizes the potential capital improvement projects that, based on an evaluation of prior studies and current conditions, are feasible and likely to alleviate flooding.

Woolpert, Inc.
1671 Belle Isle Avenue, Suite 125
Mount Pleasant, SC 29464-8338
843.216.0401

Capital Improvement Projects

The Town's runoff discharges to three main streams: Spring Branch, Meadowbrook, and Buffalo Creek. Based on a review of previous studies, discussions with Town staff, and the field investigations, Woolpert verified or identified fifteen (15) potential capital improvement projects. No new hydrologic or hydraulic modeling was done as part of this effort, so projects and potential impacts are concept level and should be further investigated before implementation.

Spring Branch:

Spring Branch runs through the middle of Smithfield and captures a large amount of the stormwater runoff from the residential areas of the Town. Withers and Ravenel has previously modeled and investigated the stormwater infrastructure capacity for potential improvements. During the field investigations, Woolpert evaluated each proposed project in the Drainage Studies under current conditions and with knowledge of flooding impacts from Hurricane Matthew, and either verified the project, identified potential alternatives, or noted potential additional projects.

2nd Street Culvert: Spring Branch

The July 2013 Spring Branch Drainage Study by Withers & Ravenel modeled the Spring Branch system to identify areas of flooding and measure improvements based on a number of scenarios. The study showed that the culvert under 2nd Street is adequately sized for a 25-year storm event, but both 2nd Street and 3rd Street overtop during a 100-year storm event. There are no further restriction points downstream of 2nd Street before Spring Branch reaches the Neuse River. Withers and Ravenel recommended installing parallel 36-inch culverts at the 2nd Street crossing to increase stormwater conveyance in the 100-year event and relieve upstream areas. This upgrade was estimated by Withers and Ravenel to be approximately $60,000 in 2013. This area was not identified as an area of flooding concern by the Town. If upstream drainage improvements are made, this improvement should be considered to avoid exacerbating flooding issues.

Alternate 4th Street Bypass or Culvert: Spring Branch

Spring Branch flows through a box culvert under 4th Street and then through a concrete lined channel against the foundation of 312 4th Street. During the field investigation, Woolpert noted that both a sewer line and a water line go through the box culvert, and the water line catches debris and impedes flow during base flow conditions. The modeling effort done in the July 2013 Withers & Ravenel Spring Branch Drainage Study shows that this box culvert acts as a constriction point and has a reverse slope, however it does have adequate capacity to pass the 25-year storm event. It is unclear from the report if the model accounts for the decreased capacity attributed to intrusion from other utilities. However, the proximity of the channel to existing homes, the confined space, and the presence of multiple utilities significantly limits the options for increasing capacity at this crossing. The Study offered two separate options for improvements at 4th street: improve the existing culvert, or install a 48 inch bypass around 312 4th Street. Due to the numerous restrictions at the existing location, Woolpert recommends further investigating the bypass option. The July 2013 Drainage Study estimated the cost of the bypass to be approximately $220,000.

5th Street Impoundment: Spring Branch

Where Spring Branch flows under 5th Street, the 4.5 by 6 ft box culvert is undersized with multiple utility crossings through the culvert impeding flow, and the channel is confined coming into the culvert between concrete walls (see Figure). The Withers & Ravenel Drainage Study identified the open area to the north of Spring Branch, between 5th

Street and 6th Street, as a potential impoundment during rainfall events to mitigate flooding. The Drainage Study states that the impoundment would only provide flood relief during storm events smaller than the 10-year storm; however, without improvements at this crossing any flood reduction measures and conveyance improvements upstream have the potential to increase flooding at this location. This impoundment, located on parcels currently owned by the Town of Smithfield, was estimated by Withers and Ravenel to be approximately $220,000 in 2013.

The model results figures for existing conditions in the Drainage Report appear to indicate that flooding upstream of 5th Street is limited to the open area, Church Street roadway, and yards. The Drainage Report does not indicate the size of the proposed impoundment or if they intended the impoundment to act as a pond that detained water or as a floodplain area where flow out was controlled by the 5th Street culvert. According to FEMA, this impoundment would be located in the 100-year floodplain, so it would only help alleviate flooding for smaller storm events. Withers and Ravenel did not include in the Drainage Study the impacts of increasing the size of the culvert under 5th Street. Combining the upsizing of the culvert under 5th Street and the construction of an impoundment with an outlet control structure to detain water may be an effective option for the Town to alleviate flooding upstream of 5th Street while not worsening conditions at 4th Street. This option would also provide a water quality benefit, and the estimated cost is approximately $400,000.

Open Channel Implementation 6th Street to 7th Street

Spring Branch is piped through a box culvert between 7th Street and 6th Street. The Drainage Report recommends replacing the closed system between 6th and 7th Street with an open channel to accommodate upstream improvements by increasing flow capacity without increasing flooding. Withers and Ravenel does not include the recommended dimensions of the proposed channel in the Drainage Report. The depth and side slopes need to be verified before construction to ensure that the channel has adequate capacity to handle upstream flows without causing flooding to adjacent properties. This upgrade was estimated by Withers and Ravenel to be approximately $750,000 in 2013. It is unclear from the Drainage Report how this cost was developed, but Woolpert estimates this cost would be closer to $150,000 to remove the existing pipe and construct a four foot deep open channel.

Additional Railroad Culvert and Storage

The Withers & Ravenel Drainage Study recommends installing an additional 48-inch flood plain culvert under the railroad along Spring Branch. Under existing conditions, multiple residences and the school are impacted during the 100-year storm event. The Drainage Study does recognize that downstream flooding would increase if downstream improvements are not made; however, the extent of this flooding is unclear and should be carefully evaluated before considering this option. This upgrade was estimated by Withers and Ravenel to be approximately $95,000 in 2013.

During the field investigations, Woolpert noted a large open area directly upstream of the railroad that could potentially be used for flood storage during large storm events to detain water and provide flood storage upstream of the railroad. This property is owned by the Town of Smithfield Recreation Department and two private citizens. Without performing hydrologic and hydraulic modeling for this scenario, the potential improvements a regional detention area at this location could provide are unknown. The estimated cost of this detention area is approximately $1 million.

Collier Street Parallel Line

One particular residence of concern noted by Town staff is 420 Collier Street, which experiences frequent and substantial flooding. This property is located in the FEMA floodway, and the Withers & Ravenel Drainage Study confirms that, even with implementing a number of improvements, flooding at this residence can be alleviated but not eliminated. One improvement noted in the Drainage Study is to install a 48-inch culvert along Town property from College Road Pond to the railroad to provide additional capacity to the existing pipe along Collier Street. This upgrade would alleviate flooding for multiple residences along Collier Street and was estimated to be approximately $225,000 in 2013.

Improvements to the residence at 420 Collier Street, such as elevating the home above the base flood elevation, may be a more cost-effective option if this home is the only one experiencing structural flooding in this area. Another option may be to buy this property and utilize this area, which is naturally a low spot, for additional storage for stormwater runoff. The Drainage Study does not indicate if the flooding shown on properties under existing conditions impacts finished floor elevations or only yards.

College Road Pond

The existing Community College Pond appears to have a large amount of available storage that is not currently being utilized. The existing outlet is a pipe at the same elevation as the pipes discharging into the pond, which could be converted into an outlet control structure to detain stormwater during large storm events and significantly decrease downstream flooding. The Withers & Ravenel Drainage Study did not specify how the riser structure was modified in their modeling effort so it is unclear from the available information if the pond's additional capacity was fully utilized. Based on a preliminary field investigation, it appears that this pond has the capacity to fully manage all of the upstream runoff. The riser structure modification was estimated by Withers and Ravenel to be approximately $30,000 in 2013.

Eliminate Bypass

There is an earthen bypass in place near the end of Harris Street that, according to the May 2012 Phase 1 Preliminary Report by Withers & Ravenel, allows approximately 30 percent of the stormwater runoff from the East Market Street channel to bypass to College Road Pond. Woolpert agrees with the Withers and Ravenel recommendation to both eliminate the bypass to direct all flow from the East Market Street Crossing and vegetated channel by the Arboretum into the pond; and to redirect the flows from the upstream end of the Belmont Trunk Line through the bypass to the pond. This would lessen the required capacity of the system along Collier Street without causing adverse impacts to the College Road Pond or other areas. The Town should verify that Withers and Ravenel modeling confirmed that the existing 5ft by 5ft box culvert bypass can accommodate the additional flows proposed. This upgrade was estimated to be approximately $40,000 in 2013.

Birch Street

Birch Street is located at the upstream end of the Spring Branch system and experiences localized flooding due to inadequate infrastructure. Adding inlets in the cul-de-sac and piping the runoff to the rest of the system would improve conditions for these residents.

Buffalo Creek

Buffalo Creek receives runoff from the northern portions of the Town and has two primary constriction points: Buffalo Road and the Smithfield Neuse River Walkway near the Smithfield Water Plant. Town staff indicated that flooding in Buffalo Creek during Hurricane Matthew resulting in flooding along Buffalo Road and Hospital Road. Buffalo Creek is shown on FEMA FIRM Panel 1694J; the Flood Hazard Data Table indicates that the 100-year water surface elevation of Buffalo Creek just upstream of Buffalo Road is 127.2 feet. FEMA notes that this elevation includes backwater effects from the Neuse River. Woolpert did not perform hydrologic or hydraulic modeling for Buffalo Creek.

Buffalo Road

The crossing under Buffalo Road appears to be adequate to pass the 25-year storm event based on a very preliminary hydraulic analysis. According to NCDOT elevation data, Buffalo Road at the stream crossing is at an elevation of 122 feet, and Hospital Road where the flooding occurred is at an elevation of 120 feet to 122 feet. Based on the available FEMA data, Buffalo Road and Hospital Road may have approximately five feet of water on them during a 100-year storm event. Since this includes backwater effects from the Neuse River, it is unlikely that any improvements to stormwater infrastructure would alleviate the flooding to a level where roadway flooding would not occur.

Considering public safety, Woolpert recommends that the Town consider implementing controls, such as gates or warning signs, to keep people off these roadways during large storm events.

Meadowbrook

Town staff indicated that multiple homes along West Meadowbrook Drive experienced severe flooding during Hurricane Matthew, requiring several of the homes to elevate their finished floor elevations following the flood. These homes are in the FEMA 100-year floodplain for the Neuse River so the flooding was likely due to backwater from the river rather than undersized infrastructure. There is currently a 60-inch CMP under Meadowbrook Drive that is failing and has a sewer line impeding flows. Increasing the size of this culvert may alleviate the depth and duration of localized flooding; however, hydrologic and hydraulic modeling would need to be done to verify this improvement. The estimated cost for the improvement is $80,000.

Wilson Street Lake

Wilson Street Lake, located between Wilson Street and Holding Street, captures runoff from the residential areas between Sanders Street and Wilson Street before discharging downstream and into the Neuse River. Town staff identified the cul-de-sac of Lakeview Drive and East Stephens Street as flooding areas of concern. Woolpert did not perform any hydrologic or hydraulic modeling to measure the existing extents of flooding or the potential impacts of implementing the recommended capital improvement projects.

Lake Discharge

Woolpert staff noted during the field investigation that the lake seemed very high with minimal storage capacity, and inlets near the lake were full and, in some cases, flowing backwards away from the lake. Further investigations found that the outlet structure of the pond appears to have been modified by replacing a metal discharge pipe and control valve with a corrugated plastic pipe and PVC pipe at a higher elevation. It is unclear if this was intentional to raise the water level of the pond or if the old outlet failed and the modification was done incorrectly. Installing a new outlet control structure for the pond that would lower the normal pool, thus increasing storage during rain events, would significantly improve flooding conditions in the area. The Town should also investigate the need to dredge the sediment out of the pond to remove nutrient-laden silt and sediment. Dredging may also improve the aesthetics of the lake and maintain the lake as a recreational feature for the residents after the lake level has been lowered. It is important to note that the downstream embankment may be classified as a dam and must abide by NC Dam Safety Laws. Costs related to this improvement would depend on the permit requirements of the embankment. Assuming no additional permitting would be needed, the cost for a modified outlet control structure is approximately $30,000.

Lakeview Place Inlets

The flooding that occurs along Lakeview Place is due to a lack of stormwater infrastructure and the high pool of the pond. Once the pond normal pool elevation is lowered, adding inlets that discharge to the Lakeview Place Pond would help reduce this issue for a minimal cost.

West Stevens Street Inlets

The flooding that occurs along West Stevens Street is due partly to a lack of stormwater infrastructure causing stormwater to collect at the intersection of West Stevens Street and South Crescent Drive. Adding inlets at this intersection that discharge to the lake would alleviate the flooding once the lake normal pool elevation is lowered to accommodate the runoff. It is important to understand that these inlets would not improve conditions unless the lake normal pool elevation is lowered.

South Brightleaf Boulevard Warehouses

Town staff noted that multiple warehouses along South Brightleaf Boulevard near Hunley Street flooded during Hurricane Matthew. There is a ditch that flows southeast between two warehouses, beginning at Brightleaf Blvd across from Hunley Street, that conveys runoff from this area under the railroad tracks. The culvert under the railroad tracks may be undersized and should be upsized to prevent future flooding. A drainage area assessment needs to be done to determine the necessary culvert size to safely convey the runoff, and to ensure that the resulting increasing flows will not negatively impact downstream areas.

Potential Water Quality Improvements

Smithfield is bordered to the north by the Neuse River, which provides an important recreational asset for the Town and is also the major receiving waterbody for stormwater runoff from the Town. The Neuse River basin has experienced extensive fish kills and harmful algae blooms due to excessive nutrient related pollution from stormwater, wastewater, and agricultural sources. In 1997, North Carolina developed the Neuse nutrient strategy, a set of rules aiming to reduce the contribution of nutrients to the Neuse River through regulation of new development, elimination of illegal discharges, identification of retrofit locations, and public education. Under these rules, Smithfield is required to identify at least two (2) retrofit sites each year for potential implementation.

During the field reconnaissance, Woolpert identified the following locations for potential water quality retrofit projects:

1. A new impoundment between 5th Street and 6th Street, to the north of Spring Branch
   Estimated Cost: $220,000
2. A new impoundment just upstream of the railroad culvert for Spring Branch
   Estimated Cost: $1,000,000
3. Modification of the College Road Pond outlet control structure
   Estimated Cost: $30,000
4. Modification of the Wilson Street Lake outlet control structure
   Estimated Cost: $20,000

The first two identified potential water quality improvement projects would create new stormwater detention basins to capture, detain, and slowly release stormwater runoff thus providing time for the nutrients to settle out of the stormwater runoff. The other potential projects would modify existing detention basins to increase runoff hold times and thus improve nutrient removal. Potential quantitative water quality improvements were not determined as part of this evaluation.

Prioritization Criteria

Woolpert will prioritize these identified projects based on a set of weighted prioritization criteria to develop CIP scoring criteria to allow for an equitable comparison between the projects. From this information, Woolpert will develop a defensible prioritized list of capital improvement projects. Based on the potential projects and the Town's goals, the Town should consider the following prioritization criteria:

- Flood Reduction Potential
- Public Safety
- Water Quality Improvements
- Aesthetics
- Project Cost Effectiveness
- Citizen Perception
- Access
- Existing Utility Conflicts

Once the Town, Jewell, and Woolpert have decided upon a final set of criteria, Woolpert will perform the prioritization and develop an initial 5-year capital improvement plan. The Town, Jewell, and Woolpert will work together to develop a feasible plan to alleviate flooding, protect public safety and property, and improve the quality of life for residents in Smithfield.

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Memo

To:	Town of Smithfield, NC
From:	Crystal Muller, PE Woolpert
Date:	February 26, 2019
Subject:	Smithfield, NC Stormwater Drainage Capital Improvement Study DRAFT Five-Year Capital Improvement Plan

Introduction

The Town of Smithfield, NC is located in the Neuse River basin and experienced severe flooding during Hurricane Matthew in 2016 as well as nuisance flooding during smaller storm events in certain areas. In an effort to improve public safety, water quality, and quality of life for the residents, the Town, with assistance from Jewell Engineering and Woolpert, conducted a study of the stormwater systems within Smithfield.

The Town's runoff discharges to three main streams: Spring Branch, Meadowbrook, and Buffalo Creek. Woolpert and Jewell evaluated findings from previous studies and identified a list of fifteen (15) potential capital improvement projects aimed to reduce flooding impacts. These projects, described in detail in the *Potential Captal Improvement Projects Memo (June 13, 2018)* were then prioritized using a set of weighted prioritization criteria to develop CIP scoring criteria to allow for an equitable comparison between the projects. This prioritized list of potential capital improvement projects, found in Attachment A, identified three projects with a weighted score greater than 25 out of a possible 33, identified in green on the prioritization list.

Currently, funding for these projects would be provided through the general fund for the Town. Given the limited available funding for capital improvement projects and the increasing concerns over flooding in the community, the Town is exploring funding sources for capital improvement drainage projects such as a stormwater utility fee and grants. Jewell Engineering has been assisting the Town with an analysis of the benefits and impacts from implementing a stormwater utility fee.

Five-Year Capital Improvement Plan

Woolpert and Jewell Engineering developed this draft capital improvement plan using the prioritized list of capital improvement projects and the expected available revenue. It is anticipated that the Town can expect an annual income of one million dollars from a stormwater utility fee, of which $350,000 can be allocated for capital improvement projects. Projecting this fee allocation over a five-year planning period, the Town can use the prioritized list of capital improvement projects to develop a schedule for project implementation. Based on an estimated available funding of

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$350,000 per year from a stormwater utility fee, the Town would be able to implement the top seven (7) prioritized capital improvement projects, as shown in Table 1.

Table 1: Capital Improvement Projects, Five-Year Plan; Stormwater Utility Fee

Capital Improvement Project	Cost	Annual Balance
Year 1: $350,000		
Spring Branch: College Road Pond Outfall Modifications	$ 45,000.00	
Spring Branch: Eliminate Bypass	$ 60,000.00	
Wilson Street Lake Outfall Repair	$ 30,000.00	
Lakeview Place Inlets	$ 25,000.00	$ 190,000
Year 2: $350,000		
Spring Branch: Collier Street Parallel Line	$ 333,000.00	$ 207,000
Year 3: $350,000		
Buffalo Creek: Buffalo Road Controls	$ 15,000.00	$ 542,000
Year 4: $350,000		
Spring Branch: Railroad Storage	$ 1,000,000.00	($108,000)
Year 5: $350,000		
West Stevens Street Inlets	$ 120,000.00	$122,000.00

In addition to the stormwater utility fee, the Town and Jewell Engineering are investigating potential grant funding that could be available to the Town. While grant money is difficult to estimate or foresee, the Town can estimate $500,000 every two to three years in available grant funding to assist with capital improvement drainage projects. Table 2 shows the projects, based on the current prioritization, that could be accomplished if the Town secured grant money valued at $500,000 in Years 2 and 4. While the grant money would provide the Town with the funds to complete additional capital improvement projects, grant money may only be available for certain types of projects, such as water quality improvement projects. This could alter the order in which projects could be implemented.

Table 2: Capital Improvement Projects, Five-Year Plan; With Grants

Capital Improvement Project	Cost	Annual Balance
Year 1: $350,000		
Spring Branch: College Road Pond Outfall Modifications	$ 45,000.00	
Spring Branch: Eliminate Bypass	$ 60,000.00	
Wilson Street Lake Outfall Repair	$ 30,000.00	
Lakeview Place Inlets	$ 25,000.00	
West Stevens Street Inlets	$ 120,000.00	$70,000
Year 2: $850,000		
Spring Branch: Collier Street Parallel Line	$ 333,000.00	
Spring Branch: Railroad Storage (Part 1)	$ 587,000.00	$0.00
Year 3: $350,000		
Spring Branch: Railroad Storage (Part 2)	$ 413,000.00	($ 63,000)
Year 4: $850,000		
Buffalo Creek: Buffalo Road Controls	$ 15,000.00	
Spring Branch: 5th Street Impoundment	$ 400,000.00	
Spring Branch: Railroad Culvert Upgrade	$ 140,000	$ 232,000
Year 5: $350,000		
Spring Branch: 4th Street Culvert	$ 325,000.00	
Spring Branch: Birch Street Inlets	$ 122,000.00	
Buffalo Creek: West Meadowbrook Drive	$ 80,000.00	$ 55,000

This draft Capital Improvement Plan shows that the Town could implement multiple projects in the first couple of years after receiving funds from a stormwater utility fee. The prioritized list of projects identified several lower cost projects as the highest priority. Implementation of these projects soon after releasing the stormwater utility fund will also help the residents understand the impacts of the fee. This capital improvement plan should be viewed as a fluid document that should be revisited at least annually and modified as necessary to accommodate actual available funds, grants received, and the scoring and ranking of the potential capital improvement drainage projects.

Attachment A

Capital Improvement Project Ranking

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Project	Capital Improvement Project Prioritization															
	Public Safety		Availability of Funding Source		Potential for Flood Reduction		Cost Effectiveness		Access/ Existing Conflicts		WQ Improvements		Public Perception/ Aesthetics		TOTAL SCORE	
	Score	Weight	Score	Weight	Score	Weight	Score	Weight	Score	Weight	Score	Weight	Score	Weight		
Spring Branch: 2nd Street Culvert	1	3	1	2	0	2	1	1	3	1	0	1	1	1	**10**	**16**
Spring Branch: 4th Street Culvert/ Bypass	3	3	1	2	2	2	1	1	0	1	0	1	3	1	**19**	**10**
Spring Branch: 5th Street Impoundment	1	3	1	2	2	2	2	1	3	1	3	1	3	1	**20**	**7**
Spring Branch: Open Channel 6th Street	2	3	1	2	1	2	1	1	2	1	1	1	1	1	**15**	**14**
Spring Branch: RR culvert	3	3	1	2	2	2	1	1	0	1	0	1	3	1	**19**	**10**
Spring Branch: Railroad storage	2	3	1	2	2	2	2	1	1	1	3	1	3	1	**21**	**4**
Spring Branch: Collier Street Parallel Line	2	3	1	2	2	2	2	1	3	1	0	1	3	1	**20**	**7**
Spring Branch: College Road Pond Outfall Modifications	2	3	2	2	3	2	3	1	3	1	3	1	3	1	**28**	**1**
Spring Branch: Eliminate Bypass	2	3	2	2	3	2	3	1	3	1	2	1	3	1	**27**	**2**
Spring Branch: Birch Street inlets	1	3	2	2	2	2	2	1	3	1	0	1	2	1	**18**	**12**
Buffalo Creek: Buffalo Road controls	3	3	2	2	0	2	3	1	3	1	0	1	1	1	**20**	**7**
Buffalo Creek: West Meadowbrook Drive	1	3	1	2	2	2	2	1	3	1	0	1	2	1	**16**	**13**
Wilson Street Lake Outfall Repair	2	3	2	2	3	2	3	1	2	1	2	1	3	1	**26**	**3**
Lakeview Place Inlets	2	3	2	2	2	2	1	1	3	1	0	1	3	1	**21**	**4**
West Stevens Street Inlets	2	3	2	2	2	2	1	1	3	1	0	1	3	1	**21**	**4**
South Brightleaf Boulevard Warehouses	2	3	1	2	2	2	1	1	0	1	0	1	1	1	**14**	**15**

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