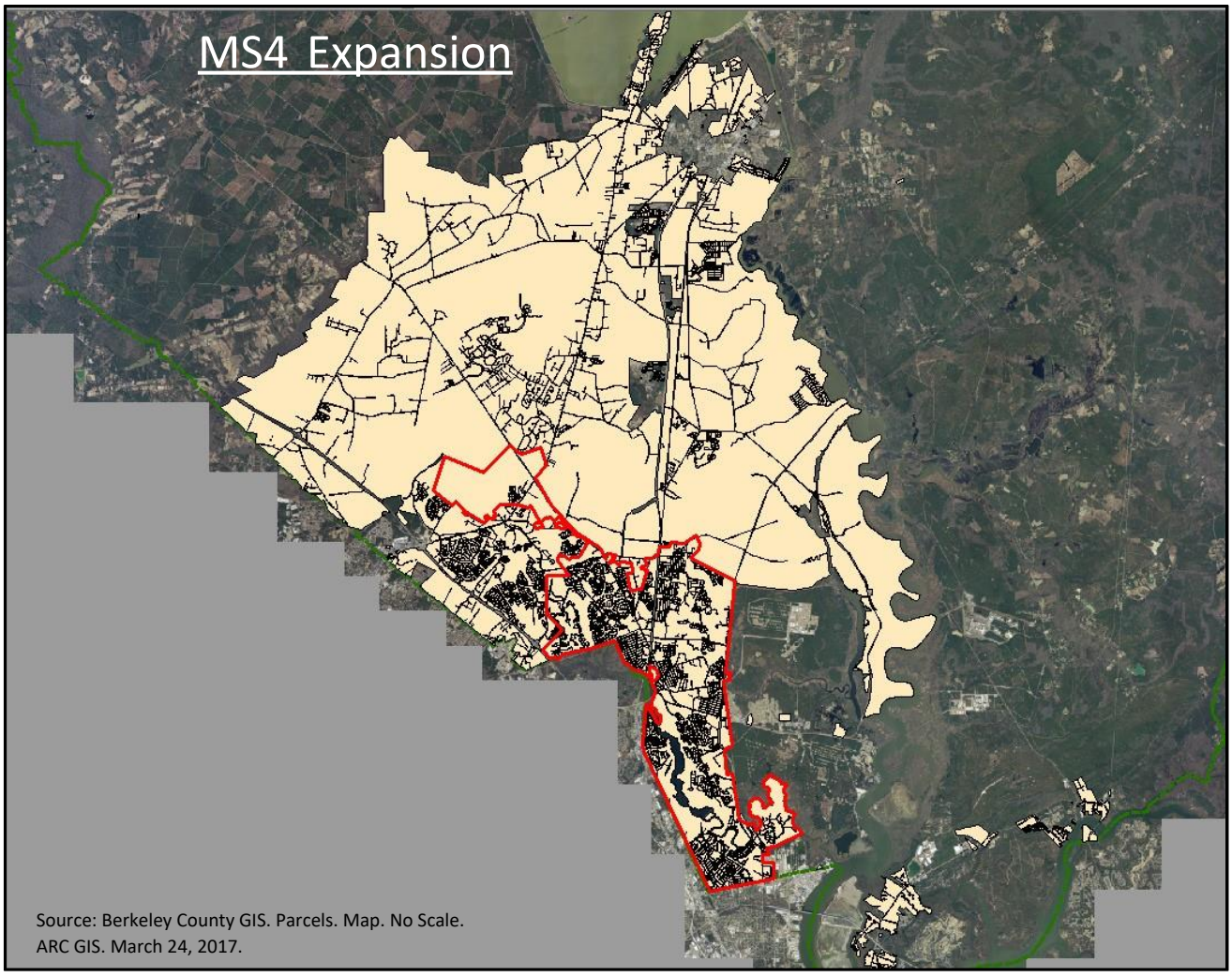
Berkeley County
Permanent Stormwater Utility Rate Study Report

Date: March 26, 2018

1.0 Stormwater Management Utility Rate Study Overview and Scope

Like many regulated Municipal Separate Storm Sewer Systems (MS4s) across the country, Berkeley County is currently faced with the challenge of paying for increasing federally mandated laws, stormwater requirements pursuant to a National Pollutant Discharge Elimination System (NPDES) permit, and the necessary improvements to aging stormwater infrastructure that contribute to flooding, water quality issues, and downstream degradation. Currently, the County operates its stormwater management program through an interim rate of fees collected and established by Berkeley County Ordinance #14-07-21 and adopted the 28th day of July 2014. However, the interim fee structure is not based on the actual area of impervious surfaces generating stormwater runoff from residential and non-residential parcels throughout the County. Additionally, as SCDHEC updates MS4 Permit coverages, regulated local governments are being forced to meet more stringent water quality and quantity requirements. A greater demand has also been placed on Berkeley County's stormwater management program because of recent Inter-Governmental Agreements (IGAs) with the City of Goose Creek and the City of Hanahan. The incorporation of these municipalities, excluding the Naval Weapons Station, effective 2015, increased the stormwater programs service area by approximately 15% (25 square miles), contributing to an increase of approximately 1.2 billion gallons of additional stormwater runoff during any given, one (1) year design storm event (see map on following page for increased area).

The County was tasked by County Council, within the existing ordinance, to determine the amount of impervious areas associated with the development of a Permanent Stormwater Management Utility Fee and Classification system. Impervious surfaces are accounted for in private walkways, parking lots, driveways, rooftops, patios, sheds, etc. The impervious rate methodology establishes a direct correlation between the amount of impervious area within a parcel and the amount of runoff from the parcel. In this method, the impervious area on a typical residential parcel is used as the basis for the calculation. This is called the Equivalent Residential Unit (ERU). The ERU method was then considered as the basis, by staff, for calculation of stormwater utility fees for non-residential and residential properties.


MS4 Expansion
Source: Berkeley County GIS. Parcels. Map. No Scale.
ARC GIS. March 24, 2017.

1.1 Federal Mandates and Regulations

The Clean Water Act (CWA), through the United State Congress, was amended in 1987 to include Chapter 402(p). Chapter 402(p), as amended, specifically addresses water quality impacts from large to medium MS4s and industrial facilities. Additionally, Congress directed the Environmental Protection Agency (EPA) to issue supplementary regulations under the NPDES program to identify and regulate other stormwater discharges thought to be contributing to water quality impairments across the country.

The NPDES stormwater program was expanded through regulations issued by the EPA in 1999. Through expansion of regulation, the NPDES program now includes discharges from small MS4s in urbanized areas, serving populations of less than 100,000 and stormwater discharges from construction activities that disturb more than one (1) acre of land. These issued regulations are known as the NPDES Phase II Stormwater Program. On January 30, 2006, the South Carolina Department of Health and Environmental Control (SCDHEC) issued the NPDES General Permit from Regulated Small MS4s. The County is considered a regulated MS4 and must comply with NPDES permit requirements. On July 1, 2008, the County was granted permission to discharge stormwater to receiving waters of the State of South Carolina, subject to Permit requirements. The Permit requires the County to develop, implement and enforce a stormwater management program to reduce discharge of pollutants from our MS4 to the maximum extent practicable (MEP), to protect water quality, and to satisfy the appropriate water quality requirements of the CWA. On January 1, 2014, SCDHEC issued the second cycle MS4 Permit with additional stormwater management requirements.

1.2 Penalties for non-compliance with the Permit

South Carolina, under Code Section 48-1-330, may issue civil fines to the County of not less than $500 or more than $25,000 for each day's violation and/or shall subject the County to a civil penalty not to exceed $10,000 per day for violating any of the provisions of the chapter, or any rule or regulation, permit or permit condition, final determination or order of the Department. South Carolina, under Code 48-1-320, may issue criminal penalties that consist of being imprisoned for not more than two years, or both. Additionally, sanctions for violations of the CWA may be imposed on the County in accordance with provisions of 40 CFR Part 122.41 (a)(2) and (3). To deal with potential violations, EPA has 3 types of enforcement actions. These include Administrative Orders, Criminal Penalties, and Criminal Prosecutions. Depending on the severity of the violation, monetary fines may range from $2,500/day/violation not to exceed as much as $125,000/day/violation. The most severe individual penalty is imprisonment for not more than 30 years and/or a fine of $500,000. Organizations may be subject to fines of not more than $2,000,000. Failure to comply with Permit conditions or the provisions of the regulation may subject the County to penalties and criminal sanctions.

1.3 Setting the Stormwater Management Utility Rate Structure in a Fair, Equitable, and Defensible Manner

The County is granted authority to establish a stormwater utility fee via South Carolina Code Section 48-14-120. It is designated within Code Section 48-14-120 that the utility fee is to fund such activities as, but not limited to, watershed master planning, facility retrofitting, infrastructure maintenance, and water

quality monitoring. Funding may be generated for a utility through the establishment of a fee system or tax assessment that is reasonable and equitable.

Local governing bodies have the discretion to establish ordinances that they deem necessary and fair. Therefore, the lawfulness of the ordinance established rules, unless it is overcome by arbitrariness, or by external indication that can clearly establish that the ordinance is unreasonable. Thus, for a lawsuit against a utility to prevail, the ordinance establishing the utility must be considered clearly and apparently inequitable, or the plaintiff must present evidence that clearly proves the ordinance is inequitable.

Applying this standard of review to the existing interim utility rate ordinance, the argument that the existing interim rate may be inequitable could be asserted. It could be asserted that since the existing utility ordinance contains five categories of fees, but does not differentiate between properties within each category based on other factors, such as impervious area, that little correlation exists between the fees and a property's contribution to stormwater runoff.

Currently, the ordinance states; “Berkeley County property owners and users should finance the stormwater management system to the extent they contribute to the need for the system and benefit from the system, and charges therefore should bear a reasonable relationship to the cost of the service, and every effort should be made to fairly and reasonably spread the cost of the system to all property owners and users”. This language can easily be interpreted to indicate there is a form of individualized treatment for the different property owners in the County, based upon the extent of contribution to the need for the system. The ordinance, initially created as a temporary measure to generate funds for an impervious surface rate study to be utilized for establishing a permanent rate structure, authorizes a form of flat-rate stormwater management fees for all parcels based on their respective use. The flat-rate concept implemented for each of the five property classes, would appear to ignore the concept of individualized treatment. Therefore, establishing a permanent utility fee, that utilizes an impervious surface methodology in the fee structure, would be an adequate replacement for the flat-rate concept. A permanent rate impervious surface fee structure ensures that the charges will be based upon contributions to the need for the system and benefits from the system.

The impervious rate methodology is the most commonly used methodology in South Carolina, and nationally, and has been tested in South Carolina and adjacent states. For example, the impervious rate methodology was upheld by the Georgia Supreme Court’s ruling in 2004 for Columbia County’s Stormwater Utility. The Supreme Court of North Carolina also upheld the impervious surface rate methodology in Smith Chapel Baptist Church v. City of Durham. Courts tend to be reluctant to second guess this methodology if it is based on the best available data and accepted professional methodologies.

2.0 STORMWATER MANAGEMENT PROGRAM & ASSOCIATED COST

Regulated MS4s in South Carolina under the NPDES Phase II MS4 General Permit are authorized to discharge stormwater to waters of the state of South Carolina. To be in compliance with the MS4 Permit, a MS4 is required to develop, implement, and enforce a Stormwater Management Plan (SWMP). The Permit states; "the SWMP should be designed to reduce the discharge of pollutants from the Small MS4 to the MEP, to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act." The Permit goes on to state; "The SWMP shall include management practices; control techniques and system, design, and engineering methods; and such other provisions as the Department determines appropriate for the control of such pollutants."

The management practices and control techniques, per the Permit, are designed to be implemented under a MS4 Program that contains elements called Minimum Control Measures (MCMs) that when implemented should result in significant reduction in pollutants discharged into receiving waters. The following list indicates the 6 MCMs and permit requirements of each MCM to be implemented through the County's SWMP.

MINIMUM CONTROL MEASURES

MCM #1: PUBLIC EDUCATION AND OUTREACH ON STORMWATER IMPACTS

PERMIT REQUIREMENT- WITHIN FIRST YEAR OF COVERAGE, PERMITTEES SHALL CONTINUE TO IMPLEMENT, AND REVISE IF NECESSARY, A COMPREHENSIVE STORMWATER EDUCATION/OUTREACH PROGRAM.

MCM #2: PUBLIC INVOLVEMENT/PARTICIPATION

PERMIT REQUIREMENT- INVOLVE THE PUBLIC IN THE PLANNING AND IMPLEMENTATION OF ACTIVITIES RELATED TO THE DEVELOPMENT AND IMPLEMENTATION OF THE SWMP. PROVIDE A FORUM AND A STRUCTURE BY WHICH TO ENCOURAGE, OR TO ALLOW, THE PUBLIC TO PARTICIPATE.

MCM #3: ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

PERMIT REQUIREMENT- PERMITTEES SHALL DEVELOP, IMPLEMENT AND ENFORCE A PROGRAM TO DETECT AND ELIMINATE ILLICIT DISCHARGES INTO THE SMALL MS4.

MCM #4: CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

PERMIT REQUIREMENT- DEVELOP, IMPLEMENT, AND ENFORCE A PROGRAM TO REDUCE POLLUTANTS IN ANY STORMWATER RUNOFF TO OUR SMALL MS4 FROM CONSTRUCTION ACTIVITIES THAT RESULT IN LAND DISTURBANCE OF GREATER THAN OR EQUAL TO ONE ACRE.

MCM #5: POST-CONSTRUCTION STORMWATER MANAGEMENT FOR NEW DEVELOPMENT AND REDEVELOPMENT

PERMIT REQUIREMENT- IMPLEMENT A PROGRAM TO CONTROL STORMWATER DISCHARGES FROM NEW DEVELOPMENT AND REDEVELOPED SITES THAT DISTURB AT LEAST ONE ACRE (INCLUDING PROJECTS THAT DISTURB LESS THAN ONE ACRE THAT ARE PART OF A LARGER COMMON PLAN OF DEVELOPMENT OR SALE, LCP) THAT DISCHARGE INTO A SMALL MS4. THE PROGRAM MUST APPLY TO PRIVATE AND PUBLIC DEVELOPMENT SITES, INCLUDING ROADS.

MCM #6: POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

PERMIT REQUIREMENT- DEVELOP AND IMPLEMENT AN OPERATION AND MAINTENANCE PROGRAM THAT INCLUDES A TRAINING COMPONENT AND HAS THE GOAL OF PREVENTING OR REDUCING POLLUTANT RUNOFF FROM MUNICIPAL OPERATIONS AS AN INTEGRAL PART OF THE SWMP.

Based on regulatory requirements, placed on the County, capital improvement needs, and operational/maintenance cost, it is estimated that fiscal year 17/18 cost to successfully meet the minimum permit requirements and administer the stormwater management program will be on the order of $3,994,737.00 (Appendix A). The estimated cost to appropriately administer the stormwater management program, is an increase over historical cost to the program, by approximately thirty- eight (38) percent. Thus, the potential permanent utility fee, to be generated during fiscal year 18/19, will be an estimated increase of approximately thirty (30) percent over the current fee. It should be noted, the new estimated potential fee generated takes into consideration the potential implementation of a credit policy, designed utilizing a Cost Allocation Analysis (Appendix B) and considers that there is a historical average of approximately ten (10) percent non-payment. It is the responsibility of the County Engineer and County Council to set the fee and budget for the County's stormwater management program.

2.1 Cost Allocation Analysis & Potential Credit Policy

The purpose for conducting the Cost Allocation Analysis (Appendix B) was to identify the proportionate share of costs between billed property vs. non-billed property, in the event a credit policy be implemented by County Council. The allocation analysis also provides a cost-based approach for calculating a potential credit policy for properties that meet established criteria of self-containment of runoff, documented stormwater facility maintenance practices, implementation of water quality education programs, etc. designated as Stormwater Control Measures (SCMs). It should be understood, there is a holistic benefit of stormwater management provided by Berkeley County stormwater staff that is universally applied to each property class, billed & non-billed, in the County. Based on the Cost Allocation Analysis, approximately 44% of Berkeley County's stormwater management program expenses are contributed to non-billed properties. Thus, the billed property owners subsidize the cost of the non-billed properties. With universal benefits of the stormwater system and stormwater management program, there are universal costs that should be equally borne by all fee payers

Under the proposed credit policy, established via the Cost Allocation Analysis, non-residential property owners who voluntarily install stormwater control measures to reduce runoff impacts would be eligible to receive a stormwater fee credit allowance. The proposed Utility Fee Credit Manual and Cost Allocation Analysis takes into consideration that there are universal benefits enjoyed by all properties within Berkeley County. The universal benefits received, come at the expense of costs allocated to Berkeley County's stormwater management program. In the event a credit policy is implemented, Berkeley County is proposing to cap the stormwater fee credits to balance the universal costs all fee payers have in common—the replacement of aging infrastructure and compliance with SCDHEC and EPA water quantity/quality requirements. In the event, Berkeley County implements a credit policy, Stormwater Staff proposes to cap the maximum amount of fee credit possible across the County at 20% of the total monetary value of potential fees generated. Applying a cap for fee payers will allow the Berkeley County stormwater management program to provide the universal benefits necessary for Berkeley County residents.

With the Cost Allocation Analysis identifying the maximum amount of credit a non-residential property owner can receive and applying to the credit policy, the stormwater management program will be allowed to fully and fairly recover necessary program costs associated with the management of stormwater. It should be noted that all property owners will benefit from the stormwater management program's actions, with an approved forty-two (42) percent cap on non-residential fee rates that will be applied back to the users of the system, utilizing stormwater control measures, as fee credits.

2.2 Stormwater Management Program Funding Feasibility

In 2014, Berkeley County, evaluated the feasibility of expanding its stormwater management program through implementation of an interim rate of fees collected and established by Berkeley County Ordinance #14-07-21. The expansion of the stormwater management program came amidst growing concerns of how to address regulatory compliance issues related to the NPDES MS4 Permit, the need for a more proactive approach to operations and maintenance (O&M) programs to address aging infrastructure, and the expansion of the stormwater drainage system throughout the County and MS4. Additionally, the County needed to take the necessary steps and precautions in addressing capital drainage improvement projects, that promote water quantity and quality.

The stormwater management program has reviewed historical trends associated with program permit requirements, O&M necessities, and capital program needs since the implementation of the interim stormwater utility fee, to identify future program funding requirements and the feasibility of a proposed permanent utility rate, utilizing an impervious surface rate methodology. A Feasibility Analysis of the permanent rate structure's ability to meet program requirements and needs considered the following;

1. Future stormwater management program infrastructure needs, permit priorities, and estimated costs associated with each.
2. Funding methods identified within later sections of this report.
3. Legal implications associated with the implementation of the interim and permanent stormwater utility fee.
4. Recommendations from the Stormwater Advisory Capital Improvements Board and potential implementation schedules for recommendations.

Historically, Berkeley County's stormwater management program has utilized a blend of funding options that originated with funds from the General Fund, that were later usurped by the interim stormwater utility fee. It should be noted; the General Fund was reimbursed by the Stormwater Utility after implementation of the interim stormwater utility fee and that jurisdictions of Goose Creek and Hanahan were added to the revenue source in 2015 through Intergovernmental Agreements (IGAs). Historical funds collected since the inception of the interim stormwater utility fee are shown below.

Historical & Projected Funds Generated:

Year	Billed	Collected	Percent Collected
2014-2015	$1,708,902.00	$1,395,468.00	81.65%
2015-2016	$2,423,310.00	$2,163,657.00	89.29%
2016-2017	$2,499,012.00	$2,290,150.00	91.64%
2017-2018	$2,549,952.00	*$2,273,130.00	*89.14%

*doesn't include delinquent stormwater fees paid.

The interim stormwater utility fee source has generated a fund balance of approximately 3.6 million dollars ending fiscal year 2017 (06/30/2017). The following indicates historical projected expenditures versus actual expenditures, and were used for assuming the feasibility of a permanent stormwater utility rate, utilizing an impervious surface rate methodology.

Historical & Projected Program Expenditures:

Fiscal Year	Projected Expenditures	Actual Expenditures	Percentage of Actual to Projected
13/14	$551,242.00	$249,910.65	45.33%
14/15	$1,049,829.14	$641,320.36	61.08%
15/16	$1,654,428.00	$675,588.00	40.83%
16/17	$2,465,393.00	$1,187,315.18	48.16%
17/18	$3,994,737.00	*$2,590,790.50	*64.85%

*projection based on historical averages and additional cost of Operation & Maintenance activities.

Stormwater management program cost for FY17/18 are projected to be on the order of $3,994,737.00 with an enhanced stormwater management program that includes the allocation of funding to the Roads & Bridges program for utilization on stormwater management program activities. This allocation of funds will help to address drainage system O&M issues and assist with future development of expanding infrastructure. Additionally, identification of priority capital improvement projects and compliance with applicable regulatory requirements, such as the good housekeeping requirements of MCM #6 are incorporated into the enhancements of the stormwater management program. When applying historical trends for percent utilized of projected, it is estimated that the stormwater management program projects to utilize approximately $2,590,790.50 during FY17/18.

Future stormwater management program fees generated for year 2018-2019, when utilizing a permanent utility fee associated with impervious surface methodology is expected to be commensurate to $4,644,468.00. This future projected fee generated will take into consideration a multitude of factors, when identifying a net amount, that includes a potential fee of $3.00/ERU, a historical rate of non-payment of approximately ten (10) percent, and the potential implementation of a credit policy, that when fully implemented will account for an approximate twenty (20) percent reduction in fee revenue generated. When incorporating all aforementioned factors into a projection for collection of fees, the stormwater management program estimates an approximate collection of approximately $3,344,016.96 with credit policy implementation. Furthermore, the stormwater management program estimates a collection of approximately $4,180,021.20 without implementation of a credit policy.

When utilizing historical percent increases for projected expenditures, it can be estimated that stormwater management program expenses, around the beginning of SCDHEC's NPDES MS4 Permit cycle (January 1, 2019), will be on the order of $6,567,747.10. If historical trends for percent of "actual to projected" persist, then the stormwater management program projects that approximately $4,585,835.71 will be spent within the FY18/19 cycle (ending 06/30/2019). Furthermore, over the course of that same time, the stormwater management program projects that net revenues will be on the order of $4,171,020.14 for year 2018-2019 when utilizing an increase of percent collected, an assumption of 50% implementation of the credit policy, and an addition of other nominal fees collected by the utility. This projection results in the need to potentially utilize approximately $414,815.57 of the utility's existing fund balance in the second half of 2019. However, considering a utility program without the implementation of a credit policy, the stormwater management program projects that net revenues will be on the order of $4589,038.46 for year 2018-2019 when utilizing an increase of percent collected and an addition of other nominal fees collected by the utility. The projection without a credit policy implemented for 2019 appears to be a wash for revenues versus expenditures. In either scenario, the proposed permanent fee utilizing an impervious surface model would appear to be a feasible funding mechanism that supports the stormwater management program's growth and enhanced services provided to the property owners of Berkeley County.

3.0 PROPOSED PERMANENT STORMWATER UTILITY RATE and RATE STRUCTURE

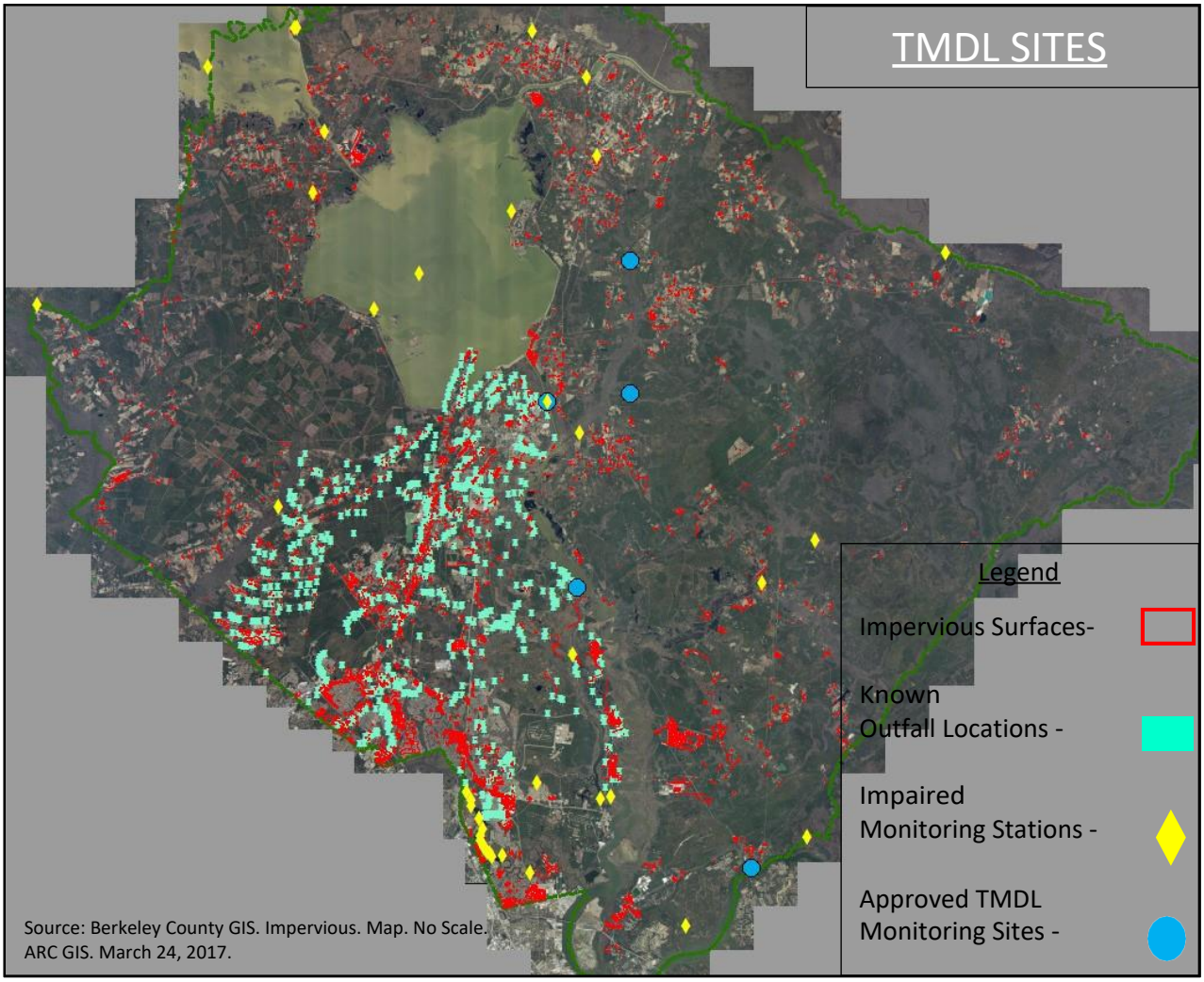
The management of stormwater runoff through, maintenance of infrastructure, stormwater plans review, analytical testing, illicit discharge tracking, and monitoring plans are all viable components to help mitigate flooding, pollutants, siltation, sedimentation, system inflow, etc.

It is important that pollutant loads in the County's MS4 are reduced prior to discharge to receiving waters. Pollutant loads tend to vary by the land use. For example, nutrients such as nitrogen and phosphorus tend to be higher in areas of residential land uses, whereas metals such as lead, zinc, and cadmium tend to be higher in areas of major byways/highways and for some commercial and industrial uses.

The increase in velocity and volume of stormwater entering the County's MS4 and receiving waters is greatly exacerbated by impervious surfaces (parking lots, roofs of structures, drive lanes, etc.). Thus, the potential for pollutants to enter the County's MS4 and receiving waters is directly correlated to the amount of impervious surface.

Total Maximum Daily Loads (TMDLs) and Waste Load Allocations (WLA) are assigned to MS4s that discharge to designated TMDL watersheds. A TMDL is a calculation of the maximum amount of a specific pollutant that a waterbody can receive and still meet water quality standards. It is the sum of the allowable loads of a given pollutant from all contributing point and nonpoint sources (stormwater run-off). At the time of this study a list of 44 303(d) impaired water quality monitoring stations have been designated by SCDHEC and EPA for all of Berkeley County, and have varying dates for proposed TMDL implementation that range from 2016 until 2022 (Appendix C). This list is updated every two years and the next list of 303(d) impaired waters will not published until 2018. Additionally, the current list (Appendix C) list each impaired monitoring station with a priority ranking. A priority ranking of one (1) indicates a current priority being addressed by TMDL or alternative restoration plans for implementation during the 2016-2018 time-frame. Priority ranking of two (2) indicates near-term priorities for implementation during the 2019-2022 time-frame. Priority ranking of three (3) indicates long-term priorities for implementation after 2022. Currently, there is one (1) priority ranking of one (1), fourteen (14) priority rankings of two (2), and twenty-nine (29) priority rankings of three (3) for impaired monitoring stations within the County.

A map depicting impaired stations utilized for TMDL development in relation to collected impervious surface data and known outfall locations is provided on the following page. Primarily, focus for permitting requirements is water pollution or the quality of our waterbodies. Current regulations require that Berkeley County perform water quality monitoring if the County's MS4 discharges into a designated TMDL watershed. In addition, dry weather screening is to be performed at all outfalls to identify potential illicit discharges. Maintaining a current stormwater system inventory, monitoring discharges from outfalls and performing dry weather screening is a very expensive process. Some estimates have shown that local governments could spend anywhere between $200,000 and $300,000 a year just on meeting TMDL water quality monitoring and outfall dry weather screening requirements.



A Stormwater Management Utility with a program of interim fees has been implemented as part of the County's utility enterprise system as authorized by S.C. Code Ann. § § 48-14-10 to 48-14-150 (Supp. 1991); § 5-7-30 (Supp. 1991) and other relevant laws and regulations of the State of South Carolina. The interim fees basis, was to allow for comprehensive mapping of our system, development of monitoring plans, and to establish baseline data to assist in the analysis, design, and development of the Stormwater Management Program. As requested in the Ordinance, the County was tasked with creating a permanent Stormwater Management Utility rate structure and schedule of fees, to be completed by the end of the three-year interim cycle (June 30, 2017).

To be fair, equitable and defensible impervious surface area was selected as the mechanism to establish a permanent Stormwater Management Utility Fee and Classification. Property owners will pay a proportionate rate based on their contribution to the stormwater system. Impervious surface area is the most common stormwater utility rate method throughout the United States, including South Carolina, and it is the most effective indicator of the amount and quality of stormwater runoff that a specific land use contributes to the system.

3.1 Utility Rate Structure Scenarios

Four rate structure scenarios are being presented to Berkeley County Council for their approval of one permanent rate structure and eventual associated fee. These scenarios are as follows:

1. Base ERU Adjusted for Calculated Impervious Area (Scenario 1) – All residential, mobile homes, and non-residential parcels with an impervious area would pay a selected permanent fee based off the single family residential (SFR) parcel ERU. With SFR parcels being assessed at one ERU per unit and mobile homes being assessed at one ERU per mobile home per parcel, and all non-residential parcels being assessed a rate for each ERU (2,760 ft^2 of impervious surface) per month (see Section 3.5 for development of the ft^2 for each ERU). Ultimately, apart from SFR parcels and mobile homes, parcels are assessed based on how much impervious area is on the parcel.

   For example: Berkeley County Landfill Operations parcel has 915,447 ft^2 (21.01 ac.) of impervious surface. 915,447 ft^2 ÷ 2,760 ft^2/ERU = 331.68 (rounded to 332 ERU) 332 ERU x $3.00/ERU = $996.00/month. Therefore, Berkeley County Water and Sanitation would pay $11,952/year based on the size and quantity of building area, parking lot, sidewalk and other impervious surfaces present on the parcel.

   a. Advantages - The relationship between impervious area and stormwater impact is relatively easy to explain to the users of the system based on if you pave, you pay. Furthermore, per the EPA, Funding Stormwater Programs Fact Sheet, more than 80 percent of all stormwater utilities utilize the ERU method and it appears to be the fairest, most equitable, and easiest method to defend.

   b. Disadvantages - The potential impact of stormwater runoff from pervious areas of a parcel are not reviewed. Sometimes, this method is considered less equitable because runoff-related expenses are recovered from the calculated impervious area only (not pervious areas) and is a smaller total base.

2. Intensity of Development (ID) (Scenario 2) – Based on the percentage of impervious area relative to an entire parcel's size. In this scenario, all parcels (including vacant/undeveloped) are charged a fee based on the level of intensity within their respective development and includes impervious and pervious areas of a parcel. ID categories are established and are assessed on a sliding scale per the rates calculated.

   For example, Berkeley County Landfill Operations parcel, which would be categorized as *light development*, would pay $0.12/month per every 1,000 ft^2 (or $1.20 for every 10,000 ft^2). At 37,927,426 ft^2 (870.69 ac.) cost estimates would appear as 37,927,426 ft^2 ÷ 1,000 ft^2 = 37,927.426 ft^2 x $0.12 = $4,551.29/month. Therefore, Berkeley County Water and Sanitation would pay $54,615.49/year based on the percentage of impervious area relative to an entire parcel's size.

Category (Impervious Percentage Range)	Rate Per Month Per 1,000 ft^2 of total area served (Impervious Plus Pervious)
Vacant/Undeveloped (0%)	$0.06
Light Development (0%+ to 20%)	$0.12
Moderate Development (21% to 40%)	$0.16
Heavy Development (41% to 70%)	$0.24
Very Heavy Development (71%+)	$0.32

a. Advantages - The ID method accounts for stormwater runoff from pervious portions of parcels. This method includes completely pervious parcels (vacant/undeveloped) and therefore undeveloped parcels are also assessed. If a parcel's impervious area experiences minor additions in area, the parcel is not likely to be moved to the next ID category. This will reduce staff time required to maintain the billable unit files.

b. Disadvantages – Parcels do not receive the degree of specificity of an ERU model and are grouped into broad categories. Parcels would not get assessed in direct proportion to their actual relative stormwater discharges from the site. This method tends to be more difficult to implement than the ERU method because parcel pervious areas and impervious areas require review and documentation during the plan review process. This type of review process would be time consuming and cost prohibitive to the County. Additionally, the County currently doesn't have a system in place for review and documentation of pervious areas. This method can become convoluted and tends to be more complicated to explain to users of the system, than the ERU method (Scenario 1).

3. Equivalent Hydraulic Area (EHA) (Scenario 3) – Just like the ID method (Scenario 2), parcels are assessed based on the combined impact of impervious surface and pervious areas. However, unlike the ID method the impervious area is charged at a much higher rate than the pervious area.

   For example, Berkeley County Landfill Operations parcel, which would be categorized as *light development*, would pay $0.02/month per every 1,000 ft^2 (or $0.20 for every 10,000 ft^2 of pervious) and $0.12/month per every 1,000 ft^2 (or $1.20 for every 10,000 ft^2 of impervious). At 37,011,979 ft^2 (849.68 ac.) of pervious and 915,447 ft^2 (21.01 ac.) of impervious, cost estimates would appear as 37,011,979 ft^2 ÷ 1,000 ft^2 = 37,011.979 ft^2 x $0.02= $740.24/month for pervious area and 915,447 ft^2 ÷ 1,000 ft^2 = 915.447 ft^2 x $0.12= $109.85/ month for impervious area. Therefore, Berkeley County Water and Sanitation would pay $10,201.08/year based on the percentage of pervious and impervious area relative to an entire parcel's size.

Category (Impervious Percentage Range)	Rate Per Month Per 1,000 ft^2 of total area served (Impervious)	Rate Per Month Per 1,000 ft^2 of total area served (Pervious)
Vacant/Undeveloped (0%)	$0.06	$0.01
Light Development (0%+ to 20%)	$0.12	$0.02
Moderate Development (21% to 40%)	$0.16	$0.03
Heavy Development (41% to 70%)	$0.24	$0.04
Very Heavy Development (71%+)	$0.32	$0.05

a. Advantages- Just like the ID method, the EHA method considers flow from pervious portions of the parcels and accounts for undeveloped or vacant parcels. However, this method is thought to be fairer than the ID method because parcels are assessed based on calculations of pervious and impervious areas, which are used to determine hydraulic response factors and are applied to determine a unique EHA.

b. Disadvantages- Parcels do not receive the degree of specificity of an ERU model and are grouped into broad categories. Similarly, to Scenario 2, parcels would not be assessed in direct proportion to their actual relative stormwater discharges from the site. This method tends to be more difficult to implement than the ERU method because a parcels pervious and impervious area require review and documentation during the plan review process. As previously stated, this type of review process would be time consuming and cost prohibitive to the County. Furthermore, the County currently doesn't have a system in place for documentation of pervious area. This method can become convoluted and tends to be more complicated to explain to users of the system than the ERU method.

4. Current Interim Rate Structure (Scenario 4) – The County Council adopted a Stormwater Management Utility Ordinance to provide a means to fund the stormwater management program and to comply with the regulatory requirements of the MS4 Permit. This method considers multiple levels of interim stormwater management utility fees and classifications, which are reviewed annually and further evaluated during each Berkeley County Annual Budget Ordinance session. The current classifications and utility fees have been in place since 2014 and are as follows:

Single Family Residential Parcels:

- For all parcels containing a single-family residence, an annual fee of $36.00 per parcel is assigned per dwelling unit.

Multi-family Residential Parcels:

- For all parcels containing multi—family residences, excluding mobile home parks, an annual fee of $18.00 per unit is assigned.

Mobile Homes:

- For all parcels containing mobile homes, an annual fee of $18.00 per unit is

assigned to every mobile home maintained onsite.

Non-Residential Parcels:

- For all developed parcels containing nonresidential land use (commercial or industrial), an annual fee of $216.00 per parcel is assigned.

Tax-exempt and Non-profit Parcels:

- For all developed tax-exempt and non-profit properties, an annual fee of $72.00 per parcel is assigned.

a. Advantages- Current conditions currently meet bottom line operating cost for the stormwater program. Much of the funds collected are associated with the most prevalent land use in the County (single family residential). Thus, this potentially could be an economic catalyst for commercial and industrial businesses, looking to locate in the region, and in Berkeley County.

b. Disadvantages- The County is required by law to establish a SWMP pursuant to its NPDES permit. To achieve compliance with our NPDES permit requirements, the County must develop, implement and enforce the 6 MCMs outlined in the permit. Under the current interim rate scenario, the County is limited, through funding, to efficiently and effectively implement and enforce the 6 MCMs to the MEP.

   Though the County has its' interim stormwater utility fee structure in place, the funds created through the interim utility fee ordinance are not based on the actual area of impervious surfaces and therefore doesn't accurately represent the actual impacts to the stormwater management system. To develop a fair, equitable, and defensible mechanism to establish the basis of the County's stormwater utility fee structure and generate adequate funds to meet our NPDES permit requirements, the County must calculate its' stormwater utility fees by correlating the impervious area of each nonresidential parcel to that of an ERU.

   Currently funds do not support the replacement and repair of the County's aging infrastructure that may not be adequate to manage stormwater during major storm events. Additionally, the current interim rate assessment of parcels does not appear to be sufficient to meet growing water quality concerns associated with runoff contribution from individual parcels in our MS4 and into receiving waters. New TMDL's and WLA's are continually updated and assigned to Berkeley County and surrounding municipalities utilizing the same receiving waters for stormwater runoff (Appendix C).

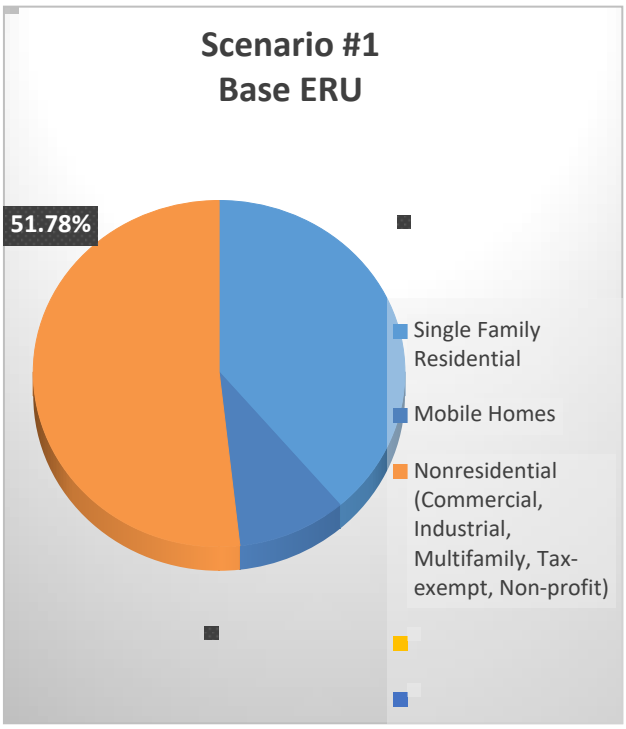
The table on page 17 summarizes the multipliers and applications used in each of the 4 scenarios and the resulting single-family residential fee structure utilizing the average impervious surface area of SFR parcels, to be 2,760 ft^2 as compared to an average lot size of 55,634 ft^2 for parcels with one (1) SFR unit. All parcel information was generated using the County's GIS database. The average residential parcel will qualify as a light development category in an ID method (Scenario 2) and EHA method (Scenario 3). The four charts on page 15 summarize the results in terms of percent of fees generated by each property class for each of the 4 scenarios. It should be noted, that when viewing the percent of fees generated by each property class that billed non-residential properties account for approximately 184,398,759 ft^2or fifty-seven (57) percent of impervious surfaces in the county. Also, that billed SFR properties account for approximately 134,136,000 ft^2or forty-three (43) percent of impervious surfaces in the county.

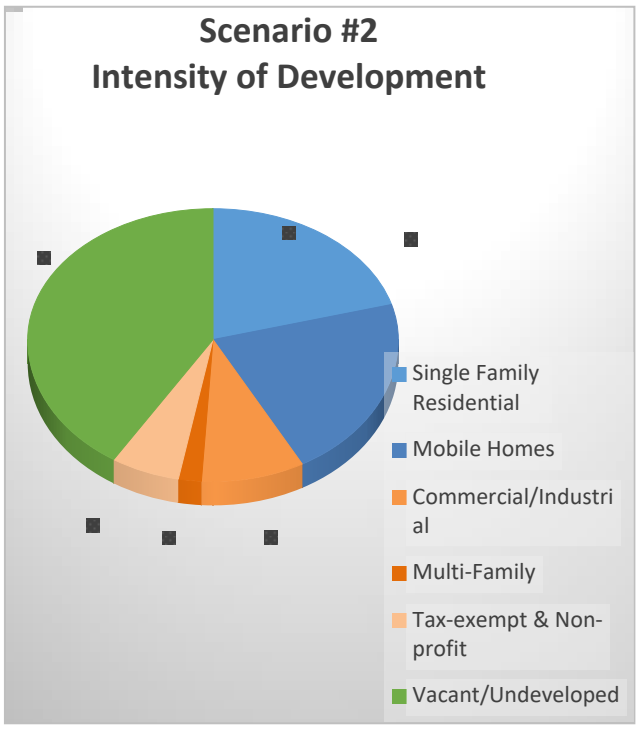
Assumptions for Utility Rate Scenarios				
Property Class	**Scenario #1 Base ERU**	**Scenario #2 Intensity of Development**	**Scenario #3 Equivalent Hydraulic Area**	**Scenario#4 Current Rate**
Single Family Residential	1 ERU/Unit	Percent Category/ month ÷ 1,000 ft^2	Percent Category/month ÷ 1,000 ft^2 for impervious and Percent Category/month ÷ 1,000 ft^2 for pervious	$36.00 per parcel & $36.00 per unit per parcel
Nonresidential (Commercial/Industrial)	Impervious ft^2 ÷ 2,760 ft^2/(ERU)	Percent Category/ month ÷ 1,000 ft^2	Percent Category/month ÷ 1,000 ft^2 for impervious and Percent Category/month ÷ 1,000 ft^2 for pervious	$216.00 per parcel
Multi-family	Impervious ft^2 ÷ 2,760 ft^2/(ERU)	Percent Category/ month ÷ 1,000 ft^2	Percent Category/month ÷ 1,000 ft^2 for impervious and Percent Category/month ÷ 1,000 ft^2 for pervious	$18.00 per unit per parcel
Mobile Homes	1 ERU/Unit	Percent Category/ month ÷ 1,000 ft^2	Percent Category/month ÷ 1,000 ft^2 for impervious and Percent Category/month ÷ 1,000 ft^2 for pervious	$18.00 per unit per parcel
Tax-exempt and Non-profit	Impervious ft^2 ÷ 2,760 ft^2/(ERU)	Percent Category/ month ÷ 1,000 ft^2	Percent Category/month ÷ 1,000 ft^2 for impervious and Percent Category/month ÷ 1,000 ft^2 for pervious	$72.00 per parcel
Vacant/Undeveloped	Not Assessed	Percent Category/ month ÷ 1,000 ft^2	Percent Category/month ÷ 1,000 ft^2 for impervious and Percent Category/month ÷ 1,000 ft^2 for pervious	Not Assessed
Avg. Monthly SFR Fee	$3.00	$6.67 [1]	$1.39 [2]	$3.00
Avg. Annual SFR Fee	$36.00	$80.11 [1]	$16.68 [2]	$36.00

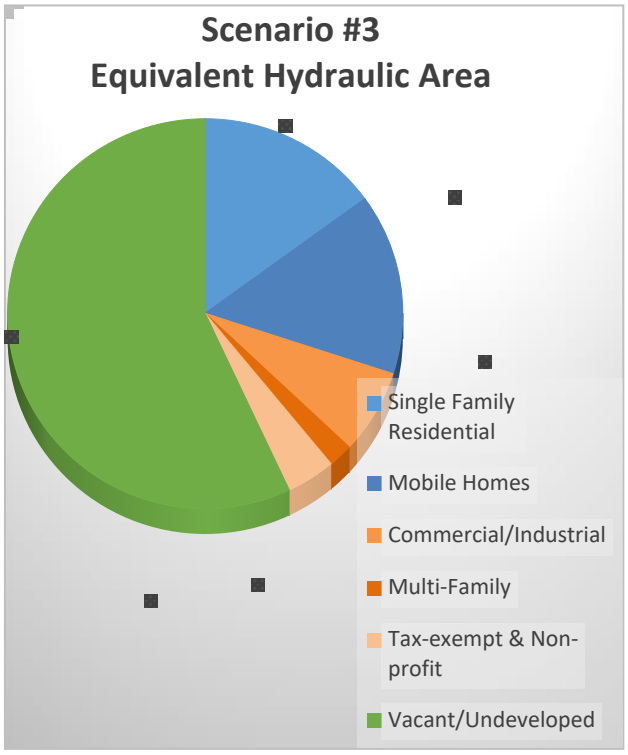
1 $\frac{55{,}634\ ft^2}{1{,}000 ft^2} = (55.634\ ft^2)(\$0.12) = \frac{\$6.67}{month}$

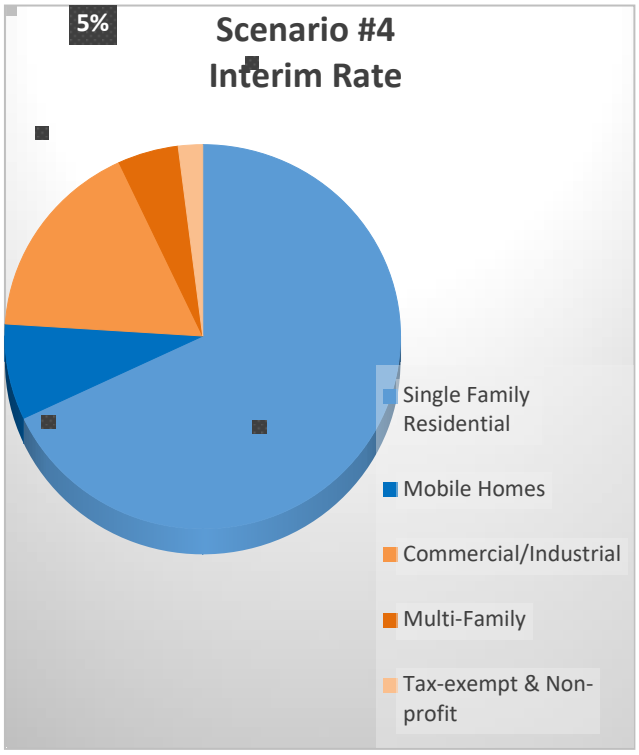
2 $\left[\frac{52{,}874\ ft^2}{1{,}000 ft^2} = (52.874\ ft^2)(\$0.02) = \frac{\$1.06}{month} for\ pervious\right] + \left[\frac{2{,}760\ ft^2}{1{,}000 ft^2} = (2.76\ ft^2)(\$0.12) = \frac{\$0.33}{month} for\ impervious\right] = \frac{\$1.39}{month} total$

Approximate Percentages for Total Fees Assessed by Use









3.2 Staff Recommendation

To ensure that the county is using the most defendable, fair, and equitable measure for its utility rate structure. The County recommends Scenario #1 (Base ERU Adjusted for Calculated Impervious Surface) to be utilized in establishing a permanent Stormwater Management Utility Fee. It is the opinion of staff that a residential rate of $3.00/ERU/month would generate sufficient funds for operating the County's Stormwater Utility Program unless future SCDHEC MS4 Permit revisions require additional resources and/or TMDL water quality monitoring is necessary.

Additionally, to ensure proper collection and distribution of funds back to the system, as it relates to the recommended scenario, the County recommends not implementing a credit policy in year one, or until further study can be conducted under the permanent rate scenario #1 system.

3.3 Utility Rate Structure

The staff recommended permanent Stormwater Management Utility rate structure will incorporate several modifiers, allowing for flexibility associated with credits, appeals, and other land use type variables (agricultural lands, forestlands, or undeveloped lands). This way the County can develop the utility fee in such a way that best fits the needs of Berkeley County and Berkeley County property owners. The rate structure developed for this study employs an impervious surface model utilizing an ERU with modifiers and variables for agricultural land, forested land, and undeveloped land. The following rate structure assumptions were developed during this study.

1. An ERU is calculated based on a representative sample of impervious surfaces associated with SFR parcels.

2. The established average impervious surface area associated with SFR properties will be assessed at 1 ERU and applied uniformly to all mobile home units and SFR units.

3. Non-residential properties will be assessed in multiples of ERUs based on actual impervious areas (subject to a 1 ERU minimum). This category of properties includes the following properties classified as:

    a. Commercial Property
    b. Industrial Property
    c. Institutional Property
    d. HOA Community Center Property
    e. Multi-Family to include Duplexes and townhomes not subdivided by parcel lines
    f. Tax-exempt and Non-profit
    g. Boat Slips (Dry Stack Marinas)
    h. Properties whose primary function is not a single-family residence

4. Common areas associated with mobile home parks, multi-family and single-family residential development will be assessed like non-residential properties and charged to the HOA or property management.

5. Roads, railroads, and the Naval Weapons Station were not assessed as part of this study.

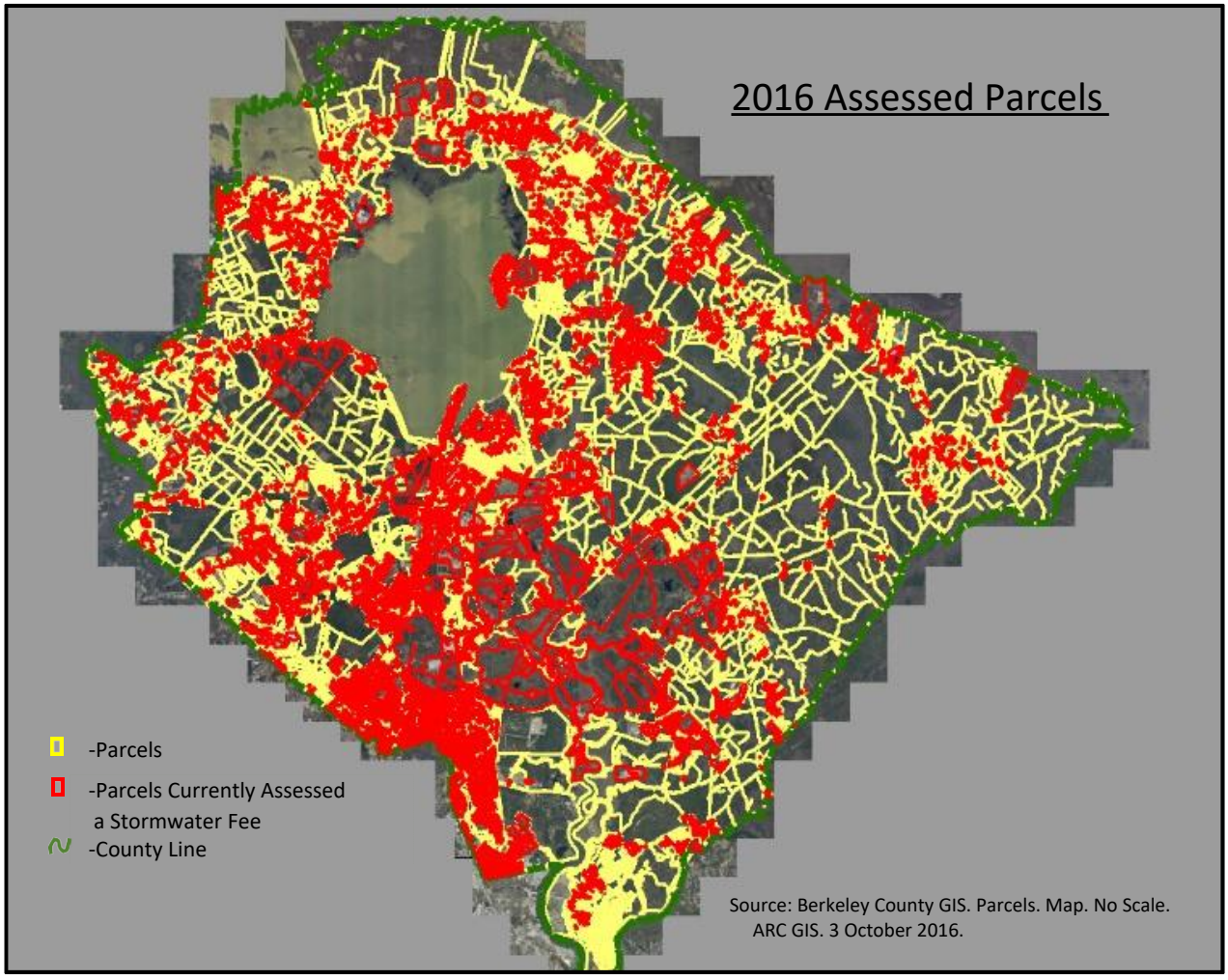
6. Credits were considered as part of this study. Credits are discussed in the Utility Credit Manual and all potential credits will be identified on a case-by-case basis.

3.4 Data Sources, Analysis, and Methodology for Establishing an ERU and Utility Rate

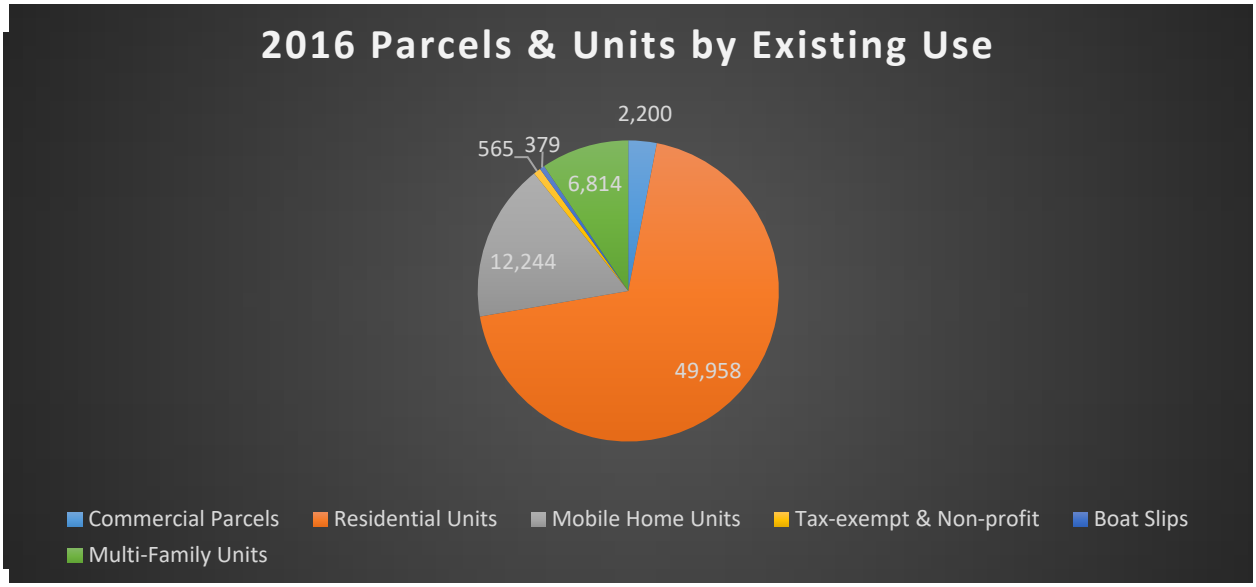
Obtaining and applying the best available data to Berkeley County's study was crucial to developing the utility rate structure that incorporated impervious surface areas via an impervious surface data layer, developed within the County's GIS software. The following was utilized to collect data throughout the course of this study, to assist in identifying the best permanent rate applicable to the County's continually evolving environment:

- Berkeley County Impervious Surface layer and associated database, (including unincorporated Berkeley County), 2014.
- Google Earth Pro Imagery, 2014 & 2105.
- Berkeley County Parcels GIS layer and associated database (including parcels in the City of Goose Creek and the City of Hanahan), 2016.
- Digitized aerial photography that created an impervious surface layer for non-residential parcels (City of Goose Creek and City of Hanahan), 2016.
- The AssessPro SQL database for specific numbers associated with specific land use by unit and or parcel, 2016.
- Predicted growth projections for the County via census statistics, historical and current interim assessed stormwater fees, historical and current land use types, 2016.
- Historical current and projected cost of staff operations, infrastructure improvements, software updates, and maintenance and upkeep of equipment, 2016.
- MS4 and Cities boundary GIS layer and associated database (excluding the City of Summerville, City of North Charleston, City of Charleston, Town of Bonneau, Town of Jamestown, Town of St. Stephens, and Town of Moncks Corner), 2016.

As of March 2017, there are approximately 91,810 parcels located within the jurisdictional boundaries of Berkeley County. Of these parcels, approximately 78,901 (or 86%) of the parcels are located within the County's stormwater utility area. The stormwater utility area excludes tax assessed districts 11, 12, 13, 14, 15, 21, 68, 81, and 99 because they are located within incorporated limits that do not include Goose Creek and Hanahan. Of the 78,901 parcels, approximately 50,958 (or 65%) of the parcels have received an interim rate bill (see map on following page). The approximate 27,943 parcels not currently receiving the interim stormwater utility fee, within the County's jurisdiction, are presumed to consist of vacant properties, agricultural properties, and properties not currently assessed because of how recently the parcel has been developed. Of the 50,958 parcels currently receiving an interim stormwater utility fee, 43,562 (or 85%) of those parcels are within the boundaries of Berkeley County's designated MS4 area. Furthermore, the 43,562 parcels within the MS4 currently receiving an interim fee would account for approximately $3,139,830.00 (or 71%) of the permanent stormwater utility fee generated, when utilizing the staff recommended rate.



Per tax year 2017, the stormwater utility billed $2,499,030.00 in fees via the current stormwater interim utility rate, not currently utilizing an ERU model. The County collected $2,290,150.00 in interim utility rate fees. The charts below depict the number of parcels and the total number of units within the stormwater utility area categorized by their current use and shows potential projections for the subsequent years based upon historical average additions.



Growth of Stormwater Utility Area vs. Growth of Stormwater Utility Area with IGAs						
Use	2014	2015	2016	2017	Yearly Units Prior IGA	Yearly Units After IGA
Commercial/Tax-exempt/MF by Parcel	2,084	2,102	2,704	2,716	18	12
SFR Parcels	28,646	29,462	47,949	48,512	816	563
Mobile Homes by Unit	11,568	11,541	12,249	12,244	-27	-5
Mixed Use (Res. & Comm.) by Parcel	154	155	173	173	1	0

- 22% increase in Commercial/Tax-exempt/MF through IGAs
- 38% increase in SFR through IGAs
- 6% increase in mobile homes through IGAs
- 10% increase in mixed use (Res. & Comm.) through IGAs

Growth Projections for Stormwater Utility Area and IGA Municipalities						
Use	2016	2017	2018	2019	2020	Yearly Unit Avg.
Commercial/Tax-exempt/MF by Parcel	2,704	2,716	2,728	2,740	2,752	15
SFR Parcels	47,949	48,512	49,202	49,892	50,582	690
Mobile Homes by Unit	12,249	12,249	12,249	12,249	12,249	0
Mixed Use (Res. & Comm.) by Parcel	173	173	173	173	173	0

- 1.74% increase in Commercial/Tax-Exempt/MF through 5-year period
- 5.2% increase in SFR through 5-year period
- 0.0% increase in Mobile Homes through 5-year period
- 0.0% increase in Mixed Use through 5-year period

3.5 ERU Calculation

To determine the average SFR parcel impervious area, a pre-sample size of 100 parcels, to establish an average impervious area mean, was selected. The 100 parcels were randomly selected in regard to their geographical placement throughout the stormwater utility area within the County and the municipalities of Goose Creek and Hanahan, which were consolidated through IGAs that were entered on October 9, 2015 and October 15, 2015, respectively.

The average impervious area for the pre-sample selection size was 3,259 ft^2 with a standard deviation of 2,111. It was then determined that the required sample size must be large enough for a 95% confidence, so that the sampled SFR parcels with impervious area would be within 5% of the of the average SFR parcel with impervious area. A representative sample size of 1,790 SFR parcels was then established from an available 47,949 SFR parcels for a confidence interval of 5%. It should be noted that mix-use parcels with commercial and residential were excluded from sample selection.

μ = 3259 ft2
σ = 2111
1 -α = 0.95
α = 0.05
α / 2 = 0.025
z α / 2 = z 0.025 = 1.96
d = 0.03×μ = 0.03× 3259 = 97.77

$$n = \left[\frac{(z_{\alpha/2})\ x\ \sigma}{d}\right]^2 = \left[\frac{(1.96)\ x\ 2{,}111}{97.77}\right]^2 = 1{,}790$$

n ≈ 1,790 parcels

μ = Mean

σ = Standard Deviation

1 -α= Confidence

d= Acceptable Error

n = Required Sample Size

Impervious surfaces included private walkways, driveways, parking lots, rooftops, patios, sheds, etc. Each SFR parcel was evaluated based on 2014 & 2015 aerial imagery from Google Earth and Berkeley County GIS, respectively. Furthermore, existing building footprints located within Real Property records were evaluated to verify consistency between the datasets. The mean impervious area for the chosen sample size of 1,790 SFR parcels was calculated to be approximately 2,761.90 ft^2. Subsequently, the ERU for Berkeley County was set at 2,760 ft^2 for this study. Comparatively, data taken from the 2017 Stormwater Utility Survey conducted by the Southeast Stormwater Association (SESWA) reported an average impervious area utilized for ERU calculations to be 3,502 ft^2.

3.6 Impervious Area Calculation

The impervious areas for the existing 2,876 non-residential parcels were isolated in the GIS database and their actual impervious areas were digitized to provide a square footage for each parcel. Flyover data for digitizing impervious areas was collected in 2014. Of the 2,876 non-residential parcels, 619 were not digitized in the 2014 flyover, due to their location within the incorporated limits of Goose Creek and Hanahan. However, the 619 parcels within the incorporated limits were digitized in November and December of 2016 for this study. The County also analyzed 235 building permits issued within the unincorporated limits since 2014, to identify additions, reductions, and new impervious surface areas on the existing 2,876 non-residential parcels.

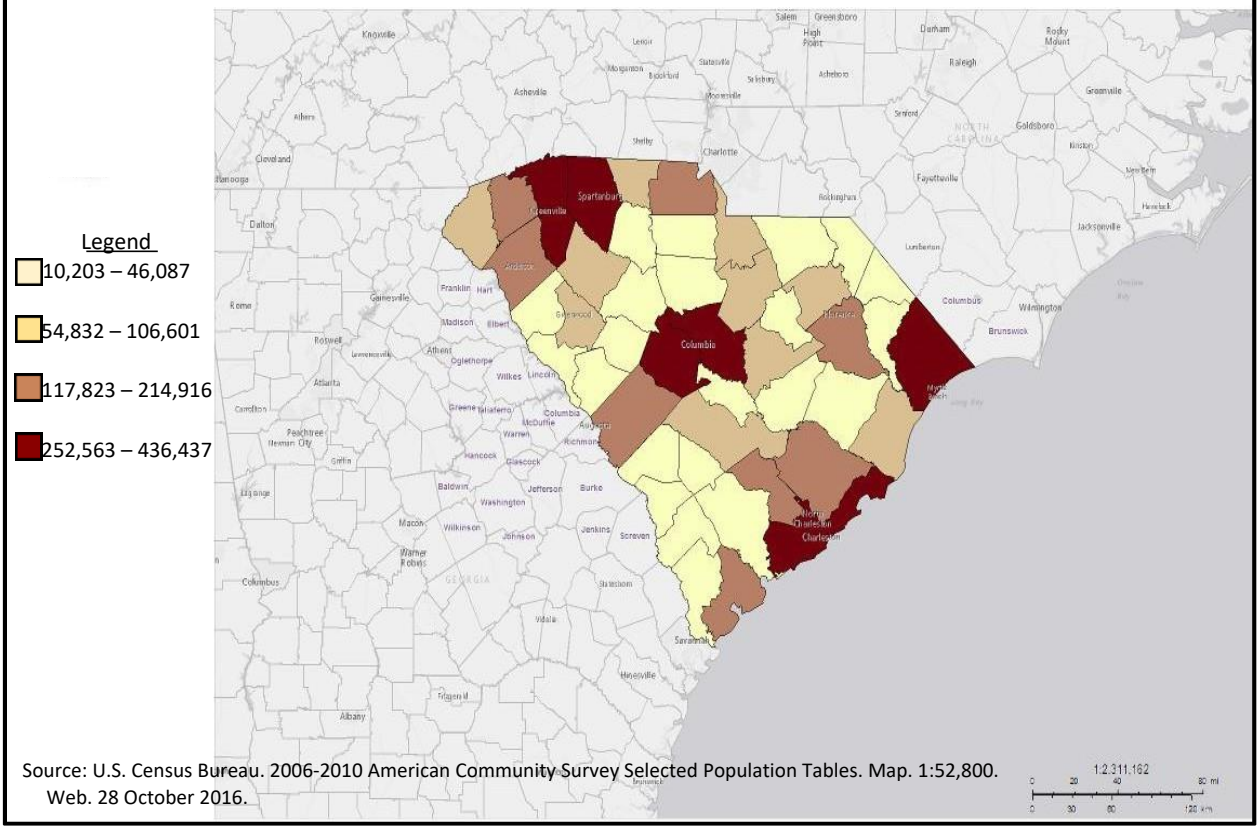
Property class information for each of the 2,876 non-residential parcels was obtained from Berkeley County Real Property. If a property was identified to be vacant, single family residential, agricultural, and/or a mobile home, then it was determined that these parcels would not be digitized for establishing impervious area. Digitization of all non-residential parcels was based on Berkeley County's existing 2014 and 2015 flyover imagery.

The County estimates, utilizing a $3.00/month SFR rate and an ERU of 2,760 ft^2, that approximately $2,405,196.00 in fees will be generated for non-residential parcels within the stormwater utility area.

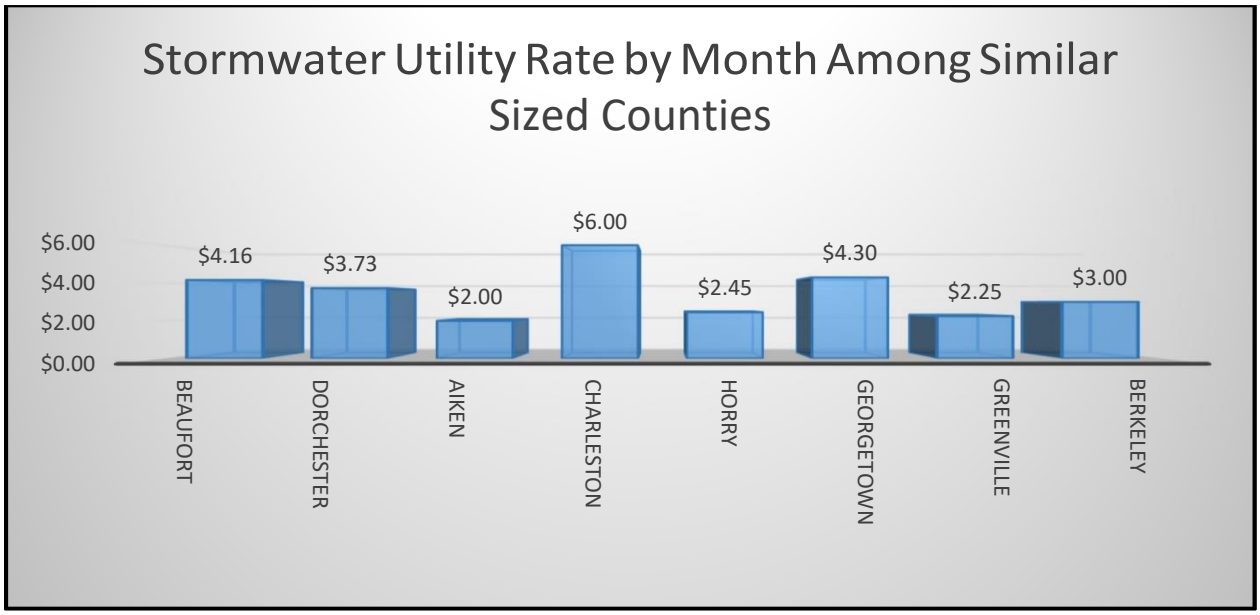
3.7 Utility Rate Comparison with other Jurisdictions

The presumed selected utility rate structure of a base ERU adjusted for calculated impervious surface assumes a utility rate per household per month of $3.00 for SFR within the unincorporated county, Goose Creek, and Hanahan. When comparing the proposed fee rate against other similarly sized counties, in population per the 2010 U.S. Census Bureau data, this fee is lower than approximately 60% of similarly sized counties (see map & chart below). Additionally, data taken from the 2017 Stormwater Utility Survey conducted by the Southeast Stormwater Association (SESWA) reported an average of $3.88 for utility rates per month amongst survey respondents, throughout the southeast and an average of $4.46 amongst survey respondents utilizing a stormwater utility rate in South Carolina.

Total Population Estimate by County



Source: U.S. Census Bureau. 2006-2010 American Community Survey Selected Population Tables. Map. 1:52,800. Web. 28 October 2016.



4.0 SUMMARY

The County performed a Stormwater Program assessment utilizing current staff personnel and existing operating costs as a basis for funding required. The County determined that an estimated annual budget to deliver the appropriate services and meet NPDES requirements would be in the range of $3 to 4 million. A multitude of proposed utility rates were analyzed as potential for revenue resources to establish the proposed revised permanent rate structure. The $3.00/month or $36.00/year SFR rate was determined the most appropriate and equitable fee to meet the County's current stormwater budget requirements. The proposed rate structures and projected revenues for the County are represented in the following table.

Table 1. Projected Berkeley County Stormwater Utility Fee Structure Utilizing Current Day ERUs

BERKELEY COUNTY FEE			
	Area (ft^2)	ERU Units	$36.00/ERU/Year
Non-Residential	184,398,759	66,811	$2,405,196.00
Mobile Homes		12,249	$440,964.00
Residential	134,136,000	49,958	$1,798,488.00
Historical Approximate Ten Percent (10%) Non-Payment			($464,464.80)
Potential Twenty Percent (20%) Applied Credits via Utility Credit Manual			($836,036.64)
Total with Implemented Credit Policy			$3,344,146.56
Total without Implemented Credit Policy			$4,180,183.20

This Utility Rate Study is an essential first step for Berkeley County Council as it decides whether a permanent stormwater utility is the most appropriate funding mechanism to meet the stormwater regulatory requirements and manage the stormwater program. The following are several additional steps required to establish the permanent stormwater utility.

Establishing a Stormwater Utility - Future steps

1. Revise Rate Structure – County must revise the existing rate structure to establish the permanent stormwater utility rate and rate structure.

2. Create a Billing Database – a billing database will be developed to include the rate structure and rate fees as assigned for each category of property class.

3. Establish a Billing Method – determine if the existing utility billing method (property tax system) is an appropriate billing method for the stormwater utility or if an independent billing system is necessary.

4. Manual for Credits – determine if the proposed credit manual properly identifies types of credits and the application process necessary to meet Berkeley County property owner's needs.

Appendix A – Average Annual Fees Generated

BERKELEY COUNTY STORMWATER UTILITY
FEE GENERATED REVENUE & POTENTIAL CAPITAL EXPENDITURES
Fiscal Year 2016/2017 Actuals & 2018/2019 Projections

Total Revenue & Net Balance FY16 - FY17:

Beginnig Balance & Actual Gross Iterim Rate Revenue From Current Fee 16/17 (12/31/15 - 12/31/16)	$5,557,051.00
Actual Less: Operations, Maintenance, Captial 16/17 (7/01/15 - 06/30/17)	$1,862,903.00
Net Balance ending FY 16/17 (06/30/2017)	$3,694,148.00

Estimated Total Revenue & Net Balance FY17-FY18:

Estimated Gross Revenue & Balance 17/18 (Estimated Fee Generated Revenue - 12/31/17)	$6,189,104.80
Estimated Less Utilizing Historical Trends for Actual Expenditures: Operations, Maintenance, Capital, 17/18 (7/01/17 - 06/30/18)	$2,590,586.94
Estimated Net Balance by end of FY 17/18 (06/30/18)	$3,598,517.86

Estimated Total Revenue & Net Balance Utilizing Impervious Surface Methodolgy for FY18-FY19:

Estimated Gross Revenue & Balance 18/19 (Estimated Fee Generated Revenue - 12/31/18)	$8,242,985.86
Estimated Less Utilizing Historical Trends for Actual Expenditures: Operations, Maintenance, Capital, 18/19 (7/01/18 - 06/30/19)	$4,585,835.71
Estimated Credit Considering One-hundred Percent Implementation	$836,004.24
Estimated Net Balance by end of FY18/19 with Credit Policy (06/30/19)	$2,821,145.91
Estimated Net Balance by end of FY18/19 without Credit Policy (06/30/19)	$3,657,150.15

Program Projections Utilizing Actuals & Estimates:

Actual Beginning Balance for FY 17 (07/01/2016)		$2,132,039.00	
Add:	Gross Revenue for 2017 (12/31/16)	$2,749,424.00	
		$4,881,463.00	
Less:	Actual Total Personnel Services	$784,059.00	
	Actual Capital Outlay	$199,850.00	
	Actual Total Operating Expenses	$203,406.00	
Actual FY 17 Ending & FY 18 Beginning Balance (06/30/2017 - 07/01/2017):		$3,694,148.00	
Add:	Estimated Gross Revenue for 2018 (12/31/17)	$2,494,956.80	
		$6,189,104.80	
Less:	Actual Budgeted Total Personnel Services	$2,335,033.00	
	Actual Budgeted Capital Outlay	$1,301,000.00	
	Actual Budgeted Total Operating Expenses	$358,704.00	
Estimated FY 18 Ending Balance: (06/30/2018)		$2,194,367.80	

Rate Estimates & Projections for Revenue Utilizing an Impervious Surface Calculation Per Jurisdiction:

	Residential Rate	Estimated Annual Fees Genearated	Potential for 18/19 Revenue Utilizing Historical Percent Collected within Jurisdiction
GC	Keeping Current Interim Residential Rate **$36.00/year**	Residential - $432,432.00 Impervious - $267,156.00 Mobile Home - $12,708.00	$641,066.40
	Keeping Current Interim Fees Generated **$20.30/year**	Residential - $243,843.60 Impervious - $150,646.30 Mobile Home - $3,582.95	$358,265.57
	Median of Current Interim Rate and Fee Generated **$28.15/year**	Residential - $338,137.80 Impervious - $208,901.15 Mobile Home - $4,968.48	$496,806.68
	Residential Rate	**Estimated Annual Fees Genearated**	**Potential for 18/19 Revenue Utilizing Historical Percent Collected within Jurisdiction**
HAN.	Keeping Current Interim Residential Rate **$36.00/year**	Residential - $177,372.00 Impervious - $181,260.00 Mobile Home - $17,028.00	$338,094.00
	Keeping Current Interim Fees Generated **$20.30/year**	Residential - $100,018.10 Impervious - $102,210.50 Mobile Home - $4,800.95	$186,326.60
	Median of Current Interim Rate and Fee Generated **$28.15/year**	Residential - $138,695.05 Impervious - $141,735.25 Mobile Home - $6,657.48	$258,379.00
	Residential Rate	**Estimated Annual Fees Genearated**	**Potential for 18/19 Revenue Utilizing Historical Percent Collected within Jurisdiction**
BC	Keeping Current Interim Residential Rate **$36.00/year**	Residential - $1,188,684.00 Impervious - $1,956,780.00 Mobile Home - $411,048.00	$3,200,860.80
	Keeping Current Interim Fees Generated **$20.30/year**	Residential - $670,285.70 Impervious - $1,103,406.50 Mobile Home - $115,892.70	$1,700,626.41
	Median of Current Interim Rate and Fee Generated **$28.15/year**	Residential - $929,484.85 Impervious - $1,530,093.25 Mobile Home - $160,708.35	$2,358,257.81
TOTALS	**$36.00/year**	Residential, Impervious, & Mobile Home - $4,644,468.00	$4,180,021.20
	$20.30/year	Residential, Impervious, & Mobile Home - $2,494,687.30	$2,245,218.57
	$28.15/year	Residential, Impervious, & Mobile Home - $3,459,381.65	$3,113,443.49

Appendix B – Cost Allocation Analysis

Stormwater Cost Allocation Analysis

Introduction

Under direction from Berkeley County Council, stormwater staff developed an estimate of the stormwater management program costs. County Council directed Berkeley County Stormwater staff to prepare stormwater permanent utility fees and classifications based on the existing impervious area and to explore the idea of developing a Stormwater Utility Credit Program. Therefore, in preparation of the potential implementation of Credit Policy, Berkeley County Stormwater staff undertook an independent analysis of the relative costs for managing stormwater from private and public property with impervious areas as compared to public rights-of-way and vacant undeveloped lands. Also, this analysis includes an estimate of the cost savings to the stormwater utility that result from on-site stormwater management from private and public property in the event Credit Policy, Stormwater Control Measures are employed. The figures and numbers utilized for this study were collected in December of 2016.

Berkeley County's stormwater management program is responsible for managing both the quantity and quality of stormwater runoff from all properties within the County and the Municipal Separate Storm Sewer System (MS4) area. However, not all properties within these jurisdictional boundaries pay a stormwater fee. Only developed properties with impervious surfaces and located within tax districts 1, 2, 3, 4, 5, 6, 7, 8, 9, 18, 28, 38, 48, and 78 pay stormwater fees. Streets and public rights-of-way, as well as other properties, such as agricultural lands, forestlands, and undeveloped lands pursuant to S.C. Code Ann. § 6-1-330 (Supp.2009), do not pay fees. The cost of managing stormwater runoff from non-billed properties, streets, and public rights-of-way is subsidized through the fees that billed properties pay.

The following general assumptions were utilized in conducting this analysis:

- Our evaluation and calculation of estimated costs is based on Berkeley County Stormwater Program's draft Utility Rate Study and the existing Stormwater Management Utility Ordinance (14-07-21) regarding the assessment of fees billed to property owners.

- To ensure a fair allocation of costs related to streets/rights-of-way, all properties within the boundaries of the stormwater utility area were included in the analysis (including non-billed properties such as vacant land).

- Runoff Coefficients assumed: Impervious Area = 97% and Pervious Area = 20%.

- Berkeley County's stormwater management program and Utility Ordinance combines commercial and industrial users that have impervious surfaces, for the ease of utility rate design. Thus, to determine the contribution of commercial and industrial properties with respect to water quality and its associated costs, Berkeley County's stormwater staff found it necessary to separate the two property types to apply appropriate pollutant loadings on a holistic scale. Stormwater staff assumed a split of 80% commercial and 20% industrial for this analysis.

- Pervious area for private and public properties were estimated based on existing collected data of impervious area and gross area per the County's geographic information system (GIS). For streets/rights-of-way, Berkeley County GIS collected linear footage data was used in conjunction with a weighted average of linear width for pervious and impervious data.

- Average rainfall was assumed to be 48.12 inches, based on a ten-year average ending in 2016.

Currently, Berkeley County recovers all stormwater management program-related costs through fees billed to private and some public properties. Additionally, Berkeley County intends to recover stormwater related costs through a form of impervious surface utility rate assessment designed under the Utility Rate Study. As designated in the Utility Rate Study, Berkeley County will continue to allocate all costs associated with the operation of the stormwater management program, on private and public property, but based on impervious areas. The impervious area and pollutant loads of streets/public rights-of-way, and pollutant loads from other properties, such as agricultural lands, forestlands, and undeveloped lands must be evaluated when calculating costs to the stormwater program. Since streets, public rights-of-way, agricultural lands, forestlands, and undeveloped lands, are exempt from the stormwater fee, such costs would be allocated back to billed properties to calculate the maximum amount of potential credit that can be applied to billed properties, to ensure cost to the stormwater management program are shielded from loss.

Allocating Cost Based on Water Quantity and Water Quality Parameters

National Pollution Discharge Elimination System (NPDES) permitting requirements on jurisdictions such as Berkeley County have caused the costs to effectively implement a stormwater management program to increase, due to quality-related issues as they relate to stormwater runoff. Most utilities across the country have historically, and continue to, use impervious areas to estimate the amount of runoff from properties; however, impervious area is only one factor creating cost for stormwater utilities. Additionally, Berkeley County must evaluate the impact pollutants are having on costs to the stormwater management program. The following has been developed to provide additional information concerning the allocation of both quantity and quality related costs.

Expense	Stormwater Management Program	
	Quantity	Quality
Environmental Monitoring and Compliance	10%	90%
Sampling and Analysis	-	100%
Street Sweeping	10%	90%
Regulatory Planning and Evaluation	10%	90%
Rates and Contracts	50%	50%
System Planning, Engineering Services, Plan Review	30%	70%
Illicit Discharge Tracking and Regulatory Compliance	10%	90%
Drainage Network Inspection	30%	70%
Capital Projects to Stormwater Infrastructure	50%	50%
Overall Stormwater Management Program Indirect & Direct Cost	30%	70%

A degree of flexibility exists when categorizing portions of costs associated with the parameters of quality and quantity; however, the above estimated allocations provide a reasonable idea for basing costs associated with the management of the stormwater program. Based on the above assumptions, and when utilizing the assumed utility rate of $3.00/month per Single Family Unit (SFU), and utilizing historical data showing approximately ten (10) percent non-payment of fees billed, the result is an allocation of

costs of approximately $1,194,501.00 for quantity and $2,787,168.00 for quality, if all fees collected were allocated back to the program's expenses in that respective fiscal year. The above allocation of costs associate quantity-related costs to that of the amount of impervious areas within the system.

To illustrate the costs that different property types cause the stormwater management program to incur, stormwater staff developed a few factors based on the amount of pollutants in milligrams per liter (mg/l) commonly found in runoff. These factors were then used to show potential costs to the County generated by property type/class; single family residential (SFR), multifamily residential (MFR), commercial, industrial, undeveloped, streets/rights-of-way). The cost to the County associated with undeveloped/forestlands/agricultural properties and streets/rights-of-way were allocated back to other billed (MF residential, commercial, and industrial) properties, to determine the maximum amount of credit we could potentially apply to billed properties. It should be noted that only streets/ROW that Berkeley County maintains, were utilized for this analysis.

Based on a review of NURP (1983), Horner et. Al (1994), and Cave et. Al. (1994), Berkeley County stormwater staff developed a scale of pollutant loadings per property class. However, Fecal Coliform (FC) bacteria concentrations were not provided due to their large scale of variability. The table below summarizes the basic data used to allocate cost to customer classes.

Property Class	Imp. Area in Square Feet	Imp. Area in Acres	Total Area in Square Feet	Total Area in Acres	Runoff Coefficient	*TSS	*BOD	*Total Phosphorus	*Total Nitrogen	*Total Zinc	*Total Lead	*Total
Billed Property												
SF Residential	134,136,000	3,079	4,350,555,000	99,875	22%	70	38	0.52	3.32	.161	.057	.026	1.83
Multi-Family Residential	10,694,508	245	157,643,640	3,619	25%	97	14	0.24	1.17	.218	.041	.033	2.12
Comm.	150,371,937	3,452	1,571,296,320	36,072	27%	77	21	0.33	1.74	.156	.049	.037	1.23
Industrial	37,592,983	863	392,824,080	9,018	27%	149	24	0.32	2.08	.671	.072	.058	1.89
Total Billed Property	332,795,428	7,639	6,472,319,040	148,584									
Non-Billed Property													
Streets/ ROW	135,297,360	3,106	360,763,920	8,282	48%	141	24	0.43	1.82	.156	.049	.037	0.83
Vacant/ Ag.	-	-	13,646,259,000	313,275	20%	51	3	0.11	.94	.000	.000	.000	0.80
Total Non-Billed Property	135,297,360	3,106	14,007,066,480	321,558									
Total System	468,092,788	10,745	20,479,385,520	470,142									

*mg/l = milligrams per liter

Water quality-based allocation factors were established by utilizing the pollutant loadings shown above, as well as the stormwater management program's utility areas, specific land use impervious and pervious data, and rainfall, to estimate the total amount of pollutants in milligrams per liter (mg/l) entering Berkeley County's stormwater network from each property class. The total pollutant loadings estimated aided Berkeley County Stormwater Staff in the allocating of quality-related costs to each property class. Total pollutant loadings, by property class, were estimated based on an empirical methodology known as the Simple Method Formula, and as shown below:

$$L = (A)[(P)(P_V)(R_V) \div 12\ (C)(6.24 \times 10^{-5})$$

where:

A = total area (square feet)
P = rainfall depth (inches)
P_j = factor that corrects "P" for storms not producing runoff (assumed = .90)
R_v = runoff coefficient (portion of rainfall converted into runoff)
12 = conversion factor
C = estimated concentration of the pollutant in urban runoff (mg/l)
(6.24×10^{-5}) = conversion factor

Utilizing the above formula, data collected from a review of NURP (1983), Horner et. Al (1994), and Cave et. Al. (1994), and the aforementioned assumptions, the information presented in the table below was established as an estimated computation for total pollutant loadings for each property class.

Calculated Pollutants in Pounds

Property Class	TSS	BOD	Total Phosphorus	Total Nitrogen	Total Zinc	Total Lead	Total Copper	Nitrites/ Nitrates	Total Pounds
Billed Property									
SF Residential	15,088,179	8,190,726	112,083	715,610	34,702	12,286	5,604	394,448	24,553,638
Multi-Family Residential	621,277	337,265	4,615	29,466	1,562	1,597	417	16,241	1,012,440
Commercial	7,103,892	1,937,425	30,445	160,529	14,392	4,520	3,413	113,477	9,368,093
Industrial	3,558,931	573,250	7,643	49,681	16,027	1,719	1,385	45,143	4,253,779
Total Billed Property	26,372,279	11,038,666	154,786	955,286	66,683	20,122	10,819	569,309	39,187,950
Non-Billed Property									
Streets/ ROW	5,498,827	935,970	16,769	70,977	6,083	1,910	1,442	32,368	6,564,346
Vacant/ Ag.	31,346,297	1,843,899	67,609	577,755	0	0	0	0	34,327,266
Total Non-Billed Property	36,845,124	2,779,869	84,378	648,732	6,083	1,910	1,442	32,368	40,891,612
Total System	63,217,403	13,818,535	239,164	1,604,018	72,766	22,032	12,261	601,677	80,079,562

Berkeley County Stormwater Staff utilized the above pollutant loads to allocate a cost per property class. The pollutant loads that were calculated for non-billed property classes were allocated back to billed property classes based on the amount of impervious area associated with each. The table below is the resulting allocation of cost by property class. It should be noted, that the amounts listed below aren't actual amounts and should be referenced for ratio related purposes only.

Property Class	Quantity	Quality	Total
Single Family	$342,294.50	$854,589.02	$1,196,883.52
Multi-Family	$27,290.74	$35,237.96	$62,528.70
Commercial	$383,726.12	$326,056.34	$709,782.46
Industrial	$95,931.53	$148,052.72	$243,984.25
Streets/ROW Vacant/Undeveloped	$345,258.11	1,423,231.96	$1,768,490.07
Total Cost	$1,194,501.00	$2,787,168.00	3,981,669.00

The allocations of cost presented in the previous table indicate an average annual per unit cost, that could be allocated back to billed property owners, of approximately $7.04 per 2,760 square feet of impervious from quantity related factors. Furthermore, the table indicates a $0.03 cost per pound of pollutant generated from quality related factors, allocated back to billed property. The allocation of cost per square feet of impervious and per pound of pollutant were identified by accepting that non-billed property decreases the overall amount of funds that can be allocated back to billed property. Essentially, if pollutants from non-billed properties didn't exist, the stormwater management program would have the capacity to allocate $0.07 per pound of pollutant back to billed property for quality related factors and $9.91 per 2,760 square feet of impervious for quantity related factors.

When utilizing the median utility rate of $3.00/month per SFU for fees generated, it is estimated that the cost associated with Streets/ROW, Vacant, Undeveloped, Agricultural will total approximately 44% of generated fees. Furthermore, it is understood that if a billed property is capturing stormwater and pollutants on-site through a fee credited stormwater control measure, that the above cost allocations will be the general savings to the stormwater management program and can be proportionately applied as a credit back to the fee payer.

Applicability of Stormwater Utility Credit

The purpose of this analysis and reason for identifying the proportionate share of costs between billed property vs. non-billed property is to provide a cost-based approach for calculating a potential credit for non-residential properties with installed Stormwater Control Measures (SCMs) and Best-Management Practices (BMP) systems that meet certain criteria when constructed and maintained on their property. However, it is understood that there is an overall benefit of stormwater management provided by the Berkeley County Stormwater Program that is universally applied to each property.

Under the perceived potential credit policy, non-residential property owners who voluntarily install stormwater control measures to reduce runoff impacts will be eligible to receive a stormwater fee credit allowance. The proposed Utility Fee Credit Manual will consider that there are universal benefits enjoyed by all properties within Berkeley County, that are a result of the costs allocated to Berkeley County's stormwater management program. Berkeley County Stormwater staff are proposing to cap the stormwater fee credits to balance the universal costs all fee payers have in common—the replacement of aging infrastructure and compliance with SCDHEC and EPA water quality requirements.

Based on the cost allocation analysis, approximately 44% of Berkeley County's stormwater management program expenses are contributed to by non-billed property. Thus, the billed property owners will continue to subsidize the cost of the non-billed properties. With universal benefits of the stormwater system, there are universal costs that should be equally borne by all fee payers. Therefore, Berkeley County Stormwater Staff proposes to cap the maximum amount of fee credits possible on a holistic scale across the County at 20% of the total monetary value of potential fee generated revenue. Potential fee generated revenue is assumed utilizing historical data trends showing approximately ten percent (10) non-payment of fees billed and the assumed median utility rate of $3.00/month per SFU.

With the aforementioned assumptions and associated cost allocation analysis, the stormwater management program will be allowed to fully and fairly recover necessary program costs associated with the management of stormwater, that all property owners benefit from, with an approved 20% holistic monetary value credit cap. It should be noted, that all property owners will benefit from the stormwater management program's actions, with an approved forty-two (42) percent cap on non-residential fee rates, under the application of a potential credit policy, that will be applied back to the users of the system, utilizing stormwater control measures, as fee credits.

Appendix C – TMDL Stations

BERKELEY COUNTY 2016 TMDL LIST

PRIORITY RANK	NOTE	BASIN	HUC_12	LOCATION	STATION	USE	CAUSE
1		SANTEE	030502010401	GUERIN CREEK AT OLD HOUSE CREEK	09B-12	SHELLFISH	FC
2		SANTEE	030502010706	GOOSE CK RES 2.3 M S OF GOOSE CREEK TOWN CENTER	RL-01008	AL	DO
2		SANTEE	030502010706	GOOSE CREEK RESERVOIR 1.0 MI NW OF SPILLWAY NEAR W SHORELINE	RL-03340	AL	CHLA, DO, TP
2		SANTEE	030502010706	GOOSE CREEK RESERVOIR 2.8 MI NW OF SPILLWAY NEAR OTRANTO	RL-04390	AL	CHLA, DO, TP
2		SANTEE	030502010706	GOOSE CREEK RESERVOIR 0.55 MI W OF DAM	RL-05412	AL	TP
2		SANTEE	030502010706	GOOSE CREEK RESERVOIR 2 MI N OF SPILLWAY	RL-06434	AL	DO
2		SANTEE	030502010706	GOOSE CK RESERVOIR 0.6 MI NW OF 2ND POWERLINES US OF BOAT RAMP, NEAR W SHORE BTWN 2 WESTERN EMBAYMENTS	RL-07017	AL	DO
2		SANTEE	030502010706	GOOSE CK RESERVOIR MIDLAKE IN LINE WITH NORTHBROOK BLVD	RL-08065	AL	DO, TP
2		SANTEE	030502010706	GOOSE CREEK RESERVOIR 0.1 MILE NORTHEAST OF THE JOHN R. BETTIS BOAT LANDING AND 0.1 MILES SOUTHEAST OF ST-033 NEAR THE NORTHEAST BANK.	RL-09081	AL	CHLA, TP
2		SANTEE	030502010706	LAKE, GOOSE CK RESERVOIR 1.95MI WEST OF POPPENHEIM CROSSING	RL-10104	AL	CHLA, DO, TP
2		SANTEE	030502010706	LAKE, GOOSE CK RESERVOIR 2.5MI SW OF POPPENHEIM CROSSING	RL-10108	AL	CHLA, DO, TP
2		SANTEE	030502010706	GOOSE CREEK RESERVOIR APPROXIMATELY 1.3 MILES UPSTREAM FROM THE DAM. SITE IS LOCATED 100 YARDS SOUTH OF THE MAJOR POINT ON THE EAST BANK IN THE MIDDLE OF THE RESERVOIR.	RL-11118	AL	CHLA, PH, TP
2		SANTEE	030502010706	GOOSE CK RESERVOIR APPROX 250 YDS NW OF END OF HANAHAN RD	RL-13132	AL	PH, TP
2		SANTEE	030502010706	GOOSE CREEK RESERVOIR 100 M US OF DAM	ST-032	AL	CHLA, TP
2		SANTEE	030502010706	GOOSE CK RESERVOIR AT 2ND POWERLINES US OF BOAT RAMP	ST-033	AL	TP
3		SANTEE	030502010701	TAIL RACE CANAL AT US 52 & 17A BELOW LAKE MOULTRIE (SC-033)	CSTL-062	FISH	HG
3		SANTEE	030502010503	WASSAMASSAW SWP AT US 176	CSTL-063	REC	ECOLI
3	#	SANTEE	030502010101	DIVERSION CANAL AT SC 45 12.6 MI W OF ST STEPHENS (SC-025)	CSTL-079	AL	CU, DO
3		SANTEE	030502010101	DIVERSION CANAL AT SC 45 12.6 MI W OF ST STEPHENS (SC-025)	CSTL-079	FISH	HG
3		SANTEE	030502010101	LAKE MOULTRIE @ DAM	CSTL-080	FISH	HG
3		SANTEE	030502010203	WADBOO SWP AT SC 402	CSTL-113	FISH	HG
3		SANTEE	030502010704	BACK RIVER RES IN FOREBAY EQUIDISTANT FROM DAM AND SHORELINES	CSTL-124	AL	DO
3		SANTEE	030502010304	EAST FORK OF COOPER RIVER NEAR QUINBYCR	CSTL-564	FISH	HG
3		EDISTO	030502050202	DEAN SWAMP AT US 176	E-030	REC	ECOLI
3		SANTEE	030502010706	GOOSE CK AT S-08-136 BRIDGE	MD-039	REC	ENTERO
3		SANTEE	030502010704	COOPER RIVER @ BUSHY PARK	MD-042	FISH	HG
3		SANTEE	030502010704	DURHAM CK AT S-08-9 BRIDGE	MD-217	FISH	HG
3		SANTEE	030502010703	FOSTER CREEK AT CHARLESTON CPW WATER INTAKE	MD-240	AL	DO
3		SANTEE	030502010706	LAKE, GOOSE CK RESERVOIR 1.95MI WEST OF POPPENHEIM CROSSING	RL-10104	REC	ECOLI
3		SANTEE	030502010402	BERESFORD CREEK 5.3 MI NNE OF WANDO AND COOPER RIVER CONFLUENCE	RO-056092	AL	DO
3		SANTEE	030502010301	TURKEY CK AT FOREST SERVICE RD 251 IRISHTOWN FM SC 402	RS-02483	REC	ECOLI
3		SANTEE	030501120105	CRAWL CREEK AT US 52	RS-12071	AL	DO
3		SANTEE	030501120105	CRAWL CREEK AT US 52	RS-12071	REC	ECOLI
3		SANTEE	030501120101	LOWER SANTEE RIVER AT WILSON'S LANDING BELOW SPILLWAY DAM	SC-024	AL	DO
3		SANTEE	030502010101	TRIBUTARY 0.6 KM UPSTR OF SC HWY. 6 NEAR CROSS HS	SC-026	REC	ECOLI
3		SANTEE	030502010101	DUCK POND CREEK @ HWY. 6	SC-034	REC	ECOLI
3		SANTEE	030501120105	REDIVERSION CANAL @ HWY. 45 BRIDGE	SC-037	AL	DO
3		SANTEE	030501120206	SANTEE RVR AT SC 41/US 17A NE OF JAMESTOWN	ST-001	FISH	HG
3		SANTEE	030502010201	WALKER SW AT US 52 2.5 MI S ST STEPHENS	ST-007	AL	DO
3		SANTEE	030501120106	SANTEE RVR AT US 52 6.5 MI NNW OF ST STEPHENS	ST-016	AL	PH
3		SANTEE	030501120105	REDIVERSION CANAL AT US 52 (SC-037A)	ST-031	FISH	HG
3		SANTEE	030502010101	LAKE MOULTRIE @ FRED L. DAY LANDING	ST-530	FISH	HG
3		SANTEE	030502010101	LAKE MOULTRIE @ HATCHERY LANDING	ST-531	FISH	HG
3		SANTEE	030501120101	SANTEE RIVER BELOW LAKE MARION (WILSONS)	ST-532	FISH	HG

HUC- Hydraulic Unit Code

USE:
REC-Recreational
AL- Aquatic Life
FISH- Fish Consumption
SHELLFISH- Shellfish Consumption

NOTE:
#- Further investigation required

CAUSE:
CHLA- Chlorophyll-a
TP- Total Phosphorus
HG- Mercury
FC- Fecal Coliform
ECOLI- Escherichia coli
ENTERO- Enterococcus
DO- Dissolved Oxygen