BEAUFORT COUNTY
STORMWATER MANAGEMENT UTILITY BOARD AGENDA
Wednesday, February 13, 2019
2:00 p.m.
Executive Conference Room, Administration Building
Beaufort County Government Robert Smalls Complex
100 Ribaut Road, Beaufort, South Carolina
843.255.2805

In accordance with South Carolina Code of Laws, 1976, as amended, Section 30-4-80(d), all local media was duly notified of the time, date, place and agenda of this meeting.

1. CALL TO ORDER – 2:00 p.m.
   A. Approval of Agenda
   B. Approval of Minutes – December 12, 2018 (backup)

2. INTRODUCTIONS

3. PUBLIC COMMENT

4. REPORTS
   A. Utility Update – Eric Larson, P.E. (backup)
   B. Monitoring Update – Eric Larson, P.E. (backup)
   C. Stormwater Implementation Committee Report – Eric Larson, P.E. (backup)
   D. Stormwater Related Projects – Eric Larson, P.E. (backup)
   E. Upcoming Professional Contracts Report – Eric Larson, P.E. (backup)
   F. Regional Coordination – Eric Larson, P.E. (backup)
   G. Municipal Reports – Eric Larson, P.E. (backup)
   H. MS4 Update – Eric Larson, P.E. (backup)
   I. Maintenance Projects Report – David Wilhelm, P.E. (backup)

5. UNFINISHED BUSINESS
   A. Voting for Stormwater Management Utility Board Chairman and Vice Chairman

6. NEW BUSINESS
   A. Evergreen Project Award (backup)
   B. Alljoy Regional Study (backup)
   C. Annual MS4 Report (backup)

7. PUBLIC COMMENT

8. NEXT MEETING AGENDA
   A. March 13, 2019 (backup)

9. ADJOURNMENT

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

December 12, 2018 at 2:00 p.m. in Executive Conference Room, Administration Building, Beaufort County Government Robert Smalls Complex, 100 Ribaut Road, Beaufort, South Carolina

Draft Minutes 1/16/2018

Board Members

Present	**Absent**
Don Smith	
Marc Feinberg	
Allyn Schneider	
William Bruggeman	
James Fargher	
Patrick Mitchell	

Ex-Officio Members

Present	**Absent**
Andy Kinghorn	Scott Liggett
Kim Jones	
Van Willis	

Beaufort County Staff
Eric Larson
Melissa Allen
Katie Herrera

Visitors
Dr. Alan Warren, USCB Lab
Alice Howard, County Council
Lamar Taylor, City of Beaufort
Brian Eber, Town of Hilton Head Island
Ellen Comeau, Clemson Extension
Keith Hall, Contractor

1. Meeting called to order – Don Smith

A. Agenda – Approved. (Moved Voting of Chairman and Vice Chairman to Item B)
B. November 14, 2018 Minutes – Approved.

2. Introductions – Completed.

3. Public Comment(s) – None.

4. Reports – Mr. Eric Larson and Mr. David Wilhelm provided a written report which is included in the posted agenda and can be accessed at: https://www.bcgov.net/departments/Administrative/beaufort-county-council/boards-and-commissions/council-appointed/board-list/stormwater-management-utility-board/agendas/2018/121218.pdf

Mr. Eric Larson introduced Mr. Keith Hall, contractor with Beaufort County to serve as the Assistant Stormwater Manager. He will be on retainer for 60 to 90 days to help with Capital Projects.

A. Utility Update – Eric Larson

In reference to item 2A (Regionalization), the consultants have met with all partners in the project and created a list of questions to ask stakeholders (those using stormwater design standards) within the community. They questions will be going out soon.

B. Monitoring Update – Eric Larson

Please reference the report, no additional updates.

C. Stormwater Implementation Committee (SWIC) Report – Eric Larson

Please reference the report, no additional updates.

D. Stormwater Related Projects – Eric Larson

In reference to item #1, Mr. Larson noted that two responses were received for the Evergreen 319 Project. These will be reviewed and staff hopes to have a selection made before the next meeting.

The County received the DOT permit last week for Wallace Road project. The solution has been approved and staff is working to get the project scheduled; the work will be done in house.

In reference to item #4, Mr. Larson shared a sample of cellulose concrete, an innovative product which is one-fourth the weight of regular concrete. This will be used on the admin. parking lot. The pipe is bedded on old timber and there is concern that concrete or fill would cause settling over time. This product is pumped in like a grout.

Mr. Larson explained that there is a long outstanding and unwritten policy that the County will install driveway pipes for $399 (item #8). An accounting problem about handling the money to provide the service came up, which led to the purpose of installing them (to ensure they were done correctly). He explained that there have only been 10 requests last year in comparison to over 800 single family home permits that were issued. The County has decided they are no longer going to install them, as the fee doesn't even cover the cost.

E. Professional Contracts Report – Eric Larson

In reference to item 1B (Brewer Memorial) County Council reconsidered the change order that was denied during the November meeting and approved it during the December 10th meeting.

In reference to item 1C (Sawmill), the field survey was better than GIS and it determines that the County is not getting the stormwater storage or the benefit needed to justify the cost of the project. It isn't a feasible project and will stay in its natural state. The County's recommendation is to not move forward with the project. Brief discussion took place about the history and funding for the acquisition of the property. Mr. Larson indicated the County is planning to cancel the contract and stop work.

F. Regional Coordination – Eric Larson

In reference to item #5 (Pepper Hall), the project passed with a 50/50 provision for stormwater. Mr. Larson explained that Ms. Alice Howard took his engineering report and presented it Council. In response to a question, Mr. Larson explained the County doesn't know the cost [but it will be 50%] of stormwater design, construction and maintenance of the project.

Ms. Howard thanked the board for asking questions about Pepper Hall and thanked Mr. Larson for providing information. She encouraged members to continue to express their opinions it to the elected officials, as it's a flexible agreement and could change. Mr. Van Willis commented about not knowing how it will impact the balance of Capital Improvement Projects (CIP) plan or fee structures in Beaufort County unincorporated. Mr. Larson

explained there is talk about a residential improvement district and that the County may be able to recoup funds through something like this. Mr. Willis asked if the board was asked for a recommendation or if they were told the money was coming from the utility. Mr. Larson explained it was stated in a public meeting that the anticipated revenue was from stormwater utility.

Conversation took place about the road (Graves Road) to get to the park. Mr. Andy Kinghorn commented about regionalization and how it will be a separate entity where they [elected officials] wouldn't be able to come in and take money away [to fund project]. Mr. Larson commented the utility would be protected from that happening (if it were a regional authority).

G. Municipal Reports – Eric Larson

Mr. Larson provided an update for the Battery Creek 319 project. He explained there is an operations and maintenance list: vac truck to remove trash and the weir needs additional rip rap. He commented that the emergency weir is in good shape and there is a downed tree on the work shelf that will need removed. Mr. Larson indicated he spoke with Paul Moore, design engineer, who has made a few recommendations to look at to play with elevations of the ponds.

Ms. Kim Jones thanked the utility for the "That's My Truck" decals for Town of Bluffton's street sweeper.

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

Mr. Larson announced that there were three grand prize winners and six runners up for the "That's My Truck" coloring contest. The "celebrity" panel for the contest judging was Eric Larson (Beaufort County), Beth Lewis (Town of Bluffton), Alice Howard (County Council), Ellen Comeau (Clemson Extension), and Shelby Berry (Beaufort Conservation District). They selected the winners to name the County Vac Truck, County Sweeper Truck and the Town of Bluffton's Sweeper Truck. The winning schools will get a show and tell to see the truck and to present the awards. May River Montessori, Port Royal Elementary and Mossy Oaks Elementary were the winning schools. Ms. Ellen Comeau noted the contest was open for two and half weeks and there were 472 entries.

I. Maintenance Projects Report – Eric Larson

Please reference the report, no additional updates.

5. Unfinished Business –

A. *Battery Creek 319 Update* – Topic was discussed under item G (Municipal Reports).

6. New Business

A. *Best Management Practices Manual and Monitoring Plan Update* – Mr. Larson explained this update is an administrative update to the manual. The handout provides an overview of the changes to the manual. Mr. Larson noted all updates [major] that are being made have been previously reviewed and voted on by the board.

Mr. Larson explained that extra steps were in the manual versus what was in the ordinance, so that oversight will be corrected. A major update has been made to the monitoring plan, which is in an administrative document to address the TMDL's and special project monitoring. The dirt road definition will be updated. The update will also be expanding land disturbance; clarifying

design criteria to the developing public. The change to the permitting process with DHEC will also be reflected in the update.

A motion was made to approve the changes as proposed to the BMP manual. The motion was approved 6/0.

B. ***Voting for Stormwater Manager Utility Board Chairman and Vice Chairman*** **–** Mr. Donald Smith announced that he has informed Councilman Dawson that he will be resigning from the board around the first of the year.

Mr. Allyn Schneider asked about the replacement for the Mr. Meisner's vacancy. Mr. Larson shared that Ms. Howard may have someone interested.

A motion was made to delay the voting for Chairman and Vice Chairman to the next meeting. The motion was approved 6/0.

7. Public Comment(s) –

Mr. Andy Kinghorn announced that he has been appointed to the BJWSA board. He expressed that he has enjoyed the opportunity and will miss being a part of the board.

Mr. Feinberg made a motion to formally thank Councilperson Howard for her continued support of the Stormwater Board in 2018. The motion was approved 6/0.

Mr. Smith shared a photo of shellfish closures along the SC coastline. He expressed it represents the work that has to be done and the challenges that are there.

Mr. Larson recognized Mr. Lamar Taylor, as he is retiring. Mr. Taylor shared that he will be with the City of Beaufort on a six month contract to help.

Mr. Smith commented that he has enjoyed serving and that is has been a pleasure.

8. Next Meeting Agenda – Approved with Addition.

Addition to Unfinished Business – Voting for Stormwater Management Utility Board Chairman and Vice Chairman

A motion was made to cancel the January meeting. During discussion Mr. Bruggeman asked if there are a minimum number of meetings required. Mr. Larson noted there were a few canceled meetings in 2018 and that he doesn't see it [canceling the meeting] being an issue. The motion was approved 6/0.

9. Meeting Adjourned

- Appendix C was added to document the effectiveness of BMPs in controlling stormwater volume.
- The Appendix includes a worksheet that must be completed to determine the "effective imperviousness" of the development. The recommended goal set for new development is 10 percent effective imperviousness.
- The former Appendix C (Sediment Control Certification Form for Construction Sites) is now Appendix D.
- The former Appendix D (Town of Bluffton Stormwater Ordinance) has been removed because the town no longer has a stand-alone ordinance.

In 2012, modifications to the manual were made to reflect the following:

- Workshop with local engineers on reformatting the manual.
- Update of the Zoning and Design Standards Ordinance (ZDSO) to a new form-based code.
- Consideration of "Step 2" on-lot controls of stormwater runoff from lots in developments that were approved prior to stormwater volume controls.
- Response to comments on draft revised manual (September 2011).

In 2016, modifications to the manual were made to reflect the following:~~This version of the manual was prepared in 2016. Modifications include the following~~:

- Update per municipal separate storm sewer system (MS4) permit requirements.
- Reorganize manual for better information flow.
- Update and clarify design requirements.
- Reconcile information with other documents including 2014 Community Development Code updates and a new standalone Stormwater Ordinance.
- Expand BMP Selection and provide Fact Sheets for Construction, Post Construction BMPs, and municipal facility good housekeeping.
- Clarify and provide for Violations and Enforcement policy.
- Clarify and provide for Operations and Maintenance (O&M) procedure.
- Respond to comments generated from public.

This version of the manual was prepared in 2018. Modifications include the following:

- Updating Stormwater Permit forms to reflect changes in County procedures.
- Clarifying Stormwater Permit procedures
- Clarifying the Violations and Enforcement policy

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- Updating the Monitoring Plan
- Updating the manual per the 20187 Ordinance revisions related to Dirt Roads ~~Ordinance~~
- Expand land disturbance and drainage plan language
- Clarifying language pertaining to DHEC permit requirements ~~:~~

1.2 Contents of the Manual

For the purpose of this manual Administrator(s) shall mean "Administrators" means the County Engineer and Stormwater Manager and other individuals designated by the County Administrator, from time to time, to administer interpret and enforce this Ordinance. Stormwater Manager and Administrator are used interchangeably in the document.

Section 2 presents a summary of County stormwater management regulations. The summary provides a starting point for developing a comprehensive set of policies and standards for development in the County. The County regulations include details on drainage easements, flood control design criteria, general planning and design requirements, retention/detention facilities, open drainage system ditches and ponds, roadway drainage planning and design standards, and storm sewer design standards that were previously in the ZDSO, Division 4 (Stormwater Management Standards).

Section 3 presents regulation of non-stormwater discharges to the storm drainage system to the maximum extent practicable as required by Federal and State laws in order to protect the existing health, safety, and general welfare of the citizens of Beaufort County, South Carolina. This section will establish methods for controlling the introduction of pollutants into the MS4 in order to comply with requirements of the NPDES permit process.

Section 4 provides guidance to ensure all new developments and redevelopments are designed to meet current design requirements. All lot owners shall meet current Federal and State laws. Individual property owners and their contractors must have available the specific erosion control measures to be used for all lots under construction.

Section 5 provides recommended policies and standards for new development and redevelopment. This section includes all information required to determine if a development satisfied both the runoff volume control and water quality control. Also included in this section are the design guidelines for BMPs and worksheets to evaluate BMP sizing. This section also considers appropriate water quality storage volume requirements for BMPs. Computer simulation models, using long-term local rainfall data as input, were applied to determine the optimum storage volumes for Beaufort County BMPs. In all cases, the recommended storage volumes are as restrictive as, or more restrictive than, the State requirements.

BEAUFORT COUNTY
STORMWATER UTILITY
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February 13, 2019

Stormwater Manager's Report for the Stormwater Utility Board Meeting

Utility Update

1. Southern Lowcountry Regional Board (SoLoCo)
   a) Nothing new to report.
   b) See Regionalization below.

2. Regionalization
   a) Regional Stormwater Design Standard and Model Ordinance Project – A base line assessment of each program has been completed. The consultant has created a questionnaire to be distributed to the engineering and development community. Responses are due by February 15th. If anyone is interested in getting the questions to respond, contact any local stormwater office as soon as possible.
   b) Regionalization of programs – No action. This is pending additional discussion after the Reg. SW Std. is completed.

3. Annual Financial report from the Municipalities – Per the Intergovernmental Agreements for the Utility, each year on September 30th, the City and Towns are required to submit a summary of revenue and expenditures for the previous fiscal year.
   a) Beaufort County – Actuals pending Finance department completion. (March 2019?)
   b) Town of Hilton Head Island – Received.
   c) Town of Bluffton – Received.
   d) Town of Port Royal – No response.
   e) City of Beaufort – Received.

4. Special Presentations – Staff has begun research on the various topics provided by the Board for future meetings:
   a) Military Site's Stormwater management – Staff has been in frequent communication with both Parris Island and the Naval Hospital. A site visit at PI is tentatively scheduled for February 15th. The staff at the Naval Hospital has expressed concern about allowing access in light of ongoing discussions with the County Attorney's office on the SWU fees in arrear for the site.
   b) Living shorelines – No action at this time.
   c) Other ideas?

5. New County Council – Eric Larson presented an overview of the Stormwater program to the new County Council members on December 13, 2018. (See attached packet given to

Council members)

6. FY 2020 Budget – Staff is working to complete a draft of the FY 2020 budget, due to Administration on February 22, 2019. A Stormwater Management fee budget proposal and a report of TY 2017 billing and collection is due to the SWIC members on February 15th. In addition, the staff is updating the 5 year plan as part of FY 2020 with an anticipating of requesting a change in SWU rate. The budget and any change in fee will be presented at a future Board meeting.

7. Board Appointments
   a) County Council is considering an appointment for the vacant seat for Stormwater District 6.
   b) The City of Beaufort has appointed Neil Desai, City Engineer and Public Works Director, to replace Andy Kinghorn.

Monitoring Update

1. Lab Update (From Dr. Alan Warren and Lab Manager Danielle Mickel)
   i. See attached report. Please note the report on the Bluffton Gateway (Wal-Mart) pond monitoring results, the Okatie West Bold and Gold study, and the Town of Port Royal Cypress Wetland monitoring report.

2. Monitoring Plan updates – The new plan was put into action in January 2019. It was submitted to SC-DHEC as part of the annual MS4 report.

Stormwater Implementation Committee (SWIC) Report

1. The SWIC has not met in the last month.

Stormwater Related Projects

1. Evergreen Regional Pond 319 Grant Project (Design=$89,286, Construction=$590,000. Grant=$229,124) – The County received two proposals on December 10, 2018. Both firms were interviewed in January. Andrews Engineering was selected. See attached action item for County Council consideration. Staff recommends that the SWUB endorse the recommendation to County Council.

2. Okatie West / SC 170 Widening Retrofit (Construction = $993,048, CO#1 Design $8,000, CO#1 &2 Const. $25,739) - Post construction monitoring plan continues. The first round of sampling yielded very good results. The proposal to ECS, the Bold and Gold vendor, for monitoring funding was accepted and the project has begun. (See monitoring report.) Results will be presented in a future meeting.

3. Wallace Road – The County's revised permit request has been approved. The work is

tentatively scheduled for April, 2019.

4. Administration Building Parking Lot and SCDOT pipe failures – (Liner construction = $131,625; remaining work in-house) – The work to safe load and abandon the unneeded second pipe with "cellular" concrete is complete. Results were acceptable but problems were encountered. Staff will continue to monitor the site for pipe failures and repair them with traditional methods as needed.

5. Easements – Staff is working on numerous easement requests and meets monthly to review status. Several condemnations are still being pursued using outside legal counsel.

6. Complaints – Staff continually works numerous drainage related complaints each month. The SWIMS (Stormwater Information Management Systems) database for project ranking and scheduling is in "beta" testing at this time. We are working out the bugs of the program and developing a written SOP for use.

7. Alljoy subwatershed flooding – Staff continues to work on potential project ideas. Staff has drafted an RFQ to solicit an engineering firm to study the watershed and make recommendations. (See attached scope of work). Disaster Recovery staff has also been working on grant ideas for property acquisition and/or structure elevation. The estimated cost for the engineering study is $250,000 and the grant match could range from $1.6 to $2.4 million. (See attached presentation and County Council agenda summary). Staff is seeking input from the SWUB on support of the project and funding needs prior to releasing the RFQ.

8. Driveway pipes and encroachment permits – County Council was briefed on the change in policy and accepted the report without objection.

9. Sommerset Point Subdivision – Staff attended the annual POA meeting on Saturday, February 9, 2019 to discuss routine ditch maintenance throughout the subdivision. The attached brochure was prepared for the purposes of education for the residents.

Professional Contracts Report

1. CIP FY 18 Grouping Stormwater Projects – (Design - Ward Edwards $202,000, Andrews Engineering $560,490, Const. est. $5,512,900) – All projects are in early design phase.
    a) Salt Creek and Shanklin Road sites continue with full design. No further updates.
    b) Brewer Memorial – The County Council overturned their decision in November and approved the change order for additional design services. The project is back on schedule and the consultant is working on full design.
    c) Sawmill / Forby – All work has stopped on this project and the portion of the scope of work in the consultant contract has been removed.

Regional Coordination

1. Factory Creek Watershed Regional Detention Basin "Phase I" & Academy Park Subdivision (Design Cost $49,873, Tree Mitigation Cost $18,200 & $18,200, Construction Cost by the Developer) – No additional update at this time.

2. Factory Creek Watershed Regional Detention Basin "Phase II" (Design Cost = $63,390, Tree Mitigation Cost is pending, Construction Cost by the Developer) – No additional update at this time.

3. Town of Bluffton and Beaufort County Joint meetings on Sanitary Sewer in the May River watershed – No additional update at this time.

4. Mossy Oaks Task Force – (Design $20,404, Construction $205,000; County portions only). See Municipal Reports.

5. Graves Property / Pepper Hall Public / private partnership – The Development Agreement between the developer and County received final approval in December. Staff has met with one potential development company considering the site and we explained the stormwater requirements and financial relationship with the County for stormwater construction and maintenance. No plans have been submitted for review at this time.

6. Whitehall property purchase – In the fall of 2018, the County Council, via Rural and Critical Lands Board, purchase approx. 10 acres (Parcel A on the attached plat) for a park. The Developer that sold the land retained the rights to place a stormwater pond for the development of Tract B on Tract A. However, there was no written agreement to that affect between the developer and County Council. This legal issue is currently being dealt with by the County Attorney's and County Administrator's offices. This update is provided for your information only. To staff's knowledge, there is no commitment to fund any portion of the design and construction.

7. US 278 "super street" widening on Jenkins Island (Windmill Harbor area) – In December, the County met with SCDOT and discussed this project and others, including the US 278 corridor study for replacement bridges to Hilton Head Island. The Jenkins Island project is within the study area. While the original project is still moving forward, the County Council is reconsidering the scope and timing of the project to avoid any perceived "wasted effort and money" towards what might be a temporary solution for traffic in the area.

8. South Carolina Coastal Communities Stormwater Pond Advisory Committee – Beaufort County staff has been participating in this committee for a few years now. Last month, the committee published a report, "Stormwater Ponds in Coastal South Carolina – 2018 State of Knowledge". The executive summary is attached.

9. Charleston Area MS4 managers group – Staff attended the quarterly meeting of the Charleston / Berkeley / Dorchester Counties MS4 program managers on February 7,

2019.

10. Bluffton Ditch Task Force – Staff met with Town of Bluffton and SCDOT staff on January 23, 2019 as part of an ongoing effort to coordinate stormwater maintenance in the town limits.

Municipal Reports

1. Town of Hilton Head Island (From Jeff Netzinger, Stormwater Manager and Brian Eber, MS4 Coordinator)
   i. See attached report.

2. Town of Bluffton (From Kim Jones, Watershed Management Division Director)
   i. See attached report.
   ii. County Staff did attend the monthly May River WAPAC meeting in January. A presentation on climate change was given by staff from SC SeaGrant.

3. City of Beaufort (From Neil Desai, Asst. Public Works Director)
   i. See attached report. Please note the Mossy Oaks Subdivision project announcement.

4. Town of Port Royal (From Van Willis, Town Manager and Tony Maglione, consultant)
   i. See Monitoring report in reference to the Cypress Wetland monitoring.
   ii. No information was available at the time of this report.

MS4 Report

1. Plan Review – See the attached chart for Beaufort County Stormwater staff plan review workload for the past 12 months.

2. Stormwater Permits – See the attached chart for Beaufort County Stormwater permits issued for the past 12 months.

3. Monthly Inspection summary - See the attached chart for Beaufort County Stormwater staff inspection, complaint, IDDE, and violations summary for the past 12 months.

4. Weather Station data. See attached chart.

5. Public Education – Lowcountry Stormwater Partners (LSP), via Carolina Clear, continues to work on several initiatives towards public education and outreach. See the MS4 Annual report for a detailed report for the past 12 months.

6. "That's my Truck" naming contest – Staff and equipment visited Mossy Oaks Elementary and Port Royal Elementary on December 17, 2018. Town of Bluffton staff presented their sweeper truck at May River Montessori School. The County Channel Staff produced a

short video of the event and it was shared with the Council in January. You can see the video at https://www.youtube.com/watch?v=BGvtPFru6jk .

7. System Mapping – County staff anticipate being 100% complete with the first round of system mapping in August 2019. In an effort to fully understand the movement of stormwater throughout the County, the County has partnered with the City of Beaufort and the Town of Port Royal to map their jurisdictions as well. We are scheduled to being mapping in the Town in September 2019 and the City in February 2020. The Towns of Hilton Head Island and Bluffton have their own GIS capabilities and perform their own mapping, sharing that data with the County on a regular basis.

8. Monitoring plan update – See Monitoring Update.

9. MS4 Statewide General permit – No update at this time.

10. Statewide General permit for Construction – No update at this time.

11. Annual MS4 report – The annual report was submitted on time to SC-DHEC. The full report can be found on the County website at https://www.bcgov.net/departments/Engineering-and-Infrastructure/stormwater-management/documents/Misc/2018_Annual_Report_Final.pdf .

12. BMP Manual update – The minor amendment of the BMP Manual approved by the SWUB in December has been published and available on the County website at https://www.bcgov.net/departments/Engineering-and-Infrastructure/stormwater-management/documents/Manuals--Plans-page/Beaufort%20County%20BMP%20Manual%20Approved%20Update%2012.12.18%20FINAL.pdf . It includes the new Monitoring Plan and the update Stormwater Management Plan for MS4 compliance.

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County Council Orientation
Eric W Larson, PE, AICP, CPSWQ, CFM
Director, Environmental Engineering & Land Management
December 13, 2018

Stormwater Management Department

1. MS4 - regulatory program
   a. Permit NOI, SWMP online
   b. Updated BMP manual, Ordinance online
   c. Updated Monitoring plan
   d. IDDE plan ahead of schedule for Permit year 2
   e. Year 4 = work on Facility plans
   f. Staff 5 inspectors, 1 Asst. SW Mgr. (new hire)
2. Utility Mgt.
   a. Rate Study and Fee Increase in 2015
   b. IGA with each Town and City (not Yemassee or Hardeeville)
   c. Cost Shares - Public Education, Monitoring, Regional Stormwater Design Standard
      i. Regional SW Std. - Contract with the Center for Watershed Protection
      ii. Public Education - Contract with Clemson University Extension Service
   c. Staff consists of 4.4 FTE. (Eric and Patty are split funded) – 1 Mgr. 1 Easement Manager, 1 Admin. Assistant, 1 Business Manager
   d. Utility Revenue $12.3 million; $5.2 million to County.
   e. County SW Budget $8.8 million. (bonding and reserve used to balance budget)
3. Operations and Maintenance - Under Public Works Operations
   a. Expanded LOS and EOS - allows some private drainage work if easements are dedicated.
   b. Crew size approx. 38 staff
4. CIP program - $16.8 mil over 10 years.
   a. Current Projects
      i. Evergreen Regional Pond 319 Grant.
      ii. Rock Springs Creek watershed ponds - Developer partnership - In construction.
      iii. Salt Creek Regional Pond
      iv. Shanklin Road Regional Pond
      v. Brewer Memorial Park BMP Demonstration Project
      vi. Forby / Sawmill Wetland Restoration
      vii. Mossy Oaks Subdivision (partnership with CoB)
5. Ongoing issues
   a. Alljoy Flooding
   b. Partnerships with Towns, City strained - lack of cooperation
   c. Regional Authority?
   d. SW Utility Board make-up
   e. Increase funding

Public Works Department

1. Roads and Drainage North / South, General Support / Admin. - maintains dirt, gravel, paved roads; mows rights-of-ways, operates convenience centers, maintains boat ramps, misc. O&M needs.
2. Reorganization into one crew (Operations) under way.
3. Manpower - approx. 141 crew (approx. 44-part time at convenience centers)

CONTINUED

4. Budget - $10.4 million (Excluding Stormwater O&M)
5. Stats.:
    a. Convenience Centers = 11
    b. Boat Ramps = 24
    c. Fleet = approx. 36 pieces heavy equipment and 36 pickups/SUVs. 43 smaller attachments and smaller pieces.
6. Ongoing Issues
    a) Yard waste composting program.
    b) In-house aluminum recycling operation.
    c) Glass recycling program.
    d) Expand litter control efforts.
    e) Evaluate the effectiveness of soil additives to dirt roads.
    f) Boat landing upgrade program
    g) Evaluate alternative fuel options for County fleet and heavy equipment
    h) Fleet Pool; reduce size of fleet through efficiency
    i) Evaluate concepts to improve sustainability while maintaining or reducing expenses

Disaster Recovery Department

1. 2 FTE - Pamela Cobb – Coordinator / Angel Bowers- Assistant Coordinator
2. Disaster Recovery Team is defined by ordinance and is made up of most higher management staff. Activates during an emergency. Larson serves as Team Director. Coordinator manages planning and preparations. Oversees Debris Operations with Public Works Director and Contractors
3. Annual duties
    a. Maintain and update Recovery Plan, DR Ordinance, All Hazard Mitigation Plan, Public Works Response Plan, Debris Management Plan, review Cont. of Service Plans
    b. Grants for Pre-disaster mitigation projects
    c. Training and Exercise planning
    d. Liaison with BC-EMD, SC-EMD, others
4. Current Activity – Hurricane Matthew, Hurricane Irma, Warning Siren Grant Project, and Daufuskie Fire Dept Hardening. Training staff on FEMA documentation. Assisting 58 clients from Hurricane Matthew through the BJLTRG.

Community Development Department

1. Adopted new Zoning code, the Community Development Code, in 2014.
    a. Reorganization to "Community Development" department completed in 2017.
2. Staff - 10 FTE.
3. Functions
    a. Update Comprehensive Plan
    b. Maintain the CDC
    c. Handle weekly SFT submittals, monthly PC submittals
    d. Natural Resources Protection (trees, marsh buffers, etc.)
    e. Passive Park Program
    f. Staff for multiple committees
        i. Rural and Critical
        ii. Northern Area Planning Committee
        iii. Southern Corridor Beautification
        iv. Design Review Board
        v. ZBOA
        vi. SRT
4. Current projects
    a. Comp. Plan update
    b. Passive Park Public Use Work Plan implementation of Tier 1 and 2 properties
    c. Lady's Island Growth Boundary revision (in conjunction with CoB)
    d. Impact Fee Update

END

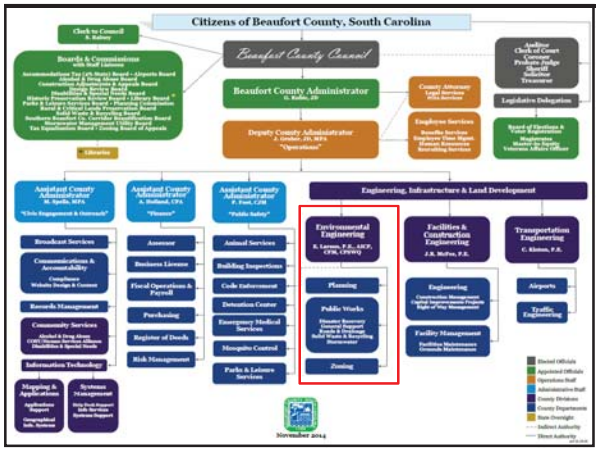
Environmental Engineering & Land Management Division

(incl. Stormwater Utility Management, Public Works, Solid Waste and Recycling, Community Development, and Disaster Recovery)

A Report to Beaufort County Council
December 13, 2018

Organizational Structure

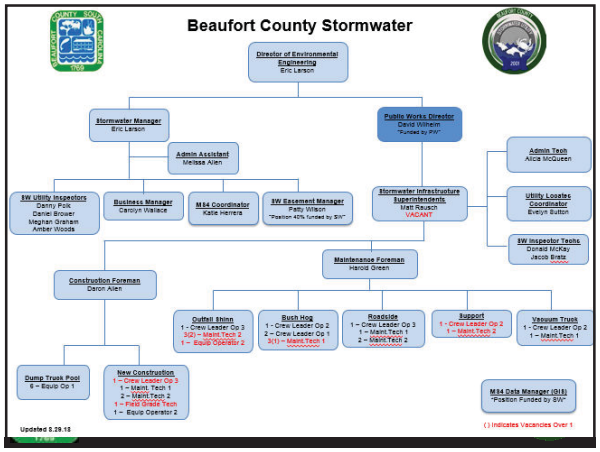
- Environmental Engineering & Land Management Division (Eric Larson)
  - Stormwater (Eric Larson)
  - Community Development (Eric Greenway)
  - Public Works (Dave Wilhelm)
    - Solid Waste (Cindy Carter)
  - Disaster Recovery (Pamela Cobb)



Stormwater

Outline

- Introduction to Stormwater
- Design Standards
- MS4 permitting
- Capital Projects
- Future of the Program



What does Stormwater Do?

- Utility Fee Billing and Collections
  - Credit and On-Lot Volume Exemption Programs
- Implement 2018 Master Plan elements
- Stormwater Infrastructure Maintenance
- State and Federal mandated permitting (MS4)
- Capital Projects
- Special Studies
- In-House GIS to support all functions

Current Utility Fees in B.C.

(Rates per single family unit)

- Town of Hilton Head = $150 (typical)
- City of Beaufort = $135 (typical)
- Town of Bluffton = $98
- Town of Port Royal = $60 (typical)
- Beaufort County = $87 (typical)

Other Utility Fees in SC

- City of Charleston = $72
- City of North Myrtle Beach = $72
- Georgetown County = $ 51.60
- City of Columbia = $47.40

S.W. Infrastructure

- Managed under Public Works
  - Operations and Maintenance
  - Limited CIP project work
- Level of Service Plan
  - Defines the services provided
- Extent of Service Plan
  - Defines where we provide the services

The Regulation

- Code of Ordinances
  - Chapter 106 – Community Development Code

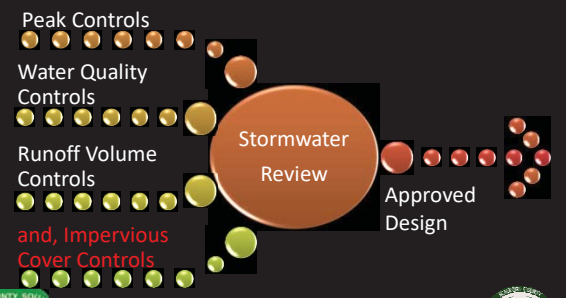
    Division 5.12.30 – Stormwater Stds.

    B. All these standards are to be achieved in accordance with the latest version of the County's **Manual for Stormwater Best Management and Design Practices (BMP)**, which is incorporated herein by reference.

The Regulation, cont.

C. All development and redevelopment shall utilize and integrate Stormwater BMPs which are appropriate to their location and environment, and contribute to the overall character of a proposal. BMPs implemented at the development scale shall be integrated … to the maximum extent technically feasible … . BMPs may be designed as a singular practice or as part of various supplemental pre-treatment BMPs in series to achieve the runoff volume, runoff pollution load, and peak runoff rate control standards.

BMP Manual Principles



MS4 Permitting

- US EPA's Clean Water Act
  - Enacted in 1972
  - Amended in 1987
- Point source pollution (1990's)
- Non-point source pollution
  - Municipal Separate Stormsewer Systems (MS4)
    - Phase I – 1999 (100,000+ pop.)
    - Phase 2 – 2003 (50,000+ pop., 1,000 person/sq. mi.)
- 2010 U.S. Census expands urban areas of County
- 2014 SC-DHEC designates Beaufort County, Towns of Hilton Head Island and Bluffton

The MS4 Program Elements

Minimum Control Measures (MCM)

1. Public Education
2. Public Outreach and Involvement
3. Illicit Discharge, Detection, and Elimination (IDDE)
4. Construction Run-Off
5. Post – Construction Best Management Practices (PC-BMP)
6. Good Housekeeping in Municipal Operations

Capital Needs

- We currently have 17 projects identified to:
  - Alleviate road flooding
  - Stormwater runoff volume reduction
  - Pollutant removal
  - Infrastructure rehabilitation
  - Promote growth
- $16.8 million (and growing)

Capital Needs cont.

- The Utility has the following projects under design and / or construction:
  - Factory Creek Phase I
  - Factory Creek Phase II
  - Shanklin Road Regional Pond
  - Salt Creek Regional Pond
  - Sawmill / Forby Wetland Enhancement
  - Brewer Memorial Park
  - Evergreen Regional Pond

Moving Forward

- Maintain MS4 Program Implementation
- Implement the 2018 Beaufort County Stormwater Management Plan
- Regional Standards
- Regional Authority (?)
- Revise SWU Board structure (?)
- Utility Rate increase; Additional bonding
  - Utilize the Credits Program more effectively

Public Works Department (incl. Solid Waste & Recycling)

MISSION STATEMENT

- To maintain and improve the infrastructure of Beaufort County Government to include the road and drainage networks and boat landings, and
- to manage the Solid Waste stream within the County and promote cost-effective recycling, and
- to manage and support beautification efforts, and
- to manage fueling sites to support County and other subscriber vehicle fleets,

in order to enhance the public safety, public health and the efficiency of Beaufort County.

CORE RESPONSIBILITIES

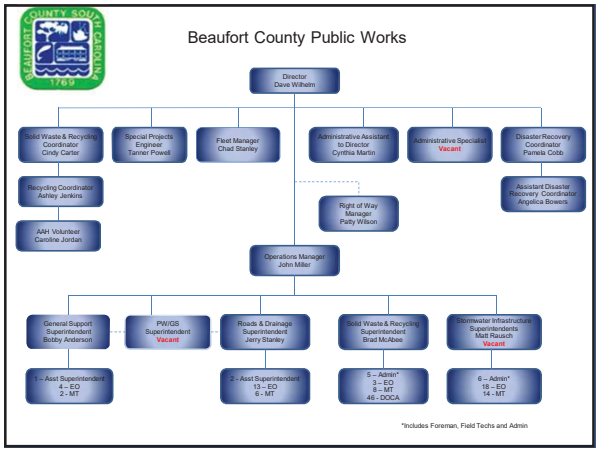
- Maintain and Improve:
  - Stormwater Infrastructure Systems
  - Roads (paved and unpaved)
  - Boat Landings, Piers and Beach Access Points
  - Solid Waste & Recycling Convenience Centers
- Manage 1st Vehicle Services Fleet Contract
- Provide exceptional customer service to the citizens of Beaufort County
- Perform diligent planning efforts to ensure all departments move forward in a logical and fiscally responsible manner
- Complete all required tasks within budget

DIVISIONS

- Stormwater Infrastructure
- Solid Waste and Recycling
- Roads and Drainage (re-org. pending)
- General Support
- Admin (including Fleet Manager and Special Projects Engineer)

STAFF

• Roads and Drainage	22 Full-time
• General Support	8 Full-time
• Stormwater Infrastructure	39 Full-time
• Solid Waste and Recycling	22 Full-time
	44 Part-time
• Administration	6 Full-time



BUDGET

- The FY19 budget for Public Works is $17,118,748. The breakdown by section is:

• Administration	$366,745
• General Support	$681,941
• Roads and Drainage	$1,731,693
• Solid Waste and Recycling	$7,657,653
• Stormwater Infrastructure	$6,680,716

CAPITAL NEEDS

- Implementation of curbside collection program including associated impacts on related programs
- Boat landing improvements
- Heavy equipment replacement
- Renovation of existing Public Works Administration building
- Upgrade and renovation of equipment maintenance shop

MOVING FORWARD

- Initiatives planned for 2019 include:
  - Creating a yard waste composting program to reduce costs in an environmentally responsible manner
  - Implement an in-house aluminum recycling operation utilizing existing infrastructure and manpower
  - Begin a glass recycling program, possibly with a private partner
  - Expand litter control efforts including bi-annual regional clean-up days

MOVING FORWARD CONT.

- Initiatives planned for 2019 include:
  - Evaluate the effectiveness of soil additives to potentially improve the surface condition of unpaved roads to reduce maintenance costs
  - Begin a planned boat landing upgrade program
  - Evaluate alternative fuel options for County fleet and heavy equipment
  - Fleet Pool; reduce size of fleet through efficiency
  - Evaluate concepts to improve sustainability while maintaining or reducing expenses

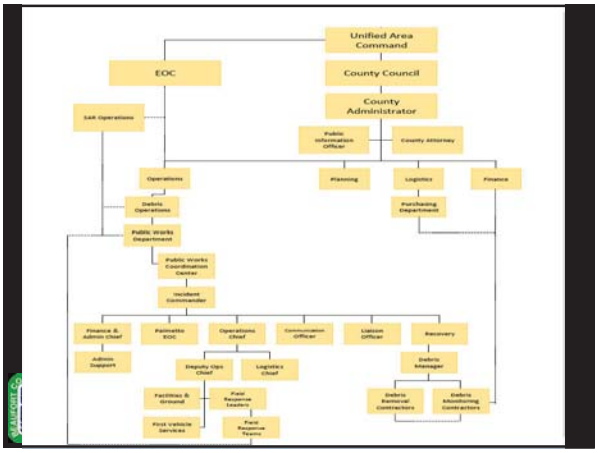
Disaster Recovery

Outline

- Organizational Structure
- Introduction to Disaster Recovery
- Hurricane Matthew
- Hurricane Irma
- Grant Projects
- Plans
- BJLTRG clients

Organizational Structure

- Disaster Recovery Task Force
  - Paul Sommerville, Ex Officio Chair
  - John Weaver, County Administrator
  - Eric Larson, Director Recovery Task Force
  - Deputy Recovery Directors: Dave Wilhelm, Monica Spells, and Chuck Atkinson
  - 27 Recovery Functions
  - Pamela Cobb – Disaster Recovery Coordinator
  - Angel Bowers – Asst. Disaster Recovery Coordinator



What does Disaster Recovery Do?

Response:

- Sheriff's Office EMD takes the lead for events
- Updates and maintains plans
- Pursues grant funding opportunities
- Provides support to EOC/ PWCC
- Oversees recovery function partners
- Coordinates w/ local, state and federal partners
- Coordinates all aspects of Debris Management

What does Disaster Recovery Do?

Recovery:

- Recovery Task Force takes lead once county transitions
- Oversees Recovery Efforts after a disaster
- Coordination between FEMA and State partners after a disaster
- Assist with PW for reimbursement

Plans

- Disaster Recovery Ordinance
- Disaster Recovery Plan
- Debris Management Plan
- Public Works Response Plan
- Hazard Mitigation Plan
- County Continuity of Service Plans

Hurricane Matthew 10/7/16

- Hurricane Matthew (PA)
  - 15 projects = Total Cost $37, 329,764.39
- Total Cost for Debris Operations: $35,389,214.57
  - -Regular Debris: $17,208,865.50
  - -Marine Debris: $6,621,919.03
  - -PPDR: $11,558,430.04

Hurricane Irma 9/11/17

Awarded only Public Assistance (No SBA or IA)

- **278 East Bound – in Appeal's process**
- **Emergency Work – pending payment**
- **Donated Resources: $20k – review process**
- **Boat Landings –pending payment**
- **Facilities – pending payment**
- **Debris Removal – Final review**

Grant projects

- Warning Siren Project – (12/13 locations)- (awarded)
- Daufuskie Fire Dept Hardening (Awarded)
- Lady's Island Airport generator- pending
- Buckwalter generator- pending
- Patrick Edgerton elevation project

BJLTRG

- Originally 198 (BFT) 55 (Jasper) applied to Palmetto/ DRO program
- Currently remain 58 clients from Hurricane Matthew
  - Beaufort (45) Jasper (13)
- 6 homes have been completed through SC 1 FUND

How We Prioritize Applicants in the NMID Counties?

Priorities will be addressed as follows:	HOUSEHOLD'S LOW TO MODERATE INCOME CATEGORY (LMI)		
	30% AMI or BELOW (Extremely Low)	31% AMI to 50% AMI (Very Low)	51% AMI to 80% AMI (Low)
Applicant's Household Includes Both Age Dependent & Disabled, or Multiple Disabled Individuals	1st Priority	3rd Priority	5th Priority
Applicant's Household Includes Either Age Dependent or Disabled	2nd Priority	4th Priority	6th Priority
Applicant's Household Includes Neither Age Dependent or Disabled	5th Priority	7th Priority	8th Priority
Age Dependent: 65 years old and above OR 5 years old and below			

- Lowest Income (taxable or nontaxable)
- Multiple Disability Household
- Age Dependent
- Disabled
- Date of paperwork completion

South Carolina Disaster Recovery Office

Community Development Department

(formerly Planning & Zoning)

Community Development Department (CDD)

- Functions
  - Update Comprehensive Plan
  - Maintain the CDC
  - Handle weekly SFT submittals, monthly PC submittals
  - Natural Resources Protection (trees, marsh buffers, etc.)
  - Passive Park Program

Community Development Department (CDD)

- Staff for multiple committees
  - Rural and Critical
  - Northern Area Planning Committee
  - Southern Corridor Beautification
  - Design Review Board
  - ZBOA
  - SRT

Community Development Department (CDD)

Current / Future Projects:

- CDD is finishing up the Lady's Island Plan update and will be working with the Steering Committee and City of Beaufort to proceed through Council for adoption.
- Community Facilities and Transportation elements to the Comprehensive Plan will be updated and sent through the Planning Commission, NRC, and Council recommendation/adoption process.
- CDD will continue to coordinate the impact fee update and development of the school impact fee between the consultant Tischler Bise, the Beaufort County School District, and appropriate County Departments.

Community Development Department (CDD)

Current / Future Projects:

- Many Passive Park development items will be coordinated and processed:
  - Mobley tract civil drawings to begin
  - Crystal Lake trail plan to be bid for construction
  - Fort Fremont interpretive center construction should break ground
  - Widgeon Point park amenities planning to be completed

Contact us

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Director, Environmental Engineering & Land Management
Department of Public Works
120 Shanklin Road
Beaufort, SC 29906
843-255-2812 (Direct)
843-592-1252 (Mobile)
elarson@bcgov.net

Beaufort County

Crystal Lake: Fish Consumption

- **Project Description:** Beaufort County wishes to determine whether Crystal Lake should be deemed "catch and release" or be unrestricted in terms of the consumption of legally-caught fish regardless of species. At present, very little is known about the number and species of fish in Crystal Lake, let alone how many fish are caught and consumed. Thus, the proposed work detailed herein assumes that edible fish can be caught in sufficient numbers for tissue analysis. Once such analysis has been conducted, tissue contaminant levels can be compared to risk-based values to determine whether consumption should be restricted. As such, the project consists of the five components listed below. A proposed budget follows, broken down into component parts.

1. Collection of a minimum of three individual fish of up to three edible species with a cast net, set net, trotline and/or rod and reel.
2. Processing fish for analysis by scaling, filleting, wrapping, bagging and freezing.
3. Submission of fish tissue to TestAmerica Laboratories, Inc. for the analysis of metals, including mercury, polycyclic aromatic hydrocarbons (PAHs), pesticides and polychlorinated biphenyls (PCBs).
4. Comparison of tissue contaminant concentrations to U.S. EPA risk-based consumption limits and/or U.S. FDA action levels.
5. Delivery of comparative analysis to Beaufort County to support a risk management decision on consumption of fish from Crystal Lake.

Proposed Budget:*

1. Fish collection: 2 fishermen x 8 hr/day x 2.5 days x $45/hr/fisherman = $1800
2. Fish processing (scaling, filleting, wrapping, bagging, freezing): 4 hr x 45/hr = $180
3. Shipping cost and dry ice: $200
4. Analysis by TestAmerica Laboratories, Inc.: $597.50 per sample x 9 samples = $5377.50 (see quote attached)
5. Comparative analysis of tissue contaminant data with risk-based consumption limits and/or action levels: $2000

Total: $9557.50

Okatie West Pond: Bold and Gold

- **Project Description:** Environmental Conservation Solutions, LLC, in conjunction with Beaufort County, installed an innovative bacteria and nutrient removing side-bank filter to a section of a newly constructed wet detention pond for the Okatie West Regional Stormwater Project. The purpose of the joint effort is to evaluate the efficiency of the Bold & Gold Side-Bank filter for the possible application in the county to achieve target stormwater treatment in existing and new stormwater BMPs. The pilot project is a 60-foot side bank filter with a 2-foot layer of Bold & Gold® CTS Filtration media as the treatment mechanism, overlaid by a 6-inch well-draining soil that is connected to an underdrain pipe. The filter is located on the south side of the wet detention pond.

- **Status:** USCB is waiting on pump materials to arrive from Environmental Conservation Solutions, LLC. See proposal below:

UNIVERSITY OF SOUTH CAROLINA BEAUFORT

Date: January 24, 2019

To: Antony Rios, E.I, Environmental Conservation Solutions, LLC and Eric Larson, P.E., Beaufort County, SC Government

From: D. Alan Warren, M.P.H., Ph.D.

Subject: Function of Bold & Gold Side-Bank Filter at Okatie West BMP

This letter represents a response to your request for a proposal to measure the ability of Bold & Gold filtration media to remove contaminants of concern from stormwater detained in the pond known as Okatie West. We propose to collect and analyze sediment overlying the bank filter on one occasion, while collecting and analyzing water on four occasions, each separated by a minimum of 3 weeks, but no more than 1 month. Water samples will be taken in two locations – one from an area of the pond overlying the bank filter and another from the pipe containing filtered water. The underdrain holding filtered water will be pumped dry and allowed a minimum of 5 hours to refill prior to sample collection. The results of each sampling event will be relayed electronically as data become available, as will the elevation of pond water relative to the weir at the time of

sampling. In addition, a final report of the entire project will be submitted once analytical results from the fourth sampling event are received. Whenever possible, methods certified by the State of South Carolina will be used for sample collection and quantification of analytes/parameters.

The project will be undertaken by three employees of the University of South Carolina Beaufort – Alan Warren, Danielle Mickel, and Hamp Simkins. Together, these employees run the University's Water Quality Laboratory. It is estimated that the project will involve four site visits by two employees, each lasting about 10 hours when travel time is included. The cost for the field collection component of the project is estimated below, followed by analytical costs. When taken together, the overall cost of the project is estimated at $6518.72.

Sample Collection
Personnel: 2 persons x 10 hours x $45/hour x 4 sampling events = $3600
Travel: 46 miles roundtrip x 4 sampling events = 184 miles x $0.58/mile = $106.72

Subtotal: $3706.72

***Ex-situ* Water Parameters**
E. Coli ($60)
Fecal Coliform ($60)
Total Suspended Solids ($20)
Copper and Zinc ($24)
Total Kjeldahl Nitrogen ($35)
Nitrates/Nitrites ($18)
Total Phosphorus ($25)
Orthophosphate ($30)

Subtotal: $272 per sampling event x 4 events x 2 locations = $2176

***In-situ* Water Parameters**
Dissolved Oxygen
Turbidity
Specific Conductivity
Salinity
pH
Temperature

Subtotal: $46 per sampling event x 4 events x 2 locations = $368

Soil Parameters
Percent Moisture ($10)

Total Organic Carbon ($150)
Total Kjeldahl Nitrogen ($35)
Nitrates/Nitrites ($18)
Total Phosphorus ($25)
Orthophosphate ($30)

Subtotal: $268 per sampling event x 1 event = $268

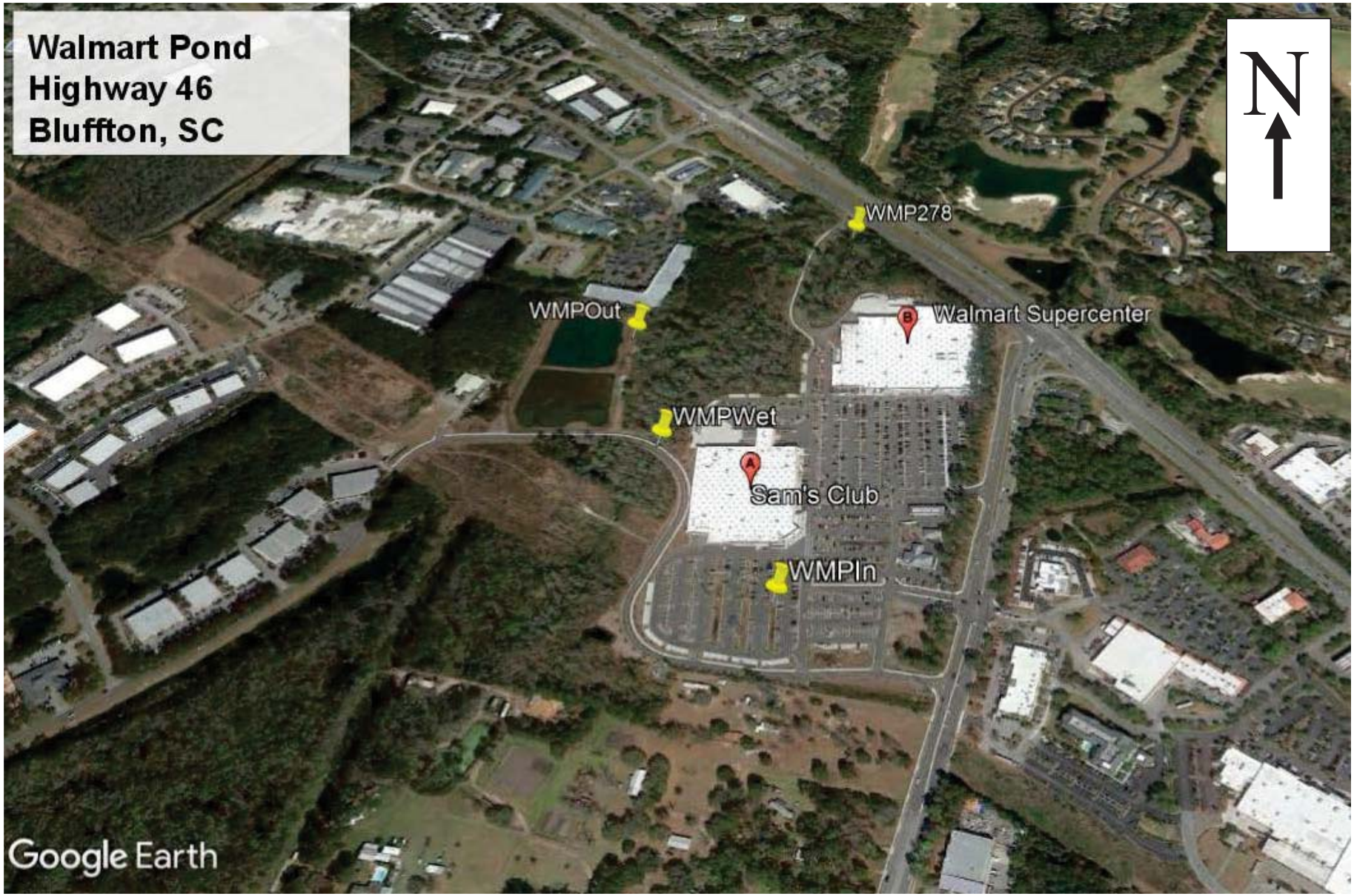
Okatie West Pond:

- Post BMP construction site visit occurred on 2/1/19 with BC and USCB.
- Post BMP construction sample collection began on 2/1/19 and continue every M, W, F for a total of 11 samples to mirror the schedule of the Pre BMP sample collection.

Walmart Pond 278:

- Sample collection and analysis has ended. See report below:

Fecal Coliform Removal Efficiency of Walmart Detention Pond Located in Bluffton, SC



Sampling Locations

WMPIn: N32.257084 -80.855553
Sampling point for water originating from Walmart and Sam's Club parking lots

WMPOut: N32.260125 -80.857240
Sampling point for water exiting wet detention pond into vegetated wetland

WMPWet: N32.258872 -80.867015
Sampling point for water flowing northward toward Highway 278 that does not enter the wet detention pond

WMP278: N32.261867 -80.854971
Sampling point adjacent to Highway 278 consisting of water discharged from wet detention pond combined with that which never entered

Fecal Coliform Data at Each Sampling Location

Sampling Date	WMPIn (CFU/100 mL)*	WMPOut (CFU/100 mL)	WMP278 (CFU/100 mL)	WMPWet (CFU/100 mL)
6/12/2018	184.0	10.0	1071.0	100.5
6/26/2018	12098.0	31.5	1141.0	1240.5
7/10/2018	12098.0	120.5	358.5	493.5
7/23/2018	1860.0	94.5	281.5	144.0
8/7/2018	1093.5	26.0	363.5	291.5
8/21/2018	19863.0	91.5	618.0	1377.5
9/4/2018	359.0	80.5	835.0	2737.5
9/18/2018	12098.0	129.5	835.0	7068.0
10/2/2018	14136.0	172.5	959.0	2586.0
10/16/2018	934.0	60.5	290.5	994.5
Average	**7472.4**	**81.7**	**757.0**	**2460.4**

*CFU/100 mL = colony forming units per 100 mL of sampled water

Fecal Coliform Removal Efficiency of Walmart Detention Pond

Sampling Date	WMPIn (CFU/100 mL)*	WMPOut (CFU/100 mL)	WMPIn – WMPOut (CFU/100 mL)	PERCENT DECREASE
6/12/2018	184.0	10.0	174.0	94.6
6/26/2018	12098.0	31.5	12066.5	99.7
7/10/2018	12098.0	120.5	11977.5	99.0
7/23/2018	1860.0	94.5	1765.5	94.9
8/7/2018	1093.5	26.0	1067.5	97.6
8/21/2018	19863.0	91.5	19771.5	99.5
9/4/2018	359.0	80.5	278.5	77.6
9/18/2018	12098.0	129.5	11968.5	98.9
10/2/2018	14136.0	172.5	13963.5	98.8
10/16/2018	934.0	60.5	873.5	93.5
Average	**7472.4**	**81.7**	**7390.7**	**95.4**

*CFU/100 mL = colony forming units per 100 mL of sampled water

Summary

In 2018, personnel from Beaufort County's Stormwater Department and the University of South Carolina Beaufort's Water Quality Lab collected and analyzed water for fecal coliform bacteria at four locations at or adjacent to a recently-constructed Walmart Supercenter and Sam's Club. The effort spanned 5 months and consisted of ten separate sampling events, the purpose of which was to estimate the efficiency with which Walmart's wet detention pond reduced fecal coliform concentrations in water largely originating from impervious parking surfaces. On 9 of 10 sampling occasions, the bacterial concentration was reduced by > 90%, with an average for all sampling events a remarkable 95.4%. This percent decrease was arrived at by simply comparing bacterial concentrations in water entering the wet detention pond (WMPIn) to those in water exiting the pond (WMPOut) on the same day. As the duration of water detention is unknown, such a comparison of bacterial concentrations on any given day is potentially misleading. Rather, the focus should be on the consistency with which substantial reductions were measured over the entire project period. It is noteworthy that a considerable amount of water that ultimately flows under Highway 278 toward the Colleton River never enters the detention pond. As might be expected, this water contains a considerably higher concentration of fecal coliform bacteria (see WMPWet) than does that exiting the BMP. Lastly, the sampling point known as WMP278 is located so as to receive both water that exits the detention pond and altogether bypasses it. Clearly, water at this location is elevated in fecal coliform bacteria relative to that at WMPOut, but is well below that sampled "upstream" at WMPWet. This may be due to the dilutional effect of BMP-treated water on water of higher bacterial content flowing northward. Based on the data presented herein, the Walmart detention pond appears to be extremely effective at removing fecal coliform bacteria from impervious runoff, ultimately reducing the amount of bacteria entering waterbodies to the north.

Port Royal Cypress Wetland:

- Cypress wetland project ended October 2018.
- See report below.

Port Royal Cypress Wetland

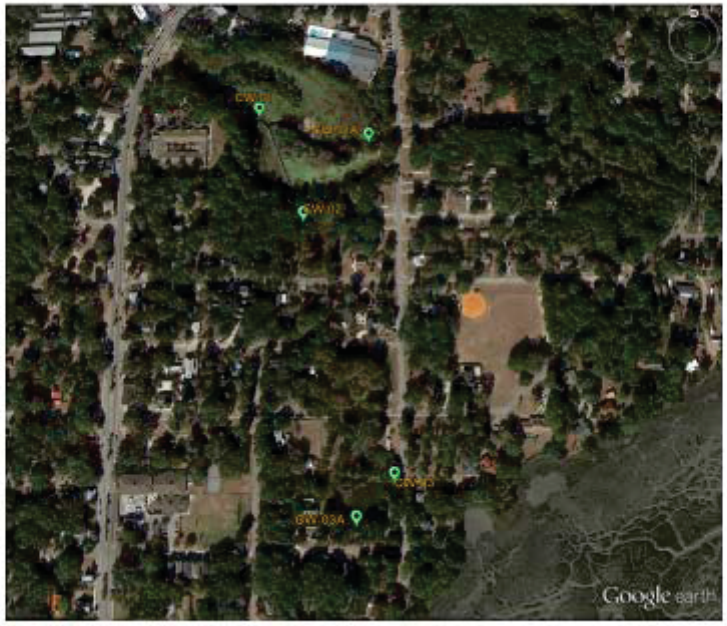
Monitoring Data

September 10, 2018-Dry Event

October 01, 2018-Wet Event

Prepared by:
University of South Carolina Beaufort
Water Quality Laboratory

Port Royal Cypress Wetland Monitoring Locations



Port Royal Cypress Wetland Monitoring Locations

CW-01
Main pond west near entrance into wetland from Paris Ave.
N32.382336 W80.690843

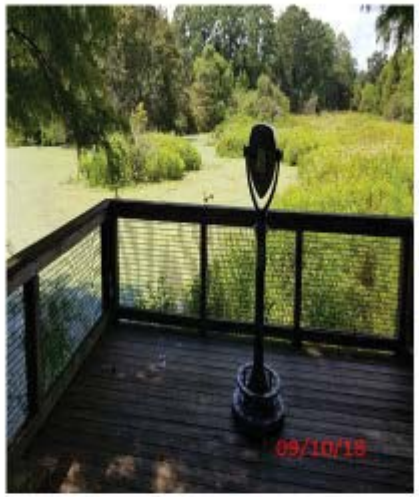
CW-01A
Main pond east side nearest Richmond Ave. and 18th St.
N32.382013 W80.689307

CW-02
Middle pond located between 17th St. and 16th St., south of Cypress Wetland area
N32.381014 W80.690150

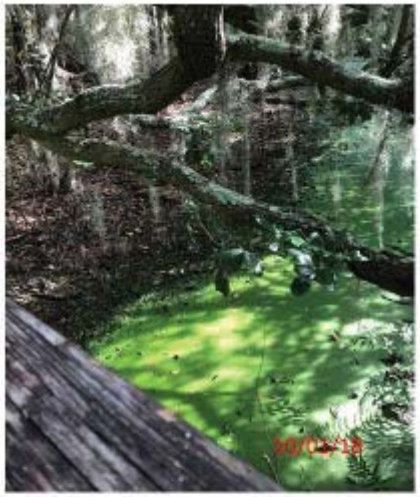
CW-03
Final pond outfall at Richmond Ave. and 13th St.
N32.378182 W80.689059

CW-03A
Final pond adjacent to 12th St., west of Richmond Ave.
N32.377754 W80.689542

CW-01
Main pond west side near entrance into
wetland from Paris Ave.
N32.382336 W80.690843

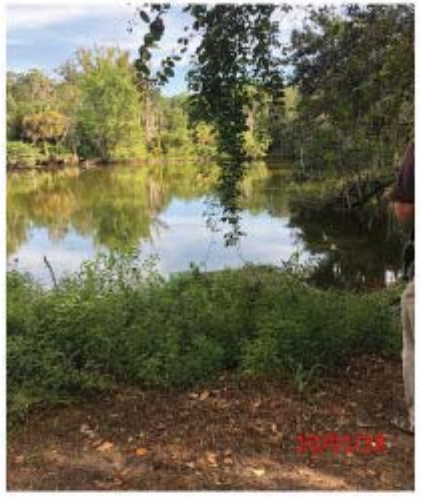


CW-01A
Main pond east side nearest Richmond Ave. and 18th St. (looking westward toward site CW-01)
N32.382013 W80.689307



CW-02
Middle pond located between 17th St. and 16th St., south of Cypress Wetland area.
N32.382013 W80.689307

CW-03
Final pond outfall at Richmond Ave. and 13th St.
N32.378182 W80.689059



CW-03A

Final Pond located adjacent to 12th St, west of Richmond Ave. View looking toward CW-03.
N32.377754 W80.689542

In Situ Data Summary

Date of Collection	Site ID	Time of Collection	Air Temperature (^{0}C)	Water Temperature (^{0}C)	Specific Conductivity (SpC) (ms/cm)	DO (mg/L)	pH (H+)	Salinity (ppt)	Turbidity (NTU)
9/10/2018	CW01	1300	26.09	26.19	0.148	0.65	6.06	0.07	5.4
9/10/2018	CW01A	1320	26.90	25.80	0.127	0.60	6.25	0.06	5.7
9/10/2018	CW02	1310	26.30	26.40	0.146	0.41	6.30	0.07	16.0
9/10/2018	CW03	1325	27.34	31.20	6.69	9.65	7.91	3.69	15.2
9/10/2018	CW03A	1340	27.20	31.20	6.70	9.36	8.12	3.74	12.9

Date of Collection	Site ID	Time of Collection	Air Temperature (^{0}C)	Water Temperature (^{0}C)	Specific Conductivity (SpC) (ms/cm)	DO (mg/L)	pH (H+)	Salinity (ppt)	Turbidity (NTU)
10/1/2018	CW01	945	23.30	24.27	0.170	0.74	6.14	0.08	3.5
10/1/2018	CW01A	1005	23.95	24.40	0.176	0.81	6.27	0.09	4.0
10/1/2018	CW02	0957	23.80	24.05	0.161	1.15	6.21	0.08	47.4
10/1/2018	CW03	1035	24.13	25.21	8.66	5.80	8.18	4.82	30.9
10/1/2018	CW03A	1020	23.80	25.21	8.61	5.80	8.22	4.80	28.7

Bacterial Data Summary

Date of Collection	Site ID	Time of Collection	MPN E. Coli (MPN/100 mL)
9/10/2018	CW01	1300	1627.5
9/10/2018	CW01A	1320	214.0
9/10/2018	CW02	1310	86.5
9/10/2018	CW03	1325	202.0
9/10/2018	CW03A	1340	149.5

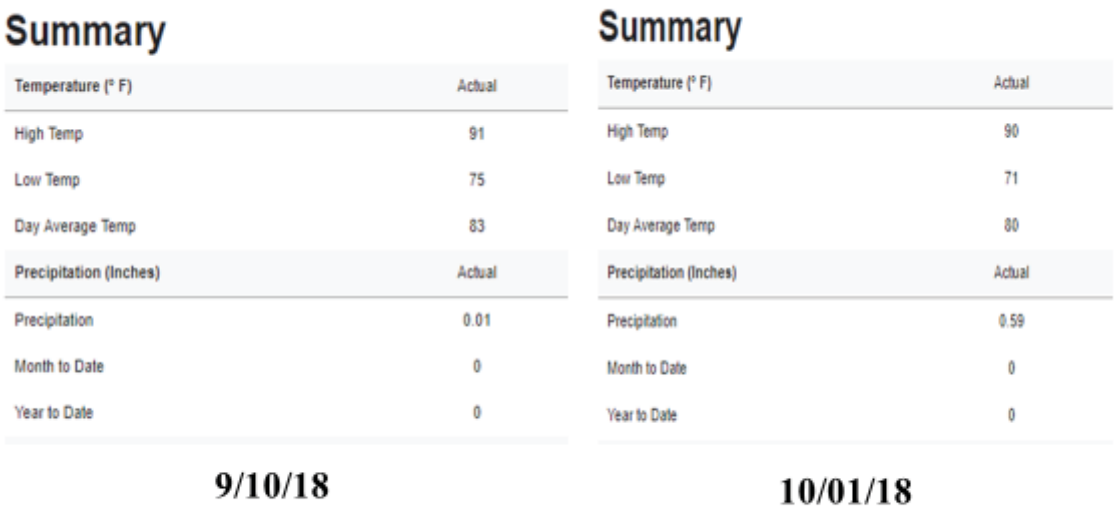
Date of Collection	Site ID	Time of Collection	MPN E. Coli (MPN/100 mL)
10/1/2018	CW01	950	134.5
10/1/2018	CW01A	1015	139.5
10/1/2018	CW02	1008	741.5
10/1/2018	CW03	1030	232.0
10/1/2018	CW03A	1025	24.0

Nutrient Data Summary

Date of Collection	Site ID	Time of Collection	Total Nitrogen (mg/L)	Total Phos (mg P/L)
9/10/2018	CW01	1300	10	1.4
9/10/2018	CW01A	1320	6.3	1.6
9/10/2018	CW02	1310	2.5	0.69
9/10/2018	CW03	1325	1.4	0.45
9/10/2018	CW03A	1340	1.4	0.48

Date of Collection	Site ID	Time of Collection	Total Nitrogen (mg/L)	Total Phos (mg P/L)
10/1/2018	CW01	950	6.5	1.8
10/1/2018	CW01A	1015	14	3.5
10/1/2018	CW02	1008	29	8.7
10/1/2018	CW03	1030	2.2	0.61
10/1/2018	CW03A	1025	1.7	0.52

Weather Conditions



Summary

Temperature (° F)	Actual
High Temp	91
Low Temp	75
Day Average Temp	83
Precipitation (Inches)	**Actual**
Precipitation	0.01
Month to Date	0
Year to Date	0

9/10/18

Summary

Temperature (° F)	Actual
High Temp	90
Low Temp	71
Day Average Temp	80
Precipitation (Inches)	**Actual**
Precipitation	0.59
Month to Date	0
Year to Date	0

10/01/18

12

Port Royal Redevelopment:

- Continue sampling quarterly wet events.

BC Monitoring Plan 2019:

- Sample collection and analysis has begun for new monitoring plan.

Town of Bluffton

Monitoring Plan:

- Accepting samples to analyze for fecal coliform at same time as MST analysis.

- Continue with weekly sample analysis.
- Accepting samples for new project: EPA 319 Grant Town Hall Pervious Paving Parking Lot. Wet event samples but as often as possible before construction begins.
- Additional bi-monthly nutrient (T-N, T-P) parameter analysis for NRP-pond site.
- USCB Lab continues to collect and share data with TOB for the shared BC MS4 sites.

Town of Hilton Head

Jarvis Creek Project:

- **Project Description**: Jarvis Creek pump station will be undergoing a modernization upgrade sometime in February of 2019. The purpose of water quality sampling is to analyze the impacts downstream of the pump station upgrade.
- Status: Jarvis Creek Park water quality sampling pre-pump upgrade has ended and will begin after upgrade project has finished.

USCB Laboratory

Additional Projects:

- Palmetto Bluff: Continued sampling efforts of 12x/year for 6 wet/6 dry events.
- Water Oak Utility: Continue accepting weekly samples for E.coli from their pump station.
- GEL Engineering: Continue accepting samples for Hilton Head collected by GEL Engineering 4x/ quarter.

Lab Projects:

- Proficiency testing for 2019 has begun. Must be completed within the year for all certified analysis to upkeep lab certification.
- Upkeep of equipment.

- Launch of new laboratory information system to include sample ID, sites, clients, field data, lab results, QA/QC requirements, reporting, etc.
- Continue laboratory certification upkeep as per state requirements.
- Continue cost tracking and invoicing of all projects.

BEAUFORT COUNTY COUNCIL

Agenda Item Summary

Item Title:

Evergreen Regional Pond Contract Award Approval - Andrews Engineering

Council Committee:

Natural Resources Committee

Meeting Date:

2/18/19

Committee Presenter (Name and Title):

Eric Larson, Manager, Stormwater Utility

Issues for Consideration:

Andrews Engineering (AE) and Ward Edwards Engineering (WEE) bid on the Request for Qualifications (RFQ) for engineering consulting services to design the Evergreen Regional Pond 319 Grant project. Both contractors are capable of fulfilling the requirements of the RFQ. The total estimated project time line from AE is 22 months; the WEE estimate is 31 months.

Points to Consider:

AE walked the property, noted potential wetland delineation changes from the RFQ, were confident their time line could be met and suggested an improved pond design to meet Best Management Practices. WEE followed the conservative time line from the 319 Grant submission, did not re-evaluate the property and did not suggest alternatives to the Grant.

Funding & Liability Factors:

Design fee of $89,285.55 will come from the Stormwater Utility CIP fund. The Construction cost is funded by $229,124 federal grant and $460,876 from the Stormwater Utility CIP fund.

Council Options:

Award the contract to Andrews Engineering, award the contract to Ward Edwards Engineering, return the project for rebid or cancel/delay the project.

Recommendation:

Award the Evergreen Regional Pond design contract to Andrews Engineering in the amount of $89,285.55.

COUNTY COUNCIL OF BEAUFORT COUNTY

PURCHASING DEPARTMENT

106 Industrial Village Road, Building 3
Post Office Drawer 1228
Beaufort, South Carolina 29901-1228

TO: Councilman Alice Howard, Chairman, Natural Resources Committee

FROM: Dave Thomas, Purchasing Director

SUBJ: RFP # 121018 Request for Qualifications to Provide Engineering and Consulting Services for the 2018 Evergreen Regional Stormwater Pond, a CWA Section 319 grant project

DATE: January 28, 2019

BACKGROUND: Beaufort County Purchasing Department issued a Request for Proposal (RFP) for engineering and consulting services for the 2018 Evergreen Regional Stormwater Pond BMP, a CWA Section 319 grant project. The proposal requested that the vendor consultant provide services to design and oversee construction of a regional stormwater best management practice. The Evaluation Committee consisted of six (6) staff members representing the County: Eric Larson - Stormwater Management; Eric Greenway – Community Development; Danny Polk – Stormwater Management; Katie Herrera – Stormwater Management; Thomas Keaveny – Legal, and Keith Hall – Stormwater Management Contractor. Beaufort County received two (2) responses to the RFP. They reviewed and evaluated the RFPs and decided to interview both vendors listed below; Andrews Engineering was selected and ranked the number one (1) firm. The final ranking is as follows:

1. Andrews Engineering, Beaufort, SC
2. Ward Edwards Engineering, Bluffton, SC

During the February 18, 2019 Stormwater Management Utility Board Meeting, the board voted unanimously to recommend the contract to Andrews Engineering for the $89,285.55 scope of services.

The term of the contract will be effective February 28, 2019 to December 31, 2020, approximately 22 months (less than the term of the grant contract with DHEC). Contract fees for the project were negotiated with Andrews Engineering, with the results attached to this recommendation.

FUNDING: Primary Funding - $89,285.55 will come from the Stormwater Utility CIP fund. The Construction cost is funded by $229,124 federal grant and $460,876 from the Stormwater Utility CIP fund

PROPOSED COST: $89,285.55

FOR ACTION: Natural Resources Committee Meeting February 18, 2019.

RECOMMENDATION: The Purchasing Department recommends that the Natural Resources Committee approve the contract award of $89,285.55 to Andrews Engineering for Engineering and Consulting Services for the 2018 Evergreen Regional Stormwater Pond BMP, a CWA Section 319 grant project.

CC: John Weaver, Interim County Administrator
Alicia Holland, Assistant County Administrator, Finance
Monica Spells, Assistant County Administrator, Civic Engagement and Outreach
Don Smith, Chairman, Beaufort County Stormwater Board
Eric W. Larson, Division Director for Environmental Engineering & Land Management

ATTACHMENTS: Fee Schedule, Fee Breakdown, Projected Project Schedule, Selection Summary

Excerpt from Alljoy Watershed Study RFQ
==

SECTION I

PREFACE

Beaufort County desires to construct a County stormwater best management practice, specifically a stormwater management system for a residential area. This work will be accomplished by the use of a Consultant to prepare the design, secure permitting, oversee construction administration, and generate grant documentation related to the Federal Emergency Management Agency (FEMA) Flood Mitigation Assistance Grant Program.

The Scope of Work, described in more detail below, includes design and construction oversight of a County stormwater management project (aka Best Management Practice, or BMP), grant administration, and public education. In addition to the foregoing, the consulting firm or firms will perform other duties related to stormwater activities outlined in the SCOPE OF SERVICES.

SECTION II

INTENT AND SCOPE OF SERVICES

INTENT

Beaufort County seeks qualifications and proposals from consultants to provide various surveying and stormwater management engineering services related to this project. These services shall be provided under a service contract. The service contract shall not guarantee the successful consultant of a specified dollar value of work or limit the County's right to seek proposals and award other stormwater services to consultants other than the one selected for this services contract. The County reserves the right to make multiple awards from this solicitation for the services contemplated in this proposal.

PURPOSE

Beaufort County has identified stormwater runoff and drainage issues in a residential area in an unincorporated area of Beaufort County. The Consultant will provide an analysis and report to identify the runoff and drainage issues within the residential area and recommend improvements. This project includes providing design, permitting services and construction oversight for approved improvements. Tasks within the scope of services include, as necessary, wetland delineation, geotechnical investigations, hydraulic and hydrology design, stormwater BMP design, and roadway design.

The County is also considering property acquisition and/or structure elevations through a FEMA Flood Mitigation Assistance Grant to acquire the lands needed for the project and/or to eliminate repetitive losses.

SCOPE OF SERVICES

Task 1: Wetland Delineation

The Consultant will conduct a jurisdictional stream and wetland delineation within the project area in accordance with the standards currently employed by the USACE (aka Atlantic and Gulf Coastal Plain Regional Supplement to the Corps of Engineers Wetland Delineation Manual). The aquatic feature boundaries will be sequentially flagged or pin-flagged. Wetland and stream flagging will be located and platted by a professional land surveyor. The wetland boundaries and appropriate documentation will be submitted to the USACE so that a final jurisdictional determination can be issued for the project area. This documentation will include information such as the Jurisdictional Determination Request, location, USGS topographic, soils, and NWI maps, infrared aerial photography, and wetland and upland data forms. If the USACE requests a site visit to verify the aquatic feature limits, their personnel will be accompanied in the field by contractor personnel during the site inspection.

Task 2: Geotechnical Investigations

The Consultant shall perform geotechnical investigations and design necessary to provide the recommended design for approved improvements. Geotechnical investigations and analysis shall be performed in accordance with the AASHTO LRFD Design Specifications. Analysis and recommendations shall be presented in a report which shall contain:

- Site description,
- Field testing procedures,
- Test location plan,
- CPT sounding and soil test boring logs which describe site soils and illustrate stratification changes, field data, and groundwater levels at the time of exploration
- Laboratory testing results,
- Site preparation procedures including any necessary stripping, undercutting, and stabilization measures, and,
- Foundation recommendations for the culverts.

Task** 3: **Hydrology and Hydraulic Design Services

The Consultant will complete an initial hydraulic and hydrologic model and report for the recommended improvements, and a final hydraulic and hydrologic model and report for the completed project.

The Consultant will perform roadway drainage design as necessary and will follow all guidelines for roadway surface drainage and sediment and erosion control. The impacts to the existing hydrology due to the proposed project will be evaluated. Based on this evaluation, design alternatives to control flooding and manage the runoff associated with the project will be examined. Designs will be performed for roadside ditches, storm sewer systems, cross line culverts, ponds, energy dissipaters and other structures as necessary.

All hydrologic and hydraulic design and studies will comply with the following design criteria:

- SCDOT's Requirements for Hydraulic Design Studies, latest edition;
- SCDOT Standard Drawings, latest edition;
- The Environmental Protection Agency's (EPA) National Pollution Discharge Elimination System (NPDES) as administered under general permit by the SC Department of Health and Environmental Control (DHEC);
- FEMA Regulations, 44CFR Chapter 1;
- State Stormwater and Sediment and Erosion Control Regulations administered by DHEC, 26 S.C. Code Ann. Regs. 72-405 (Supp. 1995) et seq.;
- South Carolina State Water Law;
- Hydraulic Engineering Circular No. 18, "Evaluating Scour at Bridges" Fifth Edition, April 2012;
- AASHTO "Highway Drainage Guidelines" dated 2007;
- "SCDOT Stormwater Quality Design Manual" dated June 2014;
- SCDOT Supplemental Specifications;
- "Beaufort County Manual for Stormwater Best Management and Design Practices", latest edition.

Task 4: Pumping Stations

Plans for pumping stations shall be prepared in compliance with the standards listed below as appropriate. Pumping stations are recommended only where no other practicable alternative is available.

- AASHTO "Drainage Manual", latest edition;
- USDOT "Urban Drainage Design Manual", latest edition;
- USDOT "Highway Stormwater Pump Station Design", latest edition.

Pump stations shall be designed for 25-year storm events. The drainage system shall be checked for the 100-year storm event to determine the extent of flooding and associated risk. The effects of smaller storm events shall be reviewed. Design changes may be considered by the County when deemed appropriate by the Contractor.

Pump stations shall be wet-pit design. A minimum of two pumps shall be installed. Pumps shall be submersible, and individual pumps shall be sized for the storm event design outflow.

Security fencing, road access with parking space, outside lighting and outside operating alarms shall be provided for pump stations. Pump stations shall have telemetry. Provisions for emergency operation shall be provided. When needed, on site fuel storage shall be aboveground and sized for 24 hours of operation.

Task 5: Structural Design

Plans for box culverts, headwalls, retaining walls and similar constructions shall be prepared in conformance with the current practice of the County. Standard drawings of the SCDOT shall be used where feasible and will be furnished by SCDOT to be modified by the County to fit the specific needs of the project. Culverts shall be designed for a live load as described in the AASHTO's LRFD specifications. The box culvert plans shall include the general drawing showing a plan and elevation view with appropriate and proposed information, culvert barrel details, and wing wall details.

Design standards will be in compliance with the following:

- The SCOOT Bridge Design Manual, 2006
- AASHTO 2012 LRFD Bridge Design Specifications, 6th Edition (2010), with interim revisions through 2013
- SCDOT Bridge Drawings and Details, latest versions
- AASHTO Guide Specifications for LRFD Seismic Bridge Design
- SCDOT Standard Specifications for Highway Construction, 2007 edition
- ANSI/AASHTO/AWS DI.S Bridge Welding Code, latest edition
- Standard Special Provisions and Supplemental Specifications used by the COUNTY/SCDOT

ADDITIONAL SERVICES

Development of the project from completion of preliminary design to construction will require additional services. The need for these additional services will be determined based upon the recommended improvements at the project site. These additional services may include, but are not limited to, the following:

- Right of Way Plan Development
- Right of Way Acquisition
- Plot Acquisition
- Construction Specifications & Bid Document Preparation

- Utility Coordination
- Subsurface Utility Engineering
- Wetland Mitigation Permitting
- Construction Engineering & Inspection
- FEMA Letter of Map Revision (LOMR)
- Roadway Design

For roadway design, all plans, designs, specifications and estimates shall conform to the SCDOT standard practices for highway construction. Roadway plans will be developed by the Consultant to illustrate roadway alignments, lane configurations, grades, cross sections, construction limits, relevant dimensions, preliminary drainage, and location of existing features and proposed improvements as necessary.

The following is a detailed Scope of Work needed to design and construct a County stormwater best management practice in addition to managing the grant contract requirements for the FEMA Flood Mitigation Assistance grant awarded to the project. A summary of the Scope of Work is as follows:

- Provide expertise in managing FEMA Flood Mitigation Assistance Grant Program documentation including other tasks typically required by a grant. The Consultant will be advising and assisting the County related to grant administration.
- Prepare needed field survey necessary for design of approved improvement projects.
- Prepare needed wetland delineations required by USACE as part of the project.
- Prepare a hydrologic and hydraulic design for approved improvement projects.
- Model pollutant removal and volume control expected for the project to assure they meet the intent of previous watershed plans and the grant goals.
- Geotechnical investigations, as needed.
- Prepare a final design(s) for construction documents.
- Prepare, submit, and manage all needed permits from the USACE, SC-DHEC/OCRM, and the County's Zoning department.
- Prepare bid package(s) for construction.
- Oversee the bidding process, evaluating and recommending a successful Contractor.
- Provide construction oversight, periodic inspections, and manage documentation during construction.
- Provide weekly required CEPSCI certified EPSC inspections for DHEC NOI.
- As-built surveys as required for permits and Grant conditions.
- Prepare public educational outreach materials for various focus groups including residents and the engineering/development community for posting on the County website, and any other materials and activities if required by Grant conditions.

- Other items needed to complete the goal yet not specifically listed above will also be the responsibility of the Consultant and will be outlined during the contract negotiation phase.

BEAUFORT COUNTY COUNCIL

Agenda Item Summary

Item Title:

Evergreen Regional Pond Contract Award Approval - Andrews Engineering

Council Committee:

Natural Resources Committee

Meeting Date:

2/18/19

Committee Presenter (Name and Title):

Eric Larson, Manager, Stormwater Utility

Issues for Consideration:

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Funding & Liability Factors:

Design fee of $89,285.55 will come from the Stormwater Utility CIP fund. The Construction cost is funded by $229,124 federal grant and $460,876 from the Stormwater Utility CIP fund.

Council Options:

Award the contract to Andrews Engineering, award the contract to Ward Edwards Engineering, return the project for rebid or cancel/delay the project.

Recommendation:

Award the Evergreen Regional Pond design contract to Andrews Engineering in the amount of $89,285.55.

Alljoy Home Elevations & Acquisitions

- Identified as a Special Flood Hazard Area (SFHA) by FEMA
  - Defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year
  - Also known as the base flood or 100-year flood
- Potential Grant
  - One resident has already submitted a grant proposal
  - 16 homes identified as Elevation Projects
  - 27 homes and 4 lots identified as Acquisition Projects

Flood Zone A08

Alljoy Home Elevations & Acquisitions

- Elevation Estimated Cost = $6,530,380
  - Local Match: $1,632,595
  - Estimated cost based on grant proposal that was submitted in 2017
- Acquisition Estimated Cost = $3,112,100
  - Local Match: $778,025
- Alternate Project-Acquisition in lieu of Elevation
  - Estimated Cost = $3,223,300
    - Local Match: $805,825

Ditch Maintenance

The primary duty of the Stormwater Infrastructure team is to maintain the County's ditches and pipes so that they function as designed.

Over time, ditches fill with sediment or erode. This reduces their ability to drain water effectively. The County's work returns these ditches to their original depth, size, and shape. This restores their function. After re-shaping the ditch, County crews re-seed the area and stabilize the soil with matting or straw. This minimizes erosion until the grass is re-established. Sod is not provided by County.

Pros and Cons of Open Ditch Systems

Open ditch systems have many benefits, such as:

- Greater drainage than a pipe system
- Better water quality
- Flowing ditches reduce health and mosquito issues

Open ditch systems have occasional problems, including:

- Sediment buildup and/or erosion
- Blockages by leaves and debris
- Visible standing water

Mosquito Control can assist homeowners with mosquito control concerns. Call (843)-255-5800 for more information.

Common Questions

Q: Who is responsible for maintaining ditches on my property?

A: The property owner is responsible for maintaining their lot so that it drains to a County maintained ditch or drain. All County maintained ditches carry "public" water (runoff from public roadways). Most ditches in-between or behind houses do not carry "public" water. These ditches are considered private. The property owner is responsible for maintaining private ditches, not the County. If you do not know if your ditch is private or not, call Beaufort County at (843)-255-2805.

Q: Why can't I replace the ditch with a pipe?

A: An open ditch will carry more water than a pipe. The vegetation in ditches also filters pollution and creates better water quality. Citizens may be allowed to pipe ditches greater than three feet deep if they obtain a permit from the County, hire a contractor, and pay for the installation costs.

Q: Why can't the County pipe the deeper ditches?

A: Piping ditches is very expensive. The cost to pipe the front of a typical residential lot is about $5,000. The County currently maintains 2,709 miles of open ditches and 244 miles of pipe. This makes this practice cost prohibitive.

Additional Questions?
Tel: 843.255.2802

Roadside Ditch Maintenance

Department of Public Works

Stormwater Infrastructure

843-255-2802

www.bcgov.net

The Purpose of Ditches

Roadside ditches move stormwater runoff off roads and keeps them passable. Vegetation in ditches can trap pollution carried by stormwater and stop it from reaching local creeks and rivers. The primary duty of the Stormwater Infrastructure team is to maintain the County's ditches and pipes so that they function as designed. This helps the County meet water quality standards required by State and Federal agencies.

Routine maintenance of these ditches reduces erosion and the flow of sediment into waterways. Roadside ditches are located within the County's right-of-way. This typically extends into your front yard.

Why We Don't Pipe Shallow Ditches

To be considered for piping, a ditch must be at least three feet deep. The reason for this is because a 15-inch interior diameter pipe is the smallest size that the County uses for stormwater drainage. To protect the pipe from vehicles that may park over it, additional cover material is needed. There is no way to protect a pipe that size in a ditch less than three feet deep.

811

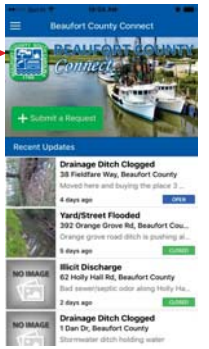
BEFORE

DURING

AFTER

Step 1: Locate the Problem

Report it to our App!
Beaufort County Connect



Stormwater Infrastructure staff assesses the problem described by homeowners. If routine maintenance can solve the problem, a work order is set up. If the issue is more complex, a stormwater engineering plan may be required. This step may take several days to several months to complete. It depends on the type of issue and if any budgetary issues arise.

Step 2: Perform the Work

Stormwater crews contact utility companies to mark all underground lines in the work area. Crews remove sediment and vegetation to match the size, shape, and depth required to effectively drain stormwater. This is done using excavators and/or hand tools, depending on the amount of sediment.

Step 3: End Result

Restoration of the ditch is complete when reseeding is done. The County will not sod ditches, so it may take time for the grass to grow back. Once the grass grows, it is important to mow high vegetation and keep debris and leaves from accumulating in the ditch. Blockages of ditches and culverts are frequent causes of flooding in neighborhoods.

STORMWATER MASTER PLAN

1 OF 1

PROJECT: 2085
DATE: 03/22/18
REVISED: 01/15/19
DRAWN BY: TAB
ENGINEER: JPA
SCALE: 1"=50'

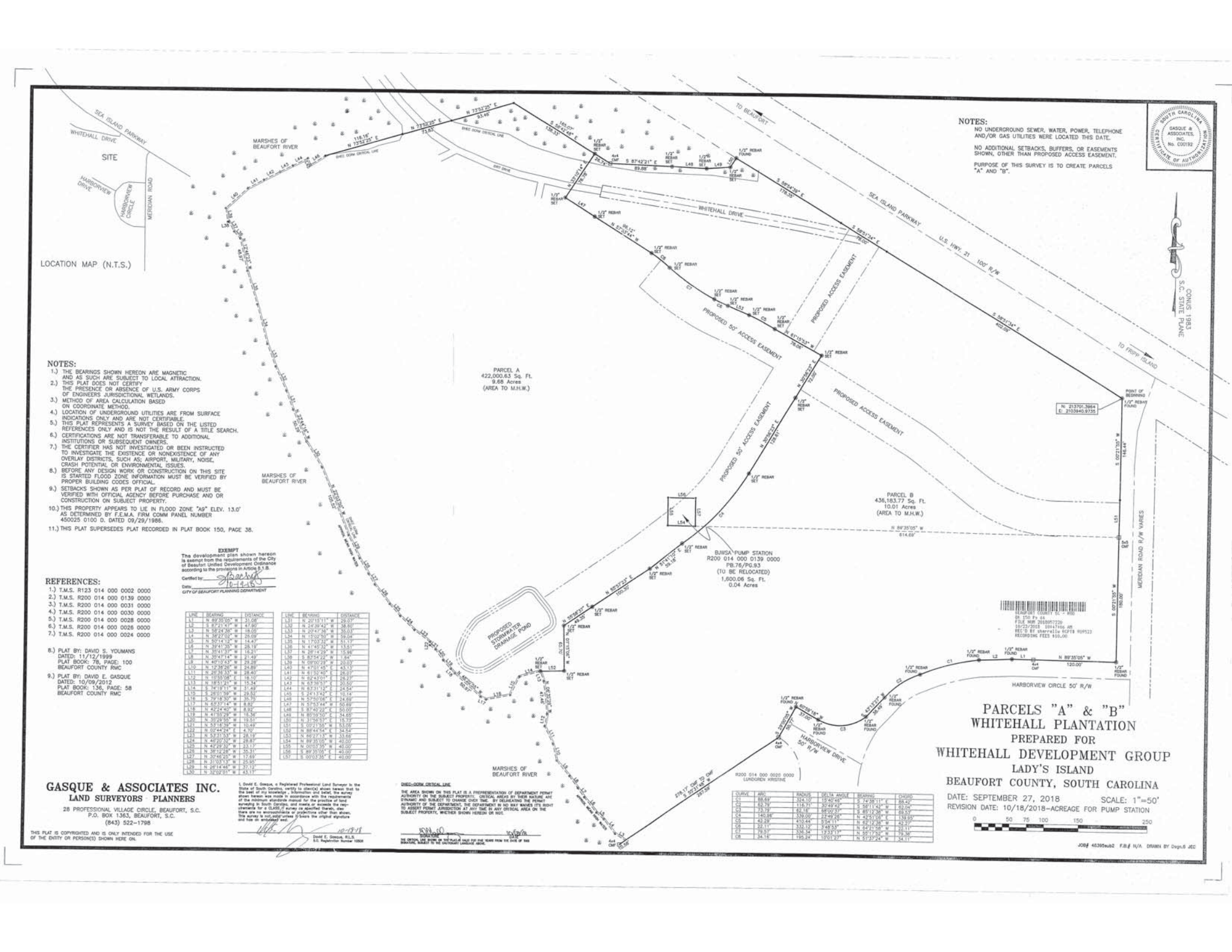
WHITEHALL
LADYS ISLAND
BEAUFORT COUNTY, SC

CAROLINA ENGINEERING CONSULTANTS, INC.
PO BOX 294
BEAUFORT, SC 29901
WWW.CAROLINAENGINEERING.COM
843/322-0553
843/322-0556 (FAX)

PLAN REVISIONS

NO.	DESCRIPTION	DATE
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-

SOUTH CAROLINA
CAROLINA ENGINEERING CONSULTANTS INC.
No. C02324
CERTIFICATE OF AUTHORIZATION



NOTES:

NO UNDERGROUND SEWER, WATER, POWER, TELEPHONE AND/OR GAS UTILITIES WERE LOCATED THIS DATE.

NO ADDITIONAL SETBACKS, BUFFERS, OR EASEMENTS SHOWN, OTHER THAN PROPOSED ACCESS EASEMENT.

PURPOSE OF THIS SURVEY IS TO CREATE PARCELS "A" AND "B".

GASQUE & ASSOCIATES, INC. No. C00192 CERTIFICATION OF AUTHORIZATION SOUTH CAROLINA

NOTES:

1.) THE BEARINGS SHOWN HEREON ARE MAGNETIC AND AS SUCH ARE SUBJECT TO LOCAL ATTRACTION.
2.) THIS PLAT DOES NOT CERTIFY THE PRESENCE OR ABSENCE OF U.S. ARMY CORPS OF ENGINEERS JURISDICTIONAL WETLANDS.
3.) METHOD OF AREA CALCULATION BASED ON COORDINATE METHOD.
4.) LOCATION OF UNDERGROUND UTILITIES ARE FROM SURFACE INDICATIONS ONLY AND ARE NOT CERTIFIABLE.
5.) THIS PLAT REPRESENTS A SURVEY BASED ON THE LISTED REFERENCES ONLY AND IS NOT THE RESULT OF A TITLE SEARCH.
6.) CERTIFICATIONS ARE NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS OR SUBSEQUENT OWNERS.
7.) THE CERTIFIER HAS NOT INVESTIGATED OR BEEN INSTRUCTED TO INVESTIGATE THE EXISTENCE OR NONEXISTENCE OF ANY OVERLAY DISTRICTS, SUCH AS; AIRPORT, MILITARY, NOISE, CRASH POTENTIAL OR ENVIRONMENTAL ISSUES.
8.) BEFORE ANY DESIGN WORK OR CONSTRUCTION ON THIS SITE IS STARTED FLOOD ZONE INFORMATION MUST BE VERIFIED BY PROPER BUILDING CODES OFFICIAL.
9.) SETBACKS SHOWN AS PER PLAT OF RECORD AND MUST BE VERIFIED WITH OFFICIAL AGENCY BEFORE PURCHASE AND OR CONSTRUCTION ON SUBJECT PROPERTY.
10.) THIS PROPERTY APPEARS TO LIE IN FLOOD ZONE "AG" ELEV. 13.0' AS DETERMINED BY F.E.M.A. FIRM COMM PANEL NUMBER 450025 0100 D. DATED 09/29/1986.
11.) THIS PLAT SUPERSEDES PLAT RECORDED IN PLAT BOOK 150, PAGE 38.

EXEMPT
The development plan shown hereon is exempt from the requirements of the City of Beaufort Unified Development Ordinance according to the provisions in Article 8.1.8.

Certified by: _____
Date: 10-19-18
CITY OF BEAUFORT PLANNING DEPARTMENT

REFERENCES:

1.) T.M.S. R123 014 000 0002 0000
2.) T.M.S. R200 014 000 0139 0000
3.) T.M.S. R200 014 000 0031 0000
4.) T.M.S. R200 014 000 0030 0000
5.) T.M.S. R200 014 000 0028 0000
6.) T.M.S. R200 014 000 0026 0000
7.) T.M.S. R200 014 000 0024 0000

8.) PLAT BY: DAVID S. YOUMANS
DATED: 11/12/1999
PLAT BOOK: 78, PAGE: 100
BEAUFORT COUNTY RMC

9.) PLAT BY: DAVID E. GASQUE
DATED: 10/09/2012
PLAT BOOK: 136, PAGE: 58
BEAUFORT COUNTY RMC

LINE	BEARING	DISTANCE
L1	N 89°35'05" W	31.08'
L2	S 89°21'43" W	47.90'
L3	N 58°24'38" W	18.05'
L4	N 38°21'02" W	26.09'
L5	N 50°14'12" W	14.47'
L6	N 39°41'35" W	28.19'
L7	N 50°41'37" W	16.21'
L8	N 35°47'14" W	21.49'
L9	N 40°10'43" W	29.28'
L10	N 12°35'26" W	24.89'
L11	N 29°35'33" W	28.40'
L12	N 11°59'09" E	18.10'
L13	N 38°51'21" W	15.34'
L14	S 74°19'11" W	31.49'
L15	S 26°01'39" W	29.53'
L16	S 79°18'32" W	35.70'
L17	N 63°37'14" W	8.82'
L18	N 42°24'40" W	8.92'
L19	N 41°55'29" W	18.36'
L20	N 30°29'55" W	19.51'
L21	N 53°16'39" W	10.49'
L22	N 02°44'24" E	4.70'
L23	N 53°31'53" W	28.19'
L24	N 45°20'32" W	28.8'
L25	N 42°29'32" W	33.17'
L26	N 38°12'28" W	36.31'
L27	N 30°46'25" W	17.69'
L28	N 31°01'13" W	25.95'
L29	N 26°14'46" W	37.10'
L30	N 32°02'01" W	43.17'

LINE	BEARING	DISTANCE
L31	N 20°15'11" W	29.07'
L32	N 24°36'42" W	38.60'
L33	N 20°47'36" W	50.03'
L34	N 13°02'50" W	43.13'
L35	N 17°03'32" W	51.17'
L36	N 41°45'32" W	13.51'
L37	N 29°14'29" W	15.96'
L38	S 83°54'22" W	1.94'
L39	N 09°00'28" W	20.03'
L40	N 47°01'45" E	43.13'
L41	N 61°52'40" E	28.07'
L42	N 62°43'01" E	28.23'
L43	N 63°36'57" E	30.00'
L44	N 63°31'12" E	24.54'
L45	S 24°11'42" E	10.14'
L46	N 57°50'08" E	24.59'
L47	N 57°57'44" W	50.69'
L48	S 87°40'27" E	50.00'
L49	N 85°59'05" E	54.65'
L50	N 31°36'57" E	15.73'
L51	S 00°21'55" W	53.08'
L52	N 88°44'54" E	34.54'
L53	N 84°37'13" W	33.66'
L54	N 89°35'05" W	40.00'
L55	N 00°03'35" W	40.00'
L56	S 89°35'05" E	40.00'
L57	S 00°03'35" E	40.00'

CURVE	ARC	RADIUS	DELTA ANGLE	BEARING	CHORD
C1	68.69'	324.10'	12°40'45"	S 74°38'11" E	68.42'
C2	62.79'	118.71'	30°49'42"	S 56°11'43" W	62.04'
C3	73.79'	62.18'	68°00'37"	S 85°12'34" W	69.53'
C4	140.98'	339.00'	23°49'26"	N 42°51'05" E	139.95'
C5	43.29'	410.44'	5°54'11"	N 61°13'58" W	43.27'
C6	22.11'	332.12'	3°48'53"	N 64°21'58" W	22.11'
C7	79.5'	336.34'	13°33'13"	N 55°17'52" W	79.38'
C8	34.16'	195.24'	10°01'27"	N 51°37'24" W	34.11'

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I, David E. Gasque, a Registered Professional Land Surveyor in the State of South Carolina, certify to client(s) shown hereon that to the best of my knowledge, information and belief, the survey shown hereon was made in accordance with the requirements of the minimum standards manual for the practice of land surveying in South Carolina, and meets or exceeds the requirements for a CLASS (A) survey as specified therein; also, there are no encroachments or projections other than shown. This survey is not valid unless it bears the original signature and has an embossed seal.

10-19-18
David E. Gasque, R.L.S.
S.C. Registration Number 10808

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RECORDING FEES $10.00

PARCELS "A" & "B"
WHITEHALL PLANTATION
PREPARED FOR
WHITEHALL DEVELOPMENT GROUP
LADY'S ISLAND
BEAUFORT COUNTY, SOUTH CAROLINA

DATE: SEPTEMBER 27, 2018 SCALE: 1"=50'
REVISION DATE: 10/18/2018-ACREAGE FOR PUMP STATION

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STORMWATER PONDS IN COASTAL SOUTH CAROLINA

2018 State of Knowledge Report
Executive Summary

Sea Grant | S.C. SEA GRANT CONSORTIUM
Coastal Science Serving South Carolina

STORMWATER PONDS RESEARCH AND MANAGEMENT COLLABORATIVE

The S.C. Sea Grant Consortium established the South Carolina Stormwater Ponds Research and Management Collaborative in 2014 to address the pressures on the state's communities, infrastructure, and natural and human resources from the increasing use of ponds for stormwater management. Stormwater ponds, especially detention ponds, are by far the most common best management practice (BMP) for controlling stormwater runoff from developed landscapes in coastal South Carolina.

The Collaborative engages technical and management expertise from throughout the state to (1) develop an integrated, sustainable, economic and natural resource strategy for the construction, use, and maintenance of stormwater ponds serving existing and future South Carolina communities; (2) satisfy the information needs and concerns of existing local communities, homeowners associations (HOAs), businesses, and industries surrounding stormwater pond design, ecology, efficiency, effectiveness, and management; (3) characterize coastal stormwater ponds to understand their functionality, durability, benefits, and costs; and (4) ultimately develop new and innovative engineering and construction practices to ensure that current and future stormwater ponds function without concerns about possible ecological impacts or additional economic costs associated with their management and maintenance.

For more information or to receive a copy of the full State of Knowledge report when it is available, please contact Hamed Majidzadeh, Ph.D. at (843) 953-6406 or email hamed.majidzadeh@scseagrant.org.

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Cover photo: Grace Beahm Alford

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INTRODUCTION

The state of South Carolina (S.C.) has seen some of the most rapid coastal population growth rates and overall rates of urbanization in the nation. Its upward trend in population growth is expected to continue with a projected population in the coastal zone of over 1.5 million by the year 2030. The resulting urban and suburban growth in the region increases the amount of impervious surfaces (e.g., roofs, roads, parking lots) to support the associated development. As impervious surface area in a watershed increases so does the amount of stormwater runoff. In coastal S.C., the most common best management practice (BMP) to control runoff is stormwater ponds (herein, "ponds").

Through working with our stakeholders, the S.C. Sea Grant Consortium (Consortium) identified ponds as a growing topic of concern throughout our eight coastal counties (**Fig. ES.1**). In October 2014, the Consortium initiated the Stormwater Ponds Research and Management Collaborative, an effort that gathered scientists and resource managers to investigate and address the challenges associated with these systems. The long-term vision of the Collaborative is to develop integrated, sustainable strategies for the construction and use of ponds

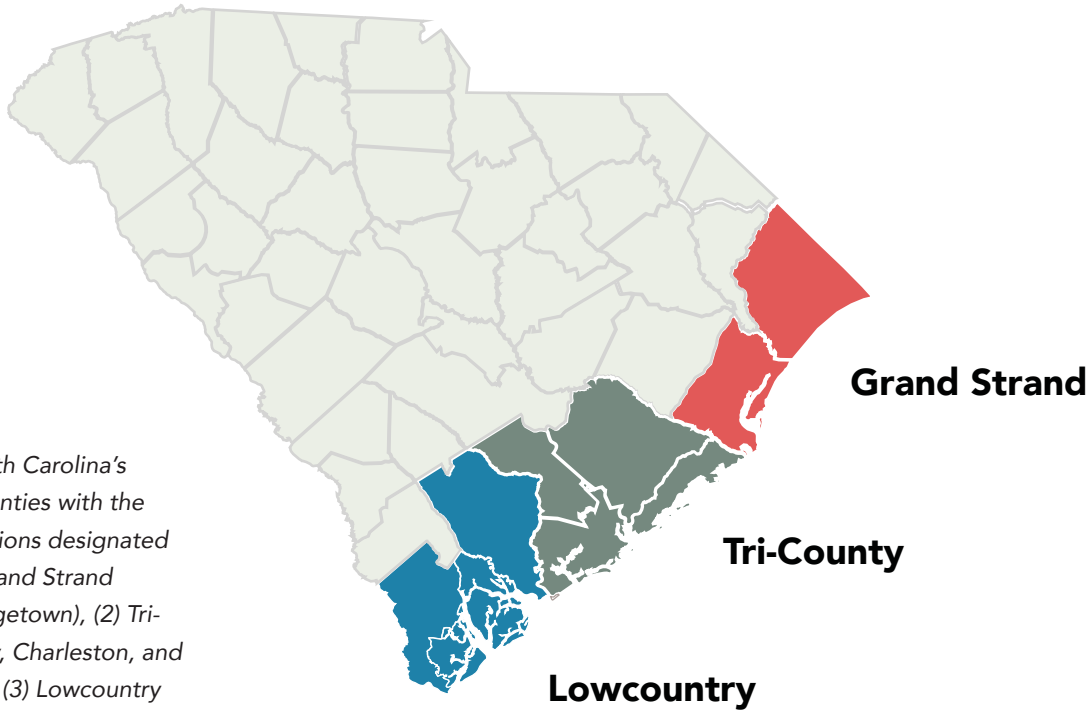

Figure ES.1 *South Carolina's eight coastal counties with the three coastal regions designated as follows: (1) Grand Strand (Horry and Georgetown), (2) Tri-County (Berkeley, Charleston, and Dorchester), and (3) Lowcountry (Colleton, Beaufort, and Jasper).*

tailored to the specific climate, hydrology, geography, and cultural needs of the coast.

What follows is a scientific state-of-knowledge report on ponds in coastal South Carolina. This effort consists of an inventory of existing ponds, a comprehensive literature review, gap analysis, and recommendations for outreach. Twenty-two researchers from six state institutions were involved in the project, which was funded by the State of South Carolina and National Sea Grant College Program from 2014 to 2016.

Each project team worked to ensure that any information on ponds from coastal S.C. was included in the report. When coast-specific or S.C.-specific data were lacking on a given topic, studies from other regions or states were incorporated, as appropriate.

To satisfy the informational needs of our diverse stakeholder groups, we produced a series of products to convey the information gathered by our project teams. This technical report was written for the following audiences: researchers, the stormwater management community, and local and state decision-makers. To share this report with non-technical groups, specifically individual property owners and homeowners associations (HOAs), the Consortium created a pamphlet and booklet series written for general audiences.

A goal of the Consortium is to ensure that science works for S.C.'s coastal communities. We believe that cultivating a science-based understanding of the engineered purpose and current conditions of our coastal ponds among diverse groups of stakeholders is vital for facilitating future collaborations. Ultimately, these partnerships will produce new and innovative practices to ensure effective, long-term stormwater management along our coast. Finally, our vision for this ongoing effort is to have cleaner, healthier, and more economically viable coastal ecosystems.

The topics covered in the report include:

Inventory and classification of stormwater ponds, as of 2013, in the coastal counties.

Transport of stormwater over surfaces and the function of ponds to retain runoff.

Nature of **pollutants** in stormwater and the storage ability of ponds.

Ecological function of stormwater ponds within the coastal landscape.

Policy and regulatory lens of coastal stormwater management.

Economic assessment of stormwater management.

Development of a **communications strategy** towards improved stormwater pond awareness and maintenance.

REPORT HIGHLIGHTS

Pond Landscape (Chapter 1)

Erik M. Smith[1,2], Denise M. Sanger[3,4], Andrew Tweel[3], Erin Koch[3]

NUMBER: Based on 2013 aerial imagery, there are 21,594 ponds in the coastal zone associated with either rural or development-related land uses (**Fig. ES.2**).

SIZE: The median size of all ponds is 0.47 acres, while development-related ponds are 0.54 acres. The vast majority (98 percent) of all ponds are less than 10 acres. However, because of this extreme skewness the combined area of large ponds is 32 percent of cumulative pond area.

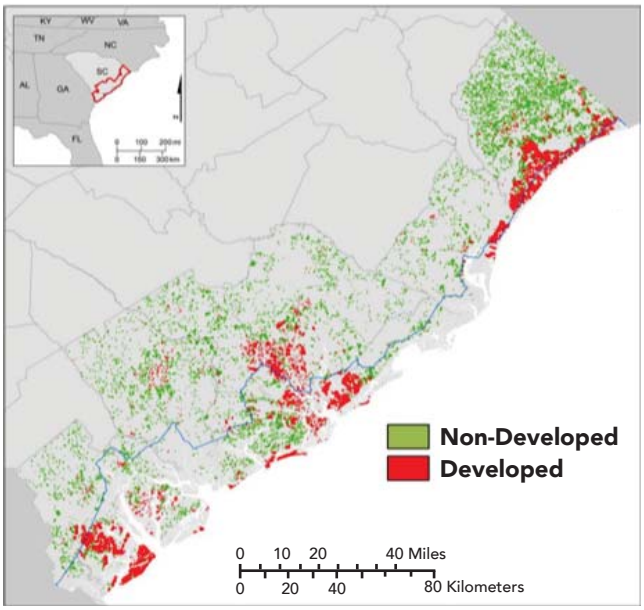

Figure ES.2 *Ponds color-coded as either non-development (green) or development-related (red) land uses. Blue line denotes the upstream limit of the DHEC-OCRM Critical Area.*

LAND-USE: Developed ponds, those associated with golf, residential, or commercial development constitute 43 percent of total ponds inventoried.

PROXIMITY: The majority of all ponds are within one mile of major downstream receiving water bodies.

DISTRIBUTION: Horry, Charleston, and Beaufort counties have the greatest number of stormwater ponds: 64 percent of total.

COVERAGE: Total area covered by ponds in the Grand Strand and Charleston County has increased by 4 percent per year (1994 to 2013); more rapidly than overall development (**Fig. ES.3**)

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3 Marine Resources Research Institute, S.C. Department of Natural Resources, Charleston, S.C.
4 ACE Basin National Estuarine Research Reserve

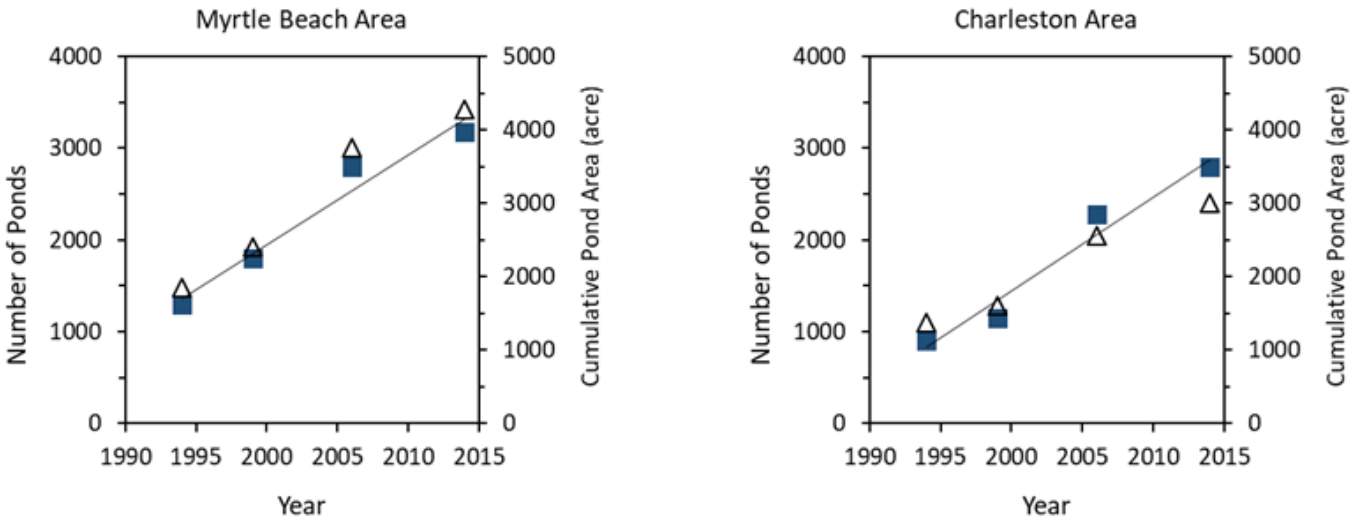

Figure ES.3 *Change over time in pond number (squares) and cumulative surface area (triangles) of development-related ponds for the greater Myrtle Beach area and the greater Charleston area.*

Transport and Fate of Contaminants in Stormwater (Chapter 2)

Vijay M. Vulava[1], Barbara A. Beckingham[1], and Timothy J. Callahan[1]

Stormwater runoff is a major problem associated with increased development. Impervious surfaces prevent rainfall from being observed naturally, causing up to a 45 percent increase in surface runoff (**Fig. ES.4**). As stormwater flows over the ground it acquires and transports pollutants. Because stormwater is not treated, what flows into storm drains later ends up in receiving waterbodies, becoming the leading cause of poor water quality.

HYDROLOGY: Water flow in coastal S.C. is strongly influenced by the flat topography, shallow water table, and especially for the Low-country region, tidal exchange.

BEST MANAGEMENT PRACTICES (BMPs): Wet detention ponds that maintain a permanent pool of water are the most common stormwater BMP in coastal S.C.

POLLUTANT REMOVAL: Chemicals and pathogens in the environment that become adsorbed or attached to particles are stored by ponds via sedimentation; pollutants may be

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removed by biological processes. According to the International BMP Database, median pollutant removal rates for wet ponds range from 17 to 96 percent, depending on the pollutant type.

PARTICLES: The physical and chemical characteristics of particles including size, density, and organic content, impact their transport and fate. For example, small particles (< 300 µm diameter) are associated with high concentrations of contaminants but are more mobile, thus less likely to settle to pond bottoms.

RESIDENCE TIME: This is the most limiting factor to water quality improvement, as the time stormwater spends in a pond controls the degree of both sedimentation and transformation of pollutants.

NEW POND DESIGNS: Building ponds with a length to width ratio of at least 3:1, ensuring a large pond surface area relative to the drainage area, and maintaining a pond depth of at least 4 to 6 feet are good design options for improving the quality of water exiting a pond.

RETROFITS: Options that increase stormwater residence time, such as the installation of sluice gates at outflows and/or the addition of a littoral shelf or forebay, can improve an existing pond's effectiveness at pollutant removal.

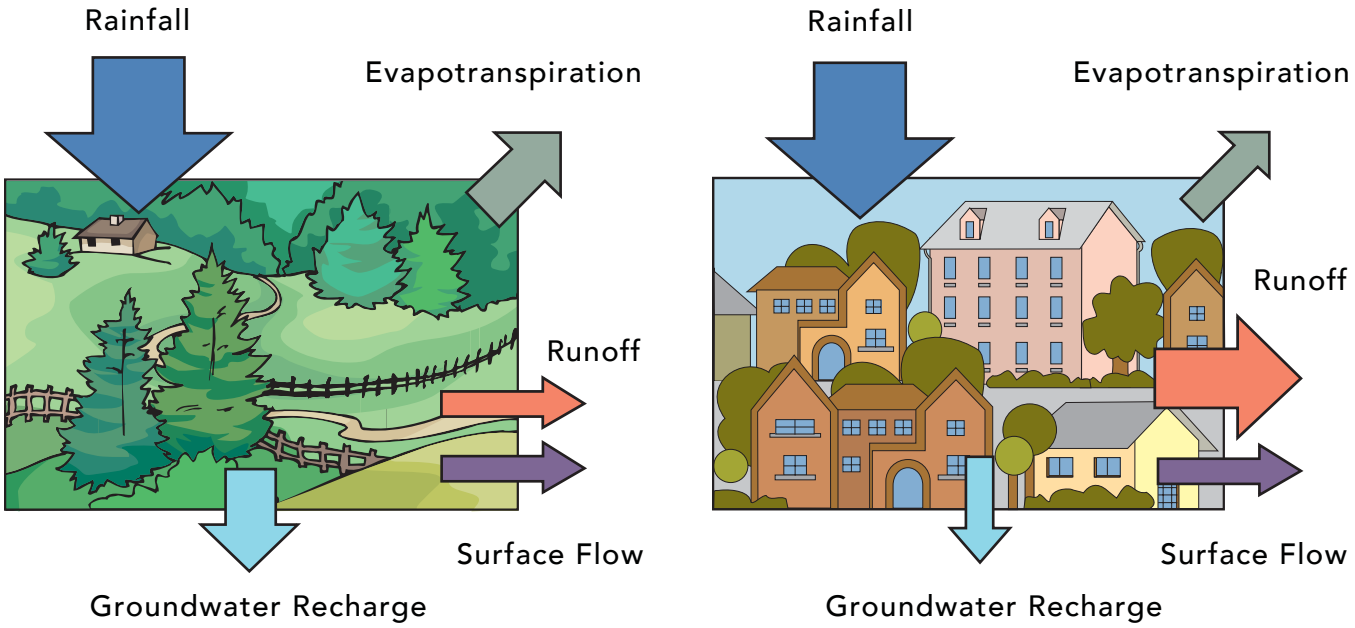

Figure ES.4 *Differences in water flows between natural (left) and developed (right) environments. Arrow width indicates the relative volume of each flow. The relative increase in runoff depends on the amount of impervious surface built.* Credit: S.C. Sea Grant Consortium, *Tidal Creek Habitats: Sentinels of Coastal Health.*

Nonpoint Source (NPS) Pollutants (Chapter 3)

Mohammed Baalousha[1], Samantha McNeal[1], and Geoffrey I. Scott[1]

Two-thirds of all pollutants impacting water quality are attributed to nonpoint source (NPS) contaminants such as metals, organics, microbes, and nutrients. These are derived from a variety of natural and anthropogenic activities, as shown in the diagram below (**Fig. ES.5**). Ponds can be highly efficient at removing pollutants, depending on pond geometry, depth, proximity to urban areas, and hydrology. However, this high pollutant loading and low water circulation can contribute to a number of water quality problems within pond basins. Due to settling of particle-bound pollutants, pond sediments can exhibit high concentrations of chemicals that could pose health risks to human, aquatic, and benthic life.

HOT SPOTS: The concentrations of a variety of pollutants, including heavy metals (especially copper, chromium, and cadmium), polycyclic aromatic hydrocarbons (PAHs) that result from combustion reactions, and microbial pollutants are elevated in coastal S.C. pond sediments as compared to estuarine sites. Mixtures of chemical contaminants in sediments may also be toxic to benthic species.

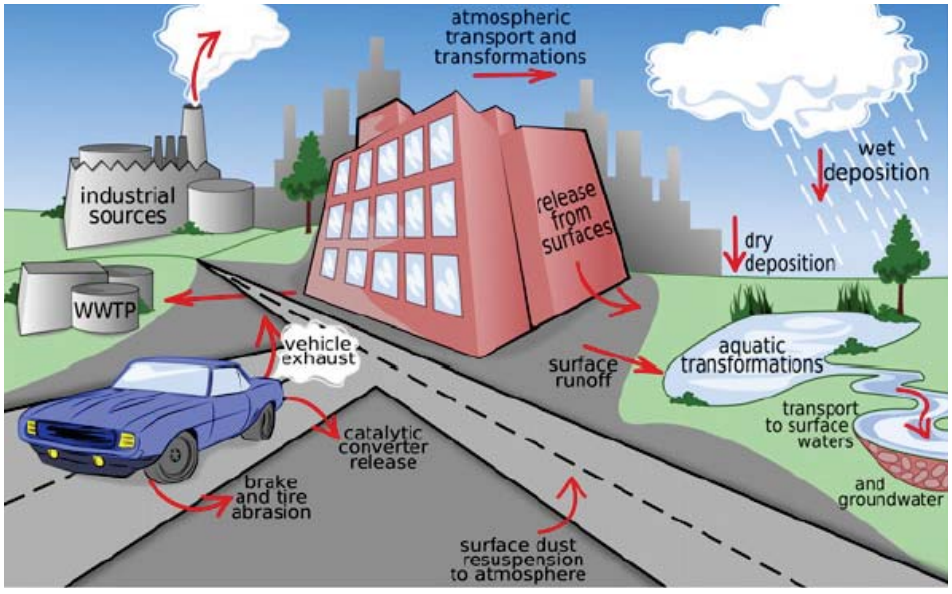

Figure ES.5 *Arrows indicate flows of nonpoint source pollutants from a variety of sources within the environment.* Credit: Baalousha et al. (2014) *Nanoscience and the Environment*, Elsevier.

CONTAMINANTS OF EMERGING CONCERN (CECs): These include pharmaceuticals, personal care products, and contemporary use pesticides (CUPs) that have the potential for negative effects on aquatic life. Nanomaterials (titanium, chromium, and iron) were found in several residential and

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golf course ponds. The CUP, chlorpyrifos, was found in 56 percent of S.C. ponds and is often associated with the herbicide atrazine, which is synergistically toxic to crustaceans.

MICROBIAL POLLUTANTS: Bacteria and viruses can be introduced to waterways via leaking septic systems, wildlife sources, and pet feces. Bacterial indicators were found to be lower in ponds than in runoff, and similar to concentrations in tidal creeks. Metals found in pond sediments have potential to induce antibiotic resistance in bacterial communities.

REMOVAL CAPABILITIES: Stormwater ponds in S.C. can substantially reduce microbial contaminants from runoff, largely via sedimentation. These removal efficiencies, or the percent of bacteria entering in runoff that is trapped by the pond, are highly variable.

POND DESIGNS FOR WATER QUALITY: Effective design options to protect downstream water quality include ensuring pond surface area is at least 5 percent of the surrounding impervious surface area, the inclusion of forebays or vegetated littoral shelves to trap sediments, and the construction of multi-pond series rather than stand-alone ponds.

Stormwater Pond Ecology (Chapter 4)

Dianne I. Greenfield[1,2], Erik M. Smith[1,3], Andrew W. Tweel[2], Denise M. Sanger [2,4], and Kimberly Sitta[5]

Stormwater ponds create unique ecosystems because they have reduced flushing capacity associated with high residence times, making them susceptible to stagnation. Furthermore, they accumulate nutrients from fertilizer runoff and are natural "incubators" for proliferation of algal blooms. Ponds may also serve as valuable permanent and/or transient habitats for a range of species. Given there are essentially no natural open-canopy ponds or lakes in the Southeast coastal plain, these habitats are a direct result of development and have become integral features throughout S.C.'s coastal landscape.

FISH KILLS: Hypoxia (low oxygen) resulting from stagnation and decaying algal blooms re-

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Figure ES.6 *A cyanobacteria bloom in a stormwater pond in coastal S.C. Some cyanobacteria can produce toxins, like microcystin, which may be toxic to aquatic life, wildlife, pets, and humans.* Credit: Dianne Greenfield

sults in about 68 percent of fish kills in ponds; harmful algal blooms (HABs) account for 27 percent.

NUTRIENTS: The relative importance of nitrogen (N) and phosphorus (P) to pond function may be more similar between fresh and saline pond systems than originally thought. Algae can be stimulated by both N and P, rather than just P as the original paradigm suggested.

HABs: Elevated N, especially organic sources like urea, stimulates growth of bloom species like cyanobacteria (**Fig ES.6**) and dinoflagellates. Organic N is used in 50 percent of fertilizers.

MICROBES: Fecal coliform and pathogenic *Vibrio* spp. can reach high concentrations in ponds; some bacteria in ponds, including those associated with pet waste, are resistant to antibiotics.

ANIMALS: Amphibians, like frogs, breed in ponds but can be disturbed by construction and are susceptible to toxins found in pond sediments. Ponds are common habitat for alligators and are often stocked with fish, including the economically-important American eel (*Anguilla rostrata*).

INVASIVE SPECIES: Ponds can host exotic species; 18 percent of coastal S.C. ponds surveyed by S.C. Department of Natural Resources were found to be infested with invasive apple snails.

CHANGE: Water temperature, salinity, connectivity, and rates of exchange are main factors regulating ponds, and the ranges of these parameters will likely change in the future. Future climate scenarios favor further algal bloom developments and increased frequency and severity of HABs.

Policy Lens of S.C. Stormwater Management (Chapter 5)

Lori A. Dickes[1], Jeffery Allen[2], Monika Jalowiecka[3], Katie Callahan[4], Bridget Cotti-Rausch[5]

Similar to many environmental issues, stormwater management operates within a network of layers of regulatory and policy oversight. The Environmental Protection Agency (EPA) defines a stormwater BMP as a "technique, measure, or structural control" that meets permitting requirements by managing the quantity and quality of runoff. In 2007, a review of 511 coastal ponds by S.C. Department of Health and Environmental Control (DHEC) found 15 percent were not in compliance with permitting requirements.

FEDERAL POLICY: Most broadly, stormwater falls under the Clean Water Act (CWA) enacted in 1972, a complex regulatory document governing water pollution control.

FEDERAL PERMITS: A key section of the CWA is the National Pollutant Discharge Elimination System (NPDES). This program requires counties and municipalities to obtain permits to monitor, reduce, and control pollutants found in stormwater.

STATE CONTROL: The federal government gives control to states to enact specific regulatory actions to meet federal permitting requirements. In S.C. this responsibility is held by the S.C. Department of Health and Environmental Control (DHEC).

MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s): The NPDES program divides permits into the following categories: regulated MS4s, construction, industrial, and general. In coastal S.C. there are currently 25 MS4-regulated communities. Developers report to the MS4 which then reports directly to DHEC; this process is the regulatory oversight for pond construction.

LOCAL OVERSIGHT: In MS4-permitted areas the county or city performs scheduled inspections on private pond systems to ensure all permitted BMPs are in compliance with the NPDES program as administered by DHEC. Though ponds are the most common BMPs, only a minority of surveyed stormwater

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5 S.C. Sea Grant Consortium, Charleston, S.C.

professionals believe them to be the best tool for managing runoff (**Fig. ES.7**).

OLDER COMMUNITIES: Communities built prior to an area becoming designated as an MS4 do not have stormwater management plans and are not inspected by the municipality. However, they are required to maintain all BMPs in a "functional condition."

COASTAL ZONE: In the coastal counties, additional regulatory requirements falling under the S.C. Coastal Zone Management Program must be met to protect our vital coastal habitats.

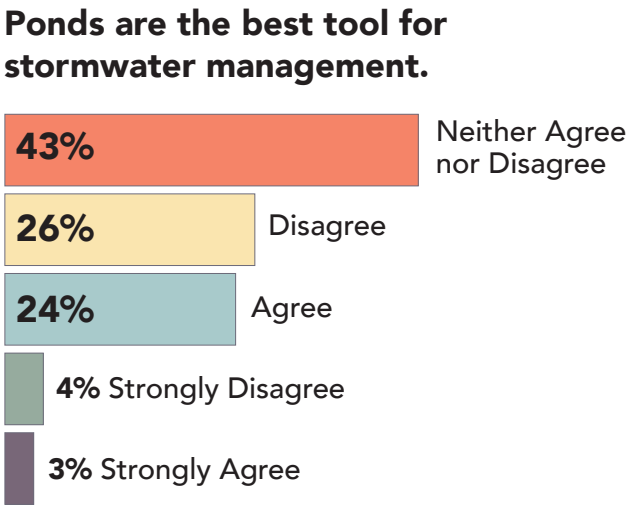

Figure ES.7 *A survey of stormwater professionals from coastal S.C. cities, towns, and counties designated as MS4s found that only 24 percent believe ponds to be the best tool for stormwater management. Additional questions from the survey suggested incorporation of low impact development (LID) practices into a stormwater management plan was seen as a favorable tool by about 60 percent of respondents.*

Economics of Stormwater Management (Chapter 6)

J. Wesley Burnett[1] and Christopher Mothorpe[1]

Like all human-developed infrastructure, ponds require maintenance and monitoring throughout their life-cycle to ensure ongoing function and environmental effectiveness. The costs of maintaining ponds often ultimately fall on local, residential homeowners associations (HOAs). However, HOAs may be unaware of their responsibilities or lack knowledge as to whether their ponds are properly serving their designed functions of flood protection and mitigating harmful runoff. Uncertainty is compounded by deficient maintenance budgets.

PUBLIC GOODS: From an economic perspective, ponds are "impure" public goods, meaning they provide both public and private benefits.

PRIVATE PROVISIONS: When public goods are privatized, there can be an under-provision of funds by property owners or HOAs so

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ponds are maintained at an inefficient level.

INCENTIVES: Some research suggests that governments can combine both credible punishments and incentives such as subsidies, grants, rebates, and installation financing to improve maintenance activities.

EDUCATION: Because the public is largely uneducated about stormwater maintenance practices and costs, economists advocate for inclusion of formal educational programs.

COSTS: Various studies from throughout the U.S. found annual maintenance costs are between 2 and 8 percent of original construction costs, depending on pond size. Operating and maintenance costs fall as pond size increases. (**Fig. ES.8**)

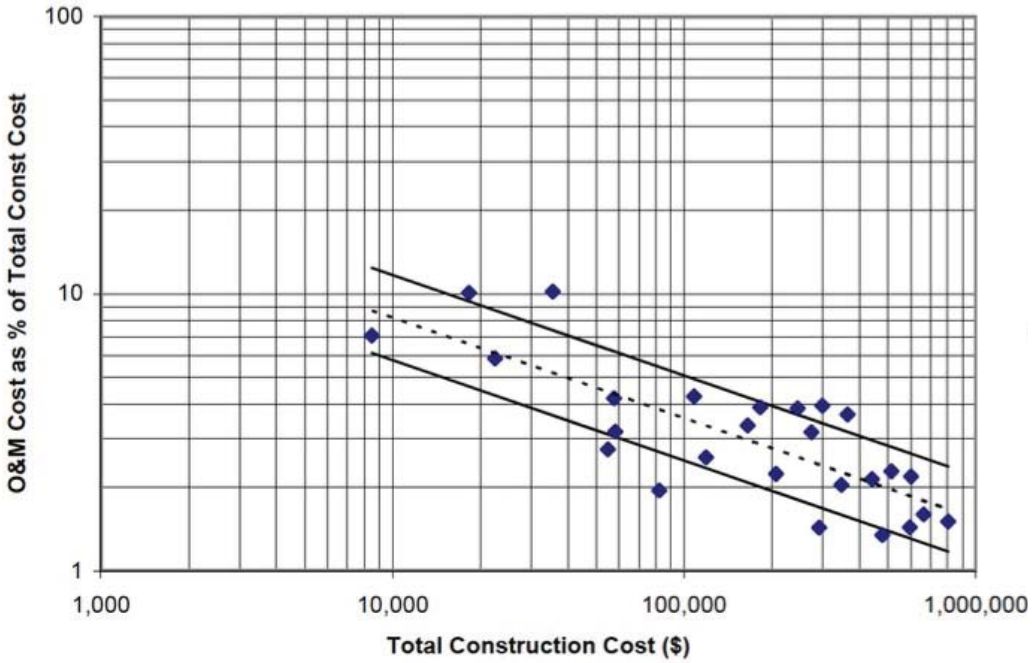
LOCAL COSTS: From a survey of 58 stormwater practitioners from S.C., we estimated the following costs:

1. Costs of new pond construction are between $17,000 and $33,000 per acre.

2. Annual maintenance costs per pond are between $230 and $760 per year.

3. Therefore, for a 0.54 acre pond (average size of urban ponds in coastal S.C.) annual maintenance is between 1 and 8 percent of the initial construction costs.

Figure ES.8 *Predicted annual life-cycle maintenance costs taken from the available scientific literature, as a function of total construction costs in 2005 U.S. dollars for ponds across the country.*



Notes: *Diamond shaped points represent empirical estimates from the literature. The dashed line represents a line of best fit through the points. The two solid lines represent the 67% confidence interval for the estimates.* Source: Weiss et al. (2005, p. 31).

Communication Strategy for Improved Pond Awareness (Chapter 7)

Katie A. Callahan[1], Amy E. Scaroni[2], C. Guinn Wallover[2], Melinda Weathers[3], Alex Neal[4]

The success of stormwater ponds as BMPs to manage runoff, protect downstream water quality, and comply with regulations relies on several factors: recognition of ownership; awareness of the pond's purpose; knowledge of pond function and maintenance needs; and responsible care of surrounding landscapes. These elements must factor into outreach messaging if it is to resonate with target audiences (**Fig. ES.9**) and ultimately protect S.C.'s vital coastal water resources.

SELF-EFFICACY: Is a major factor in addressing pond awareness, understanding, and function. HOAs want to have comprehensive instructions on pond maintenance to share with their residents.

OVERSIGHT: City and county staff in engineering, stormwater, and overall public works departments share common concerns mostly related to practices such as keeping infrastructure and conveyances clear of debris, managing erosion, and preventing flow obstructions from vegetation and sediment build-up.

BARRIERS: There are both real and perceived barriers to education and outreach. For example, attempts to implement widespread use of vegetated buffers are resisted primarily due to misconceptions about cost, function, and HOA covenants restricting planting on shorelines.

POSITIVITY: In visual campaigns, positive images of healthy ponds are more likely to capture the attention of coastal S.C. homeowners rather than those depicting algal blooms, stagnation, or other unsightly pond conditions.

CONNECTIVITY: Outreach messages addressing pond health should be specific, instructive, and connect all community residents' actions to the performance of the pond(s).

CITIZEN VOICES: The greatest concerns voiced by residents were related to the health of people, pets, wildlife, and the overall ecosystem that is connected to a pond.

1 Center for Watershed Excellence, Clemson University, Clemson, S.C.
2 Clemson Extension Service, Charleston, S.C.
3 Department of Communication Studies, Sam Houston State University, Huntsville, TX
4 College of Communication, North Greenville University, Tigerville, S.C.

Stormwater Pond Audiences and Perceptions

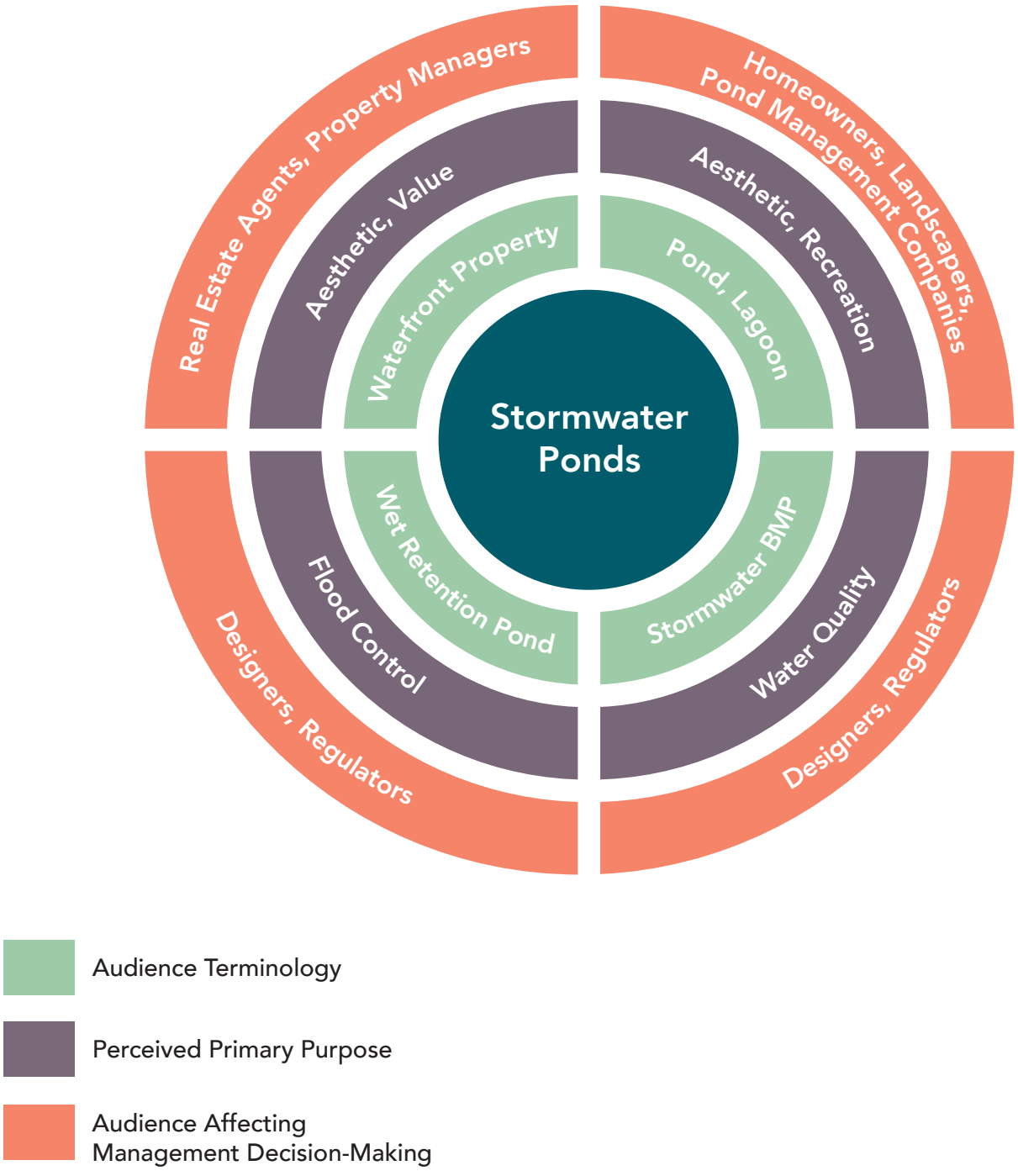


Figure ES.9 *Multiple audiences and perceptions affect stormwater pond management and messaging.*

CONCLUSION

The S.C. Stormwater Ponds Research and Management Collaborative seeks to ecologically characterize coastal stormwater ponds, understand their functionality and durability, and ultimately develop new and possibly innovative engineering and construction practices. The goal is to ensure that stormwater ponds, both existing and newly constructed, will function without concerns about possible ecological impacts or economic costs associated with their management and maintenance under current and future weather and climate patterns. While prevalent, very little information exists about their effectiveness, long-term functionality, and potential impacts on the adjoining ecosystem. A quantitative assessment of what hydrologic and water quality services ponds provide, and which management practices may maximize these services, is therefore essential to assist coastal communities in better managing their stormwater to preserve vital water quality and aquatic resources.

Faculty and students from many of the Consortium's member institutions and its own staff are participating in the Collaborative. Bringing together water quality specialists, engineers and ecologists, hydrologists and coastal processes specialists, biologists, public health and marine biomedical professionals, and economists and social scientists will enable us to holistically address these issues. And the results of this state-of-knowledge examination will provide a firm foundation for a large-scale research and development effort which will have economic, environmental, and public health benefits for the state and the Southeast region as it addresses the challenges of continued development, ecosystem and public health, and changes in climate and weather.

SCSGC-T-18-07

Total Printing Cost: $1292
Total Number Printed: 200
Cost Per Unit: $6.46

Sea Grant | S.C. SEA GRANT CONSORTIUM
Coastal Science Serving South Carolina

Stormwater Utility Board Meeting
Hilton Head Island
Monthly Report for January 2019

Reporting Period: December 1, 2018 to January 31, 2019 (2 Months)

1. MS4 Update (EBER)

MCM1 Public Education & Outreach	• Drafting update to stormwater page on Town's website
MCM2 Public Involvement & Participation	• Prep underway for meeting w/ Sea Pines and HH Preparatory School on outreach activity (classroom lecture / inlet marking)
MCM3 Illicit Discharge Detection & Elimination	3 Complaints received via Code Enforcement 3 Investigated 2 Eliminated or resolved
MCM4 Construction Site SW Runoff Control	5 Plan reviews w/ corrections required 23 Plan reviews approved 0 New LD Permit issued 11 Active permitted construction sites 22 Inspections completed 1 NOV issued
MCM5 Post-Construction SW Management	• No LDP permitted construction completed as of Jan 31, 2018. • Testing procedures for tracking and inspecting using Cartegraph when system is implemented
MCM6 Pollution Prevention/Good Housekeeping	• CD PP/GH presentation completed in December • Planning 2019 –PP/GH Training

2. Service Requests (COOK)

	Total Open as of 11/30/18	Received in Dec/Jan	Closed in Dec/Jan	Total Open as of 1/31/19
Qualifying	175	14 *	5	184
Referrals	26	5	7	24
Enforcement	2	2	0	4
Non-qualifying		2	2	
Under Evaluation	4	8 *		12
Totals	**207**	**31 ***	**14**	**224**

* Year-end requests received from PUDs with maintenance agreements (due by Dec 31).

3. Capital Improvements Update (NETZINGER)

A. Jarvis Creek Pump Station

Planning continues for major improvements including raising elevation of emergency power cutoff switch boxes, upgrades to electrical distribution, transfer switches and control systems, various safety improvements, and installation of mechanical debris screens to improve operational efficiency. Project is in conceptual design phase. Anticipate receipt of consultant's report, including cost estimates, scheduling, and recommendations in early February.

B. Sea Pines Pump Station

Reengineering pump wall-mount system. Project is in conceptual design phase. No change is status this month.

C. Wexford Pump Station

Mitigation project to raise and reinforce upstream channel levee to repair damage caused by Hurricane's Matthew and Irma. Project is in preliminary design phase. Topographic field survey to begin on February 11 with design & permitting to follow in February/March.

D. Wren Pond Emergency Spillway

Installation of an emergency spillway to protect pond embankment during extreme rainfall and tide surge events. Project is in final design phase. Construction scheduled for March.

E. Main Street Weir Safety & Operational Improvements

Installation of deck grating and handrails to improve safety and installation of hardware to improve weir operations. Design completed in January. Price negotiations underway with on-call contractor.

4. Maintenance, Repair & Rehabilitation Projects (UYESUGI / LADD)

A. Completed in December/January ($127,160)

- Sol Blatt Pkwy – pathway flumes: outfall capacity restoration - $5,000
- Yacht Cove lagoon – sediment removal - $7,600
- 11 Spotted Sandpiper – pipe & structure replacement - $15,300
- 79 Fort Walker Drive – channel maintenance (sediment removal) - $9,000
- Leamington – sinkhole repairs at 3 locations - $5,4009
- Harbourside Lane – Sinkhole Repair - $5,000
- Palmetto Hall - Weir Maintenance adjacent to pump station - $2,620
- Mathews Drive – Pathway erosion mitigation- $8,000
- 11 Iron Clad – Sinkhole Repair - $7,000
- Channel Maintenance, workshelf/vegetation – Oakview Channel, Jarvis Creek Channel, Palmetto Headlands, Gum Tree Channel, Wexford/RV Resort Channel, Arrow Road Channel - $45,250
- 71 Wexford Club Drive – System Cleaning - $5,040
- Trench Drain Cleaning – Folly Field Park & Gumtree - $1,570

- TVSS Replacement at Jarvis Creek Pump Station - $3,080
- 11 Flotilla – Pipe replacement - $7,300

B. Underway as of January 31 ($113,380)

- Jarvis Creek Pump Station – Electrical System Repairs - $16,500
- Jarvis Creek Excavation (Nature's Way to Jarvis Outfall at Cross Island Pkwy. - $96,880

C. Planned for February/March/April ($540,730)

- Main Street Weir Upgrades - $79,500
- Jarvis Lake Flap Gates – Inspection & Repair - $7,200
- Jarvis Creek – Transfer Switch #1 Inspection - $4,030
- Pump Maintenance at Jarvis Creek - $13,000
- Channel Excavation at Sunningdale Lane, Indigo Run - $8,000
- Channel Maintenance, workshelf/vegetation – Old Woodlands, Folly Field Fiddlers Cove Outfall, Ashmore Channel, - $35,000
- 12 Canvas Back Road – pipe installation - $20,000
- 37 Deerfield Road – survey & drainage system improvements - $25,000
- 271 Seabrook Drive – CCTV - $8,000
- 1 Jingle Shell Lane – CCTV & Clean - $5,000
- 9 Bobcat Lane – CCTV & Clean - $5,000
- 20 Ocean Lane – CCTV & Clean/ CIPP - $15,000
- Lighthouse Lane/ Mizzenmast Lane – CCTV & Clean - $15,000
- Long Cove Club – 2 locations – CCTV & Clean - $5,000
- 82 Myrtle Bank Road – CCTV & clean - $10,000
- Ruddy Turnstone – CCTV and Pipe Repair - $80,000
- 12 Valencia Road- Joint Repair - $30,000
- Old Fort Drive – Outfall Stabilization - $150,000
- 14 South Beach Lane – Pipe replacement - $7,000
- 4 Sara Court – Sinkhole - $5,000
- Wexford RV Park/ Powerline Channel – Pipe/Ditch Cleaning - $8,000
- S. Sea Pines Drive at 1 South Beach Lane – Sinkhole Repair - $6,000

5. Master Planning & Modeling Program (COOK)

A. Palmetto Hall/Mitchelville Inventory & Modeling Project

Town held a public meeting on January 28th to allow citizens that live in the Port Royal Sound Watershed to voice their drainage concerns and to learn about the modeling project and the modeling program objectives for the Island as whole. Inventory field work will commence on Monday, February 4.

B. Flood Plain Map Development (HHP, PRP and Point Comfort)

Town is drafting an RFQ for advertisement. Project will develop inundation maps for various design storms for several watersheds where inventory and modeling tasks have previously been completed. No change is status this month.

C. Gum Tree/Squire Pope/Stoney Inventory & Modeling Project
FY19 budgeted project planned for advertisement in Q4. No change is status this month.

D. Indigo Run/Gardner/Jonesville Inventory & Modeling Project
FY19 budgeted project planned for advertisement in Q4. No change is status this month.

6. Other Activities / Items of Interest (NETZINGER)

- Standardization of PUD Maintenance Agreements
    - Draft boilerplate document shared with Town Council Finance and Administrative Committee and discussed during December 18th meeting. Process by which other (smaller) POAs can apply for service was also presented and discussed.
    - Meeting with PUDs to present and discuss the draft document was held on January 23rd
    - Revised schedule for implementing the standardization was issued to the PUDs on Feb 1.

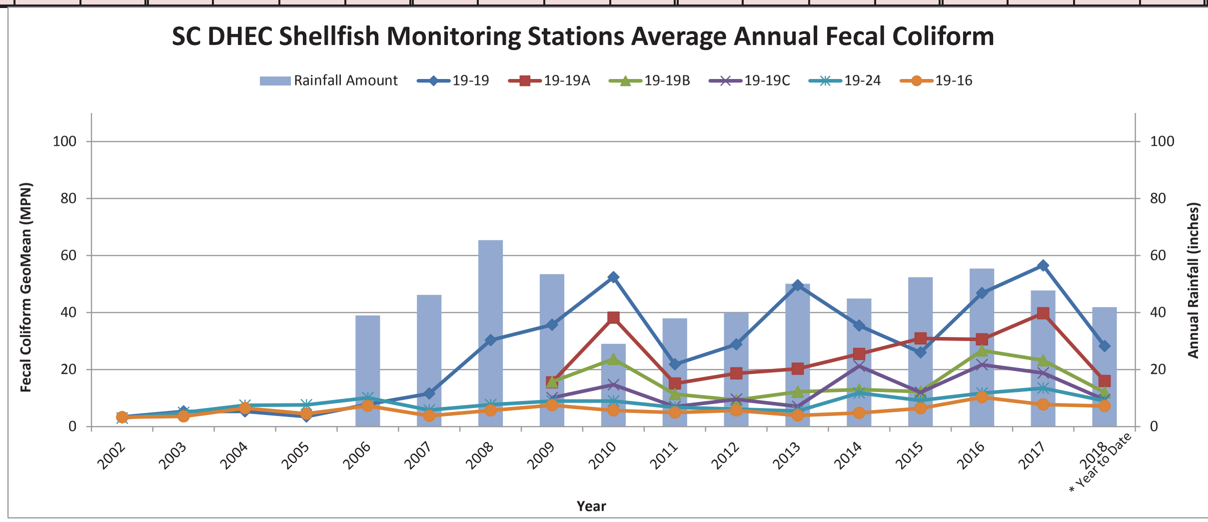
- Staffing: Storm Water Inspector
    - Position is currently vacant
    - Advertised in January / Closes on February 5th.

	19-19				19-19A				19-19B				19-19C				19-24				19-16			
	2015	2016	2017	2018	2015	2016	2017	2018	2015	2016	2017	2018	2015	2016	2017	2018	2015	2016	2017	2018	2015	2016	2017	2018
	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)	Fecal Coliform (MPN)
December	110.0	79.0	1600.0		33.0	23.0	920.0		27.0	49.0	540.0		7.8	33.0	240.0		6.8	7.8	220.0		4.5	23.0	49.0	
November	NS	33.0	49.0	49.0	NS	13.0	33.0	13.0	NS	7.8	7.8	23.0	NS	14.0	31.0	17.0	NS	13.0	2.0	17.0	NS	33.0	2.0	7.8
October	23.0	NS	22.0	79.0	49.0	NS	49.0	23.0	4.5	NS	33.0	7.8	23.0	NS	23.0	7.8	7.8	NS	6.8	7.8	4.5	NS	2.0	2.0
September	46.0	23.0	17.0	49.0	17.0	110.0	7.8	23.0	9.3	23.0	11.0	13.0	17.0	13.0	4.5	17.0	23.0	4.5	2.0	17.0	4.5	7.8	1.8	17.0
August	6.8	NS	79.0	70.0	17.0	NS	70.0	23.0	13.0	NS	21.0	13.0	13.0	NS	33.0	4.5	24.0	NS	33.0	7.8	4.0	NS	33.0	17.0
July	17.0	79.0	350.0	23.0	7.8	17.0	110.0	33.0	6.8	22.0	130.0	11.0	11.0	17.0	49.0	7.8	2.0	49.0	49.0	13.0	4.5	13.0	22.0	4.5
June	33.0	79.0	23.0	11.0	46.0	130.0	49.0	23.0	11.0	70.0	13.0	23.0	14.0	110.0	17.0	7.8	4.5	33.0	7.8	4.5	11.0	23.0	4.5	1.8
May	NS	70.0	17.0	17.0	NS	23.0	23.0	33.0	NS	49.0	7.8	17.0	6.8	49.0	2.0	13.0	6.8	14.0	23.0	23.0	23.0	17.0	4.5	13.0
April	1.8	23.0	7.8	33.0	33.0	23.0	23.0	13.0	17.0	13.0	4.5	17.0	17.0	13.0	7.8	17.0	13.0	7.8	13.0	49.0	17.0	1.8	4.5	17.0
March	170.0	33.0	350.0	22.0	130.0	33.0	11.0	21.0	49.0	33.0	33.0	4.5	17.0	17.0	13.0	11.0	13.0	11.0	13.0	7.8	6.8	7.8	33.0	9.3
February	13.0	23.0	13.0	17.0	14.0	17.0	7.8	7.8	1.8	13.0	13.0	17.0	1.8	11.0	9.3	17.0	7.8	6.8	4.5	2.0	2.0	1.8	1.8	7.8
January	79.0	110.0	95.0	13.0	79.0	33.0	79.0	2.0	49.0	49.0	31.0	4.5	33.0	17.0	49.0	2.0	17.0	7.8	27.0	1.8	7.8	17.0	33.0	4.5
Additional Samples																								
Additional Samples																								
Average Annual GeoMean	26.0	46.8	56.5	28.3	30.9	30.6	39.8	15.9	12.3	26.7	23.3	12.0	12.0	21.7	18.8	9.4	9.2	11.7	13.5	9.0	6.4	10.3	7.7	7.2
** Truncated GeoMetric Mean	37.0	37.0	44.0	41.0	21.0	30.0	36.0	28.0	11.0	16.0	20.0	20.0	11.0	16.0	16.0	15.0	7.0	9.0	10.0	10.0	4.0	6.0	7.0	7.0
** Truncated 90th Percentile	205.0	105.0	203.0	175.0	95.0	89.0	133.0	115.0	51.0	69.0	83.0	71.0	55.0	65.0	57.0	54.0	30.0	29.0	37.0	43.0	13.0	21.0	29.0	29.0

NS = No Sample

AS = Additional Samples

** Town staff calculations utilizing DHEC statistics

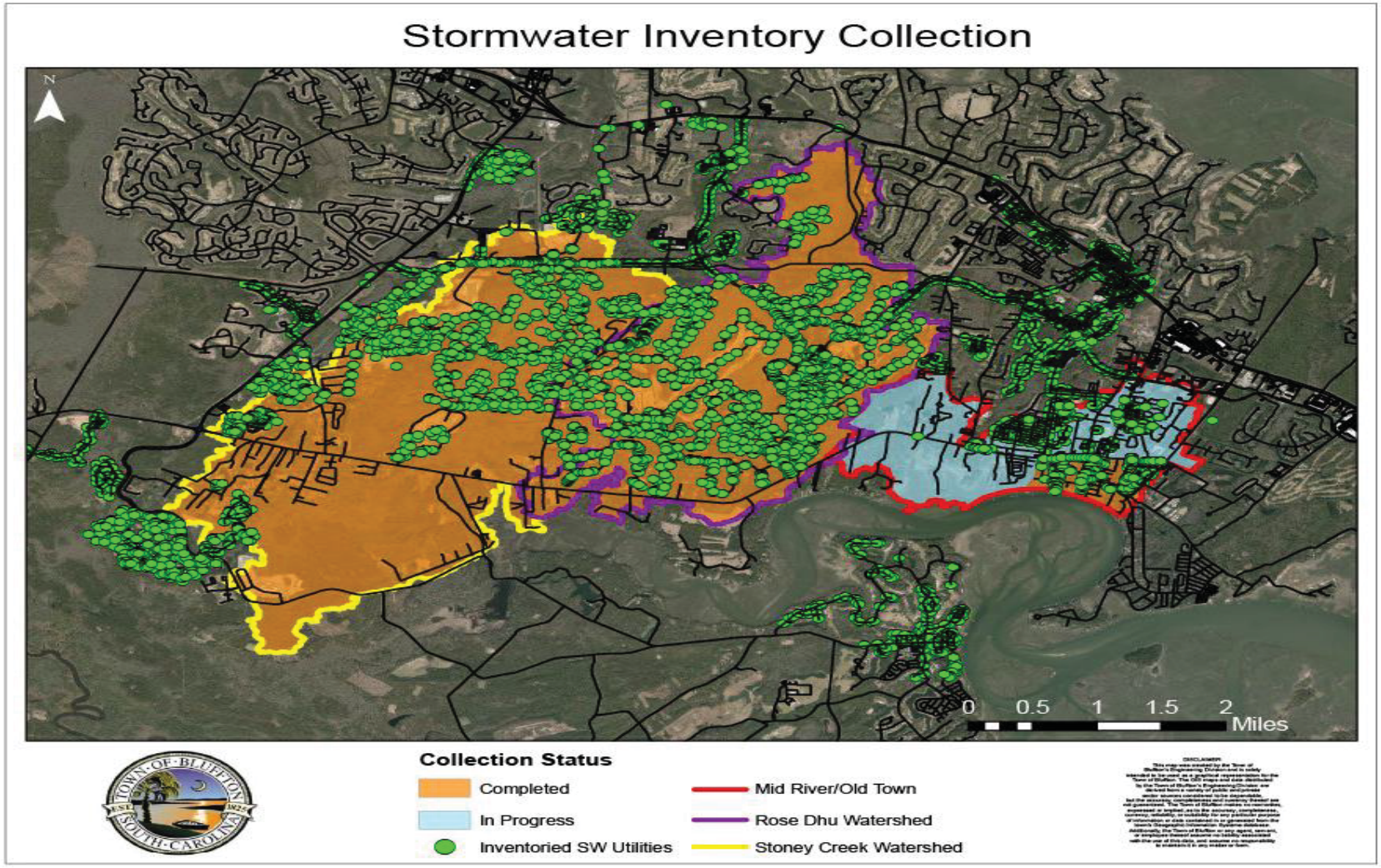


ACTIVITY - POLICY	STATUS
May River Watershed Action Plan Update	To be completed with direction and input from Water Quality Technical Advisory Committee, May River Watershed Advisory Committee, and Town Council, public and staff. Action Plan Update is a FY19-20 priority of WAPAC and Council. WAPAC scope direction provided 2/22/18 to include watershed health indicators of bacteria, biotic & abiotic parameters and social/cultural/economic indicators. Staff met with SCDHEC to confirm hybrid 5R and traditional watershed-based plan approach will be accepted. To be initiated at start of FY19 with anticipated completion in mid-FY20. **Based on initial quotes, staff has released a separate Request for Qualifications to complete MRWAP Water Quality Model, current project assessment, and proposed new projects.**
Sewer Connection & Extension Policy	*Completed 2018.* Council adopted the Sewer Connection & Extension Policy on 9/26/17. WAPAC proposed prioritization phases for sewer extension in Historic District for FY 19-23 and recommended revisions to Sewer Connection Ordinance on 2/22/18. Staff has initiated septic system maintenance education via outreach and with Lowcountry Stormwater Partners. Town Council considered WAPAC recommended amendments to Sewer Connection Program on 4/10/18. Will consider for 2nd & Final Reading upon Septic to Sewer Conversion Program establishment. Town Council Workshop of Septic to Sewer Conversion Program on 7/17/18. Ordinance and Program adoption completed 9/20/18.
ACTIVITY - PROJECTS	**STATUS**
Sanitary Sewer Extension	Buck Island/Simmonsville Road (BIS) Phases I, II, III and IV are completed. Toy Fields and Jason/Able are completed. Six phases of sewer extension are proposed in the 5-year Capital Improvement Program. Current project updates are included in Engineering Consent Agenda under "Sewer & Water." **Current project updates are included in Engineering Consent Agenda.**
May River 319 Grant Phase 1 - New Riverside Pond (Grant award of $483,500 in 2009)	*Completed in 2013.* Per water quality tests, a statistically significant reduction in fecal coliform bacteria concentration exists pre-pond versus post-pond. However, bacteria levels re-load prior to discharging into the May River, leading to additional BMP installation of Filtrexx proprietary filter socks. Installed 12/12/17 to maintain bacteria reduction. Downstream failing septic system was located by Staff and reported to County & SCDHEC for remediation.
May River 319 Grant Phase 2 - Pine Ridge (Grant award of $290,000 in 2011)	*Completed in 2016.* In post-construction monitoring phase to assess project efficacy.
May River 319 Grant Phase 3 - Town Hall Parking Retrofit (Grant award of $231,350 in 2016)	EPA & DHEC permitted a workplan amendment for this grant award to include stormwater retrofits at Town Hall. **Current project updates are included in Engineering Consent Agenda.**
Stoney Creek Wetlands Restoration: Preliminary Design Phase	Wetlands restoration project with the goal to reduce stormwater volume reaching the May River. Conceptual design completed and approved by property owners. **Current project updates are included in Engineering Consent Agenda.**
May River Watershed Water Quality Model	2002 Palmetto Bluff Duck Pond Drainage area watershed model complete. Completed New Riverside BMP model for comparison to field observations. Rose Dhu Creek sub-watershed "Existing Conditions" portion of the Headwaters Water Quality Model initiated. **Based on quotes to complete the water quality model as part of Action Plan Update from ATM, McCormick Taylor, and JMT, a separate RFQ will be released.**

ACTIVITY - FINANCIAL	STATUS
Additional Funding Opportunities	Exploring partnership opportunities with BJWSA for future sewer phases. WAPAC FY19-20 priority to assess Stormwater Utility Fee. SWU Fee Rate Model Update has commenced with Raftelis. Rate model is completed for use to project SWU fees.
ACTIVITY - PROGRAMS	**STATUS**
Public Outreach/Participation/Involvement (MS4 Minimum Control Measure #1 & 2)	Outreach and involvement efforts continue through county-wide partnership with Carolina Clear as Lowcountry Stormwater Partners - Neighbors for Clean Water, through local cleanups, civic group presentations, and the May River Watershed Action Plan Advisory Committee. **Current updates are included in Engineering Consent Agenda and Attachment 3.**
Infrastructure Mapping/GIS (MS4 Minimum Control Measure #3)	Data points continue to be collected with new development to meet MS4 requirements & populate water quality model. **Current updates are included in Engineering Consent Agenda Attachment 4a.**
Water Quality Monitoring Program (MS4 Minimum Control Measure #3)	1. SCDHEC Shellfish monitoring results 2. Fecal coliform bacteria "hot spot" concentrations 3. Microbial Source Tracking of human sources of bacteria 4. Illicit Discharge investigation and monitoring 5. BMP efficacy monitoring 6. MS4 monitoring **Current updates are included in Engineering Consent Agenda Attachments 1, 4b, 4c, and 4d.**
Construction Site Stormwater Runoff Control Program (MS4 Minimum Control Measure #4)	Sediment and erosion control inspections with escalating enforcement response. **Current updates are included in Engineering Consent Agenda Attachment 5.**
Stormwater Plan Review & Related Activity Program (MS4 Minimum Control Measure #5)	SCDHEC delegated plan review-related activities. **Current updates are included in Engineering Consent Agenda Attachment 6.**
Ditch Inspection/Maintenance Program (MS4 Minimum Control Measure #6)	Continued coordination with SCDOT, Beaufort County and Town Public Works to inspect and maintain ditches within the Town's jurisdiction. **Current updates are included in Engineering Consent Agenda Attachment 7 and under "Public Works."**
Septic System Maintenance Program	FY18 funding is $10,000 and administered by Growth Management via the Neighborhood Assistance Program (NAP). On-going assistance offered to Town residents regardless of financial status through Neighborhood Assistance Program. **Current updates, as reported by NAP, are included in Engineering Consent Agenda Attachment 9.**
Sewer Connection Program	*Completed 2018.* In FY18 Council allocated $200,000 for a Sewer Connection Program as well as $10,000 for assistance to connect income-qualified individuals to existing sanitary sewer as part of the Neighborhood Assitance Program. Council adopted the Sewer Connection & Extension Policy at 9/26/17 meeting. CIP projects were prioritized as part of FY19 Budgeting Process. Sewer Connection Ordinance 1st Reading 4/10/18. Septic to Sewer Conversion Program discussed at Council's Quarterly Workshop on 7/17/18. Second & final Ordinance changes and Program adoption completed at 9/20/18.

ATTACHMENT 4a

MS4 Minimum Control Measure #3 – IDDE (Illicit Discharge Detection & Elimination): Stormwater Infrastructure Inventory

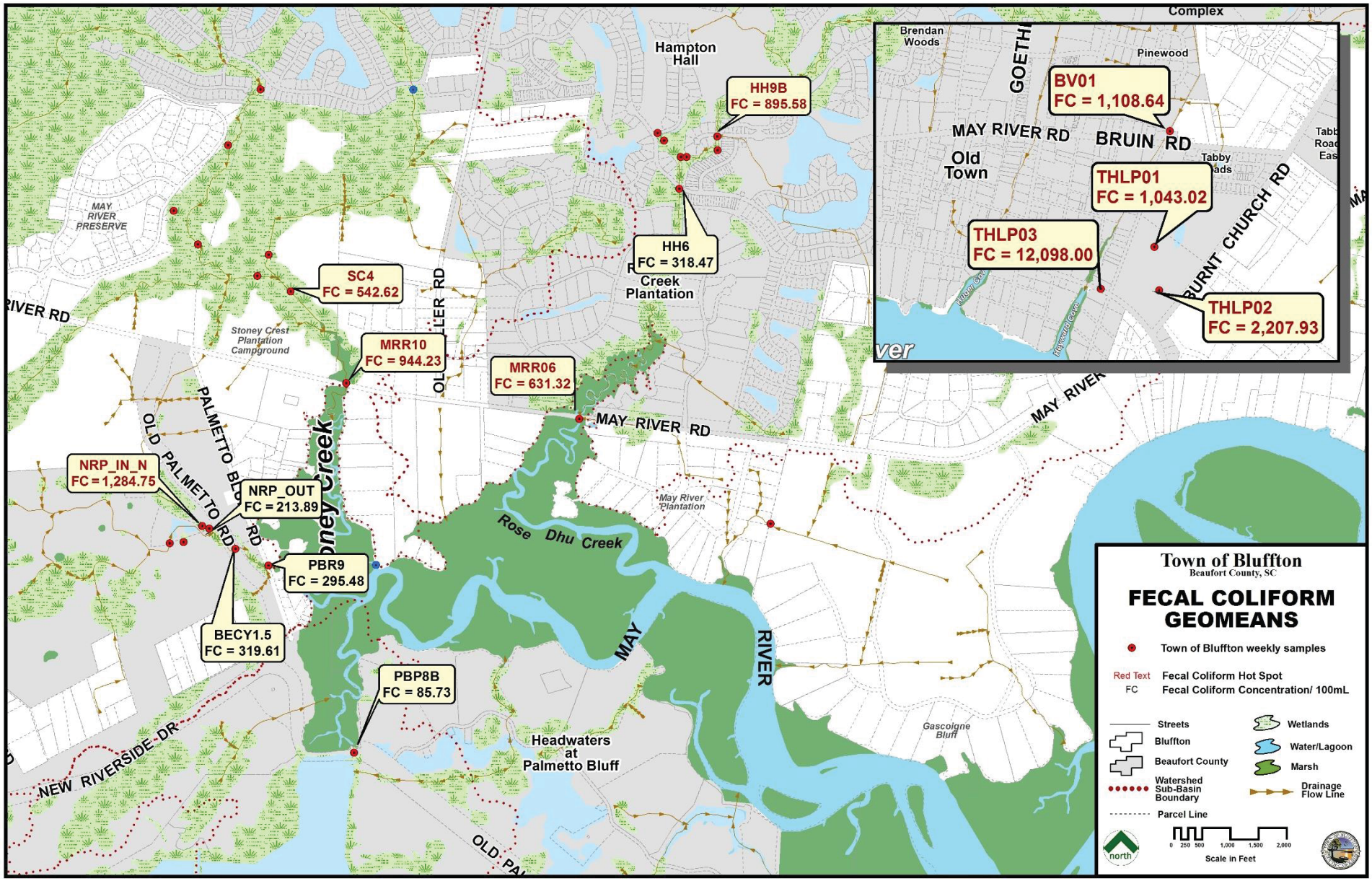


Stormwater Infrastructure Inventory Collection Status

FY 2019 YTD Collection Totals	2,375
FY 2018 Collection Totals	3,777
FY 2017 Collection Totals	3,874

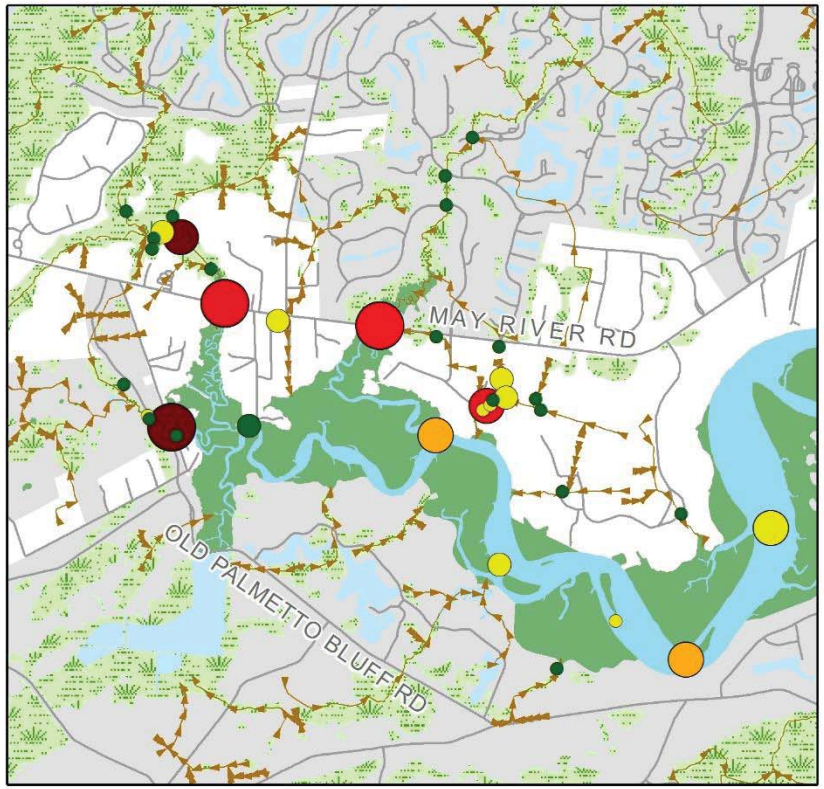
ATTACHMENT 4b

MS4 Minimum Control Measure #3 – IDDE: Fecal Coliform Concentrations Trend Map

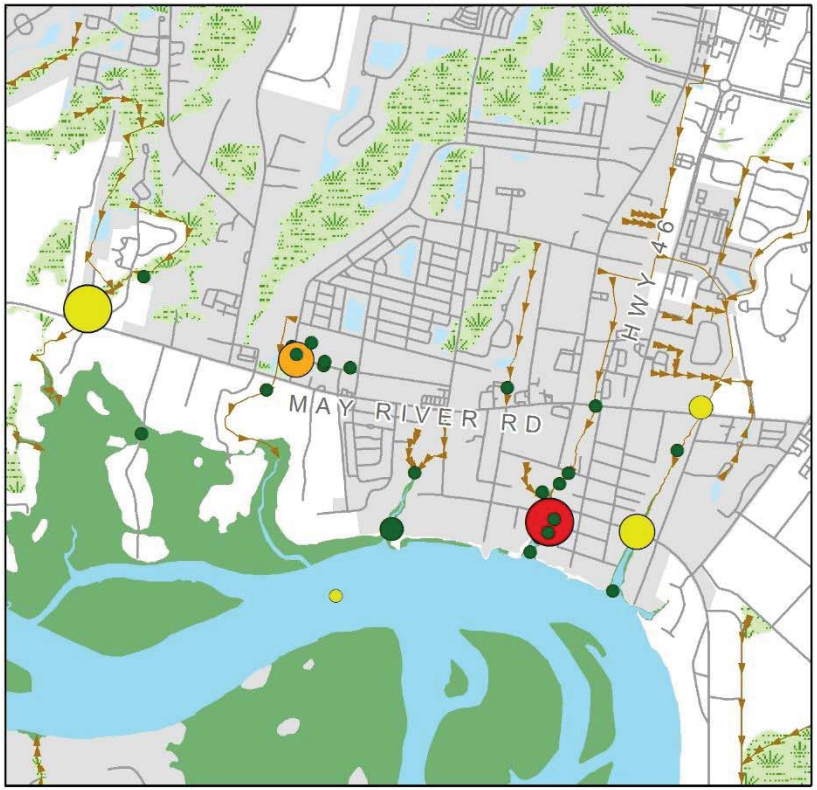


ATTACHMENT 4c

MS4 Minimum Control Measure #3 – IDDE: Microbial Source Tracking (MST) Trend Map



Microbial Source Tracking Trend Map
Headwaters May River



Microbial Source Tracking Trend Map
Old Town May River

MSTSamplingSites

Positive Hits: 0 1 2 3 >5

Times Sampled: 1 - 3 4 - 6 7 - 10 >10

Size of dot correlaes to # of times the site has been sampled.

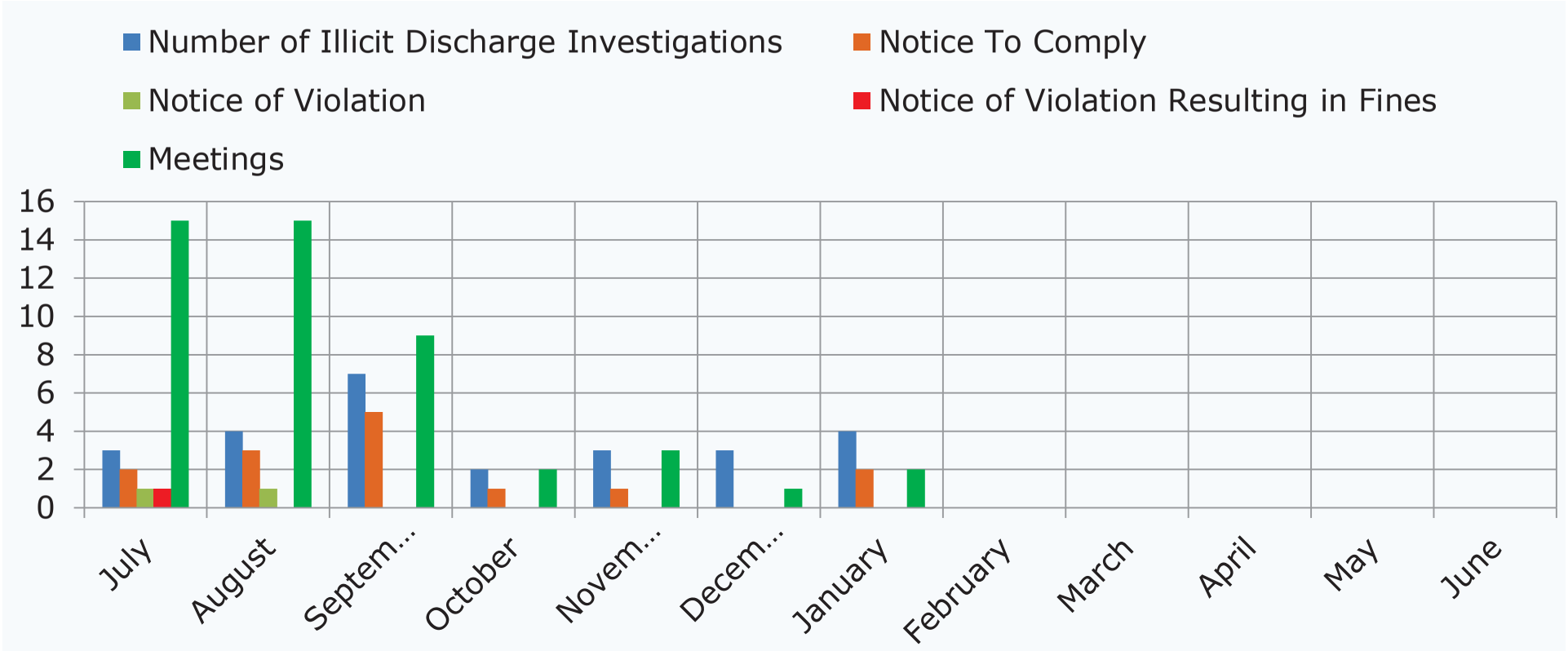
Drainage Flow Lines

Updated: 12/17/2018

north

ATTACHMENT 4d

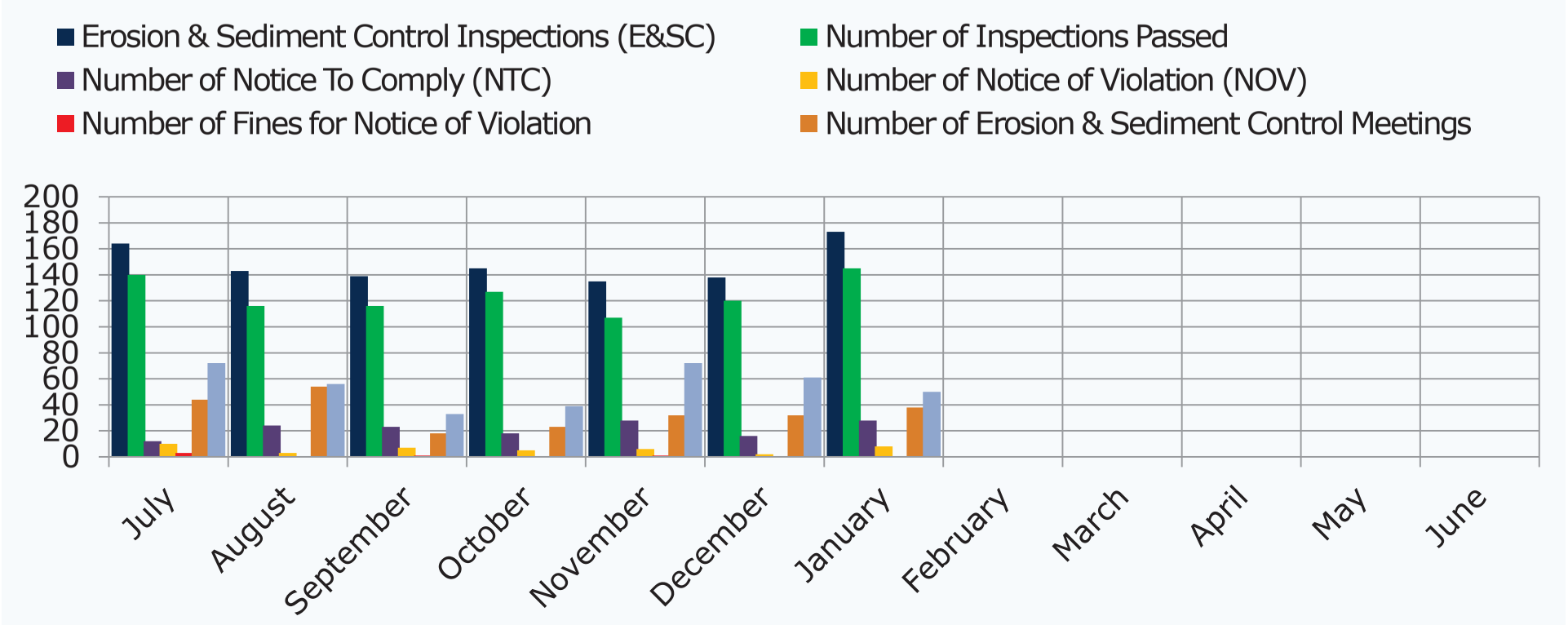
MS4 Minimum Control Measure #3 – IDDE: Illicit Discharge Investigations



	Number of Illicit Discharge Investigations	Number of Notices To Comply Issued	Number of Notices of Violation Issued	Number of NOV Enforcement Actions	Number of Meetings
FY 2019 YTD Totals	24	14	2	1	47
FY 2018 Totals	48	20	4	2	60
FY 2017 Totals	50	19	8	13	67

ATTACHMENT 5

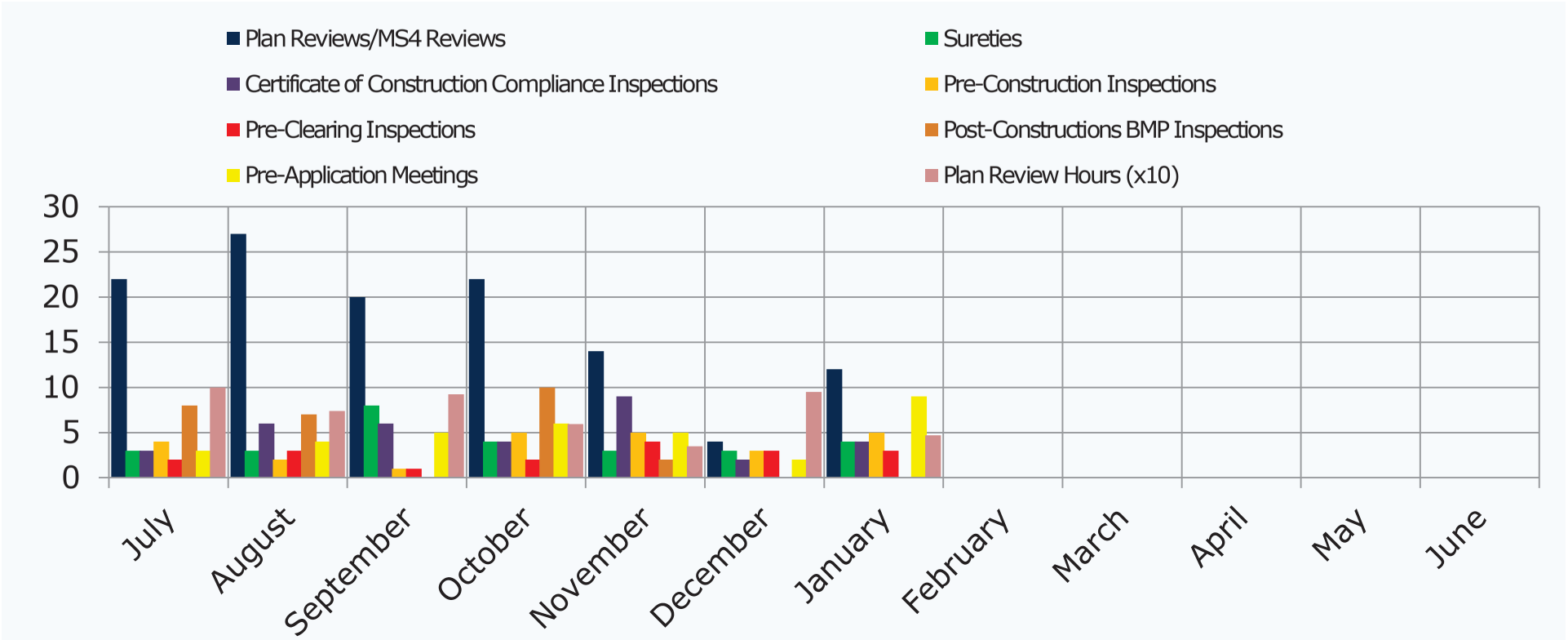
MS4 Minimum Control Measure #4 - Construction Site Stormwater Runoff Control



	Number of Sediment & Erosion Control Inspections	Number of Inspections Passed	Number of NTC Issued	Number of NOVs Issued	Number of NOV Enforcement Actions	Number of E&SC Meetings
FY 2019 YTD Totals	864	726	121	33	5	203
FY 2018 Totals	1504	1159	300	83	10	499
FY 2017 Totals	1,219	862	233	58	10	237

ATTACHMENT 6

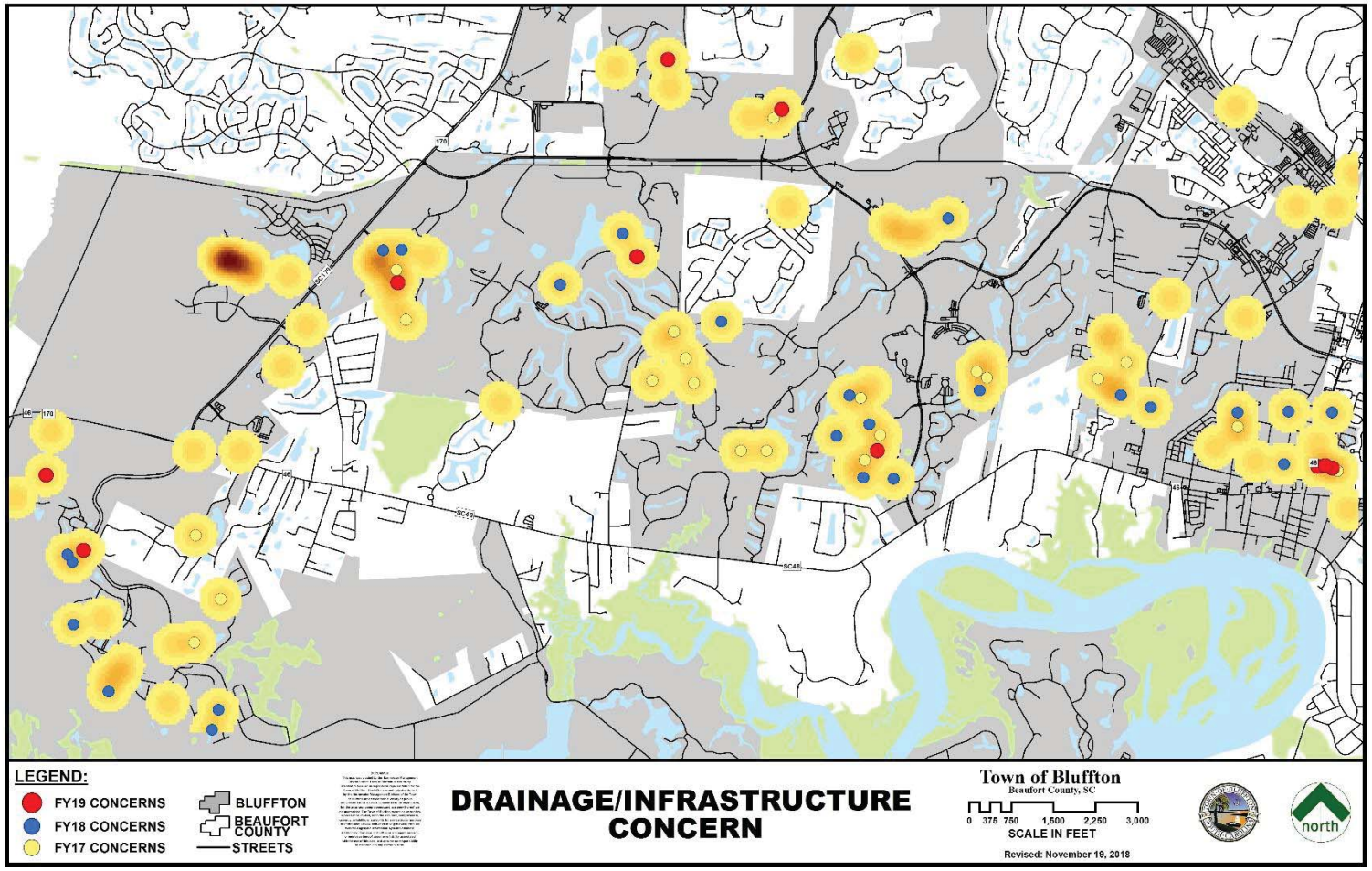
MS4 Minimum Control Measure #5
Stormwater Plan Review & Related Activity



	Plan Reviews MS4 Reviews	Sureties	Certificate of Construction Compliance Inspections	Pre-Construction Meetings	Pre-Clearing Inspections	Post Construction BMP Inspections	Pre-Application Meetings	Total Plan Review Hours
FY 2019 YTD Totals	121	28	34	25	18	27	34	502 Hrs.
FY 2018 Totals	242	59	50	32	32	88	88	1,210 Hrs.
FY 2017 Totals	253	62	96	47	45	7	23	1,265 Hrs.

ATTACHMENT 7

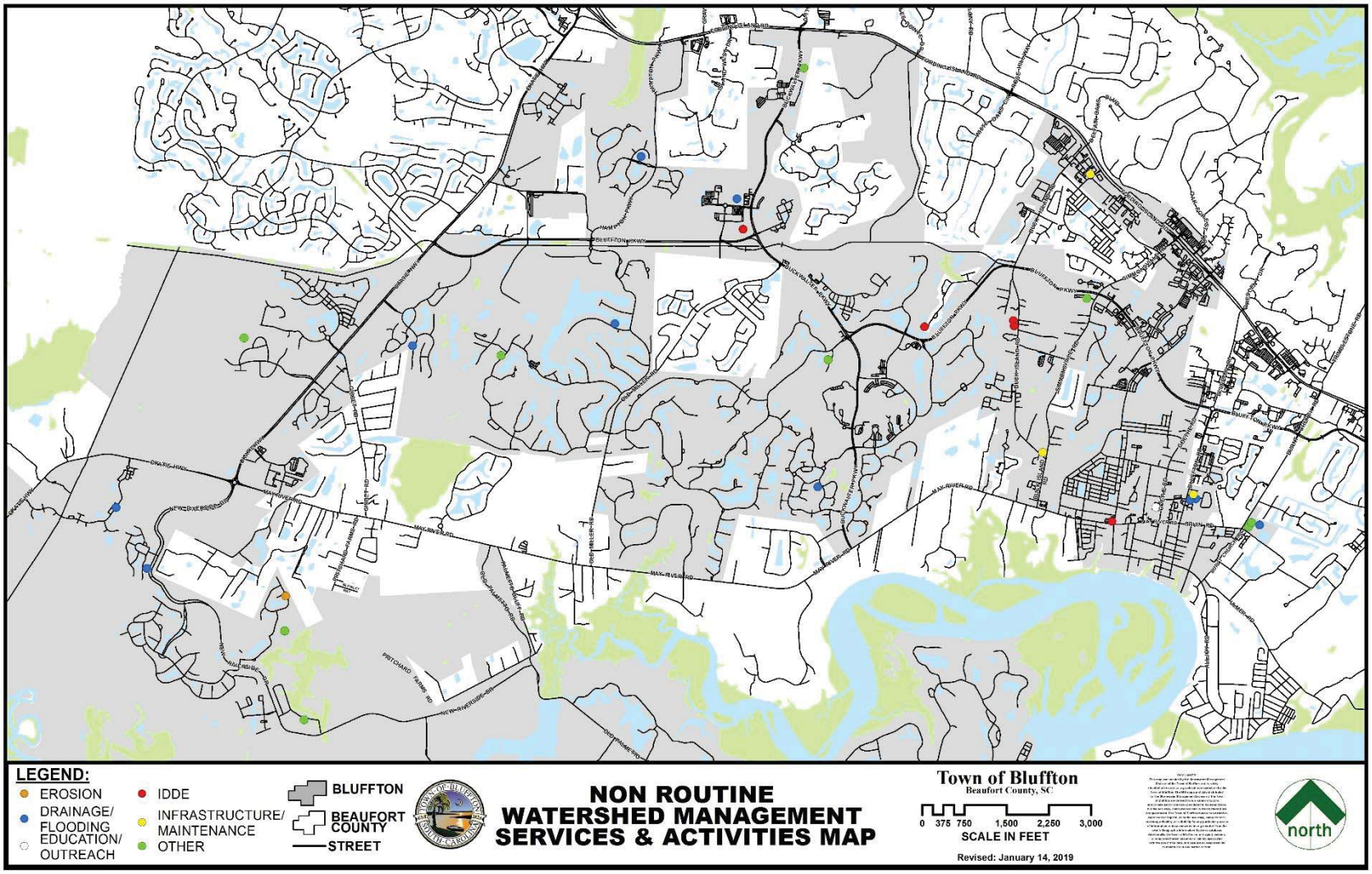
Citizen Drainage Concern Heat Map (Drainage, Maintenance and Inspections)



	Number of Drainage Concerns Investigated	Number of Meetings
FY 2019 YTD Totals	25	29
FY 2018 Totals	48	75
FY 2017 Totals	72	80

ATTACHMENT 8

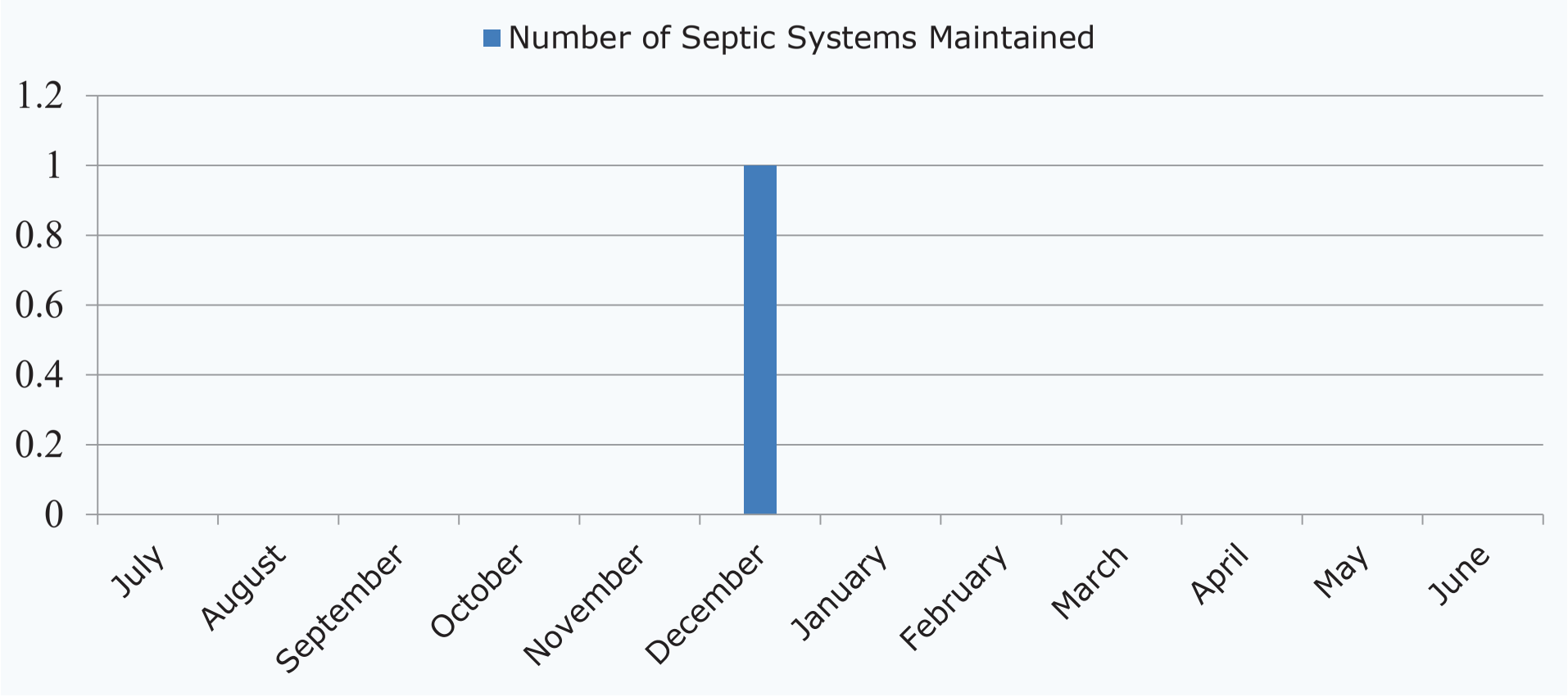
Citizen Request for Watershed Mngt. Services & Activities Map



	Number of Citizen Requests Investigated	Number of Meetings
FY 2019 YTD Totals	39	40
FY 2018 Totals	75	79
FY 2017 Totals	53	82

ATTACHMENT 9

Septic System Maintenance Assistance



	Number of Septic Systems Maintained
FY 2019 YTD Totals	1
FY 2018 Totals	16
FY 2017 Totals	18

CITY OF BEAUFORT

TO: **Eric Larson, P.E.**

FROM: **Neil Desai, P.E.**

DATE: **February 6, 2019**

SUBJECT: **Stormwater Utility Board Report**

The following is the City of Beaufort Public Works Department monthly report from January 1 to January 31, 2019

1) CAPITAL IMPROVEMENTS UPDATE

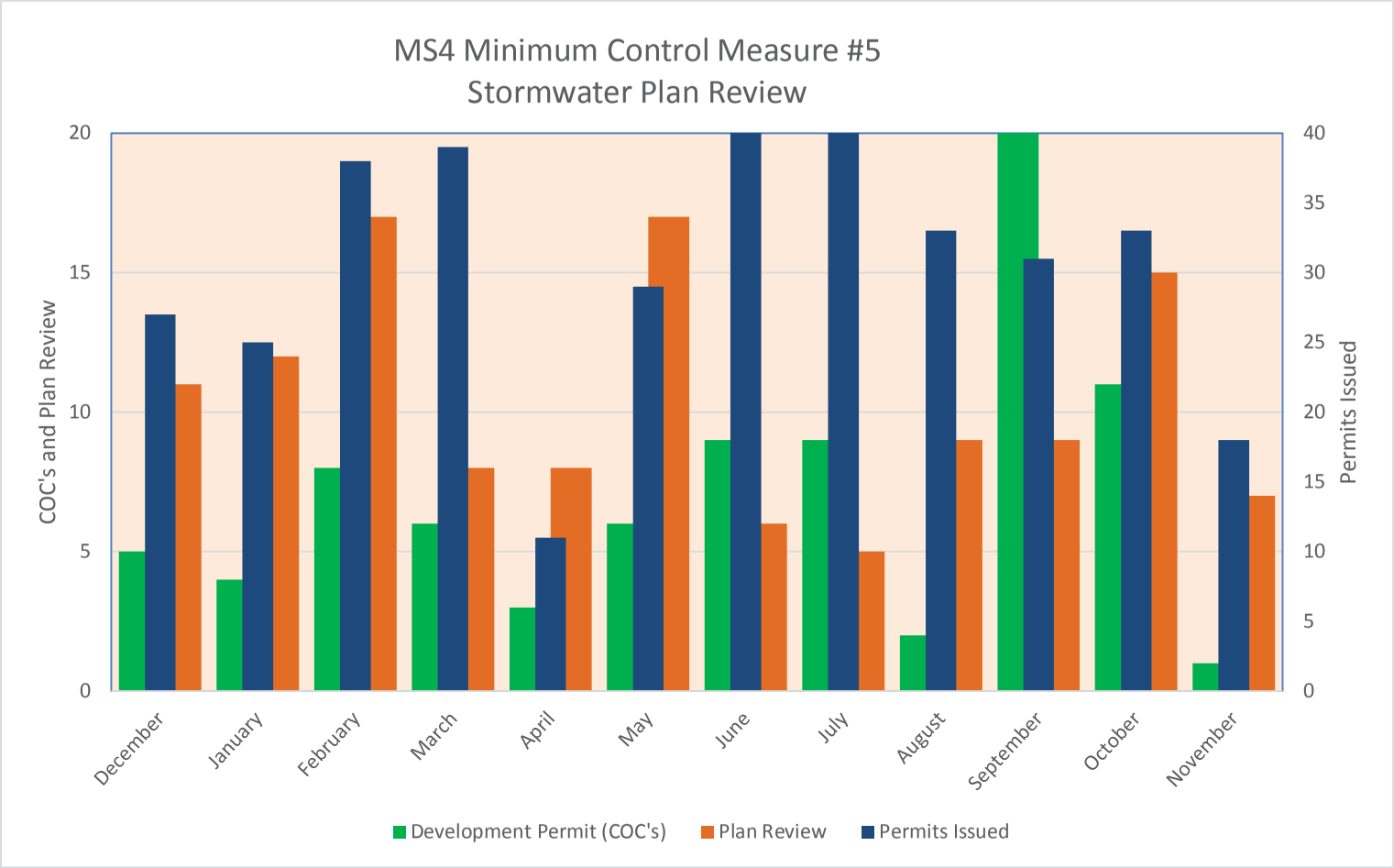
a) Mossy Oaks Drainage Project – City is awaiting permitting approvals from state and federal agency. Task force meeting scheduled for February 27th.

b) Azalea Project – Public Works staff has begun work on the project.

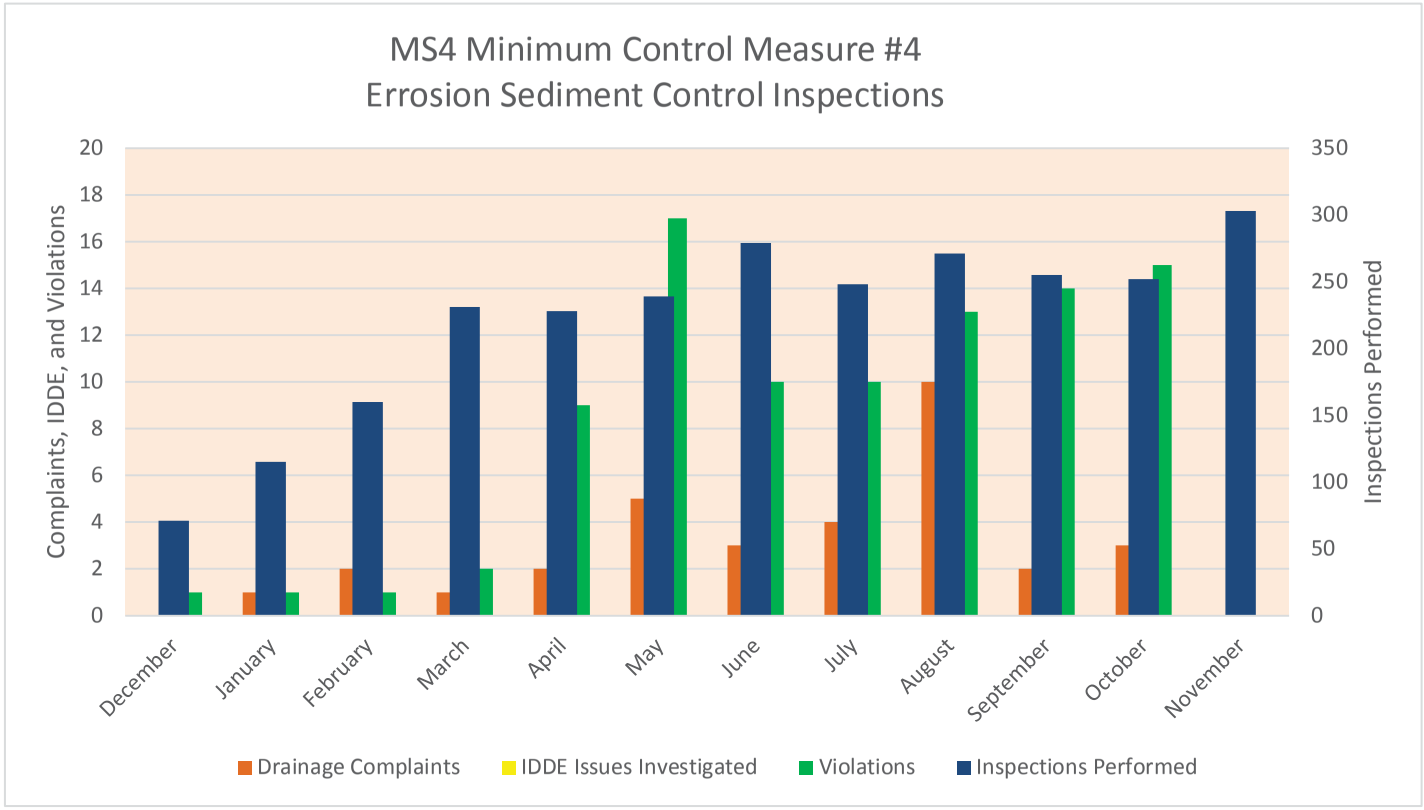
c) Greenlawn Streetscape – Water Quality component with manufactured device at outfall.

2) MAINTANCE & REPAIR UPDATE

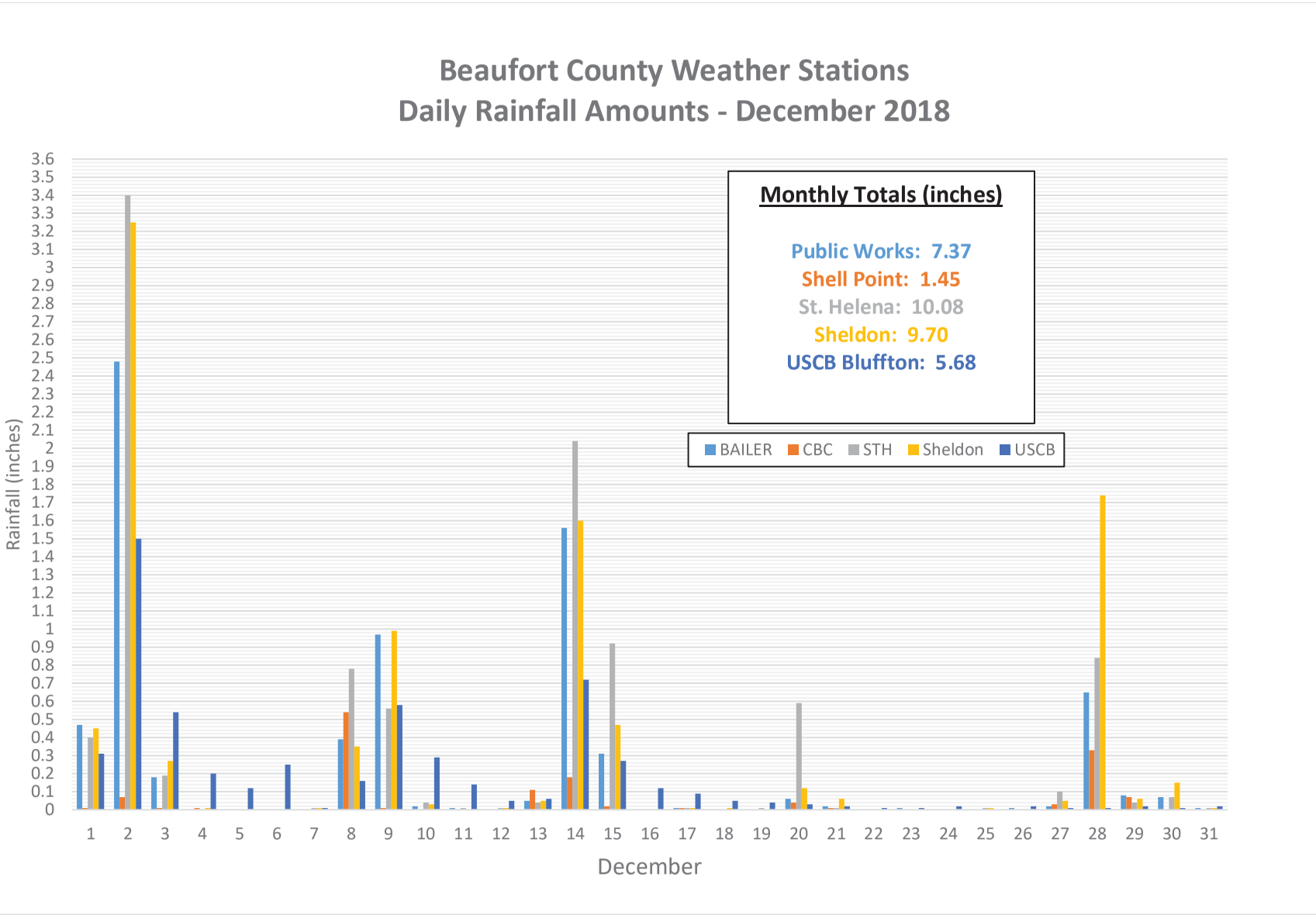
a) Routine maintenance of drainage easement City wide.

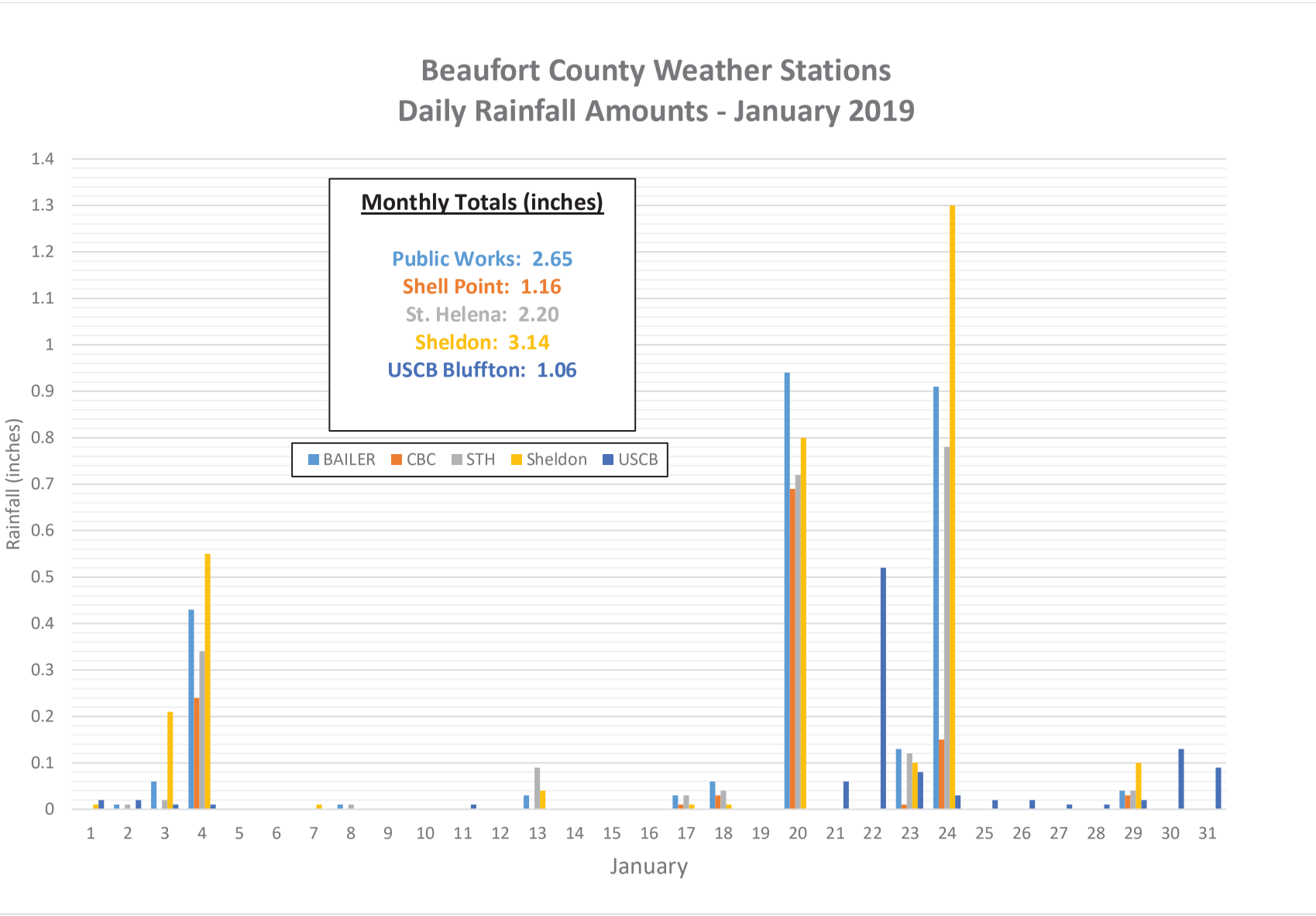


TYPE	December	January	February	March	April	May	June	July	August	September	October	November	Last 12 Months
Development Permit (COC's)	5	4	8	6	3	6	9	9	2	21	11	1	85
Plan Review	11	12	17	8	8	17	6	5	9	9	15	7	124
Permits Issued	27	25	38	39	11	29	47	45	33	31	33	18	376



TYPE	December	January	February	March	April	May	June	July	August	September	October	November	Last 12 Months
Inspections Performed	71	115	160	231	228	239	279	248	271	255	252	303	2652
Drainage Complaints	0	1	2	1	2	5	3	4	10	2	3	0	33
IDDE Issues Investigated	2	0	1	0	0	1	0	1	2	1	2	0	10
Violations	1	1	1	2	9	17	10	10	13	14	15	0	93


Beaufort County Weather Stations
Daily Rainfall Amounts - December 2018
Monthly Totals (inches)
Public Works: 7.37
Shell Point: 1.45
St. Helena: 10.08
Sheldon: 9.70
USCB Bluffton: 5.68
BAILER
CBC
STH
Sheldon
USCB
Rainfall (inches)
December


Beaufort County Weather Stations
Daily Rainfall Amounts - January 2019
Monthly Totals (inches)
Public Works: 2.65
Shell Point: 1.16
St. Helena: 2.20
Sheldon: 3.14
USCB Bluffton: 1.06
BAILER
CBC
STH
Sheldon
USCB
Rainfall (inches)
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
January

MEMORANDUM

Date: February 13, 2019

To: Stormwater Management Utility Board

From: David Wilhelm, P. E., Public Works Director

Re: **Maintenance Project Report**

This report will cover two major projects and six minor projects. The Project Summary Reports are attached.

Major Projects – Storm Drainage System Improvements:

- **Huspah Court S – Sheldon (SWUD 5):** This project improved 1,608 feet of drainage system. The scope of work included bush hogging 301 feet of channel, grubbing and clearing 303 feet of workshelf, cleaning out 730 feet of roadside ditch, 575 feet of channel, repairing a washout, installing 2 twin driveway pipes, rip rap and hydroseeding for erosion control. The total cost was **$31,895.47.**
- **Middlefield Circle – Sheldon (SWUD 5):** This project improved 9,077 feet of drainage system. The scope of work included removing a blockage from the flowline, cleaning out 6,047 feet of roadside ditch, 3,030 feet of channel, jetting 4 access pipes, 5 crossline pipes and 6 driveway pipes. The total cost was **$17,640.13**.

Minor or Routine Projects:

- **Sheldon Bush Hog - Sheldon (SWUD 5):** This project improved 148,451 feet of drainage system. The project scope included bush hogging 142,171 feet of channel and 6,280 feet of roadside ditch. The total cost was **$74,230.53.**
- **St Helena Island Bush Hog – St Helena Island (SWUD 8):** This project improved 87,019 feet of drainage system. The scope of work included bush hogging 83,166 feet of channel and 3,853 feet of roadside ditch. The total cost was **$49,512.01.**
- **Lady's Island Valley Drains – Lady's Island (SWUD 7):** This project improved 30,169 feet of drainage system. The scope of work included cleaning out 30,169 feet of valley drains. The total cost was **$16,809.59.**
- **St Helena Island Valley Drains – St Helena Island (SWUD 8):** This project improved 44,154 feet of drainage system. The scope of work included cleaning out 44,154 feet of valley drains. The total cost was **$13,816.78.**
- **Jasmine Hall Road – Sheldon (SWUD 5):** This project improved 3,996 feet of drainage system. The scope of work included cleaning out 3,996 feet of roadside ditch. The total cost was **$9,843.54.**

- **Taylor Street/Peace Haven Drive – Port Royal Island (SWUD 6):** This project improved 100 feet drainage system. The scope of work included cleaning out 100 feet of roadside ditch and jetting 1 driveway pipe. The total cost was **$1,001.01**.

Beaufort County Public Works
Stormwater Infrastructure
Project Summary

Project Summary: Huspah Court S

Activity: Routine/Preventive Maintenance

Duration: 03/01/18-07/16/18

Narrative Description of Project:

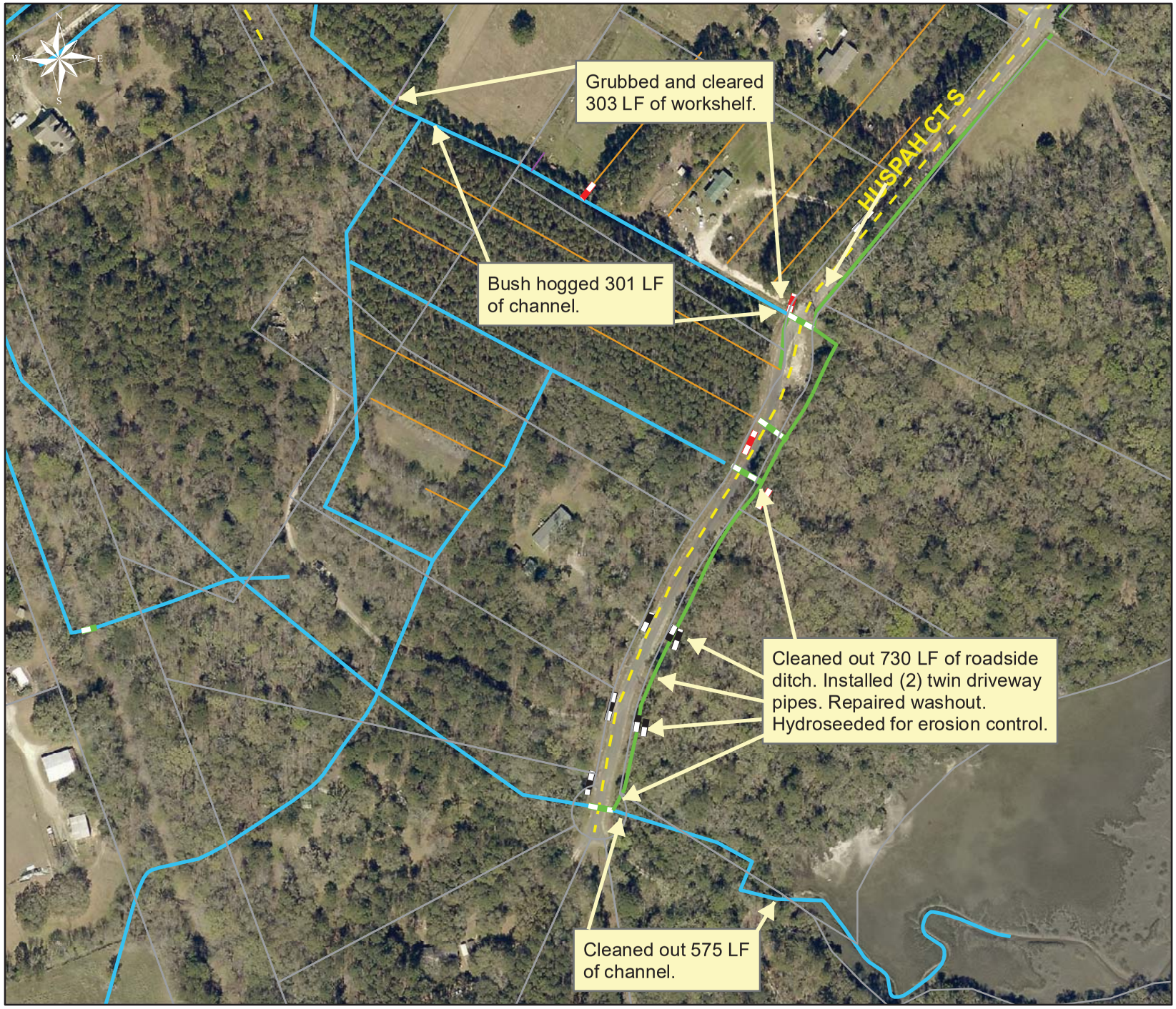
Project improved 1,608 L.F. of drainage system. Bush hogged 301 L.F. of channel. Grubbed and cleared 303 L.F. of workshelf. Cleaned out 730 L.F. of roadside ditch and 575 L.F. of channel. Repaired washout. Installed (2) twin driveway pipes, rip rap and hydroseeded for erosion control.

2018-581 / Huspah Court S	**Labor Hours**	**Labor Cost**	**Equipment Cost**	**Material Cost**	**Contractor Cost**	**Indirect Labor**	**Total Cost**
APREP / Asphalt Preparation	8.0	$183.08	$54.62	$57.87	$0.00	$118.80	$414.37
ASI / Asphalt Installation	50.0	$1,083.90	$130.44	$59.67	$0.00	$573.50	$1,847.51
AUDIT / Audit Project	1.5	$32.69	$0.00	$0.00	$0.00	$0.00	$32.69
CBH / Channel- bushhogged	4.0	$84.27	$37.13	$11.00	$0.00	$53.26	$185.66
CCO / Channel - cleaned out	140.0	$3,276.20	$1,181.41	$386.02	$0.00	$1,643.60	$6,487.23
CLRGRUB / Clearing and grubbing	44.0	$935.44	$350.64	$92.04	$0.00	$349.92	$1,728.04
DPINS / Driveway Pipe - Installed	41.0	$912.35	$323.06	$1,638.06	$0.00	$457.01	$3,330.48
HAUL / Hauling	168.8	$3,764.09	$1,798.13	$6,239.00	$0.00	$1,986.50	$13,787.71
HYDR / Hydroseeding	6.0	$142.14	$35.68	$469.89	$0.00	$39.69	$687.40
LR / Level Road	10.0	$204.60	$64.28	$61.83	$0.00	$127.20	$457.91
RPWO / Repaired Washout	13.0	$265.44	$82.28	$16.88	$0.00	$165.36	$529.96
RRI / Rip Rap - Installed	56.0	$1,257.26	$144.68	$79.68	$0.00	$811.10	$2,292.72
UTLOC / Utility locates	3.0	$74.10	$0.00	$0.00	$0.00	$39.69	$113.79
2018-581 / Huspah Court S Sub Total	545.3	$12,215.56	$4,202.35	$9,111.93	$0.00	$6,365.63	$31,895.47
Grand Total	**545.3**	**$12,215.56**	**$4,202.35**	**$9,111.93**	**$0.00**	**$6,365.63**	**$31,895.47**

Before

During

After



Project: Huspah Court South

Activity: Routine/ Preventive Maintenance

Project #: 2018-581

Township/SW Dist: Sheldon/5

Completed: July 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 60 120 240 360 480 Feet

1 inch = 250 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/08/19
File:C:\project summaries map/Huspah Court South_2018-581

Beaufort County Public Works
Stormwater Infrastructure
Project Summary

Project Summary: Middlefield Circle

Activity: Routine/Preventive Maintenance

Duration: 04/12/18-06/26/18

Narrative Description of Project:

Project improved 9,077 L.F. of drainage system. Removed blockage from flowline. Cleaned out 6,047 L.F. of roadside ditch and 3,030 L.F. of channel. Jetted (4) access pipes, (5) crossline pipes and (6) driveway pipes.

2018-600 / Middlefield Circle	**Labor Hours**	**Labor Cost**	**Equipment Cost**	**Material Cost**	**Contractor Cost**	**Indirect Labor**	**Total Cost**
AUDIT / Audit Project	1.0	$21.79	$0.00	$0.00	$0.00	$0.00	$21.79
CCO / Channel - cleaned out	54.0	$1,299.32	$324.50	$100.14	$0.00	$741.16	$2,465.12
CLPJT / Crossline Pipe - Jetted	10.0	$222.80	$191.60	$77.77	$0.00	$143.40	$635.57
DPJT / Driveway Pipe - Jetted	20.0	$445.60	$383.20	$180.68	$0.00	$286.80	$1,296.28
HAUL / Hauling	91.0	$1,985.77	$857.22	$530.11	$0.00	$86.52	$3,459.62
RB / Remove blockage from flowline	9.0	$200.49	$67.97	$12.55	$0.00	$128.79	$409.80
RSDCL / Roadside Ditch - Cleanout	201.0	$4,849.28	$1,343.39	$329.34	$0.00	$2,754.08	$9,276.09
UTLOC / Utility locates	2.0	$49.40	$0.00	$0.00	$0.00	$26.46	$75.86
2018-600 / Middlefield Circle Sub Total	388.0	$9,074.45	$3,167.88	$1,230.59	$0.00	$4,167.21	$17,640.13
Grand Total	**388.0**	**$9,074.45**	**$3,167.88**	**$1,230.59**	**$0.00**	**$4,167.21**	**$17,640.13**

Before

During

After

Project: Middlefield Circle
Map #1

Activity: Routine/ Preventive Maintenance

Project #: 2018-600

Township/SW Dist: Sheldon/5

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 100200 400 600 800 Feet

1 inch = 420 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/08/19
File:C:\project summaries map/Middlefield Circle Map #1_2018-600

Project: Middlefield Circle
Map #2

Activity: Routine/ Preventive Maintenance

Project #: 2018-600

Township/SW Dist: Sheldon/5

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 80 160 320 480 640 Feet

1 inch = 330 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/08/19
File:C:\project summaries map/Middlefield Circle Map #2_2018-600

Project: Middlefield Circle
Map #3

Activity: Routine/ Preventive Maintenance

Project #: 2018-600

Township/SW Dist: Sheldon/5

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 100200 400 600 800 Feet

1 inch = 420 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/08/19
File:C:\project summaries map/Middlefield Circle Map #2_2018-600

Beaufort County Public Works
Stormwater Infrastructure
Project Summary

Project Summary: Sheldon Bush Hog

Activity: Routine/Preventive Maintenance

Duration: 04/24/18-11/29/18

Narrative Description of Project:

First Rotation: 04/24/18-11/29/18 Project improved 148,451 L.F. of drainage system. Bush hogged 142,171 L.F. of channel and 6,280 L.F. of roadside ditch. This project consisted of the following areas: Duncan Farm Lane (3,322 L.F.), Middlefield Circle (11,667 L.F.), Gum Tree Lane (5,818 L.F.), Brown Island Road (3,695 L.F.), Stroup Road (2,070 L.F.), Hunt Ter (3,834 L.F.), Keans Neck Road (1,047 L.F.), Dan Drive (798 L.F.), Coakley Drive (695 L.F.), Oakhurst Road (1,381 L.F.), Dale Drop Off Center (620 L.F.), Lightsey Road (6,175 L.F.), Spann Circle (331 L.F.), Honeybee Island Road (835 L.F.), Coker Lane (1,349 L.F.), Wimbee Landing Road (8,877 L.F.), Mitchell Road (8,404 L.F.), Paige Point Bluff (564 L.F.), Rail Bed Road (1,476 L.F.), Robinson Hill Road (2,056 L.F.), Johnson Road (2,925 L.F.), Archie Sumpter Road (2,356 L.F.), Cuthbert Farm Road (804 L.F.), George Williams Lane (3,014 L.F.), William A Campbell Road (1,134 L.F.), Sheldon Drop Off Center (604 L.F.), Fire Station Lane (429 L.F.), Huspah Drive (2,997 L.F.), Huspah Court S (2,353 L.F.), Huspah Court N (780 L.F.), Bailey Road (3,611 L.F.), Nix Road (1,196 L.F.), Prescott Road (1,800 L.F.), Swallowtail Lane (2,231 L.F.), Gray Road (3,501 L.F.), Newberry Circle (1,137 L.F.), Joseph Lane (1,544 L.F.), Big Estate Road (4,502 L.F.), African Baptist Church Road (2,509 L.F.), Dash Road (296 L.F.), Horse Tail Road (3,421 L.F.), Albertha Fields Circle (2,706 L.F.), Booker T Washington Circle (2,043 L.F.), Twickenham Plantation Road (9,686 L.F.), Big Estate Drop Off Center (910 L.F.), Jenkins Road (736 L.F.), Horace Dawson Lane (5,801 L.F.), Dean Hall Road (367 L.F.), Seigler Road (503 L.F.), Papkee Lane (1,451 L.F.), River Oaks Road (2,962 L.F.), Jasmine Hall Road (9,280 L.F.), Old Dawson Acres (3,848 L.F.)

2019-303 / Sheldon Bush Hog	**Labor Hours**	**Labor Cost**	**Equipment Cost**	**Material Cost**	**Contractor Cost**	**Indirect Labor**	**Total Cost**
AUDIT / Audit Project	2.0	$43.58	$0.00	$0.00	$0.00	$0.00	$43.58
CBH / Channel- bushhogged	1497.0	$31,565.44	$16,811.02	$4652.23	$0.00	$19,807.03	$72,835.72
HAUL / Hauling	4.0	$89.08	$138.56	$78.00	$0.00	$57.68	$363.32
RDBH / Roadside ditch - bushhogged	20.0	$433.40	$245.51	$32.50	$0.00	$276.50	$987.91
2019-303 / Sheldon Bush Hog Sub Total	1,523.0	$32,131.50	$17,195.09	$4,762.73	$0.00	$20,141.21	$74,230.53
Grand Total	**1,523.0**	**$32,131.50**	**$17,195.09**	**$4,762.73**	**$0.00**	**$20,141.21**	**$74,230.53**

Before

During

After

Beaufort County Public Works
Stormwater Infrastructure
Project Summary

Project Summary: St. Helena Island Bush Hog

Activity: Routine/Preventive Maintenance

Duration: 05/17/18-10/09/18

Narrative Description of Project:

First Rotation: 05/17/18-10/09/18 Project improved 87,019 L.F. of drainage system. Bush hogged 83,166 L.F. of channel and 3,853 L.F. of roadside ditch. This project consisted of the following areas: James D Washington Road (407 L.F.), Jack Johnson Drive (1,404 L.F.), Cuffy Drop Off Center (3,210 L.F.), David Green Road (3,236 L.F.), Capers Island Road (700 L.F.), Candy Johnson Drive (643 L.F.), Scott Hill Road (7,903 L.F.), Peaches Hill Circle (6,268 L.F.), Scott Ball Field (1,241 L.F.), No Man Land Road (1,162 L.F.), Adams Street Baptist Church (500 L.F.), Toomer Road (3,492 L.F.), Willow Whisp Lane (1,150 L.F.), Tombee Road (1,774 L.F.), Wiggfall Road (310 L.F.), Archer Fields Lane (1,887 L.F.), Kelis Lane (4,575 L.F.), Ephraim Road (4,426 L.F.), White Sands Circle (3,656 L.F.), Luther Warren Drive (1,672 L.F.), Shiney Road (836 L.F.), Seaside Road (5,468 L.F.), Folly Road (2,798 L.F.), Simmons Road (2,326 L.F.), John Fripp Circle (812 L.F.), Langford Road (670 L.F.), Dulamo Road (286 L.F.), Bible Camp Road (4,379 L.F.), Halifax Road (3,247 L.F.), Polowana Road (2,956 L.F.), Ball Park Road (1,500 L.F.), Packing Shed (312 L.F.), James Grant Road (650 L.F.), Mattis Drive (1,691 L.F.), Major Road (2,330 L.F.), Warsaw Island Road (4,951 L.F.), JB Lane (1,335 L.F.), Pea Patch Road (856 L.F.)

2019-300 / St. Helena Island Bush Hog	**Labor Hours**	**Labor Cost**	**Equipment Cost**	**Material Cost**	**Contractor Cost**	**Indirect Labor**	**Total Cost**
AUDIT / Audit Project	1.5	$32.69	$0.00	$0.00	$0.00	$0.00	$32.69
CBH / Channel- bushhogged	971.0	$21,346.96	$9,933.90	$3,111.34	$0.00	$13,551.83	$47,944.02
HAUL / Hauling	9.0	$193.23	$146.40	$91.00	$0.00	$123.15	$553.78
RDBH / Roadside ditch - bushhogged	20.0	$445.70	$187.32	$61.70	$0.00	$286.80	$981.52
2019-300 / St. Helena Island Bush Hog Sub Total	1,001.5	$22,018.57	$10,267.62	$3,264.04	$0.00	$13,961.78	$49,512.01
Grand Total	**1,001.5**	**$22,018.57**	**$10,267.62**	**$3,264.04**	**$0.00**	**$13,961.78**	**$49,512.01**

Before

During

After

Beaufort County Public Works
Stormwater Infrastructure
Project Summary

Project Summary: Lady's Island Valley Drains

Activity: Routine/Preventive Maintenance

Duration: 04/18/18-06/14/18

Narrative Description of Project:

Project improved 30,169 L.F. of drainage system. Cleaned out 30,169 L.F. of valley drains. This project consisted of the following areas: Youmans Drive (835 L.F.), Mattis Drive (376 L.F.), James Grant Road (1,620 L.F.), Fairfield Road (4,830 L.F.), Ethel Grant Lane (250 L.F.) Woodbine Drive (1,130 L.F.), Ashley Drive (2,846 L.F.), Friendship Lane (1,880 L.F.), Gumwood Drive (2,218 L.F.), Pine Run Trail (2,070 L.F.), Deveaux Road (1,096 L.F.), Eustis Landing Road (2,570 L.F.), Stevens Lane (3,300 L.F.), Old Distand Island Road (3,688 L.F.) and Rue Dubois (1,460 L.F.)

2018-313A / Lady's Island Valley Drains	**Labor Hours**	**Labor Cost**	**Equipment Cost**	**Material Cost**	**Contractor Cost**	**Indirect Labor**	**Total Cost**
AUDIT / Audit Project	1.5	$32.69	$0.00	$0.00	$0.00	$0.00	$32.69
COVD / Cleaned Out Valley Drains	297.5	$6,598.44	$1,232.29	$558.67	$0.00	$4,113.48	$12,502.88
HAUL / Hauling	76.0	$1,779.64	$715.92	$331.32	$0.00	$955.26	$3,782.14
PRRECON / Project Reconnaissance	12.0	$274.62	$23.04	$16.03	$0.00	$178.20	$491.89
2018-313A / Lady's Island Valley Drains Sub Total	387.0	$8,685.38	$1,971.25	$906.02	$0.00	$5,246.94	$16,809.59
Grand Total	**387.0**	**$8,685.38**	**$1,971.25**	**$906.02**	**$0.00**	**$5,246.94**	**$16,809.59**

Before

During

After

Project: Lady's Island Valley Drains- Carolyn Drive Map #1

Activity: Routine/ Preventive Maintenance

Project #: 2018-313A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 30 60 120 180 240 Feet

1 inch = 130 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/15/19
File:C:\project summaries map/Ladys Isand Valley Drains- Carolyn Drive Map#1_2018-313A

Project: Lady's Island Valley Drains - Rue Du Bois
Map #2

Activity: Routine/ Preventive Maintenance

Project #: 2018-313A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 80 160 320 480 640 Feet

1 inch = 330 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/15/18
File:C:\project summaries map/Ladys Island Valley Drains- Rue Du Bois Map2_2018-313A

Project: Lady's Island Valley Drains - Ethel Grant Lane Map #3

Activity: Routine/ Preventive Maintenance

Project #: 2018-313A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 20 40 80 120 160 Feet

1 inch = 83 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/15/18
File:C:\project summaries map/Ladys Island Valley Drains- Ethel Grant Lane Map#3_2018-313A

Project: Lady's Island Valley Drains - Woodbine Drive Map #4

Activity: Routine/ Preventive Maintenance

Project #: 2018-313A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 30 60 120 180 240 Feet

1 inch = 130 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/15/18
File:C:\project summaries map/Ladys Island Valley Drains- Woodbine Drive Map#4_2018-313A

Project: Lady's Island Valley Drains - Ashley Drive Map #5

Activity: Routine/ Preventive Maintenance

Project #: 2018-313A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

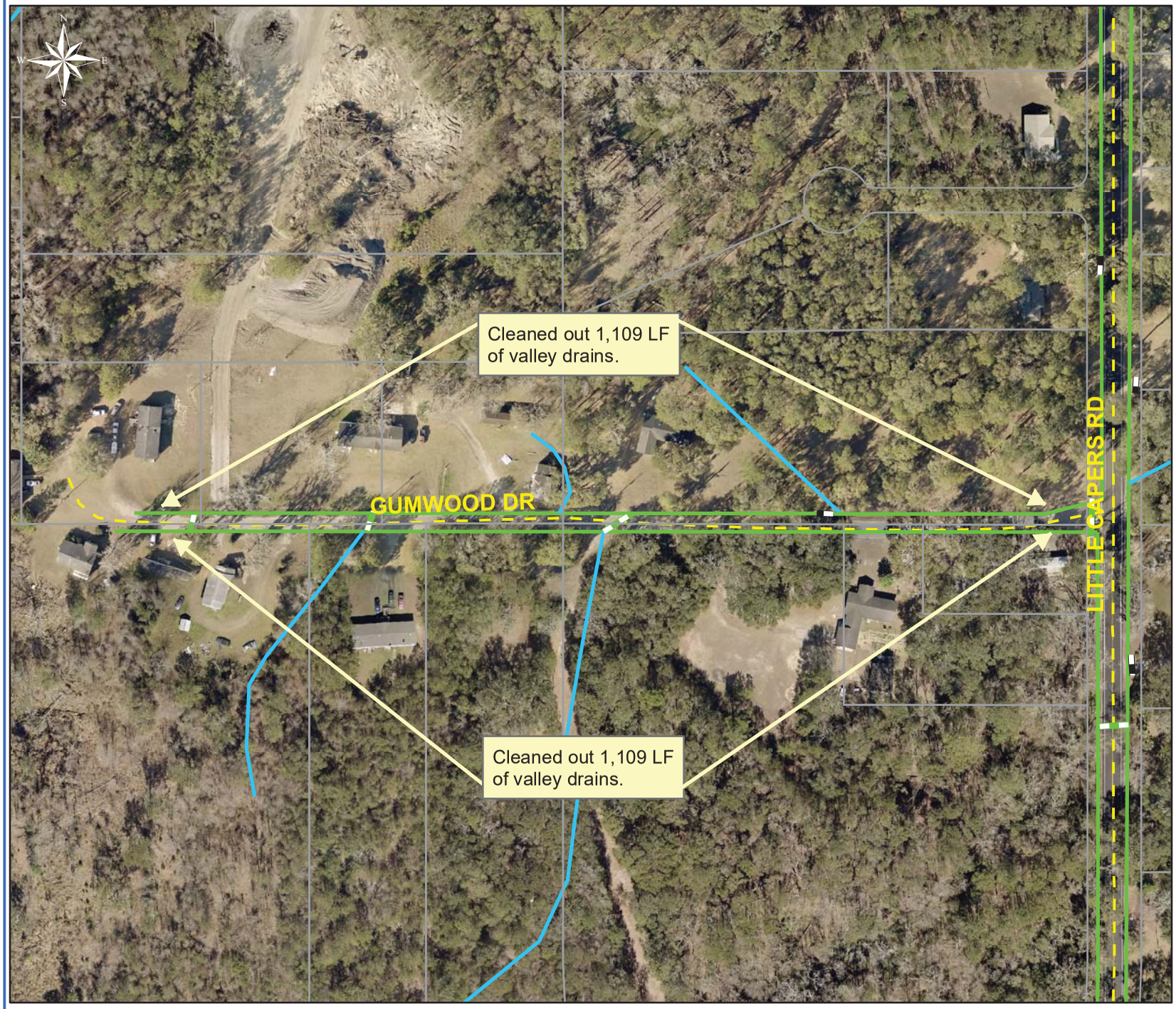
Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 80 160 320 480 640 Feet

1 inch = 330 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/15/18
File:C:\project summaries map/Ladys Island Valley Drains- Ashley Drive Map#5_2018-313A



Project: Lady's Island Valley Drains - Gumwood Drive Map #6

Activity: Routine/ Preventive Maintenance

Project #: 2018-313A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 40 80 160 240 320 Feet

1 inch = 170 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/15/18
File:C:\project summaries map/Ladys Island Valley Drains- Gumwood Dirve Map#6_2018-313A

Project: Lady's Island Valley Drains - Pine Run Trail Map #7

Activity: Routine/ Preventive Maintenance

Project #: 2018-313A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

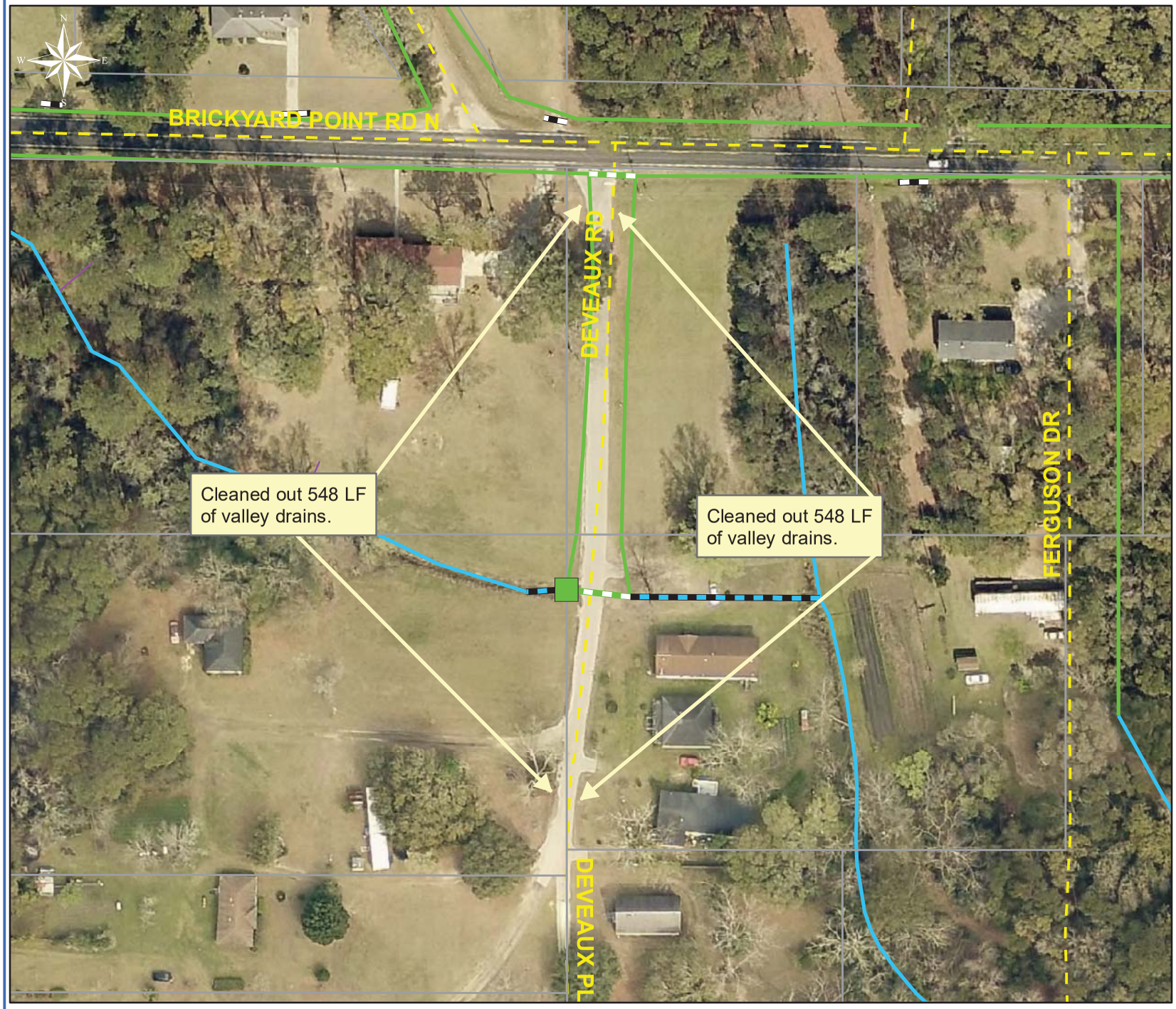
Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 100200 400 600 800 Feet

1 inch = 420 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/15/18
File:C:\project summaries map/Ladys Island Valley Drains- Gumwood Dirve Map#7_2018-313A



Project: Lady's Island Valley Drains - Deveaux Road Map #8

Activity: Routine/ Preventive Maintenance

Project #: 2018-313A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 25 50 100 150 200 Feet

1 inch = 100 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/15/18
File:C:\project summaries map/Ladys Island Valley Drains- Deveaux Road Map#8_2018-313A

Project: Lady's Island Valley Drains - Eustis Landing Road Map #9

Activity: Routine/ Preventive Maintenance

Project #: 2018-313A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

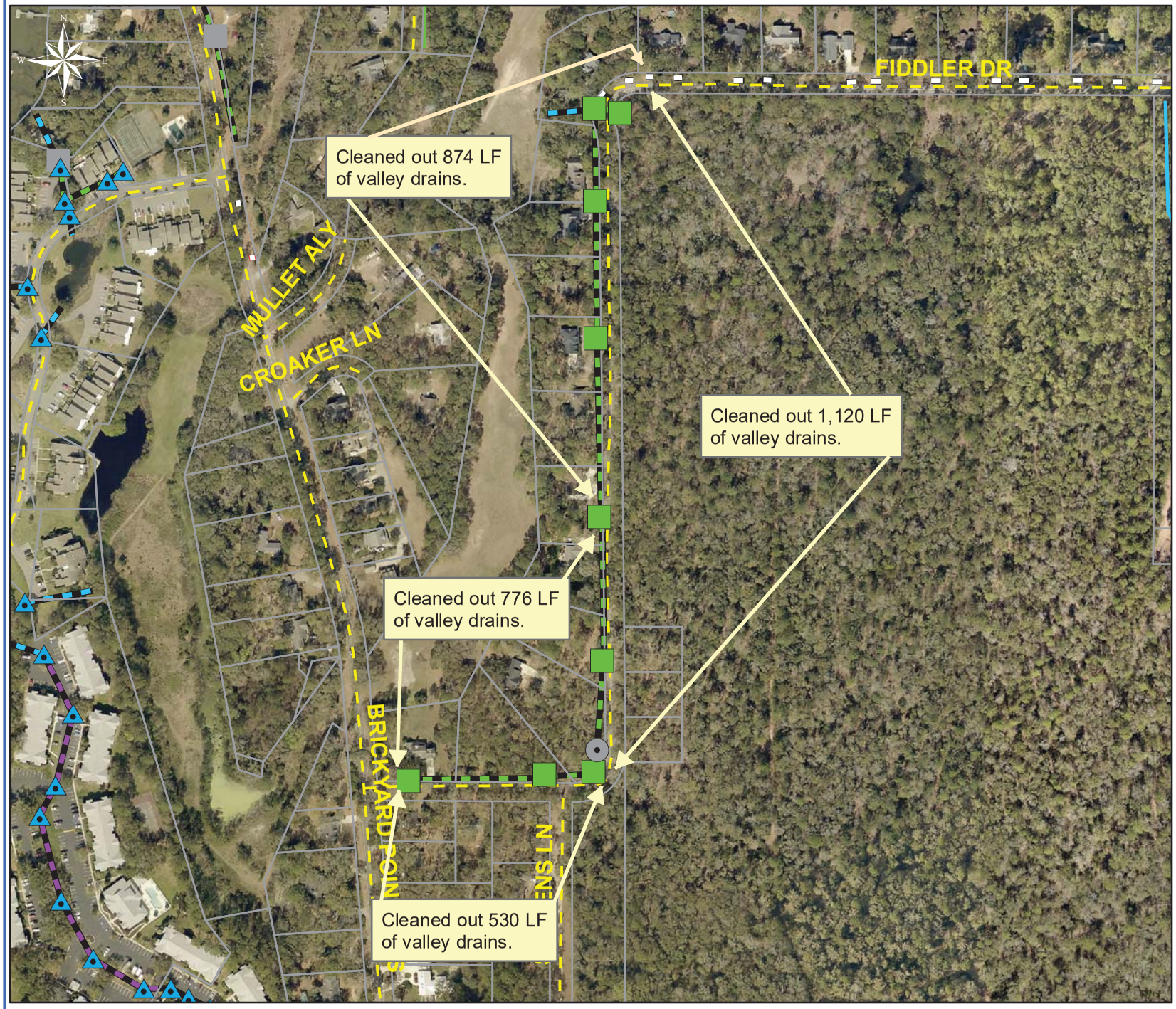
Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 50 100 200 300 400 Feet

1 inch = 210 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/15/18
File:C:\project summaries map/Ladys Island Valley Drains- Eustis Landing Road Map#9_2018-313A



Project: Lady's Island Valley Drains - Fiddler Drive Map #10

Activity: Routine/ Preventive Maintenance

Project #: 2018-313A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

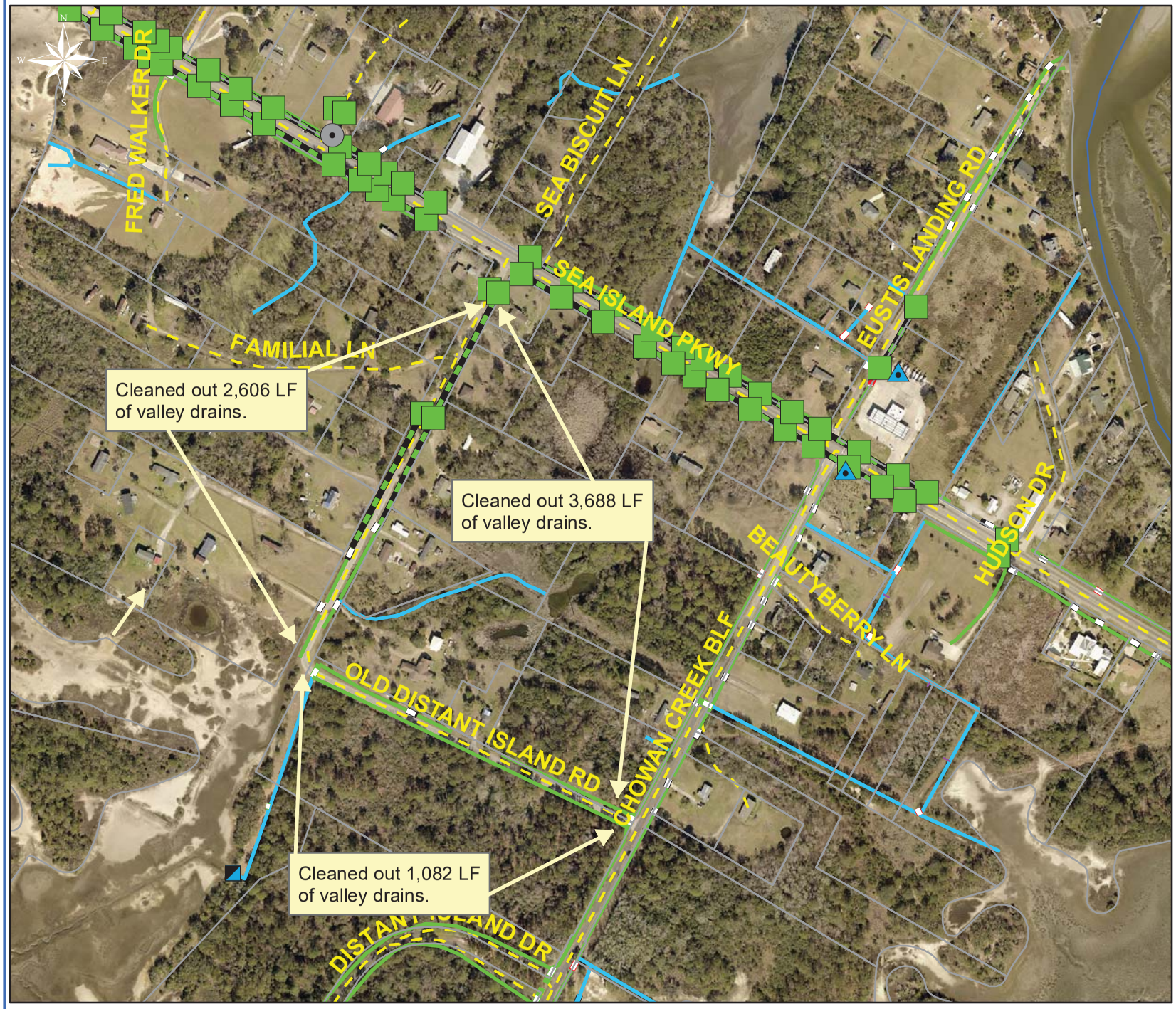
Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 80 160 320 480 640 Feet

1 inch = 330 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/15/18
File:C:\project summaries map/Ladys Island Valley Drains- Fiddler Drive Map#10_2018-313A



Project: Lady's Island Valley Drains - Old Distant Island Road Map #11

Activity: Routine/ Preventive Maintenance

Project #: 2018-313A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 100200 400 600 800 Feet

1 inch = 420 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/15/18
File:C:\project summaries map/Ladys Island Valley Drains- Old Distant Ilsnad Road Map#11_2018-313A

Project: Lady's Island Valley Drains - Friendship Lane Map #12

Activity: Routine/ Preventive Maintenance

Project #: 2018-313A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 80 160 320 480 640 Feet

1 inch = 330 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/15/18
File:C:\project summaries map/Ladys Island Valley Drains- Friendship LaneMap#12_2018-313A

Project: Lady's Island Valley Drains - Fairfield Road Map #13

Activity: Routine/ Preventive Maintenance

Project #: 2018-31A

Township/SW Dist: Ladys Island/7

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 120240 480 720 960 Feet

1 inch = 500 feet

Prepared By: BC Stormwater Management Utility
Date Print:01/16/18
File:C:\project summaries map/Ladys Island Valley Drains- Fairfield Road Map#13_2018-313A

Beaufort County Public Works
Stormwater Infrastructure
Project Summary

Project Summary: St Helena Island - Valley Drains

Activity: Routine/Preventive Maintenance

Duration: 05/15/18-06/12/18

Narrative Description of Project:

Project improved 44,154 L.F. of drainage system. Cleaned 44,154 L.F. of valley drains. This project consisted of the following areas: Hunters Grove Road (7,676 L.F.), Vineyard Point Road (8,100 L.F.), Old Ben Road (1,636 L.F.), White Sands Circle (2,448 L.F.), Levant Byas Road (5,840 L.F.) Cee Cee Road (7,400 L.F.), Mattis Drive (3,760 L.F.), Candy Johnson Drive (3,600 L.F.), Toomer Road (3,694 L.F.)

2018-312A / St Helena Island - Valley Drains	**Labor Hours**	**Labor Cost**	**Equipment Cost**	**Material Cost**	**Contractor Cost**	**Indirect Labor**	**Total Cost**
AUDIT / Audit Project	1.5	$32.69	$0.00	$0.00	$0.00	$0.00	$32.69
COVD / Cleaned Out Valley Drains	246.0	$5,321.71	$1,075.86	$514.52	$0.00	$3,265.62	$10,177.71
HAUL / Hauling	76.0	$1,693.38	$715.92	$290.88	$0.00	$906.20	$3,606.38
2018-312A / St Helena Island - Valley Drains Sub Total	323.5	$7,047.78	$1,791.78	$805.41	$0.00	$4,171.82	$13,816.78
Grand Total	**323.5**	**$7,047.78**	**$1,791.78**	**$805.41**	**$0.00**	**$4,171.82**	**$13,816.78**

Before

During

After

Project: St. Helena Island Valley Drains - Hunters Grove Road Map #1

Activity: Routine/ Preventive Maintenance

Project #: 2018-312A

Township/SW Dist: St. Helena Island/8

Completed: June 2018

Legend

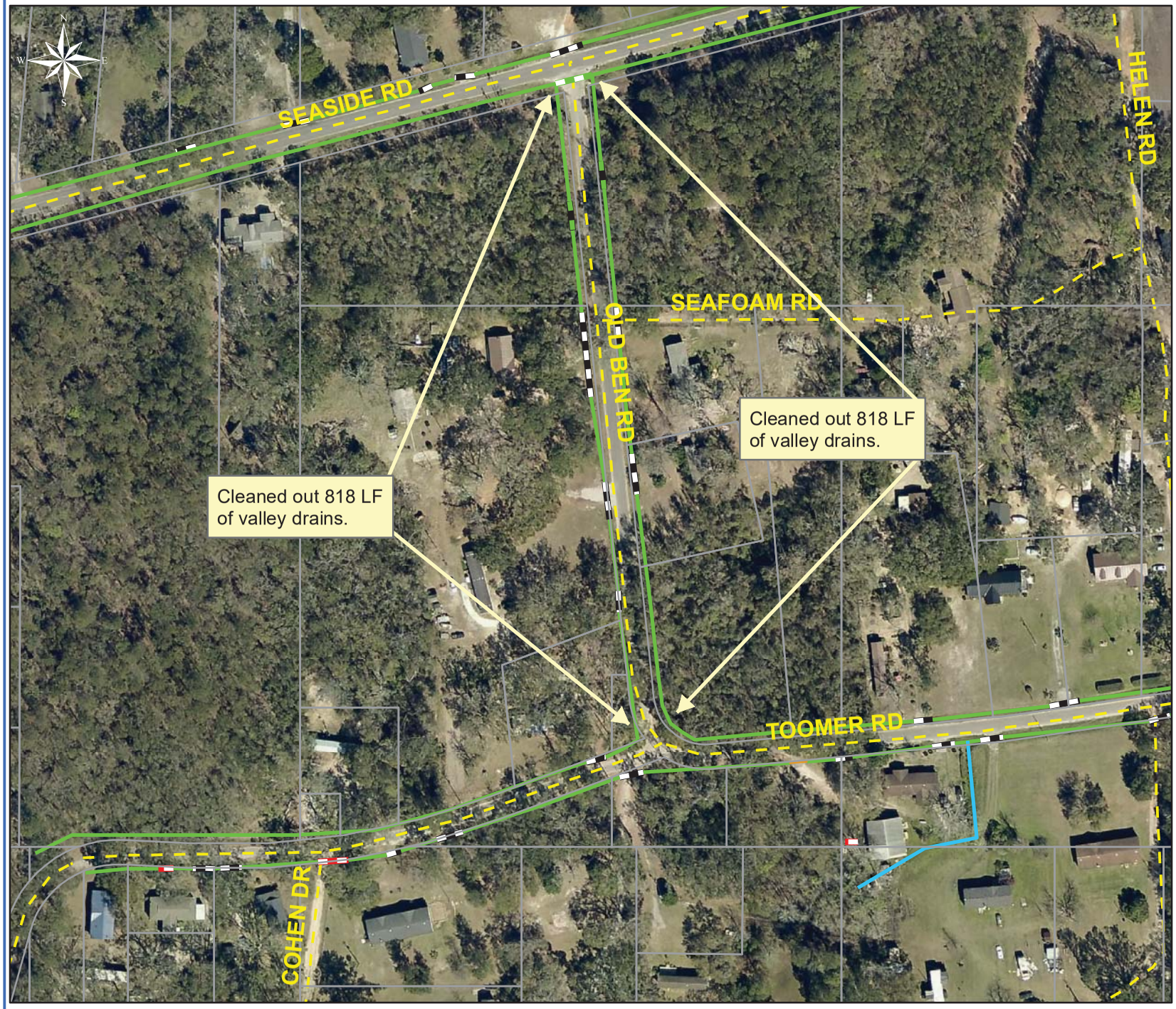
Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 120240 480 720 960 Feet

1 inch = 500 feet

Prepared By: BC Stormwater Management Utility
Date Print:12/17/18
File:C:\project summaries map/St. Helena Island Valley Drains-Hunters Grove Road Map #1_2018-312A



Project: St. Helena Island Valley Drains - Old Ben Road Map #2

Activity: Routine/ Preventive Maintenance

Project #: 2018-312A

Township/SW Dist: St. Helena Island/8

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 40 80 160 240 320 Feet

1 inch = 170 feet

Prepared By: BC Stormwater Management Utility
Date Print:12/17/18
File:C:\project summaries map/St. Helena Island Valley Drains-Old Ben Road Map #2_2018-312A

Project: St. Helena Island Valley Drains - White Sands Circle Map #3

Activity: Routine/ Preventive Maintenance

Project #: 2018-312A

Township/SW Dist: St. Helena Island/8

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 37.5 75 150 225 300 Feet

1 inch = 160 feet

Prepared By: BC Stormwater Management Utility
Date Print:12/17/18
File:C:\project summaries map/St. Helena Island Valley Drains-White Sands Circle Map #3_2018-312A

Project: St. Helena Island Valley Drains - Levant Byas Road Map #4

Activity: Routine/ Preventive Maintenance

Project #: 2018-312A

Township/SW Dist: St. Helena Island/8

Completed: June 2018

Legend

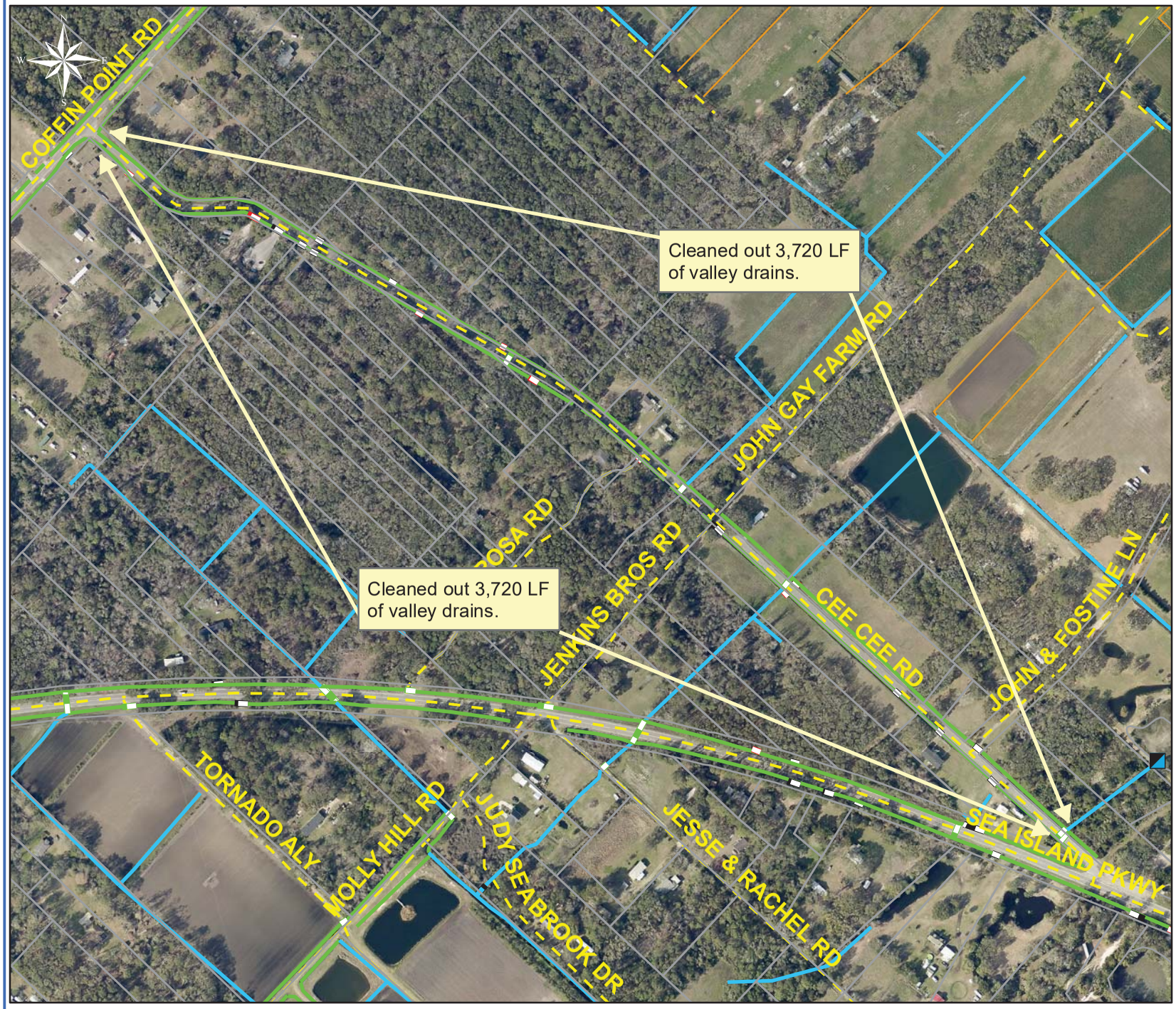
Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 80 160 320 480 640 Feet

1 inch = 330 feet

Prepared By: BC Stormwater Management Utility
Date Print:12/17/18
File:C:\project summaries map/St. Helena Island Valley Drains-Levant Byas Road Map #4_2018-312A



Project: St. Helena Island Valley Drains - Cee Cee Road Map #5

Activity: Routine/ Preventive Maintenance

Project #: 2018-312A

Township/SW Dist: St. Helena Island/8

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 100200 400 600 800 Feet

1 inch = 420 feet

Prepared By: BC Stormwater Management Utility
Date Print:12/17/18
File:C:\project summaries map/St. Helena Island Valley Drains-Cee Cee Road Map #5_2018-312A

Project: St. Helena Island Valley Drains - Mattis Drive
Map #6

Activity: Routine/ Preventive Maintenance

Project #: 2018-312A

Township/SW Dist: St. Helena Island/8

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 80 160 320 480 640 Feet

1 inch = 330 feet

Prepared By: BC Stormwater Management Utility
Date Print:12/17/18
File:C:\project summaries map/St. Helena Island Valley Drains-Mattis Drive Road Map #6_2018-312A

Project: St. Helena Island Valley Drains - Candy Johnson Drive Map #7

Activity: Routine/ Preventive Maintenance

Project #: 2018-312A

Township/SW Dist: St. Helena Island/8

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 40 80 160 240 320 Feet

1 inch = 170 feet

Prepared By: BC Stormwater Management Utility
Date Print:12/17/18
File:C:\project summaries map/St. Helena Island Valley Drains-Candy Johnson Drive Map #7_2018-312A

Project: St. Helena Island Valley Drains - Toomer Road
Map #8

Activity: Routine/ Preventive Maintenance

Project #: 2018-312A

Township/SW Dist: St. Helena Island/8

Completed: June 2018

Legend

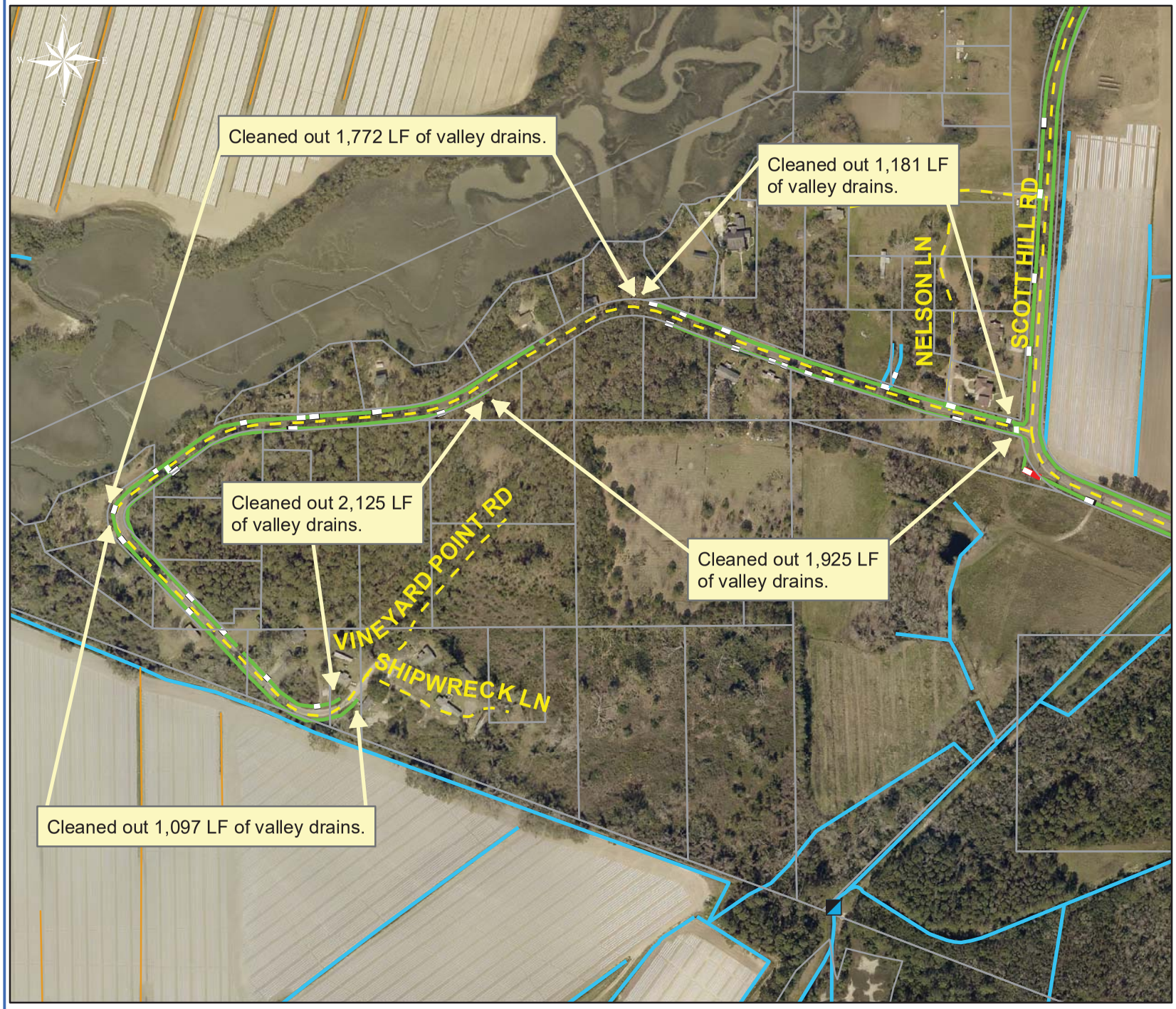
Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 62.5125 250 375 500 Feet

1 inch = 260 feet

Prepared By: BC Stormwater Management Utility
Date Print:12/17/18
File:C:\project summaries map/St. Helena Island Valley Drains-Toomer Road Map #8_2018-312A



Project: St. Helena Island Valley Drains - Vineyard Point Road Map #9

Activity: Routine/ Preventive Maintenance

Project #: 2018-312A

Township/SW Dist: St. Helena Island/8

Completed: June 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 100200 400 600 800 Feet

1 inch = 420 feet

Prepared By: BC Stormwater Management Utility
Date Print:12/17/18
File:C:\project summaries map/St. Helena Island Valley Drains-Vineyard Point Road Map #9_2018-312A

Beaufort County Public Works
Stormwater Infrastructure
Project Summary

Project Summary: Jasmine Hall Road

Activity: Routine/Preventive Maintenance

Duration: 07/24/18-08/20/18

Narrative Description of Project:

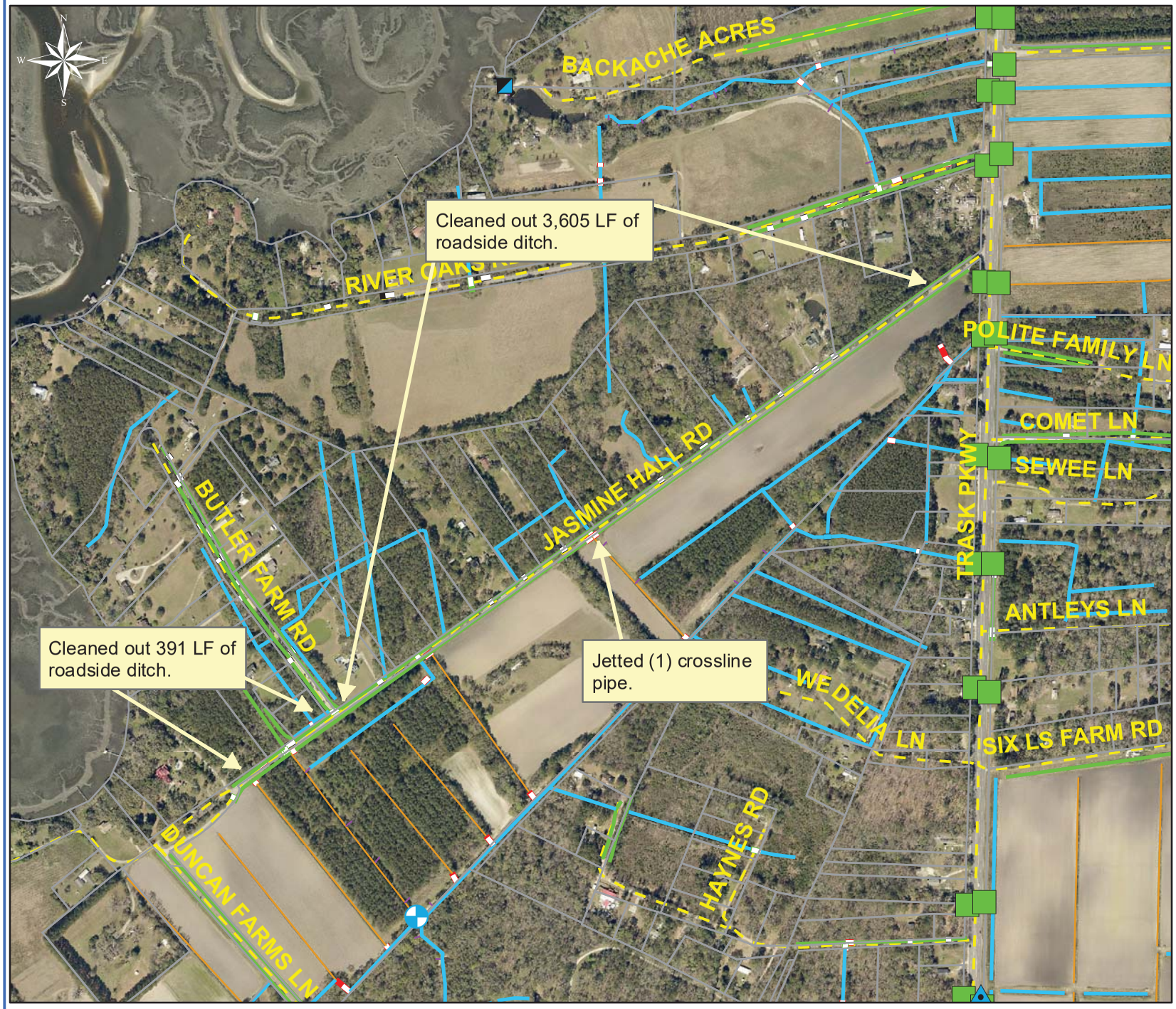
Project improved 3,996 L.F. of drainage system. Cleaned out 3,996 L.F. of roadside ditch. Jetted (1) crossline pipe.

2019-504 / Jasmine Hall Road	**Labor Hours**	**Labor Cost**	**Equipment Cost**	**Material Cost**	**Contractor Cost**	**Indirect Labor**	**Total Cost**
AUDIT / Audit Project	1.0	$21.79	$0.00	$0.00	$0.00	$0.00	$21.79
CLPJT / Crossline Pipe - Jetted	4.0	$89.12	$76.64	$13.74	$0.00	$57.36	$236.86
HAUL / Hauling	55.0	$1,089.18	$778.80	$215.26	$0.00	$119.46	$2,202.70
HEQ / Haul equipment	2.0	$49.40	$28.32	$18.32	$0.00	$32.94	$128.98
RSDCL / Roadside Ditch - Cleanout	173.0	$3,809.18	$899.86	$217.31	$0.00	$2,436.87	$7,363.22
UTLOC / Utility locates	0.5	$12.35	$0.00	$0.00	$0.00	$6.62	$18.97
2019-504 / Jasmine Hall Road Sub Total	233.5	$5,021.62	$1,755.30	$446.31	$0.00	$2,620.30	$9,843.54
Grand Total	**233.5**	**$5,021.62**	**$1,755.30**	**$446.31**	**$0.00**	**$2,620.30**	**$9,843.54**

Before

During

After



Project: Jasmine Hall Road

Activity: Routine/ Preventive Maintenance

Project #: 2019-504

Township/SW Dist: Sheldon/5

Completed: August 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 160320 640 960 1,280 Feet

1 inch = 670 feet

Prepared By: BC Stormwater Management Utility
Date Print:12/20/18
File:C:\project summaries map/Jasmine Hall Road_2019-504

Beaufort County Public Works
Stormwater Infrastructure
Project Summary

Project Summary: Taylor Street and Peace Haven Drive

Activity: Routine/Preventive Maintenance

Duration: 08/06/18-08/07/18

Narrative Description of Project:

Project improved 100 L.F. of drainage system. Cleaned out 100 L.F. of roadside ditch. Jetted (1) driveway pipe.

2019-515 / Taylor Street and Peace Haven Drive	**Labor Hours**	**Labor Cost**	**Equipment Cost**	**Material Cost**	**Contractor Cost**	**Indirect Labor**	**Total Cost**
AUDIT / Audit Project	1.0	21.79	0.00	0.00	0.00	0.00	21.79
DPJT / Driveway Pipe - Jetted	4.0	89.12	76.64	11.95	0.00	57.36	235.07
HAUL / Hauling	4.0	89.08	56.64	45.80	0.00	57.68	249.20
RSDCL / Roadside Ditch - Cleanout	12.0	262.52	43.99	20.80	0.00	167.64	494.95
2019-515 / Taylor Street and Peace Haven Drive Sub Total	21.0	$462.51	$177.27	78.55	0.00	$282.68	$1,001.01
Grand Total	**21.0**	**462.51**	**177.27**	**78.55**	**0.00**	**282.68**	**1,001.01**

(Pictures Not Available)

Project: Taylor Street and Peace Haven Drive

Activity: Routine/ Preventive Maintenance

Project #: 2019-515

Township/SW Dist: Port Royal Island/6

Completed: August 2018

Legend

Drainage Type

- Access Pipe
- Bleeder Pipe
- Channel Pipe
- Channel
- Stream
- Crossline Pipe
- Driveway Pipe
- Lateral
- Lateral Pipe
- River
- Road Pipe
- Roadside
- Roadside Pipe

0 25 50 100 150 200 Feet

1 inch = 100 feet

Prepared By: BC Stormwater Management Utility
Date Print:12/20/18
File:C:\project summaries map/Taylor Drive &Peace Haven Drive_2019-515

BEAUFORT COUNTY
STORMWATER MANAGEMENT UTILITY BOARD AGENDA
Wednesday, March 13, 2019
2:00 p.m.
Executive Conference Room, Administration Building
Beaufort County Government Robert Smalls Complex
100 Ribaut Road, Beaufort, South Carolina
843.255.2805

In accordance with South Carolina Code of Laws, 1976, as amended, Section 30-4-80(d), all local media was duly notified of the time, date, place and agenda of this meeting.

1. CALL TO ORDER – 2:00 p.m.
   A. Approval of Agenda
   B. Approval of Minutes – February 13, 2018 (backup)

2. INTRODUCTIONS

3. PUBLIC COMMENT

4. REPORTS
   A. Utility Update – Eric Larson, P.E. (backup)
   B. Monitoring Update – Eric Larson, P.E. (backup)
   C. Stormwater Implementation Committee Report – Eric Larson, P.E. (backup)
   D. Stormwater Related Projects – Eric Larson, P.E. (backup)
   E. Upcoming Professional Contracts Report – Eric Larson, P.E. (backup)
   F. Regional Coordination – Eric Larson, P.E. (backup)
   G. Municipal Reports – Eric Larson, P.E. (backup)
   H. MS4 Update – Eric Larson, P.E. (backup)
   I. Maintenance Projects Report – David Wilhelm, P.E. (backup)

5. UNFINISHED BUSINESS

6. NEW BUSINESS
   A. Special Presentation –TBD

7. PUBLIC COMMENT

8. NEXT MEETING AGENDA
   A. April 10, 2019 (backup)

9. ADJOURNMENT