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CLERK TO COUNCIL

AGENDA  
NATURAL RESOURCES COMMITTEE

Tuesday, September 8, 2015

2:00 p.m.

Executive Conference Room

Administration Building

Beaufort County Government Robert Smalls Complex

100 Ribaut Road, Beaufort

Committee Members:

Brian Flewelling, Chairman  
Alice Howard, Vice Chairman  
Gerald Dawson  
Steve Fobes  
William McBride  
Jerry Stewart  
Roberts "Tabor" Vaux

Staff Support:

Tony Criscitiello, Planning Director  
Ed Hughes, Assessor  
Eric Larson, Division Director  
Environmental Engineering  
Dan Morgan, Division Director  
Mapping & Applications

1. CALL TO ORDER – 2:00 P.M.
2. RURAL AND CRITICAL LAND PRESERVATION PROGRAM – HISTORY AND OVERVIEW ([backup](#))
3. CONTINUED DISCUSSION / AN ORDINANCE TO AMEND THE STORMWATER MANAGEMENT UTILITY ORDINANCE AS ADOPTED AUGUST 22, 2005 TO PROVIDE FOR AMENDMENT OF THE RATE STRUCTURE, ADJUST UTILITY RATES, AND TO MODIFY CERTAIN TERMS TO ACCURATELY REFLECT ADMINISTRATION STRUCTURE (TO ADOPT RATE STRUCTURE E) ([backup](#))
4. SUCCESSFUL AWARD OF A CLEAN WATER ACT SECTION 319 GRANT IN THE AMOUNT OF \$792,000 (60% OF THE PROJECT COST) FOR THE OKATIE WEST REGIONAL DETENTION BASIN PROJECT TO BE LOCATED ON THE NEW LEAF LLC TRACT BEING PURCHASED WITH RURAL AND CRITICAL LAND AND STORMWATER FUNDS ([backup](#))
5. EXECUTIVE SESSION
  - A. Discussion of negotiations incident to proposed contractual arrangements and proposed purchase of property / Proposed purchase of property pursuant to the Beaufort County Rural and Critical Lands Program

6. ADJOURNMENT

2015 Strategic Plan Committee Assignments  
Comprehensive Plan Update  
Stormwater Management and Rate Analysis



# Beaufort County Rural and Critical Land Preservation Program





# Beaufort County's Comprehensive Plan

- First Comp Plan in South Carolina
- Passed in 1997, but not without controversy
- ZDSO adopted to implement Com. Plan
- Protect rural areas, important natural, historic, and cultural resources and sites deemed “critical”
- Creation of Beaufort County Rural and Critical Lands Program (R&C Board)

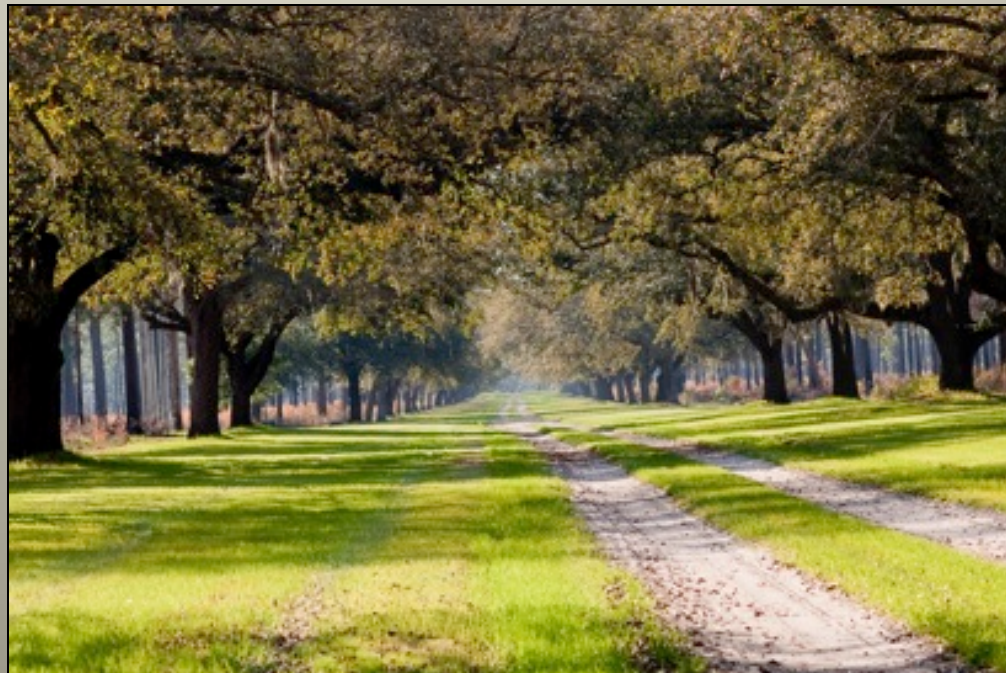
# Rural and Critical Lands

- Critical Lands: Defensive conservation tool
  - Traffic alleviation (95,815 trips avoided)
  - Amelioration of over-development
  - Targeted environmental properties (flooding, zoning, etc.)
  - Fee based purchases
- Rural Lands: Proactive conservation tool
  - Purchase of Development Rights
  - Transfer of Development rights



# Easement vs. Fee-Simple

- The decision involves which method is right for conservation and the landowner
- Conservation easements can provide public benefit for less
- Fee-simple for access or easement not possible



# Funds expended: Conservation Easement v. Fee

## Conservation Easement (PDR)

<u>Acres</u>	<u>Total Project cost</u>	<u>R&amp;C contribution</u>
12,309	\$55 mil	\$32.6 mil

## Fee

<u>Acres</u>	<u>Total Project Cost</u>	<u>R&amp;C contribution</u>
11,067	\$107 mil	\$89 mi

\* Please see handouts



# Rural and Critical Lands Partnerships

## **\$37 million in Partner funding**

- Government agencies: USDA NRCS, DOD (Marine Corps Air Station), Department of Natural Resources, NOAA CELCP Program, BC Stormwater Utility
- Local municipalities, (Factory Creek)
- Non-profits: Beaufort County Open Land Trust, The Trust for Public Land
- Others: State Conservation Bank, private landowners and businesses

# Bonds: 4 passed totaling \$135 million over 16 years

2002

\$40 million dollar bond  
Measure passed by 66%

2006

\$50 million dollar bond  
The ballot measure passed by 66%.

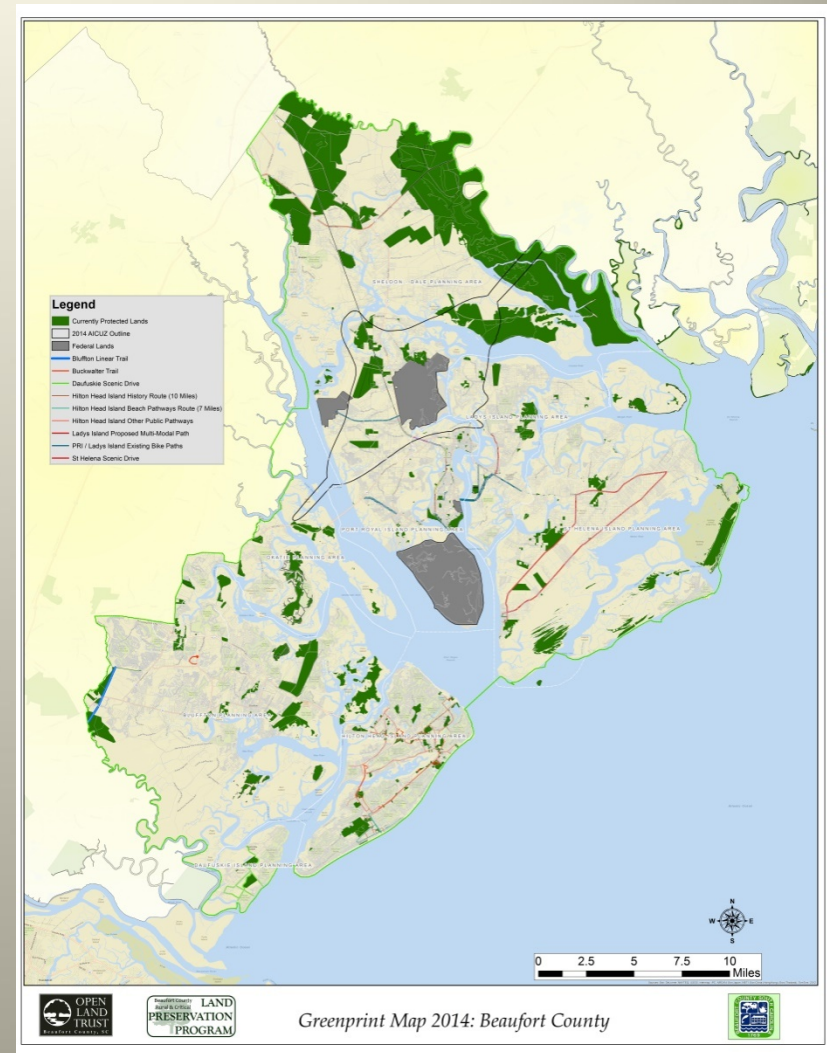
2012

\$25 million dollar bond (up to 20% for  
park infrastructure)  
The ballot measure passed 62%.

2014

\$20 million dollar bond (up to 20% for  
park infrastructure)  
The ballot measure passed 72%.

**\*\*See spreadsheet**



## Future Program Goals

- Continue protecting water quality throughout the County.  
Partner with BC Stormwater Utility
- Focus on protecting the highest priority targets
- Build significant conservation areas by purchasing important lands adjacent to land we already own
- Manage and maintain the current inventory of R and C Protected lands with an emphasis on the Passive Parks for the public

# “Planning” District Priorities

Greenprint Story Map



# *Remaining Funding*

	Acquisition	Development
2012 Bond issue	\$10,060,116 *	—
2014 Bond issue	\$15,000,000	\$5,000,000
Gift	-	<u>\$1,372,383</u>
Total	\$25,060,116	\$6,372,383

\* \$4,500,000 could be used for development

# Bringing the Passive Parks “Online”

- Inventory existing properties
- Evaluate properties Recommend uses, funding, and stewardship
- Define priorities
- Clarify management responsibilities
- Generate Action Plan



**BC Rural and Critical Land Preservation Program  
Conservation Easements Acquired 1997-2015**

1 of 4

No.	Property Name	Year	Acres	Purchase Price	RCLP Funds Used	Other Funds Used	Type
14	Winn Tract	2004	68.910	311,250	155,625	155,625	CE/RE
15	Penn Center (Tree Farm)	2004	195.411	838,000	419,000	419,000	CE
17	Calhoun Plantation	2004	143.290	850,000	850,000	0	CE
27	Rathbun	2005	27.500	1,900,000	700,000	1,200,000	CE/RE
30	Ulmer Family Property - #1	2006	449.000	3,100,000	1,550,000	1,550,000	CE
36	Ulmer Family Property - #2	2007	127.410	3,850,000	1,925,000	1,925,000	CE
37	Ulmer Family Property - #3	2007	53.190	1,975,000	987,500	987,500	CE
38	Norman Jones Farm (Scott Hill LP)	2007	92.000	360,000	360,000	0	CE
39	Sanders Property (Station Creek)	2007	158.820	1,680,000	420,000	1,260,000	CE
41	Seabrook Road Donation	2007	14.880	0	0	0	CE
45	McLeod Farms	2007	277.290	8,500,000	5,000,000	3,500,000	Fee/CE/RE
47	Chisolm Plantation	2008	4717.500	2,000,000	1,500,000	500,000	CE
49	Crosby/Pepperhall	2008	17.120	1,700,000	1,700,000	0	CE
51	Ulmer Family Property - #4	2008	257.869	6,000,000	3,000,000	3,000,000	CE
52	Oak Mulligan	2008	157.190	2,200,000	1,100,000	1,100,000	CE/RE
55	Trosdal/May River - Linden Plantation	2009	50.681	0	0	0	CE
64	Sanders (Okatie)	2010	47.438	2,500,000	2,500,000	0	CE
65	Henry Farms	2010	285.610	3,000,000	1,500,000	1,500,000	CE
68	Orange Grove Plantation	2011	784.74	3,750,000	1,250,000	2,500,000	CE
69	Coosaw Plantation	2011	1529.480	2,493,000	833,000	1,660,000	CE
70	Halbrook Sanders	2011	0.330	30,000	15,000	15,000	CE
71	Halbrook Sanders II	2011	10.000	20,000	10,000	10,000	CE
73	Joyce Crosby (New Riverside)	2011	40.000	200,000	200,000	0	CE
74	Zeke Jordan (New Riverside)	2011	127.283	636,385	636,385	0	CE
75	Lands End Plantation Holding Corp	2011	231.010	471,500	471,500	0	CE
76	Penn Center CE	2011	92.338	484,500	242,250	242,250	CE
78	Binden Plantation	2012	1,317.05	2,500,000	2,500,000	0	CE
88	Pulaski/Carson	2013	34.892	206,000	103,000	103,000	CE
90	Campbell	2014	335.957	895,000	895,000	0	CE
91	Harvey Partnership	2014	155.28	795,000	397,500	397,500	CE
92	Dopson	2014	291.620	500,000	250,000	250,000	CE
94	Christian Trask	2014	74.320	296,043	148,034	148,009	CE

**BC Rural and Critical Land Preservation Program  
Conservation Easements Acquired 1997-2015**

[illegible]



**BC Rural and Critical Land Preservation Program**  
**Fee Simple Properties Acquired 1997-2015**

No.	Property Name	Year	Acres	Purchase Price	RCLP Funds Used	Other Funds Used	Type
1	St. Helena Island Chowan Creek	1998	9.005	570,000	217,000	353,000	Fee
2	Lemon Island	1999	380.270	2,750,000	2,500,000	250,000	Fee
3	Charlotte Island	2000	34.690	990,486	990,486		Fee
4	Palm, Murdaugh, Legree Island	2000	24.240	1,800,000	1,800,000		Fee
5	Barrel Landing	2001	30.670	2,875,000	2,875,000		Fee
6	Davis Tract (Greene Shell Ring Park)	2001	3.300	200,000	100,000	100,000	Fee
7	North Williman Island	2002	8000.000	4,035,000	1,000,000	3,035,000	Fee
8	Buzzard Island	2002	120.000	600,000	150,000	450,000	Fee
9	Bluffton Oyster Company	2003	5.000	2,397,709	2,397,709		Fee/Lease
10	Ford Shell Ring (Skull Creek)	2003	6.885	3,950,000	1,975,000	1,975,000	Fee/RE
11	Okatie West (Okatie Preserve)	2004	82.340	4,950,000	4,950,000		Fee
12	Colony West Properties (Pickney Colony Park)	2004	38.210	3,250,000	3,250,000		Fee
13	Heyward Point - Altamaha	2004	100.070	3,100,000	3,100,000		Fee/RE
16	Butler Marine (Crystal Lake)	2004	4.380	1,250,000	1,250,000		Fee
18	Ft. Fremont	2004	14.410	5,400,000	5,400,000		Fee/RE
19	Okatie South (Okatie Preserve)	2004	36.740	2,150,000	2,150,000		Fee
20	Barringer (Eddings Point Rd.)	2004	1.780	375,000	375,000		Fee
21	Stewart Foundation (Crystal Lake)	2005	11.800	300,000	300,000		Don/Fee
22	Aranda (Stoney Preserve)	2005	3.460	1,250,000	625,000	625,000	Fee
23	Bathey/Wilson (Lucy Creek)	2005	63.460	1,250,000	780,875	469,125	Fee/RE
24	DuPriest (Crystal Lake)	2005	4.890	1,000,000	1,000,000		Fee
25	Ft. Frederick (Keyserling: adjacent to US Navy H)	2005	1.930	325,000	325,000		Fee
26	Lucky	2005	70.410	750,000	517,125	232,875	Fee/RE
28	AMGRAY Donation	2005	20.780	0	0		Don/Fee
29	Baxter Associates	2006	25.290	1,250,000	1,250,000		Fee
31	McDowell Hummocks (Johnson Crk & Harbor R	2006	3.960	650,000	350,000	300,000	Fee/RE
32	Pawley (Mitchelville)	2006	2.310	450,000	225,000	225,000	Fee
33	Robinson (Crystal Lake)	2006	1.040	200,000	200,000		Fee
34	New Riverside I	2006	464.320	2,250,000	2,250,000		Fee
35	Bluffton Oyster Company #2	2007	1.863	1,500,000	750,000	750,000	Fee
40	Widgeon Point (Lemon Island)	2007	162.240	4,000,000	3,500,000	500,000	Fee
42	Robinson #2 (Crystal Lake)	2007	0.150	30,000	30,000		Fee

**BC Rural and Critical Land Preservation Program**  
**Fee Simple Properties Acquired 1997-2015**

43	Bluffton Park	2007	9.650	2,000,000	1,750,000	250,000	Fee
44	Jones Landing (Buddy and Zoo Boat Landing)	2007	4.560	1,070,000	1,070,000		Fee
45	McLeod Farms	2007	98.110	8,500,000	5,000,000	3,500,000	Fee/CE/RE
46	Burch Tract	2007	24.550	520,000	520,000		Fee
48	New Riverside II (Palmetto Bluff)	2008	294.990	2,250,000	2,250,000		Fee
50	E. Adams Tract	2008	57.170	650,000	440,000	210,000	Fee/RE
53	Burch Tract 09	2009	72.230	1,500,000	1,500,000		Fee
54	Crystal Lake 08	2009	2.530	450,000	450,000		Fee
56	Faulkner Tract (Barell Landing)	2010	6.780	1,786,500	1,786,500		Fee
57	Braniger Tract (Barrell Landing)	2010	5.650	600,000	600,000		Fee
58	Jarvis Creek (Stoney Preserve)	2010	4.649	2,534,010	1,267,005	1,267,005	Fee
59	Palmer Conservation Easement	2010	30.000	500,000	500,000		CE
60	Fr. Freemont (Dowling '10)	2010	2.574	530,000	530,000		Fee
61	The Green (Elizabeth Crofut Waterhouse Squar	2010	1.057	685,000	342,500	342,500	Fee/CE
62	Martin/Reeder/Porter (Barrell Landing)	2010	5.980	1,823,900	1,823,900		Fee
63	Ihly Farms	2010	63.070	2,000,000	1,000,000	1,000,000	Fee/RE
66	Amber Karr/Broad River Drive	2010	12.550	350,000	350,000		Fee
67	Mitchellville Road Beach Parcel	2011	19.000	1,400,000	700,000	700,000	Fee
72	Factory Creek - Trumps	2011	0.330	850,000	200,000	650,000	Fee
77	Factory Creek - Pigler	2012	0.580	600,000	200,000	400,000	Fee
79	Beach City Road (3 parcels, HHI)	2012	3.767	522,760	261,380	261,380	Fee
80	Parcel 9B-1 (Okatie Preserve)	2012	46.883	1,895,000	1,895,000		Fee
81	Parcel 9B-2 (Okatie Preserve)	2012	11.807	1,505,000	1,505,000		Fee
82	Okatie Marsh	2012	77.700	1,500,000	1,500,000		Fee
83	Beach City Road (BDC Capital, 2 parcels)	2013	1.520	350,000	248,000	102,000	Fee
84	Wooddall Holdings LLLP (Garvey Hall)	2013	87.170	1,143,000	1,143,000		Fee
85	Parcel 9A (Okatie Preserve)	2013	8.850	1,400,000	1,400,000		Fee
86	Littleton (Ft. Frederick)	2013	0.65	75,000	75,000		Fee
87	Pinckney Point	2013	229.18	6,950,000	6,950,000		Fee
89	Graves	2013	18	4,000,000	4,000,000		Fee
93	4P Property	2014	3.920	189,000	189,000		Fee
96	Forby	2015	9.980	400,000	200,000	200,000	Fee
97	Duncan Farms	2015	77.875	875,000	875,000		Fee/CE
98	Chechessee (swap with Okatie Marsh)	2015	43.570	0	0		Fee

**BC Rural and Critical Land Preservation Program**  
**Fee Simple Properties Acquired 1997-2015**

	TOTALS		11066.775	107,252,365	89,104,480	18,147,885	

# **THE EVOLUTION OF THE RURAL & CRITICAL LAND PRESERVATION PROGRAM AND A PATH FORWARD FOR THE OPERATIONS OF PASSIVE PARKS**

## **BACKGROUND**

The genesis of the Rural & Critical Land Preservation (RCLP) Program can be traced back to the 1997 Comprehensive Plan (Section 4.8.3.). At that time the County was experiencing the start of unprecedented countywide growth; and the effect was anticipated to be a sharp decline in the quality of life for the citizens of Beaufort County. The environmental impacts of rapid growth were seen as one of the two major negative impacts on the quality of life; the other being the traffic impacts on our highways and bridges.

The Rural & Critical Land Preservation Program became a partial answer to the growth pressures and, over the course of the last 18 years, led to the program we have today protecting over 20,000 acres of land either in fee purchase or conservation easements.

## **THE PLANNING STAFF RELATIONSHIP TO THE RURAL & CRITICAL LAND PRESERVATION PROGRAM**

Upon the establishment of the RCLP Program the County Council created a Rural & Critical Land Preservation Board (Board) to oversee the implementation of the program. The Board was vested with certain powers, duties, and responsibilities and is answerable to the County Council for their role in the program. The Planning Department became the staff to the Board, much in the same manner that the Planning Staff works with the Planning Commission. In essence, the Planning Staff is an advisor to the Board in matters of policy-making and in the realm of making recommendation to the County Council.

In the early years of the program the emphasis of the program was in getting lands into the program, not so much in how to utilize the properties as parks. This was not done in a vacuum, because it was always understood that at sometime in the future the question would arise as to when and how properties would become “Passive Parks”.

With the growing inventory of land holdings in the RCLP Program, the natural constituency of citizens interested in the program emerged in the form of the quasi-independent citizen advisory groups known as the “Friends Groups”. The Friends of Crystal Lake, the Friends of Fort Fremont, and the Heroes on Horseback, are prime examples of this phenomenon. These groups hold a vast potential for help and service to the county, as well as significant challenges to the County, if their energies and efforts are not harnessed in the right way. Also, because they are voluntary associations, they can flag in their enthusiasm due to fatigue or the loss of strong supporters.

## **THE HOW AND WHY OF PASSIVE PARKS**

The manner in which some parks become candidates to be passive parks has a lot to do with the citizens themselves. For example, when there is a friends group that coalesces around a



particular property, and adopts the property as their special mission in the community, there is at that moment the makings of a “Friends Group” that informs the debate about how to utilize the property. Often a friends group brings to the table certain attributes and talents that are unknown to exist beforehand, and can be harnessed to define the purpose of the park itself. The “Friends of Crystal Lake” have among their membership master gardeners and master naturalists. This is the perfect interplay for a public purpose to emerge (to protect and enhance the rare natural environment found at Crystal Lake); and a private purpose (to advance the cause of education for gardeners and naturalists).

Also by the mere fact that some parks are classified as a passive park can determine what can go on in the park; i.e., horseback riding, hiking, jogging, fishing, picnicking, concerts, etc. All of this affects the costs of Operations and Maintenance (O&M).

## **THE FINANCING OF PASSIVE PARKS**

When the four (4) bond referendums were passed authorizing the RCLP Program (1<sup>st</sup> Bond Referendum - \$40 million in November 2000; 2<sup>nd</sup> Bond Referendum - \$50 million in November 2006; 3<sup>rd</sup> Bond Referendum - \$25 million in November 2012; and 4<sup>th</sup> Bond Referendum - \$20 million in November 2014), the last two allowed for the first time the construction of passive park facilities. In effect, the citizens were telling the County Council that they expected the lands in the program to be utilized for passive parks, not just set aside for their natural beauty.

This caused an opportunity to arise concerning how a public/private partnership might pave the way toward solving the maintenance and operations dilemma surrounding the utilization of passive parks.

The biggest realization is that each passive park will be different in terms of how to structure a solution to the O&M question. The friends groups are real players in this equation; and it takes time and effort to tease out of the fabric of the deal-making process just how the passive parks can be brought on-line. It will take finding linkages with all facets of the community to establish cooperation, connection, and connectivity to make a real public/private partnership work. For example, the concept of heritage tourism could mean linking with bus tour groups to visit Fort Fremont at certain designated times, and having a waiting area at the park for a Friends of Fort Fremont group designee to give a tour of the park. The opening and closing of the Interpretive Center could happen at that point in time. Fees could be established for bus tour groups to offset the cost of the O&M issue.

## **THE SHORT TERM STRATEGY FOR PASSIVE PARK DEVELOPMENT**

The public perception of passive park development is just now starting to form as “Friends Groups” develop into a natural constituency for passive parks. The Planning Department, because of its inherent role in supporting the planning efforts of community preservation committees (CPs), is well experienced in operating in this kind of a citizen participation arena. Over the course of the next two to three years as the first three passive parks come online (i.e., Fort Fremont, Crystal Lake, Okatie Regional Park), the Planning Department will be able to determine what kind of demands will be placed upon the county for passive park services. The interdepartmental cooperation between the Planning Department, Facility Management

Department, and the Finance Department are now primarily focused on bringing the Passive Parks into existence.

## **THE LONG TERM STRATEGY FOR PASSIVE PARK DEVELOPMENT**

The bond referendums have had a salutary effect on the reputation of Beaufort County. The wide margin of support for the program in each of the previous four (4) bond referendums could predict an appetite for more bond referendums. This will especially be true if the public sees and experiences a thriving passive park environment. Success in this endeavor will create a momentum to build the management infrastructure for staffing the parks with actual employees working within a department dedicated to the passive park cause.

The balancing act will come in working with “friends groups” that will have given so much of their time, talents and energies to boot strap the effort from the beginning. With a dedicated department given to the passive park cause, the challenge will be to keep the “friends groups” alive and engaged while the county staff handles the day to day operations of the passive parks.

## **FUTURE PASSIVE PARKS WITH THE POTENTIAL FOR DEVELOPMENT**

1. Widgeon Point: This park has great potential for limited public access with the Beaufort County Open Land Trust taking the lead for limited maintenance and operations. The park is located on Lemon Island and is equidistant from Southern and Northern Beaufort County. The close proximity of the Port Royal Sound Foundation to the park could provide environmental educational opportunities for the general public, but most especially for the schools of Beaufort County.
2. Altamaha: This park is the site of some very significant archeological and historical Indian artifacts dating back to the early 16<sup>th</sup> century. The property is currently unimproved except for an interpretive sign. Public access to the site is a problem, and it must be weighed against the protection of the artifacts from looting of the property. This begs the larger question for the need of staffing for a future passive park department.
3. New Riverside: This 760-acre park has \$900,000 of restricted RCLP funds attached to it. It was looked at as a passive park to include walking trails, kayaking, and a public shooting range. It needs to be re-evaluated since a shooting range is no longer accepted as a potential use of RCLP program property.
4. Pinckney Point Park: This 38-acre park is a very sensitive environmental property and might be considered as a candidate for a long leaf pine plantation. The sale of timber off the property could be a source of revenue to offset the cost of maintaining the property over the course of time.
5. Ihly Farm Park: This 63-acre property is ideal for a future public boat landing because it is on deep water. Also, the access to deep water could be useful for mariculture and leasing of the dock space for that purpose.

**A RESOLUTION OUTLINING THE POLICY OF BEAUFORT COUNTY  
WITH REGARDS TO PUBLIC-PRIVATE VENTURES FOR USE ON  
PROPERTIES ACQUIRED THROUGH THE RURAL AND CRITICAL  
LAND PRESERVATION PROGRAM**

**WHEREAS,** Beaufort County Council finds it is in the County's best interest to engage in Private-Public Ventures to utilize County-owned park lands acquired through the Rural & Critical Land Preservation Program, including ventures with both for profit and not for profit entities; and

**WHEREAS,** The public benefit derived from this policy will lead to the enjoyment of our passive park lands, and a better understanding of the environmental treasures that the parks represent to our citizens; and

**WHEREAS,** The County sees it as an opportunity to utilize the expertise and the willingness of private enterprise to put to productive use park lands currently under- utilized; and

**WHEREAS,** The Beaufort County Council wishes to find opportunities to utilize lands that represent unique environmental attributes that showcase the best qualities of our county's natural environment.

**NOW, THEREFORE, BE IT RESOLVED** by Beaufort County Council, that the following hereby shall outline Beaufort County's policy regarding public-private ventures for use on properties acquired through the Rural and Critical Land Preservation Program:

**OBJECTIVES:**

While some properties procured by Beaufort County through the Rural and Critical Lands Program should remain in their pristine condition or are unsuitable for use as parks, other properties can be utilized for limited public access and enjoyment. These limited access parks can be categorized as low impact passive parks. Only low impact passive parks should be candidates for the Private-Public Venture Policy.

**STANDARDS:**

The County Council should classify all the parks as to their best suitability for public access, and directs The Beaufort County Planning Department, the Rural & Critical Land Preservation Board, the program's consultant (Beaufort County Open Land Trust), and the Planning Commission to present a classification system to County Council for this task. The County Council further directs that the management and operations of the passive parks be of specific budgetary consideration (whether in the context of direct county operations or in Private-Public Ventures). The County Council also directs that a County department be identified for authorization to provide oversight and interaction regarding private-public ventures.

## CRITERIA TO BE CONSIDERED FOR PRIVATE – PUBLIC VENTURES:

The County Council finds that the following may serve as a template to evaluate the appropriateness of engaging in a Private-Public Venture.

1. The entity offering its services under this arrangement shall articulate its vision of how it intends to utilize the park.
2. The entity shall explain how the proposed use of the park will enhance public enjoyment of the natural environment after development occurs.
3. A business model shall be presented to the County Council that outlines the revenues stream and how expenses will be covered. This shall be stated in context of what the business model is expected to achieve over the life of the contract.
4. The County staff will develop a park budget that outlines the county's financial responsibilities and the operational requirements for staffing and development.
5. The County procurement ordinance shall be followed in all cases where goods and services are acquired through a private-public venture.
6. Contractual language will include sufficient bonding and liability requirements to protect the County and, at the County's option, return the property to its best state at the termination of the contract.

Adopted this 9<sup>th</sup> day of January, 2012.

COUNTY COUNCIL OF BEAUFORT COUNTY

By: 

Wm. Weston J. Newton, Chairman

ATTEST:



Suzanne M. Rainey, Clerk to Council




**BEAUFORT COUNTY STORMWATER UTILITY**  
**120 Shanklin Road**  
**Beaufort, South Carolina 29906**  
**Voice (843) 255-2801 Facsimile (843) 255-9478**



**INTEROFFICE MEMORANDUM**

**TO:** Beaufort County Council

**FROM:** Eric W. Larson, Stormwater Manager 

**SUBJECT:** 2015 Stormwater Rate Study – Natural Resources September 8, 2015 workshop

**DATE:** September 8, 2015

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Please find the following attachments for the agenda packet of the Natural Resources Committee 9/8/15.

- Letter from the Stormwater Utility Board w/ minutes of the August 26, 2015 meeting ([backup](#))
- Powerpoint Presentation – SWU Analysis of Rural, Ag, Vacant tracts greater than 5 acres (expanded) ([backup](#))
- PDF file of series of 9 maps explaining the 5 acre cap effect on Rural, Ag, and Vacant properties ([backup](#))
- Email from Jill Stewart, DHEC, in response to inquiry by Beaufort County on MS4 enforcement ([backup](#))
- Summary of FY 16 Utility budget ([backup](#))
- Folder containing PDF project sheets of the projects in the 5 year capital plan and Excel summary ([backup](#))
- Powerpoint Presentation of the Stormwater Utility 5 year plan from January 22, 2015 workshop ([backup](#))
- Note: the prepared presentation on the modified rate model by ATM will be made available at the meeting.

During the workshop, we recommend following this agenda for presentation of information:

1. Graphical presentation of the Rural, Agricultural use, and vacant parcels greater than 5 acres GA fee cap
2. ATM presents results of the GA Cap model and adjusted fee amounts
3. Discussion of the proposed 5 year stormwater utility plan (including MS4, CIP, and O&M) and the FY 16 budget

Thank you for your consideration.



**BEAUFORT COUNTY STORMWATER UTILITY**  
**120 Shanklin Road**  
**Beaufort, South Carolina 29906**  
**Voice (843) 255-2805 Facsimile (843) 255-9436**



September 3, 2015

Paul Sommerville, Chairman  
Beaufort County Council  
Post Office Drawer 1128  
Beaufort, South Carolina 29901

Re: Stormwater Management Utility Rate Study July 20, 2015

Dear Mr. Somerville:

This letter serves to inform County Council of actions the Stormwater Management Utility Board took at the meeting on August 26, 2015. The Board unanimously reaffirmed previous motions passed on July 15, 2015. These motions are as follows:

1. Motion to accept the rate study with the recommended option E and the rates as identified in the rate study.
2. Motion to recommend the revised Stormwater Management Utility Budget for Fiscal Year 2016.
3. Motion to acknowledge the draft ordinance and agree with the changes in the ordinance to be brought before County Council.

The board also addressed actions that would be necessary if the rate structure change and fee increase is not passed by County Council. For your information, I am attaching a draft copy of the minutes. Highlighted in the minutes are the Board's suggestions to reevaluate the need for Capital Improvement Projects and consultant studies. The board feels that MS4 implementation is nonnegotiable and should be prioritized within the utility budget.

If you have any questions, please contact me 803-920-6701 or [don@djsmith.com](mailto:don@djsmith.com)

Sincerely,

Donald J. Smith, Jr.  
Chairman Stormwater Management Utility Board  
P.O. Box 50  
Seabrook, SC 29940

Attachment: Draft August 26, 2015 Stormwater Management Utility Board Minutes

cc: Eric Larson  
Gary Kubic

**Beaufort County Stormwater Management Utility Board (SWMU Board)**  
***Meeting Minutes***

August 26, 2015 at 2:00 p.m. in Beaufort Industrial Village Building #3 Conference Room  
Draft 9-2-2015

**Board Members**

**Present**

Don Smith  
William Bruggeman  
Marc Feinberg  
Larry Meisner  
Patrick Mitchell  
James Fargher

**Absent**

Allyn Schneider

**Ex-Officio Members**

**Present**

Andy Kinghorn  
Jeremy Ritchie  
Scott Liggett

**Absent**

Van Willis

**Beaufort County Staff**

Eric Larson  
Eddie Bellamy  
Carolyn Wallace  
Kevin Pitts  
Patricia Wilson  
Allison Coppage  
Thomas Keaveny  
James Minor, Jr.

**Visitors**

Dan Duryea, BC Solid Waste Board  
Reed Armstrong, Coastal Conservation League  
Cynthia Bensch, County Council  
Alice Howard, County Council  
Shelby Berry, Bft. Soil & Water Conservation Dist.  
Denise Parsick, Bft. Soil & Water Conservation Dist.  
Kate Schaefer, Coastal Conservation League  
Paul Moore, Ward Edwards

**1. Meeting called to order – Don Smith**

- A. Agenda – The board members consented to switch item (5) Unfinished Business with item (6) New Business. The agenda was approved with this change.
- B. July 15, 2015 Minutes - Approved.

**2. Introductions – Completed.**

**3. Public Comment(s) – None.**

**4. Reports –** (Mr. Eric Larson and Mr. Eddie Bellamy provided a written report and Mr. Alan Eisenman provided a copy of the June financials and they were attached to the agenda and can be accessed at <http://www.bcgov.net/departments/Administrative/beaufort-county-council/boards-and-commissions/council-appointed/board-list/stormwater-management-utility-board/agendas/2015/082615.pdf>)

**A. Utility Update – Eric Larson**

Mr. Eric Larson referred to the report he submitted with the agenda packet. He had nothing new to report.



**B. Municipal Separate Storm Sewer System (MS4 Update) – Eric Larson**

*MS4 Permit Application* – The County received a letter from SCDHEC on August 21<sup>st</sup>. Public announcement was delayed until September 1<sup>st</sup>. The effective permit date should be October 1, 2015.

**C. Monitoring Update – Eric Larson**

*US 278 Pond Project*- Mr. Kevin Pitts and Mr. Danny Polk are working together to provide preconstruction sampling as a baseline. Later sampling should result in improved water quality and volume control as a result of the project.

*USCB and County MOU* – Meetings with Dr. Warren (USCB) have been postponed until September. The goal is to restructure the MOU for changing monitoring needs due to Capital Improvement Projects (CIP) and MS4 requirements without having to constantly amend the MOU.

**D. Stormwater Implementation Committee (SWIC) Report – Eric Larson**

The focus (of the SWIC meetings) has been the Rate Study and selection of the consultant for the Storm Water Management Plan Update. Both the July 15, 2015 and August 12, 2015 meeting minutes are included in this report.

**E. Stormwater Related Projects – Eric Larson**

*Bluffton Gateway Final Development and Island Shops Final Development Plan Review* – Both of these projects are private developments of large shopping centers. Mr. Larson reviewed these plans as part of the Staff Review Team (SRT) and he does reviews for the City of Beaufort as well. One is the Wal-Mart Center by the Airport off of Sea Island Parkway. The developers for these projects are not local and they question the complexity and cost of implementing Stormwater design standards. Mr. Larson believes these issues need to be addressed when the BMP Manual is being reviewed as part of MS4.

**Professional Contracts Report – Eric Larson**

*Utility Rate Study* – Will be discussed under Old Business.

*Stormwater Management Plan (Master Plan) Update* –The Stormwater Implementation Committee interviewed Applied Technology Management, Center for Watershed Protection, Bowman Construction and Ward Edwards. The responses were based on qualifications. The committee's recommendation is Applied Technology Management (ATM). The committee will meet with ATM to establish a scope of work, cost of service and contract and should be ready to present a recommendation to hire ATM at the September meeting.

**F. Regional Coordination - Eric Larson**

*Salinity Study (\$25,000 Budget –County Portion)* – The advisory committee is meeting on September 10<sup>th</sup> to go over the final report. SC-DNR has asked to present the findings at the September 30<sup>th</sup> Board Meeting.

*Solid Waste Board Request for Support* – Will be presented under New Business.

*SC 170 Widening* – Mr. Larry Meisner confirmed that Mr. Zinn is the same individual who made a public comment during the last board meeting. Mr. Larson reaffirmed that the County continues to meet with Mr. Zinn to resolve matters of concern to.

**G. Financial Report –**

The report was included in the packet and no questions were addressed.

**H. Maintenance Projects Report – Eddie Bellamy**

Mr. Eddie Bellamy reported that five major and twenty-three minor or routine project summaries were included in his report. Ms. Cynthia Bench questioned whether Davis Road by the new school in Bluffton was having flooding issues. Mr. Bellamy stated that he is not aware of flooding issues and the drainage is adequate. Mr. Donald Smith questioned if the recent excessive rain has caused any issues. Mr. Bellamy and Mr. Jeremy Ritchie replied that Bluffton Parkway and the area between

Masters Way and Buckwalter Parkway were experiencing flooding issues. Unclogging a storm drain resolved one issue, but staff is still trying to locate the other drainage problem.

## **5. New Business –**

- A. Public Education Briefing-** Denise Parsick - Beaufort Soil and Water Conservation District  
Ms. Denise Parsick gave a 2015 fiscal year end briefing to the Stormwater Management Utility Board Members. She provided a presentation in advance which can be viewed on the posted agenda.
- B. Solid Waste and Recycling Board Letter for Stormwater Management Utility Board-** Dan Duryea- Solid Waste Board Chairman  
Mr. Dan Duryea referred to a letter which was included in the posted agenda. Mr. Duryea is seeking the support of the Stormwater Board to phase out drop-off convenience centers for curbside service. The Stormwater Board would like more background information and consequences of MS4 implementation before discussions continue.
- C. Okatie West Pond Acceptance of Section 319 Grant and Recommendation to Beaufort County's Natural Resources Committee -** Eric Larson  
Mr. Larson included the 319 Grant Acceptance documents and the Recommendation Memo to the Natural Resources Committee in the posted packet. Mr. Larson explained how the grant is a 60% grant with 40% matching requirement. Federal funding totals \$792,000 and the Non- Federal matching portion is \$528,000. The total amount is \$1,320,000. Questions about fluctuation in the project cost were answered by stating that the total Federal funding will not increase with an increased cost, however, if the project costs are lower, then Federal funding will still only pay 60% which would reduce the Federal amount paid. This project was previously approved so the board unanimously recommended the grant approval to the Natural Resources Committee.

## **6. Unfinished Business –**

- A. Update on Rate Study –** Eric Larson  
Mr. Larson advised all in attendance that the rate study information being presented is available by viewing the July 15, 2015 Stormwater Management Utility Board Meeting Video at [http://beaufort.granicus.com/MediaPlayer.php?view\\_id=3&clip\\_id=2204](http://beaufort.granicus.com/MediaPlayer.php?view_id=3&clip_id=2204); by visiting the Stormwater Management Utility home page and clicking on the relevant links at <http://www.bcgov.net/departments/Engineering-and-Infrastructure/stormwater-management/>; by watching the Natural Resources Committee Meeting on July 20, 2015 and County Council meetings on September 22, 2014, July 27, 2015, August 10, 2015 and August 24, 2015; and by watching the County Council workshop Mr. Larson presented on January 22, 2015. Mr. Larson informed the board that County Council has delayed the 3<sup>rd</sup> reading of the Stormwater Ordinance until September 14, 2015. This revised ordinance coincides with the recommended rate study model fee increase.

Mr. Larson presented a time line of the rate study process to the board. He highlighted issues that have been brought up at public hearings and council meetings. Two key concerns addressed are:

1. Private Citizens are concerned that their drainage issues are not being addressed. Many citizens feel that they are paying a Stormwater fee with no benefit. Mr. Larson referred to the Extent of Services which provides for publically owned infrastructure. With a fee increase, the Extent of Services could be expanded. Mr. Larson also stated that the County has experienced difficulty obtaining drainage easements from citizens to perform the necessary drainage maintenance. Without an easement, the County has no legal justification for providing the necessary maintenance.

2. The potential impact on Rural, Agriculture Use and Vacant Land parcels. County Council requested that the rate study model be adjusted to analyze a cap on five or more acres. Mr. Larson discussed the percentage of parcels that were five acres and greater and their impact on revenues. He also referred to monitoring data that suggest that vacant land does affect bacteria levels in undeveloped watershed areas. These parcels have been paying based on runoff factors and were paying an impervious percentage based on SFU. The new rate study terms this as Gross Area. His revenue analysis reflects that of the 126,000 [sic] billing accounts, 65,000 are county parcels and 3,118 meet the 5 acres or more criteria. Using this data set: **the existing** rate structure percentage of revenues is 9.66%; **Option A** percentage of revenues is 8.89%; and the recommended **option E** percentage of revenues is 5.94%. This analysis demonstrates less dependency from revenues generated by parcels five acres or greater using the recommended **option E**.

Mr. Larson also addressed an adjustment in Countywide Infrastructure (CWI) for the municipalities based on reallocation of infrastructure. Mr. Larson and County Staff met with the city and towns to go over all the maps and infrastructure calculations to fine tune the rate study model. This resulted in decreased percentages for the municipalities and an increased percentage for the County. Since the CWI is calculated to the penny and the model rounded to the whole dollar, the difference made no change in the County fee.

Mr. Larson plans on getting a simplified version of the presented information for the public. He also referred to correspondence with SCDHEC confirming time lines and fines assessed if MS4 implementation does not meet regulations such as the \$37,500 per day fine. Mr. Larson said Mr. Brian Flewelling (Chairman of the Natural Resources Committee) is working on a two hour workshop prior to the Natural Resource Committee meeting on September the 8<sup>th</sup>. Mr. Larson encouraged the board to attend and support that workshop. The Stormwater Management Utility Board unanimously reaffirmed the following motions:

1. Motion to accept the rate study with the recommended option E and the rates as identified in the rate study.
2. Motion to recommend the revised Stormwater Management Utility Budget for Fiscal Year 2016.
3. Motion to acknowledge the draft ordinance and agree with the changes in the ordinance to be brought before County Council.

Mr. James Fargher questioned how individuals in Homeowner's Associations (HOAs) receive benefits from their Stormwater Credits. Mr. Larson said the HOA receives the credit. The individual is still responsible for personal Stormwater fees. Mr. Fargher feels that HOA individuals should have reduced fees due to stormwater credit compliance. Mr. Larson pointed out that the individual fee includes MS4 implementation, Capital Improvement Projects and Operation and Maintenance needs. All individuals use and benefit from public infrastructure. The utility fee would have to increase if the County maintained the HOA infrastructure.

Mr. William Bruggeman asked why five acres was the designated number for the acreage cap. Mr. Larson deferred the question to Ms. Kate Schaefer with Coastal Conservation League. Ms. Schaefer explained that she understands that this rate structure decreases revenues generated from five or greater acres, however, she feels from a scientific standpoint that Gross Area or Open Space provide an ecological service. She agrees with the revision to support MS4 implementation, but she feels there should be a cap on Gross Area. She stated that five acres is forestry zoning and that seemed like a

reasonable place to start. She also feels that development contributes more towards runoff factors and should be charged accordingly. She supports the revised rate structure with a five acre cap and she stated this at the public reading on August 24, 2015.

**7. Public Comment(s) – Cynthia Bensch (County Council)**

Ms. Bensch disagrees with putting a cap on five acres or greater. She believes that developers provide much of the fee burdens by paying impact fees and installing required infrastructure. Ms. Bensch referenced the Connecticut River Valley and how chemicals from farms ran into the Connecticut River Valley. She does not believe rural owners should receive a break while developers are penalized. Ms. Bensch is going to recommend that funding be provided by \$1.5 million out of reserve funds.

Mr. Donald Smith commented that if the rate study does not pass, then capital projects and consultant studies need to be closely evaluated because MS4 requirements need to be implemented.

**8. Executive Session –**

“Discussion of negotiations incident to proposed contractual arrangements and proposed sale or purchase of property, the receipt of legal advice where the legal advice relates to a pending, threatened, or potential claim or other matters covered by the attorney-client privilege, settlement of legal claims, or the position of the public agency in other adversary situations involving the assertion against the agency of a claim.”

Mr. Larry Meisner made a motion to proceed with Project A because (1) it is included in the Master Plan, (2) it is in the budget, and (3) after due diligence the price is determined reasonable. The motion was seconded and the board passed it unanimously.

**9. Next Meeting Agenda-** Approved with an amendment to 6B. ([Please see attachment](#))

**10. Meeting Adjourned.**

# STORMWATER UTILITY RATE STUDY

Presentation of Findings:

Analysis of Option E stormwater rate structure and proposed fee increase impacts on Rural, Ag use, and Vacant parcels greater than 5 acres

September 8, 2015

# STORMWATER UTILITY RATE STUDY

Number of Accounts identified: 3,118

County Agricultural Exemptions: 1,745 \* #

Ag. / Res. Vacant: 768

SFR / Rural residential: 405

Mobile Home lots: 139

Other (Non-Res. Vacant or IA < 1 SFU): 61

*\* inquiry of County Ag. Exemption : 2,623 accounts, approx. 878 of which are less than 5 acres*

*# parcels with Ag. Exemption were modeled with no change in fees due to the County's stormwater fee policy on agricultural use*

# STORMWATER UTILITY RATE STUDY

Existing v. Option E

Number of accounts with no change: 1,750

County Agricultural Exemptions: 1,745

Ag. / Res. Vacant: 5

SFR / Rural residential: 0

Mobile Home lots: 0

Other (Non-Res. Vacant or IA < 1 SFU): 0



# STORMWATER UTILITY RATE STUDY

Existing v. Option E

Number of accounts with decrease: 554

County Agricultural Exemptions: 0

Ag. / Res. Vacant: 521

SFR / Rural residential: 0

Mobile Home lots: 12

Other (Non-Res. Vacant or IA < 1 SFU): 21

# STORMWATER UTILITY RATE STUDY

Existing v. Option E

Number of accounts with increase: 814 \*

County Agricultural Exemptions: 0

Ag. / Res. Vacant: 242

SFR / Rural residential: 405

Mobile Home lots: 127

Other (Non-Res. Vacant or IA < 1 SFU): 40

*\* It is notable that the average increase in fee per account is less than the average decrease.*

# STORMWATER UTILITY RATE STUDY

## Comparison of data set revenue to projected revenue

### Existing structure and rate (\$50)

From this data set: \$319,583

Projected revenue (prior to increase): \$3,308,847

% of total revenue: 9.66%

### Option A (ex. Rate structure @ \$100/SFU)

From this data set: \$509,212

Projected revenue (with increase): \$5,727,114 \*

% of total revenue: 8.89%

### Option E

From this data set: \$290,118

Projected revenue (with increase): \$4,881,642 \*

% of total revenue: 5.94%

*\* Option A does not model a CWI.*

*Option E supplements County fees with the CWI. As a result, the projected revenues are different for each option but result in the same total funding for the SWU.*

# STORMWATER UTILITY RATE STUDY

For your information...

FY 16 projected account base

Accounts Countywide: 125,840

Accounts in Un-Incorporated County: 65,314

IA units (4,906 sq. ft. or SFU): 54,388

GA units (acres): 104,545

Revenue from Option E (FY 16)

Fixed Admin. Fee (\$12) = \$713,230

IA Fees (\$65) = \$3,217,051 (77%)

GA Fees (\$10) = \$951,361 (23%)

Admin. fee from municipalities = \$177,240

CWI fees from municipalities = \$712,776

other (cost shares, interest, etc.) = \$278,622

Total = \$6,050,280

# STORMWATER UTILITY RATE STUDY

- Average increase in fee for the “814” receiving an increase with Option E: \$97.36
- Average increase for parcels 5 acres < X < 25 acres: \$52.91
  - \$52.91 / yr. = \$4.41 / mo.
- Average increase for the 50 parcels exceeding 25 acres: \$776.53
- Average increase for the 35 parcels exceeding 50 acres: \$1,055.30
- Average increase for the 26 parcels exceeding 100 acres: \$1,313.66

# STORMWATER UTILITY RATE STUDY

Impact of a 5 acre cap on GA for Rural, Ag use, and vacant lands only:

- Accts. Countywide: 125,840 (100%)
  - Accts. Un-incorp. Co.: 65,314 (100% / 52%)
    - Accts. meeting criteria: 3,118 (4.8% / 2.5%)
      - Accts. w/ decrease w/ Op. E: 554 (0.8% / 0.4%)
      - **Accts. w/ increase w/ Op. E: 814 (1.2% / 0.6%)**
        - Exceeding 25 acres: 50 (0.08% / 0.04%)
          - Exceeding 50 acres: 35 (0.05% / 0.03%)
            - Exceeding 100 acres: 26 (0.04% / 0.02%)

**Parcels not receiving benefit of a 5 ac. cap on R, AG, V: 99%**

# Revised Budget for FY2016

	Revenue Sources	FY2015 Requested Budget	FY2016 Requested Budget
SWU Fees	Admin SWU Fees	\$ 313,460	\$ 357,244
	Unincorporated/CWI SWU Fees	2,766,881	5,414,414
	<b>Total Revenue from SWU Fees</b>	<b>3,080,341</b>	<b>5,771,658</b>
Other Revenue Sources	Reimbursement Projects	2,500	2,500
	Interest	2,955	2,771
	Cost-Share for Joint Efforts	41,689	273,351
Reserve Utilization	Capital Improvement Fund	767,500	434,079
	Stormwater Utility	351,091	0
<b>Projected Revenue Total</b>		<b>\$4,246,076</b>	<b>\$6,484,359</b>



Section	Efforts (Expenditures)	FY2015	FY2016
Administration		\$ 313,460	\$ 360,495
Utility Activities	Control Regulation	216,956	-
	Water Quality Monitoring	120,000	-
	Annual Maintenance	2,736,160	2,908,833
	Public Education/Outreach	50,000	-
	Drainage Enhancement	7,000	39,000
	Additional Studies	35,000	545,000
	Utility Activities Subtotal	3,165,116	3,492,833
Regulation	Control Regulation	-	445,242
	Water Quality Monitoring	-	105,000
	Public Education/Outreach	-	70,000
	Regulation Subtotal	-	620,242
Capital Improvement Fund		767,500	1,025,319
Utility Operating Fund	Surplus (Deficit)	-	985,469
Efforts Total		\$4,246,076	\$6,484,359

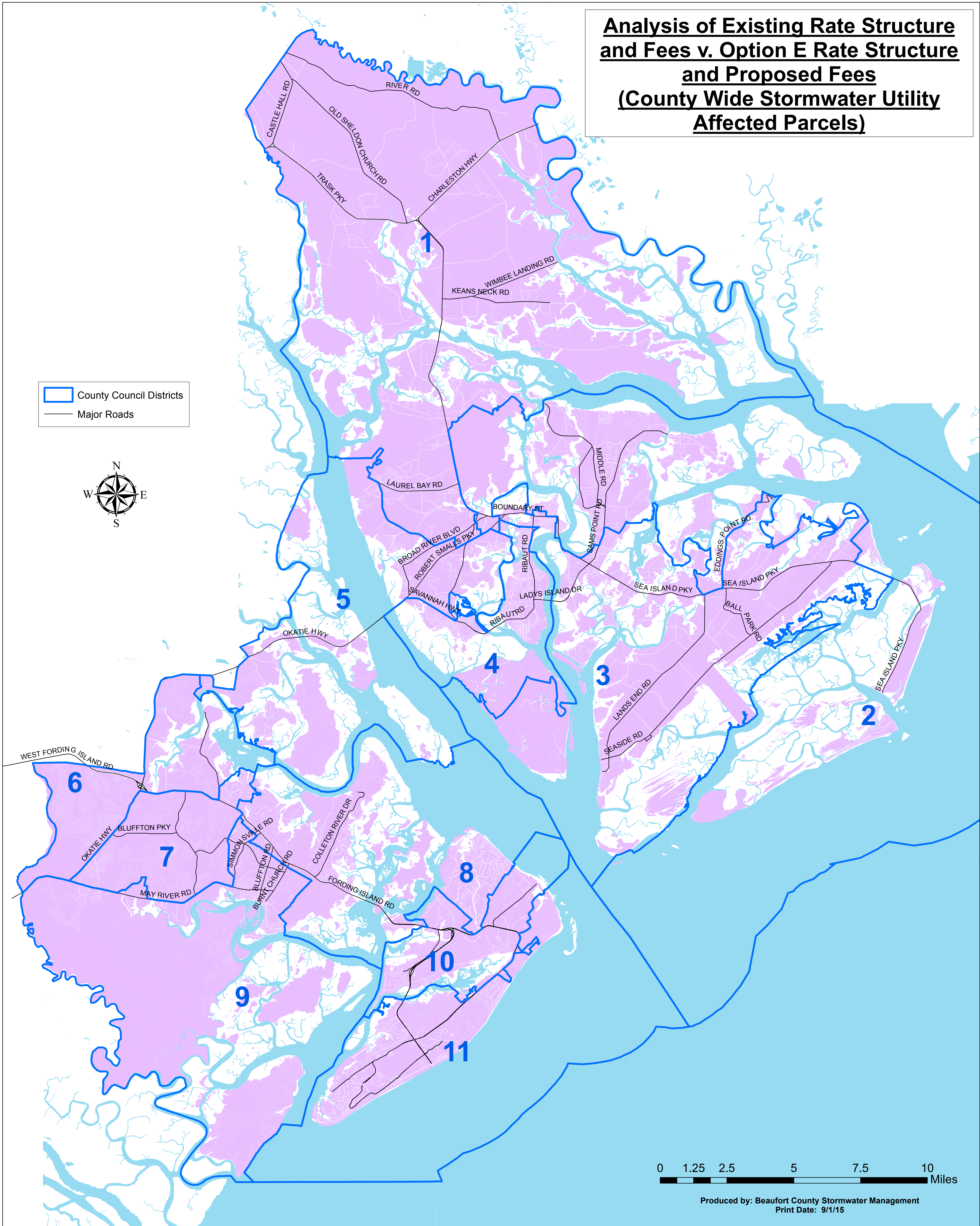
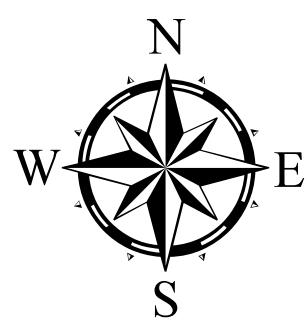
# Capital Improvement Fund

Project	FY2015 Requested Budget	FY2016 Requested Budget
Admin Parking Lot Retrofit	\$ 327,169	-
Highway 278 Retrofit	207,722	183,215
Okatie West/SC 170 Retrofit	100,000	315,000
Battery Creek Upper Retrofit	132,609	117,604
Buckingham Plantation	-	400,000
Brewer Memorial Demo Pond	-	9,500
<b>Capital Improvement Fund Total</b>	<b>\$ 767,500</b>	<b>\$1,205,319</b>



**Analysis of Existing Rate Structure  
and Fees v. Option E Rate Structure  
and Proposed Fees  
(County Wide Stormwater Utility  
Affected Parcels)**

County Council Districts  
Major Roads

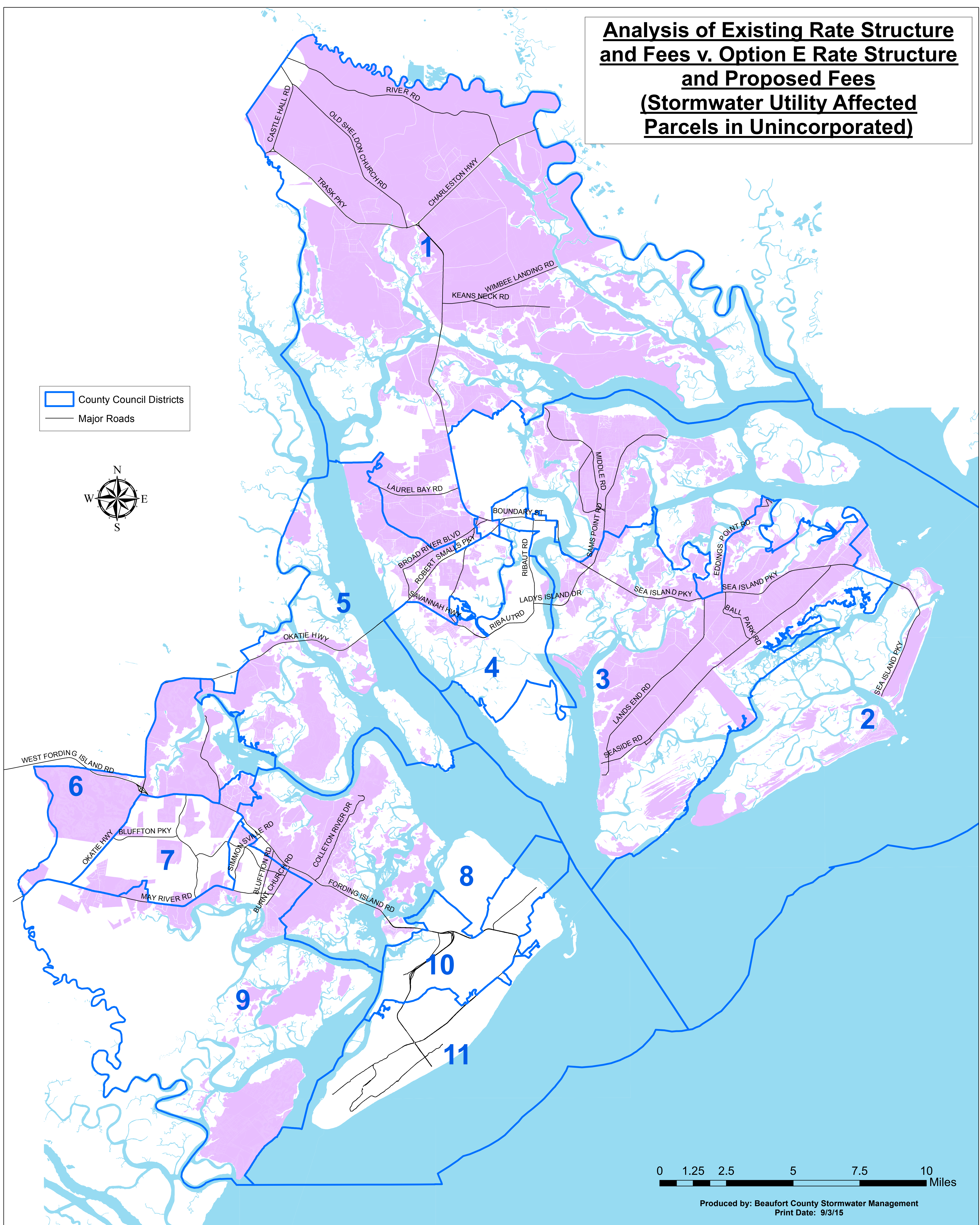
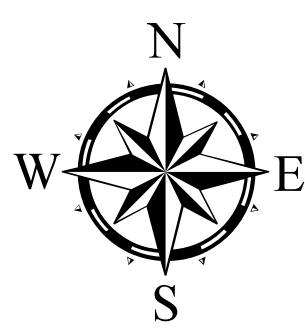


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**Analysis of Existing Rate Structure  
and Fees v. Option E Rate Structure  
and Proposed Fees  
(Stormwater Utility Affected  
Parcels in Unincorporated)**

County Council Districts  
Major Roads

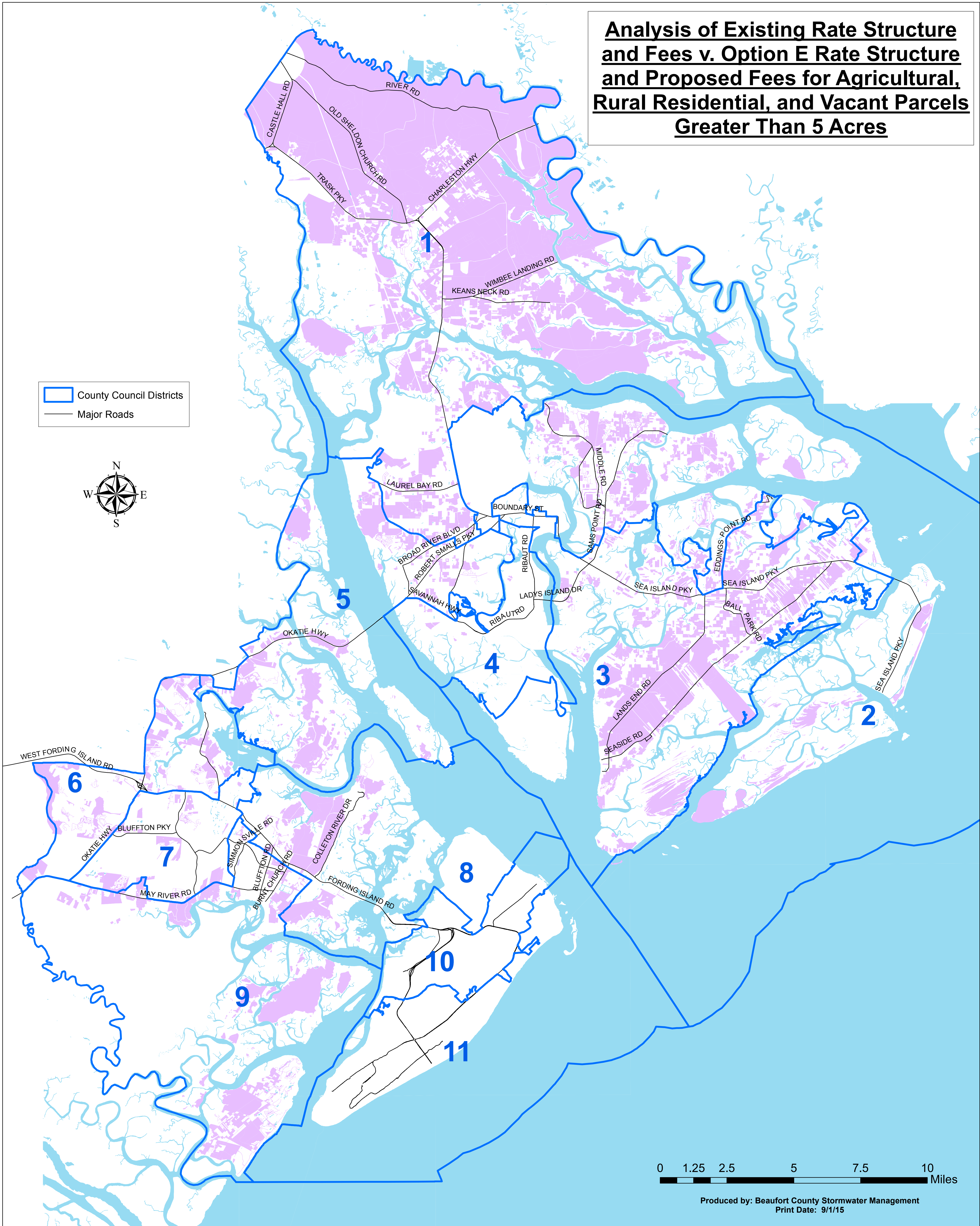
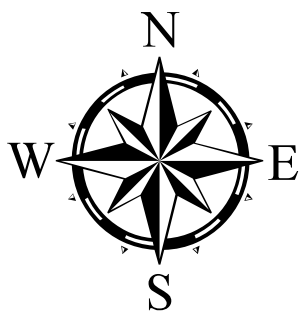


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**Analysis of Existing Rate Structure and Fees v. Option E Rate Structure and Proposed Fees for Agricultural, Rural Residential, and Vacant Parcels Greater Than 5 Acres**

County Council Districts  
Major Roads

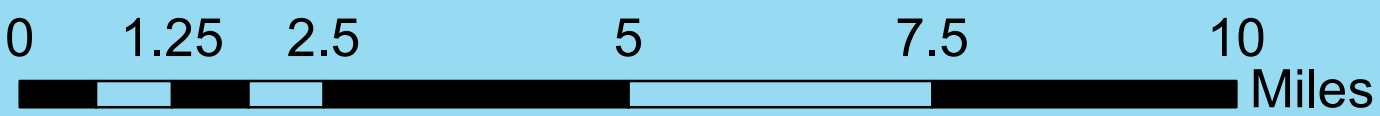
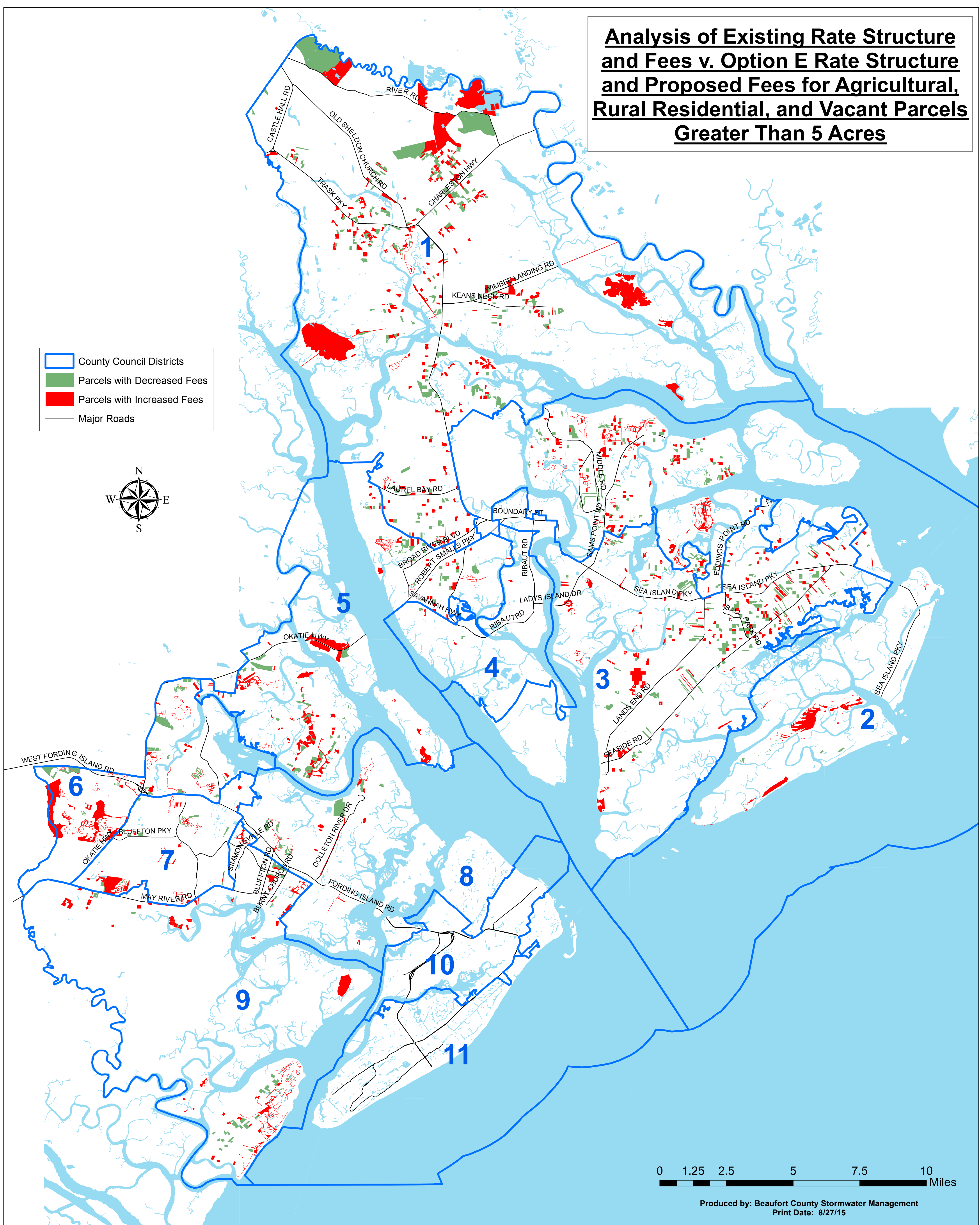
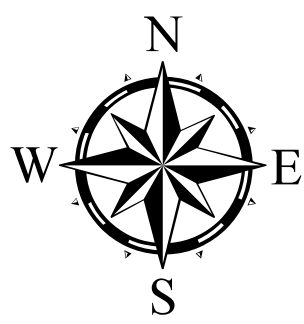


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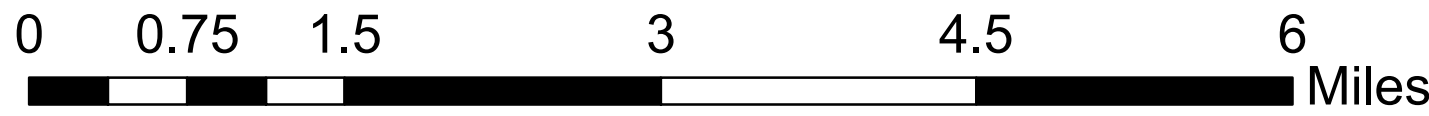
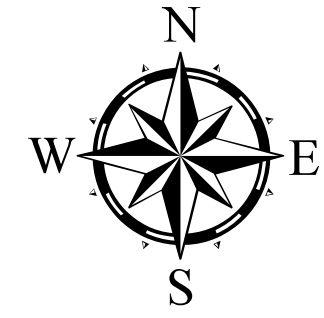
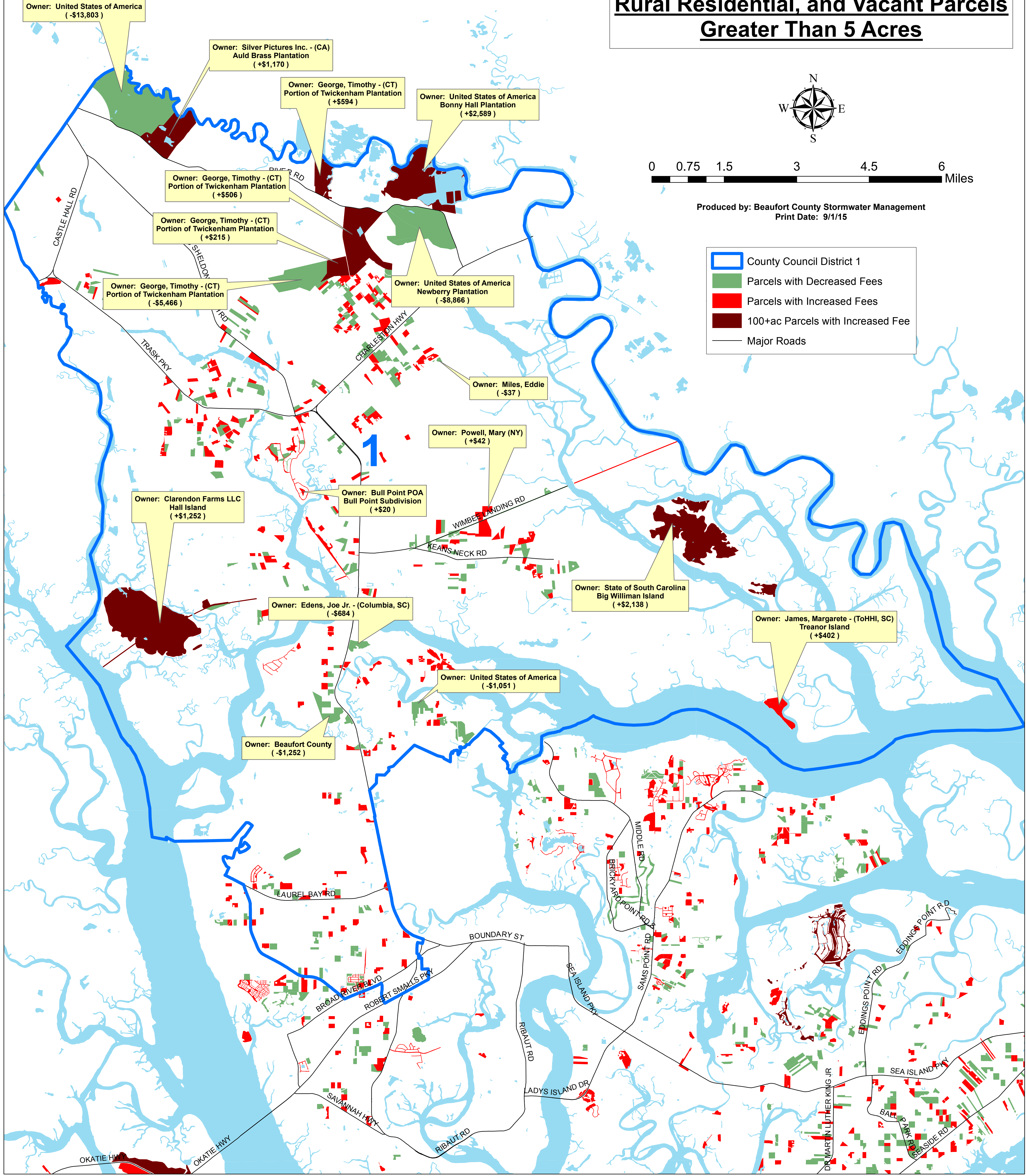
**Analysis of Existing Rate Structure and Fees v. Option E Rate Structure and Proposed Fees for Agricultural, Rural Residential, and Vacant Parcels Greater Than 5 Acres**

- County Council Districts
- Parcels with Decreased Fees
- Parcels with Increased Fees
- Major Roads





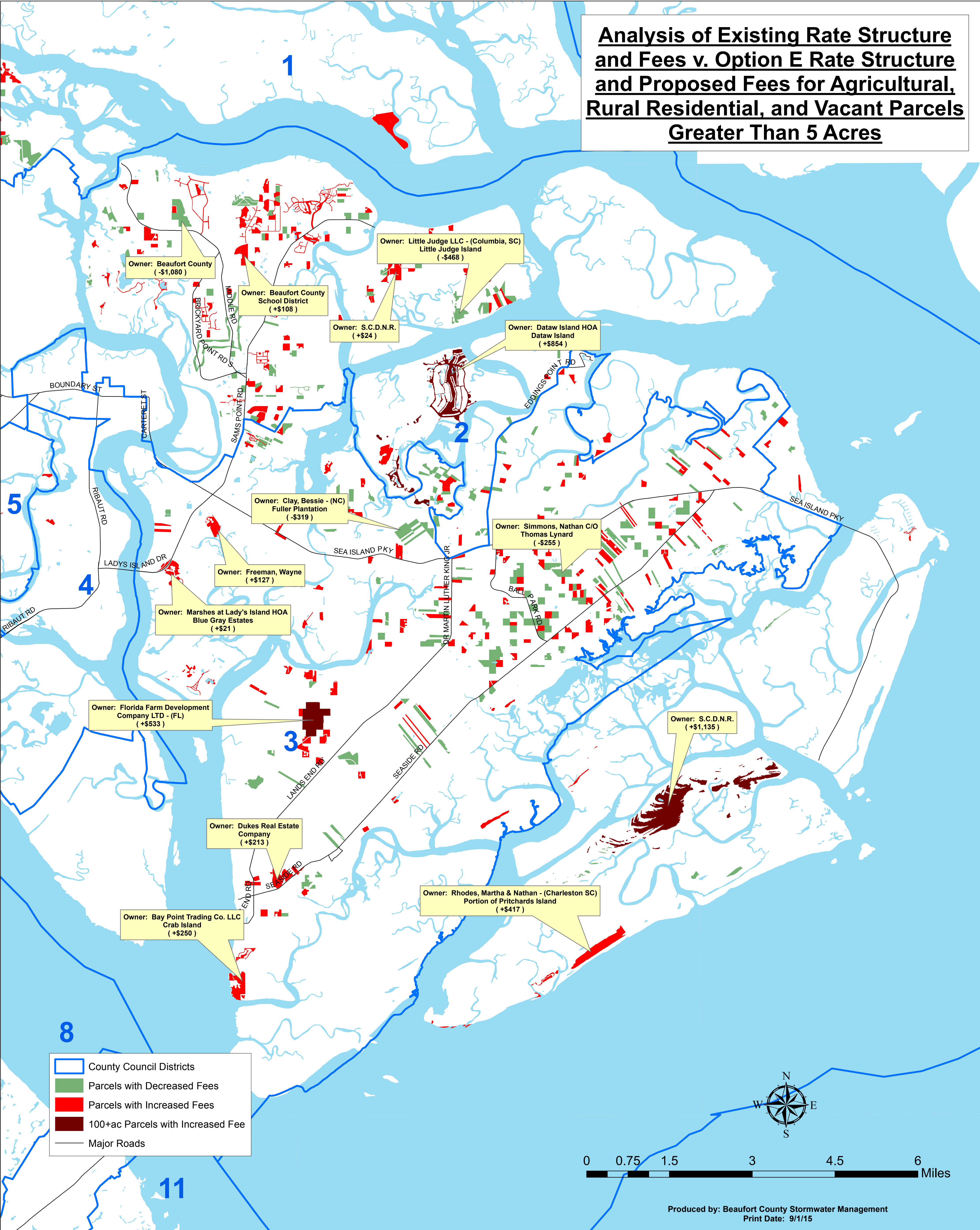
**Analysis of Existing Rate Structure and Fees v. Option E Rate Structure and Proposed Fees for Agricultural, Rural Residential, and Vacant Parcels Greater Than 5 Acres**



Produced by: Beaufort County Stormwater Management  
Print Date: 9/1/15

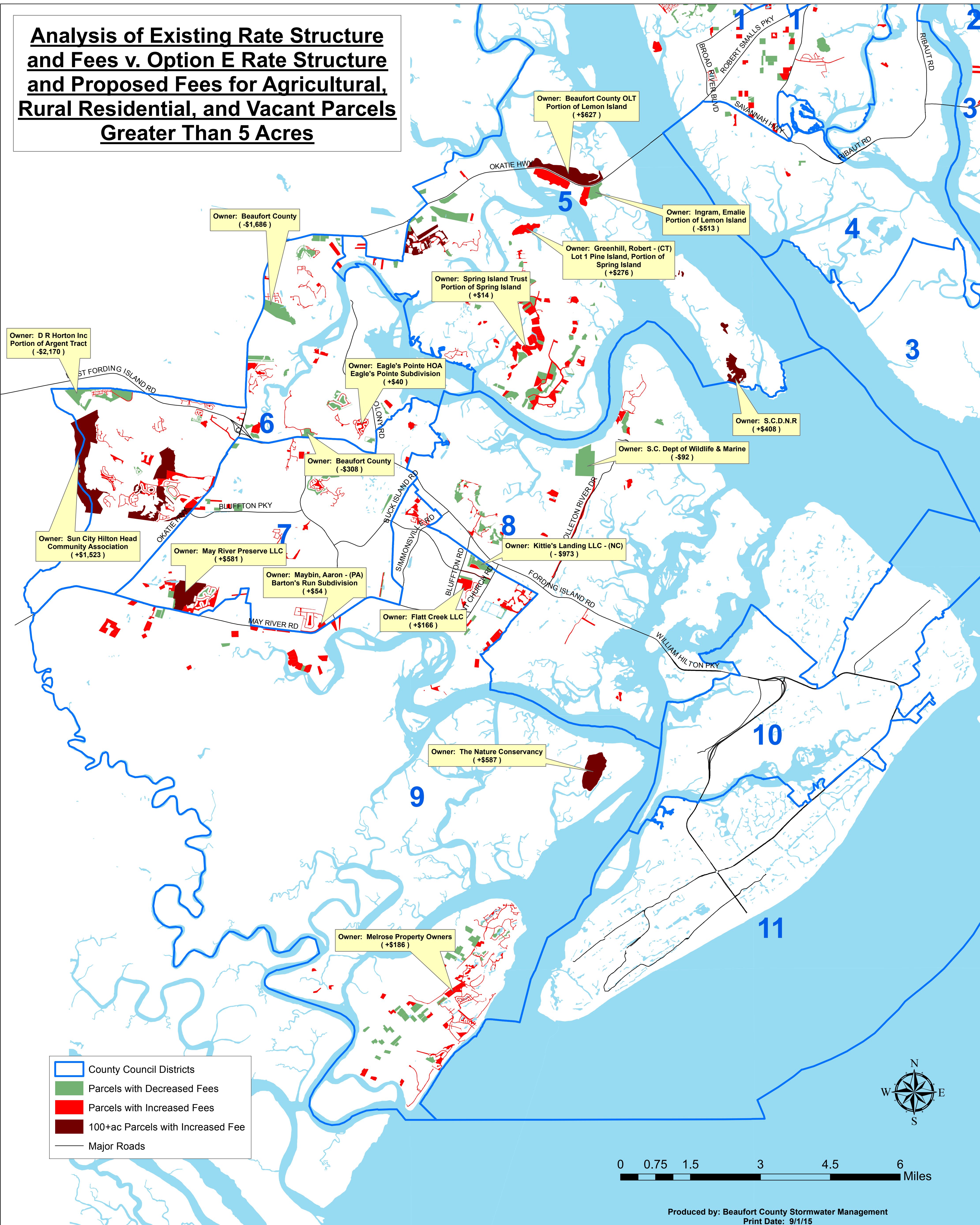


**Analysis of Existing Rate Structure and Fees v. Option E Rate Structure and Proposed Fees for Agricultural, Rural Residential, and Vacant Parcels Greater Than 5 Acres**





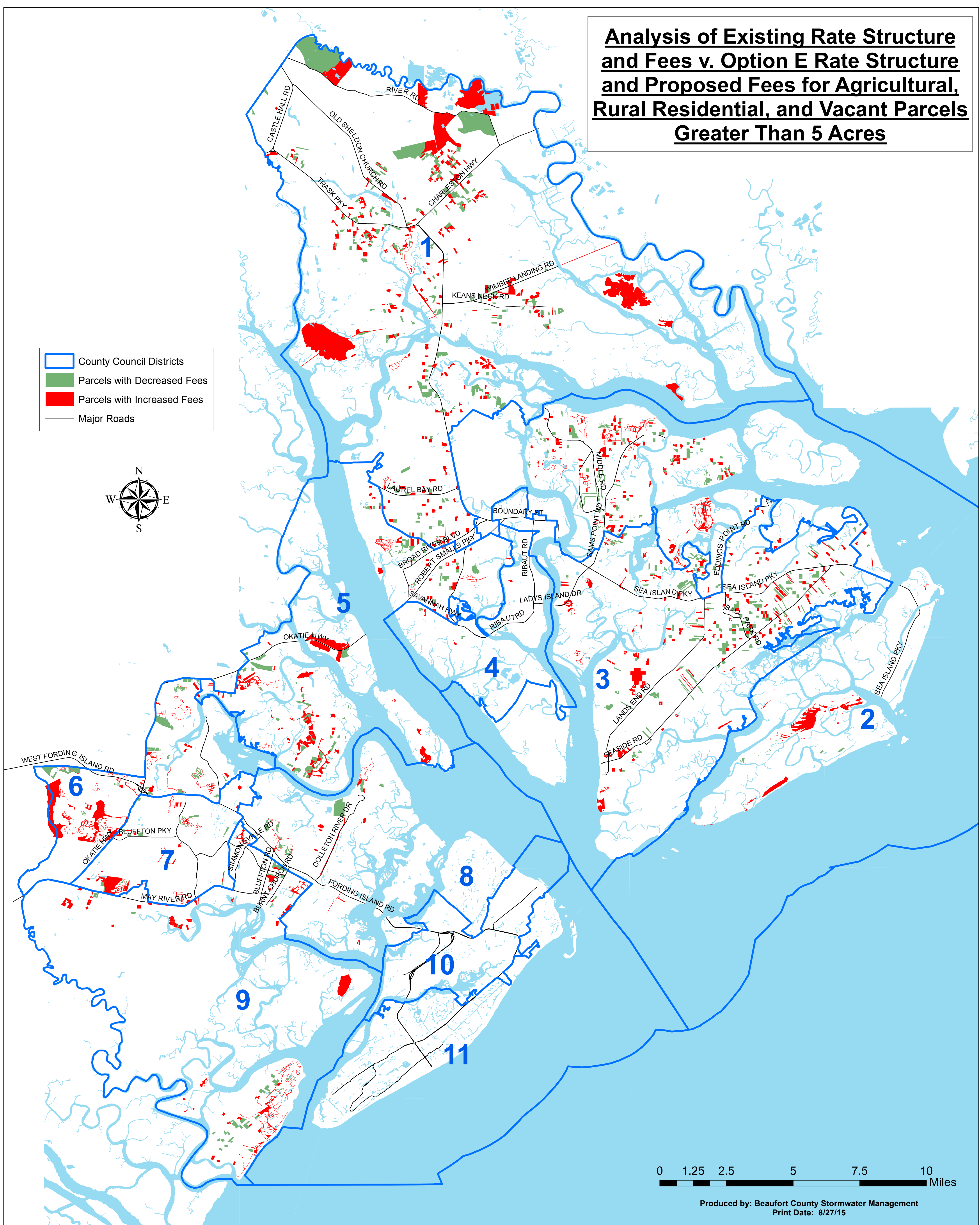
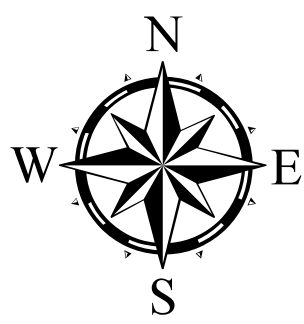
**Analysis of Existing Rate Structure  
and Fees v. Option E Rate Structure  
and Proposed Fees for Agricultural,  
Rural Residential, and Vacant Parcels  
Greater Than 5 Acres**





**Analysis of Existing Rate Structure and Fees v. Option E Rate Structure and Proposed Fees for Agricultural, Rural Residential, and Vacant Parcels Greater Than 5 Acres**

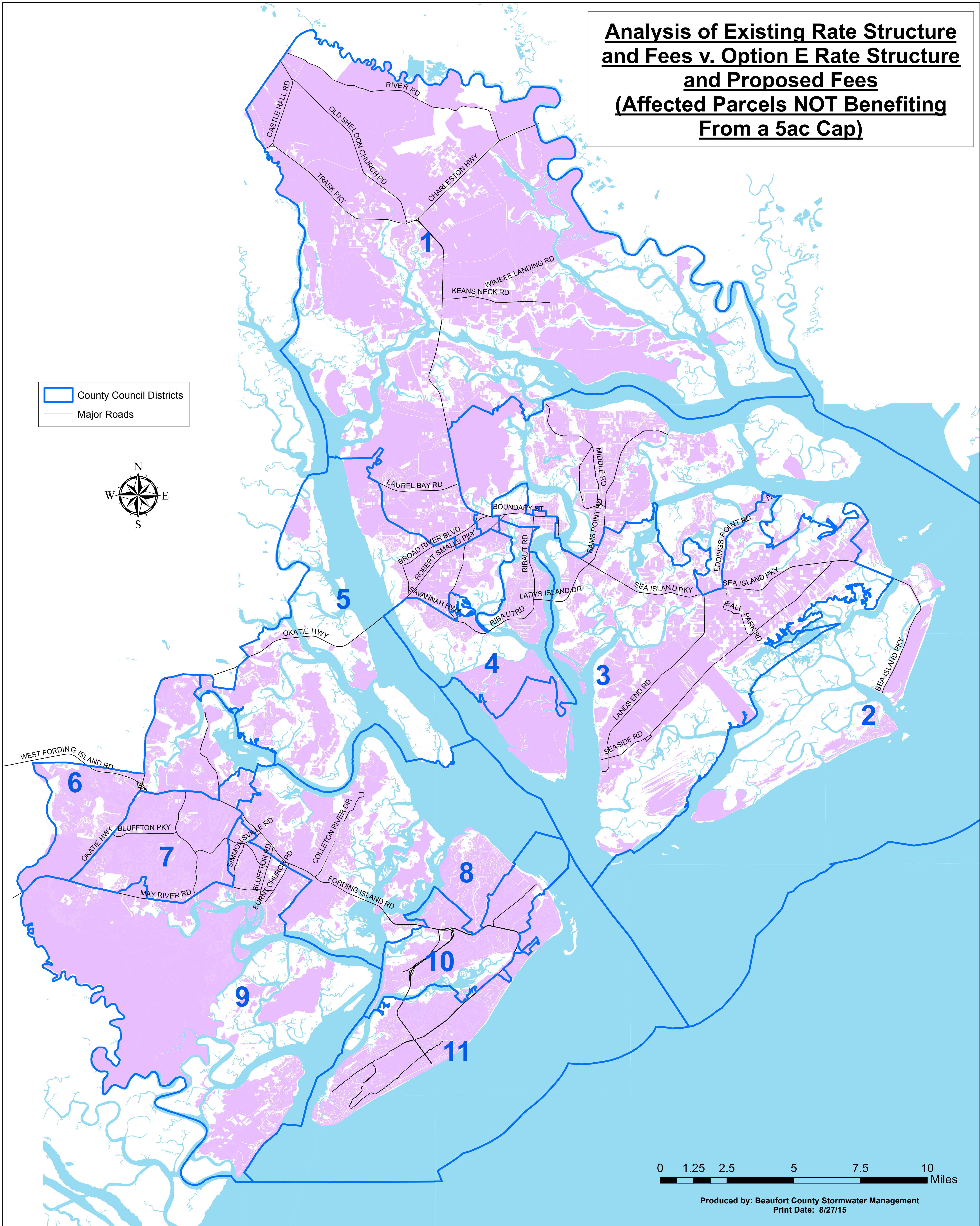
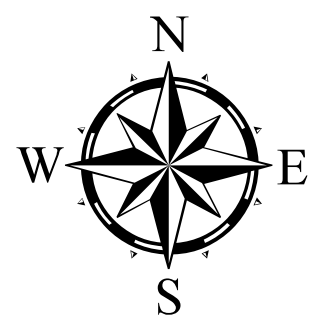
- County Council Districts
- Parcels with Decreased Fees
- Parcels with Increased Fees
- Major Roads





**Analysis of Existing Rate Structure  
and Fees v. Option E Rate Structure  
and Proposed Fees  
(Affected Parcels NOT Benefiting  
From a 5ac Cap)**

County Council Districts  
Major Roads



0 1.25 2.5 5 7.5 10 Miles



## Larson, Eric

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**From:** Larson, Eric  
**Sent:** Friday, August 28, 2015 12:28 PM  
**To:** Kubic, Gary; Gruber, Joshua  
**Cc:** Keaveny, Thomas; Copping, Allison  
**Subject:** FW: Beaufort County and MS4 compliance

For your information.

Eric W Larson

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**From:** Stewart, Jill C. [<mailto:STEWARJC@dhec.sc.gov>]  
**Sent:** Tuesday, August 25, 2015 2:08 PM  
**To:** Larson, Eric; Ovalles, Arturo  
**Cc:** McLeod, J. Nelson  
**Subject:** Re: Beaufort County and MS4 compliance

Eric,

You have posed the question of potential repercussions of an MS4s failure to implement its Stormwater Management Program once a permit has been issued. Owners/Operators of MS4 systems in urbanized areas are required to obtain a permit for their discharges and to develop **and implement** a program to control the discharge of pollutants in stormwater to Waters of the State of South Carolina. In cases where an MS4 fails to meet deadlines outlined in a permit, the Department may initiate enforcement action against the owner/operator of the system. Potential penalties are outlined in the South Carolina Pollution Control Act, which establishes civil penalties up to \$10,000 **per day per violation** and criminal penalties up to \$25,000 per day per violation. Each permit requirement and deadline that a permittee fails to implement may constitute a separate violation. EPA may also take enforcement action against an MS4 for failure to implement a stormwater program. Their penalties are levied under the Clean Water Act.

As most existing MS4s in SC know, the Department takes implementation of the MS4 program very seriously. We routinely audit MS4 to determine their compliance with permit requirements. In 2006 the Department took enforcement action against Richland County for failure to implement various components of their MS4 program. The civil penalty levied against the county was \$1,048,472, which was suspended to \$830,549.

...

Jill

Jill C. Stewart, P.E., Manager  
Stormwater Permitting Section  
Bureau of Water  
South Carolina Department of Health and Environmental Control  
2600 Bull Street, Columbia SC 29201  
p: (803) 898-0439  
[jill.stewart@dhec.sc.gov](mailto:jill.stewart@dhec.sc.gov)

Beaufort County Stormwater Utility  
Revised Budget for FY2016

Unaudited Projected Revenue		
	FY2015 Requested Board Budget	FY2016 Requested Board Budget
Revenue		
Admin SWU Fees	313,460	357,244
Unincorp/CWI SWU Fees	2,766,881	5,414,414
Total Revenue from SWU Fees	3,080,341	5,771,658
Reimbursable Projects	2,500	2,500
Interest	2,955	2,771
Cost-Share for Joint Efforts	41,689	273,351
Reserve Utilization		
Capital Improvement Fund	767,500	434,079
Stormwater Utility	351,091	0
Projected Revenue Total	4,246,076	6,484,359

\$3.18/SFU

-3.5% from FY15 to FY16

\$2,500-SCDOT or BCSD

Notes:

\*Reimbursement ck for \$38,566 from Carolina Clear to be applied to PE/PO contract.

**\*\*Cost-Share total in the model is \$47,948**

**Town of Port Royal (ToPR)**  
\$7,590 - WQ Monitoring \$60K NoBR  
\$630 - PE/O cost-share \$60K C/W  
\$13,961 - SMP Update cost-share \$475K C/W

**City of Beaufort (CoB)**  
\$18,685 - WQ Monitoring \$60K NoBR  
\$1,545 - PE/O cost-share \$60K C/W  
\$34,251 - SMP Update cost-share \$475K C/W

**Town of Hilton Head Island (ToHHI)**  
\$6,282 - PE/O cost-share \$60K C/W  
\$139,243 - SMP Update cost-share \$475K C/W

**Town of Bluffton (ToB)**  
\$2,210 - PE/O cost-share \$60K C/W  
\$48,954 - SMP Update cost-share \$475K C/W

Lowest in FY15 (Nov 14)

Most Recent (Mar 15)

Unres Net Assets-\$678K

Unres Net Assets-\$1.4M

Cash Balance-(\$178K)

Cash Balance-\$2.76M

Efforts (Expenditures)		
Administration	313,460	360,495
Utility Activities		
UA/Control Reg	216,956	-
UA/WQ Monitoring	120,000	-
UA/Annual Maintenance	2,736,160	2,908,833
UA/Public Information/Outreach	50,000	-
UA/Drainage Enhancement	7,000	39,000
UA/Additional Studies	35,000	545,000
Utility Activities Subtotal	3,165,116	3,492,833
Regulation		
UA/Control Reg		445,242
UA/WQ Monitoring		105,000
UA/Public Information/Outreach		70,000
Regulation Subtotal	-	620,242
Reserve Utilization		
Capital Improvement Fund		
Admin Parking Lot Retrofit	327,169	-
Hwy 278 Retrofit	207,722	183,215
Okatie West/SC 170 Retrofit	100,000	315,000
Battery Creek Upper Retrofit	132,609	117,604
Buckingham Plantation	-	400,000
Brewer Memorial Demo Pond	-	9,500
Reserve Utilization Subtotal	767,500	1,025,319
Utility Operating Fund		
Surplus (Deficit)	-	985,469
Efforts Total	4,246,076	6,484,359

**Personnel**

Director of EE (SW Mngr) - .8 FTE  
GIS&MS4 Data Mngr - 1.0 FTE  
SW Bus Mngr - 1.0 FTE  
Fiscal Tech - .1 FTE  
SW Admin Tech - .5 FTE

**Personnel**

New Infrastructure Inspection Tech - 1.0 FTE

**\$30K - O&M's Professional Services**

\$21K - Survey  
\$5K - Engineering Services  
\$2K - Easement Appraisal Services  
\$2K - Wetland Delineation/Restoration

**\$0 - Inventory Secondary SW System** (Staff)

**\$39K - PSMS Enhancements**

\$25K - Sawmill (Forby)  
\$14K - Contingency

**\$545K - Additional Studies**

\$475K - Update to the SMMP  
\$30K - Credits/Incentives Analysis  
\$30K - Rate Study Phase II  
\$10K - Contingency

**Personnel**

Superintendent - 1.0 FTE  
Inspector - 1.0 FTE  
Fiscal Tech - .1 FTE  
Admin Tech - .5 FTE  
New MS4 Coord - 1.0 FTE

**\$70K - SW Control Regulations' Professional Services**

\$25K - IDDE (Ord/Plan)  
\$25K - Construction (Ord/Manual)  
\$20K - Post Construction WQ (Ord. review/manual review)

**\$105K - WQ Monitoring**

\$100K - USCB WQ Lab  
\$5K - Gel Engineering  
(Purchase of monitoring equip reflected in Capital Assets)

**\$70K - Public Edu/Info**

\$60K - MCM 1&2 Contract  
\$10K - Website Development

**carolynw:**

Construction delayed

**carolynw:**

Construction delayed

Change in Capital Assets On Balance Sheet

	FY2015	FY2016
Capital Assets Additions	165,561	611,290
Depreciation	(182,523)	(248,481)
	(16,962)	362,809

**\$573,290 - UA**

\$314,460 - Replace (2) dump trucks  
\$54K - Replace (2) 4x4 pickup trucks (intermediate)  
\$32K - Add (1) pickup truck (Infr Inspection Tech)  
\$5,830 - Radio (Infr Inspection Tech)  
\$85K - Trailer Mounted Camera  
\$32K Vac Truck Overhaul  
\$50K - Land Acquisition (Condemnation)

**\$38K - Regulatory Section**

\$31K - Add (1) pickup truck (MS4 Coord)  
\$7K - WagTech Kit

SWM - \$5,826

UA - \$231,980

Reg - \$10,675



# County CIP Vicinity Map

## Municipality

- City of Beaufort
- City of Hardeeville
- Town of Bluffton
- Town of Hilton Head
- Town of Port Royal
- Town of Yemassee
- Major Roads

County Retrofit Project: Paige Point Rd Overtopping Design  
Activity: Mitigation BMP

County Retrofit Project: Shanklin Road M2  
Activity: Regional BMP

County Retrofit Project: Salt Creek South M1  
Activity: Regional BMP

County Retrofit Project: Beaufort County Administration Parking Lot  
Activity: Demonstration BMP

County Retrofit Project: Battery Creek 319  
Activity: Regional BMP

County Retrofit Project: Factory Creek M2  
Activity: Regional BMP

County Retrofit Project: Battery Creek West M1  
Activity: Regional BMP

County Retrofit Project: Brewer Memorial Park Demonstration Wet Pond Project Feasibility  
Activity: Demonstration BMP

County Retrofit Project: Grober Hill M2  
Activity: Regional BMP

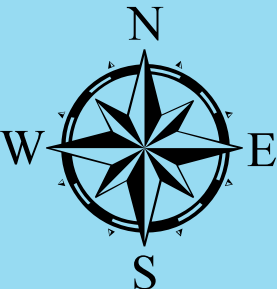
County Retrofit Project: Camp St. Mary M2  
Activity: Regional BMP

County Retrofit Project: Hwy 278 Retrofit  
Activity: Retrofit BMP

County Retrofit Project: Sawmill Creek Overtopping/Forby Land  
Activity: Mitigation BMP

County Retrofit Project: SC170/Okatie West  
Activity: Regional/Retrofit BMP

County Retrofit Project: Buckingham Plantation Stormwater Retrofit  
Activity: Retrofit BMP



0 1.25 2.5 5 7.5 10 Miles





Ranking	CAPITAL PROJECTS	Description	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	total project cost
8	Salt Creek South M1 (\$245,000 design, \$400,000 ROW, \$1,400,000 Const.)	Development in the Salt Creek South hydrologic sub-basin in the Albergotti Creek watershed includes approx. 330 acres of rural and single family development built prior to stormwater regulations. There are no stormwater best management practices such as detention facilities in the area. The project would be to construct a regional detention facility to provide stormwater runoff water quality treatment and volume reduction. Due to the presence of multiple wetlands in the area, project design would involve delineation and avoidance of the wetlands, making construction cost a limiting factor for project implementation. Albergotti Creek is impaired by bacteria pollution, a major source being urban runoff. The Creek is being proposed for reclassification to allow shellfish harvesting, making this project a higher priority than in the past. The watershed of the site is located within Beaufort County.				\$ 245,000	\$ 400,000	\$ 1,400,000					\$ 2,045,000
9	Shanklin Road M2 (\$330,000 Design, \$660,000 ROW, \$2,350,000 Const.)	Development in the Shanklin Road hydrologic sub-basin in the Albergotti Creek watershed includes approx. 600 acres of rural, single family development, commercial, and industrial built prior to stormwater regulations. There are no stormwater best management practices such as detention facilities in the area. The project would be to construct a regional detention facility to provide stormwater runoff water quality treatment and volume reduction. Due to the presence of multiple wetlands in the area, project design would involve delineation and avoidance of the wetlands, making construction cost a limiting factor for project implementation. Albergotti Creek is impaired by bacteria pollution, a major source being urban runoff. The Creek is being proposed for reclassification to allow shellfish harvesting, making this project a higher priority than in the past. The watershed of the site is located within Beaufort County.				\$ 330,000	\$ 660,000		\$ 2,350,000				\$ 3,340,000
10	Factory Creek M2 (\$200,000 design, \$340,000 ROW, \$1,200,000 Const.)	Development in the Factory Creek hydrologic sub-basin in the Rock Springs Creek watershed includes approx. 300 acres of a mix of single family development, and commercial/institutional development built prior to stormwater regulations. There are only a few stormwater best management practices such as detention basins in the area. The project would be to construct a regional detention facility to provide stormwater runoff water quality treatment and volume reduction. Due to the grades of the area and the "stop gap measure" to construct a ditch to drain a portion of the watershed, construction will involve a large amount of earthwork, making project cost a limiting factor for project implementation. Rock Springs Creek drains into the Morgan River, which is impaired by bacteria pollution, a major source being urban runoff. The site is located in Beaufort County on Lady's Island.				\$ 200,000		\$ 340,000		\$ 1,200,000			\$ 1,740,000
11	Grober Hill M2 (\$225,000 Design, \$900,000 ROW, \$1,400,000 Const.)	Development in the Grober Hill hydrologic sub-basin in the Battery Creek watershed includes approx. 130 acres of single family development built prior to stormwater regulations. There are no stormwater best management practices such as detention facilities in the area. The project would be to construct a regional detention facility to provide stormwater runoff water quality treatment and volume reduction. Due to the grades of the area, construction will involve a large amount of earthwork, making project cost a limiting factor for project implementation. Battery Creek is impaired by bacteria pollution, a major source being urban runoff. The site is located in the City of Beaufort.				\$ 225,000		\$ 900,000		\$ 1,400,000			\$ 2,525,000

Ranking	CAPITAL PROJECTS	Description	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	total project cost
12	Camp St. Mary M2 (\$342,000 Design, \$165,000 ROW, \$3,250,000 Const.)	Development in the Camp St. Mary hydrologic sub-basin in the Okatie River watershed includes approx. 500 acres of rural and single family development built prior to stormwater regulations. There are no stormwater best management practices such as detention facilities in the area. The project would be to construct a regional detention facility to provide stormwater runoff water quality treatment and volume reduction. Due to the presence of multiple wetlands in the area, project design would involve delineation and avoidance of the wetlands, making construction cost a limiting factor for project implementation. Okatie River is impaired by bacteria pollution, a major source being urban runoff. The watershed of the site is located within both Beaufort and Jasper Counties.							\$ 342,000	\$ 165,000	\$ 3,250,000		\$ 3,757,000
13	Battery Creek West M1 (\$375,000 Design, \$165,000 ROW, \$3,600,000 Const.)	Development in the Battery Creek West hydrologic sub-basin in the Battery Creek watershed includes approx. 500 acres of a mix of single family development and commercial development built prior to stormwater regulations. There are only a few stormwater best management practices such as hydrodynamic separators in the area. The project would be to construct a regional detention facility to provide stormwater runoff water quality treatment and volume reduction. Due to the grades of the area, construction will involve a large amount of earthwork, making project cost a limiting factor for project implementation. Battery Creek is impaired by bacteria pollution, a major source being urban runoff. The site is located in the Town of Port Royal.								\$ 375,000	\$ 165,000	\$ 3,600,000	\$ 4,140,000
14	Paige Point Overtopping Construction	Design \$30K/\$305K Historic complaints about road overtopping support the findings of the 2006 Stormwater Master Plan, which identified this location as a flooding hazard during a 100 year storm event. A 2013 study by the County confirmed the flooding problem and proposes raising a portion of the road and up-sizing the storm drain under the road.									\$ 30,000	\$ 305,000	\$ 335,000
													\$ -
			\$ 845,999	\$ 860,000	\$ 1,025,000	\$ 1,050,000	\$ 1,060,000	\$ 2,640,000	\$ 2,692,000	\$ 3,140,000	\$ 3,445,000	\$ 3,905,000	\$ 20,662,999

**County Retrofit Project: Hwy 278 Retrofit**  
**Activity: Retrofit BMP**  
**Township: Bluffton**

**Project Schedule: FY 2015**

**Project Cost: \$216,122**



**Drainage**

**TYPE**

— River	— Roadside
— Creek/Stream	— Roadside Pipe
— River/Creek/Marsh BANK	— Road Pipe
— Channel (fka Outfall)	— Crossline Pipe
— Channel Pipe	— Driveway Pipe
— Lateral	— Access Pipe
— Lateral Pipe	— Bleeder Pipe



0 900 1,800 3,600 5,400 7,200 Feet

**1 inch = 2,468 feet**

Prepared By: BC Stormwater Management Utility  
Date Print: 5/19/14

**Description: Construct four detention basins along US 278 between Pickney Colony Road and SC170 to intercept stormwater runoff, provide water quality treatment, and reduce volume into the Okatie River. The Okatie is impaired by bacteria pollution, a major source being urban runoff.**



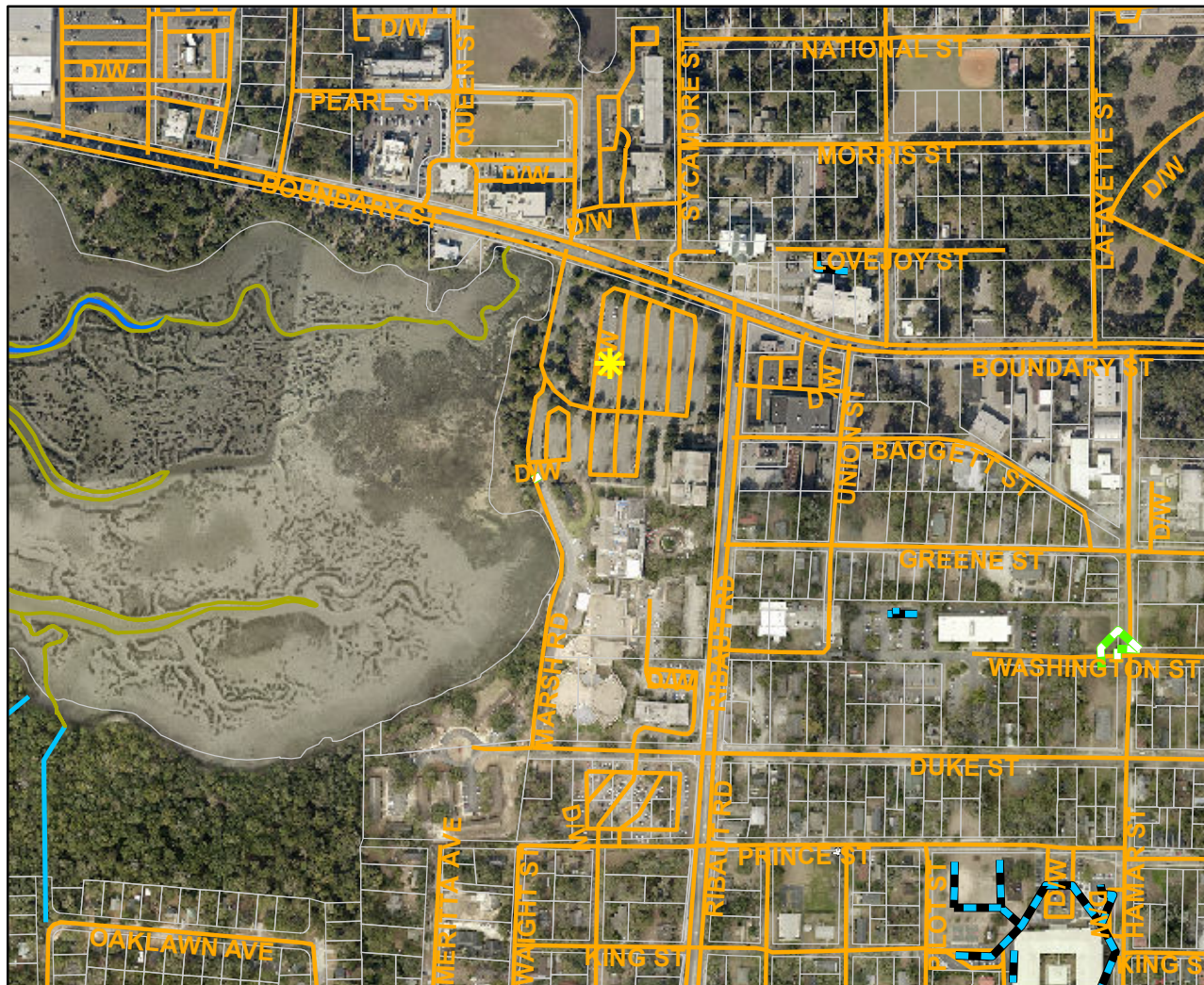
# County Retrofit Project: Beaufort County Administration Parking Lot

## Activity: Demonstration BMP

### Township: Port Royal Island

Project Schedule: FY 2015

Project Cost: \$327,768



#### Drainage

TYPE	
River	— Roadside
Creek/Stream	— Roadside Pipe
River/Creek/Marsh BANK	— Road Pipe
Channel (fka Outfall)	— Crossline Pipe
Channel Pipe	— Driveway Pipe
Lateral	— Access Pipe
Lateral Pipe	— Bleeder Pipe



0 210 420 840 1,260 1,680 Feet

1 inch = 563 feet

Prepared By: BC Stormwater Management Utility  
Date Print: 5/19/14

**Description:** Retrofit a portion of the parking lot at the County Administration Building on Ribaut Road with pervious pavement and bio-swales to reduce stormwater runoff volume and provide water quality treatment prior to discharge into the Battery Creek. This project is envisioned as a demonstration project due to the high profile location and provides an opportunity to educate the public on stormwater pollution and best management practices to address the same. Battery Creek is impaired by bacteria pollution, a major source being urban runoff.



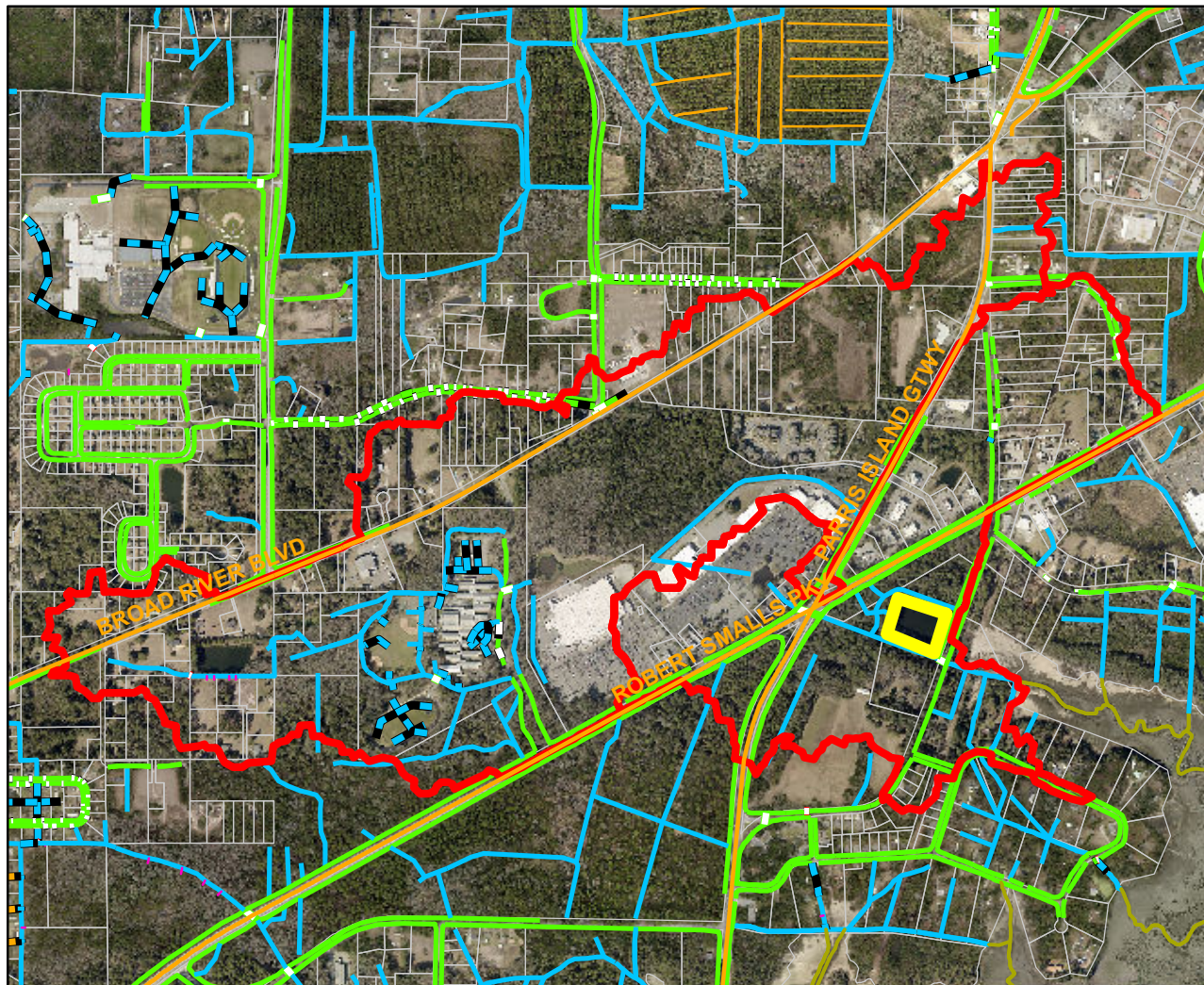
## County Retrofit Project: Battery Creek 319

### Activity: Regional BMP

### Township: Port Royal Island

Project Schedule: FY 2015

Project Cost: \$132,609



#### Drainage

##### TYPE

— River	— Roadside
— Creek/Stream	— Roadside Pipe
— River/Creek/Marsh BANK	— Road Pipe
— Channel (fka Outfall)	— Crossline Pipe
— Channel Pipe	— Driveway Pipe
— Lateral	— Access Pipe
— Lateral Pipe	— Bleeder Pipe



0 500 1,000 2,000 3,000 4,000 Feet

1 inch = 1,426 feet

Prepared By: BC Stormwater Management Utility  
Date Print: 5/19/14

**Description:** Construct a detention pond to intercept stormwater runoff from an densely developed urban area of the BatteryCreek watershed near SC170 and the US 21and the Cross Creek Shopping Center. The Project is partially funded by a US EPA Section 319 grant with the match being shared by the City of Beaufort and Beaufort County. Battery Creek is impaired by bacteria pollution, a major source being urban runoff.



**County Retrofit Project: SC170/Okatie West**  
**Activity: Regional/Retrofit BMP**  
**Township: Bluffton**

**Project Schedule: FY 2015-2017**

**Project Cost: \$975,000**

**\$60,000 (2015)**

**\$315,000 (2016)**

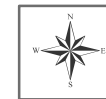
**\$600,000 (2017)**



**Drainage**

**TYPE**

— River	— Roadside
— Creek/Stream	— Roadside Pipe
— River/Creek/Marsh BANK	— Road Pipe
— Channel (fka Outfall)	— Crossline Pipe
— Channel Pipe	— Driveway Pipe
— Lateral	— Access Pipe
— Lateral Pipe	— Bleeder Pipe



0 1,400 2,800 5,600 8,400 11,200 Feet

**1 inch = 3,771 feet**

Prepared By: BC Stormwater Management Utility  
Date Print: 5/19/14

**Description:** The Okatie River watershed has been identified as a high priority watershed for water quality improvements due to bacteria contamination. The east branch of the headwaters was improved in FY2014 with a wetland enhancement project near Island West golf course and subdivision. A similar enhancement or detention basin is planned for the west branch. Increased runoff from the widening of SC170 in the west branch subwatershed basin adds to the need for a retrofit to the watershed to improve stormwater runoff water quality and reduce runoff volume. The project is a series of detention basins along SC170.



# County Retrofit Project: Brewer Memorial Park Demonstration Wet Pond Project Feasibility

## Activity: Demonstration BMP

### Township: Lady's Island

Project Schedule: FY 2015, 2016 & 2018

Project Cost: \$79,500  
 \$9,500 (2015)  
 \$20,000 (2016)  
 \$50,000 (2018)

#### Drainage

TYPE	
River	—
Creek/Stream	—
River/Creek/Marsh BANK	—
Channel (fka Outfall)	—
Channel Pipe	—
Lateral	—
Lateral Pipe	—
Roadside	—
Roadside Pipe	—
Road Pipe	—
Crossline Pipe	—
Driveway Pipe	—
Access Pipe	—
Bleeder Pipe	—



0 62.5 125 250 375 500 Feet

1 inch = 167 feet

Prepared By: BC Stormwater Management Utility  
 Date Print: 5/19/14



**Description:** Retrofit a former bait pond at the Brewer Memorial Park on Lady's Island. The site has runoff from Sea Island Parkway and adjacent properties that discharges directly to Factory Creek without water quality treatment or volume reduction. The site is envisioned as a demonstration site due to the high profile location. The park is being built with separate funding through the Beaufort Open Land Trust and will include a broadwalk and landscaping around the pond, providing opportunity for viewing and public education.



# County Retrofit Project: Buckingham Plantation Stormwater Retrofit

## Activity: Retrofit BMP

### Township: Bluffton

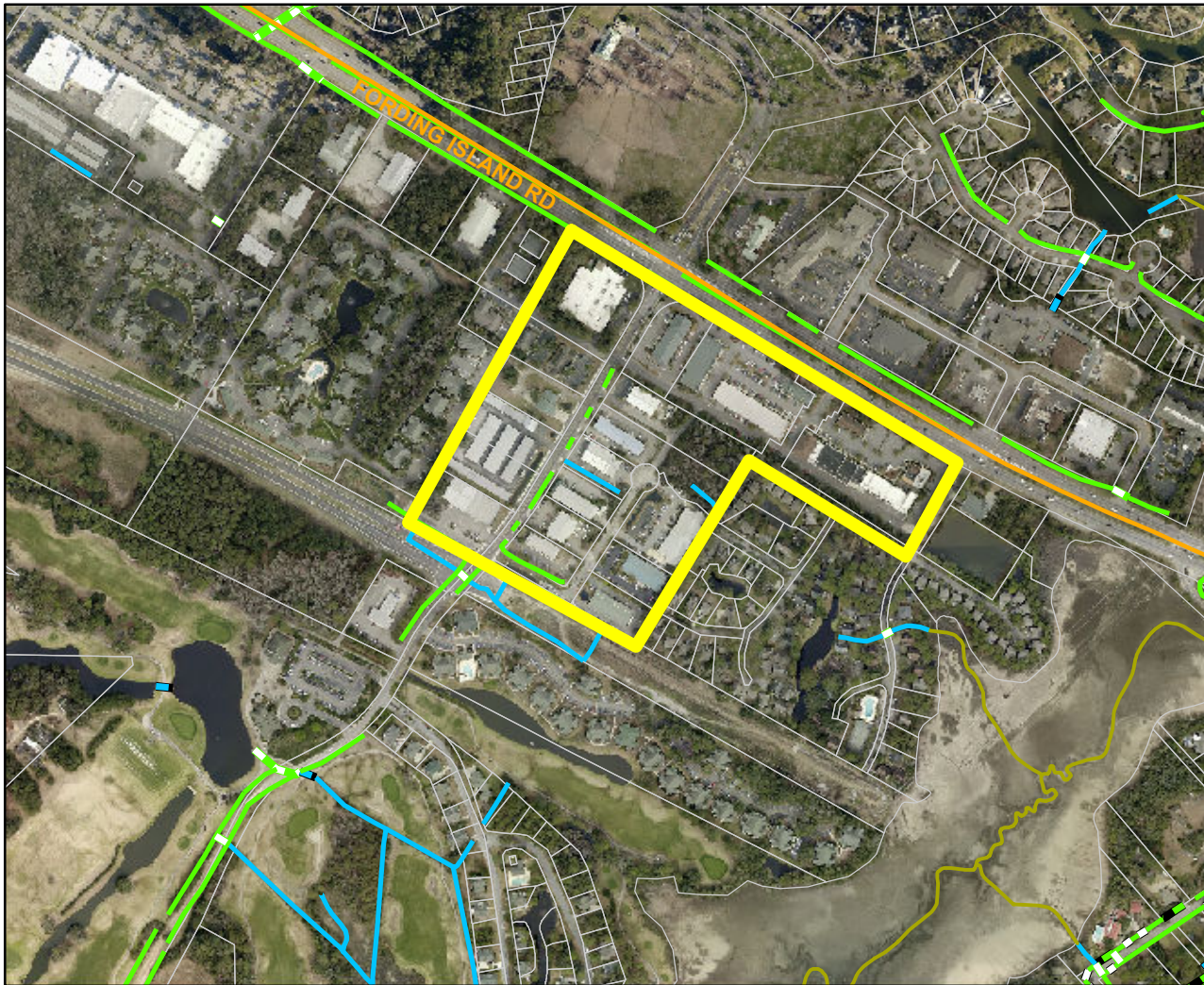
Project Schedule: FY 2015-2017

Project Cost: \$900,000

\$100,000 (2015)

\$400,000 (2016)

\$400,000 (2017)



#### Drainage

##### TYPE

— River	— Roadside
— Creek/Stream	— Roadside Pipe
— River/Creek/Marsh BANK	— Road Pipe
— Channel (fka Outfall)	— Crossline Pipe
— Channel Pipe	— Driveway Pipe
— Lateral	— Access Pipe
— Lateral Pipe	— Bleeder Pipe



0 235 470 940 1,410 1,880 Feet

1 inch = 628 feet

Prepared By: BC Stormwater Management Utility  
Date Print: 5/19/14

**Description:** Upgrading Buckingham Plantation Drive and Anolyn Ct. with water quality best management practices to provide stormwater runoff treatment and volume reduction. This project will be in conjunction with other area improvements designed to promote economic redevelopment of the area.



# County Retrofit Project: Sawmill Creek Overtopping/Forby Land

## Activity: Mitigation BMP

### Township: Bluffton

Project Schedule: FY 2016-2017

Project Cost: \$150,000  
 \$125,000 (2016)  
 \$25,000 (2017)



#### Drainage

TYPE	
River	— Roadside
Creek/Stream	— Roadside Pipe
River/Creek/Marsh BANK	— Road Pipe
Channel (fka Outfall)	— Crossline Pipe
Channel Pipe	— Driveway Pipe
Lateral	— Access Pipe
Lateral Pipe	— Bleeder Pipe



0 250 500 1,000 1,500 2,000 Feet

1 inch = 667 feet

Prepared By: BC Stormwater Management Utility  
 Date Print: 5/19/14

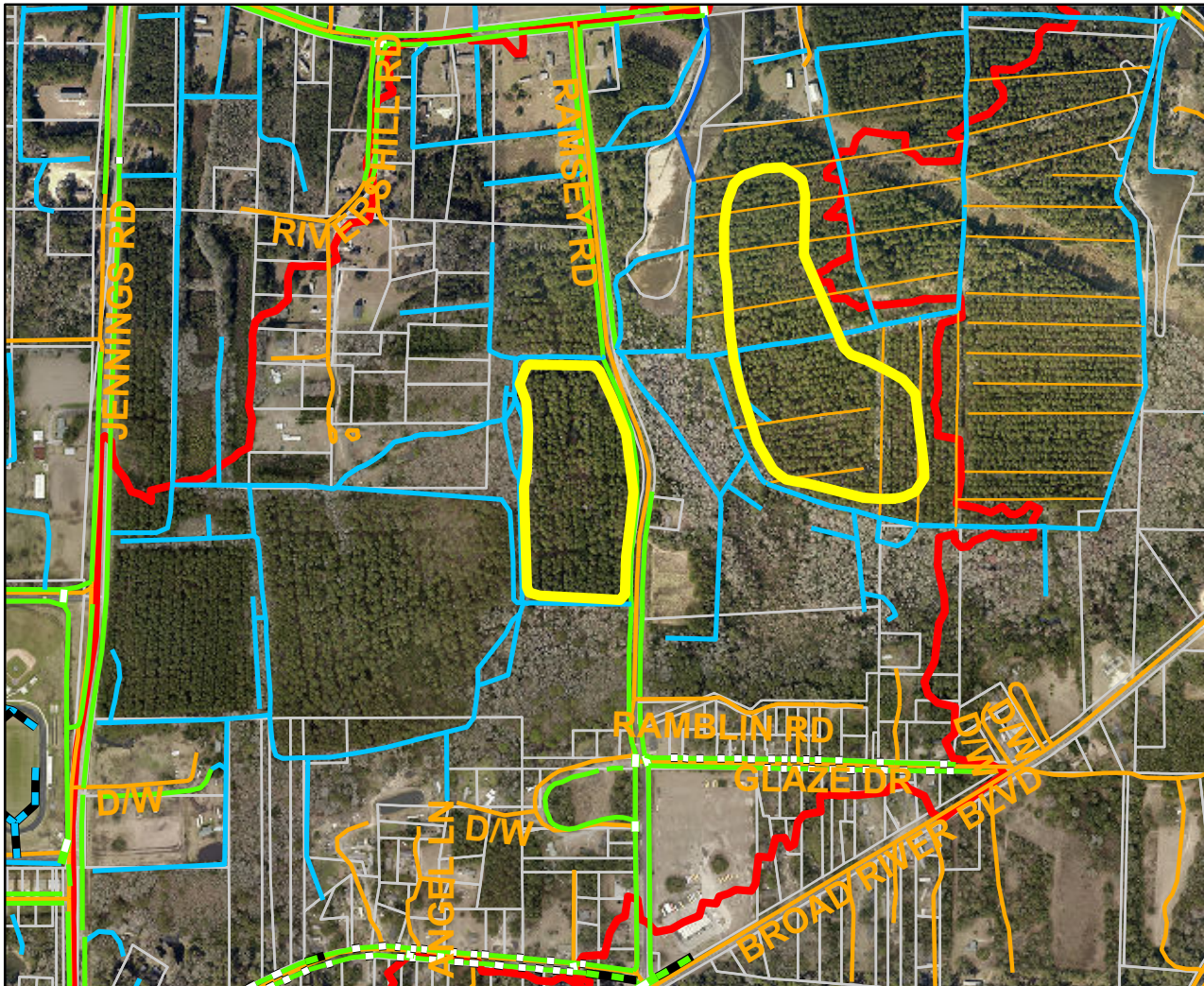
**Description:** Overtopping of US 278 near Sawmill Creek Road during a 100 - year storm event was identified in the 2006 Stormwater Master Plan. US 278 serves as an evacuation route during a hurricane. The project scope is to construct a detention pond via a wetland enhancement to slow stormwater discharge to the existing culverts under US 278 and to provide water quality treatment and runoff volume reduction. The project will be in conjunction with another project to construct a frontage road in the location providing additional interconnectivity along the south side of the highway.



County Retrofit Project: Salt Creek South M1  
Activity: Regional BMP  
Township: Port Royal Island

Project Schedule: FY 2018-2020

Project Cost: \$2,045,000  
\$245,000 (2018)  
\$400,000 (2019)  
\$1,400,000 (2020)



**Drainage**

TYPE	
River	— Roadside
Creek/Stream	— Roadside Pipe
River/Creek/Marsh BANK	— Road Pipe
Channel (fka Outfall)	— Crossline Pipe
Channel Pipe	— Driveway Pipe
Lateral	— Access Pipe
Lateral Pipe	— Bleeder Pipe



0 312.5 625 1,250 1,875 2,500 Feet

1 inch = 833 feet

Prepared By: BC Stormwater Management Utility  
Date Print: 5/19/14

**Description:** Development in the Salt Creek South hydrologic sub-basin in the Albergotti Creek watershed includes approx. 330 acres of rural and single family development built prior to stormwater regulations. There are no stormwater best management practices, such as detention facilities, in the area. The project would be to construct a regional detention facility to provide stormwater runoff water quality treatment and volume reduction. Due to the presence of multiple wetlands in the area, project design would involve delineation and avoidance of the wetlands, making construction cost a limiting factor for project implementation. Albergotti Creek is impaired by bacteria pollution, a major source being urban runoff. The Creek is being proposed for reclassification to allow shellfish harvesting, making this project a higher priority than in the past. The watershed of the site is located within Beaufort County.



**County Retrofit Project: Shanklin Road M2**  
**Activity: Regional BMP**  
**Township: Port Royal Island**

**Project Schedule: FY 2018-2019 & FY 2021**

**Project Cost: \$3,340,000**  
**\$330,000 (2018)**  
**\$660,000 (2019)**  
**\$2,350,000 (2021)**

**Drainage**

**TYPE**

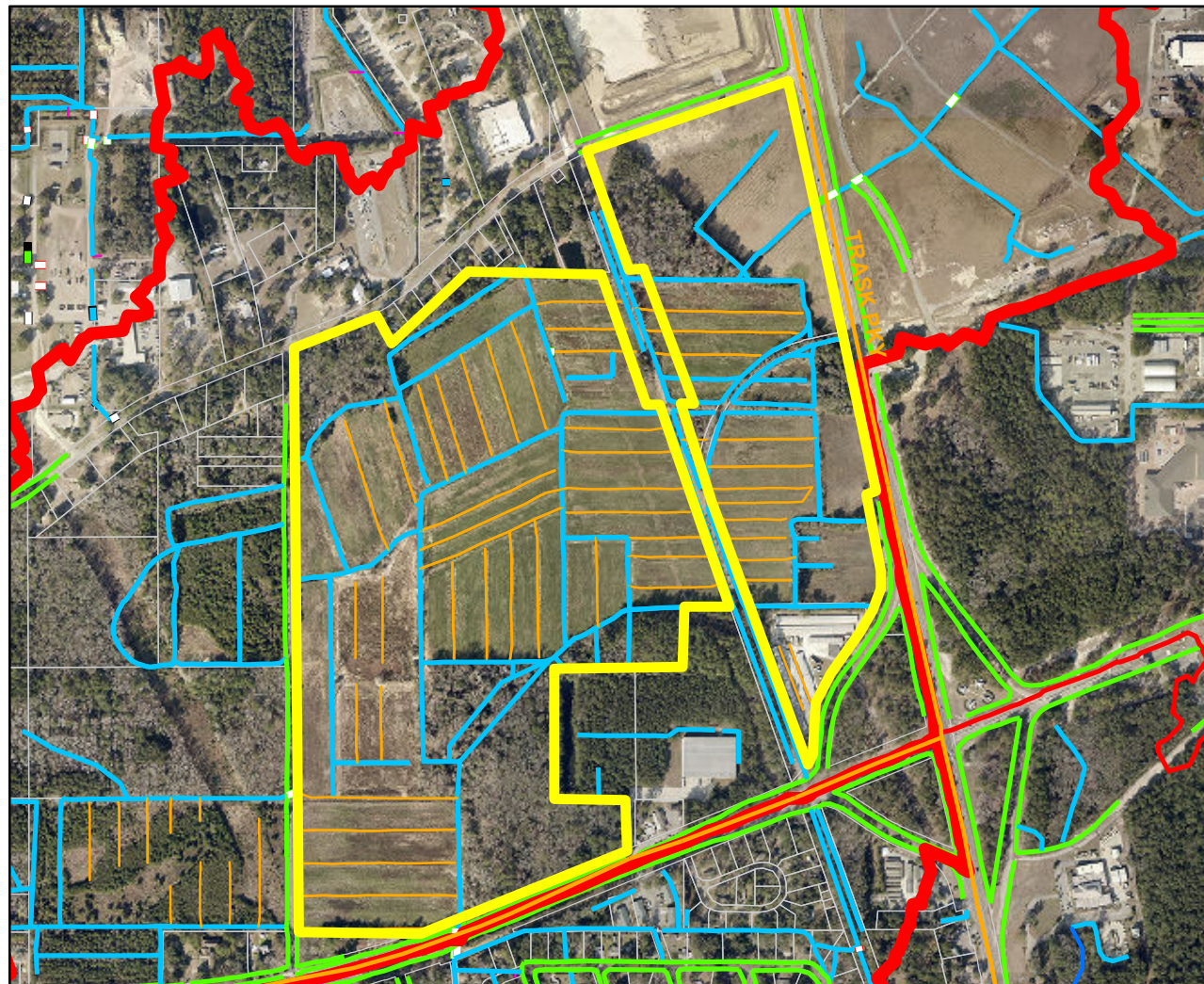
— River	— Roadside
— Creek/Stream	— Roadside Pipe
— River/Creek/Marsh BANK	— Road Pipe
— Channel (fka Outfall)	— Crossline Pipe
— Channel Pipe	— Driveway Pipe
— Lateral	— Access Pipe
— Lateral Pipe	— Bleeder Pipe



0 345 690 1,380 2,070 2,760 Feet

**1 inch = 917 feet**

Prepared By: BC Stormwater Management Utility  
Date Print: 5/19/14



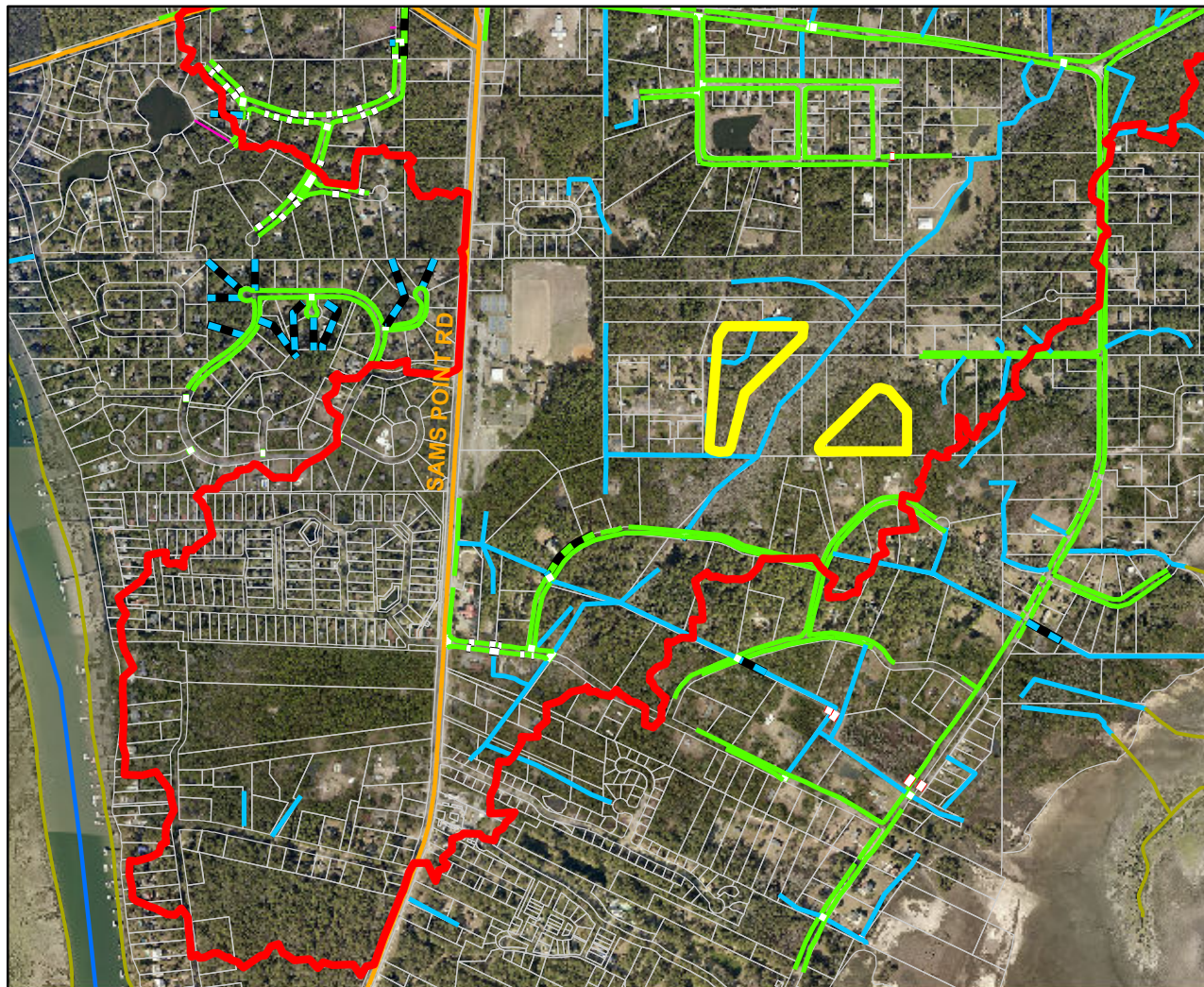
**Description:** Development in the Shanklin Road hydrologic sub-basin in the Albergotti Creek watershed includes approx. 600 acres of rural, single family development, commercial, and industrial built prior to stormwater regulations. There are no stormwater best management practices, such as detention facilities, in the area. The project would be to construct a regional detention facility to provide stormwater runoff water quality treatment and volume reduction. Due to the presence of multiple wetlands in the area, project design would involve delineation and avoidance of the wetlands, making construction cost a limiting factor for project implementation. Albergotti Creek is impaired by bacteria pollution, a major source being urban runoff. The Creek is being proposed for reclassification to allow shellfish harvesting, making this project a higher priority than in the past. The watershed of the site is located within Beaufort County.



**County Retrofit Project: Factory Creek M2**  
**Activity: Regional BMP**  
**Township: Lady's Island**

**Project Schedule: FY 2018, 2020 & 2022**

**Project Cost: \$1,740,000**  
**\$200,000 (2018)**  
**\$340,000 (2020)**  
**\$1,200,000 (2022)**



**Drainage**

TYPE	
River	— Roadside
Creek/Stream	— Roadside Pipe
River/Creek/Marsh BANK	— Road Pipe
Channel (fka Outfall)	— Crossline Pipe
Channel Pipe	— Driveway Pipe
Lateral	— Access Pipe
Lateral Pipe	— Bleeder Pipe



0 450 900 1,800 2,700 3,600 Feet

**1 inch = 1,207 feet**

Prepared By: BC Stormwater Management Utility  
Date Print: 5/19/14

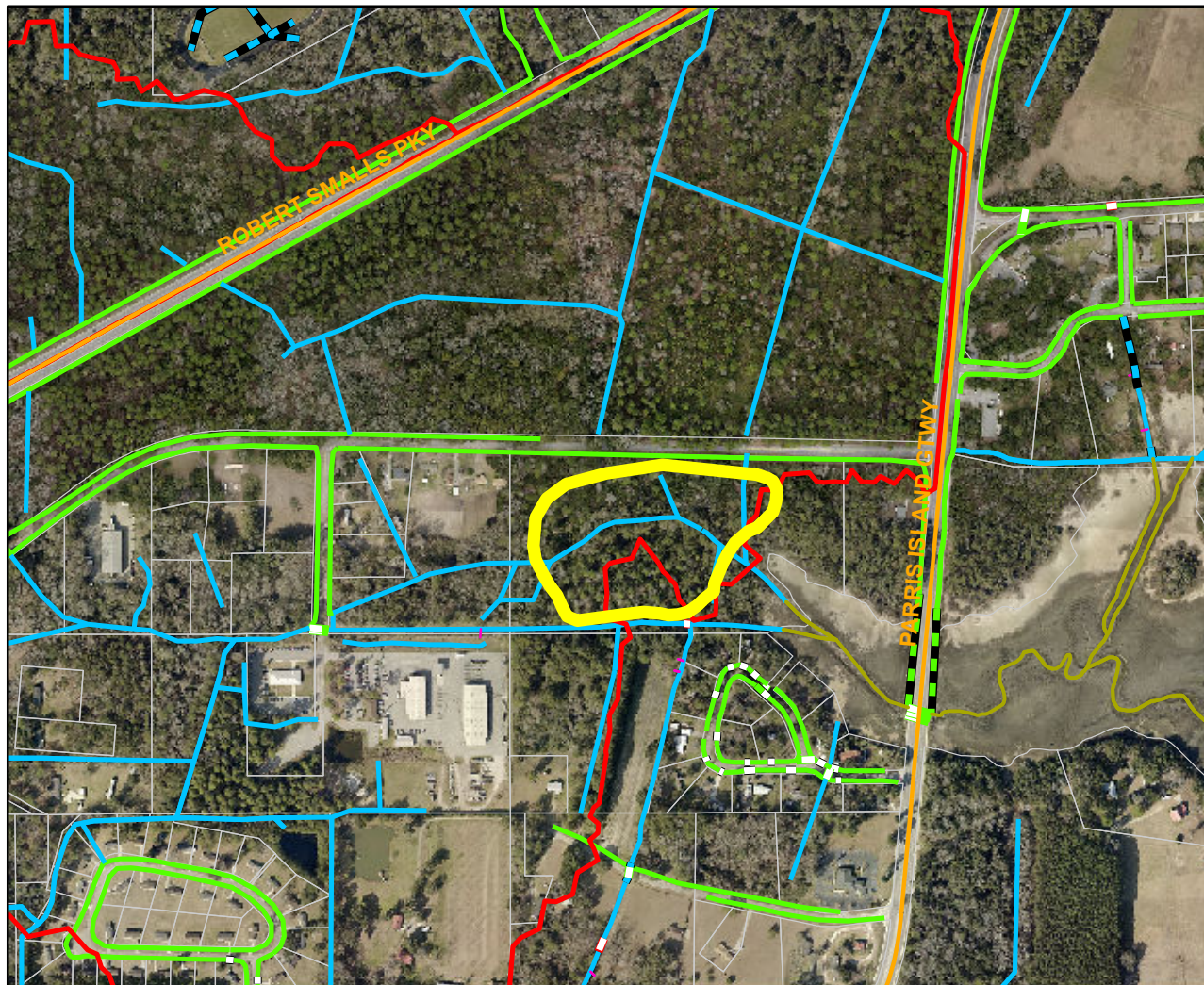
**Description:** Development in the Factory Creek hydrologic sub-basin in the Rock Springs Creek watershed includes approx. 300 acres of a mix of single family development, and commercial/institutional development built prior to stormwater regulations. There are only a few stormwater best management practices, such as detention basins, in the area. The project would be to construct a regional detention facility to provide stormwater runoff water quality treatment and volume reduction. Due to the grades of the area and the "stop gap measure" to construct a ditch to drain a portion of the wetland, construction will involve a large amount of earthwork, making project cost a limiting factor for project implementation. Rock Springs Creek drains into the Morgan River, which is impaired by bacteria pollution, a major source being urban runoff. The site is located in Beaufort County on Lady's Island.



County Retrofit Project: Grober Hill M2  
Activity: Regional BMP  
Township: Port Royal Island

Project Schedule: FY 2018,2020 & 2022

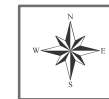
Project Cost: \$2,525,000  
\$225,000 (2018))  
\$900,000 (2020)  
\$1,400,000 (2022)



**Drainage**

**TYPE**

— River	— Roadside
— Creek/Stream	— Roadside Pipe
— River/Creek/Marsh BANK	— Road Pipe
— Channel (fka Outfall)	— Crossline Pipe
— Channel Pipe	— Driveway Pipe
— Lateral	— Access Pipe
— Lateral Pipe	— Bleeder Pipe



0 250 500 1,000 1,500 2,000 Feet

1 inch = 667 feet

Prepared By: BC Stormwater Management Utility  
Date Print: 5/19/14

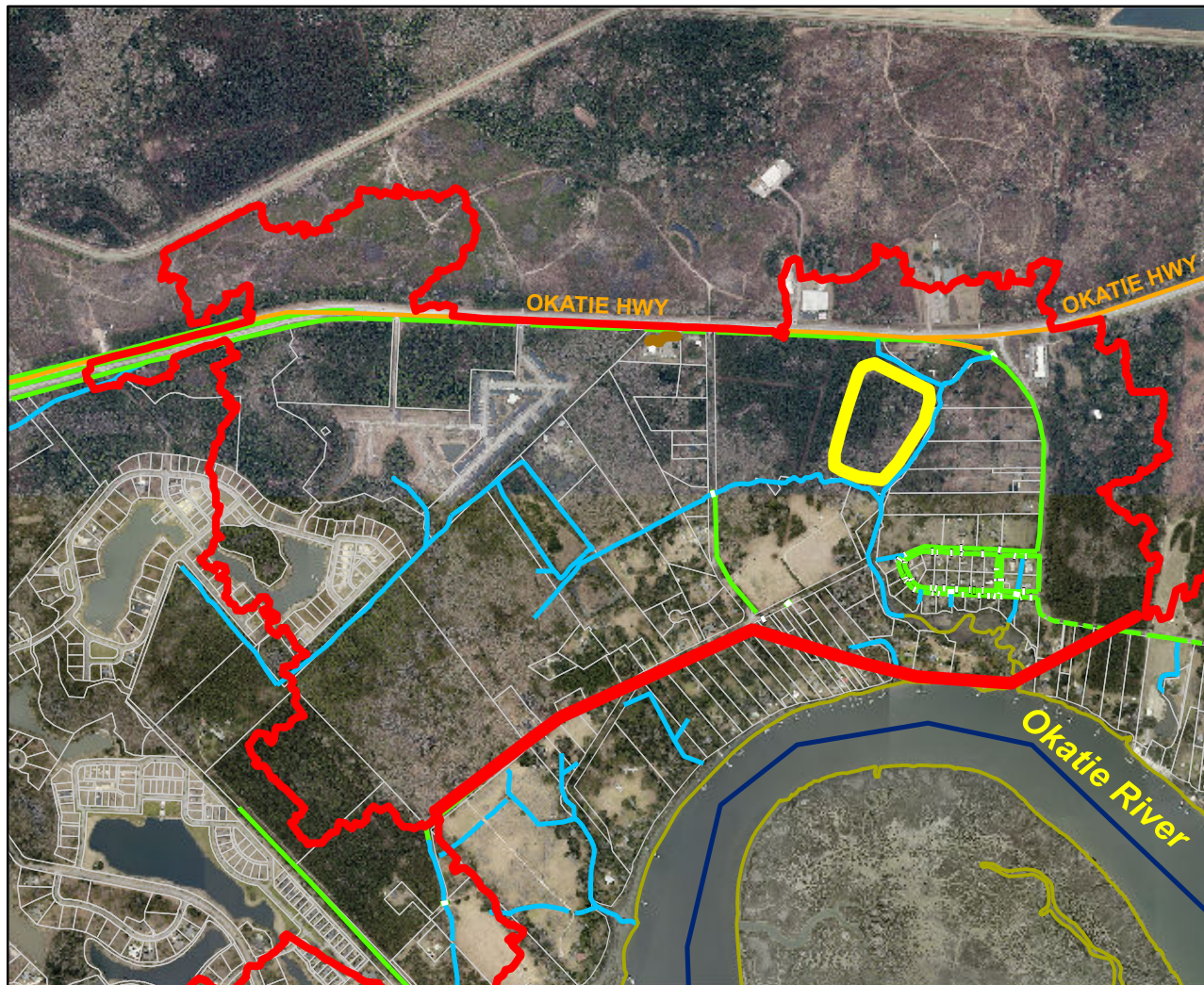
**Description:** Development in the Grober Hill hydrologic sub-basin in the Battery Creek watershed includes approx. 130 acres of single family development built prior to stormwater regulations. There are no stormwater best management practices, such as detention facilities, in the area. The project would be to construct a regional detention facility to provide stormwater runoff water quality treatment and volume reduction. Due to the grades of the area , construction will involve a large amount of earthwork, making project cost a limiting factor for project implementation. Battery Creek is impaired by bacteria pollution, a major source being urban runoff. The site is located in the City of Beaufort.



**County Retrofit Project: Camp St. Mary's M2**  
**Activity: Regional BMP**  
**Township: Bluffton**

**Project Schedule: FY 2021-2023**

**Project Cost: \$3,757,000**  
**\$342,000 (2021)**  
**\$165,000 (2022)**  
**\$3,250,000 (2023)**



**Drainage**

TYPE	
River	Roadside
Creek/Stream	Roadside Pipe
River/Creek/Marsh BANK	Road Pipe
Channel (fka Outfall)	Crossline Pipe
Channel Pipe	Driveway Pipe
Lateral	Access Pipe
Lateral Pipe	Bleeder Pipe



0 550 1,100 2,200 3,300 4,400 Feet

**1 inch = 1,457 feet**

Prepared By: BC Stormwater Management Utility  
Date Print: 5/19/14

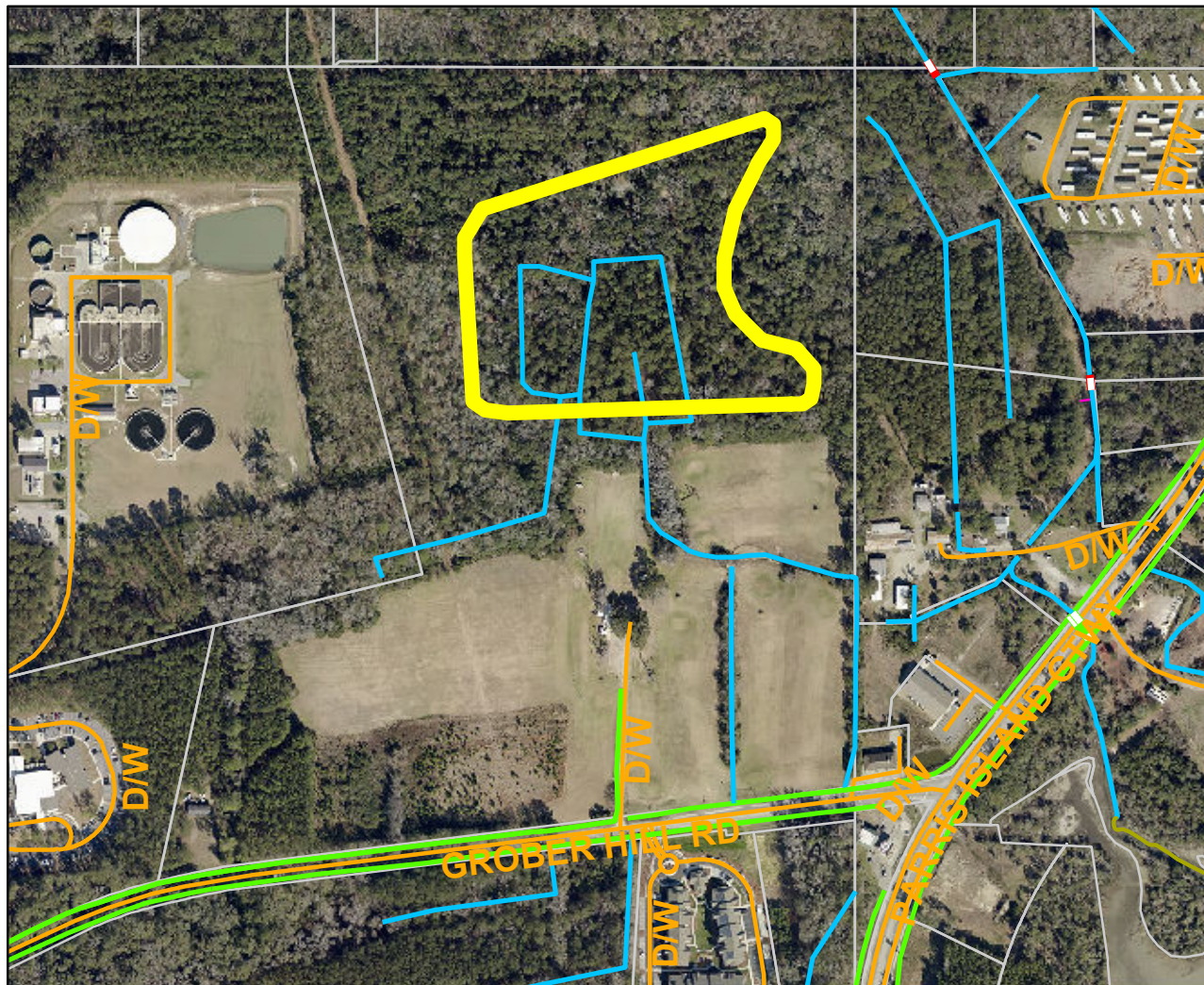
**Description:** Development in the Camp St. Mary hydrologic sub-basin in the Okatie River watershed includes approx. 500 acres of rural and single family development built prior to stormwater regulations. There are no stormwater best management practices, such as detention facilities, in the area. The project would be to construct a regional detention facility to provide stormwater runoff water quality treatment and volume reduction. Due to the presence of multiple wetlands in the area, project design would involve delineation and avoidance of the wetlands, making construction cost a limiting factor for project implementation. Okatie River is impaired by bacteria pollution, a major source being urban runoff. The watershed of the site is located within both Beaufort and Jasper Counties.



**County Retrofit Project: Battery Creek West M1**  
**Activity: Regional BMP**  
**Township: Port Royal Island**

**Project Schedule: FY 2022-2024**

**Project Cost: \$4,140,000**  
**\$375,000 (2022)**  
**\$165,000 (2023)**  
**\$3,600,000 (2024)**



**Drainage**

TYPE	
River	— Roadside
Creek/Stream	— Roadside Pipe
River/Creek/Marsh BANK	— Road Pipe
Channel (fka Outfall)	— Crossline Pipe
Channel Pipe	— Driveway Pipe
Lateral	— Access Pipe
Lateral Pipe	— Bleeder Pipe



0 187.5 375 750 1,125 1,500 Feet

**1 inch = 500 feet**

Prepared By: BC Stormwater Management Utility  
Date Print: 5/19/14

**Description:** Development in the Battery Creek West hydrologic sub-basin in the Battery Creek watershed includes approx. 500 acres of a mix of single family development and commercial development built prior to stormwater regulations. There are only a few stormwater best management practices, such as hydrodynamic separators, in the area. The project would be to construct a regional detention facility to provide stormwater runoff water quality treatment and volume reduction. Due to the grades of the area, construction will involve a large amount of earthwork, making project cost a limiting factor for project implementation. Battery Creek is impaired by bacteria pollution, a major source being urban runoff. The site is located in the Town of Port Royal.



# County Retrofit Project: Paige Point Rd Overtopping Design

## Activity: MitigationI BMP

### Township: Sheldon

Project Schedule: FY 2023-2024

Project Cost: \$335,000  
\$30,000 (2023)  
\$305,000 (2024)



#### Drainage

TYPE	
River	— Roadside
Creek/Stream	— Roadside Pipe
River/Creek/Marsh BANK	— Road Pipe
Channel (fka Outfall)	— Crossline Pipe
Channel Pipe	— Driveway Pipe
Lateral	— Access Pipe
Lateral Pipe	— Bleeder Pipe



0 312.5 625 1,250 1,875 2,500 Feet

1 inch = 833 feet

Prepared By: BC Stormwater Management Utility  
Date Print: 5/19/14

**Description:** Historic complaints about road overtopping support the findings of the 2006 Stormwater Master Plan, which identified this location as a flooding hazard during a 100 - year storm event. A 2013 study by the County confirmed the flooding problem and proposes raising a portion of the road and up-sizing the storm drain under the road.



Beaufort County  
Stormwater Utility  
proposed 5 year plan for Master  
Plan, Capital Improvement Program  
(CIP), Operations and Maintenance  
(O&M), and Municipal Separate  
Stormsewer (MS4) Permit

A Report to Beaufort County Council  
January 22, 2015



# Outline

- 2006 Master Plan update
- Capital Projects
- Expansion of Operations and Maintenance Services
- Utility Locates Service
- Manpower Needs
- Equipment Needs
- MS4 Implementation



# Why is the Master Plan update needed?

- Action items are completed
- Goals / Priorities change
  - Community focus
  - Need to expand services
- Regulatory requirements change
  - Volume Control
  - MS4 permitting





# 2006 Master Plan Elements

- Stormwater control regulations
- Primary Stormwater Management System (PSMS) enhancements
- Water quality controls for existing development
- Water quality monitoring
- O&M of PSMS and secondary SW mgt. systems
- Inventory of the secondary system
- Add. & on-going studies
- Public information



# 2006 Master Plan accomplishments

- Stormwater control regulations
  - BMP Manual updates in '08, '09, & '12
  - Volume control Ordinance
- Primary Stormwater Management System (PSMS) enhancements
  - Several overtopping studies resulted in construction projects
  - Currently “on the shelf”
    - Trask Parkway
    - Paige Point
    - Sawmill Creek (Forby)





# Plan accomplishments, cont.

- Water quality controls for existing development
  - Burton Hill M2 (Battery Creek 319 grant) - ongoing
  - Okatie East wetland enhancement – complete '14
  - Backache Acres pond retrofit – complete '13
  - Rice Road pond retrofit – complete '13
  - Shanklin Road pond retrofit – complete '13
  - US 278 widening stormwater enhancement - ongoing
  - SC 170 widening stormwater enhancement – just starting
  - Graves Tract – just starting
  - Others still not started



# Plan accomplishments, cont.

- Water quality monitoring
  - Weekly, quarterly monitoring
  - USCB Lab set up
- Add. & on-going studies
  - Retrofit Study (Phase II of Master Plan)
  - Water Budget Study
  - Salinity Study
- Public Information
  - Partnerships with Carolina Clear, Towns, and City
  - New partnership with Beaufort Conservation District





# Master Plan updates needed

- Update and align with MS4 permit needs
  - Stormwater control regulations (ordinances and BMP manual)
  - Inventory of the secondary system
  - Water quality monitoring
  - Public Information
- Primary Stormwater Management System (PSMS) enhancements & water quality controls for existing development
  - How has volume control changed our priority areas?
  - How has development changed our watersheds?
- O&M of PSMS and secondary SW mgt. systems
  - Revision of LOS and EOS will expand needs
- Add. & on-going studies
  - What is the next evolution?
    - Water re-use techniques?
    - Aquifer recharge?



# Master Plan Update Schedule

- Plan should include all municipalities within the County
- Cost share proposed
- Create / Update MOUs with municipalities
- Hire consultant(s)
- Total cost = \$250,000 to \$300,000



# Capital projects

- Master Plan includes engineering modeling of all watersheds within the County
- Changes in design standards will change modeling conditions
- A new CIP priority list will come out of the Master Plan update





# Capital needs

- The 2006 Master Plan identified projects to mainly deal with:
  - Alleviate road flooding
  - Infrastructure rehabilitation
  - Pollutant removal (to a limited degree)
- We currently have 14 projects identified to:
  - Meet 2006 Master Plan goals, and
  - Stormwater runoff volume reduction
  - Fully address pollutant removal
  - **Promote growth**
- Scheduled over 10 years



# Capital needs cont.

- The Utility has the following projects under design and / or construction:
  - US 278 widening drainage - **\$359,400** ('13)
  - Admin. Complex parking retrofit - **\$327,768** ('13)
  - Burton Hill M2 (aka Battery Creek 319) - **\$132,609** (county portion of cost share) ('12)
  - SC170 widening drainage / Okatie West - **\$2,193,000** ('14)



Year denotes date of last cost estimate

# Capital needs cont.

- The 2006 Stormwater Management Plan identified numerous capital projects:
  - Salt Creek South M1 - **\$2,045,000** ('06)
  - Shanklin Road M2 - **\$3,340,000** ('06)
  - Factory Creek M2 - **\$1,740,000** ('06)
  - Grober Hill M2 - **\$2,555,000** ('06)
  - Camp St. Mary M2 - **\$3,757,000** ('06)
  - Battery Creek West M1 - **\$4,140,000** ('06)
  - Paige Point Overtopping - **\$335,000** ('06)



Year denotes date of last cost estimate



# Capital needs cont.

- Other projects and needs have been identified since 2006:
  - Buckingham Plantation infrastructure rehabilitation - **\$900,000** ('14)
  - Sawmill Creek overtopping (aka Forby site) - **\$150,000** ('14)
  - Brewer Memorial Park Demonstration wet pond - **\$79,500** ('14)

**\$22,000,000 total**

Year denotes date of last cost estimate



# Level of Service (LOS)

- Adopted in May 2010
- Main purpose is to provide a set of consistent, equitable standards of service to the citizens
- Defines level of effort needed to maintain our system
- Assures compliance with SC DHEC regulations



# LOS Elements

- Inventory
- Asset Management
- Service Requests (complaints)
- Routine / Preventive Maintenance
- Corrective Maintenance
- Retrofit Program
- Public Education and Outreach
- Development Plan Review
- Floodplain Management
- Water Quality Monitoring
- Utility Administration





# LOS Updates needed

- Outdated references to MS4 permit
  - Create IDDE section as part of MS4 permit
  - Outdated Public Education Plan
- Outdated Utility Administration activities
- Outdated Development Plan review SOP
- Expand Monitoring to match MS4 requirements
- Expand basic services provided to meet MS4 expectations
- Update of LOS planned for FY 16 w/ FY 17 implementation



# Extent of Service (EOS)

- Adopted in May 2010
- In summary, the EOS defines where we will implement the LOS
- The jurisdiction is:
  - In un-incorporated Beaufort County,
  - Outside of State DOT ROW & not DOT outfalls
  - Not on Commercial property
  - Not within gated and/or private communities
  - Only within County ROW or Easements



# Current Resources to meet EOS

- Current EOS workload requires:
  - 4 Mgmt., Supervisors, and Admin.
  - 1 – 4 man crew in roadside maintenance
  - 1 – 4 man crew in Shinn/Outfall Ditch maint.
  - 2 – 2 man bush hog crews
  - 6 man truck driver crew
  - 2 man vac. truck crew
  - 1 – 6 man corrective construction crew
- Current vacancies = 8





# Issues with EOS

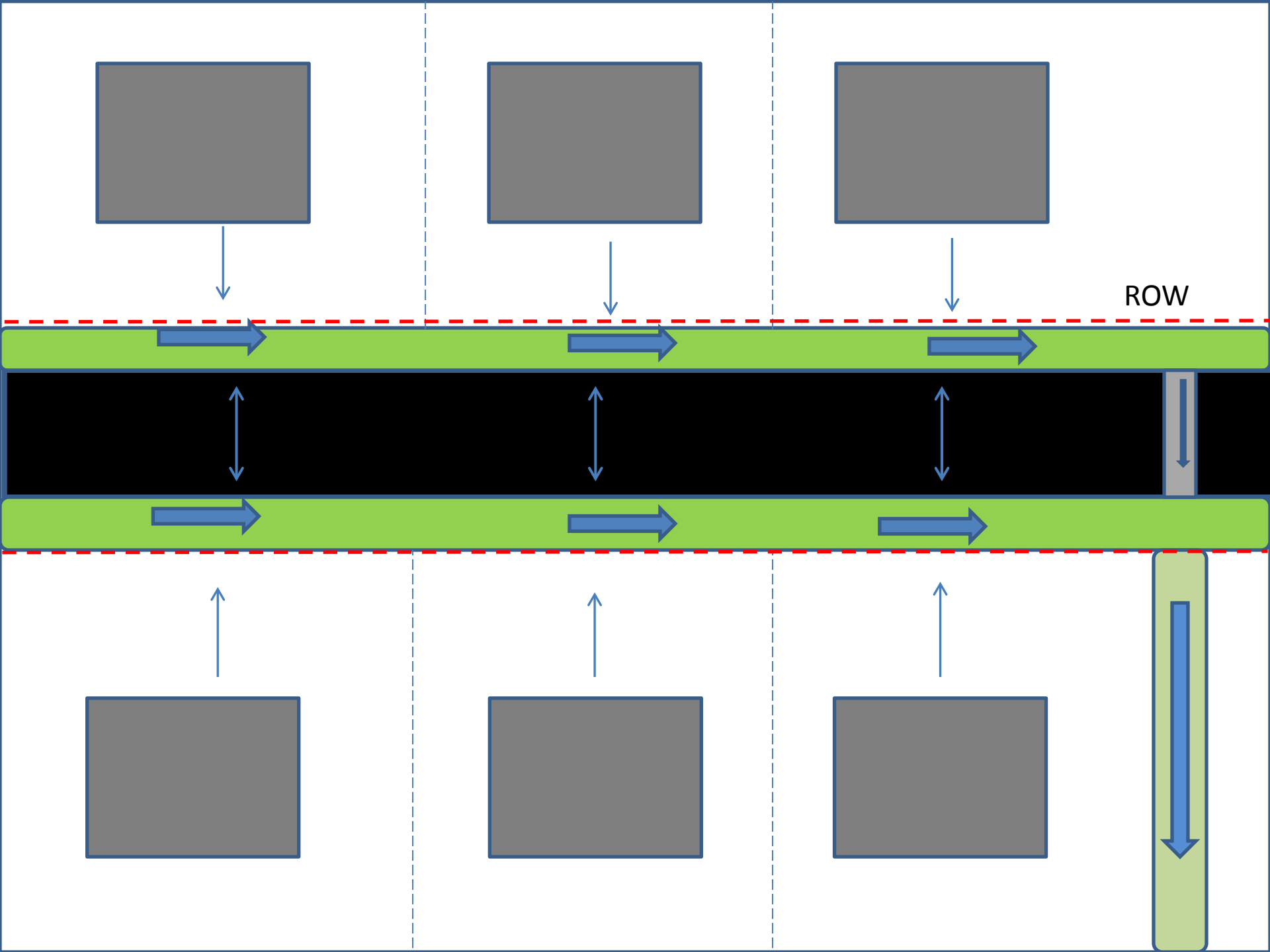
- Ongoing debate with SC DOT over the definition of “State Channel / Outfall Ditches”
- Working outside of ROW or without easement
- Update of EOS planned for FY 16 w/ FY 17 implementation



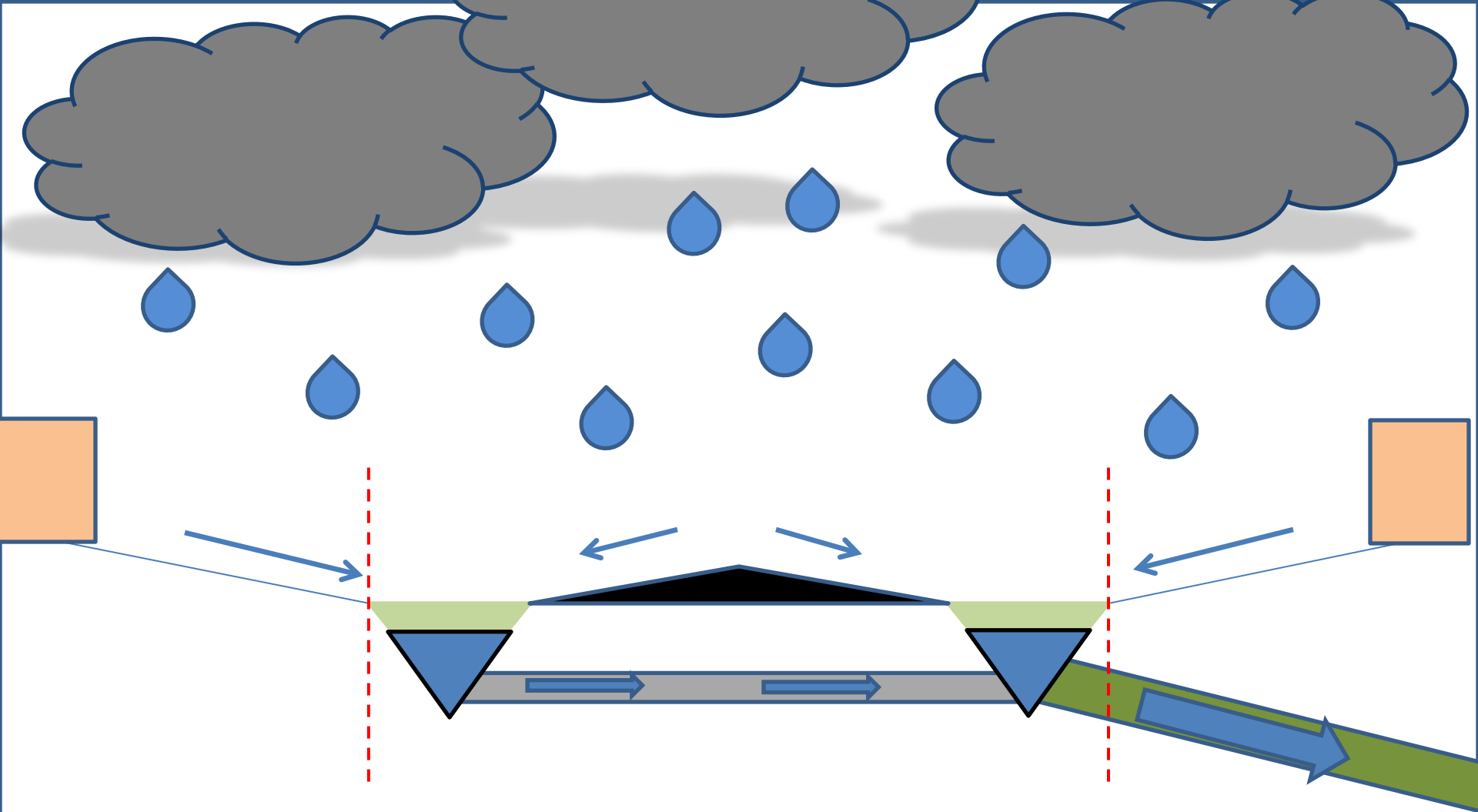
# State DOT impacts

- We estimate, based on limited GIS data, approx. 179 miles of State outfall ditches, serving 584 miles of State roadside ditches
- Lack of maintenance of the ditches beyond SCDOT ROW is causing adjacent property flooding
- SCDOT position is that our local utility should fund this work since runoff from State roadside ditches includes that from adjacent parcels









ROW

ROW

# Resources needed to meet demand

- If expanded to assume State outfalls
  - All current vacancies (8) filled (FY 15 & FY 16)
  - 2 additional 2 man bush hog crew (FY 17)
  - 2 new 4 man support crews (FY 17 & FY 19)
  - 1 additional supervisor (FY 19)
  - 1 additional administrative support staff (FY 19)
- Additional basic services include
  - Street sweeper operator (FY 18)
  - Asset Management Inspection staff (2)  
(FY 16 & FY 17)



# Equipment needs

- Current high value replacements
  - Shinn Cutter \$550,000 (FY 17)
  - Vac. Truck \$286,000 (FY 16)
  - 3 Excavators \$202,000 each (FY16, FY17 & FY18)
  - Bulldozer \$90,000 (FY 19)
  - Trailer Mounted Camera System \$85,000 (FY 16)
- Other fleet replacement needs
  - 6 pick up trucks, 4 dump trucks, 3 trailers, and numerous small equipment attachments (\$1,215,000 ) (over 5 years)





# Equipment needs cont.

- New purchases for expanded services
  - Street sweeper \$170,000 (FY 18)
  - 2 trucks for inspection staff (\$36,000 each) (FY16 & FY 17)
  - 2 trucks for support crews \$40,000 each (FY 19)
  - Excavator \$200,000 (FY 19)
  - skid steer \$70,000 (FY 19)
  - Trailer \$12,000 (FY 19)
- Total equipment needs:  
Approx. \$730,000 annually



# Utility Locates

- State legislation in 2014 requires private utility companies to provide locate services for their underground systems
- Law did not require local governments to participate, however
- Due to numerous cases of damaged stormsewer pipe systems by contractors, the Utility voluntarily joined the PUPS network



# Utility Locates crew

- Promotion of our existing Locates coordinator to serve as a supervisor
- Hired a Locates Technician (FY 15)
- Utilized existing truck and computer equipment to start field services
- Technician to be trained and certified to perform utility locates of others systems for our use on stormwater projects (FY 16)





# MS4 implementation

- Submitted our permit application Nov. 19, 2014
- Permit becomes effective on or about Jan., 2015
- Within 12 months
  - Develop a Stormwater Management Plan
  - Develop program and Identify priority areas for MCM 3
- Within 18 months
  - Develop the MCM 4 and MCM 5 program
- Within 24 months
  - Stormwater Ordinances in place to enforce SWMP
  - Develop a municipal facility assessment plan for MCM 6
  - TMDL monitoring plan
- Annual reporting



# MS4 implementation

- Program development will require consultant(s) use
  - \$50,000 (FY 15)
  - \$85,000 (FY 16)
  - \$60,000 (FY 17)
  - \$15,000 (FY 18)
  - \$45,000 (FY 19)
- Includes the annual reporting (initially)
- Permit will be renewed every 5 years



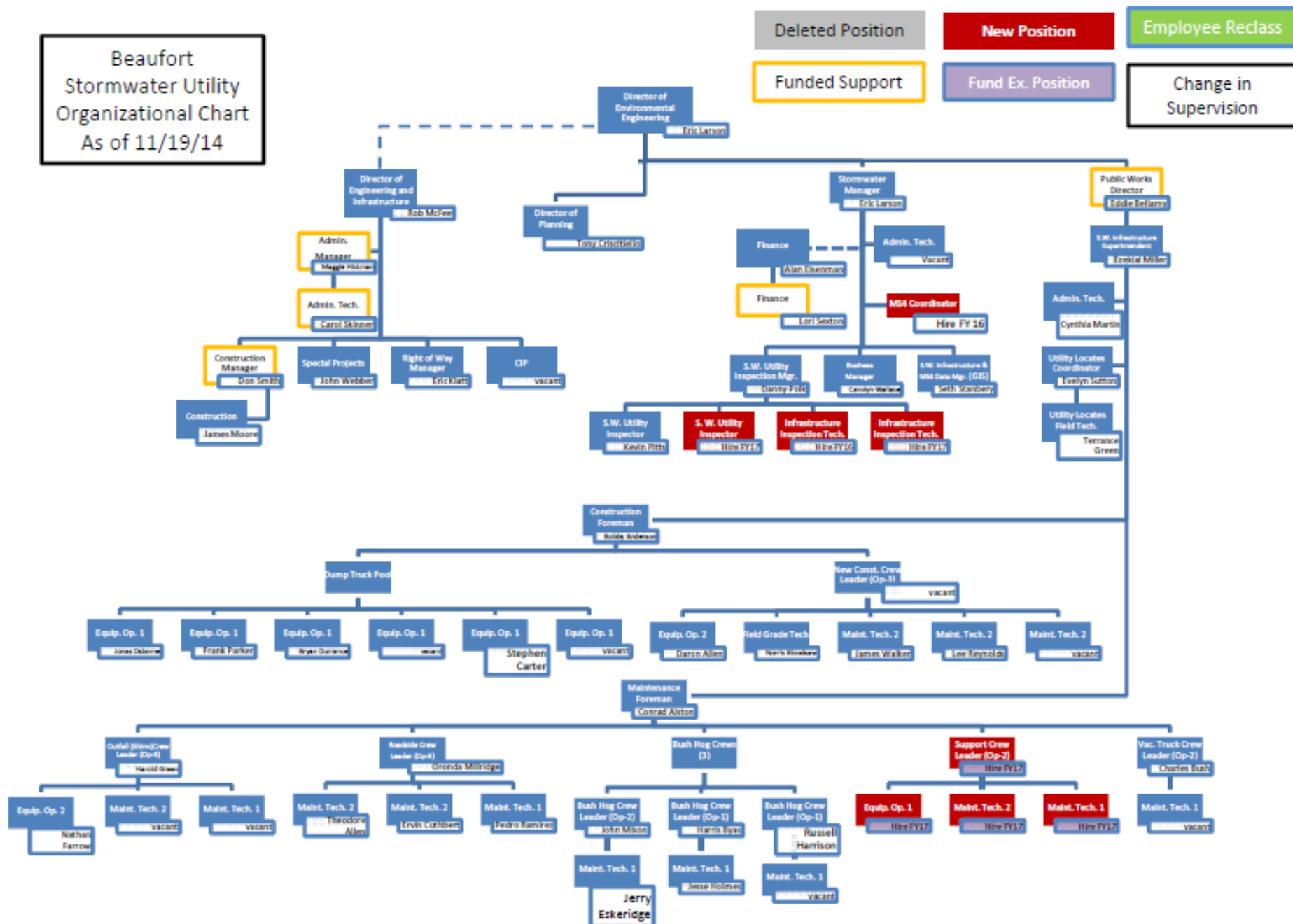
# Resources Needed

- 1 Admin. Support staff (FY 15)
- MS4 Coordinator (FY 16)
- 2 MS4 Inspectors (FY 15 and FY 17)
- 2 trucks for inspection staff (\$36,000 each)  
(FY16 and FY 17)
- Laptops, iPads, smartphones, mobile printers  
for field use





Beaufort  
Stormwater Utility  
Organizational Chart  
As of 11/19/14



# Summary

The Stormwater Utility staff are recommending support of the proposed five year plan, which contains proactive initiatives to improve our program and comply with federally mandated permit programs

- Update the Master Plan
- Fund capital projects
- Update the LOS and EOS
- Expand crew and resources
- Implement a MS4 program





**BEAUFORT COUNTY STORMWATER UTILITY**  
120 Shanklin Road  
Beaufort, South Carolina 29906  
Voice (843) 255-2801 Facsimile (843) 255-9478



**INTEROFFICE MEMORANDUM**

**TO:** Councilman Brian Flewelling, Chairman, Natural Resources Committee

**FROM:** Eric W. Larson, Stormwater Manager *Eric W. Larson*

**SUBJECT:** Okatie West Water Quality Retrofit project  
EPA CWA Section 319 grant award acceptance

**DATE:** September 8, 2015

**BACKGROUND:**

The 2002 Okatie River Watershed Management Plan identified a regional retrofit project in the west tributary of the Okatie River headwaters, which was further detailed in the 2009 Regional Retrofit Study, the 2014 SC170 Highway Widening Retrofit Study, and the 2015 Okatie River Watershed Management Plan update. In late 2014, the Stormwater Utility partnered with the Rural and Critical Lands Board to make an offer to purchase the New Leaf, LLC tract along SC 170 and the potential site for this regional project. Closing is anticipated soon. In April 2015, the Stormwater Utility submitted the "Okatie West" project for grant funding by the USEPA Clean Water Act Section 319 grant program. On August 11, 2015, the County was notified that the project was granted funds for design and construction of the site. The grant program is a 60% funding with 40% match. The proposed match is Stormwater CIP funds.

**FUNDING:**

Primary Funding – 50260014–51160; Stormwater CIP funds - \$528,000  
Grant Funding - \$792,000

**ESTIMATED PROJECT COST:**

\$1,320,000

**FOR ACTION:**

Natural Resources Committee meeting September 8, 2015.

**RECOMMENDATION:**

The Stormwater Department recommends that the Natural Resources Committee approve and recommend to County Council to accept the EPA CWA Section 319 grant award in the amount of \$792,000 and grant the County Administrator the authority to sign all necessary grant award contracts with the South Carolina Department of Health and Environmental Control (DHEC).

CC: Gary Kubic, County Administrator *GKubic*  
Josh Gruber, Deputy Administrator *JGruber*  
Alicia Holland, Chief Financial Officer *AH*

Att: Grant project workplan



**1. PROJECT INFORMATION:**

Project Title: Okatie West Water Quality Retrofit  
 Length (months): 36

Watershed Name(s): Salkehatchie  
 12 Digit HUC(s): 030502080606  
 County(ies): Beaufort  
 Water Quality Parameter(s): Fecal Coliform Bacteria  
 SCDHEC Monitoring Site(s): 18-08, 18-16, 18-17, 18-07

This watershed: (check one)

☒ Has a draft or approved TMDL ☐ Is impaired (no TMDL)

**2. FUNDING REQUEST:**

Federal Request: \$792,000.00  
 Non-Federal Match: \$528,000.00  
 Total Amount: \$1,320,000.00

Additional Federal Funding, if applicable: \$  
 Source: \_\_\_\_\_

**3. LEAD ORGANIZATION INFORMATION:**

Lead Organization: Beaufort County  
 Federal ID Number: 57-6000311

Project Manager: Eric Larson  
 Mailing address: 120 Shanklin Road Beaufort, SC 29906  
 Telephone: 843-255-2805  
 Fax: 843-255-9436  
 Email: [elarson@bcgov.net](mailto:elarson@bcgov.net)

Alternate Contact: Paul Moore – Ward Edwards Inc.  
 Telephone: 843-384-5266  
 Email: [pmoore@wardedwards.com](mailto:pmoore@wardedwards.com)

Financial Officer: Alan Eisenman  
 Telephone: 843-255-2295  
 Email: [aeisenman@bcgov.net](mailto:aeisenman@bcgov.net)

Official project paperwork (e.g. contract) Eric Larson  
 should be sent to the attention of: \_\_\_\_\_

#### 4. COOPERATING ORGANIZATIONS:

Beaufort County will be the only organization contributing financially to the project. The County's Stormwater Utility has lead the efforts to restore the Okatie River watershed but has support from the other local municipalities through the County's Stormwater Implementation Committee (SWIC) and Stormwater Utility Board. The County will fund the non-federal match through the capital improvements funds collected and reserved by the County's Stormwater Utility Fee. The County will lead the design, permitting, procurement, construction, public outreach, and education components. The Town of Bluffton, the Rural & Critical Land Preservation Program, and the Beaufort County Soil & Water Conservation District are public agencies that have provided a letter of support for the project. Private organizations that are supporting the project include the Sun City Hilton Head Community Association, the Oldfield Property Owners Association, and the Island West Property Owners Association.

#### 5. GENERAL PROJECT OVERVIEW (ABSTRACT):

Beaufort County has recognized the growing water quality problems within the Okatie River watershed since the early 1990s when shellfish harvesting restrictions within the waters first began. The County has led preservation and restoration efforts through a series of studies, task forces, management plans, development code revisions, and retrofit projects. The County has a number of ongoing and planned projects and strategies that are summarized in the latest *Okatie River Watershed Management Plan* dated April 2015.

Beaufort County's Stormwater Master Plan (SWMP) developed in 2006 identified the Okatie Headwaters as a priority basin within the County. The headwaters basin located upstream of SCDHEC monitoring station 18-08, is split into two sub-basins, Okatie East and Okatie West, and the County's 2009 Water Quality Retrofit Study proposed water quality BMP projects in both sub-basins. The sub-basins were studied to locate the best sites for the regional BMPs based on criteria such a land availability, limiting impacts to natural resources, feasibility, construction cost, soils, and topography. A low-cost wetland enhancement project proposed for the Okatie East basin was implemented in 2013, and the County now plans to implement a pond construction project proposed for the Okatie West sub-basin. The regional retrofit plan calls for the flow from the 1,170 acre upstream area to be diverted to a pond that will be constructed in a low upland area located on property the County recently purchased. The proposed pond will be constructed near the main outfall channel for the sub-basin, such that flows from the smaller more frequent rainfall events can be diverted to the pond for treatment. An outfall structure will be constructed in the pond to provide attenuation of the upstream runoff, and release the stored stormwater at rate less than current conditions. Based on conceptual modeling results, the proposed Okatie West Pond is predicted to reduce the peak flow to the tributary by as much 20% for the 95<sup>th</sup> percentile storm. The pond should also reduce the volume of freshwater reaching the salt water river.

In addition to the runoff reduction, it is expected that the Okatie West retrofit pond will provide effective removal of bacteria from the runoff. Water quality modeling prepared as part of the 2006 SWMP showed that implementation of a BMP within the headwaters sub-basin would reduce the bacteria load at station 18-08. A water quality model of the Okatie River 3 water quality sub-basin updated as part of the Okatie WMP shows that the Okatie West BMP will reduce the bacteria load from the BMP service area by 16%. This equates to a 7% reduction in bacteria load in the Okatie River 3 water quality sub-basin (containing monitoring Station 18-08). Combining the Okatie West load reduction with the recently implemented Okatie East Regional Retrofit results in a predicted load reduction near station 18-08 of 15.86% (1.75E+14 #/yr). Beaufort County's Stormwater Utility will implement and fund the project from its capital improvements fund collected as part of the county-wide stormwater utility fee.

A previous Watershed Based Plan and 319 Grant from the 2008 cycle was recently completed in 2014. That program was comprised of many small regional and non-regional strategies that were implemented with mixed results. The project did not result in correction of the bacteria contamination problem and reopening of the shellfish beds. The new *Okatie River Watershed Management Plan* completed in April 2015 will build on the previous successes and learn from the failures in order to implement larger strategies intended to address the contaminant sources. The ultimate goal is of the overall watershed based plan is to improve water quality such that the shellfish beds within the watershed are reopened for harvesting.

## 6. PROJECT DESCRIPTION:

### A. General Background

Located in the South Carolina lowcountry, the Okatie River watershed (HUC 030502080606) is approximately 16,321 acres in size and spans Beaufort County and Jasper County. The majority of the watershed (12,325 acres) is in Beaufort County while the remaining portion (3,995 acres) is in Jasper County. Within Beaufort County, the majority is in unincorporated Beaufort County and the rest is in the Town of Bluffton. The Okatie River is a euhaline river, with no freshwater inputs other than stormwater runoff, and the River drains to the Colleton River, which in turn drains to Port Royal Sound and the Atlantic Ocean. The River is classified as an Outstanding Resource Water (ORW) and as shellfish harvesting waters, although the upper reaches of the river are restricted for shellfish harvesting due to fecal coliform bacteria contamination. The restrictions first began in 1995, and Beaufort County has been working ever since to protect and restore the River to pre-restriction conditions. SCDHEC initiated a fecal coliform TMDL for the watershed in 2010 which mandates reductions in bacteria loads as high as 51% in the Headwaters portion of the watershed. Portions of the watershed are about to become part of a MS4 area, as Beaufort County has submitted a draft MS4 permit and expects approval is imminent. Exhibit 1 shows the watershed boundaries, the shellfish classifications, the SCDEHC monitoring stations, the watershed sub-basins, and the MS4 boundary.

The original Okatie River Watershed Management Plan was prepared and enacted in 2002. The plan was amended in 2008 as part of a 319 Grant administered by the Lowcountry Council of Governments (LOCOG). The 319 grant funded a number of small regional and non-regional projects such as a septic tank inspection program, a pet waste education program, and an irrigation reuse program. The project was completed in 2014 and a summary report was published by LOCOG. The project's goal was to address the bacteria contamination problem in the River and reopen the shellfish beds to harvesting; however, the results fell short of that goal. The new *Okatie River Watershed Management Plan* completed in April 2015 will build on the previous successes and learn from the failures in order to implement larger strategies intended to address the contaminant sources. The ultimate goal of the overall watershed based plan is to improve water quality such that the shellfish beds within the watershed are reopened for harvesting.

Non-point source pollution from growth and development are generally to blame for bacteria contamination throughout the County, and the Okatie River watershed has faced among the highest development pressure within the County over the past 25 years. Beaufort County responded to the shellfish bed closures in the Okatie and other rivers by implementing a number of strategies. Among the strategies were improvements to the County's stormwater standards for new development, implementation of a Stormwater Utility in cooperation with the local municipalities, and the completion of a baseline study for the Okatie River. To address the County's stormwater standards for new development, Beaufort County's first version of the *Manual for Stormwater Best Management Practices* was implemented in 1998. SCDHEC aided in the recommendation for a baseline water quality by completing a combined baseline study of the Okatie River and Broad Creek in 2000. Most importantly, the County's Stormwater Utility was created in 2001. The Stormwater Utility included the participation of all the local municipalities and all subsequent water quality studies and initiatives in the County were implemented by or supported by the Stormwater Utility. The first Okatie River Watershed Management Plan was completed in 2002 and contained a number of specific strategies, some of which have been implemented. Additional studies such as the *Beaufort County Stormwater Master Plan*, completed in 2006, recommended regional retrofit projects intended to offset the increasing bacterial contamination from stormwater runoff. A new Okatie River Watershed Management Plan was recently completed in April 2015 and was updated to include the most recent information and studies related to the River, including the Okatie River TMDL. Section 1.0 of the WMP describes in greater detail, the history of the studies and reports for the River. Section 2.0 describes the watershed's existing land-use, future land-use, political boundaries, and the baseline water quality.

Water Quality within the watershed is generally good, with the exception of the previously mentioned fecal coliform bacteria impairment. Bacteria levels generally meet recreational contact standards at all stations except the headwaters station (18-08); however, the three upstream most stations (18-08, 18-16, & 18-17) generally exceed the shellfish harvesting standards that apply to the River. The "restricted" portions of the river have fluctuated over the years, but are generally located between stations 18-08 and 18-07; with 18-07 being the downstream station at which the classification transitions to "approved". The bacteria concentrations are believed to be improvable based on water quality modeling prepared as part of the County's 2006 *Stormwater Master Plan*, and modeling prepared as part of the 2015 *Watershed Management Plan*. The modeling demonstrates that implementation of regional retrofit BMPs combined with non-regional management strategies such as reducing septic tank usage will reduce the predicted future bacteria loadings in assumed future land-use conditions. Sections 2.4 and 5.5 contain information about the

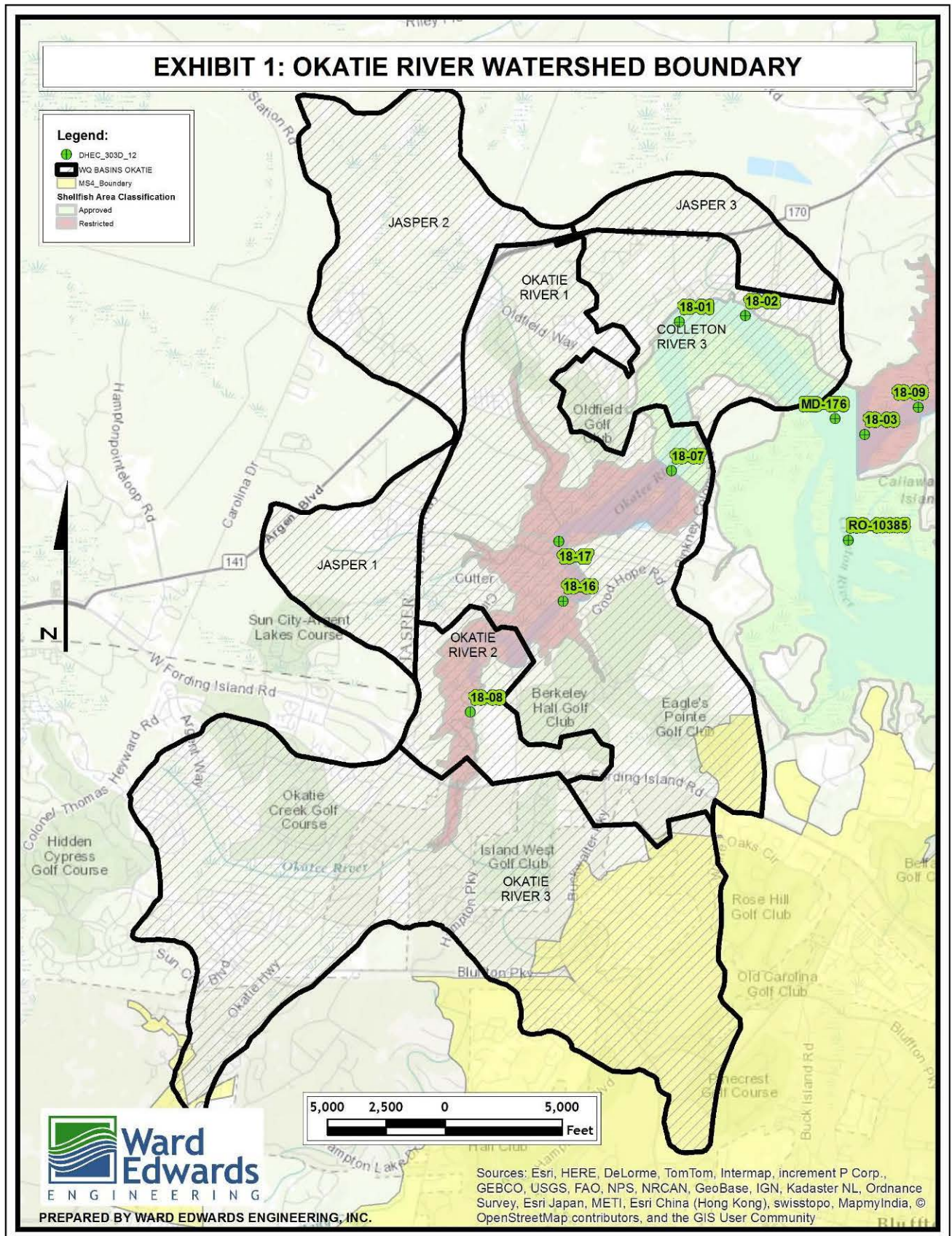


predictive water quality modeling prepared for the watershed. Addendum 1 of the Watershed Management Plan contains the updated model for the Okatie River 3 water quality sub-basin. The model demonstrates that the proposed pond BMP will provide significant bacteria pollutant removal from the runoff treated by the BMP and make a difference in the bacteria load reaching monitoring station 18-08. Based on field research conducted by Beaufort County, appropriately sized wet detention ponds provide bacteria removal of at least 80%. The proposed Okatie West pond will be undersized for the area it will serve, but should provide at least a 16% ( $7.78 \times 10^{13}$  #/yr) removal for runoff entering the pond, and results in a 7% reduction in overall load reaching Station 18-08.

Beaufort County has many other management strategies that are being implemented along with the Okatie West project, including:

- The Okatie East Wetland Enhancement – This project was recently constructed and is undergoing refinement. It is expected to provide an 8.82% ( $9.74 \times 10^{13}$  #/yr) reduction in bacteria load reaching station 18-08.
- Highway 278 non-regional retrofits – This project involves construction of four smaller ponds along the recently widened highway directly adjacent to the Okatie River headwaters. They are expected to provide bacteria treatment and runoff volume control for runoff leaving the road.
- Highway 170 widening retrofits – This project is similar to the Highway 278 project in its goals, but is located directly upstream of the Okatie West project. The construction of these ponds will enhance the function of the Okatie West pond by pre-treating runoff that will drain through the Okatie West pond. Pond 6A is located within the same parcel of land as Okatie West and could provide additional detention should the Okatie West wetland delineation reduce the upland area available for the proposed pond.
- Land preservation – Beaufort County has been and continues to preserve land within impaired watersheds such as the Okatie River watershed. The Beaufort County Rural and Critical Land program purchases property or preservation easements to prevent development in areas that could further degrade water quality. The program has preserved 500 acres in the Okatie River watershed and 21,000 acres County-wide. The County is actively pursuing property preservation in the Okatie River including some large parcels directly adjacent to the Okatie River headwaters.
- Educational Programs – Beaufort County's stormwater educational program is handled by the Beaufort Soil & Water Conservation District (BCSWD). The County has partnered with the Town of Bluffton and BCSWD as part of the \$60,000 annual program to host a pond maintenance conference in the County. The conference will teach designers, land developers, and homeowner associations proper design and maintenance strategies that will keep ponds in good working conditions that maximize water quality treatment.
- Illicit discharge ordinance. The County is in the process of developing and implementing an illicit discharge ordinance throughout that County.
- The County is partnering with the Town of Bluffton, the Town of Hilton Head Island, the City of Beaufort, and the Town of Port Royal to fund a \$475,000 update to the County-wide Stormwater Master Plan. SWMP update will include new water quality modeling of critical basins such as the Okatie River and is expected to reveal the most effective management strategies for improving water quality.

The management strategies and projects listed above are all part of the latest Okatie River WMP and were chosen to improve water quality in the watershed. They are being funded by Beaufort County and other local partners. 319 Grant funding for the Okatie West retrofit project will allow quicker implementation of the regional retrofit and will better leverage the County Stormwater fee to implement similar strategies.



#### B. Specific Objectives and Goals of the Project:

The objective of the project is to construct a water quality retrofit pond that will treat runoff from the 1,170 acre Okatie West tributary of the Headwaters sub-basin, located upstream of SCDHEC monitoring station 18-08. This tributary represents roughly half of the headwaters sub-basin in which the TMDL requires a 51% reduction in bacteria loads. It is not expected that this single project will result in reclamation of the headwaters as an approved shellfish harvesting area, but instead would be a step toward this ultimate goal. The proposed pond is expected to reduce the FC load from the 1200 acre service area by 16% (7.78E+13 #/yr) and result in a 7% reduction in load reaching monitoring station 18.08. The Okatie West project is but a single project among many projects and strategies outlined in the watershed based plan and will continue the County's ongoing efforts to restore the Okatie River. Section 4.0 of the WMP identifies the overall watershed objectives and goals. The objectives and goals specific to this project include:

- Treat stormwater runoff from existing developments that currently have no stormwater BMPs or BMPs that don't meet current standards.
- Reduce the peak runoff rate and runoff volume discharged from the Okatie West tributary. A reduction in the runoff volume to the receiving waters directly results in a reduction to the contaminant loads reaching the River.
- Reduce the amount of bacteria reaching SCDHEC Station 18-08

### C. Detailed Project Description:

The primary management strategy that will be implemented as part of this project is the Okatie West Regional Retrofit BMP. The term 'Okatie West' describes the western tributary of the headwaters portion of the Okatie River watershed. The term was first used in the 2002 *Okatie River Watershed Management Plan*, which identified the tributary and targeted it for a regional retrofit project. The Okatie West branch is located in the Okatie 3 water quality sub-basin as delineated in the 2006 *Beaufort County Stormwater Master Plan* (SWMP). The SWMP recommended a retrofit project in the eastern tributary, but not one in the western tributary. The subsequent 2009 *Regional Retrofit Study* added a retrofit site back into the Okatie West branch; specifically recommending a wet detention pond BMP designed to capture runoff from the main outfall canal. The BMP proposed in that 2009 study is the project recommended for this grant.

The service area for the proposed Okatie West BMP would be roughly 1,200 acres and would contain a mixture of land-uses including single family residential (Sun City – Del Webb), small commercial, medical, institutional, and Highway 170. Much of the residential and commercial uses within the basin were developed with relatively current water quality standards, but preceded the most recent volume control standards. The existing highway was constructed and later widened prior to all current water quality standards and volume control standards. For these reasons, it is believed that a regional stormwater pond would benefit water quality within the western branch. Exhibit 2 shows the Okatie West and Okatie East branches within the Okatie River 3 water quality sub-basin.

The site for the proposed BMP consists of two parcels under previously common ownership, totaling 111 acres. The County purchased the property in 2015 as part of the Rural and Critical Land program for two purposes. The first purpose is to limit development of the property due to its location in the sensitive headwaters of the Okatie River watershed. The second purpose was to allow for the construction of the Okatie West regional BMP and two smaller non-regional BMPs detailed in the watershed management plan. The acquired property borders Hwy 170 to the west and partially developed parcels to the north, east, and south. A large jurisdictional wetland containing the main flow path for the western tributary separates the two parcels. A wetland delineation from 2009 showed a 4.8 acres upland area located near the main conveyance channel, surrounded on three sides by wetlands. The existing elevations in the uplands are roughly equal to the elevations in the wetlands. The low elevations of the uplands and its proximity to the conveyance channel make the area well suited to accepting re-routed runoff from the channel and treating it in a stormwater pond BMP. The project will require a new wetland determination and could result in a change in the amount of upland area available for the proposed pond. However, the County has a contingency plan should the usable upland area shrink. There are other upland areas on the property purchased by the County that can be used for a pond, but will require more earthwork and higher construction costs. Site 6A from the Hwy 170 retrofit project is one of the alternate sites for a pond should the wetland delineation change.

Ponds have been found to be effective in treating stormwater for bacteria removal in Beaufort County. Modeling done as part of the Watershed Management Plan update indicates that the proposed pond will remove 16% of the bacteria load from the 1200 acres watershed. Ponds typically provide an 80% removal efficiency, but the model adjusted the

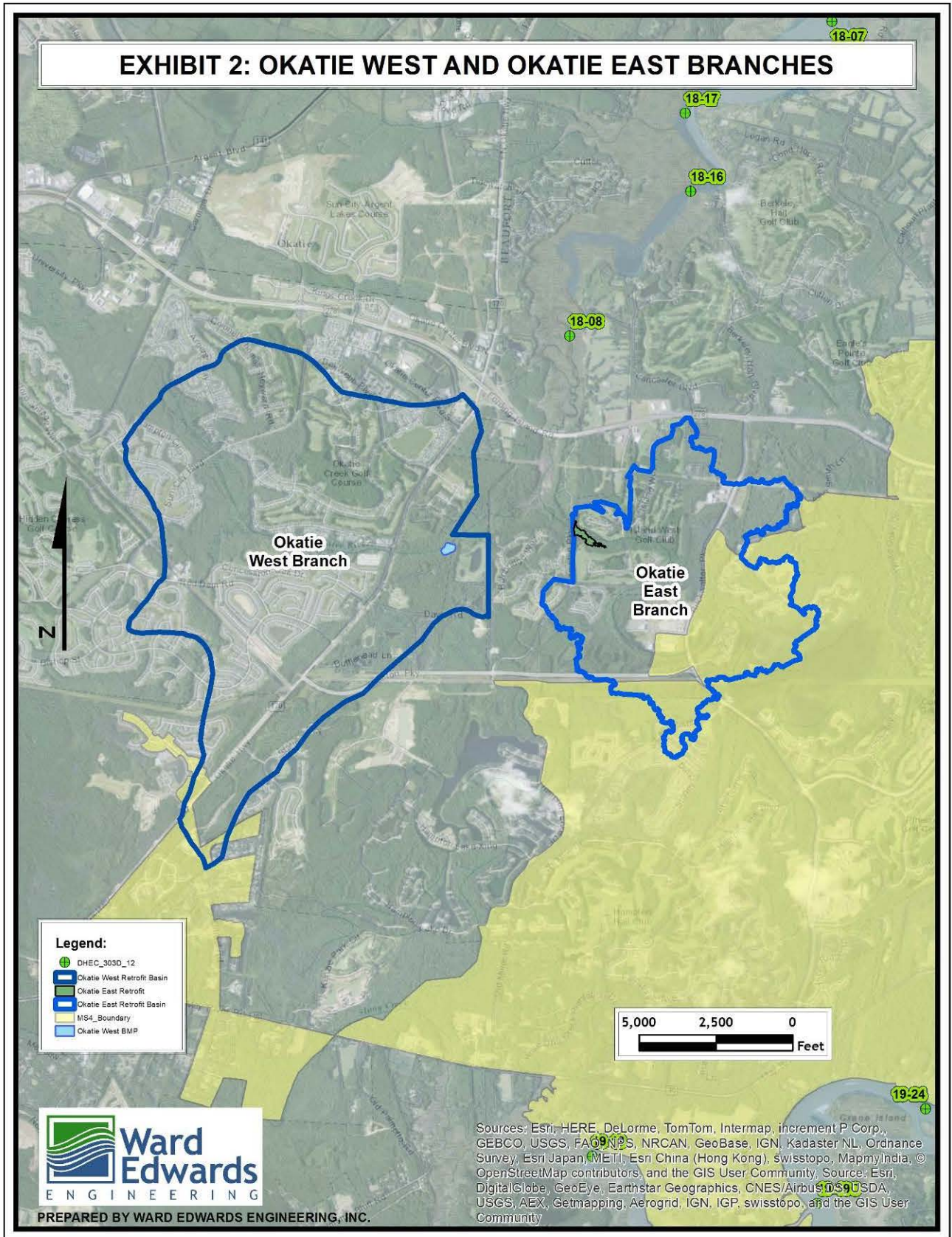


removal by a factor taking into account the proposed pond size. If additional pond area becomes available as part of the new wetland delineation or if the 6A alternative is used, then removal efficiencies could increase.

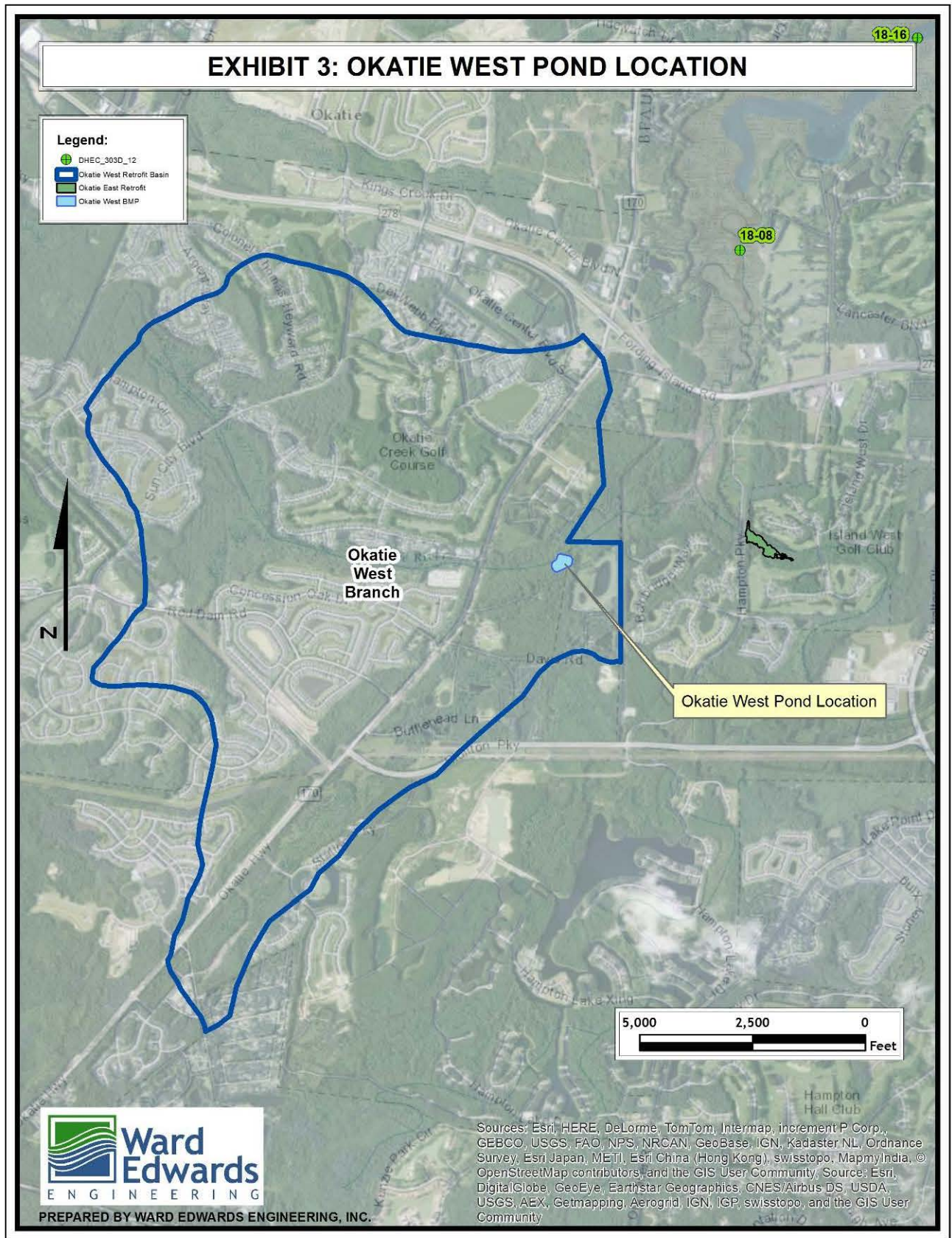
Ponds can also be designed to reduce flashy discharges of runoff volume. Increases in stormwater volume from development are believed to be contributing to higher bacteria counts in the saltwater rivers. Higher bacteria measurements have been observed with lower salinities in estuarine water bodies and it is believed to be related to higher fecal coliform mortality rates in higher salinities. Previous stormwater regulations required the analysis of pre-post peak discharge rates, but not pre-post volume control. The likely result of these standards is that land development over the past twenty years is producing large slugs of freshwater discharges in high volumes inconsistent with natural pre-development hydrology and hydraulics. For these reasons, Beaufort County has been including runoff volume reducing strategies in all BMP designs targeting bacteria treatment, and that is the case for the Okatie West Retrofit Project.

Being fairly close to the downstream sub-basin discharge point would allow the pond to serve the majority of the 1,200 acre sub-basin, which would help supplement the existing upstream stormwater treatment BMPs. Exhibit 3 shows the proposed pond location within the sub-basin.

## EXHIBIT 2: OKATIE WEST AND OKATIE EAST BRANCHES



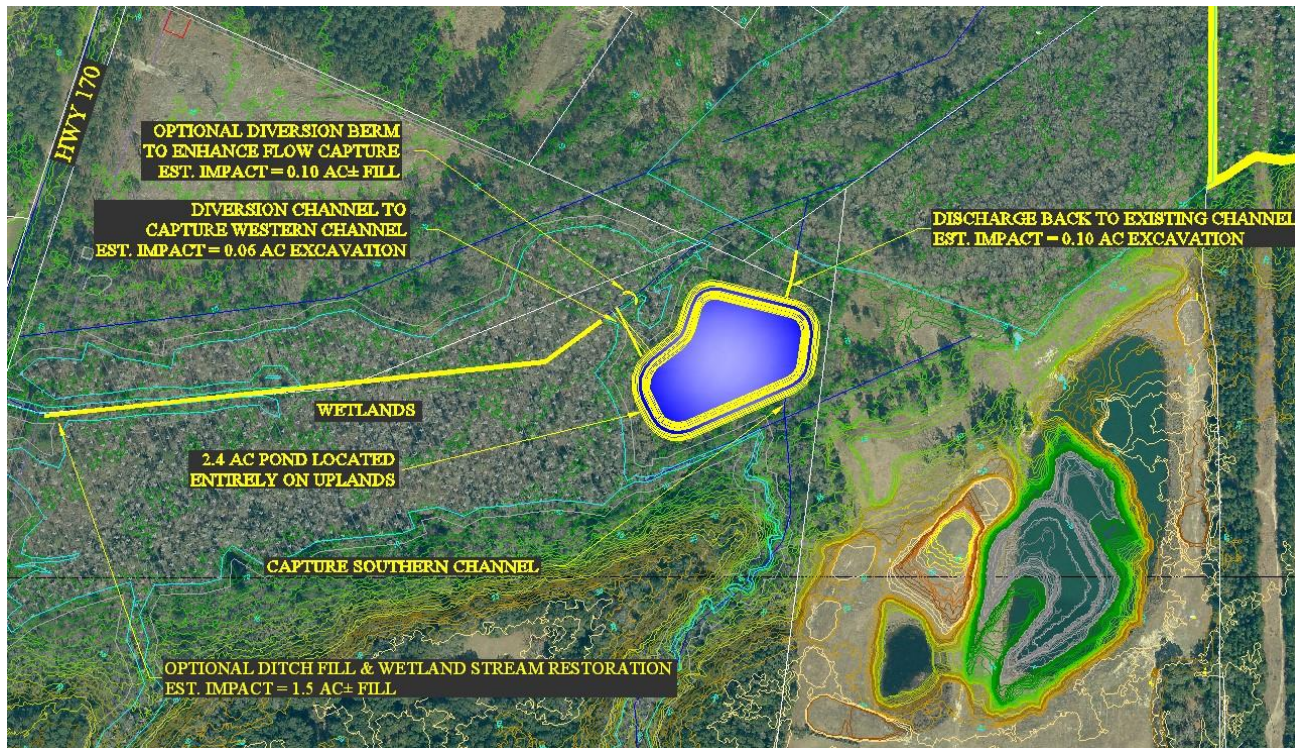




The proposed BMP concept involves constructing a new 2.4 acre pond within the upland area that is in close proximity to the nearby outfall canal. The outfall canal would be redirected to drain to the pond for treatment of the runoff prior



to discharge back to the downstream canal. The pond will be constructed with an outlet control structure that would provide the detention component; controlling the small, more frequent storms, and bypassing the larger, less frequent storms. The proposed project will require topographic surveying, wetland delineation, wetland impact permitting, engineering design, and regulatory permitting prior to construction. The project concept was presented in 2010 to the U.S. Army Corp of Engineers Inter-Agency Review Team for a pre-application review. The agencies represented at the meeting, including USACE, SCDHEC-EQC, SCDHEC-OCRM, USFWS, SCDNR, and SHPO were in favor of the project and didn't anticipate any permitting issues, provided the detention pond is constructed in upland areas. The wetland impact permits required to direct flow to and from the pond could be permitted (possibly under Nationwide Permits), as long as the detention occurs outside waters of the State as is intended. The conceptual design proposes to limit the pond to the upland area based on the existing wetland delineation that is to be renewed during the project permitting. Exhibit 4 shows the proposed pond size and configuration.



**Exhibit 4 – Proposed Okatie West Pond Concept**

Beaufort County recently acquired the property that would contain the proposed pond, with the express intent of implementing this project. Obtaining the property was perhaps the biggest challenge to overcome in the implementation, but there are a number of other design and permitting steps needed to construct the project. These tasks were identified in the Regional Retrofit Study and will have to be addressed during the design and permitting of the BMP. The 2009 wetland delineation for the property has expired, so a new delineation verification will be necessary. It is possible that the size and shape of the upland area in which the pond is planned may change, but the operation of the pond would not be affected by a change in the configuration. Redirecting flow to the pond will require wetland impacts but these impacts could be permitted as nationwide permits, which will simply the permit process and timeline.

Detailed information on the proposed BMP sizing calculations and predictive modeling analyses are presented in the Regional Retrofit Study and in the 2015 *Watershed Management Plan*. Results of the conceptual modeling analyses estimate a 20% reduction in peak flow rate and a 6% reduction in runoff volume at the Okatie River outfall. Updated water quality modeling from the WMP indicates that the pond will reduce bacteria loads from the BMP service area by 16%.

**Beaufort County is seeking funds to help with the construction of the proposed BMP.** The County will directly fund the following items related to the design, permitting, and construction of the project:

- Tree and topographic survey of the site, including the existing canal, the proposed pond site, and the area that will provide access to the site from Hwy 170
- Renewal of the expired wetland verification
- Engineering design of the proposed pond and channel re-routing
- Wetland impact permitting to re-route flow to the pond and to discharge treated stormwater back to the canal.
- State and local level regulatory permitting

The above services will be contracted by the County through their standard procurement procedures or through their current on-call stormwater engineering consultant. Construction services will also be contracted by the County through their standard procurement rules. The County will provide the non-federal match through the Stormwater Utility Capital Reserve Fund. The Stormwater Utility will also be responsible for the long-term maintenance of the BMP and the post-construction monitoring. Beaufort County will own, operate, and maintain the proposed BMP through its Public Works Department.

#### **D. Information/Education Component:**

The information and public outreach component of this project will focus on the joint efforts of the County Stormwater Utility and the County's Rural & Critical Land Program. The Rural & Critical Land Program (RCL) has been in place since the year 2000 and involves property tax increases dedicated to funding the purchase of properties or preservation easements in environmentally sensitive areas. Overall, the program has preserved more than 22,000 acres county-wide and 500 acres of land within the Okatie River watershed. Additional land preservation is an important anti-degradation component of the Okatie River Watershed Management Program, but retrofit projects are needed to address existing water quality problems. However, the past RCL program focused simply on preservation and prevented the County from using the acquired property for stormwater treatment projects. The continuation of the program approved by voters in 2014 was amended to allow stormwater projects, and the Okatie West will be one of the first retrofit projects to be implemented by the County on land acquired by the RCL program. The Okatie West project could serve as an example project to educate the community on both the RCL program and the Stormwater Utility, uniting the outreach programs for each.

Signage is typically placed at all land preserved by the RCL, and will be done at the site of the Okatie West as well; however, the signage in this case will include information related to the Stormwater Utility's work in restoring the Okatie River. The target audience for the education program will be the residents and homeowners within the watershed. For example, the Sun City development just across the highway from the project site has many retired homeowners, most of who are recently moved to the County from other parts of the country. They may be unaware of the impairments in the river; one of the many natural resources that drew them to the area. The County plans to do a workshop prior to construction to inform the general public (focusing on the nearby residents of Sun City) of the water quality impairments, the needed improvements, and how they can help contribute. The workshop will be capped by a tour of the proposed BMP site. This workshop offers the chance to inform residents of other important practices they can personally participate in such as pet waste disposal, irrigation reuse, or septic system maintenance. Educating the nearby homeowners in this manner will help with some of the watershed management plan strategies such as the community wide irrigation reuse and pet waste programs.

A secondary outreach strategy will be the education of developers and engineers on proper maintenance of ponds. Proper pond and stormwater BMP maintenance is a growing concern in Beaufort County as the BMPs constructed 15 to 20 years ago are reaching the point where they need significant maintenance in order to continue functioning as intended. This pond will be maintained by the Beaufort County Stormwater Utility and may be an opportunity for the County to demonstrate maintenance practices to commercial and institutional landowners on proper maintenance. The proposed outreach will come in the form of a workshop near the completion of the project construction, including a field visit to the site for physical demonstration of proper pond design and construction related bank stabilization, vegetation removal and pipe cleaning. The proposed BMP will also serve as a good demonstration of an effective bacteria treatment BMP, so the County intends to continue offering site tours after completion of the Grant project.

#### **E. Anticipated Environmental Results:**

Since runoff volume control is a planned component of the BMP, the proposed BMP was modeled to determine the effects it will have on the runoff hydrology. The model prepared as part of the 2009 Regional Retrofit Study, estimates

that the BMP will result in a 20% reduction in peak flow rate and a 6% reduction in the runoff volume reaching the Okatie River. Increases in stormwater volume from development are believed to be contributing to higher bacteria counts in the saltwater rivers. Higher bacteria measurements have been observed with lower salinities in estuarine water bodies and it is believed to be related to higher fecal coliform mortality rates in higher salinities. Although data analysis has not indicated a net long-term decrease in salinity of County waters, the slugs of freshwater may be causing extreme variations of salinity, resulting in the more frequent instances of bacteria counts exceeding the state standards. The effect is more pronounced in the upstream, headwaters portion of rivers such as the Okatie River. For these reasons, reductions in runoff volume and reductions in the peak rate the volumes are reaching the river, are expected to have positive results in the bacteria counts in the Okatie River. This project combined with the other volume reducing strategies proposed in the Watershed Management Plan are expected to produce long term improvements in the water quality beyond simple anti-degradation goals.

The *Beaufort County Stormwater Manual for Stormwater Best Management Practices* estimates that wet detention ponds provide an average bacteria removal rate of 80% based on historical research of ponds in similar environments. Field research by Beaufort County of actual installed and functioning ponds within the Okatie River Watershed has demonstrated removal efficiencies as high as 99% (*Eagles Point PUD Water Quality Monitoring & Testing Report*). The only stormwater quality modeling done for the Okatie River was performed as part of the 2006 *Stormwater Master Plan*. The assumed future conditions such as land use, septic coverage, and proposed BMPs used in that modeling are far out of date and inaccurate to the current and proposed conditions. The 2006 model was based on a BMP located in a different part of the sub-basin with a much smaller service area. The Okatie West BMP was proposed as part of the 2009 *Regional Retrofit Study*, which found a better location for the proposed Okatie headwaters BMP, with a much larger service area. Bacteria reduction amount haven't been modeled based on the new BMP size and located, but they are expected to be much better given the larger service area. ***Beaufort County will be updating the SWMP in the following year, but for the purpose of the Okatie West Project, they expect that the pond will provide as much as a 90% removal efficiency for the 1,200 sub-basin served by the BMP.*** In the meantime, the Addendum to the Watershed Management Plan included a simple water quality model of the BMP service area that demonstrates an estimated load reduction of 7.78E+13 #/yr, which equates to a 16% reduction in load from the BMP service area and a 7% load reduction at Station 18-08. Combined with the other structural BMPs the County is currently implementing, the model is predicting a 16% reduction in bacteria load at Station 18-08.

Monitoring data at SCDHEC shellfish station 18-08 should indicate some positive results from the project implementation. The Okatie West BMP will not likely provide enough bacteria load reduction to completely recover shellfish harvesting in the River by itself, but the County has many other projects and strategies planned that will help achieve the desired results.

#### **F. Technical And Financial Assistance Needed:**

The only technical support needed beyond the Beaufort County Stormwater Utility will be the survey, engineering, and natural resources expertise needed to implement the project. The County plans to acquire the technical support through contracting with private engineering, surveying, and natural resources consultants. Permits that may be needed include a SCDHEC-NPDES permit, a wetland impact permit, a SCDOT encroachment permit, and a Town of Bluffton planning permit. No additional financial assistance is needed to implement the Okatie West Project, because the Beaufort County Stormwater Utility has been saving money for this and other projects by means of a Capital Improvements Fund.

#### **G. Completion of Watershed-Based Plan Implementation:**

Initial plan implementation was completed via a 319 Grant with LOCOG along with matching activities funded by Beaufort County. Beyond this, the County is already in the process of implementing components of the *Okatie River Watershed Management Plan*. The Okatie West project is a flagship component to the County's watershed plan that if fully funded with our grant request, will facilitate a quicker implementation and will allow the County to leverage the Stormwater Utility funding towards the other WMP strategies. The following projects and strategies are already being implemented and are described in greater detail in the WMP:



- Okatie East Wetland Restoration – This is a regional retrofit in the eastern branch of the Okatie River headwaters designed to reduce the runoff volume reaching the river. The project was constructed and is currently being monitored and refined to optimize the stormwater detention and treatment.
- Highway 278 Widening Retrofits – Beaufort County is currently constructing 4 small ponds at existing outfalls from the Hwy 278 widening that was recently completed. The ponds are intended to treat runoff from the impervious areas added during the highway widening.
- Highway 170 Widening Retrofits – Similar to the Hwy 278 project, this project involves constructing small detention BMPs to treat runoff from a public road that is currently being widened. The County is pursuing the property needed to construct the BMPs and plans to design, permit, and construct the BMPs as the property is acquired.
- Land Preservation: Through its Rural and Critical Land Program, Beaufort County is actively pursuing property within the Okatie River to preserve. Most notably is an 84 acre parcel directly adjacent to the River that is the site of horse pastures noted in the Okatie River TMDL. The County Council has been debating the merits of the purchase and will be holding subsequent votes within the month of May.
- Education & Outreach: The Beaufort County Stormwater Utility has an active public education and outreach program that focuses on a variety of water quality topics applicable to homeowners, developers, and professional services.
- Illicit Discharge Ordinance: The County is in the process of developing an illicit discharge ordinance and inspection/enforcement plan.

The above strategies and projects are the highest priority strategies, but others mentioned in the Watershed Management Plan are also being pursued; as the County's Stormwater Utility is actively preparing short-term and long-term plans. Beaufort County Stormwater Utility has been implementing projects through their Capital Improvements Fund, but will need additional funding sources to leverage the shrinking fund. It is anticipated that other projects in the watershed based plan can be funded through future 319 grants and by State Revolving Fund loans. The County is current performing a rate study to plan for future funding sources, and is considering debt service options such as SRF and revenue bonds as part of the rate study.

#### H. Measurable Milestones:

#	Month	Milestone
1	Quarterly	Submit progress reports, invoices, MBE/WBE forms and BMP information per schedule outlined in grant agreement.
2	30 days after project completion	Submit final invoice and final technical closeout report to DHEC. Submit Final Budget Report within 45 days of project close.
3	Month 1	Public education workshop and site visit for nearby residents
4	Months 1-4	Project survey & initiate wetland verification update
5	Months 4-6	Preliminary Engineering
6	Months 6-27	Complete final design and update wetland verification
7	Months 27-33	Project regulatory permitting
8	At the start of construction	Erect signage at along Highway 170 informing the general public of the water quality BMPs purpose, benefit, and contribution of the Rural & Critical Lands program
9	Months 33-36	Construction procurement
10	Months 36-45	Construction
11	Months 45-48	Post Construction public education workshop and site visit for local developers & engineers
11	30 days after project completion	Submit final invoice and final technical closeout report to SCDHEC. Submit Final Budget Report within 45 days of project close

**I. Measures Of Project Success:**

1. Installation and proper function of the regional BMP as proposed in the conceptual design
2. Gradual decrease and stabilization in fecal coliform bacteria at SCDHEC station 18-08
3. Participation and feedback from workshops and site visits

**7. PROPOSED BUDGET****A. Overall Project Budget**

	Federal	Non-Federal	Total
Personnel - Salary			\$0.00
Personnel - Fringe			\$0.00
Travel			\$0.00
Equipment			\$0.00
Supplies			\$0.00
Contractual		\$110,000.00	\$110,000.00
Construction	\$792,000.00	\$418,000.00	\$1,210,000.00
Other			\$0.00
Indirect (Requires additional documentation)			\$0.00
<b>TOTAL</b>	<b>\$ 792,000.00</b>	<b>\$ 528,000.00</b>	<b>\$1,320,000.00</b>

**B. Budget Narrative:**

Personnel - Salary: None: All services will be contracted

Personnel – Fringe: None: All services will be contracted

Travel: None: All services will be contracted

Equipment: None: Contracted professionals will provide their own equipment

Supplies: None: Contracted professionals will provide their own supplies

Contractual: Beaufort County will contract the surveying, natural resources consulting, geotechnical testing, and engineering design services. The contractual costs were estimated from the conceptual Budget presented in the 2015 *Okatie River Watershed Management Plan*, which updated the conceptual costs from the 2009 *Regional Retrofit Study*.

Construction: Construction services will be procured by the County through their established procurement rules. The construction costs were estimated from the conceptual Budget presented in the 2015 *Okatie River Watershed Management Plan*, which updated the conceptual costs from the 2009 *Regional Retrofit Study*. The amounts for individual construction items are presented below in the “Okatie West BMP Retrofit Cost Estimate” table.

Other: None

Indirect : None

The following cost estimate was originally prepared as part of the 2009 *Regional Retrofit Study*, and later revised as part of the 2015 *Okatie River Watershed Management Plan*. The actual construction costs will be highly dependent on the offsite use and/or disposal of the soil excavated from the proposed pond. ***Beaufort County hopes to be awarded the full amount of the Federal Request but is prepared to fund the difference from the Stormwater Utility Capital Improvement Reserve Fund and possibly from debt services. However a full Federal Match would help better leverage the County’s Capital Reserve Fund for the other projects planned within the Watershed; projects necessary to achieve the goal of fully restoring the Okatie River shellfish harvesting.***

Okatie West BMP Retrofit Cost Estimate from the Okatie River Watershed Management Plan					
	Units	Unit Cost	Quantity	Cost	
<b>Mobilization</b>	EA	\$10,000	1	\$10,000	
<b>Site Prep/Restoration Erosion &amp; Sediment Control</b>	EA	\$7,500	1	\$7,500	
<b>Clearing</b>	AC	\$5,500	8	\$44,000	
<b>Gravel Access Road</b>	SY	\$25	4,400	\$110,000	
<b>Excavation &amp; Offsite Disposal</b>	CY	\$20	43,000	\$860,000	
<b>30" RCP</b>	LF	\$50	150	\$7,500	
<b>Outlet Control Structure</b>	EA	\$10,000	1	\$10,000	
<b>Rip Rap Overflow Weir &amp; Outlet Protection</b>	SY	\$150	250	\$37,500	
<b>Grassing &amp; Stabilization</b>	SY	\$0.50	27,000	\$13,500	
Pre-Contingency Sub-total				\$1,100,000	
<b>Contingency (10%)</b>				\$110,000	
Construction Sub-total				\$1,210,000	<b>Construction - \$1,210,000</b>
<b>Engineering/Legal/Admin (10%)</b>				\$110,000	<b>Engineering (Contractual) - \$110,000</b>
<b>Total</b>				<b>\$1,320,000</b>	<b>Total - \$1,320,000</b>



Okatie West Water Quality Retrofit									
Section	Federal Budget (to be billed to 319 Grant)				Section	Non-Federal Budget (Match to grant)			
<b>1</b>	<b>Federal: Personnel - Salary Costs (Lead Organization Personnel ONLY)</b>				<b>10</b>	<b>Non-Fed: Personnel - Salary, In-Kind Hours (Lead Organization ONLY)</b>			
	Employee	# of Hours or Years	Hourly Rate or Salary	Total Cost		In-Kind Employee	# of Hours	Hourly Rate	Total Cost
		0.00	\$0.00	\$0.00			0.00	\$0.00	\$0.00
			Section 1 TOTAL	\$0.00				Section 10 TOTAL	\$0.00
<b>2</b>	<b>Federal: Personnel - Fringe Benefits Costs (Lead Organization Personnel ONLY)</b>				<b>11</b>	<b>Non-Fed: Personnel - Fringe Benefits Costs (Lead Organization ONLY)</b>			
	Percentage of TOTAL Federal Salary		0.00%			Percentage of TOTAL Non-Federal Salary		0.00%	
			Section 2 TOTAL	\$0.00				Section 11 TOTAL	\$0.00
<b>3</b>	<b>Federal: Travel (Lead Organization Personnel ONLY)</b>				<b>12</b>	<b>Non-Fed: Travel (Lead Organization ONLY)</b>			
	Employee	# of miles	Per Mile	Total Cost		Employee	# of miles	Per Mile	Total Cost
		0.00	\$0.575	\$0.00			0.00	\$0.575	\$0.00
		Mileage	Sub Total	\$0.00			Mileage	Sub Total	\$0.00
**	Overnight Travel Cost		\$0.00	\$0.00	**	Overnight Travel Cost		\$0.00	\$0.00
			Section 3 TOTAL	\$0.00				Section 12 TOTAL	\$0.00
<b>4</b>	<b>Federal: Equipment (If applicable. Equipment is defined as single items with cost over \$2,500)</b>				<b>13</b>	<b>Non-Fed: Equipment (If applicable. Equipment is defined as single items with cost over \$2,500)</b>			
	Description	Single Cost	Number Needed	Total Cost		Description	Single Cost	Number Needed	Total Cost
		\$0.00	0	\$0.00			\$0.00	0	\$0.00
			Section 4 TOTAL	\$0.00				Section 13 TOTAL	\$0.00
<b>5</b>	<b>Federal: Supplies (i.e., office supplies, laptop, printing costs, postage)</b>				<b>14</b>	<b>Non-Fed: Supplies (i.e., office supplies, laptop, printing costs, postage)</b>			
	Description	Cost				Description	Cost		Total Cost
		\$0.00		\$0.00			\$0.00		\$0.00
			Section 5 TOTAL	\$0.00				Section 14 TOTAL	\$0.00
<b>6</b>	<b>Federal: Contractual / Services - Section A (Sub-Contractor services, not associated with salary)</b>				<b>15</b>	<b>Non-Fed: Contractual / Services - Section A (Not associated with volunteered time)</b>			
<b>A</b>	Description	Cost		Total Cost	<b>A</b>	Description	Cost		Total Cost
		\$0.00		\$0.00		Surveying & Engineering	\$110,000.00		\$110,000.00
		\$0.00		\$0.00			\$0.00		\$0.00
			Section A Sub Total	\$0.00				Section A Sub Total	\$110,000.00
<b>B</b>	<b>Federal: Contractual / Services - Section B - Salary Costs (Sub-Contractors)</b>				<b>B</b>	<b>Non-Fed: Contractual / Services - Section B - Salary Costs (In-Kind from Volunteers, etc.)</b>			
	Employee	Total # of Hours	Hourly Rate	Total Cost		In-Kind Employee	Total # of Hours	Hourly Rate	Total Cost
		0.00	\$0.00	\$0.00			0.00	\$0.00	\$0.00
			Section B Sub Total	\$0.00				Section B Sub Total	\$0.00
<b>C</b>	<b>Federal: Contractual / Services - Section C - Travel (Sub-Contractors)</b>				<b>C</b>	<b>Non-Fed: Contractual / Services - Section C - Travel (In-Kind from Volunteers, etc.)</b>			
	Employee	Mileage	Per Mile	Total Cost		In-Kind Employee	Mileage	Per Mile	Total Cost
		0.00	0.575	\$0.00			0.00	0.575	\$0.00
			Section C Sub Total	\$0.00				Section C Sub Total	\$0.00
			Section 6 TOTAL	\$0.00				Section 15 TOTAL	\$110,000.00

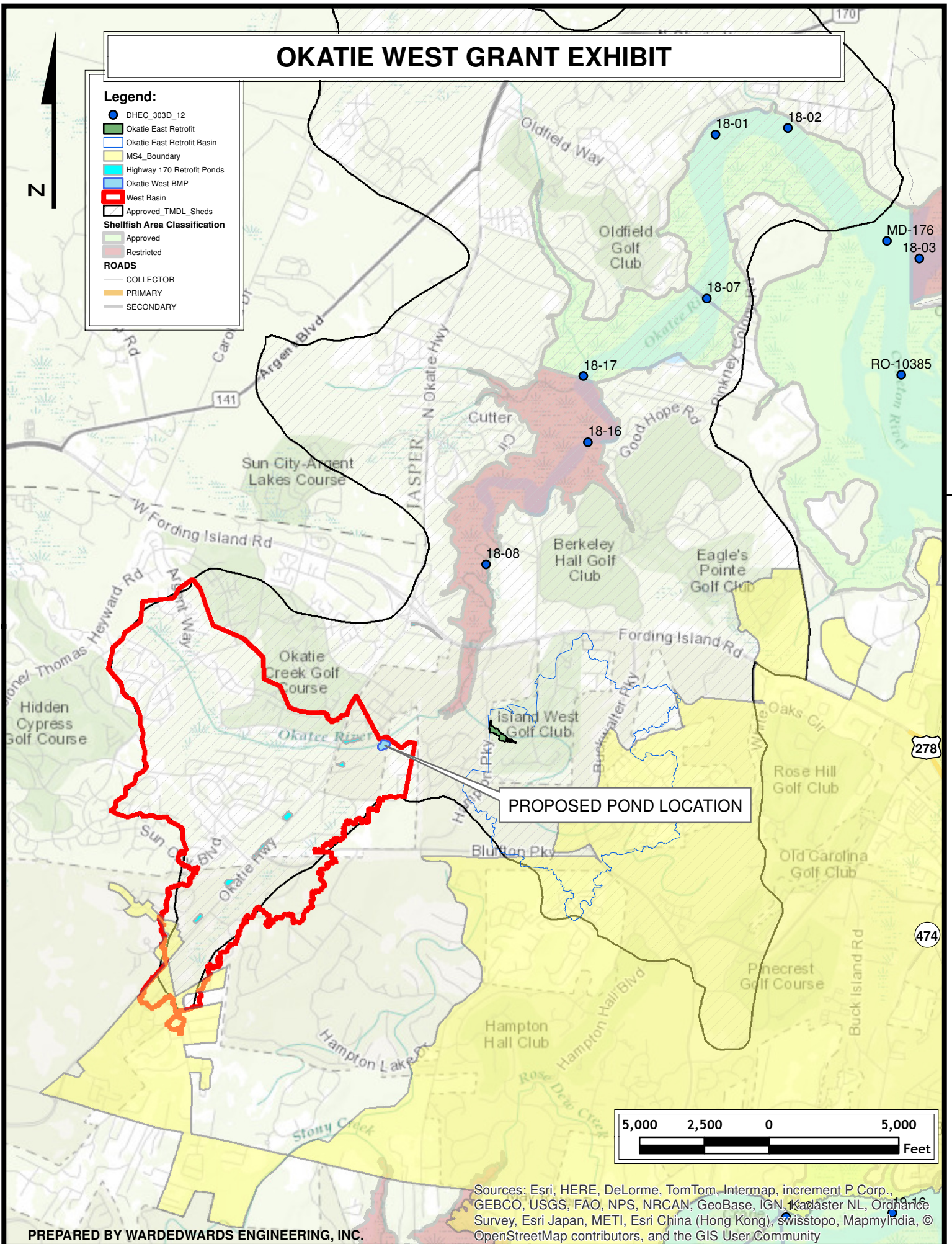
7	Federal: Construction (i.e. BMPs)				16	Non-Fed: Construction (i.e. BMPs)			
	Description	Single Cost	Number Needed	Total Cost		Description	Single Cost	Number Needed	Total Cost
	BMP Construction	\$792,000.00	1	\$792,000.00		BMP Construction	\$418,000.00	1	\$418,000.00
		\$0.00	0	\$0.00			\$0.00	0	\$0.00
			Section 7 TOTAL	\$792,000.00				Section 16 TOTAL	\$418,000.00
8	Federal: Other				17	Non-Fed: Other			
	Description	Cost				Description	Cost		
		\$0.00	Section 8 TOTAL	\$0.00			\$0.00	Section 17 TOTAL	\$0.00
9	Federal: Indirect				18	Non-Fed: Indirect			
		Include Attachment 4					Include Attachment 4		
	Percentage of TOTAL Federal Salary		0.00%			Percentage of TOTAL Non-Federal Salary		0.00%	
			Section 9 TOTAL	\$0.00				Section 18 TOTAL	\$0.00
FEDERAL Budget Summary					NON-FEDERAL Budget Summary				
19	Category	Section Totals	Percentage			Category	Section Totals	Percentage	
	Federal:					Non-Federal / Match			
1	Personnel - Salary	\$0.00			10	Personnel - Salary	\$0.00		
2	Personnel - Fringe	\$0.00			11	Personnel - Fringe	\$0.00		
3	Travel	\$0.00			12	Travel	\$0.00		
4	Equipment	\$0.00			13	Equipment	\$0.00		
5	Supplies	\$0.00			14	Supplies	\$0.00		
6	Contractual / Services	\$0.00			15	Contractual / Services	\$110,000.00		
7	Construction	\$792,000.00			16	Construction	\$418,000.00		
8	Other	\$0.00			17	Other	\$0.00		
9	Indirect	\$0.00	18	Indirect	\$0.00				
	Federal TOTAL	\$792,000.00	60.00%	Federal TOTAL		Non-Federal TOTAL	\$528,000.00	40.00%	Non-Federal TOTAL
19	Grand TOTAL	\$1,320,000.00	FEDERAL & NON-FEDERAL Budget Grand Total						



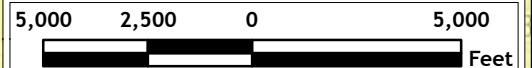
# OKATIE WEST GRANT EXHIBIT

## Legend:

- DHEC\_303D\_12
- Okatie East Retrofit
- Okatie East Retrofit Basin
- MS4\_Boundary
- Highway 170 Retrofit Ponds
- Okatie West BMP
- West Basin
- Approved\_TMDL\_Sheds
- Shellfish Area Classification**
  - Approved
  - Restricted
- ROADS**
  - COLLECTOR
  - PRIMARY
  - SECONDARY



PROPOSED POND LOCATION



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



## **Addendum 1 – Okatie River Watershed Management Plan**

*June 2015*

### **Addendum Purpose**

The most recent Beaufort County Stormwater Master Plan and associated water quality modeling was completed in 2006 and is due to be updated. The County is currently procuring engineering assistance to update the SWMP, but it will be a year or more before those services are completed. The water quality models associated with the current SWMP are out of date given the land-use changes over the past ten years, the changes in the County's stormwater regulations, the recent water quality BMPs installed, and the water quality BMPs proposed within the Okatie River watershed. However, analysis of the proposed regional BMPs required some sort of water quality model to evaluate and predict the effectiveness of the BMPs. This Addendum was prepared to model the water quality removal efficiencies of the two regional retrofit projects within the headwaters portion of the watershed (Okatie River 3).

### **Water Quality Model Methodology & Assumptions**

The original 2006 SWMP water quality model was prepared using a spreadsheet model developed by the CDM Smith called the Watershed Management Model (WMM). The spreadsheet model considered the land-use based non-point source pollution loading factors (Event Mean Concentrations), stormwater runoff rates, base flow runoff rates, septic tank impacts, and point source loads. The spreadsheet model results for each water quality sub-basin were calculated separately and then applied to a one dimensional hydrodynamic tidal flushing model called the Water Quality Analysis Simulation Program (WASP) to evaluate the longer term fate of the pollutants during tidal flushing and to identify more sensitive watersheds.

For the purpose of this model update, a spreadsheet model similar to the WMM was developed using the original model input and assumptions. However, the new model used updated land-uses from current aerial photography, along with considerations for the currently proposed regional BMPs. Only the Okatie River 3 sub-basin was analyzed because this was the area of specific concern related to the proposed BMPs. The model results provide average annual pollutant runoff load estimates from each land-use type for both base flow conditions and rainfall runoff conditions, based on EMCs and yearly average baseflow and runoff. Point source loads were not used in the model because there are no waste water treatment plants within the watershed. The resulting annual loads area added together to get a total sub-basin pollutant load and then the BMP removal effectiveness was applied to the load to determine the amount of pollutant load reductions. The load reductions were also factored based on the percentage of the sub-basin served by the proposed BMPs and by a sizing factor related to the proposed BMP size compared to the optimum BMP size.

Table 2-5 from the SWMP lists the Average Annual Runoff in inches/year for each land-use type:

**TABLE 2-5  
LAND USE CATEGORIES AND ASSOCIATED RUNOFF COEFFICIENTS  
FOR ANNUAL LOAD CALCULATIONS**

**Urban Systems**

Land Use	% Impervious	Impervious Runoff Coefficient	Pervious Runoff Coefficient	Average Annual Runoff (inches/year)
Low-Density Residential	10%	0.90	0.10	8.7
Medium-Density Residential	25%	0.90	0.10	14.5
High-Density Residential	50%	0.90	0.10	24.2
Institutional	38%	0.90	0.10	19.6
Industrial / Transportation	72%	0.90	0.10	32.7
Commercial / Business	85%	0.90	0.10	37.8
Golf Courses	1%	0.90	0.10	5.2
Impervious	100%	0.90	0.10	43.6
Open Space*	1%	0.90	0.10	5.2

\*e.g., parks, cemeteries

**Agricultural Systems**

Land Use	% Impervious	Impervious Runoff Coefficient	Pervious Runoff Coefficient	Average Annual Runoff (inches/year)
Row Crop	1%	0.90	0.10	5.2
Silvaculture	1%	0.90	0.10	5.2

**Natural Systems**

Land Use	% Impervious	Impervious Runoff Coefficient	Pervious Runoff Coefficient	Average Annual Runoff (inches/year)
Open Water	100%	1.00	0.10	48.4
Forested Wetland	100%	0.25	0.10	12.1
Non-Forested Wetland	100%	1.00	0.10	48.4
Sandy Area	100%	1.00	0.10	48.4
Forestland	1%	0.90	0.10	5.2
Grassland	1%	0.90	0.10	5.2

Table 2-6 lists the Runoff Event Mean Concentrations (EMCs) for each land-use

**TABLE 2-6**  
**RUNOFF EVENT MEAN CONCENTRATIONS (EMCs) FOR ANNUAL LOAD CALCULATIONS**

**Urban Systems**

Land Use	BOD (mg/l)	TSS (mg/l)	Total-P (mg/l)	Total-N (mg/l)	Lead (mg/l)	Zinc (mg/l)	Fecal Coliform (#/100 ml)
Low-Density Residential	11	117	0.40	1.9	0.020	0.078	32,200
Medium-Density Residential	11	117	0.40	1.9	0.020	0.078	32,200
High-Density Residential	10	116	0.29	1.9	0.016	0.119	21,750
Institutional	10	117	0.23	1.9	0.016	0.119	32,200
Industrial / Transportation	10	116	0.23	1.9	0.016	0.119	11,100
Commercial / Business	10	116	0.23	1.9	0.016	0.119	11,300
Golf Courses	2	26	1.30	2.6	0.009	0.041	6,400
Impervious	10	116	0.23	1.9	0.016	0.119	11,300
Open Space*	2	26	0.10	1.3	0.001	0.006	6,400

\*e.g., parks, cemeteries

**Agricultural Systems**

Land Use	BOD (mg/l)	TSS (mg/l)	Total-P (mg/l)	Total-N (mg/l)	Lead (mg/l)	Zinc (mg/l)	Fecal Coliform (#/100 ml)
Row Crop	4	55	1.30	2.6	0.009	0.041	6,400
Silviculture	4	55	0.14	2.1	0.009	0.041	6,400

**Natural Systems**

Land Use	BOD (mg/l)	TSS (mg/l)	Total-P (mg/l)	Total-N (mg/l)	Lead (mg/l)	Zinc (mg/l)	Fecal Coliform (#/100 ml)
Open Water	3	6	0.16	1.3	0.006	0.146	6,400
Forested Wetland	2	26	0.10	1.3	0.001	0.006	6,400
Non-Forested Wetland	3	6	0.16	1.3	0.006	0.146	6,400
Sandy Area	3	6	0.16	1.3	0.006	0.146	6,400
Forestland	2	26	0.10	1.3	0.001	0.006	6,400
Grassland	2	26	0.10	1.3	0.001	0.006	6,400

Source: CDM, 2003

Table 2-7 lists the Baseflow EMCs applied to all land-uses

**TABLE 2-7**  
**BASEFLOW EVENT MEAN CONCENTRATIONS (EMCs) FOR ANNUAL LOAD CALCULATIONS**

BOD (mg/l)	TSS (mg/l)	Total-P (mg/l)	Total-N (mg/l)	Lead (mg/l)	Zinc (mg/l)	Fecal Coliform (#/100 ml)
3	18	0.16	1.0	0.001	0.001	200

Source: T&H sampling - Eagle's Pointe and Buckwater



Table 2-11 lists the BMPs and associated pollutant removal efficiencies

**TABLE 2-11**  
**BMPs AND ASSOCIATED REMOVAL EFFICIENCIES FOR ANNUAL LOAD CALCULATIONS**

BMP Type	BOD	TSS	Total-P	Total-N	Lead	Zinc	Fecal Coliform
Wet Detention Basin	40%	80%	60%	40%	80%	70%	80%
Extended Dry Detention Basin	30%	80%	30%	15%	80%	50%	35%
Modified Extended Dry Detention Basin	35%	80%	45%	25%	80%	60%	50%
Infiltration	75%	90%	55%	45%	75%	75%	90%
Grass Swale with Check Dams	20%	70%	25%	20%	60%	40%	30%
Biofiltration Swale	10%	30%	15%	10%	30%	25%	10%
Bioretention	50%	80%	55%	30%	80%	60%	70%
Innovative Technology							
- Swirl Concentrator	30%	80%	30%	15%	80%	50%	10%
- Settling/Filtration	30%	80%	30%	15%	80%	50%	35%
- Settling/Wetland	40%	80%	60%	40%	80%	70%	70%

Source: CDM, 2003.

## Updated Water Quality Model for Okatie River 3 Water Quality Sub-basin

The updated spreadsheet model used the above mentioned methodology and input data to calculate the total bacteria pollutant load generated in the sub-basin. The model then calculated the service area and BMP sizing weighted removal efficiencies for the two regional retrofits within the sub-basin; the recently constructed Okatie East Wetland Enhancement and the proposed Okatie West Regional Pond. The spreadsheet model is shown below.

### Okatie River 3 Water Quality Sub-WQ Calculations Summary

Annual Baseflow Rate	7	inches/yr/acre
Annual Baseflow	3368.75	ac/ft
Annual Runoff	4943.42	ac/ft
Calculated FC Load	1.10E+15	#/yr

BMP	BMP % Removal Efficiency	BMP Size Factor	BMP Service Area Load Removal	% Service Area Load Reduction	% of Okatie 3 Sub-Basin Served	Predicted Load Removal	% Load Reduction
Okatie East	70%	30%	9.74E+13	21.00%	42%	9.74E+13	8.82%
Okatie West	80%	20%	7.78E+13	16.00%	44%	7.78E+13	7.04%
Total Load Removed						1.75E+14	

Calculated FC Load	1.10E+15	#/yr
Total Load Removed	1.75E+14	#/yr
Predicted Future Load	9.29E+14	#/yr
Total % Reduction	15.86%	

**Okatie River 3 Water Quality Sub-WQ Calculations**

Land Use Type	Average Annual Runoff (inches/year)	Watershed Land Use Area (Ac)	Annual Base Flow (ac-ft)	Annual Base Flow (ml)	Annual Runoff (Ac- ft)	Annual Runoff (ml)	Fecal Coliform Base Flow Concentration (#/100 ml)	Annual Base Load (#/yr)	Fecal Coliform Runoff Concentration (#/100 ml)	Annual Storm Load (#/yr)	Total Annual Load (#/yr)
Low-Density Residential	8.7	59.00	34.42	4.25E+10	42.78	5.28E+10	200	8.49E+10	32200	1.70E+13	1.71E+13
Medium-Density Residential	14.5	1575.00	918.75	1.13E+12	1903.13	2.35E+12	200	2.27E+12	32200	7.56E+14	7.58E+14
High-Density Residential	24.2	38.00	22.17	2.73E+10	76.63	9.45E+10	200	5.47E+10	21750	2.06E+13	2.06E+13
Institutional	19.6	98.00	57.17	7.05E+10	160.07	1.97E+11	200	1.41E+11	32200	6.36E+13	6.37E+13
Industrial/Transportation	32.7	0.00	0.00	0.00E+00	0.00	0.00E+00	200	0.00E+00	11100	0.00E+00	0.00E+00
Commercial/Business	37.8	112.00	65.33	8.06E+10	352.80	4.35E+11	200	1.61E+11	11300	4.92E+13	4.93E+13
Golf Courses	5.2	334.00	194.83	2.40E+11	144.73	1.79E+11	200	4.81E+11	6400	1.14E+13	1.19E+13
Impervious	43.6		0.00	0.00E+00	0.00	0.00E+00	200	0.00E+00	11300	0.00E+00	0.00E+00
Open Space	5.6	2370.00	1382.50	1.71E+12	1106.00	1.36E+12	200	3.41E+12	6400	8.73E+13	9.07E+13
Row Crop	5.2		0.00	0.00E+00	0.00	0.00E+00	200	0.00E+00	6400	0.00E+00	0.00E+00
Silviculture	5.2	74.00	43.17	5.32E+10	32.07	3.96E+10	200	1.06E+11	6400	2.53E+12	2.64E+12
Open Water	48.4	56.00	32.67	4.03E+10	225.87	2.79E+11	200	8.06E+10	6400	1.78E+13	1.79E+13
Forested Wetland	12.1	766.00	446.83	5.51E+11	772.38	9.53E+11	200	1.10E+12	6400	6.10E+13	6.21E+13
Non-Forested Wetland	48.4		0.00	0.00E+00	0.00	0.00E+00	200	0.00E+00	6400	0.00E+00	0.00E+00
Sandy Area	48.4		0.00	0.00E+00	0.00	0.00E+00	200	0.00E+00	6400	0.00E+00	0.00E+00
Forestland	5.2		0.00	0.00E+00	0.00	0.00E+00	200	0.00E+00	6400	0.00E+00	0.00E+00
Grassland	5.2	293.00	170.92	2.11E+11	126.97	1.57E+11	200	4.22E+11	6400	1.00E+13	1.04E+13
Total		5775.00	3368.75	4.16E+12	4943.42	6.098E+12		8.31E+12		1.10E+15	1.10E+15

## Model Results

The model results indicate that the proposed Okatie West BMP will remove  $7.78\text{E}+13$  #/year of bacteria from the BMP service area, which equates to a 16% reduction. The Okatie East BMP will remove  $9.74\text{E}+13$  #/year from its service area, which equates to a 21% reduction. Considering these load reductions within the entire Okatie River 3 water quality sub-basin, that equates to a respective 7% and 8.8% reduction at SCDHEC monitoring station 18-08, for a total load reduction of  $1.75\text{E}+14$  #/year (15.8% reduction). This is a significant reduction given the size of the water quality sub-basin. Although this is not enough to recover the river for shellfish monitoring, it will make a difference in the quality, especially given the other regional and non-regional BMP strategies planned for the watershed.