Greenville
NORTH CAROLINA

PUBLIC WORKS

January 27, 2017

RE: 2017 Stormwater Advisory Committee (SWAC)

Dear SWAC Member:

As you may recall, a few months ago you were contacted regarding the formation of a City Stormwater Advisory Committee. We would like to formally thank you for accepting this appointment, and we look forward to working with you throughout this process.

The Committee makeup includes citizens with diverse backgrounds to include developers, property managers, HOA presidents, engineers, and citizens impacted by stormwater runoff. The goal is to develop a vision for the future regarding stormwater management in Greenville. We will be looking at several areas including what level of service is sustainable. This will require review of development requirements and maintenance/operation practices. As a leader in our community, we value your experiences and are interested in how various approaches as well as potential changes in our Program/Ordinance would impact our residences and business community.

The initial kickoff meeting is scheduled for Friday, February 3, 2017, beginning at 11 a.m. and lasting approximately two hours (see attached agenda). The meeting will be held in the Public Works Main Conference Room located at 1500 Beatty Street. Lunch will be provided (see attached menu). Please e-mail Ms. Amanda Braddy (ajbraddy@greenvillenc.gov) with your menu selection by Thursday, February 2nd, at NOON.

In an effort to help you understand where we have come from, the following statement papers authored by the First Stormwater Advisory Committee have been attached for your review. These papers provide some prospective on the development of our current Ordinance and Program.

- 2002 Vision for Stormwater Management in Greenville
- 2002 Mission and Roles Statement
- 2002 Level and Extent of Service Statement
- 2002 Stormwater Utility Service Fee Rate Study

All of this information will be discussed during the next few months with our initial focus on identified needs and financing strategies.

Thank you for being a part of this process. We look forward to working with you and appreciate the time you are willing to commit to this Committee. Together we will hear many opinions or ideas on developing a sustainable stormwater management program in Greenville. If you have any questions prior to the January 24th meeting, please do not hesitate to call Ms. Lisa Kirby at 329-4467.

Best regards,

Kevin Mulligan, PE
Director of Public Works

Attachment

STORMWATER ADVISORY COMMITTEE (SWAC)

Meeting #1 – Kick Off Meeting
February 3, 2017 @ 11:00 A.M.

PUBLIC WORKS DEPARTMENT
CONFERENCE ROOM
1500 BEATTY STREET

"Come with an open mind, a willingness to hear all opinions or ideas,
and be a champion for sustainable stormwater management in Greenville."

1. Welcome/Introductions

2. Background Information on the development of the City's Stormwater Utility and Stormwater Management Program/Ordinance

3. Summary of the Current Stormwater Management Program

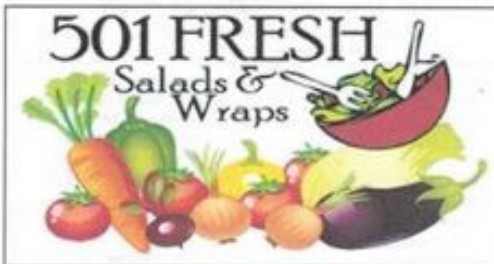
4. Summary of the Watershed Master Plans

5. Goals and Objectives for the Committee

6. Questions & Comments

7. Closing Remarks

501 FRESH Salads & Wraps



252.751.0799

HOURS 11 to 3 Monday-Saturday

SALADS & WRAPS

All are available as a salad or wrap

Your choice of an Original, Tomato Basil or Spinach Herb Wrap

#1 caesar 8.50
Romaine, Croutons, Parmesan Cheese, Fresh Cracked Black Pepper, and Grilled Chicken. ***Parmesan Caesar***

#2 asian 8.50
Romaine, Carrots, Red Cabbage, Asian Noodles, Cilantro, Mandarin Oranges, and Grilled Chicken. ***Spicy Thai Peanut***

#3 the 501 8.50
Romaine, Spinach, Kale, Cheddar Cheese, Bacon, Tomatoes, Red Onions, Cucumber, Croutons with Smoked Ham and Turkey.
Spicy Thousand Island

#4 greek 8.50
Romaine, Feta Cheese, Red Onions, Cucumbers, Tomatoes, Beets, Kalamata Olives, Pepperoncinis, and Grilled Chicken ***Greek***

#5 spinach & smoked bacon 8.50
Spinach, Carrots, Boiled Egg, Red Onions, Apple Wood Bacon, Blue Cheese Crumbles, Mushrooms, and Croutons. ***Creamy Blue Cheese***

#6 chef 8.50
Romaine, Smoked Ham and Turkey, Cheddar Cheese, Tomatoes, Boiled Egg, Cucumber, and Green Onion. ***Buttermilk Ranch***

#7 santa fe 8.50
Romaine, Green Onion, Tomatoes, Black Bean & Corn Relish, Cilantro, Radish, Cheddar Cheese, Bell Pepper, and Grilled Chicken.
Chipolte Ranch

#8 cobb 8.50
Romaine, Bacon, Avocado, Blue Cheese Crumbles, Tomatoes, Boiled Egg, Green Onions and Grilled Chicken.
Creamy Blue Cheese

#9 fruit and nuts 8.50
Spinach, Feta Cheese, Fresh Strawberries, Dried Cranberries, Red Onions, and Sliced Almonds. ***Raspberry Vinaigrette***

#10 fresh harvest 8.50
Kale, Romaine, Carrots, Almonds, Mushrooms, Bell Peppers, Tomatoes, Red Cabbage, Feta Cheese and Grilled Chicken.
Honey Jalapeno Lime Vinaigrette

***Consuming raw or under cooked MEATS, POULTRY, SEAFOOD, SHELFISH, or EGGS may increase your risk of food borne illness.**

Please e-mail Ms. Amanda Braddy (ajbraddy@greenvillenc.gov) with your menu selection by Thursday February 2nd at NOON.

Design Your Own Salad or Wrap

Pick a Green & 5 Items 7.00 extra items

Additional items 1.00 each

- o Chopped Romaine
- o Baby Spinach
- o Kale
- o Tomatoes
- o Cucumbers
- o Red Onion
- o Green Onion
- o Carrots
- o Red Cabbage
- o Sliced Radish
- o Cilantro
- o Avocado
- o Beets
- o Bell Peppers
- o Kalamata Olives
- o Black Bean & Corn Relish
- o Mandarin Oranges
- o Fresh Strawberries
- o Asian Noodles
- o Home Style Croutons
- o Sliced Almonds
- o Dried Cranberries
- o Cheddar Cheese
- o Feta Cheese
- o Blue Cheese
- o Parmesan Cheese
- o Hardboiled Egg
- o Mushrooms
- o Pepperoncinis

Add a protein to any salad or wrap

o APPLE WOOD BACON	1.00
o GRILLED CHICKEN	2.00
o SMOKED TURKEY BREAST	2.00
o SMOKED HAM	2.00

***Consuming raw or under cooked MEATS, POULTRY, SEAFOOD, SHELFISH, or EGGS may increase your risk of food borne illness.**

Dressings

1.75 Ounces

Additional dressings 1.00 each

- o PARMESAN CAESAR
- o CREAMY BLUE CHEESE
- o GREEK
- o SPICY THAI PEANUT
- o CHIPOTLE RANCH
- o SPICY THOUSAND ISLAND
- o HONEY JALAPENO LIME VINAIGRETTE
- o ITALIAN CASHEW
- o ITALIAN
- o BUTTERMILK RANCH
- o LOW FAT RANCH
- o LOW FAT CAESAR
- o LOW FAT CREAMY BALSAMIC VINAIGRETTE
- o CREAMY BALSAMIC VINAIGRETTE
- o RASPBERRY VINAIGRETTE

City of Greenville
Stormwater Management Program
Vision Statement

This paper reflects the discussion of the Advisory Committee and City staff to identify the vision for stormwater management in Greenville.

The following statement represents a vision for the future of stormwater management within Greenville. The concepts are discussed in greater detail in the background provided below.

> ***Stormwater management will comprehensively address surface water within the city through public leadership to protect and preserve the environment and the quality of life in Greenville. Design, construction, maintenance and management of the physical structures and water courses will be in partnership with the community, to meet community goals of reducing the risk of flooding and of protecting surface water quality.***

Background

The City of Greenville faces a number of challenges in its management of surface water through the storm drainage system. Surface water is recognized as a key resource in the community. The stormwater infrastructure is designed to provide a level of protection for public health and safety through reduction of the risk of flooding as well as improving environmental quality. Through growth and development, the existing system is not able to perform at an optimal level, resulting in more frequent nuisance flooding and reduced stormwater quality. The pace of growth has exceeded the resources provided to support these efforts. It is a goal of the community to establish a comprehensive stormwater program to optimize stormwater quality protection and to reduce flood risk. It requires a partnership between the City government and the community to achieve the desired outcomes.

In the City of Greenville, the City Council provides overall policy and goals for the stormwater program. Providing technical leadership to implement appropriate strategies is primarily a role of the Public Works Department. The Public Works Department will take the lead in addressing environmental protection activities mandated by the Federal and State governments, through new regulatory controls. The public is an active partner in this effort and will be engaged through educational and volunteer activities.

The physical system is built in partnership with the development community and is designed and constructed based on standards of design and performance. It is a goal of the program that technology will enhance the services provided by the City to the community through the use of drainage Master Plans, taking into account current and future land use conditions. The use of technology will provide an objective standard of performance for the design of the system. This will involve structural and non-structural controls for both flood-reduction and stormwater quality protection activities.

Environmental protection and preservation are key community goals and through the comprehensive stormwater program, surface water quality initiatives shall be integrated into the overall services, based on regulatory mandates and protection goals. Surface water quality is important in Greenville and the management of the drainage system will fully integrate best management practices, including both structural and non-structural control measures, as appropriate.

City of Greenville
Stormwater Management Program
Mission and Roles Statement

It is the mission of the comprehensive stormwater management program to meet Federal and state mandates for water quality protection; reduce the risk of flooding; protect, maintain, rehabilitate and upgrade existing stormwater resources and infrastructure; and involve the public through education and volunteer efforts. The intent of this program will be to meet these objectives through a balance of public and private investment in the system.

Leadership for the City's stormwater program will be provided through the Public Works Department. Staff will provide the technical leadership and direction for all city-provided services. Coordination on issues, policy and service delivery will be the responsibility of the Engineering Division.

The maintenance of the system, performed by the Public Works Department staff, will be performed on City property, City-owned right-of-way and on public and/or private property to the extent defined by the level and extent of service policies. Easements will be obtained on the drainage system maintained by the City and such easements will prohibit the placement of structures, fences or other obstructions to access. The City will ensure that all structural controls are maintained and meet performance standards, regardless of ownership. This may be done through regulatory enforcement or by direct service of City maintenance crews on City-owned facilities.

The following table provides an understanding of the roles of the City and community in stormwater management.

Task	City of Greenville Role	Community Roles
System expansion	Expand capacity; upgrade and retrofit the existing system.	Expand new lines to serve development.
Maintenance	Maintain public system, both remedial and routine. Establish standards for performance.	Maintain privately owned system elements to required standards.
Engineering services	Maintain current level with enhancements to serve public more effectively. Maintain technical competency. Establish system performance standards. Manage and protect floodplain from encroachment.	Design expansions; meet regulatory standards.
Construction of CIP	Master Plan, design, contract construction, inspect and accept for public dedication.	Design and construct through contracts with the City.
Protection and preservation of Water Quality	Comply with regulations, inspect and enforce ordinances and permit conditions. Initiate studies; establish performance standards. Assist private sector in protection of greenways, riparian habitat. Educate public.	Comply with regulations. Maintain water quality structural controls as required. Remedy problems.

City of Greenville
Stormwater Management Program
Level and Extent of Service Statement

Issue

In the past, moving runoff away from public roadways, off all property, and into the collection system, was the overall goal for managing stormwater. Now, stormwater management initiatives and program mandates, ranging from flood control and floodplain management to improved water quality in receiving streams, are an integral part of stormwater management strategies throughout the nation. Comprehensive programs, such as the one being proposed in Greenville, must be quantified in terms of the "public" responsibility to provide services that achieve the community's goals for public safety and environmental protection. Establishing the level and extent of service to be provided are key factors in determining the cost of service to the community, as well as equitably distributing the costs to those who will pay for the services.

This policy statement sets forth the structure for defining the level and the extent of service that will be provided by the utility in support of the goals of the comprehensive stormwater management program.

Definitions

- Extent of Service addresses the application of specific stormwater responsibilities and activities to the physical systems. It defines the "inner boundaries" of specific elements of the stormwater management and flood control program (what part of the physical system will the City's program take responsibility for and in what way) as well as defines the outer boundaries (what are the geographical limits of the service area).

- Level of Service defines system performance capability objectives, the condition that should exist in each type of system, and/or how much production is desired in certain activities. It also dictates how system performance and conditions should be judged, measured, estimated, or otherwise validated, and how productivity yardsticks can be used to guide management decisions (performance standards).

The following recommendations are intended to set forth an initial framework for establishing the cost of services to be provided.

It is recommended that:

1) The stormwater program goals, objectives, and operating policies be consistent throughout Greenville's service area. In the extraterritorial jurisdiction (ETJ), where the City has limited jurisdiction, efforts will be made to work with other local agencies to help ensure that consistent policies are in place throughout the service area;
2) Greenville define its extent of service to include the following:
    a) All storm drainage within City maintained streets, as well as system elements within the City limits, that carry public stormwater from City and State maintained streets;
    b) Drainage structures and pipe systems 15 inches or greater in diameter not carrying runoff from public streets but connected to system elements defined in paragraph (a) above provided that the structures are located solely within single family or duplex development, serve multiple lots and meet minimum standards for material and easement dedication established by the City.
3) A pre-determined level of service be provided equitably to all so defined segments;
4) The City develop and maintain an inventory of the above defined segments so that system maintenance can be addressed on a prioritized manner over time

5) The City move forward with construction of its currently identified, highest priority capital projects;

6) Within the first five years of the stormwater utility, the City develop master plans that will assist in identification and prioritization of needed capital improvements. The identified improvements should then be programmed based on the utility's ability to meet programmatic and financial needs;

7) The City will identify and correct stormwater problems such that similarly situated properties receive a consistent and uniform level of service;

8) The City seek means to comply with stormwater quality regulations such that the City's goal is to meet or exceed applicable water quality regulations, such as the Tar-Pam nutrient strategies and the risk of fines and other penalties is minimized;

9) The City develop stormwater management programs to target known quality-based problems. In doing so, the City should seek partnerships with other organizations within the community, as well as grants and other tools, which will leverage the resources of the community and the utility;

10) The City partner with other jurisdictions in the region to address stormwater problems that impact more than one jurisdiction. This may include implementing an expanded extent of service on a regional or watershed basis, which crosses jurisdictional boundaries.

City of Greenville
Stormwater Management Program
Stormwater Utility Service Fee Rate Study

Overview of Utility Funding

Utility funding is based on an independent revenue stream that is dedicated to a specific purpose, whether it is water supply, wastewater treatment, solid waste management, or stormwater management. Typically, periodic service fees provide the bulk of utility's revenue. A methodology for calculating the service fees must be identified in order to generate that independent revenue stream. In the case of Greenville's stormwater utility, this has been accomplished through the preparation of an analysis titled ***User Fee Rate Methodology***, previously submitted to the City.

A service fee rate methodology should be designed to fit a projected utility program. Stormwater management priorities and costs vary from place to place, but most stormwater programs require capital investment in facilities and equipment and ongoing expenditures for operations and maintenance of the systems and regulatory programs.

Stormwater quality management has been mandated for most urban communities by federal law and Greenville must comply with new regulations beginning in 2003. Utilities often incur non-operating expenses such as operating and emergency reserves and provisions must be made for delinquencies and bad debt in the rate analysis.

Just as local stormwater management programs and costs in other cities and counties vary, the details of stormwater utility service fee rate methodologies also differ. The differences sometimes reflect program goals or priorities, the influence of other policy objectives such as growth management or economic development, technical constraints, or the availability of resources like geographical information systems or other databases.

The demands that each property imposes on the public stormwater systems and programs are the paramount consideration in designing service fee rates. The intensity of development of a property impacts its hydrologic function. Replacing natural land surfaces with "impervious" area (rooftops, paving, etc.) increases the peak rate and total volume of stormwater runoff. Empirical studies over the past thirty years have conclusively demonstrated that the intensity of development also correlates closely with pollutant loadings in stormwater runoff. Therefore, most stormwater service fee rate methodologies reflect development conditions in one way or another.

Two service fee rate methodologies that might be used in Greenville were examined in detail, one based on impervious area and the other based on a combination of the gross (total) property area and the intensity of development of individual properties or classes of properties. The rate methodology analysis examined modifiers that might be applied to the basic rate parameters to attain refinements that enhance equity or reduce the cost of implementation. Secondary funding methods were also identified that could be blended with service fees. After an extensive review and discussion involving the administration, staff, and a citizen advisory committee, an impervious area methodology was identified as the preferred approach in Greenville. The methodology recommended values open space and combined with a recommended credit program for dedication of conservation easements will support long-range goals of greenway development and reduced urban sprawl.

Locally Determined Rate Design Decisions

A key attribute of utility service fee funding is that the Greenville City Council has broad authority to design

its rate methodology to fit local circumstances and practices and achieve an allocation of the cost of services and facilities that it desires. There are no absolute rules or proscriptions and, when utility rates are challenged in court, judges generally defer to the judgment of an elected legislative authority in rate-making issues. The principle constraint courts have applied on that broad authority is that a utility rate methodology must be fair and reasonable and the resulting service fees must bear a substantial relationship to the cost of services and facilities. This is commonly referred to as a rational nexus test. Elected officials may not be arbitrary and capricious in making decisions involving service fee rates, and the selected rate methodology may not be illegally discriminatory in its application.

This last point requires some clarification. The fundamental purpose of a utility service fee rate methodology is to differentiate among customers so that those who place a greater cost burden on the City pay commensurately higher fees. However, service fees may not be structured in ways that would illegally discriminate among customers based on gender, age, religion, race, ethnicity, or other banned characteristics. For example, a wastewater utility might charge cheese processors a higher service fee than residential customers because the peak flow and strength of the effluent they discharge to the public sewer system demands greater conveyance capacity and more expensive treatment, but they couldn't be charged more simply because they were Dutch (or Swiss, or Danish) cheese makers. As long as service fees for similarly situated properties are generally consistent and are calculated in the same manner, and dissimilar properties are treated in like fashion so that there is a demonstrable explanation for resultant variations in service fees, most courts have been reluctant to intervene in local rate decisions.

Menu of Options and Recommended Approach

A "menu" of stormwater rate methodologies, modifying factors, and other funding methods were examined in the ***User Fee Rate Methodology*** analysis. Two basic rate methodologies, six modifying factors, and ten secondary funding methods were considered.

Basic Rate Methodologies

The two rate methodologies examined in detail for Greenville are based on:

- Impervious area;
- Gross area and intensity of development

These are the most common stormwater utility rate methodologies. Surveys indicate they make up about seventy-five (75) percent of all stormwater rate structures in the United States.1 In both cases, they reflect key factors that influence the demand for services and facilities and the costs that a utility incurs.

Impervious Area Methodology:

An impervious area rate methodology is recommended for Greenville. It is based on the definition of a service unit described as an Equivalent Rate Unit, or ERU. Slightly different terms have been used in other communities, such as an equivalent service unit or when the unit value is defined based on the average condition on residential properties an equivalent residential unit. The concept is consistent, however. Regardless of terminology, the purpose of an equivalent unit is to provide a common value for normalizing the service fee calculations for dissimilar properties.

The recommended ERU value in this case is 2,000 square feet of impervious area. The rate methodology would charge each 2,000 square feet of impervious coverage, or increment thereof, the same amount.

[1] Surveys conducted by the National Association of Flood and Stormwater Management Agencies and Black and Veatch, a consulting firm, suggest that approximately one-half of all stormwater rate methodologies are based on impervious area, and about one-quarter are based on gross area and some factor reflecting development intensity.

Thus, a small commercial property, a single-family residence, and a public park all having between 2,000 and 4,000 square feet of impervious coverage would all be charged for two (2) equivalent rate units (ERU).

It is recommended that the equivalency unit serve as the divisor for determining fees for both residential and non-residential parcels in Greenville, applying it to the actual measured impervious coverage of each property. Each property's service fee would be calculated based on the number of impervious units on the subject parcel, multiplied times a charge per ERU as calculated in this ***Service Fee Rate Study*** to recover the cost of service and facilities.

Gross Area and Intensity of Development:

This type of methodology is typically based on the total area of each property and an estimated or measured coefficient of runoff (intensity of development) factor applicable to various categories of land use. Usually anywhere from five to eight descriptive categories of intensity factors are normally used, ranging from "very lightly developed" to "very heavily developed".

The service fee calculation for this methodology often involves normalizing the area of each parcel to a common equivalency unit such as 1,000 square feet or 10,000 square feet. The intensity of development is likewise normalized in terms of values referenced to land use intensity, which are commonly cited in the engineering literature. For example, a land use that typically has a coefficient of runoff for hydrologic analysis of .3 (single-family residential) might serve as the common reference value for all intensities of development. The intensity of other land uses would be related to that reference value. Thus, all multi-family residential properties might be assigned an intensity value of .6. Such properties would be billed at twice the rate of the single-family residential benchmark and any other land uses categorized as having a .3 intensity value. Heavy industrial and commercial properties might be assigned an intensity value of .9 and be billed at three times the rate applied to those with a .3 intensity value for each property area unit. Each property area unit (say, 1,000 or 10,000 square feet) would be considered at that intensity, so that a property of 100,000 square feet would be charged ten (10) times as much as a 10,000 square foot property of the same intensity value. In this type of rate methodology it is common for the intensity value to be estimated and assigned categorically rather than determined by field measurements.

This approach works most effectively when very diverse conditions exist within a service area, for example expansive rural areas as well intensely developed urban areas. It is also frequently used when the more exacting data are not available for establishing an impervious area database. A flat rate for residential properties and/or a base rate are also commonly used with this approach.

Modifying Factors

Rate modifying factors are used to enhance the equity of a service fee, reduce the expense of implementing and maintaining master account file, and otherwise make the basic methodology better in its local application. However, they can also quickly complicate a simple rate methodology, so care must be exercised initially to select only modifying factors that are easily explained and do not increase implementation costs.

A full range of modifying factors that could be applied to the basic impervious area rate methodology recommended for Greenville were examined in the User Fee Rate Methodology report, including:

A simplified or flat-rate charge for single-family residential properties;
Credits against the service fee for mitigative measures such as on-site detention;
A base rate for certain costs which are fixed per account;
Basin-specific capital improvement and floodplain surcharges;
A development and land-use factor; and
A level of service factor.

Only the first three of the modifying factors listed above were judged to be potentially viable in Greenville. One or more of the other modifiers may be worthy of reconsideration in the future.

Modifying factors are particularly valuable for adjusting to anomalous situations where the impervious area data doesn't fully portray the demands a property imposes on the City's stormwater management systems and program. The database assembled for the service fee provides an accurate measurement of the impervious area on every property. This enables the City Council to adopt as detailed a rate methodology as it might wish, but the practical accuracy of the data should not be overstated in the rate design. For example, using the product of the photo-interpretative analysis, service fees could be based on the exact measured amount of impervious area on each property, even to two or three decimal points. But is the data really that accurate? Of course it isn't. It was derived from relatively large-scale aerial photographs and maps, but even those resources are not absolutely precise or accurate. Even though the database provides an impervious area measurement for every parcel, using a range interval equal to the equivalency value of 2,000 square feet is recommended to ensure that the accuracy of that measurement is not overstated. This is akin to billing water usage in increments of 100 cubic feet rather than ounces. It ensures that the vast majority of properties are assigned to the proper grouping, although a few may still fall on the wrong side of the dividing line between 2,00 square foot increments.

Single-family residential parcels provide an opportunity to simplify the rate structure by grouping these properties into tiers. Many communities use a single flat rate for all residential properties, or group like properties together in two or three classes. This is typically done when the data necessary to assign rate units to each single family home does not exist. Now that the impervious area data has been assembled and reviewed, it is recommended that a relatively discrete residential service fee concept be applied in Greenville. The community has a diverse housing stock. It is recommended that the 2,000 square foot (impervious area) ERU value be applied to residences as well as to non-residential properties. When the concept was introduced the Advisory Committee, the option of using just three tiers of residential customers was explored. Doing so would essentially cap the single-family residential fee at the third range of the ERU value. This enhances the efficiency of account management reducing the overhead costs. The Committee recommended the following rate structure for single-family residential properties, using a cap for residential fees of 6,000 square feet of imperviousness:

SFR	Range in Sq. Ft. Impervious	# Equivalent Runoff Units
SFR 1*	>200 – 2,000*	1
SFR 2	2,001-4,000	2
SFR 3	4,001-6,000	3
SFR 4	>6,000	4

Does the impervious data inherently recognize the mitigative on-site measures that each property owner may have installed to reduce the demands the property places on the City's stormwater systems and programs? Not at all. On-site detention systems show up on aerial photographs, but the impervious surface measurement process does not account for the mitigative effect they may or may not have (depending or whether they have been modified since installation and/or don't function effectively). Thus the need for a modifying factor to provide credits for on-site control measures.

Service fee credits are recommended to account for mitigative systems and special activities that reduce the City's cost of providing stormwater management services and facilities. In the case of measures that mitigate increases in peak runoff and total volume discharged from properties as a result of development, it is recommended that the crediting mechanism reflect the hydrologic conditions. If a property with five acres of roofs and paving has an on-site detention system that reduces the peak rate of runoff to that which

would be typical of a property with only one acre of impervious coverage, then the reduced cost of serving that property in terms of system capitalization and operation should be reflected in a reduced service fee. If an owner is willing to dedicate a permanent conservation easement, taking their vacant property out of the potential for development and thereby supporting the City's greenway and open space objectives, then a credit should be granted to adjacent property that has imperviousness on it. If public and/or private schools conduct an educational program that reduces the City's program costs to comply with its National Pollutant Discharge Elimination System (NPDES) permit, the service fee to the school should be credited for that mitigative activity. It is in the utility's interest to encourage and work with its customers to identify opportunities for on-site controls and activities that reduce the public cost of stormwater management by providing appropriate service fee credits.

Based on a detailed ***Cost of Service Analysis*** (submitted separately) and this ***Service Fee Rate Study*** report, it is recommended that the City not adopt a base rate for fixed costs per account as part of the initial service fee rate methodology. The costs of stormwater management are merely estimated at this time, and any allocation of costs to a base rate category would be based on broad general assumptions. The actual cost of service will be much better known within two to three years, at which time the issue of a base rate for fixed costs per account can be revisited.

Secondary Funding Methods

Secondary funding methods that should be included in the program and are evaluated in the rate model include use of bonds for capital improvements projects, continued support from current City resources such as Powell Bill funding, and State Clean Water Trust Fund grants. These resources will enhance the City's capability of addressing a significant capital improvement program backlog and demonstrate a comprehensive effort to address long-standing problems within the drainage system.

Secondary funding methods were considered but are not recommended for inclusion within the utility funding strategy but should be reviewed periodically:

- Special service fees for enhanced levels of service;
- System development charges;
- In lieu-of-construction fees;
- Impact fees; and
- Developer extension/latecomer fees.

Projected Rate Base

A stormwater utility was established by the City Council in May 2001, and the City directed its consultant team to assemble detailed information on the development status of properties throughout Greenville in order to prepare this ***Rate Study*** and implement a service fee master account file. A high level of detail and accuracy was attained in the development of the database using scaled aerial photographs and maps. It provides accurate information on the "rate base" available in the Greenville community to support the stormwater program through service fees.

The rate base comprises the total of all clients that will be served by the stormwater utility. The most identifiable clients, and the largest component of the rate base initially, are the property owners and managers of properties that are served by the City's program to acquire, improve, maintain, operate, and/or regulate the use of the stormwater systems. This includes those with properties at the top of the drainage system and those properties that directly abut major drainage channels, streams and the Tar River. Every property will be "served" in some manner by the City's efforts to control runoff, reduce erosion, and correct water pollution caused by stormwater runoff. The rate base includes tax-exempt, (e.g., churches, East Carolina University and City-owned properties), as well as taxable properties.

The table below summarizes the rate base data for the stormwater service fee. The distribution of approximately thirty percent residential and seventy percent non-residential is consistent with the experiences of other cities using an impervious area rate methodology.

Rate Base Summary

Type of Property	Number of Equivalent Units*	% of Total Equivalent Units
Single-family Residential	22,517	28.1 percent
Other (commercial, industrial, etc.)	57,550	71.9 percent
Total	80,067	100.0 percent

*based on master account file as of 10-1-02

Revenue/Expenditure (Cash Flow) Analysis

The cost and rate base data assembled by the consultant team provides a very accurate basis for projecting the service fees rates necessary to meet the utility's costs of services and facilities and a pro forma cash flow analysis. Because the rate base information is so detailed, complete, and accurate, it allows the City the flexibility of choices. For example, a refined residential service fee structure is proposed that would be based on the impervious area information for each property, allowing the City Council to adopt discrete service fees. Alternatively, the City Council might determine that the residential rate should be capped at some figure.

Assuming that the database is properly maintained as growth continues, it provides an excellent data set for supporting a transitional strategy without incurring substantial added expense as changes are implemented. This might involve a relatively simple initial rate concept for a few years while master planning is underway, shifting to a more refined approach as the stormwater management program evolves. Finally, the data supporting the rate base projection is also very valuable as a watershed master-planning tool. It will enable the City to conduct the sophisticated hydrologic analyses to accurately determine system sizing requirements.

The table on Page 10 of this report summarizes the pro forma cash flow analysis for the stormwater utility. This analysis assumes the recommended impervious area rate methodology. Allowances are made for service fee credits for both on-site mitigative measures and other activities that are beneficial to the utility program plus delinquencies and bad debt.

Annual Operating Expense includes all personnel, supplies, and services. Annual and Bonded Capital Expense includes major equipment, land and easements, and system betterments (construction improvements). It does not include contributed capital (improvements built by developers). Inflation, at an annually compounded rate of three (3) percent, is applied only to Annual Operating Expense. The cost of bonds sales, debt service and related expenses are accounted.

Other Revenues must be deducted from these costs to determine how much of the total revenue requirement must be generated by service fees. These include funds carried forward in the enterprise account from previous years, receipts from bonds sales, other fees and charges (e.g., special inspection fees), interest income, recovered delinquencies, and other resources such as grants and loans.

The Service Fee Revenue Requirement is determined by deducting the Other Revenues from the Total Annual Expenses. The service fee revenue requirement must then be adjusted to account for reduction allowances, including credits, offsets (repayment to the General Fund for the establishment of the utility), delinquencies and bad debt. The Adjusted Service Fee Revenue Requirement is the product of this calculation, recognizing that the rates must be set to generate excess revenue sufficient to meet the Service Fee Revenue Requirement.

The number of Equivalent Rate Units (ERU) is estimated from the master account file database. The Service Fee Rate per ERU per Month is set to meet the revenue requirement and also meet a year-end fund balance allowance test to ensure sufficient tolerance for any significant change in financial conditions of the utility. The revenue created by the service fee and the year-end fund balance is projected. A year-end fund balance of this magnitude is a prudent and common provision for municipal utilities. It provides a cushion against seasonal variations in expenditures and short-term revenue shortfalls.

The Rate Model calculates that a service fee of $2.85/ERU/month could be held constant for five years. Charges to non-residential properties having between the minimum threshold of 200 square feet and 2,000 square feet of impervious area (1 ERU) would initially be billed $1.88/month. Properties with 2,000 to 4,000 square feet of impervious area would have two ERU, and would be charged $5.70/month, and so on. It is proposed that all non-residential properties be billed $2.85/month for each ERU. Under this rate schedule each acre of impervious area would cost $62.07/month. This amounts to $.017 per square foot of impervious area per year.

The projected service fee rates are generally consistent with the experiences of stormwater utilities nationally, which typically charge between $3 and $4/month for residential properties when the utility is initially implemented. The impervious area methodology is the most commonly used approach among stormwater utilities, and the charge per square foot of impervious coverage is within the norm of $.01 to $.02 per square foot per year that usually results from an impervious area rate methodology. Many cities and counties have adopted a flat-rate service fee for all single-family residential properties, often because they lack sufficiently accurate data to support a more refined approach. In Greenville's case, the data that was generated during this project allows a more discrete rate structure for single-family residential properties.

Summary of Program Activities for Five-Year Planning Period:

The Cost of Service addresses currently funded programs within the Public Works Department and additional services to build a comprehensive set of programs to accomplish the priorities and goals for stormwater management in Greenville. The Cost of Service report provides further detail on these issues. Attached to this report is the summary table of costs, allocated on a program basis for the planning period. The objectives and priorities funded include:

Compliance with federal and state water quality regulations.
Construction of major capital improvements to improve drainage system performance.
Improve maintenance of the drainage system, focusing on water quality and water quality objectives.
Increased regulatory controls, primarily addressing imposed federal and state regulations but also providing a higher level of service to the development community.
Public outreach and education

Summary of Revenues and Expenses:

The Pro Forma Cash Analysis follows this section and provides a complete picture of the rate model. A summary of primary revenues and expenditures by broad categories gives a general outlook for how the stormwater management program will evolve.

	Year One	Year Two	Year Three	Year Four	Year Five
Revenues:					
Service Fee	2,738,291	2,779,336	2,821,056	2,863,372	2,906,323
Powell Bill	535,699	551,739	568,291	585,340	602,900
CWTF Grant	360,000	629,000	160,000		
Bonds	-0-	1,945,000	1,300,000	1,300,000	-0-
Expenditures					
Operating	2,078,780	2,303,942	2,198,663	1,978,155	1,896,461
Capital	1,155,000	3,224,000	2,190,000	2,030,000	1,200,000
Bond Payment		390,000	390,000	390,000	390,000
Reserves	115,197	109,933	98,908	109,933	100,000
GF Payback	105,000	105,000	105,000	105,000	105,000

Pro Forma Cash Flow Analysis

	Year 1	Year 2	Year 3	Year 4	Year 5
Expenses					
Annual Operating Expense	2,078,780	2,303,942	2,198,663	1,978,155	1,896,461
Annual and Bonded Capital Expense	1,155,000	3,224,000	2,190,000	2,030,000	1,200,000
Subtotal: with Inflation [2]	3,233,780	5,527,942	4,388,663	4,008,155	3,096,461
Bond Sale Costs and Debt Service	0	145,000	390,000	390,000	390,000
Operating Reserve	115,197	109,933	98,908	109,933	100,000
Total Program Expenses	3,348,977	5,782,875	4,877,571	4,508,088	3,586,461
Other Revenues					
Funds Carried Forward	0	158,964	152,025	1,039	204,657
Bond Sales Receipts	0	1,945,000	1,300,000	1,300,000	0
Other Fees and Charges	12,000	12,000	12,000	12,000	12,000
Interest Income	95,840	82,149	83,381	84,632	85,901
Recovered Delinquencies	0	74,846	65,034	39,606	40,200
Other Resources (Grants/Loans/Powell Bill)	895,669	1,180,738	728,291	585,340	602,900
Total Other Revenues	1,003,509	3,453,697	2,340,731	2,022,617	945,658
Service Fee Revenue Requirement	2,354,468	2,398,297	2,603,800	2,544,815	2,697,697
Revenue Reduction Allowances					
Delinquencies and Bad Debt	78,785	68,457	41,690	42,316	42,951
Credits and Offsets	146,074	160,587	175,526	176,584	177,658
Total Reductions	224,859	229,044	217,216	218,900	220,609
Adjusted Service Fee Revenue Requirement	2,579,328	2,627,341	2,280,017	2,658,716	2,813,306
Number of ERU	80,067	81,268	82,487	83,724	84,890
Service Fee Rate/ERU/Month	2.85	2.85	2.85	2.85	2.85
Annual Service Fee Revenue	2,738,291	2,779,336	2,821,056	2,863,372	2,906,323
Year-end Fund Balance	158,964	152,052	1,039	204,657	93,017
Fund Balance: % of Operating Costs [3]	6.9%	6.9%	0.1%	10.8%	7.2%

[2] Inflation estimated at 3 % per year, compounded, beginning in Year 2.

[3] Fund Balance as Percent of the Next Year's Annual Operating Expense

Greenville North Carolina

Stormwater Cost of Service Analysis/Rate Model

Cost of Service Analysis; All Costs, Summary by Cost Subcategory by Year

Major Cost Category	Year 1	Year 2	Year 3	Year 4	Year 5
Cost Subcategory					
Administration					
General Stormwater Program Administration	$ 1,672.25	$ 13,267.80	$ 9,043.50	$ 12,372.37	$ 9,781.45
Billing, Finance and Customer Services	$ 95,597.13	$ 81,535.93	$ 80,744.36	$ 80,796.05	$ 84,885.10
Legal Support Services	$ 20,000.00	$ 20,000.00	$ -	$ -	$ -
Personnel Services	$ -	$ -	$ -	$ -	$ -
Administrative Support Services	$ 14,545.00	$ 10,545.00	$ 10,545.00	$ 10,545.00	$ 10,545.00
Program Planning and Development	$ 1,672.25	$ -	$ -	$ -	$ -
Inter-agency Coordination	$ 1,672.25	$ -	$ -	$ -	$ -
Public Education Programs - General	$ 15,879.26	$ 17,563.84	$ 18,617.40	$ 19,751.14	$ 21,998.39
Stormwater Advisory Committee Support	$ 1,758.51	$ 1,828.85	$ 1,902.00	$ 989.04	$ 2,057.21
Indirect Cost Allocations	$ -	$ -	$ -	$ -	$ -
Unspecified Overhead	$ 21,640.00	$ 21,640.00	$ 21,640.00	$ 21,640.00	$ 21,640.00
Cost and Rate Analysis	$ -	$ -	$ -	$ -	$ 50,000.00
Emergency/disaster Management	$ 1,672.25	$ 1,739.13	$ 857.70	$ 1,881.05	$ 4,013.50
Subtotal:	$ 176,108.87	$ 168,120.56	$ 143,349.96	$ 147,974.64	$ 204,920.64
Engineering and Master Planning					
Stormwater Quantity Master Planning	$ 185,740.20	$ 410,075.95	$ 213,331.99	$ 213,865.27	$ 14,419.88
System/project Design Engineering	$ 55,102.43	$ 10,075.95	$ 13,331.99	$ 10,898.14	$ 14,419.88
Maintenance and Field Engineering Support	$ 6,516.45	$ 5,037.97	$ 4,288.49	$ 5,449.07	$ 4,638.43
GIS, Database, and Mapping	$ 73,634.22	$ 65,258.06	$ 72,358.38	$ 72,542.71	$ 161,064.42
Technical Services/Public Assistance	$ 30,348.59	$ 6,801.82	$ 10,057.89	$ 25,335.16	$ 6,622.57
Best Management Practice Analysis/Design	$ 7,827.84	$ 7,316.24	$ 6,657.89	$ 5,935.16	$ 11,315.59
Design Criteria and Design Manual	$ 63,430.47	$ 9,161.52	$ 9,527.98	$ 9,909.10	$ 14,419.88
Field Data Collection	$ 111,654.28	$ 213,769.87	$ 264,320.67	$ 14,893.49	$ 15,489.23
Hazard Mitigation Planning	$ 4,051.22	$ -	$ -	$ -	$ -
Code Development and Zoning Support Services	$ 879.26	$ 1,649.42	$ 1,715.40	$ 2,773.05	$ 1,855.37
Mutliuse Planning and Design	$ 4,930.47	$ 1,649.42	$ 1,715.40	$ 2,773.05	$ 3,912.58
Flood Insurance and Community Rating System	$ 3,344.49	$ 1,649.42	$ 1,715.40	$ 2,773.05	$ 1,855.37
Infrastructure Management Planning	$ 6,516.45	$ 1,828.85	$ 4,755.01	$ 3,956.17	$ 5,143.02
Subtotal:	$ 553,976.35	$ 734,274.48	$ 603,776.48	$ 371,103.45	$ 255,156.24
Operations					
Operations and Maintenance Management	$ 105,763.09	$ 62,418.60	$ 62,418.60	$ 62,418.60	$ 62,418.60
Storm Sewer and Culvert Maintenance	$ 49,680.00	$ 49,680.00	$ 49,680.00	$ 49,680.00	$ 49,680.00
Remedial Repair and Replacement	$ 68,850.00	$ 68,850.00	$ 68,850.00	$ 68,850.00	$ 68,850.00
Inlet, Catch Basin, and Manhole Cleaning	$ 158,700.00	$ 158,700.00	$ 158,700.00	$ 158,700.00	$ 158,700.00
Erosion and Sediment Control	$ 1,585.98	$ -	$ -	$ -	$ -
Detention/retention System Maintenance	$ -	$ -	$ -	$ -	$ -
Ditch and Channel Maintenance	$ 360,447.50	$ 360,447.50	$ 560,447.50	$ 560,447.50	$ 560,447.50
Curb and Gutter Maintenance	$ 237,110.00	$ 328,975.00	$ 186,975.00	$ 186,975.00	$ 186,975.00
Infrastructure Management Program	$ 8,025.48	$ 7,366.27	$ 10,358.41	$ 8,639.14	$ 10,886.39
Public Assistance Program	$ -	$ 2,474.13	$ 2,573.09	$ 2,676.02	$ 2,783.06
Emergency Response	$ 4,223.75	$ 1,649.42	$ 1,715.40	$ 1,784.01	$ 1,855.37
Subtotal:	$ 994,385.80	$ 1,040,560.92	$ 1,101,718.00	$ 1,100,170.27	$ 1,102,595.92
Regulation/Enforcement					
Code Development and Enforcement	$ 14,752.59	$ 15,945.69	$ 19,304.52	$ 16,977.58	$ 20,610.49
Stormwater Permit Administration	$ 4,895.64	$ 5,826.46	$ 8,912.52	$ 6,301.90	$ 9,639.79
Drainage System Inspection and Regulation	$ 31,732.56	$ 33,736.86	$ 34,135.33	$ 35,500.74	$ 36,920.77
Zoning and Land Use Regulation Support	$ 31,732.56	$ 32,087.44	$ 34,321.94	$ 33,716.73	$ 35,065.40
Special Inspection Programs	$ 2,737.80	$ 2,847.31	$ 2,961.20	$ 3,079.65	$ 3,202.84
Dumping Regulation Program	$ 2,737.80	$ 3,672.02	$ 3,818.90	$ 3,971.66	$ 4,130.52
Floodplain Management	$ 4,396.28	$ 3,478.27	$ 6,470.41	$ 2,773.05	$ 4,941.18
Erosion/sediment Control Regulation	$ 92,789.96	$ 72,315.83	$ 77,110.47	$ 79,205.84	$ 83,402.68
Subtotal:	$ 185,775.18	$ 169,909.87	$ 187,035.29	$ 181,527.15	$ 197,913.67
Capital Improvements					
Capital Improvement Project Management	$ 29,517.02	$ 18,562.50	$ 16,331.99	$ 19,365.27	$ 35,062.67
Major Capital Projects	$ 762,481.97	$ 2,631,781.25	$ 1,619,043.50	$ 1,309,405.24	$ 509,781.45
Small Capital Projects	$ 406,602.72	$ 607,781.25	$ 586,190.49	$ 738,416.20	$ 707,724.24
Land, Easement, and Rights Acquisition	$ 3,517.02	$ 8,695.67	$ 6,190.49	$ 7,427.16	$ 6,695.64
Subtotal:	$ 1,202,118.73	$ 3,266,820.67	$ 2,227,756.48	$ 2,074,613.87	$ 1,259,264.01
Stormwater Quality					
Stormwater Quality Master Planning	$ 30,723.46	$ 37,819.22	$ 13,331.99	$ 13,865.27	$ 9,276.86
NPDES Administration and Reporting	$ 7,443.43	$ 12,305.29	$ 8,985.49	$ 10,325.95	$ 13,816.80
Watershed Assessment	$ 1,758.51	$ 4,123.55	$ 6,190.49	$ 6,438.11	$ 9,781.45
Water Quality Monitoring	$ -	$ -	$ -	$ -	$ -
Best Management Practices Development	$ 14,380.34	$ 10,276.44	$ 9,736.49	$ 12,104.04	$ 9,502.39
Water Quality Retrofitting Program	$ -	$ 5,037.97	$ 6,190.49	$ 6,438.11	$ 5,667.03
Installation of BMPs	$ 1,311.39	$ 5,487.39	$ 5,706.89	$ 8,902.29	$ 6,172.57
Illicit Connections and Illegal Dumping Program	$ 37,329.69	$ 35,973.46	$ 35,261.39	$ 36,460.89	$ 35,690.72
General Commercial/Residential Program	$ 655.70	$ 1,506.63	$ 1,566.90	$ 1,629.57	$ 1,694.76
Pesticide, Herbicide, and Fertilizer Program	$ -	$ -	$ -	$ -	$ -
Toxic and Hazardous Materials Control Program	$ -	$ 824.71	$ 857.70	$ 892.01	$ 927.69
Spill Response and Cleanup Program	$ 1,311.39	$ 2,188.56	$ 2,276.10	$ 2,367.14	$ 2,461.83
Industrial Runoff Control Program	$ 2,897.37	$ 1,363.85	$ 1,418.40	$ 1,475.14	$ 1,534.14
Public Education Program	$ 29,051.22	$ 26,739.13	$ 27,759.70	$ 25,892.01	$ 25,927.69
Groundwater and Drinking Water Program	$ -	$ -	$ -	$ -	$ -
Septic, Inflow, and Infiltration Program	$ 655.70	$ 681.92	$ 709.20	$ 737.57	$ 767.07
Emergency Response	$ 2,897.37	$ 3,927.69	$ 5,035.80	$ 5,237.23	$ 3,389.51
Habitat Assessment	$ -	$ -	$ -	$ -	$ -
Subtotal:	$ 130,415.55	$ 148,255.81	$ 125,027.04	$ 132,765.33	$ 126,610.51
TOTAL:	$ 3,242,780.47	$ 5,527,942.31	$ 4,388,663.25	$ 4,008,154.72	$ 3,146,461.00