CITY OF WILMINGTON
STORMWATER SERVICES

City of Wilmington, North Carolina

STORMWATER MANAGEMENT PLAN & ANNUAL NPDES PERMIT REPORT

Prepared by:
City of Wilmington, NC
Stormwater Services
PO Box 1810
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Wilmington, NC 28412

NPDES Permit No.: NCS000406

Reporting Year: July 1, 2017 – June 30, 2018

REPORTING CERTIFICATION

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

11/29/18

Derek R. Pielech, P.E. — Date

Manager, Stormwater Services

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INTRODUCTION

Stormwater Management Plan Overview

The North Carolina Division of Water Quality issued NPDES Phase II Permit NCS000406 to the City of Wilmington effective November 12, 2012. The Stormwater Management Plan is the City of Wilmington's program to comply with NPDES Phase II permit NCS000406 for stormwater discharges from Small Municipal Separate Storm Sewer Systems (MS4s). The plan defines strategies and guidelines necessary for protecting water quality and reducing pollutant discharges to the maximum extent practicable. The plan also includes reporting results for the current yearly reporting period from July 1, 2017 to June 30, 2018.

The plan is a guidance document to be used by the City staff and the general public. The plan is evolving and will address needs and priorities that will be reflected in compliance programs over the 5 year implementation schedule.

As required by EPA regulations for the NPDES Phase II stormwater programs, the following six minimum measures are addressed in the plan:

1. Public Education and Outreach
2. Public Participation and Involvement
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post-Construction Runoff Control
6. Pollution Prevention and Good Housekeeping for Municipal Operations

Program Implementation Status

The City of Wilmington is pleased to report excellent progress for year 5 compliance with requirements of NPDES Phase II permit NCS000406. Primary areas of work include:

- Continued implementation of amended ordinances related to Post Construction and Illicit Discharge BMPs.
- Continued mapping of stormwater infrastructure within areas where data is absent.
- Continuation of Public Outreach and Public Participation efforts.
- Continued effort to implement new SCMs at City facilities to improve water quality.
- Implementation of several key actions of the Bradley and Hewletts Creek Watershed Restoration Plan, including the installation of a large bioretention area through the collaborative efforts of plan partners and stakeholders.

Wilmington continues to move forward with implementing the necessary goals and objectives as outlined in their permit. Progress was made this year related to dry weather flow monitoring

and planning and also with improved in-house maintenance procedures. We continue to have success with our public outreach and participation program and education to the public. The City remains focused on improving the water quality for the areas surrounding water bodies as indicated by UNCW's Center for Marine Science ambient monitoring of water quality on creeks within the City.

CITY OF WILMINGTON STORMWATER SERVICES OVERVIEW

Comprehensive Stormwater Management

Comprehensive stormwater management takes into account both the quantity and quality of stormwater runoff and is reflected in five core components of Wilmington's Stormwater Services program:

Management & Planning

Master planning utilizes the existing stormwater system inventory to develop a long range plan to improve drainage and water quality within an entire watershed. When planning on such a large scale, Stormwater Services seeks involvement and input from citizens and stakeholders. Management activities also include customer service – responding to customer concerns or inquiries and administrative services required for operation of the City stormwater utility.

Regulatory and Enforcement

Regulatory and enforcement activities are outlined in the City's existing stormwater ordinance requiring comprehensive stormwater management and creating technical standards for design and maintenance of private stormwater facilities. Stormwater Services also provides semi-annual inspections for privately permitted stormwater retention facilities. These inspections are performed in order to ensure compliance with city maintenance standards. Compliance with NPDES Phase II stormwater regulations also fall into this category.

Capital Improvements

The stormwater utility provides dedicated funding and staff resources for planning, designing, and constructing capital projects. These projects are necessary when the existing storm drainage system is inadequate and can result in flooded streets, houses, and businesses. Capital improvement projects require collaboration among City departments, outside agencies, and citizens in affected areas. Whenever possible, capital projects incorporate innovative design or best management practices (BMPs) to improve water quality and reduce the quantity of stormwater runoff.

Operations and Maintenance

The City of Wilmington's Maintenance Division is responsible for maintaining the public drainage system. Maintenance activities consist of open drainage, closed drainage, street sweeping, and best management practices (BMPs). The open drainage system consists of roadside swales, ditches, channels, creeks, and ponds. The closed drainage system consists of pipes, culverts, catch basins, and manholes. Both of these systems are maintained using manual and mechanical techniques to insure that they remain open for proper drainage. Street sweeping provides preventative maintenance to minimize the amount of trash, debris,

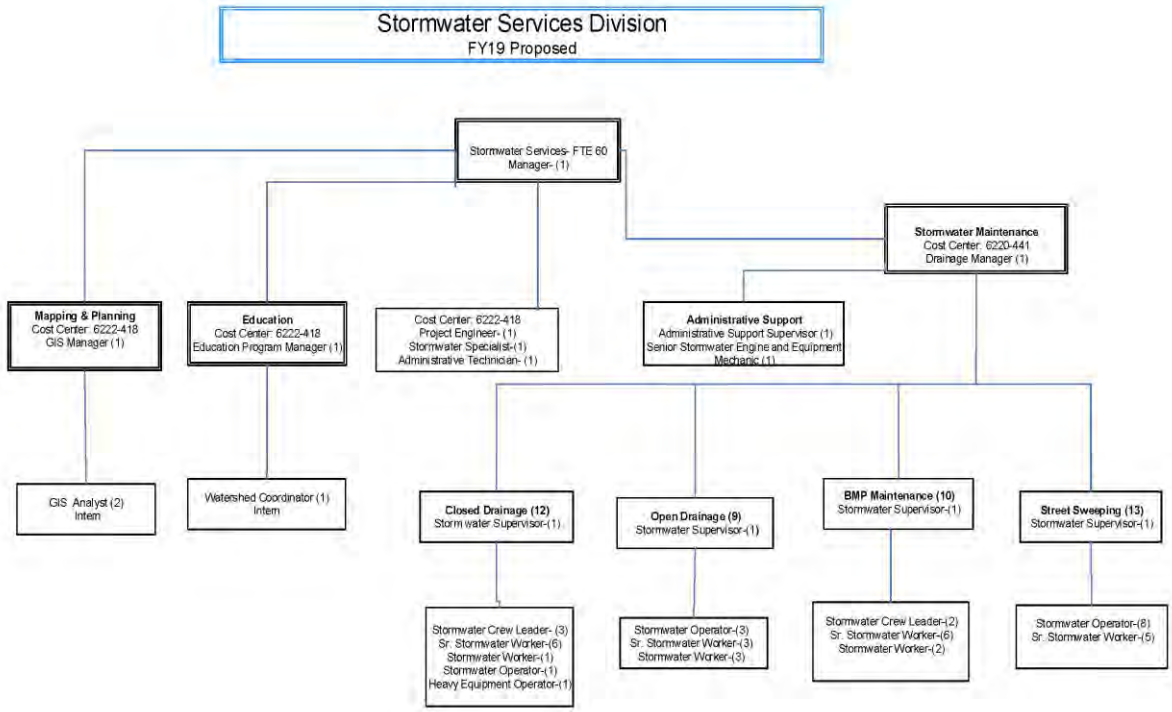
sediment, and other pollutants entering open or closed drainage routes. BMP maintenance consists of activities necessary to keep over 75 BMP sites including ponds, wetlands, and bio-retention areas in fully-functioning condition.

Water Quality

Water quality monitoring is executed by the University of North Carolina at Wilmington under annual contract with the City. Monitoring is performed on specific creeks and waterways within the City limits. Monitoring tests for specific pollutants and resulting data is used to plan capital improvement projects, guide outreach and education efforts, assess water quality at the sites monitored, identify persistent pollutant discharge areas or points, help to build a framework for future detection and tracing of pollutant sources and obtain grant funding. In addition, Stormwater Services implements an extensive outreach, education, and public involvement program that serves the citizens of Wilmington and includes a wide array of water quality education programming and materials. These programs include school presentations, homeowner association outreach, stormwater publications and giveaways, mass media advertising, special event exhibits, workshops, volunteer cleanups and storm drain marking, and collaborative efforts such as grant projects. These efforts strive to educate and engage citizens in protecting and improving local water quality through awareness, education, behavior modification and action.

Management and Planning

Organization Chart of the Stormwater Services Division



Estimated FY 17-18 Stormwater Management Fund Budget for NPDES

	FY 17-18 Adopted	FY 18-19 Adopted
REVENUES		
Storm Water Utility Fees	8,487,789	8,570,211
City Streets Storm Water Fees	2,649,015	2,742,393
Storm Water Discharge permits	47,000	50,000
NCDOT Drainage Maintenance	37,000	37,000
Interest Earnings	61,758	164,860
Miscellaneous	-	-
Appropriated Fund Balance	4,114,323	212,475
TOTAL REVENUES	15,396,885	11,776,939
EXPENDITURES		
Public Services	5,350,632	5,530,674
Non-Departmental	1,017,425	1,026,322
Debt Service	1,837,321	1,843,480
Contingency	100,000	76,463
Transfer to Capital Project Fund	7,088,045	3,300,000
TOTAL EXPENDITURES	15,396,885	11,776,939 [1]

[1] The FY 2017 budget was adopted by the Wilmington City Council on June 19, 2018

Regulatory and Enforcement

Public Services Code Enforcement

The City's stormwater ordinance required by this permit has been effective since November 1, 2009. Citizens can report suspected pollution through the Stormwater Hotline and the webpage reporting form. All complaints received by the Stormwater Division either from the public or from City staff is investigated; corrective action is prescribed; documented and followed until the violation is resolved. A Enforcement/Civil Penalty Guidance tool has been developed and is now being used to ensure consistency and help to guide the decision making process for NOVs and Civil Penalty issuance. Any complaints received that have environmental impacts other than stormwater or fall outside the City's regulatory authority are referred to DENR DWQ Wilmington Regional Office.

In an effort to maximize voluntary compliance, the City has, and will continue to develop and distribute educational materials to targeted populations in an aggressive manner. Consequently, all complaints provide the opportunity to educate the public on the issues that threaten stormwater, the best management practices for prevention, the awareness of our city's stormwater program, and the new ordinance.

Compliance through Public Education

The stormwater code enforcement program strives to maximize voluntary compliance through public education and use enforcement through penalties as a last resort. Staff has found that most stormwater ordinance violations can be resolved through public education. Most of the people encountered violating the ordinances are not even aware of their wrongdoings. Teaching them why they are in violation and why it matters works because most people want to do the right thing. There are very few repeat offenders. In Fiscal Year 2017-18, a total of 2 repeat offenders were identified. Our enforcement and civil penalties are reserved for 1) serious discharges and spills with the potential of harming human health and the environment, 2) repeat offenders, and 3) as a last resort to achieve compliance.

The program developed an assortment of educational material for targeted audiences, as well as targeted pollutants that teach the public about our stormwater ordinance and pollution prevention. For other circumstance specific letters are written with instructions to guide violators to a solution and compliance expectations. This clear outline of the City's expectations is a powerful tool for preventing future pollution problems.

Yard Waste

Yard waste violations receive a face to face meeting and a standardized letter explaining the ordinance and the reasons why it is necessary. Also highlighted are the expectations for compliance and civil penalties for any future violations. This letter is accompanied by a poster in English or Spanish and in various sizes. The poster's objective is to help educate landscape companies and their employees on the ordinance requirements that keep yard waste out of the drainage system and surface waters and the city's expectations.

Pet Waste

Reports of pet waste violations receive a face to face meeting if possible. A brochure and flyer has been developed explaining the dangers of pet waste bacteria in surface waters and the city's expectations as well as the ordinance and penalty amounts for any violations. Pet waste message flags are used and distributed with ordinance information in parks and public places, and in specific neighborhoods in response to complaints. The pet waste flyer is also available in poster size for display when needed in parks and common areas.

Illicit Discharges

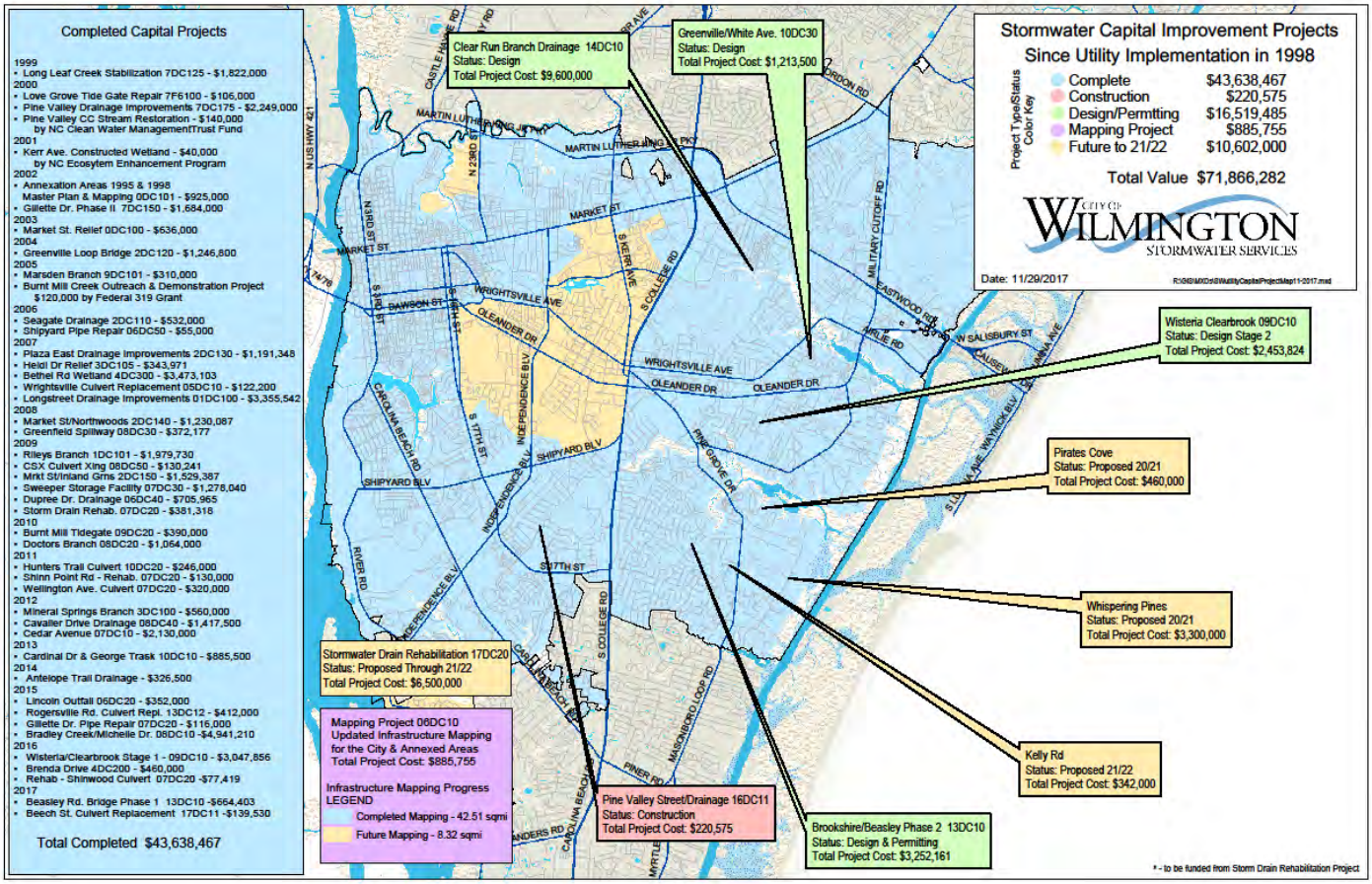
Reports of illicit discharges are addressed on a case by case basis. Informational posters and brochures for general use have been developed for distribution targeting the general public as well as specific source types that are typical in any urban area. These posters are kept on hand and distributed to businesses on an as needed basis to inform and educate them and their employees in restaurants, vehicle maintenance facilities, construction sites, on industry specific issues and best management practices specific to their businesses on how to avoid and prevent stormwater pollution. For issues that require investigation, assessment, and enforcement the process detailed in the Illicit Discharge Detection and Elimination Manual is followed.

Cape Fear Public Utility Authority

The Cape Fear Public Utility Authority (CFPUA) currently employs three Environmental Compliance Officers, one Environmental Compliance Supervisor, and one Environmental Compliance Manager that implement and enforce elements of the City's NPDES Wastewater Discharge Permit to include the City's Collection System Permit. As part of those requirements the group regulates sanitary sewer overflows (SSOs) and eliminates any wastewater or other polluted waters from leaving their system. They respond to reports and investigate leads generated by the public or monitoring results as part of their permit requirement and respond using public education, enforcement, and maintenance. The CFPUA copies the City on all SSOs and follows up with monitoring results and clean up measures. The CFPUA has maintained right of entry on the properties that it services. The city and CFPUA are working together to keep open lines of communication, continue to build relationships, and combine resources in a continued effort to locate chronic leaks and minimize release to MS4.

The CFPUA and the City continue to utilize the joint policy established in 2011 for the reporting and documentation of SSOs and leaks. This policy provides procedures for CFPUA to follow regarding reporting and documentation of SSOs that impact the City's MS4. These guidelines will enable the City to comply with Phase II reporting requirements as well as provide assistance to CFPUA in mitigating any potential threat to public health and environment. This policy is attached in Appendix D.

Capital Improvements



In-House Projects

Location	Pipe				Structures			BMP			Total Cost
	Amt.	Size	Type	Cost	Amt.	Type	Cost	Amt.	Type	Cost	
Lancaster Infiltration Swale								1	Infiltration Swale	$ 12,519.56	$ 12,519.56
302 S. 10th St.					1 1	Casting, fabricated top Casting, fabricated bottom	$ 4,148.67				$ 4,148.67
9 N. 17th St					1 1	Specialty made bottom, 5 x 5 Casting, manhole complete, 24" x 8"	$ 4,991.41				$ 4,991.41
5806 Anne Dr					2 1	Specialty, made top, 5 x 5 Casting, frame & grate, 24" x 36"	$ 3,804.49				$ 3,804.49
1702 Burnett Blvd.	77 28	18" 18"	RCP ADS	$ 15,441.61	1	Specialty, made top, 5 x 5	$ 5,440.37				$ 20,881.98
700 Blk Cassidy Dr	430	18"	ADS	$ 25,325.65	4 4	Casting, frame & grate, 24" x 36" Specialty made top, 5 x 5	$ 20,723.44				$ 46,049.09
400 Blk. Colony Circle N.	40 45	15" 24"	ADS ADS	$ 18,124.38	1 1	Specialty made bottom, 5 x 5 Specialty made top, 5 x 5	$ 5,097.08				$ 23,221.46
900 Blk. Ewell Dr	174	15"	RCP ADS	$ 23,166.37	2 1	Specialty made bottom, 5 x 5 Specialty made top, 5 x 5	$ 6,276.93				$ 29,443.30
Greenville Lp. Rd & Tonbo Trail					1 1	Casting, fabricated top Casting, fabricated bottom	$ 5,242.54				$ 5,242.54
1002 Princess St	30	15"	RCP	$ 4,181.55	1	Specialty made top, 5 x 5	$ 9,073.12				$ 13,254.67
909 Rabbit Run	24	15"	ADS	$ 6,480.19							$ 6,480.19
221 Southgate Dr	28 168	15" 24"	ADS ADS	$ 28,391.95							$ 28,391.95
217 Stonewall Jackson Dr	40	15"	RCP	$ 5,611.06							$ 5,611.06
300 Blk. Suffolk Lane					1	Casting, frame & grate, 24" x 36"	$ 2,097.38				$ 2,097.38
200 Blk Brookshire Lane	48	12"	RCP	$ 6,030.83							$ 6,030.83
400 Blk. Sharon Dr	158	15"	RCP	$ 26,711.05	1 1	Specialty made bottom, 5 x 5 Specialty made top, 5 x 5	$ 232.28				$ 26,943.33
1702 Burnett Blvd.	77 28	18" 18"	RCP ADS	$ 15,441.61	1	Casting, fabricated top	$ 5,440.37				$ 20,881.98
1202 Upper Reach Dr	85	6"	PVC	$ 10,313.29							$ 10,313.29
Total				**$ 185,219.54**			**$ 72,568.08**			**$ 12,519.56**	**$ 270,307.18**

Operations and Maintenance

Yearly Maintenance Activities Chart

	Amount	Unit of Measure	Total Labor Hrs.		Total Cost
SECTION 1: CONSTRUCTION					
C-1 Construction - Structure	27.00	each	1,559.50	$	93,441.73
C-1 Construction - Pipe	1,445.00	ft.	2,607.50	$	177,356.73
C-2 Construction - Flume	2.00	each	120.00	$	5,213.58
C-3 Construction - Ditch	2.00	each	243.50	$	12,597.04
C-3 Construction - BMP	7.00	each	892.50	$	44,119.00
C-0 Construction - Stock pile material	114.00	load	172.50	$	12,038.34
C-0 Construction - Plan work			147.00	$	6,452.31
			5,742.50	**$**	**351,218.73**
SECTION 2: INSPECTION					
I-1 Inspection - Closed			4,393.75	$	157,139.81
I-1 Inpection - Video	21,747.00	ft.	452.00	$	13,387.73
I-1 Inspection-Video data management			10.00	$	251.24
I-1 Inspection-new system					
I-1 Inspection-Survey			95.00	$	4,766.66
I-2 Inspection-Open			642.00	$	17,921.60
I-3 Inspection-BMP	343.00	each	252.50	$	7,315.13
I-3 Inspection-Lake					
I-4 Inspection-Tide gate					
I-0 Inspection-Miscellaneous					
I-0 Inspection-Plan work			11.00	$	352.84
			5,856.25	**$**	**201,135.01**
SECTION 3: MAINTENANCE					
M-1 Maintenance-BMP	777.00	each	4,689.75		160.339.30
M-1 Maintenance-Right of Way			5,148.75	$	176,735.43
M-2 Maintenance-Ditching manual	110,329.00	ft.	2,001.00	$	62,140.61
M-3 Maintenance-Ditching mechanical	30,042.20	ft.	3,061.50	$	200,464.85
M-4 Maintenance-Culvert	129.00	each	214.00	$	7,125.56
M-5 Maintenance-Pipe	101,627.00	ft.	2,557.50	$	135,363.43
M-5 Maintenance-Structure	13,525.00	each	3,721.90	$	162,067.17
M-5 Maintenance-Reset cover	203.00	each	294.00	$	8,210.90
M-6 Maintenance-Lake	43.00	each	437.50	$	17,019.76
M-7 Maintenance-Mowing	488,187.00	ft.	2,324.50	$	160,335.34
M-7 Maintenance-Mowing right of way	36.74	acre	380.00	$	37,078.60
M-8 Maintenance-Tide gate	8.00	each	69.00	$	2,210.08
M-9 Maintenance-Sweep streets	10,543.23	mile	5,828.50	$	510,624.96
M-9 Maintenance-Sweep support			2,477.25	$	146,015.07
M-10 Maintenance-Haul waste	816.00	load	1,771.25	$	126,874.15
M-10 Maintenance-Screen material					
M-11 Maintenance-Vehicle			2,022.00	$	194,066.10
M-0 Maintenance-Yard			710.50	$	20,696.74
M-0 Maintenance- Ditching (creek walk thru)	48443.00	ft.	3,151.75	$	92,562.15
M-0 Maintenance-Plan work			8.00	$	695.83
			40,868.65	**$**	**2,060,286.73**
SECTION 4: REPAIR					
R-1 Repair-Pipe failure	171.00	each	4,173.90	$	226,825.61
R-2 Repair Pipe work	939.00	ft.	1,275.25	$	82,445.36
R-2 Repair-Convert structure	11.00	each	568.50	$	28,798.83
R-3 Repair Structure	55.00	each	1,242.75	$	57,905.28
R-4 Repair Erosion	3,894.00	ft.	452.50	$	33,935.33
R-5 Repair Replace cover	115.00	each	136.50	$	16,717.02
R-5 Repair Tidegate	-	each			
R-0 Repair- Plan work			26.50	$	1,451.57
			7,875.90	**$**	**448,079.00**

Water Quality

Monitoring Program Overview

In October 1997, the City of Wilmington contracted with the UNCW Center for Marine Science for a project with the goal of assessing water quality in Wilmington City watersheds under base flow conditions. Also, certain sites were analyzed for sediment heavy metals concentrations (EPA Priority Pollutants). New Hanover County also participated in this effort for tidal creeks outside of City jurisdiction. UNCW produced a combined report of results entitled Environmental Quality of Wilmington and New Hanover County Watersheds. Immediately below is an overview of their work methods. Following this overview is the executive summary of their most recent report.

The water quality data in these reports are presented from a watershed perspective. Some of the watersheds cross political boundaries (i.e. parts of the same watershed may lie in the County but not the City). Howe and Whiskey Creeks are examples. Water quality parameters analyzed in the tidal creeks include water temperature, pH, dissolved oxygen, salinity/conductivity, turbidity, nitrate, ammonium, orthophosphate, chlorophyll *a*, and in selected creeks fecal coliform bacteria. Similar analyses were carried out in the City watersheds with the addition of total nitrogen (TKN), total nitrogen (TN), total phosphorus (TP), total suspended solids (TSS) and biochemical oxygen demand (BOD) at selected sites.

Water Quality Methods

Field parameters were measured at each site using a YSI 6920 Multiparameter Water Quality Probe (sonde) linked to a YSI 650 MDS display unit. Individual probes within the instruments measured water temperature, pH, dissolved oxygen, turbidity, salinity, and conductivity. YSI Model 85 and 55 dissolved oxygen meters were also used on occasion. The instruments were calibrated prior to each sampling trip to ensure accurate measurements. The UNCW Aquatic Ecology laboratory is State-Certified for field measurements (temperature, conductivity, dissolved oxygen and pH) and for laboratory chlorophyll *a* measurements.

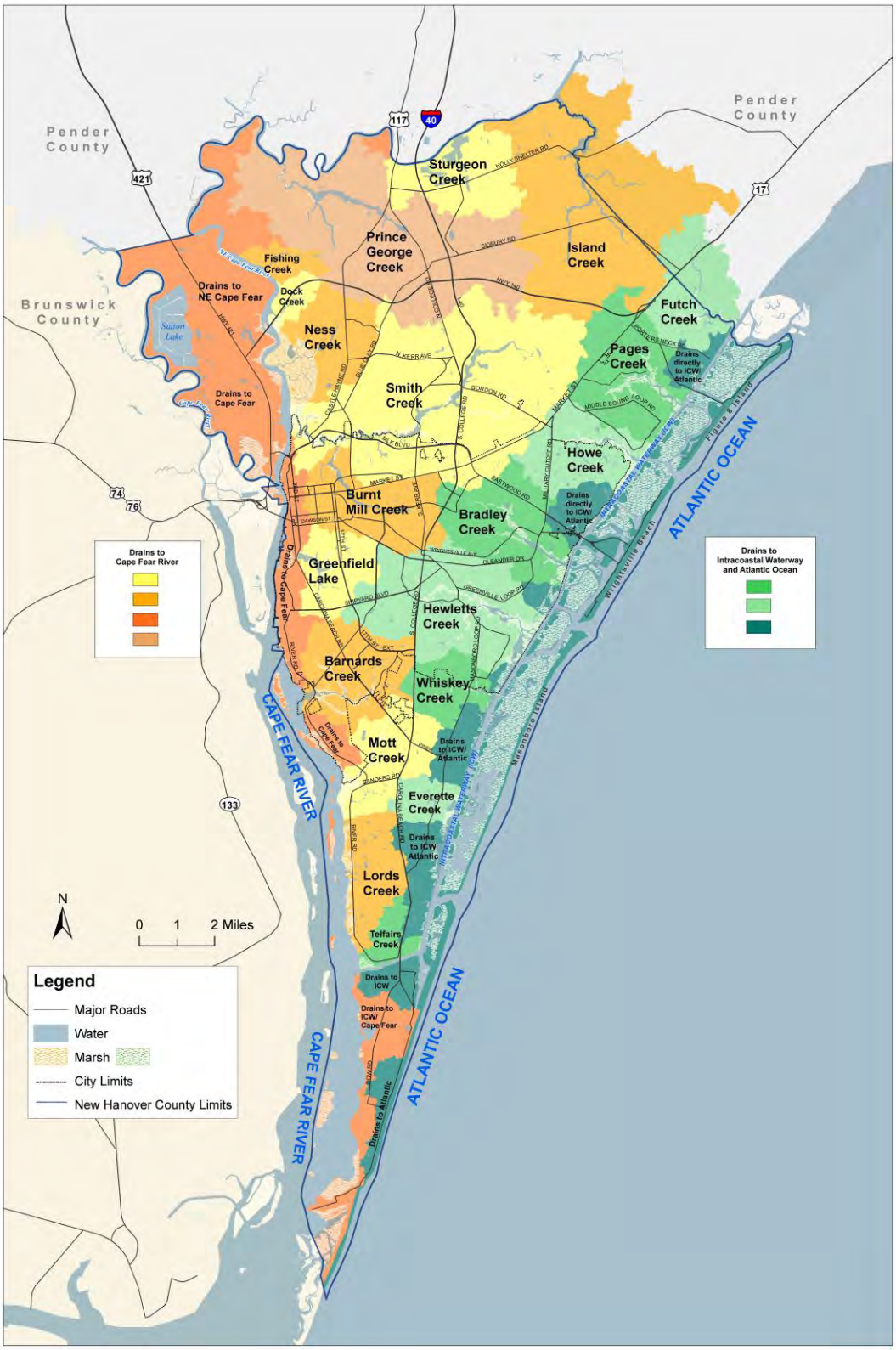
The analytical method used to measure chlorophyll *a* is described in Welschmeyer (1994) and US EPA (1997). Chlorophyll *a* concentrations were determined from the 1.0 micrometer glass fiber filters used for filtering samples for nitrate+nitrite and orthophosphate analyses. All filters were wrapped individually in aluminum foil, placed in an airtight container and stored in a freezer. During the analytical process, the glass filters were separately immersed in 10 ml of a 90% acetone solution. The acetone was allowed to extract the chlorophyll from the material for 18-24 hours. The solution containing the extracted chlorophyll was then analyzed for chlorophyll *a* concentration using a Turner AU-10 fluorometer. This method uses an optimal combination of excitation and emission bandwidths that reduces errors in the acidification technique.

Nutrients (nitrate, ammonium, total Kjeldahl nitrogen, total nitrogen, orthophosphate, and total phosphorus) and total suspended solids (TSS) were analyzed by a state-certified contract laboratory using EPA and APHA techniques. We also computed inorganic nitrogen to phosphorus

molar ratios for relevant sites (N/P). Fecal coliform concentrations were determined using a membrane filtration (mFC) method (APHA 1995).

For a large wet detention pond (Ann McCrary Pond on Burnt Mill Creek) and for a constructed wetland on Kerr Avenue (at the headwaters area of Burnt Mill Creek) UNCW collected data from input (control) and outfall stations. This data was used to test for statistically significant differences in pollutant concentrations between pond input and output stations. The data were first tested for normality using the Shapiro-Wilk test. Normally distributed data parameters were tested using the paired-difference t-test, and non-normally distributed data parameters were tested using the Wilcoxon Signed Rank test. Statistical analyses were conducted using SAS (Schlotzhauer and Littell 1987).

Wilmington (New Hanover County)Watersheds Map



ENVIRONMENTAL QUALITY OF WILMINGTON AND NEW HANOVER COUNTY WATERSHEDS, 2017

by

Michael A. Mallin, Matthew R. McIver and Nicholas Iraola

CMS Report 18-01
Center for Marine Science
University of North Carolina Wilmington
Wilmington, N.C. 28409

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Executive Summary

This report represents combined results of Year 20 of the Wilmington Watersheds Project. Water quality data are presented from a watershed perspective, regardless of political boundaries. The 2017 program involved 7 watersheds and 22 sampling stations. In this summary we first present brief water quality overviews for each watershed from data collected between January and December 2017; note that fewer samples were collected in 2017 because funding did not arrive until late fall.

Barnards Creek – Barnards Creek drains into the Cape Fear River Estuary. It drains a 4,173 acre watershed that consists of 22.3% impervious surface coverage, and a population of approximately 12,200. Water column sampling was not funded during 2017, but new funding from the City allowed UNCW to re-initiate sampling of Barnards Creek in January 2018.

Bradley Creek – Bradley Creek drains a watershed of 4,583 acres, including much of the UNCW campus, into the Atlantic Intracoastal Waterway (AICW). The watershed contains about 27.8% impervious surface coverage, with a population of about 16,470. Three sites were sampled, all from shore. In 2017 there were no significant algal blooms recorded, but there were several incidents of low dissolved oxygen at the uppermost site BC-CA on College Acres. All three sites sampled were rated poor due to high fecal coliform bacteria, with the College Acres station BC-CA having especially high counts.

Burnt Mill Creek – Burnt Mill Creek drains a 4,207 acre watershed with a population of about 23,700. Its watershed is extensively urbanized (39.8% impervious surface coverage) and drains into Smith Creek. Three locations were sampled during 2017.

High fecal coliform counts occurred at only one of the three sites in 2017, much better than previous years. Two major and one minor algal blooms were recorded in 2017. Dissolved oxygen concentrations were good in two stations and fair in the remaining mid-creek site.

The effectiveness of Ann McCrary wet detention pond on Randall Parkway as a pollution control device for upper Burnt Mill Creek was mixed for 2017. Comparing inflows to outflows, there was a good bit of variability in parameter concentrations and hence no significant differences between inflow and outflow. Several water quality parameters showed an increase in pollutant levels along the creek from the exit from the detention pond to the downstream Princess Place sampling station, including fecal coliform bacteria, orthophosphate and nitrate.

Greenfield Lake – This lake drains a watershed of 2,465 acres, covered by about 37% impervious surface area with a population of about 10,630. This urban lake has suffered from low dissolved oxygen, algal blooms, periodic fish kills and high fecal bacteria counts over the years. The lake was sampled at four tributary sites and three in-lake sites. Of the four tributaries of Greenfield Lake, Squash Branch (near Lake Branch Drive), Jumping Run Branch at 17th Street, Jumping Run Branch at lakeshore Dr., and Clay Bottom Branch (near Lakeshore Commons Apartments), three suffered from low dissolved oxygen problems, although main lake oxygen problems were only minor.

Algal blooms are periodically problematic in Greenfield Lake, and have occurred during all seasons, but are primarily a problem in spring and summer. In 2017 a filamentous green algal bloom occurred in early spring and a massive summer blue-green algal bloom of *Anabaena* occurred late spring - summer. In the period 2007-2013 there was a statistically significant relationship within the lake between chlorophyll *a* and five-day biochemical oxygen demand (BOD5) meaning that the algal blooms are an important cause of low dissolved oxygen in this lake, and high BOD occurred congruent with the blooms in 2017. Stormwater runoff into the streams also contributes BOD materials into the lake. In 2017 all

tributary stations and all of the in-lake stations exceeded the fecal coliform State standard on 40% or more of occasions sampled.

Greenfield Lake is currently on the NC 303(d) list for impaired waters due to excessive algal blooms. Thus, in 2016-17 UNCW graduate student Nick Iraola, as part of his MS Thesis, conducted wet-period and dry-period sampling of the five main inflowing tributaries to the lake to assess where the principal nutrient inputs came from. The results showed that the largest inorganic nutrient loads came in from Jumping Run Branch and Squash Branch, and best management practices (BMPs) to reduce nutrient loading should be targeted for those streams.

Hewletts Creek – Hewletts Creek drains a large (7,478 acre) watershed into the Atlantic Intracoastal Waterway. This watershed has about 25.1% impervious surface coverage with a population of about 20,210. In 2017 the creek was sampled at four tidal sites and one non-tidal freshwater site (PV-GC-9).

Incidents of low dissolved oxygen were rare at Hewletts Creek in 2017. Turbidity was low, and only one minor algal bloom was documented in 2017. Fecal coliform bacteria counts exceeded State standard 100% of the time at NB-GLR (the north branch), 80% of the time at MB-PGR (the middle branch), 60% of the time at PVGC-9, and 80% of the time at SB-PGR (the south branch). The geometric means at PVGC-9, MB-PGR, SB-PGR and NB-GLR all well exceeded 200 CFU/100 mL for a poor rating for this pollutant parameter, but the geometric mean of fecal bacteria counts at HC-3 was well under the state standard.

During 2015-16 a wetland was created along Sharon and Patricia Drives, upstream of the sampling location NB-GLR along the north branch of Hewletts Creek. Vegetation was sparse until summer 2017. In future reports statistical comparisons will be made between pre-and-post wetland parameter concentrations to measure wetland efficacy as a pollutant removal feature.

Howe Creek – Howe Creek drains a 3,516 acre watershed into the AICW. This watershed hosts a population of approximately 6,460 with about 21.4% impervious surface coverage. Two stations were sampled in Howe Creek in 2017. The uppermost site HW-DT had one major algal bloom in the 2017 sampling. Both the uppermost station HW-DT and the mid-creek station HW-GP were rated poor for high fecal coliform bacteria counts, exceeding the state standard on 50-100% of the times sampled. However, dissolved oxygen concentrations were good at both sites in 2017.

Motts Creek – Motts Creek drains a watershed of 3,342 acres into the Cape Fear River Estuary with a population of about 9,530; impervious surface coverage 23.4%. This creek was not sampled for water quality by UNCW in 2017, but new funding from the City allowed UNCW to resume sampling of Motts Creek in January 2018.

Smith Creek – Smith Creek drains into the lower Northeast Cape Fear River just upstream of where it merges with the Cape Fear River. It has a watershed of 16,650 acres that has about 21.3% impervious surface coverage, with a population of about 31,780. One estuarine site on Smith Creek, SC-CH, was sampled by UNCW under the auspices of the Lower Cape Fear River Program (LCFRP).

The dissolved oxygen standard for Smith Creek, which is rated as C Sw waters is 4.0 mg/L, which was not violated in our 2017 samples. The North Carolina turbidity standard for estuarine waters (25 NTU) was not exceeded. There were no major algal blooms present in our 2017 sampling. However, fecal coliform bacterial concentrations exceeded 200 CFU/100 mL on 75% of samples in 2017, for a Poor rating.

Whiskey Creek – Whiskey Creek is the southernmost large tidal creek in New Hanover County that drains into the AICW. It has a watershed of 2,078 acres, a population of about 8,000, and is covered by approximately 25.1% impervious surface area. One station, on Masonboro Loop Road, was sampled from shore along this creek in 2017. This site had low to moderate nutrient concentrations and no algal bloom problems.

Dissolved oxygen was substandard (below 5.0 mg/L) on one of five occasions sampled, and fecal coliform bacteria counts exceeded 200 CFU/100 mL on 20% of occasions sampled.

Water Quality Station Ratings – The UNC Wilmington Aquatic Ecology Laboratory utilizes a quantitative system with four parameters (dissolved oxygen, chlorophyll *a*, turbidity, and fecal coliform bacteria) to rate water quality at our sampling sites. If a site exceeds the North Carolina water quality standard (see Appendix A) for a parameter less than 10% of the time sampled, it is rated Good; if it exceeds the standard 10-25% of the time it is rated Fair, and if it exceeds the standard > 25% of the time it is rated Poor for that parameter. We applied these numerical standards to the water bodies described in this report, based on 2017 data, and have designated each station as good, fair, and poor accordingly (Appendix B).

Fecal coliform bacterial conditions for the entire Wilmington City and New Hanover County Watersheds system (22 sites sampled for fecal coliforms) showed 18% to be in good condition, 18% in fair condition and **68%** in poor condition, an improvement over the previous year. Dissolved oxygen conditions (measured at the surface) system-wide (22 sites) showed 64% of the sites were in good condition, 18% were in fair condition, and 18% were in poor condition, an improvement from 2016. For algal bloom presence, measured as chlorophyll *a*, 68% of the 22 stations sampled were rated as good, 23% as fair and 9% as poor. For turbidity, all of the 22 sites sampled were rated as good. It is important to note that the water bodies with the worst water quality in the system also have the most developed watersheds with the highest impervious surface coverage; Burnt Mill Creek – 39% impervious coverage; Greenfield Lake – 37% impervious coverage; Bradley Creek – 28% impervious coverage.

2017-2018 NPDES PROGRAM HIGHLIGHTS & ANNUAL REPORTING

Public Education & Outreach

- 66 Enviroscape watershed education presentations delivered to 8th grade science classes in New Hanover County Schools serving over 2,200 students.
- Stormwater Watch annual newsletter mailed to 40,000+ city residents highlighting stormwater fee billing, UNCW & NC water quality data, and an anti-litter ad.
- Stormwater Services led tours of the Stormwater Demonstration Site for the NC Floodplain Managers Association conference.

Public Involvement & Participation

- 28 storm drain markers were placed by volunteers on Racine Drive near the UNCW campus and the neighborhood near Steeplechase Drive area this year.
- 11 watershed cleanups were held involving 343 volunteers contributing 702 volunteer hours and collecting over 24.75 (96 gallon bins) and 4 (30 gallon bags) of trash, and 26.5 (96-gallon bins) of recycling.
- Stormwater Services conducted a public meeting for residents in the spring of 2018 for the Scotland Lane drainage project. Meetings were also held with individual property owners impacted by the project. Doorhangers and/or mailings were distributed to residents impacted by the Ewell Drive and Cassidy Drive drainage projects.

Illicit Discharge Detection and Elimination (IDDE)

- Stormwater infrastructure mapping has continued with the goal of mapping the public drainage system throughout the City. Currently, approximately 93% of the City has been mapped.
- Engineering construction inspectors went through IDDE training to identify potential sources while out conducting routine maintenance.
- The City conducted 5 dry weather flow investigation segments in the Burnt Mill Creek, Greenfield Lake and Upper Cape Fear River watersheds.

Post-Construction Site Runoff Controls

- Continued implementing the City's Land Development Code to provide post construction controls to meet the requirements of the City's Phase II permit and to bring the ordinance into compliance with the recent Coastal Stormwater Legislation.
- Continued site plan reviews coordinated with Engineering Dept.of all new development and redeveloped sites.
- Planning for updating the city's Land Development Code that relates to redevelopment standards.

Pollution Prevention and Good Housekeeping for Municipal Operations

- Continued implementation of SCMs in SPPP for Fleet Maintenance Facility.
- Continued water quality improvements for City operations facilities.
- Planning for improved water quality SCMs at City facilities for Good Housekeeping/Pollution Prevention.

Voluntary Watershed Restoration Plan

- NC Coastal Federation was awarded EPA 319 Grant in collaboration with UNCW and the city to install pervious pavement around storm drains and a rain garden on campus.
- Created new public service announcement, promoting the installation and use of rain barrels.
- Developed and mailed postcards in the winter and spring focused on the Heal Our Waterways website and BMPs to approximately 16,200 residents and businesses in the Hewletts and Bradley Creek Watersheds.
- Decreased stormwater volume entering target watersheds by 2,203 cubic feet with BMP installations by the HOWBMP Program and NCCF grant installations.

PUBLIC EDUCATION AND OUTREACH

1. Objectives for Public Education and Outreach

a. Implement a public outreach and education program, locally or through cooperative or contractual agreement, which includes a combination of approaches designed to reach the public and target audiences with stormwater pollution prevention messages.

b. Distribute educational materials and information and conduct outreach/education activities for the community, which address the impacts of stormwater discharges on water bodies and the steps the public can take to reduce stormwater pollution.

2. BMPs for Public Education and Outreach

The permittee shall implement the following BMPs to meet the objectives of the Public Education and Outreach Program.

BMP	Measurable Goals
a. Define outreach/education program goals including a description of the target pollutants, sources, and target audiences	Define goals and objectives of the outreach/education program to include a description of target pollutants or stressors, likely residential and/or industrial and commercial sources of these pollutants, target audiences for each pollutant and why they were selected, and key outreach messages. Update this section as necessary to reflect changes in the target audience, public awareness, etc.

Accomplishments:
A comprehensive outreach and education plan including goals, objectives, target pollutants, sources, and target audiences is included in the Public Education and Outreach Appendix. The plan defines the origin and sources for each pollutant and includes suggested outreach messages and strategies. Staff regularly uses this information as a guide for planning, implementing, and evaluating outreach and education efforts throughout the city. The plan is updated and modified as pollutant sources, target audience demographics, public awareness, water quality, funding, and other program variables change over time.

b. Distribute public education materials and information to identified target audiences and user groups. For example, schools, homeowners, and/or businesses.	The permittee shall distribute stormwater educational materials and information to appropriate target groups. Instead of developing its own materials, the permittee may rely on Public Education and Outreach materials supplied by the state, and/or other entities through a cooperative or contractual agreement, as available, when implementing its own program.

Accomplishments:

The Enviroscape Watershed Education Program has been integrated into the 8th grade curriculum for 11+ years. As a result, the program reaches all 8th grade science classes in New Hanover County Schools, this year serving 76 classes and 2,200+ students. The interactive presentation discusses topics including watersheds, water quality, non-point source pollution and solutions, and stewardship. Cape Fear River Watch, New Hanover Soil & Water Conservation District, and the City of Wilmington Stormwater Services use trained and certified instructors to deliver presentations. An instructor training was conducted for new and veteran instructors in January 2018. Anonymous teacher feedback was overwhelmingly positive this school year.

- *All presenters were great! My students understood the presentation and it lead to follow up questions the next day.*
- *Both instructors were very professional and great! I would definitely recommend them!*
- *Both presenters were fantastic! They did a great job interacting with the kids. Many thanks!*

This year's annual Stormwater Watch newsletter was mailed to 40,000+ city residents and contained articles highlighting stormwater billing, litter reduction, and the UNCW water quality report of creeks and lakes that lie within the city limits.

Stormwater education staff presented and/or exhibited at Cape Fear Academy, Isaac Bear Early College, the MLK Center Imagination Station Event, Earth Day Festival, UNCW Pier 601 Creative Advertising class, and UNCW's Our Green Future event and UNCW Sustainability Clean Water Day with Canines event. 31 student and faculty pet owners signed the pledge at this event.

Stormwater Services debuted the Super Pooper Scooper Photo Booth at the 2018 Wilmington Earth Day Festival that educated participants about pet waste in a fun and interactive manner.

Stormwater Services led tours of the Stormwater Demonstration Site for the NC Floodplain Managers Association conference. Staff led tours of BMPs in the city that have been installed with grant funding for 319 Grant staff from the NC Division of Water Resources.

Fall and Spring coordinated media campaigns aired on digital billboards, radio, television, media websites, and digital and mobile platforms. In a review of media stats, message formats (ie interactive video) were above the national average for digital engagement. For example, for the fall stormwater campaign on WECT/NBC digital and mobile platforms:

- Total ads viewed Oct-Dec: 322,646
- 1,175 visitors went to wilmingtonnc.gov/stormwater via WECT digital and mobile ads to get more information about stormwater
- Interactive Video: 62% engagement rate with 85,156 ads served
- WECT.com – News & Weather apps – 195,563 ads served

An online Watershed Map debuted on the city's GIS web portal. Citizens can type in their residential or business address to learn which watershed they live in. In addition, staff has found this map extremely useful when vetting BMP projects for specific locations.

c. Informational Web Site	The permittee shall promote and maintain an internet web site designed to convey the program's message(s).

Accomplishments:

Staff continued to update the dedicated website with relevant stormwater and project content. Several capital projects were added to the site, as well as Canines for Clean Water photos, Super Pooper Scooper photos, news and events, UNCW water quality report, annual Stormwater Watch Newsletter, and more. www.wilmingtonnc.gov/stormwater

Maintain Hotline/Help line	The permittee shall promote and maintain a hotline for citizens and businesses to report suspected stormwater pollution and illicit discharges occurring within the City.

Accomplishments:

The Stormwater Pollution Prevention hotline was established in January 2010 to field calls from citizens, businesses, and employees to report illicit discharges and instances of potential or actual stormwater pollution. The hotline phone # is 910-341-1020 and the web address is www.wilmingtonnc.gov/reportstormwaterpollution.

Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to each hotline report. The hotline and online reporting webform are advertised on the City's cable TV channel and via the stormwater website, citywide newsletters, public presentations and displays, large educational magnets on stormwater fleet vehicles, and promotional outreach items including cups, pens, reusable bags, magnets, and other giveaways to the public.

To summarize hotline activity this past year: 20 calls were placed to the City's Stormwater hotline, 6 online hotline webform reports were submitted, and 357 emails and 81 calls were directly received by the Compliance Officer related to stormwater violations. The nature of the hotline reports are found in the Enforcement section of the Appendix.

d. Extent of Exposure/Reporting Requirements	For each event, activity, or media, including those elements implemented locally or through a cooperative or contractual agreement, the permittee shall estimate and record the extent of exposure.

Accomplishments:

The extent of exposure requirement is documented in tables in the Public Education Appendix, as well as the Public Involvement Appendix. Documentation includes the date of event or activity, the type of event/activity, audience reached, who delivered the content, the method of delivery and/or message, and the resulting attendance or participation.

In addition to these records, the Stormwater Education Program Manager serves on the NC Aquarium at Fort Fisher Advisory Board as appointed by the NC Department of Cultural & Natural Resources. The Program Manager also attended the Environmental Educators of NC Conference and the NCAPWA Public Education Workshop. She also has consulted with the newly-formed NC committee tasked with developing tools to help HOAs understand stormwater management requirements and built upon area (BUA).

Assessment of Program Implementation

The city's stormwater outreach and education program continues to implement a variety of innovative activities and programs that meet or exceed the minimum requirements of our NPDES permit, educate the community about stormwater runoff pollution/solutions, and inspire action and behavior change. These extensive activities can be viewed in the Appendix.

Objectives for Next Year

- Develop grant info sheets for all current and former stormwater grant projects with data that includes the source of grant funding, in-kind match, grant project goals, etc and post on website.
- Complete outreach and education plan update including goals, objectives, target pollutants, sources, target audiences, and assessment.
- Develop content for the citywide Annual Spring Stormwater Watch public newsletter, to include UNCW's annual water quality report and the State's 303(d) list data.
- Coordinate the Enviroscape Watershed Program serving 8th grade science classes in NHCS.

PUBLIC INVOLVEMENT AND PARTICIPATION

1. Objectives for Public Involvement and Participation

Involve the community in the development and implementation of the stormwater program by implementing a public involvement and participation program locally or through cooperative or contractual agreement.

2. BMPs for Public Involvement and Participation

The permittee shall implement the following BMPs to meet the objectives of the Public Involvement and Participation Program.

BMP	Measurable Goals
a. Volunteer community involvement program	The permittee shall include and promote volunteer opportunities designed to promote ongoing citizen participation, implemented locally or through cooperative or contractual agreement.

Accomplishments:

The City of Wilmington Stormwater Services contracts annually with Cape Fear River Watch (CFRW) and New Hanover Soil & Water Conservation District (NHSWCD) to implement public involvement and participation activities, as well as public education and outreach services. Both agencies sign an annual contract with the City which specifies deliverables that help Stormwater Services fulfill many of the NPDES public education and public participation requirements. In addition to full time staff, each agency taps into a volunteer base and encourages citizens to become involved in stormwater outreach, education and involvement efforts.

Services performed by CFRW & NHSWCD include activities such as volunteer watershed clean-ups, volunteer creek monitoring, educational presentations for schools and the community, participation in the Lower Cape Fear Stewardship Awards program, a monthly rain barrel sale, volunteer creek monitoring, volunteer storm drain marking, eco-tours, Envirothon competition and school field days, website content, community stormwater best management practice (BMP) installations, and more.

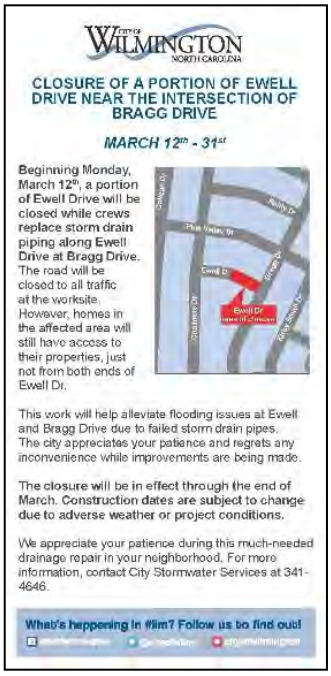
Each agency provides the City with four quarterly progress reports and invoices during the annual contract period for services performed. The cumulative year-end progress report for each agency is included in the Public Involvement and Participation Appendix of this annual report.

CFRW and NHSWCD continued their efforts to engage volunteers through the Storm Drain Marking Program. These efforts include adhering metal markers with pollution messages next to storm drains and distributing educational doorhangers to nearby residents and businesses. In addition, the city maintains a GIS webmap that allows education staff to track and record volunteer data and the number and locations of marked drains in the city.

Stormwater Services jointly participates in a monthly rain barrel sale which is organized by the New Hanover Soil & Water Conservation District. Rain Barrel USA, a North Carolina company, is the current vendor, enabling us to offer 60 and 80 gallon rain barrels at a discounted price for the public. The sale is publicized through a variety of media outlets including city and county public TV and websites, press releases, garden shows, and special events. This year, 39 rain barrels were sold to the public.

b. Mechanism for Public involvement	The permittee shall provide and promote a mechanism for public involvement that provides for input on stormwater issues and the stormwater program, implemented locally or through cooperative or contractual agreement. These mechanisms could include public meetings, citizen/business surveys, citizen portal website feedback, public event participation, one-on-one citizen contact, etc.

Accomplishments:



Doorhangers and/or mailings were distributed to residents affected by drainage projects for Scotland Lane, Ewell Drive, and Cassidy Drive. A public meeting was held for Scotland Lane, as well as individual meetings with property owners impacted by the project.

The City of Wilmington Stormwater Services was a major sponsor of the area's annual Earth Day Festival. This year, we debuted the Super Pooper Scooper interactive photo booth to educate the public about pet waste pollution. We also had a display booth with stormwater information and giveaways and engaged in direct contact with citizens. The city also engaged in community events such as the MLK Imagination Station community event, Cape Fear Academy, UNCW Pier601 Creative, and Isaac Bear school presentations.

The city helped promote the Lake Love Cleanup of Greenfield Lake hosted by Cape Fear River Watch. The event was well attended and helped remove garbage and recyclables in the main part of the lake and tributaries into the lake.

City Parks, Engineering, Stormwater, and Planning Divisions all worked together on a Tree Grant hosted by the Green Infrastructure Center. Two public meetings were held, in July and November, to gather public input about issues including the city's tree program, canopy, preservation, and vision for the future.

Hotline/Help line	The permittee shall promote and maintain a hotline for citizens and businesses to report suspected stormwater pollution and illicit discharges occurring within the City.

Accomplishments:
The Stormwater Pollution Prevention hotline was established in January 2010 to field calls from citizens, businesses, and employees to report illicit discharges and instances of potential or actual stormwater pollution. The hotline phone # is 910-341-1020 and the web address is www.wilmingtonnc.gov/reportstormwaterpollution.

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Assessment of Program Implementation
The City has continued to partner with contract agencies to implement public education, involvement and participation activities. These annual, contractual agreements have resulted in activities and events that involve the public to a great degree.

These include the Canines for Clean Water program, storm drain marking program, volunteer watershed cleanup events, community workshops, grant partnerships, monthly rain barrel sale, eco-tours, etc.

Objectives for Next Year

- Participate in community events to engage citizens in stormwater pollution prevention education.
- Disseminate stormwater improvement project information to impacted residents and conduct public meetings for upcoming drainage projects.
- Utilize contracts with partner agencies to implement volunteer and community-focused public participation activities.

ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

1. Objectives for Illicit Discharge Detection and Elimination

a. Implement and enforce a program to address the detection and elimination of illicit discharges into the MS4.

b. Maintain a storm sewer system map, showing the location of all major outfalls and the names and location of all waters of the United States that receive discharges from those outfalls;

c. Prohibit, through ordinance, or other regulatory mechanism, non-storm water discharges except as allowed in this permit and implement appropriate enforcement procedures and **actions;**

d. Implement a plan to detect and address non-storm water discharges, including illegal dumping, to the MS4;

e. Inform public, employees, businesses, and the general public of hazards associated with illegal discharges, how to recognize illicit discharges and improper disposal of waste; and

f. Address non-storm water discharges or flows as identified in Part I, Paragraph (8).

2. BMPs for Illicit Discharge Detection and Elimination

The permittee shall implement the following BMPs to meet the objectives of the Illicit Discharge Detection and Elimination Program and shall notify the Division prior to modification of any goals.

BMP	Measurable Goals
a. Maintain adequate legal authorities	The permittee shall annually review the permittee's IDDE ordinances or other regulatory mechanisms, or adopt any new ordinances or other regulatory mechanisms that provide the permittee with adequate legal authority to prohibit illicit connections and discharges and enforce the approved IDDE Program.

Accomplishments:

The City continues to utilize the existing ordinances in place to address illicit discharges to its system. The City passed the Ordinance to amend Chapter 12 of the City Code on 9/15/2009 to address illicit discharges to the stormwater system and to protect public water and sewer systems. This Ordinance change went into effect on November 1, 2009.

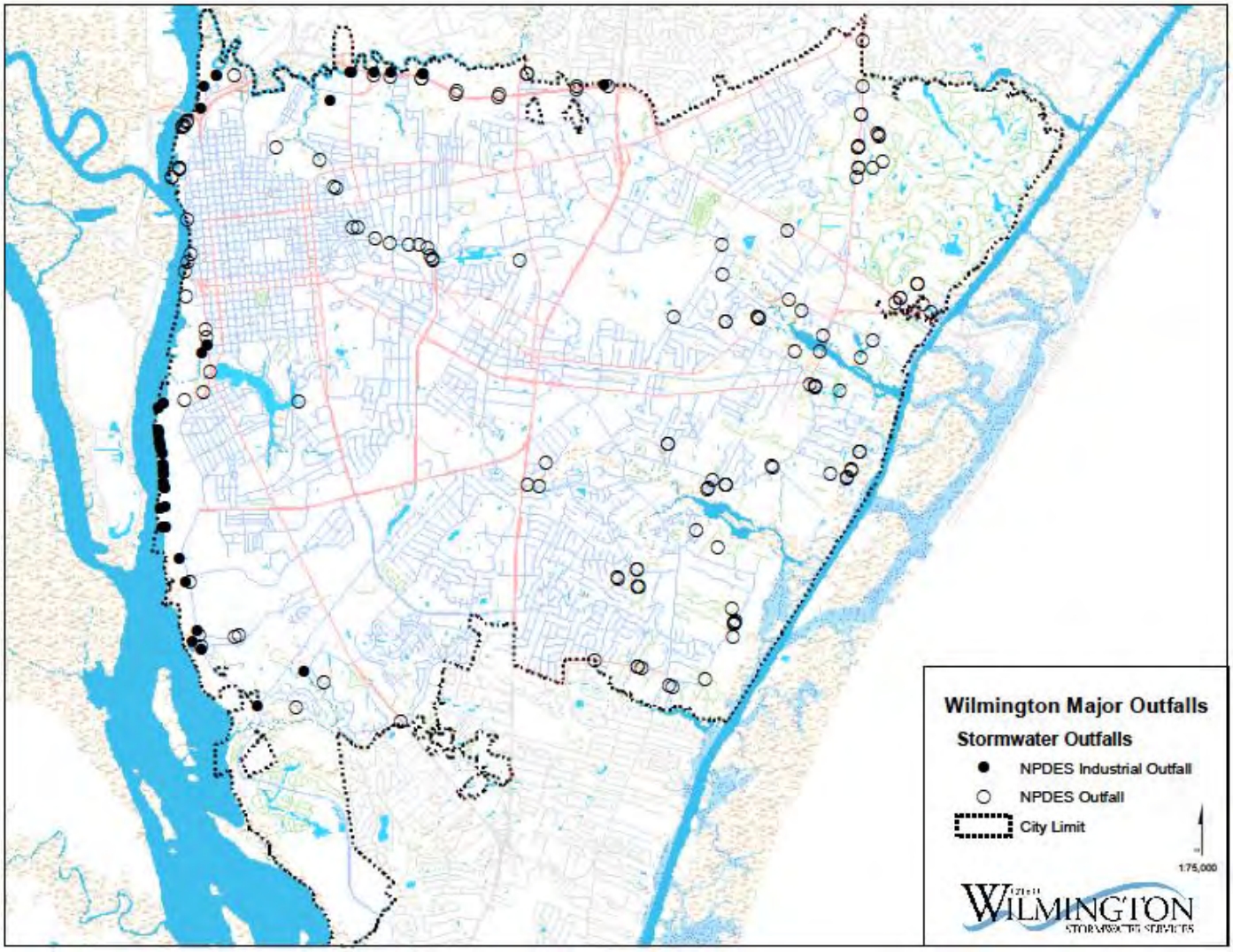
The current Cape Fear Public Utility Authority (CFPUA) ordinance defines wastewaters that are required to be discharged into the sanitary sewer system. The City utilizes CFPUA's ordinance to address discharges of regulated wastewaters to the City's MS4 and other natural outlets.

Stormwater staff and City Planning review staff met this year to discuss Senate Bill 24 (SB24) which could possibly allow food establishments to utilize outdoor grills for their patrons. The result of this bill could lead to outdoor washing down of grills or runoff during rain events that could lead to illicit discharges into the city's MS4. The result of this discussion allowed for planning, preventable measures and coordination between departments to evaluate site plans as they go through the review process in order to limit the potential impact to the City's drainage system.

The City will continue to review its ordinance annually to make sure we are providing adequate legal authority.

b. Maintain a Storm Sewer System Base Map of Major Outfalls.	The permittee shall maintain a current map showing major outfalls and receiving streams

Major Outfall Map

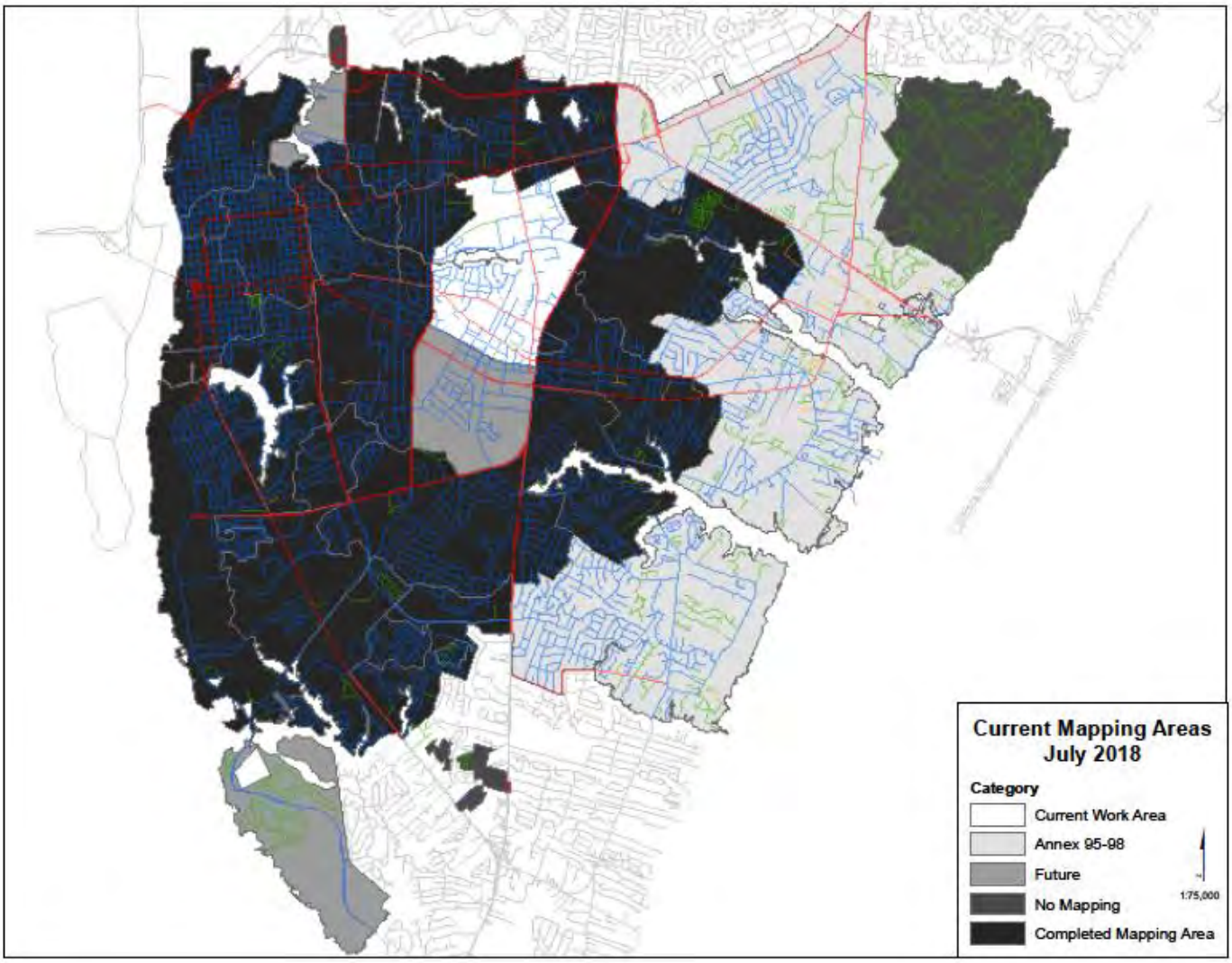


Accomplishments:

The City continues to maintain and update a base map of major outfalls and receiving water

bodies. Outfalls are classified and added to the GIS dataset as mapping of the City MS4 proceeds. Additionally, the City has made significant improvements to the GIS mapping of watershed boundaries using the best available data. At this time, approximately 93% of the City has been mapped as part of its stormwater inventory. This percentage demonstrates an increase from last due to a concerted effort to map the remaining portions of the City that are still unknown. A continued effort to map the remaining portions of the City will be a goal in the next few years.

Stormwater Inventory Mapping was completed this past reporting year in the Burnt Mill Creek Watershed. Burnt Mill Creek Watershed, an impaired water body as noted on the 303d list, was noted in the previous year's report as an area to be prioritized. This area is an older part of the City where the stormwater inventory is not fully known. The new stormwater inventory data will help staff to understand where current drainage systems are located as well as provide data to help in future planning for the requirements for our NPDES Phase II permit. Future locations are shown below on the map.

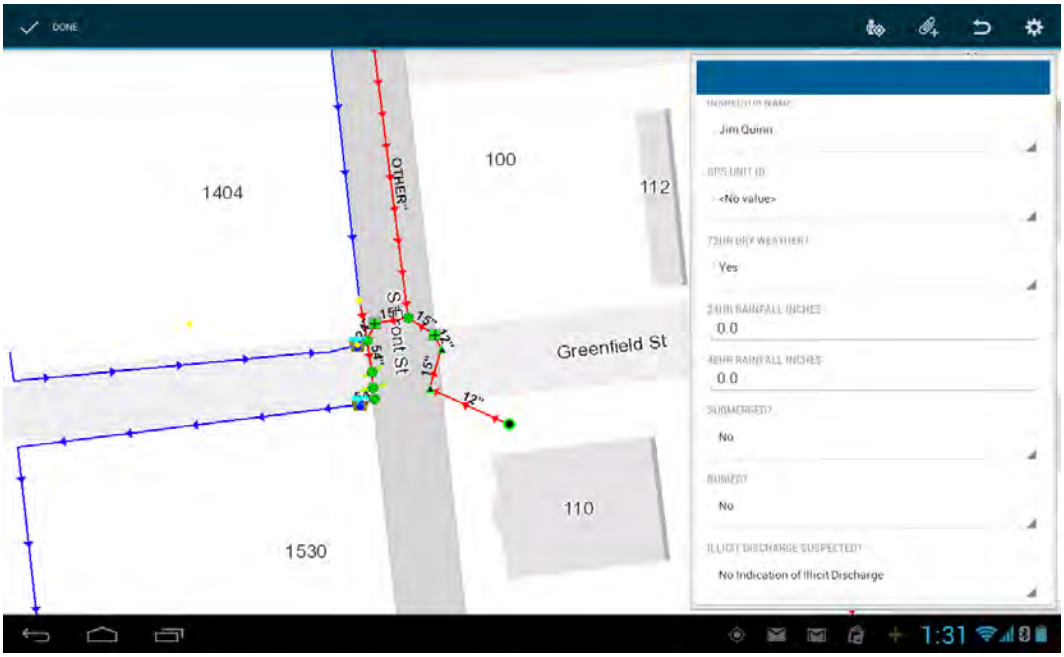


c. Detect dry weather flows	The permittee shall develop and implement a program for conducting dry weather flow field observations in accordance with a written procedure for detecting and removing the sources of illicit discharges.

Accomplishments:

The City continues to use its data collection procedures established during the previous reporting years. The process has streamlined time spent at each structure while providing copious information that can be exported into a spreadsheet for reviews. Several Stormwater Services staff utilize the field procedures in order to provide additional assistance and scheduling flexibility throughout the next year.

The dry weather flow web map, when accessed through the Collector app (as shown below), allows staff to collect relevant data while in the field, including photographs, using only a tablet or smart phone. The inspector is able to enter the data, including date and time, color, odor, turbidity and other relevant characteristics of the location into the preformatted database. The data are then uploaded to the City servers in real time, allowing office staff to see the data and develop reports without the need for cumbersome data transfer routines or post processing.



The City managed to investigate 5 trunk line investigations from major outfall locations across its jurisdictional area, which was a decrease from the previous year partly due to weather and staff scheduling. The locations were found within the Burnt Mill Creek, Greenfield Lake and Upper Cape Fear River watersheds. Maps of the 5 locations and associated table are found in Appendix D.

d. Investigations into the source of all identified illicit discharges.	The permittee shall maintain, and evaluate annually written procedures for conducting investigations of identified illicit discharges.

Accomplishments:
The City has continued to utilize its Illicit Discharge Detection Elimination (IDDE) Policy and Procedures Manual document. The purpose of this document is to provide a standard for guidance and information for the effective and efficient implementation of the Illicit Discharge Detection and Elimination Program within the City of Wilmington. The document outlines the investigation, testing, coordination with other authorities, GIS inventory, follow up, and documentation procedures to be taken to resolve a questionable dry weather flow.

The City continues data input and documentation through *Intelligov*, our data management system. All details of incidences are reported are entered from the start of an incidence until the investigation until is closed. This documentation into *Intelligov* has allowed for the extraction of data for evaluation of our program, and assessment to identify repeat offenders and chronic violators as well as serve as help us identify areas of the City with higher violation reports. See Appendix I.

The City continues to look at upgrading all data management systems throughout the organization. There is a schedule to begin rolling out the new systems in spring of 2019 for certain departments
.

e. Track investigations and document illicit discharges	The permittee shall track all investigations and document the date(s) the illicit discharge was observed; the results of the investigation; any follow-up of the investigation; and the date the investigation was closed.

Accomplishments:
The City continues to address illicit discharges in the stormwater system and to protect public water under its Ordinance. This Ordinance change went into effect on November 1, 2009. The City continues to update the Illicit Discharge Detection Elimination (IDDE) Policy and Procedures manual as the program evolves. The purpose of this document is to provide standards for protocol, field guidance and information for the effective and efficient implementation of the Illicit Discharge Detection and Elimination (IDDE) Program. We continue to update as procedures change and become more efficient for data collection and reporting into the City's tracking database *Intelligov*.

The City has continued to utilize its improved process for collecting data for dry weather flow monitoring during this reporting period.

f. Employee Training	The permittee shall implement and document a training program for appropriate municipal staff who as part of their normal job responsibilities, may come into contact with or otherwise observe an illicit discharge or illicit connection to the storm sewer system.

Accomplishments:
The City conducted training for its Engineering Staff during this reporting year (See Appendix D). Refresher training and education for existing staff will be updated as necessary and implemented every 2 years.

g. Provide Public Education	The permittee shall inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.

Accomplishments:
The Education Program Manager and staff do an outstanding job of providing the public information through education regarding illegal discharges. One of these ways is through The Enviroscape Watershed Education Program. The Enviroscape Watershed Education Program has been integrated into the 8th grade curriculum for 11+ years. As a result, the program reaches all 8th grade science classes in New Hanover County Schools, this year serving 76 classes and 2,200+ students

This year's annual Stormwater Watch newsletter was mailed to 40,000+ city residents with focus on stormwater billing, litter reduction, and the UNCW water quality report of our local tidal creeks and water bodies within the City limits.

Targeted media campaigns included digital billboards throughout the city, radio and television standard and digital formats, and events such as the annual Earth Day Festival and Canines for Clean Water.

The City's Public Services Code Enforcement Officer also works hard to educate the public on Illicit Discharges through educational material and flyers when making site visits and meeting with the public during investigations.

h. Public reporting mechanism	The permittee shall promote, publicize, and facilitate a reporting mechanism for the public and staff to report illicit discharges and establish and implement citizen request response procedures.

Accomplishments:
The Stormwater Pollution Prevention hotline was established in January 2010 to field calls from citizens, businesses, and employees to report illicit discharges and instances of potential or actual stormwater pollution. The hotline phone # is 910-341-1020 and the web address is www.wilmingtonnc.gov/reportstormwaterpollution.

Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to each hotline report. The hotline and online reporting webform are advertised on the City's cable TV channel and via the stormwater website, citywide newsletters, public presentations and displays, large educational magnets on stormwater fleet vehicles, and promotional outreach items including cups, pens, reusable bags, magnets, and other giveaways to the public.

To summarize hotline activity this past year: 20 calls were placed to the City's Stormwater

hotline, 6 online hotline webform reports were submitted, and 357 emails and 85 calls were directly received by the Compliance Officer related to stormwater violations. The nature of the hotline reports are found in the Enforcement section of Appendix I.

i. Enforcement	The permittee shall implement a system to track the issuance of notices of violation and enforcement actions as administered by the permittee. The data maintained in this system shall enable permittee to identify chronic violators for initiation of actions to reduce noncompliance.

Accomplishments:

The City of Wilmington uses *Intelligov* data management system to track all requests for service. This includes illicit discharge reports from the public and from City staff. This system allows us to enter all relevant data from an investigation and then analyze, map, and track various aspects of the incident including enforcement actions and repeat offenders in order to identify chronic violators. For year 2017-2018 there were no repeat offenders for Illicit Discharges. See Appendix I for enforcement actions summary for this reporting year.

Assessment of Program Implementation

The City continues to implement and enforce its IDDE program to address the detection and elimination of illicit discharges. The City continues implementing its dry weather flow monitoring program with field training for additional staff this year. Dry weather flow locations will continually be updated and added through outfall investigations that are scheduled throughout the year and also through investigations initiated by City field crews and citizen complaints.

The City has documented another year of *Intelligov data*, our data management system. The City is currently reevaluating its data management system throughout the whole organization for replacements and upgrades. These replacement programs could lead to increased efficiency and documentation to help further meet NPDES Phase II requirements. The replacement may be available to some departments in spring 2019.

The City continues to utilize the existing ordinances in place to address illicit discharges to its system. To date, no changes to the ordinance have been necessary as it provides the adequate legal authority to prohibit illicit connections and discharges and enforce the approved IDDE Program at this time.

Public education and employee training regarding illicit discharges continues to be one of the major goals for the City. Interestingly, of the 85 stormwater inquiries for possible illicit discharges to the City's Public Services Code Enforcement Officer, 44% were City employees, 21% were from cooperating agencies and 35% were from concerned citizens. This is a good indication that our employee training throughout the City for identifying illicit discharges is working along with public education media and material that goes out to our citizens.

Dry weather flow methods and field procedures continue to be assessed through investigations and data collection.

Objectives for Next Year

- Continue to research and update locations for dry weather flow monitoring. Develop schedule as new locations are identified.
- Continue with the goal of completing 7 dry weather flow drainage segments per year as identified in the City's Public Services Strategic Plan.
- Continue to evaluate the effectiveness of the *Intelligov* reporting practices. Assess locations of offenders to determine repeat violations and make recommendations to address those sites.
- Evaluate recently initiated NC statutes as needed to ensure that the City's MS4 is not impacted.
- Continue with public education efforts to help reduce illicit discharges and illicit connections to the City's MS4.
- Implement training sessions for other City field departments regarding IDDE.
- Continue Inventory Mapping of areas identified. Reassess next mapping area.

CONSTRUCTION SITE RUNOFF CONTROLS

The permittee relies on New Hanover County to comply with this minimum measure. The New Hanover County Sediment and Erosion Control Program effectively meets the requirements of the Construction Site Runoff Controls by permitting and controlling development activities disturbing one or more acres of land surface and those activities less than one acre that are part of a larger common plan of development. This program includes procedures for public input, sanctions to ensure compliance, requirements for construction site operators to implement appropriate erosion and sediment control practices, review of site plans which incorporates consideration of potential water quality impacts, and procedures for site inspection and enforcement of control measures.

New Hanover County Erosion Control Program information supplied in Appendix E.

POST CONSTRUCTION SITE RUNOFF CONTROLS

1. Objectives for Post-Construction Site Runoff Controls

a. Implement and enforce a program to address storm water runoff from new development and redevelopment projects that require a CAMA major development permit or a Sedimentation and Erosion Control Plan. The program shall ensure that controls are in place that would prevent or minimize water quality impacts.

b. Implement strategies which include a combination of structural and/or non-structural best management practices (BMPs) appropriate for the community;

c. Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects; and

d. Adequate long-term operation and maintenance of BMPs.

2. BMPs for Post-Construction Site Runoff Controls

The permittee shall implement the following BMPs to meet the objectives of the Post-Construction Stormwater Management Program. To the extent there is any conflict between this permit and the post-construction ordinances adopted by the permittee as approved by the N.C. Division of Water Quality, the post-construction ordinances shall apply with regard to permit compliance.

BMP	Measurable Goals
a. Adequate legal authorities	Maintain through an ordinance, or other regulatory mechanism, adequate legal authorities to meet the objectives of the Post-Construction Site Runoff Controls program. The permittee shall have the authority to review designs and proposals for new development and redevelopment to determine whether adequate stormwater control measures will be installed, implemented, and maintained. The permittee shall have the authority to request information such as stormwater plans, inspection reports, monitoring results, and other information deemed necessary to evaluate compliance with the Post-Construction Stormwater Management Program. The permittee shall have the authority to enter private property for the purpose of inspecting at reasonable times any facilities, equipment, practices, or operations related to stormwater discharges to determine whether there is compliance the Post-Construction Stormwater Management Program.

Accomplishments:
The City continues to utilize the Land Development Code that was amended and adopted on September 15, 2009 to provide post construction controls in order to meet the requirements of the City's Phase II permit and to bring the ordinance into compliance with the new Coastal Stormwater Legislation.

Currently the City is looking at changes to its Land Development Code. Planning for these changes has been occurring during the last year with the City hiring a consultant to help make recommendations for the changes. The main changes to the code that would affect stormwater planning and review would involve redevelopment of properties. Tentatively, the draft of the new Code should be available to review and discuss in early 2019.

b. Strategies which include BMPs appropriate for the MS4	The permittee shall adopt the DWQ BMP Design Manual or certify that the local BMP Design Manual meets or exceeds the requirements in the DWQ BMP Design Manual.

Accomplishments:
The DWQ BMP manual was adopted when the stormwater ordinance was amended in 2009. This ordinance contains provisions addressing the use of combinations of structural and non-structural BMPs to manage stormwater runoff. Some examples of these include providing peak attenuation flow for the 2, 10 and 25 year storm event, requiring (new development) a 50 foot set back from surface waters, and stricter built-upon requirements for projects near SA waters.

c. Plan reviews	The permittee shall conduct site plan reviews of all new development and redeveloped sites that disturb greater than or equal to one acre (including sites that disturb less than one acre that are part of a larger common plan of development or sale). The site plan review shall address how the project applicant meets the performance standards and how the project will ensure long-term maintenance.

Accomplishments:
The City continues to conduct site plan reviews utilizing the City's Land Development Code in order to provide post construction controls to meet the requirements of the City's Phase II permit. A summary of the plan review activities for this reporting year is available in Appendix F.

d. Inventory of projects with post-construction structural stormwater control measures	The permittee shall maintain an inventory of projects with post-construction structural stormwater control measures installed and implemented at new development and redeveloped sites, including both public and private sector sites located within the permittee's corporate limits that are covered by its post-construction ordinance requirements.

Accomplishments:
The City's Plan Review Engineers continue to update a spreadsheet of projects with stormwater control measures installed during the reporting year. This spreadsheet includes the dates permits were issued, review times for projects, types of projects (new development, redevelopment), and the types and numbers of BMPs per project location. This spreadsheet will continue to be used for future permits issued and evaluated or modified if data extraction is warranted. See Appendix F.

e. City Code, Permitting Regulations, Easement, and/or Deed Restrictions and Protective Covenants	Ensure development activities will maintain the project consistent with approved plans.

Accomplishments:
Current City of Wilmington stormwater management ordinance stipulates among other requirements for stormwater management after construction that:

Record (as-built) drawings (reproducible mylar) for all stormwater management facilities certified by an authorized registered professional must be provided to the City for permanent record.

When deemed necessary by the City, an easement in a form approved by the City attorney, granting the City and its agents and representatives adequate and perpetual access to the facility and sufficient area for inspection and maintenance, if necessary, by the City, its agents and representatives. Said easement shall be filed in the New Hanover County Registry, at the expense of the applicant, and shall bind all subsequent owners and assigns of the facility and of the property on which the facility is located.

The following excerpt from the new stormwater ordinance became operational upon adoption City Council:

The approval of the stormwater permit shall require an enforceable restriction on property usage that runs with the land, such as recorded deed restrictions or protective covenants, to ensure that future development and redevelopment maintains the site consistent with the approved project plans.

Additionally, the new ordinance has provisions to ensure that conveyance of the property does not terminate the original developer's obligations until a replacement permit has been issued. The original developer will be required to record in the deed conveying the property a notice of the existence of any stormwater devices and the purchaser's obligations to maintain and inspect them and to obtain a permit. There are also specific and detailed special requirements for property owner associations regarding operation and maintenance of stormwater devices, escrowing funds to ensure maintenance and remedies for the City in the event of failed compliance.

f. Provide a mechanism to require long-term operation and maintenance of structural BMPs.	The permittee shall implement or require an operation and maintenance plan for the long-term operation of the structural BMPs required by the program.

Accomplishments:
The DWQ BMP manual was adopted when the stormwater ordinance was amended in 2009. This ordinance contains provisions addressing the use of combinations of structural and non-structural BMPs to manage stormwater runoff. With this adoption, the City also reviews and approves the O&M requirements and plans of the State through the review process.

g. Inspections of Structural Stormwater Control Measures	To ensure that all stormwater control measures meet the permittee's performance standards and are being maintained pursuant to the maintenance agreement, the permittee shall develop and implement a written inspection program for structural stormwater controls installed pursuant to the permittee's post-construction program. The permittee shall document and maintain records of inspections, findings and enforcement actions and make them available for review by the permitting authority.

Accomplishments:
Under the current stormwater management ordinance of the City, permitees of structural BMPs are required to properly maintain their stormwater management systems to ensure long term operation. The City conducted biannual compliance inspections for privately owned stormwater BMPs in order to ensure maintenance responsibilities are being undertaken by property owners. Inspections were conducted by a City staff member who has completed the Stormwater BMP Inspection and Maintenance Certificate offered through NC State's Biological and Agricultural Engineering Department (certification #182). Recertification occurred on January 31, 2017. An inspection summary is included in Appendix F. In addition, sample inspection reports are provided.

The City continues to review and update its manual for all O&M plans for known City owned and/or maintained BMPs under their respective NCDWQ stormwater permits. This manual provides access to BMP schedules for O&M and permit renewal dates.

h. Educational materials and training for developers	The permittee shall make available through paper or electronic means, ordinances, post-construction requirements, design standards checklist, and other materials appropriate for developers. New materials may be developed by the permittee, or the permittee may use materials adopted from other programs and adapted to the permittee's new development and redevelopment program.

Accomplishments:
Currently all ordinances, design standards, application forms, BMP Manual and Technical Standards for developers are found online at the City's website. The city provides instruction online for the forms so that developers can provide the necessary documentation for the process

review.

i. Enforcement	The permittee shall track the issuance of notices of violation and enforcement actions as administered by the permittee. This mechanism shall include the ability to identify chronic violators for initiation of actions to reduce noncompliance.

Accomplishments:
The City has tracked the issuance of violations through its current inspection process since the implementation of the stormwater ordinance. The City will continue to make improvements in the inspection process (as necessary) and its associated database for private BMPs.

Assessment of Program Implementation
The City has continued to maintain adequate legal authorities to meet the objectives of the Post-Construction Site Runoff Controls program through its Land Development Code. In addition, the City continues to conduct site plan reviews utilizing the City's Land Development Code in order to provide post construction controls to meet the requirements of the City's Phase II permit.

The City's Plan Review Engineers continue to their update their database in order to track projects with stormwater control measures installed. This spreadsheet provides relevant information regarding new development and redevelopment projects. This spreadsheet will continue to be used for future permits issued and evaluated or modified if data extraction is warranted.

Objectives for Next Year
- Review ordinances to determine if any changes are needed to improve the post-construction requirements.
- Review any drafts to changes in Land Code Development that may be available.
- Continue to update and evaluate database of new or redeveloped projects to determine if information can be improved, if documentation is adequate, and if modification for data extraction is needed.
- Continue with inspections of privately owned BMP to ensure compliance with City and State maintenance requirements.
- Review new State statutes that may affect City's NPDES permit. Review appropriate local ordinances to determine if they are effective regarding new NC Statutes.

3. Post-construction Stormwater Runoff Controls for New Development

a. In order to fulfill the post-construction minimum measure program requirement the permittee may use the Department's model ordinance, design its own post-construction practices that meet or exceed the Department's Stormwater Best Management Practices Manual on scientific and engineering standards, or develop its own comprehensive watershed plan that is determined by the Department to meet the post-construction stormwater management measure required by 40 Code of Federal Regulations§ 122.34(b)(5)(1 July 2003 Edition).

b. The permittee shall meet the State's stormwater requirements for projects that are performed by, or under contract for, the permittee.

c. Adoption of the Universal Stormwater Management Program (USMP) meets the requirement to develop and implement a Post-Construction Program by the local government adopting an ordinance that complies with the requirements of l5A NCAC 02H .1020 and the requirements of 15A NCAC 02B .0104(f). Adoption of the USMP may not satisfy water quality requirements associated with the protection of threatened or endangered species or those requirements associated with a Total Maximum Daily Load (TMDL).

d. Compliance with the stormwater management and water quality protection promulgated in Rules 15A NCAC 2H .1000 and Session Law 2008-211 effectively meets the Post- construction Stormwater Runoff control requirements within the 20 coastal counties.

POLLUTION PREVENTION AND GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

1. Objective for Pollution Prevention and Good Housekeeping for Municipal Operations

a. Implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations.

b. Provide employee training to prevent and reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance.

2. BMPs for the Pollution Prevention and Good Housekeeping for Municipal Operations

The permittee shall implement the following BMPs to meet the objectives of the Pollution Prevention and Good Housekeeping Program.

BMP	Measurable Goals
a. Inventory of municipally owned or operated facilities	The permittee shall maintain a current inventory of facilities and operations owned and operated by the permittee with the potential for generating polluted stormwater runoff.

Accomplishments:

The City continues to keep an inventory of its known facilities with the potential for generating polluted runoff. Sites are identified by location, type of facility and potential pollution sources. These sites were evaluated to determine if further implementation of pollution prevention measures and BMPs could help to minimize current on-site procedures and equipment from potentially polluting the surrounding stormwater systems. Although no formal SPPP was required for each individual site, the City opted to be proactive in reducing the potential for contaminants and other pollutants that could leave the sites. Site BMP recommendations were implemented at some of the locations this reporting year such as the City's Operations Complex Coleman Sweeper Complex. Additional structural and non-structural BMP implementation will continue at the other identified locations.

The City currently has a Spill Prevention Control and Countermeasure plan (SPCC) for the Operations Complex and a separate Stormwater Pollution Prevention Plan (SPPP) for the Fleet Maintenance building located within the complex. A SPCC is also in place for the Police Headquarters location.

b. Operation and Maintenance (O&M) for municipally owned or operated facilities	The permittee shall maintain and implement, evaluate annually and update as necessary an Operation and Maintenance (O&M) program for municipally owned and operated facilities with the potential for generating polluted stormwater runoff. The O&M program shall specify the frequency of inspections and routine maintenance requirements.

Accomplishments:

Currently, The City relies on a SPCC plan and a SPPP for the Operations Complex and Fleet Maintenance building. These plans focus on the activities at Fleet Maintenance and also preventive inspections at the City's fueling islands, (2) 10,000g fuel tanks and the 6 generators on site. An additional SPCC for the Police Headquarters addresses inspections for their fueling island and backup generator as well. Analytical and qualitative monitoring of the outfall per the requirements of the SPPP and General Permit (NCG08000) for Fleet Maintenance indicate parameter levels well below benchmark values.

Stormwater staff meets annually with appropriate site managers to ensure that proper documentation of the SPCC and SPPP is occurring. Stormwater staff evaluates any changes or modifications that may have occurred to the site within the year and works with the site managers to address any operation and maintenance practices that can be improved.

This year the City has begun implementing an O&M plan for all of its locations where oil/water separators are present. The Buildings Manager has begun to budget for getting these locations on a regular quarterly schedule for inspection and maintenance in order to ensure their longevity and functionality. The City plans to follow through with a contractor in the next budget year – 2019-20.

c. Spill Response Procedures	The permittee shall have written spill response procedures for municipally- owned or operated facilities.

Accomplishments:

Spill Response procedures are identified in the City's SPCC plans for the Operations Complex and Police Headquarters and also in the SPPP for Fleet Maintenance. The City will continue to follow these plans and make any changes if necessary and also ensure documentation is occurring within the plans.

Stormwater staff and the Public Services Safety Specialist have implemented the requirement for appropriate staff to complete training courses regarding spill prevention and small spill cleanup. Eight (8) Fleet Maintenance Staff completed training for the *prevention of spills* and *small spills cleanup*. During the upcoming reporting year, Stormwater Field Supervisors will be included in the same training.

Planning has begun for the 2018-19 reporting year to bring all relevant personnel into a field training session at all necessary locations.

d. Streets, roads, and public parking lots maintenance	The permittee shall evaluate BMPs to reduce polluted stormwater runoff from municipally-owned streets, roads, and public parking lots within the corporate limits. Within 12 months, the permittee must update its Stormwater Plan to include the BMPs selected.

Accomplishments:

The City currently utilizes BMPs that help reduce polluted stormwater runoff from streets, roads, and public parking lots within its jurisdictional area. Stormwater crews sweep City streets with curbing (on average) twice/month, NCDOT owned roads once/month, and City owned parking lots from once/month to once/ quarter. City owned parking lots include City operations facilities, City Hall, parks locations, and recreation facilities.

In reporting year 2017-18, street sweepers swept 10,543 curb miles while collecting 2,926 tons debris, sediment, vegetation and trash potentially diverted from the stormwater sewer system.

In fiscal year 2017-18, hand maintenance and vacuum trucks cleaned 101,627 linear feet of pipe and removed blockages and cleaned 13,525 drainage inlets and manholes thus reducing debris, sediment, vegetation and trash potentially diverted from being discharged into our receiving waters.

The City has been a member of the Urban Stormwater Consortium of the Water Resources Research Institute of the University of North Carolina. This group funded and completed a study at nutrient loading in urban areas. One of the conclusions from the study indicated that urbanized, downtown areas of cities were the highest contributors of gross solids in catch basins. The study recommended that street sweeping should be conducted more frequently in these areas to help minimize the solids from entering the catch basins. Currently, the City follows this practice by conducting routine street sweeping in the Central Business District, 7 days/week to help prevent and reduce the amount of gross solids from entering the downtown stormwater system.

The City implemented its improved procedures for decanting operations of vacuum trucks after pipe or structural maintenance/cleaning occurs. The City began utilizing its own wet pond facilities located throughout the City as potential decanting sites for maintenance crews while conducting their jobs in these areas. The intent of this measure is to improve water quality to the decanting methods that were previously being conducted in the field. This implementation was met well with field crews and appears to be successful at this time. The City continues to further look at all of its field maintenance activities to determine if improvements to water quality can be incorporated.

e. Streets, roads, and public parking lots maintenance	Within 24 months, the permitee must implement BMPs selected to reduce polluted stormwater runoff from municipally-owned streets, roads, and public parking lots.

Accomplishments:

See above 2.(d).

f. Operation and Maintenance (O&M) for municipally - owned or maintained catch basins and conveyance systems	Within 12 months, the permittee shall develop and implement an O&M program for the stormwater sewer system including catch basins and conveyance systems that it owns and maintains.

Accomplishments:
The City currently has a program for the operation and maintenance of all City owned structural BMPs, storm sewer system, and street sweeping. This program includes repair, inspection and maintenance of all City owned right of ways and officially accepted easements. This information was previously included in this report under *Operations/Maintenance – Yearly Maintenance Activities Table* on page 11.

g. Identify structural stormwater controls	The permittee shall maintain a current inventory of municipally-owned or operated structural stormwater controls installed for compliance with the permittee's post-construction ordinance.

Accomplishments:
The City keeps and updates a BMP Manual for all of its City owned BMPs. The manual includes all associated State DWQ stormwater permits, O&M plans, and site mapping in order to review maintenance requirements and permit renewal dates along with any additional documentation that might be needed. This manual provides information that can be readily reviewed by maintenance crews in order to keep the BMPs in compliance.

h. O&M for municipally-owned or maintained structural stormwater controls	The permittee shall maintain and implement an O&M program for municipally-owned or maintained structural stormwater controls installed for compliance with the permittee's post-construction ordinance. The O&M program shall specify the frequency of inspections and routine maintenance requirements. The permittee shall inspect and maintain municipally-owned or maintained structural stormwater controls in accordance with the schedule developed by permittee. The permittee shall document inspections and maintenance of all municipally-owned or maintained structural stormwater controls.

Accomplishments:
The City keeps and updates a BMP Manual for all its City owned BMPs. The manual includes all associated State DWQ stormwater permits, O&M plans, and site mapping in order to review maintenance requirements and permit renewal dates along with any additional documentation that might be needed. This manual provides information that can be readily reviewed by maintenance crews in order to keep the BMPs in compliance. Documentation occurs with every BMP site visit and maintenance activity.

i. Pesticide, Herbicide and Fertilizer Application Management.	The permittee shall ensure municipal employees and contractors are properly trained and all permits, certifications, and other measures for applicators are followed.

Accomplishments:
The City has compiled all pesticide, herbicide and fertilizer application certifications for its Parks and Recreation and Stormwater personnel to ensure that they are current. These certifications are updated and renewed annually. Currently, there are 14 certifications for Parks and Recreation staff and 2 certification for Stormwater/Public Services staff.

j. Staff training	The permittee shall implement an employee training program for employees involved in implementing pollution prevention and good housekeeping practices.

Accomplishments:
The City documents staff training for site supervisors involved with the SPCC and SPPP. Sites are reviewed at scheduled times during the reporting period to ensure that implemented SCMs are working and being utilized and that staff is documenting their respective plans as necessary. A supervisor training record for Fleet Maintenance is found in Appendix G.

Stormwater staff and the Public Services Safety Specialist review online employee training annually through *Otis Safety* regarding preventing spills and small spill cleanup for Fleet Maintenance staff and the Spill Response Team per the City's SPPP and SPCC plan. This training will be an annual requirement for these employees. In addition, on site hands-on training for employees is being discussed and planned by Stormwater staff and The PS Safety Specialist regarding spill control/cleanup at the Fleet Maintenance site.

k. Prevent or Minimize Contamination of Stormwater Runoff from all areas used for Vehicle and Equipment Cleaning	The permittee shall describe and implement measures to prevent or minimize contamination of stormwater runoff from all areas used for vehicle and equipment cleaning.

Accomplishments:
Maintenance and cleaning conducted at the City's Operations Complex continues to occur at a wash down station, located at the Solid Waste facility, equipped with an oil/water separator that accepts wash water and directs it to the sanitary sewer.

During the previous reporting year, Stormwater staff along with the Fleet Maintenance Manager, began to evaluate the need for annual maintenance of the interior trench drains located along the perimeter of the garage facility. Although no vehicle or equipment cleaning occurs at this location, sediment and grit accumulates in the trench drains from the everyday maintenance of vehicles pulled in and out of the building along with wind swept debris. Maintenance of the trench drains will be now be conducted annually at the site to help eliminate any gross solids from entering the surrounding stormwater system. This maintenance is to be determined for fall 2018.

Small engine repair (line trimmers, blowers, chain saws, compacters, etc.) and cleaning for various City activities occurs in individual departments maintenance garages. In the event of an accidental discharge, the garages have drains located within the floor that connect to an oil water separator located on each site within the Operations Complex.

Assessment of Program Implementation

The City continues implementing its SPCC and SPPP for designated City owned facilities with the potential to pollute receiving waters. Site SCMs continue to be implemented and documentation has been addressed with building supervisors.

The City continues to evaluate implementing SCMs at other City facilities identified with the potential to pollute based on the type of activities that occur there.

The City reviewed and compiled current herbicide, pesticide and fertilizer licenses to determine if personnel are current in their training.

Stormwater Staff and the Public Services Safety Specialist have designated appropriate city employees to complete required training for spill prevention and spill cleanup.

The City has evaluated all of its facility oil/water separators in order to begin a regular O&M schedule.

The City continues to conduct street sweeping efforts across the City with increased activity in its downtown area in order to help reduce the amount of gross solids from entering the stormwater drainage system.

Objectives for Next Year

- The City will continue to evaluate and implement any necessary SCMs at its facilities.
- Budget and approve a contract with an outside consultant in order to get all of its facility oil/water separators on a regular schedule.
- Continue required spill control training for appropriate employees per SPPP and SPCC plan.
- Conduct training for Fleet Maintenance staff regarding Pollution Prevention/Good Housekeeping.
- Evaluate other maintenance activities in order to determine if water quality improvements can be implemented.
- Ensure documentation for SPCC and SPPP are being completed for various site locations.

TOTAL MAXIMUM DAILY LOADS (TMDLs)

1. Objective

a. Determine whether a TMDL has been developed and approved or established by EPA for the receiving water(s) of the MS4 stormwater discharge and/or downstream waters into which the receiving water directly flows.

b. Develop and implement BMPs to reduce non-point source pollutant loading to the maximum extent practicable (MEP) if the permittee is or becomes subject to an approved TMDL with an approved Waste Load Allocation (WLAs) assigned to stormwater.

c. If subject to an approved TMDL, the permittee is in compliance with the TMDL if the permittee complies with the conditions of this permit, including developing and implementing appropriate BMPs to reduce non-point source pollutant loading to the maximum extent practicable (MEP). While improved water quality is the expected outcome, the NPDES MS4 permit obligation is to reduce non-point source pollutant loading to the maximum extent practicable (MEP). The MS4 permittee is not responsible for attaining water quality standards (WQS) at the ambient monitoring stations. The Division expects attaining WQS will only be achieved through reduction from the MS4, along with reductions from other nonpoint source contributors.

2. Best Management Practices (BMPs)

At any time during the effective dates of this permit, if the permittee is or becomes subject to an approved TMDL with an approved Waste Load Allocation (WLAs) assigned to stormwater, the permittee shall implement the following BMPs to reduce non-point source pollutant loading to the maximum extent practicable (MEP):

BMP	Measurable Goals
a. Identify, describe and map watershed, outfalls, and streams	Within 12 months the permittee shall prepare a plan that: • Identifies the watershed(s) subject to an approved TMDL with an approved Waste Load Allocation (WLAs) assigned to stormwater, • Includes a description of the watershed(s), • Includes a map of watershed(s) showing streams & outfalls • Identifies the locations of currently known major outfalls within its corporate limits with the potential of contributing to the cause(s) of the impairment to the impaired segments, to their tributaries, and to segments

BMP	Measurable Goals
	and tributaries within the watershed contributing to the impaired segments and • Includes a schedule to discover and locate other major outfalls within its corporate limits that may be contributing to the cause of the impairment to the impaired stream segments, to their tributaries, and to segments and tributaries within the watershed contributing to the impaired segments.

b. Existing measures	Within 24 months the permittee's plan: • Shall describe existing measures being implemented by the permittee to enhance water quality in the watershed to which the TMDL applies; and • Provide an explanation as to how those measures are designed to enhance water quality.

c. Assessment of available monitoring data	Within 24 months the permittee's plan shall include an assessment of available monitoring data. Where long-term data is available, this assessment should include an analysis of the data to show trends.

d. Monitoring Plan	Within 36 months the permittee shall develop and submit to the Division a Monitoring Plan for each pollutant of concern or cause of impairment as specified in the TMDL. The permittee shall maintain and implement the Monitoring Plan as additional outfalls are identified and as accumulating data may suggest. Following any review and comment by the Division the permittee shall incorporate any necessary changes to monitoring plan and initiate the plan within 6 months. Modifications to the monitoring plan shall be approved by the Division. Upon request, the requirement to develop a Monitoring Plan may be waived by the Division if the existing and proposed measures are determined to be adequate to enhance water quality and reduce non-point source pollutant loading to the maximum extent practicable (MEP).

e. Additional Measures	Within 36 months the permittee's plan: • Shall describe additional measures to be implemented by the permittee to enhance water quality in the watershed to which the TMDL applies; and • Provide an explanation as to how those measures are designed to enhance water quality.

f. Implementation Plan	Within 48 months the permittee's plan shall: • Describe the measures to be implemented within the remainder of the permit term to enhance water quality in the watershed to which the TMDL applies and • Identify a schedule for completing the activities.

g. Incremental Success	The permittee's plan must outline ways to track and report successes designed to reduce non-point source pollutant loading to MEP. Successes could include increased inspections, expanded and/or tailored BMPs within the scope of the six minimum measures, structural and non-structural BMP installed and/or implemented, including retrofits, and strategies developed and implemented for development and redevelopment that include green infrastructure and LID practices.

h. Reporting	The permittee shall conduct an annual assessment of the program to enhance water quality in the watershed to which the TMDL applies and submit a report of the assessment to the Division. Any monitoring data and information generated from the previous year are to be submitted with each annual report.

3. If no stormwater waste load allocation is specified in the TMDL

If there was no stormwater waste load allocation in the TMDL, in lieu of developing a Water Quality Recovery Plan, the permittee shall evaluate strategies and tailor and/or expand BMPs within the scope of the six minimum measures to enhance water quality recovery strategies in the watershed(s) to which the TMDL applies. The permittee shall describe the strategies and tailored and/or expanded BMPs in their Stormwater Management Plan and annual reports.

4. Watershed Restoration Plan approved by the Division

Voluntary implementation of a Watershed Restoration Plan approved by the Division constitutes compliance with this requirement and will allow deferment of TMDL development if tracking and monitoring are provided that demonstrate progress in implementing stormwater BMPs and/or enhancing water quality.

Bradley & Hewletts Creeks Watershed Restoration Plan Accomplishments:

The Bradley and Hewletts Creeks Watershed Restoration Plan has continued to make progress in promoting volume-reducing best management practices (BMPs) to the public. Heal Our Waterways (HOW), which is the informal name of the restoration plan, is becoming more widely

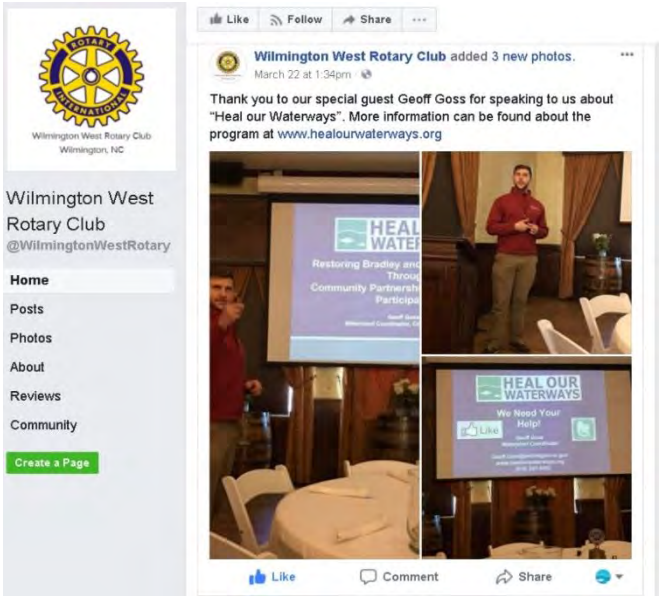
known within the watersheds. This is being accomplished through the use of strategically implemented education and outreach efforts and successful networking and promotion among stakeholders, community groups, and partner organizations.

As with previous years, two educational postcards were created and mailed, this time in the winter and spring, to 16,500+ residents and businesses within the Bradley and Hewletts Creek watersheds, as well as areas adjacent to the watersheds that drain directly into the Intracoastal Waterway. The winter 2017 postcard educated recipients about the new Heal Our Waterways website, providing examples of information found there and how it is beneficial. The spring 2018 postcard addressed BMPs in general, educating recipients about their benefits and uses, as well as promoting a rain barrel giveaway at the local Earth Day event.

Due to the success of last year's advertising efforts, efforts this year similarly focused on digital and radio platforms. Following the success of 2016's downspout disconnection public service announcement, starring local news anchor Jon Evans, two more public service announcements were filmed in 2018. Jon once again appeared as the spokesman for the Heal Our Waterways program, this time speaking about the use and benefits of rain barrels. This PSA played whenever a HOW advertisement was clicked on the WECT.com website. Web and digital platforms including video pre-roll ads, mobile ads, and digital weather channel ads were also part of this advertisement campaign. WECT.com is viewed by an average of 25,000 unique visitors per month.

In addition to the rain barrel message advertised on WECT, a digital billboard campaign promoting a similar message also aired. Contracting with Fairway Outdoor, billboard locations were chosen based on their proximity to Bradley and Hewletts Creeks, appealing to the viewer's sense of place. The billboards ran for two weeks in February, with 8 seconds of air time per minute, 24 hours a day.

HOW also renewed its presence as an underwriting partner with local National Public Radio affiliate, WHQR. This continued partnership with the local station will likely continue, as the money spent there seems to correlate with website visitations and program participation. A 15-second message aired 76 times over the course of 12 weeks. Each week, WHQR reached about 40,000 listeners in the Wilmington Designated Market Area. The WECT campaign also aired in this timeframe as well.



City staff delivered a Heal Our Waterways presentation to members of the Wilmington West Rotary Club and a presentation on rain garden design and installation for the Surfrider Cape Fear Chapter and general public. City staff also partnered with the Manager of the North Carolina Coastal Federation Southeast Regional Office to conduct an information session with a group of homeowners whose community would be impacted by a grant-funded stormwater retrofit.

HOW staff continued its presence this year at Wilmington's Earth Day Festival. As with years past, the event was well-attended, attracting 7,000+ visitors. Promotional items and program materials were distributed at the event, and a drawing for a rain barrel giveaway was conducted. Along with providing educational opportunities, these events also help gage outreach and advertising effectiveness. During the Earth Day Festival, several individuals stated that they had heard about the HOW program before. Additionally, 9 people joined the mailing list at the Earth Day event in order to receive more information about how to get involved.

HOW staff also attended the Lower Cape Fear Stewardship Development Awards Ceremony. An educational display table was set up and staff engaged with attendees to discuss the Watershed Restoration Plan, Stormwater Services, stormwater pollution and BMPs. Promotional materials were distributed and contacts were made with local and regional environmental professionals. Seventy five people were in attendance.

City Communications and HOW staff continue to maintain a visually appealing website. The "Who's Helping" page form where citizens can report their individual efforts or express interest in a stormwater reduction project through HOW has proven useful this year. Eight entries were completed by citizens expressing interest in helping decrease stormwater pollution, three of whom were within the target watersheds. This year, the Heal Our Waterways home page has received 1,620 unique views. This is up from 1, 044 the previous year. The Heal Our Waterways social media presence has also increased, with Twitter and Facebook followers of 217 and 171, respectively.

Heal Our Waterways ended two grants this year, continued two more, and is pending another. The EPA 319 grant with NC State University ended, as did the Lynnwood Environmental Enhancement Grant. The EPA 319 grant with the North Carolina Coastal Federation and the Green Infrastructure Center Tree grant both continued. And an additional EPA 319 grant in partnership with the North Carolina Coastal Federation and the University of North Carolina at Wilmington was recently approved.

The NCCF Hewletts & Bradley Creek 319 Grant continued through FY 17-18. Grant team partners met to discuss the project on multiple occasions. Through the grant, permeable pavement was installed at both the New Hanover County Arboretum and Waterman's Brewing. Grant partners also conducted a neighborhood presentation at another planned installation location. The grant will continue into 2019, with planned installations at Wrightsville Beach Animal Hospital, a neighborhood off Greenville Loop Road (Skystasail Drive), and a rain barrel giveaway/outreach campaign at the Palmetto Point neighborhood.

The NCSU 319 grant ended in March 2018. No additional installations were created through the grant. A re-planting and wetland plants workshop conducted by NCSU at the Lancaster bioretention area occurred in June 2018 due to unforeseen runoff volume impacts.

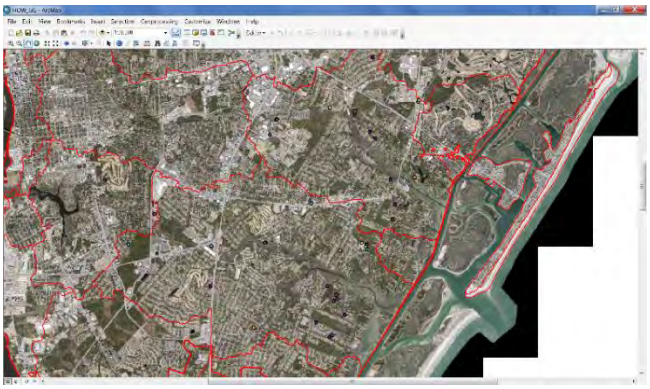
In partnership with City Planning, Stormwater, and Parks Divisions, the Green Infrastructure Center (GIC) Tree grant made strides in FY 1718. The citywide study looked at tree canopy and opportunities to use trees in the city. A public meeting in November 2017 gauged citizen priorities and perceptions about the existing tree canopy in Wilmington. The GIC then incorporated the public comments into their recommendation for improvements to City of Wilmington code and policy. The City arborist will present the final product to City Council in the future.

The Lynnwood/Glen Meade EEG grant successfully wrapped up in early 17-18. Actions on this project included the addition of more wetland suitable plantings to the bioretention area, carried out by volunteers from the NC Coastal Federation and City staff. Follow-up maintenance was also done on the site in July 2017 to ensure proper function and to prevent erosion.

One new grant was accepted this year through the EPA 319 program. In collaboration with the NC Coastal Federation and UNCW, a linear rain garden system as well as pervious pavement ribbons will be installed on the UNCW campus.

New Hanover Soil & Water Conservation District (NHSWCD) was once again granted a contract (HOWBMP) with the city to install BMPs on private properties in the watersheds. HOWBMP produced four installations this year, and identified interested potential participants for next year. Of this year's participants in the program, three were homeowners in the Hewletts Creek

Watershed and one was an HOA installation. The total volume reduction from the HOWBMP program this year was 809 cubic feet.



HOW staff continues to track BMP volume reduction projects that are in design or in the ground using the GIS Atlas, which was developed in the previous year but required some reform in early FY 1718. Staff worked on inconsistencies and errors that were identified in several of the GIS Atlas entries' unit conversions and calculations. This tracking tool allows HOW to analyze current impacts and assess stormwater volume reduction numbers from BMPs within the two target watersheds, and continues to be a key factor in HOW's progress, both in scope and accuracy.

Annual Assessment & Evaluation of Plan Implementation:

Last year's progress with the HOW program continued this year, with many of the growing pains and difficulties experienced in years past being smoothed out. However, several other hurdles to program success were identified. The website and citizen contacts yielded positive partnerships and interactions. Likewise, the HOW media presence created a greater overall awareness of the program, which manifested in additional public contacts and plans for future partnership.

While the groundwork is being laid for successful implementation of the plan, UNCW's water quality data still indicates that fecal coliform levels in the tidal creeks are increasing. This illustrates the need for broader implementation and buy-in, as well as novel approaches to increase BMP installation throughout the watersheds. One key item to pursue, which has seen great success in other communities, is a rain garden/BMP cost-share program.

Adding a cost-share program, while beneficial if successful, will require several issues to be addressed first. The main issue is that of City-held liability in working on or contracting on private property. Preliminary work is being investigated to address this issue, and Stormwater staff will work with the City Attorney's office to find a solution.

Ultimately, the HOW program is continuing in its progress towards the Bradley and Hewletts Creeks Watershed Restoration Plan's 6 Objectives and 35 Actions. The information below outlines that progress towards the Objectives & Actions of the Bradley & Hewletts Creeks Watershed Restoration Plan.

Objective 1: Continue existing programs that address water quality impairments in both watersheds:

Objective	Action #	Specific Action	Timeline	Partners
1. Continue Existing Programs that Address Water Quality Impairments in Both Watersheds	Action 1-1	Implement and enforce existing stormwater requirements for new development and redevelopment	On-going	City of Wilmington – Stormwater Services, Engineering, Development Services; NC DWQ, WB
	Action 1-2	Continue to promote LID designs	On-going	City of Wilmington – Stormwater Services, Engineering, Development Services; NC DWQ, WB
	Action 1-3	Continue to cooperate with CCAP	On-going	City of Wilmington –Engineering, Development Services; NCCF, WB, New Hanover Soil & Water
	Action 1-4	Maintain existing educational programs	On-going	City of Wilmington - Stormwater Services; NCCF, New Hanover Soil & Water, WB
	Action 1-5	Reflect plan in other City plans and NPDES annual permit report	As plans are updated	City of Wilmington – Stormwater Services, Engineering, Development Services: WB, NCCF
	Action 1-6	Continue education and code enforcement programs that reduce and eliminate sources of bacteria and pathogens related to human and pet wastes	On-going	City of Wilmington – Stormwater Services; WB

Much like years past, the HOW program has continued its environmental education and outreach efforts this year by sending out winter and spring postcard mailings to watershed residents in FY 1718, focusing on the Heal Our Waterways website and Best Management Practices, respectively.

Public service campaigns were created this year, with several new ads, seeking to raise awareness of rain barrels. These advertisements on WECT's website and apps and The Weather Channel app, followed in the same format, starring news anchor Jon Evans. The WHQR radio underwriting campaign was very similar to years past, and again proved to be fruitful. These campaigns brought a marked increase in website visitation as well as three citizen contacts indicating awareness of the program because of WHQR.

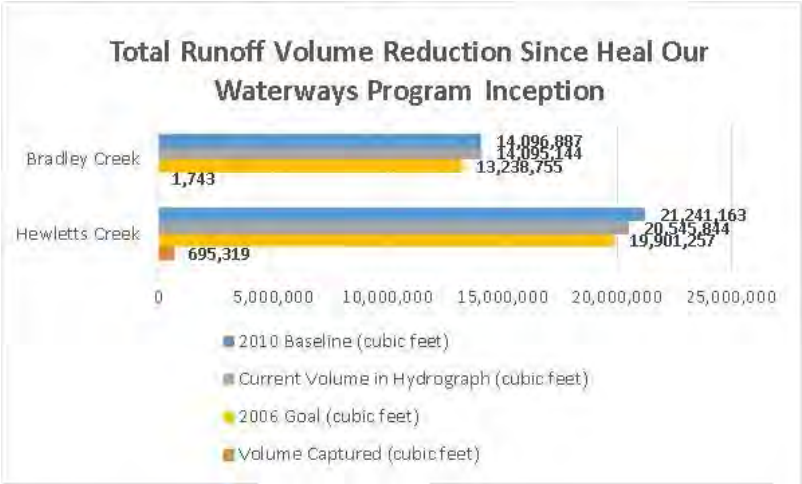
Another existing program with continued success this year is the partnership with New Hanover Soil and Water Conservation District (NHSWCD), called the HOWBMP Program. Although the number of installations was less this year, volume reduction was greater, and the number of potential participants continues to increase. News and participation in the program continues to

spread by word of mouth within the community, helping to raise awareness of water quality issues.

Objective 2: Determine appropriate water quality classifications and designated uses where water quality impairment exists:

2. Determine Appropriate Water Quality Classifications and Designated Uses Where Water Quality Impairment Exists	Action 2-1	Work with SS, UNCW, WB and NCCF to conduct preliminary evaluations of water quality to determine where more intensive state (SS) water quality investigations are needed	Year 1, establish preliminary monitoring	City of Wilmington –Stormwater Services; UNCW, SS, WB, NCCF
	Action 2-2	Work with SS to establish new monitoring stations within impaired waters influenced by the Bradley Creek watershed	Year 2 based upon preliminary monitoring	City of Wilmington –Stormwater Services; UNCW, SS, WB, NCCF
	Action 2-3	Work with SS to establish new monitoring stations within impaired waters influenced by the Hewletts Creek watershed	Year 2 based upon preliminary monitoring	City of Wilmington –Stormwater Services; UNCW, SS, WB, NCCF
	Action 2-4	Evaluate the results of bacterial source monitoring in Banks Channel that is being conducted by UNC-CH	Study underway, evaluate results in Year 1	WB, UNC-CH, UNCW, NCCF
	Action 2-5	Request Use Attainability Study on SA waters along Wrightsville Beach shoreline in Banks Channel. These waters are automatically closed to Shellfish Harvest due to marinas, and have been polluted since 1947.	Year 2	WB, NCCF, NC DWQ
	Action 2-6	Request Use Attainability Study on SB waters now "Approved" for shellfish harvest in waters influenced by the Bradley Creek Watershed	Year 2	City of Wilmington, WB, NCCF, NC DWQ
	Action 2-7	Determine if there is potential to restore shellfish harvest in any additional waters classified as SB that are influenced by the Bradley Creek watershed	Years 4-5	City of Wilmington –Stormwater Services; UNCW, SS, WB, NCCF
	Action 2-8	Evaluate the status and trends in bacteria contamination within the entire Hewletts Creek watershed based upon more intensive data collected as part of plan implementation	Year 5	City of Wilmington –Stormwater Services; UNCW, SS, NC DWQ, NCCF

In accordance with Action 2-1, Dr. Mike Mallin's office with the University of North Carolina at Wilmington (UNCW) continues to conduct regular surface water sampling to determine what effects the program's volume reduction efforts are having on the health of the creeks.



This plan objective concentrates heavily on the classification of local waters and the appropriateness of current classifications considering today's conditions. Ongoing issues regarding the proper classification of some waters and the possibility of a reassessment and overhaul of the classification criteria by the State of North Carolina have delayed staff in addressing this objective for the last several years. As with years past, there has been no change in classification this year. While not critical to the success of the plan at this stage, as the plan continues to gain traction and improve water quality, reclassification will become a more pressing concern.

Objective 3: Reduce the transport of bacteria from land to water by reducing and tracking volume reduction:

3. Track the reduction of the transport of bacteria from land to water	Action 3-1	Secure and budget funds for retrofits in the Bradley Creek watershed, deter-mine volume that can be reduced with funds, and track actual reductions using measurement tools	Secure funds years 1 & 2, design retrofits year 3, install and track reductions years 4 & 5	City of Wilmington –Stormwater Services; UNCW, SS, NC DWQ, NCCF
	Action 3-2	Secure and budget funds for retrofits in the Hewletts Creek watershed, deter-mine volume that can be reduced with funds, and track actual reductions using measurement tools	Secure funds years 1 & 2, design retrofits year 3, install and track reductions years 4 & 5	City of Wilmington –Stormwater Services; UNCW, SS, NC DWQ, NCCF

Actions 3-1 and 3-2, regarding funding for retrofits in both of the target watersheds, have seen progress in seeking additional funding for volume reduction BMPs. Funds are pending approval for the newest 319 grant, to be administered by the NC Coastal Federation, to install retrofits on the UNCW campus in the Bradley Creek Watershed. These funds should produce multiple installations in the coming year, resulting in volume reduction.

HOWBMP installed retrofits in the Hewletts Creek Watershed this year. For four rain garden installations, the volume reduction was 809 cubic feet.

The existing Hewletts Creek 319 grant, in partnership and administered by the NC Coastal Federation, also produced multiple installations this year. One installation was for pervious pavers at the New Hanover County Arboretum, located in the Bradley Creek Watershed. Pervious pavers were also installed at Waterman's Brewing, located in the "Drains to Intracoastal" watershed north of Bradley Creek.

Objective 4: Promote stormwater reduction efforts:

4. Promote Stormwater Reduction Efforts	Action 4-1	Promote use of GIS web based retrofit Atlas	Each year	City of Wilmington – Stormwater Services, Engineering, Development Services; WB, NCCF
	Action 4-2	Investigate cost effective methods of working with landowners to disconnect impervious surfaces	Year 1 & 2	NCCF, City of Wilmington, WB
	Action 4-3	Promote LID retrofits within private development	Each year	City of Wilmington – Stormwater Services, Engineering, Development Services; WB, NCCF.
	Action 4-4	Promote tree planting and retention	Each year	Wilmington Tree Commission; City of Wilmington - Development Services, Stormwater Services; Keep New Hanover Beautiful, NCCF, Coop Extension, WB
	Action 4-5	Promote stormwater reduction measures on City streets in future capital improvement projects	Dependent on Capital Improvement schedule	City of Wilmington - Stormwater Services, Engineering, Streets Divisions, Development Services; WB, NCCF
	Action 4-6	Pursue strategy with NCDOT to incorporate retrofits into highway upgrades	Years 1 – 5	City of Wilmington - Development Services, Stormwater Services; NCDOT, NCCF, WB
	Action 4-7	Promote LID retrofits in future publicly funded maintenance or redevelopment of City owned buildings, parks, parking lots, and drainage systems	Based upon project schedules	City of Wilmington – Engineering, Stormwater Services, Community Services, D Services; WB, NCCF
	Action 4-8	Promote and assist with LID retrofits at county schools	Ongoing based upon efforts at schools	NCCF, New Hanover County School System, CCAP
	Action 4-9	Encourage UNC-W to develop campus wide master plan to retrofit to reduce stormwater volume	Year 3	City of Wilmington - Stormwater Services, Development Services; UNCW, NCCF
	Action 4-10	Evaluate properties for retrofit or restoration potential.	Year 2	City of Wilmington - Stormwater Services, Development Services; WB
	Action 4-11	Evaluate existing stormwater ponds on public/private property for potential vol. reductions, retrofit them if feasible	Years 3 - 5	City of Wilmington - Stormwater Services; WB, NCCF

The HOW program has seen gains in the promotion of stormwater volume reduction efforts in FY1718, from social media to traditional media campaigns to collaboration with UNCW and NHSWCD.

Action 4-1 calls for the use of the GIS Atlas to aid homeowners and others in identifying cost-effective retrofit opportunities while quantifying the impact of decreased runoff volume. For the first time since the inception of this program, a working GIS Atlas has been created and is now usable to track and quantify the impacts of volume reduction. It is also a valuable tool in providing a visual representation of areas that are in greater need of retrofits. This, combined with the water quality monitoring that is being conducted by UNCW, will prove to be an invaluable tool in the coming years.

Actions 4-2 and 4-3 discuss working with landowners to disconnect impervious surfaces and the promotion of LID retrofits of existing private development, respectively. In accordance with these actions, through the NC Coastal Federation EPA 319 grant, a neighborhood has been identified as a prime candidate for a rain barrel giveaway program. This program is set to take place in the summer of 2018.

Also supporting Action 4-3, City Engineering staff and the Watershed Coordinator have worked together to establish a working protocol for reporting new development, as well as proposed re-development within the target watersheds. This has resulted in the Watershed Coordinator's inclusion in the Technical Review Committee concept review process. In FY 1819, concept plans presented that are within the target watersheds will be met with suggested LID retrofits.

In support of Action 4-4, the Green Infrastructure Center (GIC) grant to protect and restore urban tree canopy for stormwater management report should yield some success for this effort in FY 18-19. Action 4-9 calls for the development of a UNCW campus-wide stormwater master plan. While this has been stagnant for many years, this year the university finally made progress, although it is not known to what degree. Separate from the master planning process, a preliminary meeting was held between the UNCW Sustainability Captain, a research faculty member, and the HOW Watershed Coordinator to set forth potential projects and collaboration to follow.

Objective 5: Form and maintain partnerships:

5. Form and Maintain Partnerships	Action 5-1	Work with partners to educate stakeholders	Years 1 – 5	City of Wilmington - Stormwater Services, Development Services; NCCF, New Hanover Soil & Water, WB
	Action 5-2	Work with government agencies and NGOs to secure grants for retrofits and other programs	Years 1 – 5	City of Wilmington – Stormwater Services; Development Services; NCCF, WB, Cape Fear Public Utilities
	Action 5-3	Provide strategies and policies for city departments to carry out plan by incorporating runoff reduction strategies into the CIP process.	Years 1 – 5	City of Wilmington - Stormwater Services; Development Services, and Finance Depts.; NCCF

	Action 5-4	Promote use of atlas among key City departments in their routine business	Years 1 – 5	City of Wilmington - Stormwater Services, Development Services; NCCF, WB
	Action 5-5	Promote existing technical training opportunities to advance plan	Years 1 – 5	Special training arranged by partners using their own funds and grants, City of Wilmington - Stormwater Services, Development Services; WB, NCCF
	Action 5-6	Work with UNCW on retrofit projects	Years 1 – 5	grants, capital improvements City of Wilmington - Stormwater Services; UNCW, NCCF

The partnerships that were strengthened in FY16-17 were further bolstered this past year. HOW maintained all of the partnerships from the past, including UNCW, NC Coastal Federation, NC State Cooperative Extension, New Hanover County Soil and Water Conservation District, Surfrider Foundation Cape Fear Chapter, WECT TV-6, WHQR Public Radio, the Cape Fear Group of the Sierra Club, Cape Fear Public Utility Authority, the Wilmington Tree Commission, and Fairway Outdoor Advertising. New partnerships include the Wilmington West Rotary Club, the American Public Works Association, and the homeowners associations of the Palmetto Point and Shandy Point neighborhoods.

In accordance with Action 5-1, HOW delivered an educational program to the Wilmington West Rotary Club that was attended by 27 people. For Action 5-5, HOW also delivered an informative rain garden presentation for the Cape Fear Chapter of the Surfrider Foundation and interested citizens. The ongoing partnership with the NC Coastal Federation continues to fulfil Action 5-2, securing 319 grant for retrofits within both target watersheds.

In accordance with Action 5-6, the partnership with UNCW has continued. UNCW has partnered with the NC Coastal Federation and the City of Wilmington on the application of a 319 grant. This grant specifies locations on UNCW's campus to install runoff-reducing retrofits.

Objective 6: Measure success and adapt plan based upon results:

6. Measure Success and Adapt Plan Based Upon Results	Action 6-1	Use atlas accounting system to track progress toward watershed goals.	Years 1 – 5	City of Wilmington - Stormwater Services, Development Services; NCCF, WB
	Action 6-2	Work with SS, WB, and UNCW to monitor water quality status and trends	Years 1 – 5	City of Wilmington - Stormwater Services, Development Services; NCCF, WB, UNCW
	Action 6-3	Conduct annual and five year assessment of plan's success and modify plan as needed	Yearly	City of Wilmington - Stormwater Services, Development Services; NCCF, WB, UNCW

Water quality is still being closely monitored by UNCW, in accordance with Action 6-2. The most recent report, published in April of 2018, yields some frustrating results. Fecal coliform bacteria levels at five of the eight monitoring sites within the two target watersheds were higher in 2017 (the most recent data) than in 2016. This illustrates the need for a greater focus on runoff-reducing

installations in the coming years. With established programs like HOWBMP in place, additional programs and approaches will be necessary in order to positively impact results. A BMP cost-share installation program is one such addition, as is the promotion of BMP installations at the concept review stage of Technical Review Committee meetings.

This does not mean that the plan has not been successful, however. While installations must increase for runoff volume to be reduced, there are still many facets of the program that have been positive. Website visits and social media contacts have both increased markedly. Public interaction has increased both in quantity and in quality, meaning that interactions with members of the public involve a noticeably higher level of awareness on the topic of water quality related to stormwater runoff than in years past.

Five-Year Plan Assessment

Five years have passed since the inception of the Bradley and Hewletts Creeks Watershed Restoration Plan. Over the course of those five years, many lessons were learned, and much was accomplished. Likewise, areas for improvement were identified in order to support the plan objectives into the future.

From the beginning of the plan, there were several areas that have taken considerably longer to implement than was originally intended. Both the GIS Atlas and the Heal Our Waterways website took until FY 1617 to be fully operational. Likewise, partnerships that were anticipated to be productive, like New Hanover County Schools, have experienced unforeseen setbacks. Fortunately, programs and partnerships that were not considered at the beginning of the plan, such as HOWBMP and the partnership with the Surfrider Foundation, have proven fruitful.

Stormwater volume entering the target areas of Bradley and Hewletts Creeks has not decreased as rapidly as originally intended. But over time, the processes needed to accomplish that goal have become clearer. The success of the HOWBMP program has warranted a closer look at how the City of Wilmington can increase the installation of BMPs on private property. This has catalyzed the development of the BMP cost share program, set for implementation in FY 1819.

As with any plan, adjustments are necessary as time and unforeseen constraints arise. Over the last five years, the groundwork for the implementation of the plan was lain. Now, in the five years to come, we should build upon that groundwork to see measurable gains in water quality and a measurable decrease in stormwater volume entering the target areas. We can do that through continued use of educational efforts and partnerships, while implementing new ideas and approaches to volume reduction.

5. Information regarding North Carolina TMDLs

Information regarding North Carolina TMDLs is available at:
http://portal.ncdenr.org/web/wq/ps/mtu/trndlltmdls

APPENDICES

APPENDIX A: PROGRAM IMPLEMENTATION INCLUDING MODIFICATIONS AND JUSTIFICATION

None for this reporting period.

APPENDIX B: PUBLIC EDUCATION AND OUTREACH

Included in this section:

- BMP Reporting Table
- Public Outreach, Education and Involvement Plan including program goals, description of target pollutants, sources, and target audiences

DATE OF EVENT/ ACTIVITY	EVENT/ACTIVITY	AUDIENCE	DELIVERED BY (AGENCY)	METHOD OF DELIVERY / MESSAGE	ATTENDANCE/ PARTICIPATION
BMP a. Define outreach/education program goals including a description of the target pollutants, sources, and target audiences					
Outreach and education program goals, as well as a description of the target pollutants, sources, and target audiences, why they were selected and key outreach messages are thoroughly identified in the Appendix. This section is updated as necessary to reflect changes in target audience characteristics, awareness, etc.					
BMP b. Distribute public education materials and information to identified target audiences and user groups. For example, schools, homeowners, and/or businesses.					
In addition to public outreach efforts in this category, the Stormwater Compliance Officer also distributes education materials to the public and targeted user groups (i.e. pet owners, auto shops, restaurants, residents, etc) and issues NOVs and fines to citizens and businesses that have been identified as non-compliant with the City's stormwater ordinances. Information about code enforcement actions are included in the Appendix.					
Annually	8th Grade Enviroscape Watershed Presentations	All 8th Grade NHC Schools Science Classes	Stormwater Services CFRW NHSWCD	Classroom presentation about watersheds, water quality, nonpoint source pollution, BMPs and stewardship	76 classes 2200 students
7/28/2017	BRC Bridge Summer Program	Students at Hemenway Community Center	Stormwater Services	Education materials for rain garden planting event	12 students
9/12/2017	Presentation: UNCW Pier 601 Class	Undergraduate students	Stormwater Services	PowerPoint presentation and discussion, constraints discussion, PSA videos shown, Q&A, educational giveaways - watershed maps, newsletters, zip wallets	10 students 2 faculty
11/9/2017	Presentation: Isaac Bear Early College Science Class	Early college students in Environmental Club+C20	Stormwater Services	Classroom presentation about watersheds, water quality, nonpoint source pollution, BMPs and stewardship	30 students
2/14/2018	Direct presentation	Cape Fear Academy 1st Graders	Stormwater Services	Presentation about stormwater pollution, litter, and plastic pollution. Stormwater giveaways for students	20 students
2/22/2018	Lower Cape Fear Stewardship Awards Program	Realtors, Developers, Environmental Agencies, Politicians	Stormwater Services	Stormwater Services sponsored silver level in partnership with Planning Dept.	150 in attendance

3/10/2018	Canines for Clean Water booth at New Hanover County Rabies Clinic	Rabies clinic participants	NHSWCD	Canines for Clean Water booth - interactive event where pet owners sign a pledge to clean up after their pet and submit a photo of their pet to be featured on our website wilmingtonnc.gov/canines	24 pledges signed
3/13/2018	UNCW Sustainability Our Green Future Event	College students & faculty	Stormwater Services	Booth and interactive exhibit. Stormwater education materials and promos distributed.	100 in attendance
3/24/2018	Walk & Dog Dash @ Hugh MacRae Park	Pet owner participants	NHSWCD	Canines for Clean Water booth - interactive event where pet owners sign a pledge to clean up after their pet and submit a photo of their pet to be featured on our website wilmingtonnc.gov/canines	28 pledges signed
4/17/2018	Tour & Talk at Anne McCrary Park Stormwater Demonstration Site	NC Association of Floodplain Managers	Stormwater Services	Presentation about site, then tour	30 in attendance
4/21/2018	Lower Cape Fear Earth Day Celebration at Hugh MacRae Park	Festival attendees, general public	Stormwater Services (SWS is an annual sponsor of Lower Cape Fear Earth Day Festival)	Display booth to promote stormwater pollution education and interactive Super Pooper Scooper pet waste photo booth	5000 attendees
5/1/2018	Pet Waste Tidy Bag Pet Dispensers	Pet owners	Stormwater Services	Supplement to signage program. Compliance officer distributes bag dispensers to pet owners to encourage pick up and proper disposal	250 tidy bag pet waste dispensers purchased.
5/10/2018	Citizens Information Day in the Courtyard	General Public	Stormwater Compliance	Stormwater educational booth and information distributed	30 citizens
5/19/2018	Imagination Station at MLK	Kids Parents	Stormwater Services	To See or Turbidity interactive educational game; stormwater prize giveaways	65 in attendance

BMP c. Informational Web Site (www.wilmingtonnc.gov/stormwater)					
Ongoing/Regular Updates	Stormwater Services website	General public, website viewers	Stormwater Services	Dedicated stormwater website	www.wilmingtonnc.gov/stormwater
Ongoing	Stormwater Hotline info advertised on City website homepage and Facebook page	General public	Stormwater Services Communications Div.	Stormwater hotline and web reporting form for public; posted on website under What's New section and on City's Facebook page	Stormwater website, city website, Facebook fans, general public
1/10/18	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Street Sweeper building solar energy savings	COW web viewers and Facebook fans
7/24/2017	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - City's tree canopy and stormwater	COW web viewers and Facebook fans

8/15/2017	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Beasley Road to reopen Aug. 18	COW web viewers and Facebook fans
9/19/2017	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Drainage improvements underway on Beech St	COW web viewers and Facebook fans
11/29/2017	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Public input meeting on city's trees	COW web viewers and Facebook fans
11/27/2017	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Work begins on new repaving project	COW web viewers and Facebook fans
1/10/2018	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Portion of N. Colony Circle to temporarily close	COW web viewers and Facebook fans
1/10/2018	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Imagine a $40/month electric bill	COW web viewers and Facebook fans
1/19/2018	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Pine Valley project nears completion	COW web viewers and Facebook fans
1/25/2018	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - N. Colony Cir drainage improvements complete	COW web viewers and Facebook fans
2/2/2018	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Cassidy Drive temporarily closed	COW web viewers and Facebook fans
2/2/2018	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Crews lower Greenfield Lake	COW web viewers and Facebook fans
3/8/2018	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Stormwater work in Pine Valley East	COW web viewers and Facebook fans
4/2/2018	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Drainage work in Pine Valley East complete	COW web viewers and Facebook fans
4/2/2018	City of Wilmington website homepage and Facebook news	General public Web Viewers	Communications Div.	News article - Pine Valley project complete	COW web viewers and Facebook fans

BMP d. Maintain Hotline/Help line

The Stormwater Pollution Prevention Hotline was established in January 2010 to field calls from the citizens, businesses, and city employees regarding illicit discharges and other reports of stormwater pollution. The hotline phone # is **910-341-1020** and the web address is **www.wilmingtonnc.gov/reportstormwaterpollution.** Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to all hotline reports. Information regarding hotline reports is included in the Enforcement Appendix section including the number and nature of hotline phone/web reports.

Ongoing	Stormwater Hotline advertised using various outreach methods: truck magnets, signs, billboards, presentations, etc.	General public	Stormwater Services	Hotline poster, website, GTV-8 and promo items (pens, magnets, sticky notes) are used to raise awareness of the Stormwater Hotline	Hotline calls and webform reports vary each year. More info can be found in the "Enforcement" section of the report.

BMP e. Extent of Exposure/Reporting Requirements

Media Advertising Campaigns

September - November 2017	Mass Media - WECT-6 website, digital, mobile and targeted ad campaign	General public Mobile, digital, and web viewers	Stormwater Services	Ads on media Click thrus to website or 30 second 'Stormwater Animation' PSA on TV (72 spots total)	Target Audience: General public Ads Served: 322,646 on website and news/weather app Ads Clicked: 1175 Engagement Rate: .36% Total cost: $4725
March 2018	Cape Fear Public Utility Authority (CFPUA)	General public CFPUA customer service visitors	Stormwater Services	Provided CFPUA with stormwater education slides for their TV stations at CFPUA customer service locations	CFPUA visitors
March - May 2018	Mass Media - WECT-6 website, digital, mobile and targeted ad campaign	General public Mobile, digital, and web viewers	Stormwater Services	Ads on media Click thrus to website or 30 second 'Stormwater Animation' PSA on TV (72 spots total)	Target Audience: General public Ads Served: 312,806 on website and news/weather app Ads Clicked: 525 Engagement Rate: .17% Livestream Views: 17,348 Total cost: $4725
March - May 2018	Fairway Outdoor Billboard Advertising	Motorists Pedestrians	Stormwater Services	Litter Pollution digital billboard & targeted geo-fencing campaign for Burnt Mill Creek & Greenfield Lake	Target Audience: General public Reach: Motorists Frequency: Rotating billboard shown for 8 seconds every minute 24/7 using rotating billboard locations Total cost: $4000
April - May 2018	Local Voice Wilmington	Radio & Digital viewers	Stormwater Services	93.7 & 106.3 radio stations Digital advertising on portcitydaily.com	Radio: 72 :30 second ads per month 36 paid ads in primetime 36 matching BTAs Digital Advertising: Banner Ads 120,000 unique readers per month
Spring 2018	Going Green Magazine	Magazine and web viewers	Going Green Publications	Magazine Ad - Seriously, Ya'll Still Litter?	Target Audience: Adutls, General public, Environmental groups Reach & Frequency: 8000 printed .
Cumulus Media is no longer purchasing Arbitron or Nielson ratings systems. This is a cost-cutting measure on their part, but it means they no longer have the ability to provide us with reach and frequency data for the campaigns that run on their stations. The data provided references prior years available reach and frequency data for these stormwater outreach campaigns. Approved per M. Randall, NCDEQ.					

News Coverage

8/23/2017	Port City Daily	Online newspaper readers Radio listeners	Port City Daily reporter	Print and online newspaper article - Rampant 'poo-petrators' pushing more apartment complexes to DNA-test dog poop	Stats: -160,000 digital and print readers -140,000 weekly radio listeners -50% male, 50% female
10/19/2017	Port City Daily	Online newspaper readers Radio listeners	Port City Daily reporter	Print and online newspaper article - Greenfield Lake has been considered an 'impaired' body of water for 3 years	Stats: -160,000 digital and print readers -140,000 weekly radio listeners -50% male, 50% female
10/24/2017	Port City Daily	Online newspaper readers Radio listeners	Port City Daily reporter	Print and online newspaper article - New research pinpoints problem streams for Greenfield Lake	Stats: -160,000 digital and print readers -140,000 weekly radio listeners -50% male, 50% female

Social Media

Ongoing	Posts on City of Wilmington, NC Facebook page	Facebook viewers	City Communications	Facebook posts about stormwater runoff, water pollution, capital projects, etc.	23,883 page likes

Distributing promos/giveaways

Ongoing	Public Meetings, events, displays, city buildings	General public	Stormwater Services	Distribute items or leave in strategic locations where citizens will pick them up	Spread stormwater messages via freebies/promos at events such as Earth Day, Canines for Clean Water, etc.
Ongoing	Canines for Clean Water program at community pet events (ie Rabies Clinics, Pawz in the Park, etc)	Pet owners	Stormwater Services NHSWCD	Pet owners sign a pledge to clean up after their pet and submit a photo of their pet to be featured on our website wilmingtonnc.gov/canines	Goodie bag includes Canines for Clean Water pet bandana, pet waste pick up bags, pet waste brochure, pens, notepads
7/28/2017	BRC Bridge Summer Program	Students at Hemenway Community Center	Stormwater Services	Education materials for rain garden planting event. Stormwater educational giveaways - brochures, zip wallets, tote bags, watershed posters	12 students
9/12/2017	Presentation: UNCW Pier 601 Class	Undergraduate students	Stormwater Services	PowerPoint presentation and discussion, constraints discussion, PSA videos shown, educational giveaways - watershed maps, newsletters, zip wallets	10 students
2/14/2018	Enviroscape Presentation	Cape Fear Academy 1st Graders	Stormwater Services	Stormwater giveaways for students - newsprencils, posters	20 students

5/1/2018	Pet Waste Tidy Bag Pet Dispensers	Pet owners	Stormwater Services	Supplement to signage program. Compliance officer distributes bag dispensers to pet owners to encourage pick up and proper disposal	250 tidy bag pet waste dispensers distributed
3/10/2018	Canines for Clean Water booth at New Hanover County Rabies Clinic	Rabies clinic participants	NHSWCD	Canines for Clean Water booth - interactive event where pet owners sign a pledge to clean up after their pet and submit a photo of their pet to be featured on our website wilmingtonnc.gov/canines	24 pledges signed
3/13/2018	UNCW Sustainability Our Green Future Event	College students & faculty	Stormwater Services	Booth and interactive exhibit. Stormwater education materials and promos distributed.	100 in attendance
3/24/2018	Walk & Dog Dash @ Hugh MacRae Park	Pet owner participants	NHSWCD	Canines for Clean Water booth - interactive event where pet owners sign a pledge to clean up after their pet and submit a photo of their pet to be featured on our website wilmingtonnc.gov/canines	28 pledges signed
4/17/2018	Tour & Talk at Anne McCrary Park Stormwater Demonstration Site	NC Association of Floodplain Managers	Stormwater Services	Presentation about site, then tour	30 in attendance
4/21/2018	Lower Cape Fear Earth Day Celebration at Hugh MacRae Park	Festival attendees, general public	Stormwater Services (SWS is an annual sponsor of Lower Cape Fear Earth Day Festival)	Display booth to promote stormwater pollution education and interactive Super Pooper Scooper pet waste photo booth	5000 attendees
5/1/2018	Pet Waste Tidy Bag Pet Dispensers	Pet owners	Stormwater Services	Supplement to signage program. Compliance officer distributes bag dispensers to pet owners to encourage pick up and proper disposal	250 tidy bag pet waste dispensers purchased.
5/19/2018	Imagination Station at MLK	Kids Parents	Stormwater Services	To See or Turbidity interactive educational game; stormwater prize giveaways	65 in attendance

Local Cable Access (GTV-8)

Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (slides)	Cable access TV viewers	Stormwater Services GTV-8	Monthly rain barrel sale to the public (updated content to reflect program changes)	Inform public about opportunity to purchase reduced cost rain barrels every month
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (slides)	Cable access TV viewers	Stormwater Services GTV-8	Re-route your downspout slideshow	Inform public about re-routing downspouts to let water soak in, instead of runoff

Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (video slideshow)	Cable access TV viewers	Stormwater Services GTV-8	Shortnose Sturgeon narrated slideshow	Inform public about the Shortnose Sturgeon, an endangered species in the Cape Fear River
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (slides)	Cable access TV viewers	Stormwater Services GTV-8	Pet waste ordinance slideshow, detailing ordinance rules and fines	Inform public of pet waste ordinance
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (slides)	Cable access TV viewers	Stormwater Services GTV-8	Yard waste ordinance slideshow, detailing ordinance rules and fines	Inform public of yard waste ordinance
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (slides)	Cable access TV viewers	Stormwater Services GTV-8	Stormwater hotline info slideshow	Inform public of water pollution/illicit discharge and hotline to report pollution
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (slides)	Cable access TV viewers	Stormwater Services GTV-8	Stormwater Poster slideshow	Inform public about hotline, pet waste, yard waste, and where runoff drains
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater Services GTV-8	:30 second PSA	UNCW Buffers PSA
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater Services GTV-8	:30 second PSA	Grasshopper Litter PSA
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater Services GTV-8	:30 second PSA	Hard to Train a Human Pet Waste PSA 2014 (refilmed in Hi-Def)
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater Services GTV-8	:30 second PSA	Yard Waste PSA 2010
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater Services GTV-8	:30 second PSA	Johnny Fishpatrick PSA - NC DENR
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater Services GTV-8	:30 second PSA	Keep America Beautiful Grasshopper PSA
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater Services GTV-8	:30 second PSA	Not your Ashtray PSA
Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (documentary)	Cable access TV viewers	Stormwater Services GTV-8	Documentary	Puget Sound Scuba Urban Pollution documentary

Airs on rotating schedule	GTV-8 City's cable access channel stormwater programming (PSA)	Cable access TV viewers	Stormwater Services GTV-8	:30 second PSA	Shortnose Sturgeon Documentary

CCTV & Marlin Information Boards

Airs on rotating schedule	GTV-8 marlin information boards	Employees	Stormwater Services	Stormwater education slides Rain Barrel slides Stormwater Basics PSA	Employees and visitors to city offices
Airs on rotating schedule	Cape Fear Public Utility Authority (CFPUA) CCTV	CFPUA viewers	Stormwater Services	Stormwater education slides Rain Barrel slides Stormwater Basics PSA	Employees and visitors to CFPUA offices

Brochures, Displays, Signs, Welcome Packets, Pamphlets

Ongoing Enforcement Activity	Pet Waste Signage Pilot Program	Pet owners	Stormwater Services	Continued program to deploy educational pet waste signage in city easements where pet owners walk their dogs	Signage deployed to problem locations throughout the city on rotating basis
7/10/2017	Stormwater Services brochures delivered to CFPUA	CFPUA / Stormwater custormers	Stormwater Stormwater Services	Two CFPUA Offices received updated Stormwater Services brochures to distribute to customers	2500 brochures

Newsletters

Fall 2017	Citywide Public Information Report Newsletter	City residents Public library Special events	Stormwater Services Communications Div.	Brief highlights about Stormwater Drainage Projects - Peachtree Avenue	40,000+ newsletters mailed to city residents
Winter 2018	Citywide Public Information Report Newsletter	City residents Public library Special events	Stormwater Services Communications Div.	Stormwater Project info included	40,000+ newsletters mailed to city residents
Spring 2018	Stormwater Watch Newsletter Insert included in Citywide Public Information Report Newsletter	City residents Public library Special events	Stormwater Services Communications Div.	UNCW Annual Water Quality Report including articles about stormwater billing, and litter impacting wildlife	40,000+ newsletters mailed to city residents

Grant Projects

NC Dept. of Environmental Quality- Division of Water Resources	Southern Coastal Grant Sites Visit by DWR staff	Hewletts Creek Burnt Mill Creek	NCCF NCSU Stormwater Services	Tour of grant site installations in Hewletts and Bradley Creeks	Two staff from the NC Division of Water Resources
Began August 2015. Closed out grant participation in August 2017	Lynnwood EEG Grant	Hewletts Creek	NCCF NCSU Stormwater Services	Bio-infiltration Area designed and constructed Jan/Feb 2017. Will reduce runoff volume for Heal Our Waterways program. Conducted pre- and post-test surveys with homeowners	Collaboration with NC Coastal Federation, NC State, and City of Wilmington Stormwater Services to design and construct project and conduct public education
Began December 2016	Green Infrastructure Center Tree Grant	Citywide	GIC City Planning, Stormwater, Parks	Citywide study to look at tree canopy and opportunities to use trees to mitigate stormwater	Collaboration with the Green Infrastructure Center, and City Planning, Stormwater, and Parks Divisions

Began Jan 2015 (1st year of 2.5 year grant). Closed out March 2018	319 Hewletts Creek Watershed BMP Installations Grant (A collaborative approach to voluntary watershed restoration)	Hewletts Creek	NCSU Stormwater Services	Stormwater improvement projects on private and city property	Collaboration with NCSU to implement projects that align with the Bradley & Hewletts Creek Watershed Restoration plan
Began April 2017	EPA 319 NCCF Grant for Bradley & Hewletts Creeks	Hewletts Creek Bradley Creek	Stormwater Services NC Coastal Federation	Grant to install BMPs in Hewletts and Bradley Creek Watersheds	Collaboration with NCCF to implement projects that align with the Bradley & Hewletts Creek Watershed Restoration plan
Ongoing	Watershed restoration plan for Hewletts and Bradley Creeks, now being implemented by Watershed Coordinator	Hewletts & Bradley Creek watershed residents and businesses	Partners: Stormwater Services NC Coastal Federation Town of Wrightsville Beach Withers and Ravenal UNCW	Heal Our Waterways program implementation. See TMDL section of report for status of restoration plan implementation	Watershed restoration plan implementation began in 2013. Program is called Heal Our Waterways

Participation on Boards/Committees

Quarterly Meetings	NC of Natural & Cultural Resources appointment	NC Aquarium at Fort Fisher	Stormwater Education Program Manager	Advisory Committee Appointment	3-year term
Quarterly Meetings	New Hanover County Watershed Roundtable	Local water quality agencies, government, NGOs	Stormwater Education Program Manager	Participation in collaborative meeting	Ongoing

Employee Trainings

7/10/2017	IDDE/Stormwater Presentation for Engineering Staff	Engineering Staff	Compliance Officer	Illicit Discharge Detection & Elimination	5 attendees

Weekly Update Articles for City Council / City Staff / Media

Weekly	Weekly Email Update	City Council Employees Media	Various city staff	Weekly update of city news, events, projects, etc.	Stormwater information was included in 17 Weekly Updates

Citizen Contacts

Ongoing/ regularly	Stormwater office via phone, email or walk-in	Citizens/ Businesses	Stormwater Services	Responses to requests for information, literature, etc.	Information provided regarding specific nature of contact

LEGEND:

COW = City of Wilmington

NHSWCD = New Hanover Soil & Water Conservation District

CFPUA = Cape Fear Public Utility Authority

CFRW = =Cape Fear River Watch

WECT-TV6 = NBC station

CUMULUS = radio stations

NCSU = NC State University

FB = Facebook

HOW = Heal Our Waterways program

CITY OF WILMINGTON
STORMWATER SERVICES

Public Outreach & Education, Public Involvement & Participation Plan

Compiled
August 2012
Updated as Needed

Table of Contents

Introduction

Stormwater runoff is water from rain or irrigation that flows over land and into local creeks, streams and waterways. According to the US Environmental Protection Agency (EPA), stormwater runoff is the #1 source of surface water pollution.

Impervious surfaces are hard surfaces that water cannot penetrate, such as driveways, streets, parking lots and rooftops, which prevent stormwater runoff from naturally soaking into the ground. Instead, runoff flows over these surfaces picking up pollutants such as pet waste, auto fluids, fertilizers, pesticides, litter, and yard waste and carries them through the stormwater drainage system, directly into our waterways.

In Wilmington, runoff travels through a complex, interconnected system of storm drains, pipes, ditches, creeks and other natural and man-made features. In Wilmington, the storm drainage system consists of approximately:

- 9,000 catch basins and manholes
- 220 miles of pipe
- 200 miles of open drainage (ditches, creeks, and channels)
- 145 acres of retention ponds including Randall Pond and Silver Stream Pond
- 12 miles of culverts under roads
- Greenfield Lake, Love Grove Tidegates
- Stormwater BMPs such as Kerr Avenue Wetland, Park Avenue Bioretention Area, Wade Wetland, etc.

This plan for Public Education and Outreach and Public Participation and Involvement is a segment of the City of Wilmington's Comprehensive Stormwater Management Plan (hereinafter referred to as Stormwater Plan), as required by the State of North Carolina Department of Environment and Natural Resources Division of Water Quality Permit No. NCS000406. The permit authorizes the City of Wilmington to discharge stormwater from their municipal separate storm sewer system (MS4) to the receiving waters of the State within the Cape Fear and White Oak River Basins, under Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES) Program.

As required by the NPDES Permit, the City of Wilmington's Stormwater Plan must detail the City's outreach program for the five-year term of the stormwater permit. This document serves as the Outreach and Education Plan.

Since 1993, scientists at the UNC Wilmington Center for Marine Science Research have been assessing the water quality of Wilmington's major waterways. Approximately 70 sampling sites assess the water quality of 10 of Wilmington's tidal creeks, as well as Greenfield Lake, and the Cape Fear River. The findings are reported annually and serve as a valuable tool to gauge changes in water quality in the area.

Public education, outreach, and participation are essential tools to develop stewardship and awareness of stormwater pollution issues in Wilmington. By successfully reaching out to citizens

and businesses, we can reduce the pollution in our local surface waters preserving them as a healthy, beautiful resource for our area.

Mission of Stormwater Services

The City of Wilmington Stormwater Services provides comprehensive management of the stormwater drainage system in order to protect our community and environment.

Goals & Objectives ~ Outreach, Education, Involvement Program

The City of Wilmington Stormwater Services strives to improve local water quality by creating awareness of stormwater runoff issues through public education and outreach and public participation and involvement.

Through education, outreach, and involvement we educate citizens, businesses and employees about the stormwater drainage system, sources of stormwater pollution, the direct impacts of stormwater pollution on local waterways, and what we can do as a community to prevent and reduce stormwater pollution. The program complies with the City's NPDES stormwater permit.

The education program addresses the following facts as a basis for education efforts:

- Storm drains and drainage conveyances (i.e. ditches) carry water directly to local waterways without any treatment. Only rain should go down the storm drain!

- Impervious surfaces increase the speed and volume of polluted stormwater runoff entering the stormwater drainage system.

- Polluted stormwater runoff flows directly into local waterways where it impacts water quality, aquatic habitat, shellfish harvest areas, and drinking water supplies.

- Plants, shrubs, trees, and other vegetation greatly reduce stormwater pollution by absorbing and filtering stormwater runoff and preventing soil from washing away.

- Reduce the amount of polluted stormwater runoff entering local waterways by utilizing BMPs (Best Management Practices). BMPs are any action or on-the-ground practice that reduces the amount of stormwater and pollution flowing into waterways. BMPs such as rain gardens, rain barrels, and re-routing downspouts to grassy areas allow stormwater runoff to soak into the ground and be cleaned and filtered naturally.

The program also addresses the six major pollutants that impact Wilmington's waterways:

1) Fecal coliform bacteria
2) Nutrients
3) Sediment
4) Chemicals
5) Litter
6) Vehicle Pollution

Target Pollutants, Sources, and Audiences

The following pollutants have been identified as significant sources of pollution in Wilmington's waterways. Many of these pollutants also negatively impact the proper functioning of the stormwater drainage system. These particular pollutants were chosen based on several sources including UNCW's water quality monitoring data, New Hanover Animal Control statistics, and the 2006 NC Statewide Stormwater Survey of North Carolina residents.

This is a working document; therefore the goals and target pollutants will change over time based on the target audiences' knowledge and implementation of stormwater-friendly practices, as well as water quality data and trends.

Target Pollutant	**Pollutant Origin**	**Likely Pollutant Sources / Target Audience** (Residential & Commercial/Industrial)
Fecal Coliform Bacteria	⌖ Domestic & wild animal waste	- Pet owners and their pets - Stray dogs, feral cats - Boarding kennels - Veterinarian facilities - Pet-related businesses
Nutrients (nitrogen and phosphorous)	⌖ Fertilizers ⌖ Yard waste	- Homeowners - Gardeners - Landscapers/Landscaping Companies - Turf maintenance professionals - Golf courses
Sediment (sand, soil, etc)	⌖ Eroding stream banks ⌖ Exposed soil ⌖ Construction	- Construction sites/land-disturbing activities - Landscapers/landscaping companies - Homeowners
Chemicals	⌖ Pesticides ⌖ Pressure washing chemicals ⌖ Vehicle and boat washing soaps	- Homeowners - Pressure washing businesses - Mobile detailers - Pressure washers - Turf/landscape professionals - Restaurants
Litter	⌖ Plastics ⌖ Paper ⌖ Cigarette butts	- Motorists - Smokers - Restaurants - Retail centers - Construction sites
Vehicle Pollution	⌖ Vehicle fluids (motor oil, antifreeze, etc) ⌖ Vehicle washing soaps/detergents	- Motorists' vehicles - Backyard mechanics - Vehicle maintenance repair shops - Mobile detailers - Dealership lots

Target Pollutant: FECAL COLIFORM BACTERIA (domestic and wild animal waste)

Nutrients, such as nitrogen and phosphorus, enter our waterways in excessive amounts via stormwater runoff that carries fertilizers and yard waste into the storm drainage system. High nutrient loads causes algal blooms, low dissolved oxygen levels, fish kills, and impaired aquatic habitats.

Pollutant Source:

Likely Residential Sources: Domesticated Animals, Stray and Feral Animals
Likely Commercial/Industrial Sources: Boarding Kennels, Veterinarian Facilities, Pet-Related Businesses

Background/Environmental Impacts:

- Storm drains and drainage conveyances (i.e. ditches) carry polluted runoff directly to local waterways without any treatment. Only rain should go down the storm drain!
- Fecal coliform bacteria is the #1 pollution problem impacting Wilmington's creeks and waterways, as identified through water quality monitoring. The primary source of this bacterial pollution is canine and outdoor cat waste.
- Stormwater runoff washes bacteria, parasites, viruses, and nutrients from animal waste directly into our waterways.
- There is a direct correlation between the amount of impervious surface coverage and fecal coliform bacteria counts in Wilmington's waterways.
- Once in our waterways, these pathogens can cause shellfish bed closures, swimming advisories, algal blooms, low dissolved oxygen levels, fish kills, and impaired aquatic habitat.
- High levels of fecal coliform bacteria can cause diseases and infections in humans upon contact such as roundworm, salmonellosis, toxoplasmosis, E. coli, and gastroenteritis.

Target Pollutant: FECAL COLIFORM BACTERIA (domestic and wild animal waste)

Key Outreach Messages:

- Messages should connect uncollected pet waste to water quality problems and human health impacts.
- Dogs waste is a major source of bacterial pollution considering their population, daily defecation rate, and bacterial production. Outdoor cats are also a major problem for these same reasons; steps should be taken to control their waste as well.
- Bacteria can cause diseases in humans and other animals.
- Pet owners have a responsibility to clean up after pets and dispose of the waste properly.
- Debunk barriers to cleaning up after pets (i.e. it's not fertilizer, it's okay to use a bag to pick it up with your hand, pet waste is still a problem even if it's in your own backyard, etc).
- Pet owners should be aware of and abide by the City's Pet Waste Ordinance:
  - Fully and immediately clean up after pets on any public property. *(Public property consists of streets, sidewalks, right of ways, parks, plazas, stream banks, public accesses, pathways, drainageways, storm drains, creeks, officially accepted easements, etc.)*
  - Carry a clean-up device (i.e. bag, scooper) at all times.
  - Show the clean-up device to a Code Enforcement Official, if requested.
  - Bag and dispose of pet waste in a closed trash receptacle or refuse container.
  - Do not flush pet waste down the toilet (Cape Fear Public Utility Authority ordinance).
  - Fines for non-compliance with the City's pet waste ordinance are $250 per occurrence.
- Utilizing BMPs, such as rain gardens, rain barrels, and re-routing downspouts to grassy areas allows polluted runoff to soak into the ground and be cleaned and filtered naturally.

Target Audience	Audience Description (Why Selected?)	Suggested Outreach Strategies
Pet Owners	By right of ownership, a pet owner has the power to reduce pet waste-contaminated runoff by cleaning up after their pet. Survey data reports both females and males should be targeted, with a slightly higher % of males not picking up.	• Educate citizens about the City's pet waste ordinance via the stormwater website and GTV • Participate in local pet-related events (i.e. Paw Jam) • Continue Canines for Clean Water program (C4CW) • Post educational signs at pet waste stations • Distribute pet waste education brochures and flyers during special events • Air public service announcements in paid spots • Direct mail enforcement letter to neighborhoods with complaints • Include blurbs in the citywide newsletter • Utilize enforcement actions when necessary for violators of the pet waste ordinance
Pet-Related Businesses	Targeting pet-related businesses will educate those in the profession about best practices for pet waste management and also serve as a conduit to deliver outreach messages to the public. Businesses include: - Veterinarians - Animal hospitals - Kennels - Pet stores - Groomers - Trainers - Petsitters	• Encourage businesses to be models for environmental stewardship at their place of business (i.e. install pet waste receptacles in parking lot islands or properly design kennel runs for waste removal) • Encourage businesses to post the pet waste education poster and/or brochures for customers to view

	- Doggie day care - Local pet magazines - Local adoption agencies - NHC Animal Control - NH Humane Society	
Management/ Residents of Apartment Complexes	Apartment complexes often experience problems with uncollected pet waste on their property. In Wilmington, a large number of college students with pets reside in these complexes. Management can play a key role in educating their residents about pet waste and implementing and enforcing a pet waste management policy on their property.	• Provide materials to educate the management of apartment complexes on how to institute a pet waste policy, as well as provide a consistent policy for enforcement • Encourage apartment complex management to educate their residents by distributing the City's pet waste education materials to each apartment • Encourage management to post the pet waste education poster and/or brochure in common areas for their residents to view • Encourage management to be make it easy for their residents to manage pet waste by installing pet waste receptacles around the property
Assessment & Evaluation		
• Assess and evaluate local water quality utilizing UNCW Center for Marine Science annual water quality monitoring, specifically Fecal Coliform counts in local waters • Periodically assess the habits of pet owners and pet industry professionals by: - Direct observation of habits *(collects vs. doesn't collect, where dispose, etc.)* - Count of citations issued for pet waste violations - Count of reported complaints to Stormwater Hotline regarding pet waste violations		

Target Pollutant: NUTRIENTS (fertilizers, yard waste)

Nutrients, such as nitrogen and phosphorus, enter our waterways in excessive amounts via stormwater runoff that carries fertilizers and yard waste into the storm drainage system. High nutrient loads causes algal blooms, low dissolved oxygen levels, fish kills, and impaired aquatic habitats.

Pollutant Source:
Likely Residential Sources: Homeowners, Gardeners, etc.
Likely Commercial/Industrial Sources: Landscapers, Turf Maintenance, Golf Courses, etc.

Background/Environmental Impacts:

- Storm drains and drainage conveyances (i.e. ditches) carry polluted runoff directly to local waterways without any treatment. Only rain should go down the storm drain!
- Lawn fertilization is one of the most widespread watershed behaviors by homeowners and landscaping companies.
- Improper application of fertilizer results in the introduction of nutrients into our waterways via stormwater runoff.
- Yard waste (i.e. grass clippings, leaves, pinestraw) are often improperly blown or directed into streets, storm drains, and ditches leading to clogged stormwater conveyances resulting in flooding of streets and property. This organic matter can also flow through the drainage system introducing nutrients and pesticides into waterways.
- Fertilizers and yard waste that end up in local surface waters impact aquatic life by introducing an overabundance of nutrients, a process known as eutrophication.
- Eutrophic water conditions cause algal blooms. Once the excess nutrients are used up in a water body, the algae will decompose using up the dissolved oxygen in the water, which aquatic organisms (i.e. fish) need to survive. This can lead to fish kills.
- Algal blooms produced from eutrophic conditions also prevent sunlight from reaching benthic (bottom-dwelling) aquatic plants and organisms.
- Some types of algal blooms are toxic to plants and animals, including humans.

Target Pollutant: NUTRIENTS (fertilizers, yard waste)

Key Outreach Messages:

- A direct link exists between improper fertilizer application and yard waste disposal and poor water quality resulting in algal blooms, fish kills, and habitat degradation.
- Grass cycle! Leave grass clippings on the lawn to reduce or eliminate the need for fertilizer. Clippings conserve soil moisture and are a natural fertilizer.
- Compost yard waste and use the resulting material in your landscape or garden
- Contain yard waste for City pickup.
- Before fertilizing, get a free soil test from NHC Cooperative Extension. It will tell you the exact nutrients your lawn needs and could save you money spent on fertilizer.
- Design and maintain lawns with the goal of absorbing runoff. For instance, minimize the use of lawn area and fertilizer by replacing with native trees, shrubs, plants and groundcover.
- Use alternatives to fertilizer such as organic fertilizer, compost, grass cycling, worm poop, etc.
- If fertilizer must be used, read the label and apply correctly. Improper application includes over-applying by frequency or volume, applying the wrong type, applying before rain, and failure to clean excess fertilizer from driveways and streets after application.
- Utilizing BMPs, such as rain gardens, rain barrels, and re-routing downspouts to grassy areas allows polluted runoff to soak into the ground and be cleaned and filtered naturally.
- Improper disposal of yard waste (leaves, grass clippings, pine straw) can clog the storm drainage system causing flooding of streets and property.
- Landscapers/Property owners should be aware of and abide by the City's Yard Waste Ordinance:
  - It is unlawful to rake, sweep, blow, wash, direct or place any debris into the storm drainage system. (*The storm drainage system consists of streets, storm drains, ditches, swales, creeks, lakes, rights-of-way, dedicated easements, etc).*
  - Property owners shall keep all ditches, drains, swales, and other drainageways on their property free from obstructions which would impede the flow of water.
  - Fines for non-compliance with the City's yard waste ordinance are $250 per occurrence.
- Landscaping company employees should be trained on proper fertilization and yard waste disposal practices.

Target Audience	Audience Description (Why Selected?)	Suggested Outreach Strategies
Homeowners/ Residents	Many citizens improperly apply fertilizer and/or blow yard waste into the street or storm drain. Target audience is majority male homeowners for self-application of fertilizer and yard waste disposal. Also target households that hire landscaping companies.	• Distribute fertilizer and yard waste education brochures and soil test kits to Wilmington residents during HOA presentations and special events like Earth Day • Inform residents about proper disposal methods for yard waste including grass cycling, composting, and collecting yard waste for pick-up by posting info on GTV • Post educational lawn care poster on stormwater website • Air public service announcements on mass media outlets • Include blurbs in citywide newsletter • Submit periodic press releases to the media

Landscapers and Turf Maintenance Professionals	Landscaping and turf maintenance companies frequently use fertilizers and produce a large amount of yard waste on a regular basis. Employees are often male and of Hispanic background.	• Distribute large format education poster about yard waste disposal to landscapers and lawn maintenance companies, available in both English and Spanish • Emphasize proper staff training on practices like fertilization application and yard waste disposal • Distribute fertilizer education info to golf course management • Post outreach materials in English and Spanish on stormwater website and GTV • Utilize enforcement actions when necessary for violators of yard waste ordinance
Assessment & Evaluation		
• Periodically assess the habits of homeowners and landscape industry professionals by: - Direct observation of the fertilizer application habits of homeowners and landscape industry - Surveys of the fertilizer application habits of homeowners and landscape industry professionals • Assess and evaluate local water quality utilizing UNCW Center for Marine Science annual water quality reporting, specifically nitrogen, phosphorus, BOD, and algal bloom frequencies and locations		

Target Pollutant: SEDIMENT (sand, dirt, gravel, clay, soil particles)

Sediment is generated by the process of natural or accelerated erosion and consists of sand, dirt, clay, or soil particles. Sedimentation occurs when stormwater runoff carries soil particles from a disturbed land area or eroding stream bank to surface waters. Sediment can quickly fill in a waterbody, clog the storm drainage system, and cause turbidity and problems for aquatic life.

Pollutant Source:
Likely Residential Sources: Yards, Driveways, etc.
Likely Commercial/Industrial Sources: Construction Sites, Landscapers, Clear-cut Land, etc.

Background/Environmental Impacts:

- Storm drains and drainage conveyances (i.e. ditches) carry polluted runoff directly to local waterways without any treatment. Only rain should go down the storm drain!
- Both natural and accelerated erosion produce sediment. Natural erosion is the process of weathering that forms soil. Accelerated erosion is a result of land-disturbing activities by humans that loosen topsoil, making the land more prone to erode quickly (i.e. construction-related activities).
- While natural erosion contributes sediment to waterways, the majority of sediment comes from areas where accelerated erosion has occurred. Stormwater runoff carries soil particles from a disturbed area of land to local creeks and streams. The waves created by boaters can also cause accelerated erosion near the banks.
- Excessive sedimentation can fill in a water body or clog the storm drainage system, leading to flooding. Sedimentation also impacts bottom-dwelling organism by smothering fish eggs, shellfish, coral and benthic (bottom-dwelling) plants.
- Sediment can also cause water to become cloudy, also known as turbidity. Turbidity impairs the photosynthesis of aquatic plants, as well as the ability of aquatic animals to breathe and see prey/predators.
- Sediment serves as a “transport vehicle” for other pollutants such as nutrients, metals, and bacteria. These pollutants attach to sediment particles and cause additional water quality issues when the sediment gets stirred up (i.e. boating, hurricanes, etc) and re-pollutes the water.
- Other sources of sediment include poorly vegetated areas in a yard or landscape.

Target Pollutant: SEDIMENT (eroding streambanks, construction, exposed soil)

Key Outreach Messages:

- Any land-disturbing activity including gardening, planting, construction, etc. can produce sediment which can lead to flooding of streets and property when the sediment is carried into the storm drainage system via stormwater runoff.
- There is a direct link between sediment and poor water quality, in addition to impacts on aquatic life and habitat.
- Residents can plant groundcover, shrubs, and trees to hold soil in place and prevent erosion. Use native plants whenever possible – they don't need fertilizers and pesticides. For properties with sandy soil, mix organic matter (i.e. compost) in with the sand to allow plants to grow better.
- Mulch should be used to cover exposed soil and prevent it from washing away.
- Sediment should be collected off paved surfaces and not rinsed or blown into the drainage system.
- Lack of vegetation along waterfront property and streambanks can produce significant erosion. These types of property owners should be encouraged to plant vegetative buffers.
- Developers should follow all sedimentation and construction site laws and practices. Construction site violations can be reported to the State Hotline: 1-800-STOP-MUD
- Utilizing BMPs, such as rain gardens, rain barrels, and re-routing downspouts to grassy areas, allows polluted runoff to soak into the ground and be cleaned and filtered naturally.

Target Audience	Audience Description (Why Selected?)	Suggested Outreach Strategies
General Public/ Homeowners	The environmental consequences of sedimentation are not widely understood by citizens. Sources of sediment in our surface waters are primarily the result of human-related activities. Homeowners may have exposed soil in lawns or landscape beds or poorly vegetated areas on their property. Target both males and females.	• Encourage homeowners to plant vegetation or apply mulch to anchor soil in place and prevent erosion during HOA or community presentations • Post outreach materials on stormwater website and GTV • Lack of vegetation along waterfront property and streambanks can produce significant erosion. These types of property owners should be encouraged to plant vegetative buffers. • The public should be made aware of the City's yard waste ordinance via GTV and paid spots on mass media
Construction/ Landscape Professionals	Construction, landscape, and related industries significantly contribute to sediment loading in waterways. Employees in this field are often male.	• Promote compliance with the land development code and sedimentation and erosion control laws • Encourage proper staff training with construction, landscaping, and related businesses • Post outreach materials on stormwater website and GTV • Construction workers and landscapers should be aware of the City's yard waste ordinance which prohibits sediment from being blown into streets and storm drains. Provide landscaping companies with the yard waste poster that addresses sediment

Assessment & Evaluation

- Assess and evaluate local water quality utilizing UNCW Center for Marine Science annual water quality reporting, specifically Total Suspended Solids (TSS)
- Gather information from NHC Sedimentation and Erosion program about violations within the city

Target Pollutant: CHEMICALS (pesticides, pressure washing and cleaning soaps)

Stormwater runoff washes harmful chemicals found in pesticides, pressure washing cleaners, vehicle washing soaps and other illicit discharges directly into our waterways. All of these pollutant sources contain toxic chemicals that can persist in the environment, causing toxicity in humans and aquatic organisms, in addition to contaminating drinking water resources.

Pollutant Source:
Likely Residential Sources: Homeowners, Gardeners, Car/Boat Owners, etc.
Likely Commercial/Industrial Sources: Pressure Washers, Vehicle Washing Businesses, Turf/Landscape Professionals, Restaurants, etc.

Background/Environmental Impacts:

- Storm drains and drainage conveyances (i.e. ditches) carry polluted runoff directly to local waterways without any treatment. Only rain should go down the storm drain!
- An illicit discharge is any unlawful disposal, placement, emptying, dumping, spillage, leakage, pumping, pouring, emission, or other discharge of any substance other than stormwater into the storm drainage system.
- Chemicals and cleaning agents used to wash cars, boats, driveways and other surfaces are carried into storm drains and eventually into our waterways. These chemicals can destroy the external mucus layer on fish that protects them from bacteria and parasitic infections.
- Commonly used organophosphate pesticides are present in stormwater runoff and are toxic to aquatic life in receiving water bodies. Pesticides bio-accumulate up the food chain and are harmful to beneficial insects, humans and other wildlife, as well as entire aquatic ecosystems.

Target Pollutant: CHEMICALS (pesticides, pressure washing/vehicle washing soaps and cleaners, etc.)

Key Outreach Messages:

- There is a direct link between the use of chemicals on land (i.e. pesticides, pressure washing cleaners) and water quality and habitat impacts (i.e. frogs with six legs).
- Install native plants which do not require pesticides or fertilizers.
- Use alternatives to pesticides such as ladybugs, weeding by hand, and organic pesticides.
- If you must apply pesticides, read the labels and apply the correct amounts. Do not apply before rain.
- Suggest less toxic, environmentally-friendly alternatives to chemicals.
- Promote info on how to properly dispose of chemicals and other household chemicals, including promotion of Household Hazardous Waste Collection Days.
- Pressure washing surfaces and washing cars/boats using soaps or cleaning agents of any toxicity level can negatively affect water quality. These surfaces can only be washed legally with plain, clear water.
- Wash on grassy areas that can absorb and filter the chemicals and wastewater naturally.
- Businesses are required to capture and discharge the wastewater legally in a treatment system.
- The City's Illicit Discharge ordinance specifies that it is unlawful to dispose of or discharge any substance other than stormwater into the storm drainage system. Fines are up to $10,000 per offense.
- Utilizing BMPs, such as rain gardens, rain barrels, and re-routing downspouts to grassy areas allows polluted runoff to soak into the ground and be cleaned and filtered naturally.

Target Audience	Audience Description (Why Selected?)	Suggested Outreach Strategies
Homeowners / Residents	All citizens have the potential to contribute chemical pollution by washing outdoors (i.e. driveways, homes, lawn furniture) or by using pesticides around their property. Target a higher % of males.	• Distribute educational materials to residents about practicing environmentally safe gardening/lawn maintenance and washing of materials outdoors • Emphasize compliance with the City's Illicit Discharge ordinance • Promote the stormwater hotline to report illicit discharges • Post outreach materials on stormwater website and GTV • Promote Household Hazardous Waste Collection Days
Mobile Detailers, Pressure Washers	Businesses that wash surfaces often use cleaning agents containing chemicals that are harmful to our waterways. These chemicals can be easily washed into the storm drainage system. Target males.	• Mail educational info to pressure washing businesses and mobile detailers • Post outreach materials on stormwater website and GTV
Landscape/Turf Maintenance Professionals	Landscape/turf maintenance professionals frequently use pesticides. Employees in this field are often male.	• Promote training of workers for proper application of pesticides • Emphasize use of pesticides as a last resort; promote alternatives • Post outreach materials on stormwater website and GTV
Restaurants	Restaurants often clean equipment or dump mop wash water outdoors. The discharge of any type of wastewater into the storm drainage system is unlawful.	• Distribute educational poster to local restaurants • Disseminate business checklist to ensure stormwater-friendly practices • Encourage employee training on wastewater practices, proper chemical use and disposal, etc. • Promote compliance with the illicit discharge ordinance via GTV and website

Assessment & Evaluation

- Conduct a survey of restaurants to gauge compliance with local stormwater ordinances and stormwater-friendly

practices

- Periodically assess the pesticide application habits of homeowners and landscape professionals by:
    - Direct observation of pesticide application habits of homeowners and landscape professionals
    - Surveys of pesticide application habits of homeowners and landscape professionals
- Assess and evaluate local water quality utilizing UNCW Center for Marine Science annual water quality reporting, specifically focusing on illicit discharge tested locations

Target Pollutant: LITTER (plastic, paper, cigarette butts, etc.)

Litter is generated as a result of improperly discarded plastics, food wrappers, cigarette butts, etc. that can wash into waterways via the storm drainage system and impact habitat, wildlife, and water quality.

Pollutant Source:
Likely Residential Sources: Motorists, Smokers, General public, Trash pickup incidental litter, etc.
Likely Commercial/Industrial Sources: Restaurants, Retail Centers, Construction Sites, etc.

Background/Environmental Impacts:

- Storm drains and drainage conveyances (i.e. ditches) carry polluted runoff directly to local waterways without any treatment. Only rain should go down the storm drain!
- Litter is carried by stormwater runoff into the drainage system where it can clog storm drains and drainage routes and cause flooding on streets and property.
- Litter that washes into local surface waters can be mistaken by fish, birds and other wildlife for food that become sick or die from ingesting it. Wildlife also can become entangled in litter and die as a result.
- Litter is often produced as a result of being dropped during trash pickup.
- Litter introduces chemical pollutants into waterways, such as plastics and cigarette butts.
- Cigarette butts are a major source of litter and contain many dangerous toxins that can leach into waterways.
- Littered areas beget litter; areas that are clean tend to repel litter.

Target Pollutant: LITTER (plastic, paper, cigarette butts, etc.)

Key Outreach Messages:

- Flooding of streets/property is sometimes attributed to the accumulation of litter in the drainage system.
- A direct link exists between animal impacts, habitat destruction, and water quality as a result of littering.
- Cigarette butts leach chemicals such as cadmium, lead, and arsenic into the aquatic environment within one hour of contact with water.
- The 2011 Ocean Conservancy International Coastal Cleanup identified cigarette butts as the #1 most littered item.
- Litter attracts wildlife to the side of the road where they are likely to get hit by oncoming vehicles.
- Utilizing BMPs, such as rain gardens, rain barrels, and re-routing downspouts to grassy areas allows polluted runoff to soak into the ground and be cleaned and filtered naturally. BMPs can also trap litter so it doesn't wash away.

Target Audience	Audience Description (Why Selected?)	Suggested Outreach Strategies
Youth (8th grade presentations)	Litter habits cannot be confined to a particular demographic in most cases. However, targeting 8th graders during yearly presentations should be a priority since they are in the developmental stage of thinking and forming opinions.	• Make students aware of the impact of littering and the toxicity of many littered items • Emphasize easy solutions to littering - using trash or recycling receptacles • Promote the 5 R's: Reduce, Reuse, Recycle, Refuse, Repurpose • Explain the negative impacts on wildlife species (i.e. plastic bags look like jellyfish to sea turtles)
Smokers	Cigarette butts are the largest environmental litter problem both locally and worldwide. Target both male and female smokers.	• Display signs encouraging proper disposal of cigarette butts in public areas (i.e. Wave Transit buses) • Post outreach materials on stormwater website and GTV • Encourage use of ashtrays for smokers • Distribute pocket ashtrays at public events
Motorists and Pedestrians	Along roadways, motorists (52%) and pedestrians (23%) are the largest contributors of litter. Target males and females.	• Educate citizens about North Carolina's Swat-A-Litterbug program via website and GTV • Remind motorists about the proper disposal of trash by displaying educational signs on public transportation vehicles (i.e. Wave Transit buses) • Encourage use of car litterbags for proper trash disposal

Assessment & Evaluation

- Conduct an informal poll before 8th grade presentations to gauge how many students litter and then pledge not to litter after the presentation.
- Elicit count of Stormwater Maintenance Department responses to clogged stormwater drainage system components as a result of litter.
- Have Stormwater Maintenance crews continually provide field observations of problem litter areas for clean-up by community service workers or Cape Fear River Watch.
- Periodically assess the litter disposal habits of Wilmington residents by:
  - Direct observation of habits
  - Surveys of habits
  - Count of citations issued pertaining to improper litter disposal habits
  - Count of reported violations to Stormwater Hotline, Keep America Beautiful of NHC, or Swat-a-Litterbug from New Hanover county

Target Pollutant: VEHICLE POLLUTION (vehicle fluids, washing soaps/detergents, etc.)

Vehicle pollution comes from the intentional or unintentional disposal of vehicle fluids into our waterways, some of which washes off impervious surfaces into the drainage system or is disposed of improperly. These fluids are insoluble and can easily contaminate water resources, as well as poison fish and other aquatic organisms.

Pollutant Source:
Likely Residential Sources: Motorists, Backyard Mechanics
Likely Commercial/Industrial Sources: Vehicle Maintenance Repair Shops, Mobile Detailers, Dealership Lots

Background/Environmental Impacts:

- Storm drains and drainage conveyances (i.e. ditches) carry polluted runoff directly to local waterways without any treatment. Only rain should go down the storm drain!
- Vehicles have seals and gaskets that have the potential to leak a variety of fluids, such as oil and grease. An accumulation of these fluids on roadways and parking lots gets carried away by stormwater runoff emptying into our waterways.
- Commonly, it is the backyard mechanic that is illegally dumping or draining vehicle fluids.
- 1 quart of motor oil can contaminate 250,000 gallons of water.
- Once vehicle pollution enters a body of water, it disperses quickly and forms a film on the water's surface, making oxygen transfer from the surface to the bottom difficult, as well as toxic for aquatic organisms.
- It is a common watershed behavior to wash vehicles on impervious (hard) surfaces
- Washing vehicles or boats can cause nutrients, heavy metals, hydrocarbons and grime to wash down the street and into waterways.
- Soaps and detergents used to wash vehicles or boats are carried into storm drains and eventually into our waterways. These chemicals can destroy the external mucus layer on fish that protects them from bacteria and parasitic infections.
- Vehicle washers are typically unaware of the content of washing soaps and detergents and their impact on water quality.

Target Pollutant: VEHICLE POLLUTION (vehicle fluids, washing soaps/detergents)

Key Outreach Messages:

- There is a direct link between the introduction of vehicle fluids and water quality degradation, habitat destruction and plant/animal death.
- All vehicles, machinery, and equipment that utilize vehicle fluids (i.e. oil, grease) for operation have the potential to leak and contribute to water pollution.
- Keep vehicles tuned up, check and repair leaks, check tire pressure, and recycle or properly dispose of vehicle fluids and batteries.
- Properly clean up vehicle leaks and fluid spills using an absorbent material (i.e. kitty litter) to soak up the spill. Sweep up contaminated absorbent, put in a sealed bag and place in the trash.
- Driving less, carpooling or using alternative transportation are some of the best ways to prevent vehicle pollution.
- Washing vehicles or boats using soaps/detergents can negatively affect water quality by contaminating them with chemicals, debris, or sediment that is washed off of vehicles, driveways, parking lots, etc.
- Wash vehicles on the grass using a phosphate-free detergent, and/or use a commercial car wash which recycles and treats wash water. If you must wash on pavement, use plain, clear water and no chemicals.
- On-site storage (i.e. fluids, batteries) has the potential to leak during filling, emptying, storage unit failure, or vandalism.
- Business owners should be aware of and abide by the City's Illicit Discharge Ordinance which states that
    - Anyone found responsible for causing a polluting substance to enter the storm drainage system will be subject to a fine up to $10,000 per violation.
    - The city will have the authority to enter property to inspect for illicit discharges, and if found, to require that they be disconnected and permanently closed.
    - Commercial businesses will not be permitted to wash vehicles, equipment, or any other surfaces with any soaps or solvents or dislodge any other substance that may be harmful to surface waters, unless the resulting wastewater is diverted to the sanitary sewer system.
    - Restaurants will not be permitted to discharge any wastewater outside.
    - Dumpster lids must be kept closed and dumpster plugs in place.
    - Swimming pool water must be de-chlorinated before discharging.
    - Floor drains in old buildings, connected to the storm drainage system, will be required to be disconnected and permanently closed.
    - Residents and businesses will be expected to prevent harmful substances from running off into the storm drainage system.
    - Fines for non-compliance with the City's illicit discharge ordinance are up to $10,000 per offense.
- Utilizing BMPs, such as rain gardens, rain barrels, and re-routing downspouts to grassy areas allows polluted runoff to soak into the ground and be cleaned and filtered naturally.

Target Audience	Audience Description (Why Selected?)	Suggested Outreach Strategies
General Public/ Backyard Mechanics	All citizens of driving age have the potential to contribute to vehicle pollution by nature of driving the vehicle or washing it. For backyard dumping of auto fluids, target males.	• Emphasize vehicle maintenance is the #1 priority (i.e. tune ups) • Post outreach materials on stormwater website and GTV • Promote alternative methods of transportation (i.e. public transportation, carpooling, bikes, walking, bio-fuels) • Encourage the utilization of the stormwater hotline to report illegal fluid dumping • Encourage environmental stewardship to practice eco-friendly vehicle washing using commercial car wash businesses or washing vehicles in a grassy area to absorb polluted runoff • Mark storm drains in visible areas to prevent illegal dumping
Vehicle Maintenance	Businesses in auto parts or maintenance/repair-related	• Distribute Auto Care educational poster to businesses for employees to learn about proper vehicle maintenance, fluid

Repair, and Auto Parts Businesses	fields deal with vehicle fluids on a regular basis. Most employees are male.	storage and disposal methods, and the City's Illicit Discharge ordinance • Post outreach materials on stormwater website and GTV
Pressure Washers, Vehicle Washing Businesses, Dealership Lots	Vehicle washing businesses often use cleaning agents containing chemicals that are harmful to our waterways. These chemicals, along with other vehicle fluids, can be easily washed into the storm drainage system. Employees are typically male.	• Distribute educational flyer to businesses • Encourage environmental stewardship to practice eco-friendly vehicle washing using commercial car wash businesses or washing vehicles in a grassy area, or washing using plain water and no chemicals over pavement • Post outreach materials on stormwater website and GTV

Assessment & Evaluation

- Periodically assess vehicle fluid disposal habits of Wilmington residents and businesses
    - Direct observation of habits
    - Surveys of habits
    - Count of reported violations pertaining to chemical leaks or disposal habits to Stormwater Hotline
- Periodically assess vehicle washing and exterior home washing habits of Wilmington residents by:
    - Direct observation of habits
    - Surveys of habits
- Assess and evaluate local water quality utilizing UNCW Center for Marine Science annual water quality monitoring

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APPENDIX C: PUBLIC INVOLVEMENT AND PARTICIPATION

Included in this section:

- BMP Reporting Table
- Cumulative Year End Reports for Contractual/Cooperative Agreements with:
  - New Hanover Soil & Water Conservation District
  - Cape Fear River Watch

DATE OF EVENT/ ACTIVITY	EVENT/ACTIVITY	AUDIENCE	DELIVERED BY (AGENCY)	METHOD OF DELIVERY / MESSAGE	ATTENDANCE/ PARTICIPATION
BMP a. Volunteer community involvement program					
Community Events / Participation					
2/22/2018	Lower Cape Fear Stewardship Awards Program	Realtors, Developers, Environmental Agencies, Politicians	Stormwater Services	Sponsorship with the Planning Department; HOW display booth	75 in attendance
7/28/2017	BRC Bridge Summer Program	Students at Hemenway Community Center	Stormwater Services	Education materials for rain garden planting event	12 students
9/12/2017	Presentation: UNCW Pier 601 Class	Undergraduate students	Stormwater Services	PowerPoint presentation and discussion, constraints discussion, PSA videos shown, Q&A, educational giveaways - watershed maps, newsletters, zip wallets	10 students 2 faculty
11/9/2017	Presentation: Isaac Bear Early College Science Class	Early college students in Environmental Club+C20	Stormwater Services	Classroom presentation about watersheds, water quality, nonpoint source pollution, BMPs and stewardship	30 students
2/14/2018	Presentation: Cape Fear Academy	1st Graders	Stormwater Services	Presentation about stormwater pollution, litter, and plastic pollution. Stormwater giveaways for students	20 students
2/22/2018	Lower Cape Fear Stewardship Awards Program	Realtors, Developers, Environmental Agencies, Politicians	Stormwater Services	Stormwater Services sponsored silver level in partnership with Planning Dept.	150 in attendance
3/10/2018	Canines for Clean Water booth at New Hanover County Rabies Clinic	Rabies clinic participants	NHSWCD	Canines for Clean Water booth - interactive event where pet owners sign a pledge to clean up after their pet and submit a photo of their pet to be featured on our website wilmingtonnc.gov/canines	24 pledges signed
3/13/2018	UNCW Sustainability Our Green Future Event	College students & faculty	Stormwater Services	Booth and interactive exhibit. Stormwater education materials and promos distributed.	100 in attendance

3/24/2018	Walk & Dog Dash @ Hugh MacRae Park	Pet owner participants	NHSWCD	Canines for Clean Water booth - interactive event where pet owners sign a pledge to clean up after their pet and submit a photo of their pet to be featured on our website wilmingtonnc.gov/canines	28 pledges signed
4/17/2018	Tour & Talk at Anne McCrary Park Stormwater Demonstration Site	NC Association of Floodplain Managers	Stormwater Services	Presentation about site, then tour	30 in attendance
4/21/2018	Lower Cape Fear Earth Day Celebration at Hugh MacRae Park	Festival attendees, general public	Stormwater Services (SWS is an annual sponsor of Lower Cape Fear Earth Day Festival)	Display booth to promote stormwater pollution education and interactive Super Pooper Scooper pet waste photo booth	7000 attendees
5/1/2018	Pet Waste Tidy Bag Pet Dispensers	Pet owners	Stormwater Services	Supplement to signage program. Compliance officer distributes bag dispensers to pet owners to encourage pick up and proper disposal	250 tidy bag pet waste dispensers purchased.
5/10/2018	Citizens Information Day in the Courtyard	General Public	Stormwater Compliance	Stormwater educational booth and information distributed	30 citizens
5/19/2018	Imagination Station at MLK	Kids Parents	Stormwater Services	To See or Turbidity interactive educational game; stormwater prize giveaways	65 in attendance

Monthly Public Rain Barrel Sale

Monthly	Monthly rain barrel sale to the general public. Held the 2nd Thursday of each month at NHC Government Center with partner agency, NHSWCD	General public	Stormwater Services NHSWCD RainBarrelUSA	Stormwater runoff reduction, watershed and water conservation education with rain barrel sale attendees	39 total sales this year

Storm Drain Marking

Ongoing campaign	Campaign to place storm drain awareness markers and educational doorhangers throughout the City	City residents, businesses, landscapers	Contract agencies: CFRW NHSWCD and their volunteers	Stormwater awareness activity. Volunteers place educational markers on storm drains and distribute educational doorhangers to residents in neighborhoods where markers are installed	28 markers were placed in the Independence South, Holly Glen, Brookwood, and Colonial Drive areas this year

Stream & Litter Clean-ups

Ongoing	Watershed cleanups including the Annual Big Sweep event	Volunteers	CFRW volunteers	Watershed cleanup and/or invasive species vegetation removal Areas cleaned include Greenfield Lake, Smith Creek, Cape Fear River, Burnt Mill Creek, Randall Pond, Kerr Avenue Wetland	10 cleanup events including annual International Coastal Cleanup event 343 volunteers contributed a total of 702 volunteer hours Collected: 24.75 96-gallon bins of trash 26.5 96-gallon bins of recyclables 4 (30 gallon) bags of trash

CreekWatchers Observation Monitoring

Every other month	Volunteer monitoring of creek segments that drain to Cape Fear River	CFRW volunteers are trained to do observations. City staff receive these reports	CFRW and volunteers	Volunteers conduct bi-monthly observations of area creeks and provide a monitoring report and photos to Stormwater Services	Observations include creek and corridor conditions, vegetation and wildlife present, litter quantity, and suggestions for remediation

Contracts / Cooperative Agreements

The City of Wilmington contracts annually with Cape Fear River Watch (CFRW) and New Hanover Soil & Water Conservation District (NHSWCD) to implement additional public involvement and participation activities, as well as education and outreach activities. Both organizations sign a yearly contract with the City of Wilmington that includes specific deliverables that enable the City to meet many of its federal NPDES permit requirements. A year end summary report for each agency's contract is included in the Appendix. Below is a summary of each agency's annual service deliverables.

CFRW - Supports NPDES permit activities including: 8th grade classroom presentations, educational programs for Wilmington residents, volunteer storm drain marking, volunteer watershed cleanups and coordination, volunteer creek monitoring program, Kerr Ave. education, support for NPDES public meetings and education efforts, quarterly reporting/invoicing.

NHSWCD - Supports NPDES permit activities such as: 8th grade classroom presentations, fecal coliform/pet waste education, community presentations, local outreach events, LID education, environmental field days, educational website, volunteer storm drain marking, monthly rain barrel sale, Stewardship Development Awards Program coalition and planning member, Hewletts Creek education, support for NPDES public meetings and education efforts, quarterly reporting/invoicing.

BMP b. Mechanism for Public involvement

Public Notices, Public Meetings & Community Input

1/19/2018	Targeted doorhangers	Residents affected by Cassidy Road project	Stormwater Services	Project info doorhangers distributed to local residents in advance of project work	30 doorhangers distributed to residents
7/1/2017	Targeted doorhangers	Residents affected by Ewell Drive project	Stormwater Services	Project info notice distributed to local residents in advance of project work	100 doorhangers distributed to residents
5/9/2018	Public Meeting	Residents affected by Scotland Lane project	Stormwater Services	Project info notice distributed to local residents in advance of project work	12 residents in attendance
6/25/2018	Individual meetings with property owners	Residents affected by Scotland Lane project	Stormwater Services	Project info notice distributed to local residents in advance of project work	Meeting with property owner

6/25/2018	Individual meetings with property owners	Residents affected by Scotland Lane project	Stormwater Services	Project info notice distributed to local residents in advance of project work	Meeting with property owner

BMP c. Maintain Hotline/Help line					
The Stormwater Pollution Prevention Hotline was established in January 2010 to field calls from the citizens, businesses, and city employees regarding illicit discharges and other reports of stormwater pollution. The hotline phone # is **910-341-1020** and the web address is **www.wilmingtonnc.gov/reportstormwaterpollution.** Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to all hotline reports. Information regarding hotline reports is included in the Enforcement Appendix section including the number and nature of hotline phone/web reports.					
Ongoing	Stormwater Hotline advertised using various outreach methods: truck magnets, signs, billboards, presentations, etc.	General public	Stormwater Services	Hotline poster, website, GTV-8 and promo items (pens, magnets, sticky notes) are used to raise awareness of the Stormwater Hotline	Hotline calls and webform reports vary each year. More info can be found in the "Enforcement" section of the report.

Cumulative Year-End Contract Agency Reports

FY 1718

NEW HANOVER SOIL & WATER CONSERVATION DISTRICT
230 Market Place Drive, Suite 100
Wilmington, NC 28403

Quarterly Progress Report #4: April 1 – June 30, 2018

New Hanover Soil & Water Conservation District (NHSWCD), under contract with the City of Wilmington Stormwater Services, will provide the following services for the time period consistent with the City's fiscal year from **July 1, 2017** through **June 30, 2018** for the agreed amount of **$24,182.** These contracted services, implemented as equitably as possible throughout the fiscal year, assist the City in meeting requirements of its federal NPDES Stormwater Permit.

Public Education/Outreach

Total Allocated Cost: $16,607

Conduct Enviroscape Presentations for at least 1/3 of 8th grade science classes in New Hanover County Schools each semester for the entire school year. The Enviroscape watershed education presentation is an integral component of the 8th grade science curriculum in New Hanover County Schools. Presentations will be done in coordination with other cooperating environmental agencies and will focus on the specific NC Essential Standard and Objectives for the Hydrosphere/Hydrology unit. Enviroscape instructors will be trained, certified, and follow all applicable Enviroscape presentation policies and procedures as set forth by the City of Wilmington Stormwater Services. A maximum of 3 trained Enviroscape instructors from each agency (which includes the Enviroscape supervisor) are permitted to deliver presentations in 8th grade. Enviroscape supervisors are responsible for ensuring that their instructors are fully trained, certified, and observed accordingly and kept up to date on the script, photo aids, maps, props and other pertinent presentation information. Contracted Enviroscape supervisors will deliver a minimum of two presentations each semester (2 in the fall semester, 2 in the spring semester). Additional presentations given should not conflict or duplicate the 8th grade presentations in any fashion; a summary should be provided in each quarterly report for any additional presentations given. Other efforts may include assisting with curriculum development, scheduling presentations, teacher relations, and training and observing instructors. **($2200)**

July 1 - September 30, 2017

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
9/13/17	Virgo MS	8th	1	10
9/21/17	Roland Grise MS	8th	4	120

October 1 - December 31, 2017

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
11/15/17	Holly Shelter MS	8th	1	20
11/21/17	Trask MS	8th	4	109

January 1 - March 31, 2018

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
2/16/18	Noble MS	8th	1	27
2/20/18	Noble MS	8th	4	114
3/14/18	Williston MS	8th	1	31
3/15/18	Williston MS	8th	1	27

*Assisted on 1/26/18 with training 7 instructors for the Enviroscape program.

April 1 – June 30, 2018

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
4/10/18	Murray MS	8th	4	128
4/26/18	Myrtle Grove MS	8th	1	32

Increase awareness and education in the city about pet waste/fecal coliform bacterial pollution and the City's pet waste ordinance. Implement education with city residents about pet waste, fecal bacteria, the impacts on water quality, the city's pet waste ordinance, and solutions. Provide outreach and education materials via K-12 education programs, public meetings, agency website, and by participating/staffing the Canines for Clean Water (C4CW) Program booth at a minimum of 3 pet-related events (with pets largely present at a minimum of 2 events). The expectation is to target well-attended pet events. **($1550)**

January 1 – March 31, 2018

Pet Events				
Date	**Event**	**Location**	**Method of Delivery / Materials Distributed / Etc.**	**# of signed Pet Waste pledges**
3/10/18	Free Rabies Shot Clinic	NHC Animal Services	C4CW display table and pledge signatures acquired	24
3/24/18	Walk & Dog Dash	Hugh MacRae Park	C4CW display table and pledge signatures acquired	28

April 1 – June 30, 2018

Pet Events				
Date	**Event**	**Location**	**Method of Delivery / Materials Distributed / Etc.**	**# of signed Pet Waste pledges**
4/29/18	Pawz4people 5k	Greenfield Lake Park	C4CW display table and pledge signatures acquired	50

Conduct at least 2 "Stormwater 101" education presentations to HOAs, garden clubs, community/civic groups, property management companies, businesses, college students, developers, or during watershed-wide meetings. 1 presentation may target college classes/students or county employees. Initiate direct contact with potential audiences, promote program, and schedule/deliver presentations. **($1000)**

July 1 - September 30, 2017

Stormwater 101 Presentations			
Date	**Organization / Audience**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
9/5/17	UNCW Coastal Management Class	PowerPoint / site visit and design BMP on campus	24
9/15/17	UNCW Environmental Studies Lab Coordinators meeting	PowerPoint/ Enviroscape model	8
9/16/17	Native Plant Festival Presentation	PowerPoint/1 60 gallon Rain Barrel given away	23

April 1 – June 30, 2018

Stormwater 101 Presentations			
Date	**Organization / Audience**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
4/19/18	Andrew's Reach HOA	Power point / Enviroscape model	8

Provide educational contact with residents in the Hewletts Creek Watershed conservation easement areas and pursue opportunities as they arise to secure additional conservation easements within the City. Contact with residents may include an annual newsletter, educational presentations, easement education, etc. In addition, NHSWCD will provide stormwater education programs at the J.E.L. Wade Stormwater Wetland, as the need arises. **($1350)**

October 1 - December 31, 2017

Hewletts Creek Educational Contact				
Date	**Audience Name OR School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
11/16/17	Holly Glen HOA	Provided copy of easement language to HOA to clarify what was allowed in easement.	n/a	n/a

April 1 – June 30, 2018

Hewletts Creek Educational Contact				
Date	**Audience Name OR School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
6/25/18	Hewletts Creek	Annual newsletter mailed	N/A	218

Facilitate additional environmental education presentations in the city that highlight issues such as stormwater, water quality, and LID for local residents, students, teachers, camps, business owners, etc. Presentation topics will tie into water quality, BMPs, wildlife, and water conservation issues. **($2650)**

October 1 - December 31, 2017

Environmental Education Presentations				
Date	**Audience Name OR School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
10/5/2017	Osher Lifelong Learning Institute	District environmental education programs/topics	1	115
10/18/17	Myrtle Grove MS, 7th	Water cycle	2	64
10/19/17	Williston MS, 6th	Water cycle	2	45
11/17/17	UNCW/various educators	Project Learning Tree workshop	1	15
11/20/17	Sea-Tech, 9th grade	Soils	2	60

January 1 - March 31, 2018

Environmental Education Presentations				
Date	**Audience Name OR School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
1/25/18	Pine Valley ES, 3-5th	Water cycle	1	300
2/12/18	Environmental educators	Food, Land, and People workshop – Credits given for NCEE Certification	1	10
3/23/18	Roland Grise MS, 6th	Water cycle	2	64

April 1 – June 30, 2018

Environmental Education Presentations				
Date	**Audience Name OR School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
4/17/18	Forest Hills ES, 1st	Recycling, water cycle, soils	3	70
4/23/18	Howe Pre-K	Worms and Earth Day	6	90
6/5/18	Anderson ES, 1st	OELC pollinator garden planting	2	20

Organize/participate in community outreach events to engage citizens and provide stormwater education. NHSWCD will attend and provide stormwater, BMP, and rain barrel sale education at community outreach events (such as the New Hanover County Fair, Earth Day, etc). **($3000)**

July 1 - September 30, 2017

Community Outreach Events				
Date	**Event**	**Location**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
8/19/17	Boy Scout Merit Badge College	CFCC North Campus	Led small class of scouts in completion of their Sustainability merit badge	10
9/16/17	International Coastal Cleanup	Wilmington	Organized group and participated in cleanup, reducing pollution to our waterways	6
9/16/17	Native Plant Festival	NHC Arboretum	Informational booth about District programs and rain barrels/did Stormwater 101 presentation	100
9/23/17	District BMP tour	Bradley Creek ES	Conducted BMP tour for elected officials and public to educate them on BMPs	8

October 1 - December 31, 2017

Community Outreach Events				
Date	**Event**	**Location**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
10/15/17	Fire in the Pines Festival	Halyburton Park	Informational booth about District programs and rain barrels	500

January 1 – March 31, 2018

Community Outreach Events				
Date	**Event**	**Location**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
1/13/18	StriperFest	Coastline Convention Center	Assisted in activities geared toward children to help learn about water quality and local water issues. Had booth at the event where stormwater related materials and natural resource materials	200

			were distributed.	
1/19/18	TreeFest	Independence Mall	Assisted with tree handouts and customer service	676

April 1 – June 30, 2017

Community Outreach Events				
Date	**Event**	**Location**	**Method of Delivery / Materials Distributed / Etc.**	**Attendance**
4/21/18	Wilmington Earth Day Festival	Hugh MacRae Park	Set up a display table to inform attendees about District roles/programs and potential volunteer opportunities along with information about stormwater and available programs aimed at reducing pollution.	~7,000

Promote/consult on Low Impact Development (LID) including stormwater Best Management Practices (BMPs). Activities can include providing education and technical assistance to property owners, education and promotion through local media or distributed publications, or providing comments to City Technical Review Committee. **($1057)**

July 1 - September 30, 2017
Submitted 3 soils reports for Technical Review Committee (TRC) which included information about the county LID ordinance and suggested edits/changes to plan to use these practices.
October 1 – December 31, 2017
Submitted 2 soils reports for Technical Review Committee (TRC) which included information about the county LID ordinance and suggested edits/changes to plan to use these practices.
January 1 – March 31, 2018
Submitted 4 soils reports for Technical Review Committee (TRC) which included information about the county LID ordinance and suggested edits/changes to plan to use these practices.
April 1 – June 30, 2018
Submitted 2 soils reports for Technical Review Committee (TRC) which included information about the county LID ordinance and suggested edits/changes to plan to use these practices.

Organize/facilitate at least 2 Environmental Field Days a year serving an entire grade at a New Hanover County School. Environmental field days will have a water quality education component. **($2400)**

July 1 - September 30, 2017

Environmental Field Days				
Date	**School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
9/27/17	Pine Valley ES, 4th	Soils/forestry/wildlife/water cycle	4 of each	100

April 1 – June 30, 2018

Environmental Field Days				
Date	**School & Grade**	**Topic and/or Activity**	**# presentations**	**# of attendees**
5/2/18	Virgo MS, 6th	Soils/Stewardship/Water Quality/Macroinvertebrates	2	60
5/4/18	Murrayville ES, 3rd	Water Cycle / Soils / Forestry / Wildlife	4	130

Update and maintain agency website and social media outlets to include stormwater education materials, events, and the city's Report Stormwater Pollution hotline. The website will also provide links to stormwater educational materials in Spanish in an effort to reach more minorities in our region. The city's Report Stormwater Pollution hotline and online reporting form will be promoted and linked to from the NHSWCD website. NC Community Conservation Assistance Program (CCAP) and Heal Our Waterways (HOWBMP) project pictures will continue to be labeled and uploaded and a local map showing these project locations will be available on the website. The website will be promoted on local government TV and social media outlets. **($1400)**

July 1 - September 30, 2017
Added events such as public BMP tour to website.

October 1 – December 31, 2017
Added additional documents on CCAP program to website; promoted rain barrel sales through social media

January 1 – March 31, 2018
Added new photos for Heal Our Waterways BMPs and updated website content.

April 1 – June 30, 2018
Added new website content and promoted rain barrel sales via county TV and social media. Also added updated HOW BMP map.

Public Involvement/Volunteer Efforts

Total Allocated Cost: $1,100

Encourage public participation by engaging city residents/businesses/civic groups in a volunteer Storm Drain Marking program in the city to involve and educate the community about stormwater pollution. A minimum of 1 volunteer day with at least 5 community volunteers and 14 drains marked is required. Agencies are welcome to do additional storm drain marking beyond this requirement. Educational doorhangers will be distributed to surrounding residences/businesses during storm drain marking. Assist in identifying areas to mark drains, educate volunteers about stormwater and the purpose of the program, train volunteers in marking and safety, use supplied markers, and help provide oversight of the program. A trained staff member and/or trained intern is required to be present during all storm drain marking activities and with each volunteer group. **($1100)**

April 1 – June 30, 2018

Storm Drain Marking			
Date	**Name of Volunteer Organization, Business, etc.**	**# of Volunteers**	**Specific Area Marked / # of Storm Drains Marked**
6/18/18	Cape Fear Surfrider/Leslie Cohen group	9	Racine Drive/14

Programs/Partnerships

Total Allocated Cost: $3,775

Administer and partner with the City of Wilmington Stormwater Services to hold a public rain barrel sale. NHSWCD will promote the sale using methods such as local government television, agency website, community events, signage, and media contact. Rain barrel buyers will

be asked to give their watershed location in order to educate them about watersheds and track/record volume reduction for the Heal Our Waterways Bradley/Hewletts Creek watershed restoration effort. **($1325)**

July 1 - September 30, 2017
July: 3-60 gallon; 5-80 gallon sold
August: 0-60 gallon; 2-80 gallon sold
September: 1-60 gallon; 0-80 gallon sold

October 1 - December 31, 2017
October: 0-60 gallon; 0-80 gallon sold
November: 1-60 gallon; 0-80 gallon sold
December: 1-60 gallon; 3-80 gallon sold

January 1 - March 31, 2018
January: 0-60 gallon; 1-80 gallon sold
February: 1-60 gallon; 3-80 gallon sold
March: 0-60 gallon; 5-80 gallon sold

April 1 – June 30, 2018
April: 0-60 gallon; 2-80 gallon sold
May: 1-60 gallon; 1-80 gallon sold
June: 7-60 gallon; 2-80 gallon sold

Serve as a partner organization on grant projects or initiatives that benefit local surface water quality and water resources within the city such as the Lower Cape Fear Stewardship Development Awards Program. The Stewardship Development program recognizes developers for demonstrating outstanding environmental stewardship such as stormwater reduction and LID practices through the protection and awareness of our water and natural resources. **($2450)**

July 1 - September 30, 2017
Attended two monthly board meetings for Lower Cape Fear Stewardship Development Coalition (LCFSDC). Worked with Education/Events committee to secure venue space. Collected applications and fees of current year applicants.

Met with 319 grant partners 8-9-17 to discuss strategy on BMPs to install and business to target. Currently working with Waterman's Brewery to install pervious pavement through CCAP and 319 grant funds.

Responded to two calls regarding water flow in neighborhoods in Hewlett's creek. Gave suggestions as to additional contacts to help with problem as a BMP was not a 100% solution.

October 1 – December 31, 2017
Met with new LCFSDC Treasurer to assist them with role responsibilities; attended 3 meetings. Also attended and helped with judging of 2017/18 projects submitted.

Met with 319 grant group 12/18/17 to update partner organizations on status of matching funds and timelines for projects.

Attended public input meeting regarding City Tree study 11/30/17 to provide input and gather information about study.

January 1 – March 31, 2018

Attended 2 meetings for LCFSDC. Also attended and helped with Luncheon of 2017/18 projects submitted.

Toured the NHC Landfill with Keep New Hanover Beautiful (KNHB) to learn about operations and discuss ways to increase public participation in recycling and waste management programs that will help protect local waterways. Also attended KNHB board meeting. Attended the LCFSDC Awards Luncheon.

April 1 – June 30, 2018

Attended LCFSDC annual retreat to discuss efficiency and relevance of program. Board voted to remain active by cut meetings down to bi-monthly, and more frequently during event time if needed. Staff will serve as co-chair of the education committee.

Attended 319 grant meeting for Bradley and Hewlett's creek 6/22/18 to update on projects, correct issues and decide next steps in process before grant expires in December.

Attended KNHB board meeting and local cleanup. Applied for grant for KNHB that would grant money to purchase additional cigarette butt recycling canisters, helping prevent litter and local waterway pollution.

Contract Administration

Total Allocated Cost: $2,700

Quarterly progress reports and invoices will be submitted in accordance with the following provisions:

Quarterly reports and invoices are due within 10 days of the quarter end date and will follow templates and instructions set forth by Stormwater Services.

Submit cumulative quarterly progress reports and invoices according to the following quarters: July 1 - Sept 30; October 1 - Dec. 31; January 1 -March 31; April 1 - June 30. The 4th quarter progress report will serve as a compiled year-end summary report and will be included in the City's NPDES annual report.

The quarterly invoice should use the supplied template which shows the % of each service completed each quarter, invoice amount, and amount remaining to be paid. Invoices will be paid once quarterly progress report and invoice(s) are received and reviewed by the City for adequate progress. Non-performance or inadequate progress may result in non-payment or reduction of payment. No pre-payment of services will occur.

Reports and invoices that do not follow templates/instructions will be returned for correction; payment will be processed once updated reports and invoices are received, reviewed, and approved.

NHSWCD will maintain all records and reports related to this contract on a fiscal year (FY) basis (July 1-June 30). These records should be retained for a period of at least 5 years.
In addition, an annual compilation CD or DVD copy of all contract documents, records, reports, invoices, and pertinent educational materials will be provided to the City of Wilmington Stormwater Services by July 10th for the prior FY. These files are public record and should be accessible.

Contact person: Stormwater Services requires one main point of contact for the implementation, management, communication and reporting of this annual contract. This staff person will be the individual that implements the majority of contract services, and therefore will be the most familiar with the contract. The designated contact person is: **Dru Harrison. ($2700)**

Other:

Do not assign a cost.

Assist Stormwater Services in implementing additional public outreach, education, involvement, and participation activities required by federal NPDES stormwater permit.
Summary reports and information may be included in the City's NPDES yearly report to the State.

Report compiled by: Dru Harrison **Date:** 6/30/18

FY 1718

CAPE FEAR RIVER WATCH
617 Surry Street
Wilmington, NC 28401
(910) 762-5606
www.capefearriverwatch.org

Quarterly Report #4: April 1 – June 30, 2018

Cape Fear River Watch, Inc. (CFRW), under contract with the City of Wilmington Stormwater Services, will provide the following services for the time period consistent with the City's fiscal year from **July 1, 2017** through **June 30, 2018** for the agreed amount of $**14,100** These contracted services, implemented as equitably as possible throughout the fiscal year, assist the City in meeting requirements of the federal NPDES Stormwater Permit.

Public Education/Outreach

Total Allocated Cost: $5650

Conduct Enviroscape Presentations for at least 1/3 of 8th grade science classes in New Hanover County Schools each semester for the entire school year. The Enviroscape watershed education presentation is an integral component of the 8th grade science curriculum in New Hanover County Schools. Presentations will be done in coordination with other cooperating environmental agencies and will focus on the specific NC Essential Standard and Objectives for the Hydrosphere/Hydrology unit. Enviroscape instructors will be trained, certified, and follow all applicable Enviroscape presentation policies and procedures as set forth by the City of Wilmington Stormwater Services. A maximum of 3 trained Enviroscape instructors from each agency (which includes the Enviroscape supervisor) are permitted to deliver presentations in 8th grade. Enviroscape supervisors are responsible for ensuring that their instructors are fully trained, certified, and observed accordingly and kept up to date on the script, photo aids, maps, props and other pertinent presentation information. Contracted Enviroscape supervisors will deliver a minimum of two presentations each semester (2 in the fall semester, 2 in the spring semester). Additional presentations given should not conflict or duplicate the 8th grade presentations in any fashion; a summary should be provided in each quarterly report for any additional presentations given. **($2200)**

July 1 - September 30, 2017

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
September 13, 2017	Virgo	8	3	88
September 22, 2017	Roland Grise	8	2	55
Other Enviroscape Presentations				
Date	**School/Group/Event**	**Grade**	**# of presentations**	**# of attendees**
July 17, 2017	CFRW Eco Camp		1	20
July 24, 2017	CFRW Eco Camp		1	19

July 31, 2017	CFRW Eco Camp		1	24

October 1 – December 31, 2017

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
Nov. 14, 2017	Holly Shelter	8	1	30
Nov. 15, 2017	Holly Shelter	8	1	32
Nov. 21, 2017	Trask	8	2	64
Other Enviroscape Presentations				

January 1 – March 31, 2018

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
Feb. 16, 2018	J.C. Roe	8	1	12
Feb. 19, 2018	Noble Middle School	8	2	60
Mar. 14, 2018	Williston Middle School	8	1	25
Mar. 16, 2018	Williston Middle School	8	4	95
Other Enviroscape Presentations				
Feb. 22, 2018	Cape Fear Academy	8	2	60

April 1 – June 30, 2018

8th Grade Enviroscape Presentations				
Date	**School**	**Grade**	**# of presentations**	**# of students**
April 9, 2018	Murray Middle School	8	1	30
April 25, 2018	Myrtle Grove Middle School	8	2	50
April 26, 2018	Myrtle Grove Middle School	8	2	65
Other Enviroscape Presentations				
April 4, 2018	CFRW Intersession Camp	4th – 6th	1	20

Provide educational programs and eco-tours for Wilmington residents related to water quality, water resources, and stormwater pollution. Educational programs include First Saturday Seminars, presentations to community and civic organizations, and other scheduled talks in the community. Educational programs for homeowners associations should be planned and coordinated with Stormwater Services. Educational programs will also include eco-tours and birding tours at Greenfield Lake and local creek paddling tours. Wildlife feeding education can be incorporated into these established educational activities, as well as provided by the boathouse staff for lake patrons. Efforts will be made by CFRW to inform the local media about educational programs.

Outreach and education activities for the Kerr Avenue Wetland may include outreach/education for business owners/operators and property owners in close proximity to the KA Wetland, group cleanups *(independent of the 10 cleanups service),* and presentations to groups. **($250 is allocated for Kerr Avenue education)**
($3450)

Kerr Ave Outreach was conducted on June 20th, 2018. 10 businesses were delivered brochures: Trolley Stop, McCallisters Delis, Cook Out, Long Island Eatery, Hibachi To Go, US Cleaners, Apple Annies, Rounds Bagels, Wilmington Brewery, Wine Sampler

July 1 - September 30, 2017

First Saturday Seminars			
Date	**Topic**	**Speaker**	**Attendance**
7/1/2017	Confined Animal Feeding Operations	Kemp Burdette	59
8/5/2017	Green Infrastructure and Ecosystem Services	Bill Hunt	47
9/2/2017	Coastal zone storm Hazards	Roger Shew	51
Other Presentations by CFRW Staff			
Date	**Organization/Audience**	**Topic/Speaker**	**Attendance**
7/26/2017	River Lights	The Mission of CFRW/Frank Yelverton	11
8/16/2017	Friends School of Wilmington/Staff	GenX and other CFRW pollutants/Kemp Burdette	35
8/23/2017	Environmental Review Commission	GenX/Madi Polera	150
8/29/2017	UNCW/Freshmen Seminar	GenX/Madi Polera	20
9/1/2017	Myrtle Grove Christian School/Grade 3	The role of an Ecologist/Frank Yelverton	42
9/5/2017	UNCW/Communications Studies Class	CFRW Mission and Projects/Kemp Burdette, Kay Lynn Hernandez, Jen Cole	30
Greenfield Lake Tours & Creek Paddle Tours			
Date	**Group Served/Audience**	**Type of Tour/Topic/Location**	**Attendance**
7/18/2017	CFRW Eco Camp/Summer campers	Walking Eco Tour, Raindrop Journey/Stormwater runoff, flora and fauna, wildlife feeding/Greenfield Lake	20
7/25/2017	CFRW Eco Camp/Summer campers	Walking Eco Tour, Raindrop Journey/Stormwater runoff, flora and fauna, wildlife feeding/Greenfield Lake	19
7/31/2017	CFRW Eco Camp/Summer campers	Walking Eco Tour, Raindrop Journey/Stormwater runoff, flora and fauna,wildlife feeding/Greenfield Lake	24
8/14/2017	YWCA/summer campers	Walking Eco Tour/Stormwater runoff, flora and fauna,wildlife feeding/Greenfield Lake	40
8/15/2017	YWCA/summer campers	Walking Eco Tour/Stormwater runoff, flora and fauna, wildlife feeding/Greenfield Lake	35
8/16/2017	YWCA/summer campers	Walking Eco Tour/Stormwater runoff, flora and fauna, wildlife feeding/Greenfield Lake	40
8/21/2017	YWCA/summer campers	Walking Eco Tour/Stormwater runoff, flora and fauna, wildlife feeding/Greenfield Lake	35
8/23/2017	YWCA/summer campers	Walking Eco Tour/Stormwater runoff, flora and fauna, wildlife feeding/Greenfield Lake	34
9/25/2017	UNCW/OLLIE	Paddling Eco Tour/Stormwater runoff, history of GFL, wildlife feeding, flora and fauna/Greenfield Lake	19
9/26/2017	UNCW/OLLIE	Paddling Eco Tour/Stormwater runoff, history of GFL, wildlife feeding, flora and fauna/Greenfield Lake	20
9/27/2017	Friends School/7th Graders	Walking Eco Tour/Stormwater runoff, flora and fauna, wildlife feeding/Greenfield Lake	16
9/29/2017	NC Virtual Acadamy/K-12 students	Walking Eco Tour and paddle boating/Stormwater runoff, flora and fauna, wildlife feeding/Greenfield Lake	60

October 1 – December 31, 2017

First Saturday Seminars			
Date	**Topic**	**Speaker**	**Attendance**
10/7/2017	East Coast River Relay	Dennis Markatos-Soriano	35
11/4/2017	The Role of a Writer for the Environment	Phillip Gerard	53
12/2/2017	Climate Change	Paul Hearty	48
Other Presentations by CFRW Staff			
Date	**Organization/Audience**	**Topic/Speaker**	**Attendance**
10/8/2017	CFRW vols	CFRW/Kemp Burdette	20
10/9/2017	UNCW/EVS	CFRW/Kemp Burdette	30
10/11/2017	Residents of Old Wilmington	CFRW/Kemp Burdette	45
10/16/2017	UNCW/EVS	CFRW Education, Action, Advocacy/Kay Lynn Hernandez	40
10/25/2017	NC Solid Waste Enforcement Officers Association	CFRW overview/Kay Lynn Hernandez	95
10/26/2017	Cuculorus Film Fest	CFRW/Kemp Burdette	10
11/9/2017	League of Women Voters	CFRW/Kemp Burdette	20
11/12/2017	CFRW Membership Meeting	CFRW/Kemp Burdette	80
11/12/2017	CFRW Membership Meeting	CFRW/Frank Yelverton	80
11/12/2017	CFRW Membership Meeting	CFRW Education/Kay Lynn Hernandez	80
11/14/2017	Watson School of Education/9th and 10th Graders	Threat to our Environment and Careers/Kay Lynn Hernandez	120
12/13/2017	Sea Grant NC	The Role of CFRW in protecting the CFR/Frank Yelverton	33
Greenfield Lake Tours & Creek Paddle Tours			
Date	**Group Served/Audience**	**Type of Tour/Topic/Location**	**Attendance**
10/18/2017	Home School/4th and 5th grades	Raingrop Journey/Stormwater/Greenield Lake	17
12/18/2017	Home School/1st – 4th	Bird Identification and Stormwater/GFL	14

January 1 – March 31, 2018

First Saturday Seminars			
Date	**Topic**	**Speaker**	**Attendance**
2/3/2018	Arboreal travelers: Native Trees and Shrubs	Kate Cardemone	42
3/3/2018	Microcystis	Madi Polera	49
Other Presentations by CFRW Staff			
Date	**Organization/Audience**	**Topic/Speaker**	**Attendance**
1/13/2018	StriperFest/Fisheries Science Forum	GenX and other Emerging Contaminants in the CFR/Detlaff Knappe	22
1/13/2018	StriperFest/Fisheries Science Forum	The Environmental Justice Issue of Fish Consumption in the NECFR/Kay Lynn Hernandez	10
1/13/2018	StriperFest/Fisheries Science Forum	Fish Passage on the CFR/Frank Yelverton and Dawn York	10
2/11/2018	Forward Motion Dance	CFRW/Madi Polera	30
2/20/2018	Cape Fear River Partnership	Permit Data Analyses/Madi Polera	25
2/27/2018	Hoggard High School/Seniors	GenX/Madi Polera	30
2/28/2018	Hoggard High School/Seniors	GenX/Madi Polera	30
3/26/2018	UNCW/EVS students	CFRW mission/activities/Kay Lynn Hernandez	110
3/29/2018	Clean Water Matters/Public	GenX/Madi Polera	110

Greenfield Lake Tours/Creek Paddle Tours			
Date	**Group Served/Audience**	**Type of Tour/Topic/Location**	**Attendance**
2/21/2018	Homeschool/K-7	Walking Eco Tour/Flora & Fauna of GFL+Stormwater/GFL	20
3/8/2018	Homeschool/K-7	Walking Eco Tour/Flora & Fauna of GFL+Stormwater/GFL	15
3/22/2018	Island Montessori/4th Grade	Raindrop Journey/Stormwater, other impacts/GFL	24

April 1 – June 30, 2018

First Saturday Seminars			
Date	**Topic**	**Speaker**	**Attendance**
4/7/18	NHC Vector Control: Why we do what we do; what we do and how we do it.	Marie Hemmen, Environmental Health Supervisor, New Hanover County	37
5/5/18	Emerging Contaminants and the Sweeny Water Treatment Plant: A Path Forward	Jim Fletcher, Executive Director, Cape Fear Public Utility Authority	43
6/2/18	Offshore Energy NC: Current Status and Possible Implications of Exploration/Development	Roger Shew, Geology and Environmental Science Professor, UNCW	63
Other Presentations by CFRW Staff			
Date	**Organization/Audience**	**Topic/Speaker**	**Attendance**
4/2/18	UNCW/Environmental Science	Environmental job preparation/KayLynn Hernandez	50
4/17/18	Wilmington Community	GenX/Madi Polera	60
4/28/18	Forward Motion Dance Annual Performance	CFRW Mission/Frank Yelverton	250
5/5/18	NAACP Health Fair	Fish Consumption – Safe/Not Safe – Madi Polera	100
5/22/18	Cape Fear River Partnership/Quarterly Meeting	Update on Cape Fear River Locks and Dams Fish Passage Efforts/Frank Yelverton	95
5/23/18	Hanover Seaside Club	Cape Fear River Watch Mission and Anadromous Fish Passage on the Cape Fear River/Frank Yelverton	42
Greenfield Lake Tours/Creek Paddle Tours			
Date	**Group Served/Audience**	**Type of Tour/Topic/Location**	**Attendance**
4/18/18	Murrayville Elementary/4th Grade	Raindrop Journey/Stormwater, wildlife, history/Greenfield Lake	60
4/20/18	N. Brunswick H.S/AP Biology	Walking Eco-Tour/Stormwater, wildlife, history/Greenfield Lake	20
4/23/18	Home School/3rd – 5th graders	Walking Eco-Tour/Stormwater, wildlife, history/Greenfield Lake	7
4/25/18	Murrayville Elementary/4th Grade	Raindrop Journey/Stormwater, wildlife, history/Greenfield Lake	60
4/27/18	Williston Middle School/students	Walking Eco-Tour/Stormwater, wildlife, history/Greenfield Lake	47
4/30/18	Homeschool Group/K-9	Walking Eco-Tour/Stormwater, wildlife, history/Greenfield Lake	17
5/2/18	Forest Hills Elementary/4th Grade	Raindrop Journey/Stormwater, wildlife, history/Greenfield Lake	55
5/3/18	Ogden Elementary/Kindergarten	Walking Eco-Tour/Stormwater, wildlife, history/Greenfield Lake	85
5/9/18	Sunset Park Elementary/4th Grade	Raindrop Journey/Stormwater, wildlife, history/Greenfield Lake	60
6/20/18	Kiddy Academy/K-3	Walking Eco-Tour/Stormwater, wildlife, history/Greenfield Lake	25

6/21/18	Kiddy Academy/K-3	Walking Eco-Tour/Stormwater, wildlife, history/Greenfield Lake	45
6/26/18	YWCA camp/2nd-3rd	Walking Eco-Tour/Stormwater, wildlife, history/Greenfield Lake	28
6/27/18	The Learning Center/5-12 year old	Walking Eco-Tour/Stormwater, wildlife, history/Greenfield Lake	30
6/28/18	YWCA camp/4th-7th Grade	Walking Eco-Tour/Stormwater, wildlife, history/Greenfield Lake	28
6/29/18	YWCA camp/2nd-3rd Grade	Walking Eco-Tour/Stormwater, wildlife, history/Greenfield Lake	30

Public Involvement/Volunteer Efforts *Total Allocated Cost: $7230*

Encourage public participation by engaging city residents/businesses/civic groups in a volunteer Storm Drain Marking program in the city to involve and educate the community about stormwater pollution. A minimum of 1 volunteer day with at least 5 community volunteers and 14 drains marked is required. Agencies are welcome to do additional storm drain marking beyond this requirement. Educational doorhangers will be distributed to surrounding residences/businesses during storm drain marking. Assist in identifying areas to mark drains, educate volunteers about stormwater and the purpose of the program, train volunteers in marking and safety, use supplied markers, and help provide oversight of the program. A trained CFRW staff member and/or trained intern is required to be present during all storm drain marking activities and with each volunteer group. **($700)**

October 1 - December 31, 2017

Storm Drain Marking			
Date	**Name of Volunteer Organization, Business, etc.**	**# of Volunteers**	**Specific Area Marked / # of Storm Drains Marked**
10/30/2017	UNCW Eco Club	7	Steeplechase/15 drains

Coordinate volunteer clean-ups of city watersheds/tributaries 10x per year, once per month (with the exception of July and December). These cleanups will focus on tributaries that flow into Greenfield Lake, Smith Creek, Burnt Mill Creek, Barnards Creek, Mott Creek, the Cape Fear River, and as the need is discovered by the City.
10 monthly clean-ups will be completed including at least one site for the International Coastal Cleanup, an annual international clean-up event.

A cleanup location map and list will be provided to CFRW and a field trip can also be conducted by the city with CFRW, as necessary, to point out the cleanup locations. Cleanups done in conjunction with Keep America Beautiful must be performed at the locations identified by the city, in order to be reimbursable under this contract.

In order to avoid duplication of cleanup activities, CFRW will provide a schedule to City Stormwater Services 1 month in advance of proposed cleanup event locations. CFRW will inspect these sites in advance to make sure the area is actually in need of a cleanup.

Local watershed clean-ups may also include volunteer efforts to remove wetland and aquatic invasive plants with a focus on Greenfield Lake, Kerr Ave, and the Mary Bridger Wetland, but should not be conducted in place of cleanups.

Any cleanups conducted on private property should include written permission obtained in advance of the cleanup by CFRW from the property owner. These "written permissions" should be included with the Watershed Cleanup Report and on the year-end compilation CD of documents/materials.

Efforts should be made to inform the local media/social media about upcoming cleanup events. In addition, significant water quality problems identified during cleanups will be reported ***immediately*** to the appropriate officials, including the city's Stormwater Compliance Officer.

A summary of each clean-up event will be completed and submitted to Stormwater Services. *Reports will be submitted using the supplied template and within 10 days of the cleanup event.* Reports will include: the specific watershed, the location within the watershed that was cleaned, number of community volunteers, hours worked, estimate of the quantity of waste/recyclable materials removed, photographs to document work completed including before and after of cleanup site, volunteer photos, and documentation of efforts to secure volunteers and promote the event in the media/social media. **($5430)**

July 1 - September 30, 2017

Watershed Clean-ups				
Date	**Watershed**	**Specific Area Cleaned (List map # and specific location cleaned)**	**Trash Collected (ie. # of 30 gallon bags, and type of trash collected)**	**# of Volunteers/ Total Volunteer Hours Contributed**
8/26/2017	Burnt Mill Creek	Randall Pond/Ann McCrary Park	Trash: Three 96-gallon bins filled Recycling: Two 96-gallon bins filled -A City of Wilmington Trash bin -Traffic cone	24 Volunteers/48 Hours
9/16/2017	Burnt Mill Creek, Greenfield Lake. (ICC Clean-up)	GFL location #2 and BMC Location #1/Randall Pond Creek arm past Lion's Bridge, pavilion/playground and other lake areas. GFL Location #2 & BMC Location #1	Greenfield Lake: 3 96-gallon recycling bins filled 2.75 96-gallon trash bins filled Randall Pond: 1 96-gallon trash bin filled 1 96-gallon recycling bin filled	32 Volunteers/62 Hours

October 1 - December 31, 2017

Watershed Clean-ups				
Date	**Watershed**	**Specific Area Cleaned (List map # and specific location cleaned)**	**Trash Collected (ie. # of 30 gallon bags, and type of trash collected)**	**# of Volunteers/ Total Volunteer Hours Contributed**
10/14/2017	Drains directly to CFR	Locations #1 (Intersection of Front and Greenfield St) and #2 Ditch next to Cape Fear Outdoor Equipment	Two 96-gallon trash bins filled - Two 96-gallon recycle bins filled -4 trash bags filled with more recycling	17 vols/34 hours
11/11/2017	Smith Creek	Hurst and Evans #2	Trash: 4 full 96-gallon trash bins of trash. 12 tires. Over a hundred pounds of scrap items. Recycling: 1.5 96-gallon bins filled with recycling	10 vols/38 hours

January 1 - March 31, 2018

Watershed Clean-ups				
Date	**Watershed**	**Specific Area Cleaned (List map # and specific location cleaned)**	**Trash Collected (ie. # of 30 gallon bags, and type of trash collected)**	**# of Volunteers/ Total Volunteer Hours Contributed**
1/20/2018	Burnt Mill Creek	BMC #4, ditch behind Jackson BBQ and BMC # 6, MacMillan Ave. ditch	120 lbs assorted trash 60 lbs recycling	24 vols/48 hours
2/10/2018	Greenfield Lake	Emphasis on GFL #2 & #4, all of GFL cleaned	Trash: three 96-gallon bins, Recycling: seven 96-gallon bins, plus needles, furniture & buckets	100 vols/200 hours
3/10/2018	Burnt Mill Creek	BMC #9, McCumbers ditch	Trash: three 96-gallon bins, Recycling: two 96-gallon bins, bicycle, tombstone	26 vols/52 hours

April 1 – June 30, 2018

Watershed Clean-ups				
Date	**Watershed**	**Specific Area Cleaned (List map # and specific location cleaned)**	**Trash Collected (ie. # of 30 gallon bags, and type of trash collected)**	**# of Volunteers/ Total Volunteer Hours Contributed**
4/14/2018	Burnt Mill Creek	BMC #8 – Dead end at Shirley Rd.	Trash: Three 96-gallon bins filled. Recycling: Three 96-gallon bins filled. Misc: Tire, A large glass aquarium	44 vols/88 hours
5/12/2018	Burnt Mill Creek	BMC #1 – Randall Pond	Trash: Three 96-gallon bins filled. Recycling: 2.5 96-gallon bins filled. Misc: Shopping cart, propane tank	32 vols/64 hours
6/9/2018	Burnt Mill Creek	BMC #9 – Shirley to Princess along the creek	Trash: 1 96-gallon bins filled. Five Trash Bags filled Recycling: 2.5 96-gallon bins filled.	34 vols/68 hours

Conduct a volunteer CreekWatchers monitoring program and alert Stormwater Services when volunteers find problem areas. Every other month CreekWatcher volunteer monitoring activities will be conducted in at least 2 locations and will target high priority creeks or creek sections identified in cooperation with Stormwater Services. The monitoring reports submitted should rotate among the list of locations provided to CFRW by the City. Observation reporting months are August, October, December, February, April, and June. The CreekWatch Observation Monitoring Form with basic field observations and photo documentation will be submitted for review to Stormwater Services *within 10 days of monitoring.* In addition, significant water quality problems identified during observation monitoring will be reported ***immediately*** to the appropriate officials, including the city's Stormwater Compliance Officer. CreekWatchers should be trained community volunteers (not staff and interns) to help satisfy public involvement objectives **($1100)**

July 1 - September 30, 2017

Date of Creek Watch Report	**Observer Name(s)**	**Watershed**	**Specific Creek Location Observed** *(reference the list provided)*
8/26/2017	MM Vaught	Smith Creek	Maides Park/Hurst Branch
8/30/2017	Virginia Holman/Curry Guinn	Barnards Creek	Chula Vista Drive

October 1 - December 31, 2017

Date of Creek Watch Report	**Observer Name(s)**	**Watershed**	**Specific Creek Location Observed** *(reference the list provided)*

10/26/2017	Amy and Kevin McClane	Burnt Mill Creek	Shirley/Klein
10/28/2017	Mary Martha Vaught	Smith Creek	Maides Park/Hurst Branch
12/31/2017	Rebecca Powell	Greenfield Lake	Robin Hook between 16th and 17th St.
12/31/2017	Rebecca Powell	Hewletts Creek	Lincoln Outfall

January 1 - March 31, 2018

Date of Creek Watch Report	**Observer Name(s)**	**Watershed**	**Specific Creek Location Observed** *(reference the list provided)*
2/24/2018	Tom Tewey	Burnt Mill Creek	Wilshire at Downey Branch
2/24/2018	M.M. Vaught	Smith Creek	Maides Park at Hurst Branch

April 1 - June 30, 2018

Date of Creek Watch Report	**Observer Name(s)**	**Watershed**	**Specific Creek Location Observed** *(reference the list provided)*
4/28/2018	MM Vaught	Smith Creek	Hurst Branch at Maides Park
4/28/2018	Taylor Beard	Burnt Mill Creek	Wilshire at Downey Branch
6/2/2018	Taylor Beard	Burnt Mill Creek	Wilshire at Downey Branch
6/25/2018	MM Vaught	Smith Creek	Hurst Branch at Maides Park

Contract Administration

Total Allocated Cost: $1220

Quarterly progress reports and invoices will be submitted in accordance with the following provisions:

Quarterly reports and invoices are due within 10 days of the quarter end date and will follow templates and instructions set forth by Stormwater Services.

Submit cumulative quarterly progress reports and invoices according to the following quarters: July 1 - Sept 30; October 1 - Dec. 31; January 1 -March 31; April 1 - June 30. The 4th quarter progress report will serve as a compiled year-end summary report and will be included in the City's NPDES annual report.

The quarterly invoice should use the supplied template which shows the % of each service completed each quarter, invoice amount, and amount remaining to be paid. Invoices will be paid once quarterly progress report and invoice(s) are received and reviewed by the City for adequate progress. Non-performance or inadequate progress may result in non-payment or reduction of payment. No pre-payment of services will occur.

Reports and invoices that do not follow templates/instructions will be returned for correction; payment will be processed once updated reports and invoices are received, reviewed, and approved.

CFRW will maintain all records and reports related to this contract on a fiscal year (FY) basis (July 1-June 30). These records should be retained for a period of at least 5 years.
In addition, an annual compilation CD or DVD copy of all contract documents, records, reports, invoices, and pertinent educational materials will be provided to the City of Wilmington Stormwater Services by July 10th for the prior FY. These files are public record and should be accessible.

Contact person: Stormwater Services requires one main point of contact for the implementation, management, communication and reporting of this annual contract. This staff person will be the

individual that implements the majority of contract services, and therefore will be the most familiar with the contract. The designated contact person is: **Kay Lynn Hernandez ($1220)**

Other:

Do not assign a cost.

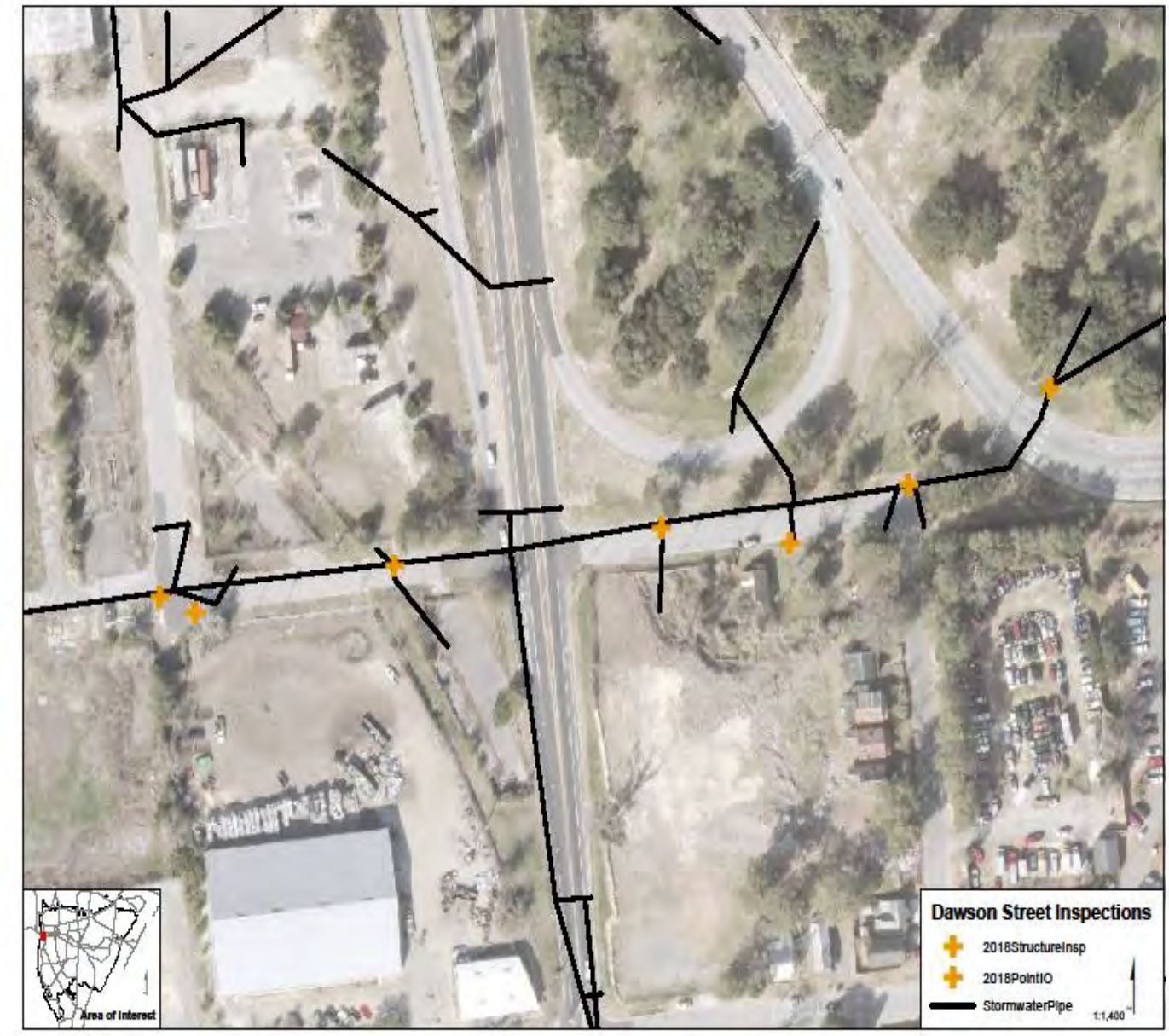
Assist Stormwater Services in implementing additional public outreach, education, involvement, and participation activities required by federal NPDES stormwater permit. Summary reports and information will be included in the City's NPDES yearly report to the State.

Report compiled by: Kay Lynn Hernandez **Date:** June 30, 2018

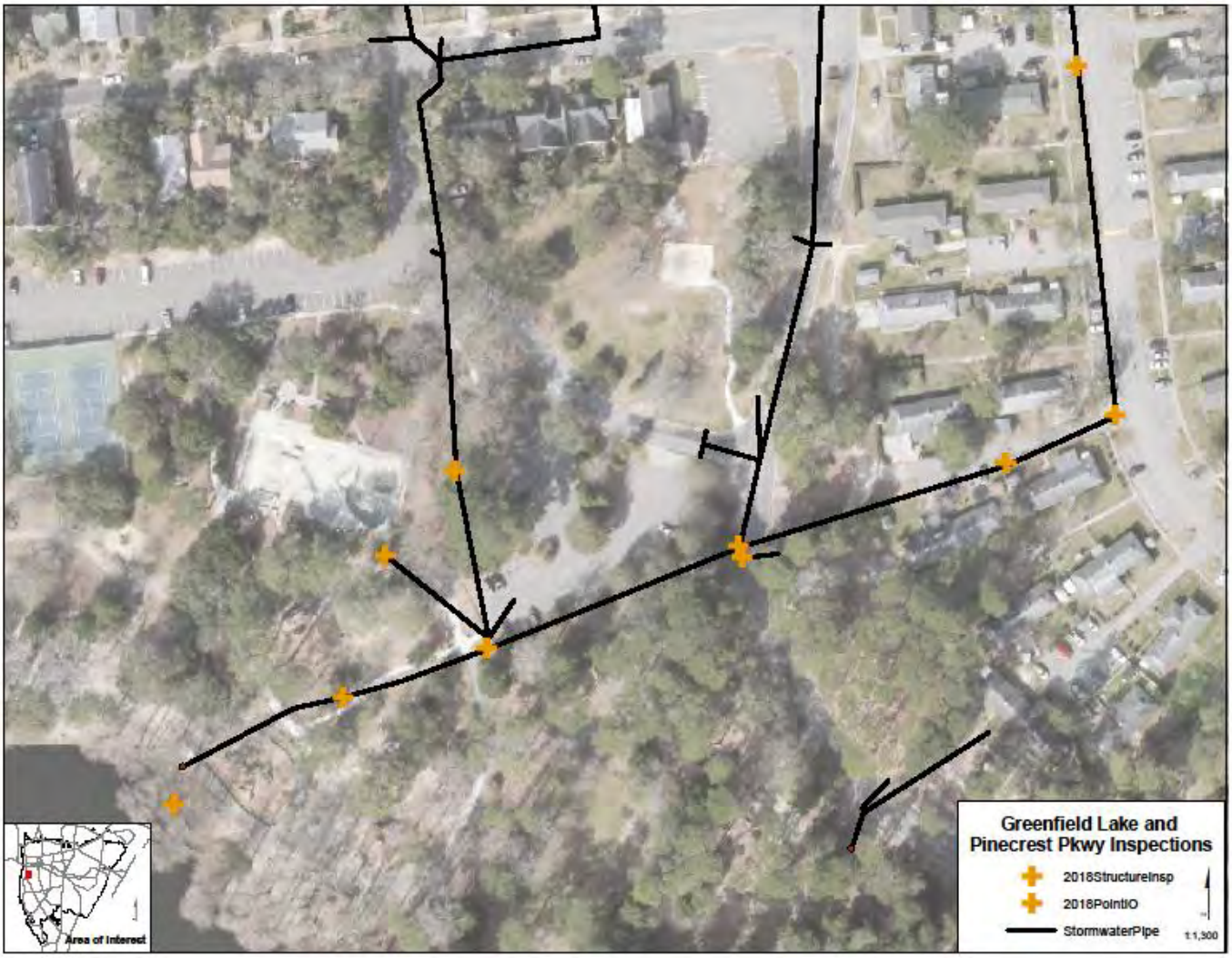
APPENDIX D: ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

Dry Weather Flow Monitoring Location Maps

Drainage Segment Location *(description)*
Outfall (54" RCP) at Dawson Street, eastward along Dawson Street., northeastward towards S. 3rd Street, then northward along S. 3rd Street.

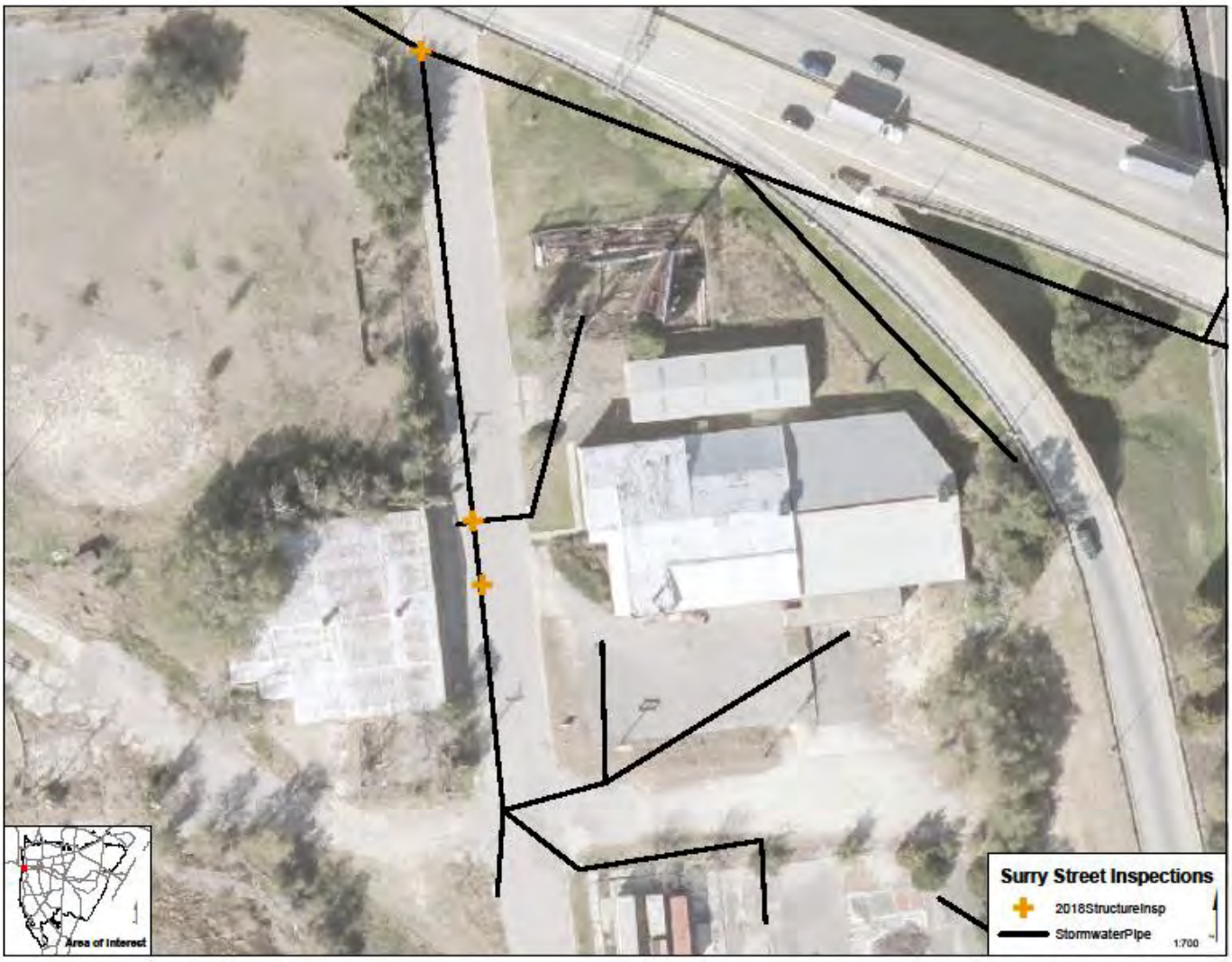


Drainage Segment Location *(description)*
30" RCP at Greenfield Lake, eastward to Lake Shore Drive, eastward to Pinecrest Parkway, then northward along Pinecrest Parkway.

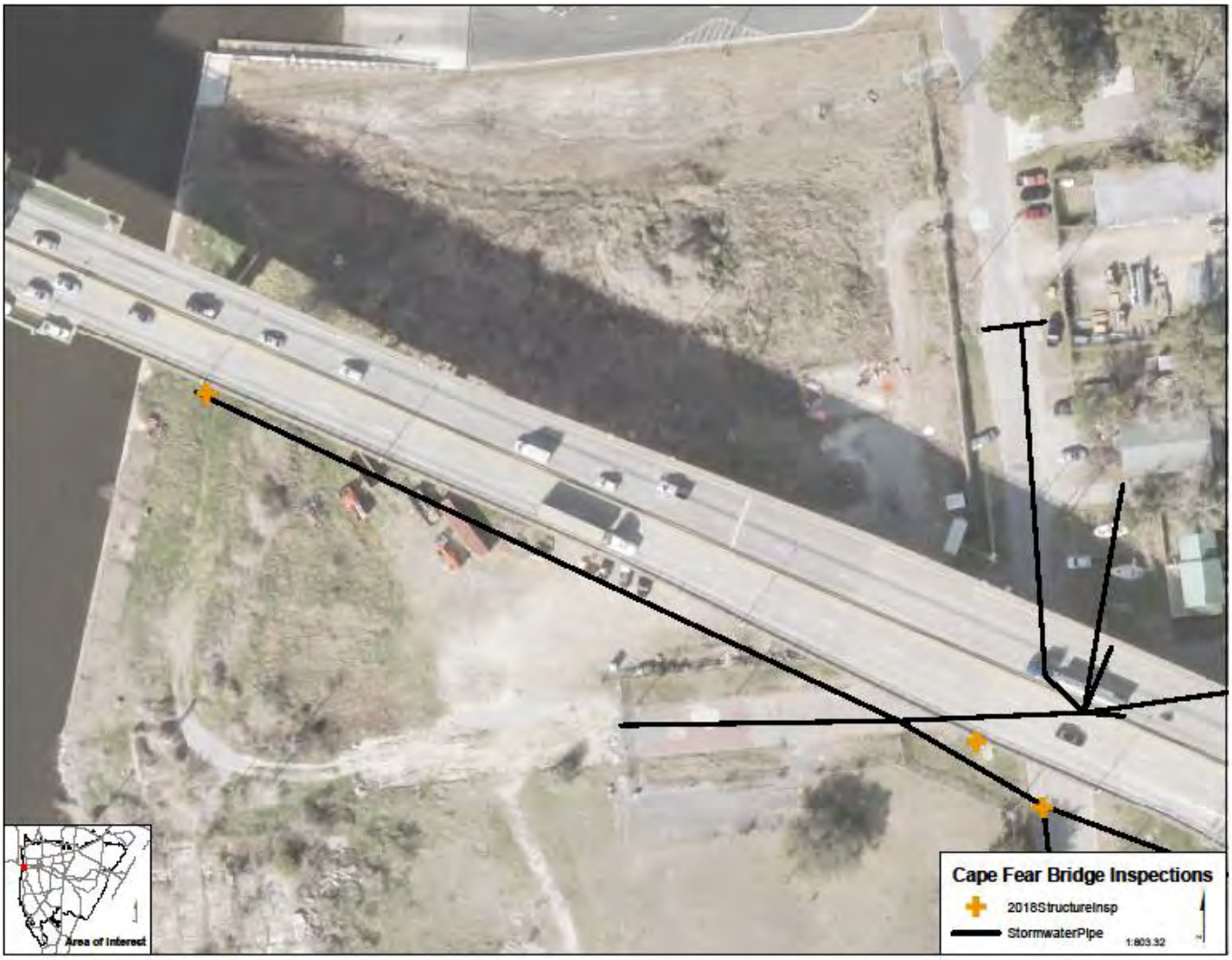


Drainage Segment Location *(description)*
Outfall (42" RCP) at Metts avenue, then eastward along Metts Avenue to Forest Hills Drive.

Drainage Segment Location *(description)*
Outfall (36"RCP) at Surry Street, southeastward to S. Front Street, then southeastward towards US 17/74/76 exit ramp.



Drainage Segment Location *(description)*
Outfall (30”RCP) at Cape Fear Memorial Bridge, southeastward to Surry Street.



Dry Weather Flow Inspection Point Table

ID	Inspection Date	Inspector	Illicit Discharge?	Observation	Referred?	Description
8584	6/6/2018	Corey Boyett	NO INDICATION	ALLOWED FLOW		
24844	5/2/2018	Saskia Cohick	NO INDICATION	ALLOWED FLOW	NO	
24845	5/2/2018	Saskia Cohick	NO INDICATION	ALLOWED FLOW	NO	
24846	5/2/2018	Saskia Cohick	NO INDICATION	DEBRIS	NO	
24847	5/2/2018	Saskia Cohick	NO INDICATION	NA	NO	
24848	5/2/2018	Corey Boyett	NO INDICATION	NA	NO	
25244	5/2/2018	Saskia Cohick	POSSIBLE DISCHARGE	UNKNOWN	NO	deep flow
25245	5/2/2018	Saskia Cohick	POSSIBLE DISCHARGE	OTHER	YES	stagnant water
25246	5/2/2018	Saskia Cohick	NO INDICATION	NA	NO	flowing water
25247	5/2/2018	Jim Quinn	NO INDICATION	ALLOWED FLOW	NO	
25248	5/2/2018	Corey Boyett	NO INDICATION	NA	NO	inaccessble
25249	5/2/2018	Corey Boyett	NO INDICATION	NA	NO	
25250	5/2/2018	Corey Boyett	NO INDICATION	NA	NO	
25251	5/2/2018	Corey Boyett	NO INDICATION	NA	NO	dry
26044	5/15/2018	Saskia Cohick	NO INDICATION	ALGAE	NO	
26045	5/15/2018	Saskia Cohick	NO INDICATION	ALGAE	NO	
26444	6/6/2018	Corey Boyett	NO INDICATION	NA	NO	
26445	6/6/2018	Corey Boyett	NO INDICATION	NA	NO	
26446	6/6/2018	Corey Boyett	NO INDICATION	NA	NO	
26447	6/6/2018	Corey Boyett	NO INDICATION	NA	NO	
26448	6/6/2018	Saskia Cohick	NO INDICATION	ALLOWED FLOW	NO	
26449	6/6/2018	Corey Boyett	NO INDICATION	NA	NO	
26450	6/6/2018	Corey Boyett	NO INDICATION	NA	NO	
26451	6/6/2018	Saskia Cohick	NO INDICATION	NA	NO	a!!owed flow
26452	6/6/2018	Saskia Cohick	NO INDICATION	NA	NO	
2	5/18/2018	Saskia Cohick	NO INDICATION	NA	NO	
4	5/18/2018	Saskia Cohick	NO INDICATION	NA	NO	
5	5/18/2018	Saskia Cohick	NO INDICATION	NA	NO	
6	5/18/2018	Saskia Cohick	NO INDICATION	Inaccessable	NO	
7	5/18/2018	Saskia Cohick	NO	Allowed Flow	NO	
8	5/18/2018	Saskia Cohick	NO	No Indication of Illicit Discharge	NO	
9	5/18/2018	Saskia Cohick	No	No Indication of Illicit Discharge	NO	
3	5/18/2018	Saskia Cohick	NO INDICATION	NA	NO	Unable to locate structure, assumed burried.
3979	6/28/2017	Corey Boyett	NO INDICATION	NA		
8423	5/2/2018	Saskia Cohick	NO INDICATION	NA	NO	not accessable
8823	5/2/2018	Saskia Cohick	NO INDICATION	NA	NO	

Employee Training

Employee training was conducted for the Engineering Dept. Construction Inspectors. Five (5) individuals went through the training conducted on 7/10/17. Refresher training and education for existing staff will be updated as necessary and implemented every 1-2 years.

Policy for Reporting and Documentation of Sanitary Sewer Overflows and System Leaks

Cape Fear Public Utility Authority and City of Wilmington

Purpose:

The purpose of this document is to establish agreed upon procedures for the Cape Fear Public Utility Authority (CFPUA) to follow regarding reporting and documentation of sanitary sewer overflows (SSO) that impact the City of Wilmington Municipal Separate Storm Sewer System (MS4). These guidelines will enable the City to comply with NPDES Phase II Stormwater permit reporting requirements as well as to provide assistance to CFPUA in mitigating any potential threat to public health or the environment.

Reporting Requirements:

All SSOs resulting in discharge to the City of Wilmington MS4, or causing possible contamination of stormwater discharging to the storm system, must be reported to the City within 48 hours of occurrence in accordance with City Code Chapter 12, section 12-24. Failure to comply may result in a notice of violation (NOV) for the CFPUA. Fines for non-compliance range up to $10,000 based on quantity, risk to the public, environment damage and degree of negligence as documented in the City Code. The following table documents the minimum information required for sanitary sewer overflows and sewage leaks that may impact the City's MS4.

	Date of Spill/Leak	Location	Volume	Corrective Action	NCDWQ Form	Analytical Data
SSO						
< 1000 gal	x	x	x	x		
> 1000 gal	x	x	x	x	x	x
System Leak	x	x	x	x	x	as needed

Spills greater than 1,000 gallons require an additional completed copy of the DWQ's Collection System Sanitary Sewer Overflow Reporting Form (CS-SSO) provided at the same time as when provided to the State. Failure to comply may result in an NOV for CFPUA. Clean up requirements are in accordance with the CFPUA's Clean up Procedure Policy. This information will also be used in documenting the compliance with the City of Wilmington's annual NPDES Phase II Stormwater report to NCDWQ.

City of Wilmington Contact Information:

Spills less than 1,000 gallons

Use the Pollution Prevention Hotline: 910-341-1020
Or go to: www.wilmingtonnc.gov/reportstormwaterpollution and fill out the on line form.

Spills greater than 1000 gallons or system leaks

1) Corey Boyett
Stormwater Compliance Officer
910-341-0092
Corey.Boyett@wilmingtonnc.gov

2) Jim Quinn
Stormwater Specialist
910-341-4694
Jim.Quinn@wilmingtonnc.gov

3) Derek Pielech
Stormwater Services Manager
910-341-5818
Derek.Pielech@wilmingtonnc.gov

(From Page 8 of City of Wilmington Illicit Detection and Elimination Program Manual)

Dry Weather Flow Inspection Program

In accordance with permit requirements for detecting dry weather flows, the City is developing and implementing a program for conducting inspections throughout the MS4 to detect dry weather flows. Dry weather flows are defined as any flow in the MS4 that occurs after a 72 hour period without rain. The objective is to identify and eliminate flows that contain pollutant or pathogen loads. Such flows vary in source, content, and frequency, thereby imparting variable impacts within the larger MS4 and the final receiving water bodies. Promptly identifying dry weather flows is instrumental in recognizing and addressing deleterious illicit discharges. As the program develops, procedures will be evaluated and modified with the aim of more effectively detecting and eliminating illicit discharges.

Employees of the City familiar with outfall inspection procedures will conduct the inspections. Inspections will be conducted only during dry periods to facilitate identification of only those flows unassociated with allowable stormwater flows. Furthermore, those outfalls located along tidally influenced reaches will be inspected at low tide; should the outfall still be submerged at low tide, the stormwater conduit will then be traced upgrade to the nearest manhole or observable location beyond tidal influence, where an inspection will be more likely to detect a dry weather flow. A similar modified observation procedure will be used for those points where direct inspection of the outfall point is not possible; observations will be made immediately upgrade in the system at an appropriate location for dry weather inspection.

The inspection itself will consist of an initial visual inspection of the outfall to determine the presence or absence of water or liquid flow. Photographs will be taken of the inspection location and saved along with the inspection record containing data describing the conditions observed at the outfall or observation point. . The detection of any suspicious dry weather flow will prompt a service request for a field screening as described in later sections of this manual outlined as Steps 1-4, in which physical, chemical, and biological parameters may be analyzed to determine the nature and source of any illicit discharge.

The inspection records will be stored in the GIS as tables. Screen shots of the actual ArcPad routine and a diagram showing the database designed for storing these records is shown in Appendix E: *Field Data Collection of Dry Weather Inspections using ArcPad.*

Given that the City is located in a coastal area with tidal influence in parts of the MS4 and numerous groundwater sources infiltrating or directly routed into the MS4, our strategy for performing the observations will be adjusted accordingly. The initial location of all major outfall points has provided the starting point for the Dry Weather Flow Inspection Program. Each of the major outfall points will be inspected, photographed and have an observation record saved to the GIS database as described above. Following completion of this effort, a similar systematic inspection of major trunk lines and areas of interest will begin.

The selection of major trunk lines for inspection will be a strategically targeted effort to isolate those portions of the drainage system that may be contributing to any dry weather flow. At this point, we envision inspections progressing up a selected trunk line from the outfall so that any contributing dry weather flow source areas can be identified and investigation into the source can begin. MS4 structures which have sewer cross pipes associated with them are at the greatest risk for sewage contamination; therefore along with the trunk line inspection effort, special attention will be given to inspecting any MS4 structures or junctions which have a sewer cross pipe passing through the structure. Any identified illicit discharge encountered during the both the trunk line and sewer cross pipe inspection process will result in a service request being generated.

The selection of major trunk lines and points along the trunk line for inspection will be scheduled with consideration given to several influencing factors including: weather conditions, the degree to which stormwater infrastructure mapping is reliable and complete within a given area, suspicion of negative inputs to the MS4 based upon annual water quality reports, 303d listings, and/or industrial land use designations. Also, indications of illicit discharge observations from the MS4 mapping crew will prompt inspections. Dry weather inspections will be performed at a minimum of four locations along one or more trunk lines during any given month depending on weather conditions.

APPENDIX E: CONSTRUCTION SITE RUNOFF CONTROLS

Included in this section:

New Hanover County Erosion & Sedimentation Control Ordinance

New Hanover County Ordinance:

The following are excerpts culled from the New Hanover County Erosion and Sedimentation Control Ordinance:

The New Hanover County erosion and sedimentation control ordinance is adopted for the purposes of:

(1) Regulating certain land disturbing activity to control accelerated erosion and sedimentation in order to prevent the pollution of water and other damage to lakes, watercourses, and other public and private property by sedimentation; and

(2) Establishing procedures through which these purposes can be fulfilled.

General requirements of the permit include among others:

(a) *Plan required.* No person shall initiate any land disturbing activity which uncovers more than one acre without having an erosion control plan approved by the county. No land disturbing activity may be initiated until the county is notified of the date that the land disturbing activity will begin.

(b) *Protection of property.* Persons conducting land disturbing activity shall take all reasonable measures to protect all public and private property from damage caused by such activity.

(c) *More restrictive rules shall apply.* Whenever conflicts exist between federal, state, or local laws, ordinances, or rules, the more restrictive provision shall apply.

(e) *Inspections.* Any and all applicable intermediate inspections may be held in any trade (building, mechanical, electric and/or plumbing) if any land disturbing activity, on a tract, including single-family residences, is found not to be in compliance with any part of this article.

(f) *Building finals.* Building finals and/or certificates of occupancy may not be issued if any land disturbing activity, including single-family residences, is found not to be in compliance with any part of this article.

Mandatory Standards For Land Disturbing Activity

No land disturbing activity subject to the control of this article shall be undertaken except in accordance with the following mandatory standards:

(1) *Buffer zone*.

a. No land disturbing activity during period of construction or improvement to land shall be permitted in proximity to a lake or natural watercourse unless a buffer zone is provided along the margin of the watercourse of sufficient width to confine visible siltation within the 25 percent of the buffer zone nearer the land disturbing activity. Waters that have been classified as trout waters

by the environmental management commission shall have an undisturbed buffer zone 25 feet wide or of sufficient width to confine visible siltation within the 25 percent of the buffer zone nearest the land disturbing activity, whichever is greater. Provided, however, that the county may approve plans which include land disturbing activity along trout waters when the duration of said disturbance would be temporary and the extent of said disturbance would be minimal. This subdivision shall not apply to a land disturbing activity in connection with the construction of facilities to be located on, over, or under a lake or natural watercourse.

b. Unless otherwise provided, the width of a buffer zone is measured from the edge of the water to the nearest edge of the disturbed area, with 25 percent of the strip nearer the land disturbing activity containing natural or artificial means of confining visible siltation.

c. The 25-foot minimum width for an undisturbed buffer zone adjacent to designated trout waters shall be measured horizontally from the top of the bank.

d. Where a temporary and minimal disturbance is permitted as an exception by subsection (1)a. of this section, land disturbing activities in the buffer zone adjacent to designated trout waters shall be limited to a maximum of ten percent of the total length of the buffer zone within the tract to be distributed such that there is not more than 100 linear feet of disturbance in each 1,000 linear feet of buffer zone. Larger areas may be disturbed with the written approval of the director.

e. No land disturbing activity shall be undertaken within a buffer zone adjacent to designated trout waters that will cause adverse temperature fluctuations, as set forth in 15 NCAC 2B.0211 "Fresh Surface Water Classification and Standards", in these waters.

(2) Graded slopes and fills. The angle for graded slopes and fills shall be no greater than the angle, from zero to nineteen degrees, which can be retained by vegetative cover or other adequate erosion control devices or structures. Only when approved by the county may slopes be steeper than two foot of run to one foot of rise. In any event, slopes left exposed will, within 15 working days or 30 calendar days, whichever is shorter, of completion of any phase of grading, be planted or otherwise provided with ground cover, devices, or structures sufficient to restrain erosion.

(3) Ground cover. Whenever land disturbing activity is undertaken on a tract comprising more than one acre, if more than one acre is uncovered, the person conducting the land disturbing activity shall install such sedimentation and erosion control devices and practices as are sufficient to retain the sediment generated by the land disturbing activity within the boundaries of the tract during construction upon and development of said tract, and shall plant or otherwise provide a permanent ground cover sufficient to restrain erosion after completion of construction or development. Except as provided in section 23-238(b)(5), provisions for a ground cover sufficient to restrain erosion must be accomplished within 30 working days or 120 calendar days following completion of construction or development whichever period is shorter.

(4) Prior plan approval. No person shall initiate any land disturbing activity on a tract if more than one acre is to be uncovered unless, 30 or more days prior to initiating the activity, an erosion and sedimentation control plan for such activity must be both filed with and approved by the county. The county shall forward to the director of the division of water quality a copy of each erosion and sedimentation control plan for a land disturbing activity that involves the utilization of ditches for the purpose of dewatering or lowering the water table of the tract.

Design and Performance Standards.

(a) Except as provided in subsection (b)(2) of this section, erosion and sedimentation control measures, structures and devices shall be so planned, designed and constructed as to provide protection from the calculated maximum peak of runoff from the ten-year storm. Runoff rates shall be calculated using the procedures in the USDA, Soil Conservation Service's "National Engineering Field Manual for Conservation Practices," or other acceptable calculation procedures.

(b) In high quality water (HQW) zones, the following design standards shall apply:

(1) Uncovered areas in HQW zones shall be limited at any time to a maximum total area within the boundaries of the tract of 20 acres. Only the portion of the land disturbing activity within an HQW zone shall be governed by this section. Larger areas may be uncovered within the boundaries of the tract with the written approval of the director.

(2) Erosion and sedimentation control measures, structures and devices within HQW zones shall be so planned, designed and constructed to provide protection from the runoff of the 25-year storm which produces the maximum peak rate of runoff as calculated according to procedures in the United States Department of Agriculture Soil Conservation Service's "National Engineering Field Manual for Conservation Practices" or according to procedures adopted by any other agency of this state or the United States or any generally recognized organization or association.

(3) Sediment basins within HQW zones shall be designed and constructed such that the basin will have a settling efficiency of at least 70 percent for the 40-micron (0.04 mm) size soil particle transported into the basin by the runoff of that two-year storm which produces the maximum peak rate of runoff as calculated according to procedures in the United States Department of Agriculture Soil Conservation Services "National Engineering Field Manual for Conservation Practices" or according to procedures adopted by any other agency of this state or the United States or any generally recognized organization or association.

(4) Newly constructed open channels in HQW zones shall be designed and constructed with side slopes no steeper than three horizontal to one vertical if a vegetative cover is used for stabilization unless soil conditions permit a steeper slope or where the slopes are stabilized by using mechanical devices, structural devices or other acceptable ditch liners. In any event, the angle for side slopes shall be sufficient to restrain accelerated erosion.

(5) Ground cover sufficient to restrain erosion must be provided for any portion of a land disturbing activity in a HQW zone within 15 working days or 60 calendar days following completion of construction or development, whichever period is shorter.

Responsibility For Maintenance.

During the development of a site, the person conducting the land disturbing activity shall install and/or maintain all temporary and permanent erosion and sedimentation control measures as required by the approved plan or any provision of this article, the act, or any order adopted pursuant to this article or the act. After site development, the land owner or person in possession or control of the land shall install and/or maintain all necessary permanent erosion and sediment control measures, except those measures installed within a road or street right-of-way or easement accepted for maintenance by a governmental agency.

The full text of this article can be found under Chapter 23, Article VI of the Code of Ordinances County of New Hanover, North Carolina.

APPENDIX F: POST-CONSTRUCTION SITE RUNOFF CONTROLS

Included in this section:

Inspection Reporting Summary
Inspection Letter
Stormwater Detention Facility Compliance Inspection Report

Dates of Inspections	**Jul./Aug. 2017**	**Jul./Aug. 2017**
Total # Sites Inspected	349	In Progress+
Response Letter Severity		
Level 1 (first letter)	36	TBD
Level 2 (second letter)*	0	TBD
Level 3 (third letter)**	0	TBD
# of Sites Requiring Maintenance	36	TBD

*If no response from first letter after 60 days, second letter is sent
**If no response from second letter after 60 days, third letter is sent
+ Inspections are in progress and will be included in next year's report

TBD = To Be Determined

SAMPLE LETTER

Date

«OWNER»
«CO_OWNER»
«OWN_ADDR»
«OWN_CITY», «OWN_STATE» «OWN_ZIP»

RE: Storm Water Maintenance Inspection - «SUBD_NAME»
(Parcel # «PIN»)

The City of Wilmington Storm Water Services Section has recently completed a routine inspection of the storm water management facilities at «SIT_ADDR» for the above referenced site. The facility was inspected for compliance with the operation and maintenance requirements as outlined in the City's Technical Standards Manual. The City will be conducting these inspections a minimum of twice a year. Our ---------- (date) inspection indicates that the storm water facilities at the above property does not comply with current maintenance standards as listed on the attached Compliance Inspection Report.

According to the storm water management specifications and standards and the inspection and maintenance agreement from the responsible entities, corrective action must be taken within a reasonable time period. The City will be reinspecting the above storm water facilities to track the progress of any corrective action. I will be happy to work with you toward a satisfactory resolution of this matter. If you have questions, please contact me at 341-4694. Your cooperation and assistance in the City's storm water management efforts is greatly appreciated.

Sincerely,

Jim Quinn
Stormwater Specialist
Stormwater Services

Stormwater Detention Facility

Compliance Inspection Report

SITE:

DATE:

LOCATION:

The Stormwater Management for Post-Construction Ordinance requires a bi-annual inspection of all structural water quality detention facilities to ensure that they are being properly maintained and are functioning as originally designed.

The results of this inspection are as follows:

☐ **Visual inspection found no apparent problems with the facility.**
☐ **Please complete the following repairs and/or maintenance items within 60 days of this report**

Slopes
☐ Repair eroded pond slopes
☐ Repair erosion at pond inlet
☐ Repair erosion at outlet structure
☐ Re-seed and/or repair bare areas
☐ Mow and regularly maintain vegetation
☐ Regrade slopes and/or aquatic shelf

Inlets
☐ Remove vegetative obstruction
☐ Remove sediment accumulation within pipes

Emergency Spillway
☐ Remove debris located in spillway
☐ Remove trees and woody vegetation
☐ Repair eroded areas and/or rip-rap

Outlet Structure
☐ Remove debris obstructing outlet structure
☐ Remove obstruction to orifice
☐ Repair and/or replace trash rack
☐ Repair trash screen for lower orifice
☐ Remove vegetation around outlet structure

Pond Main Body
☐ Repair vegetative shelf
☐ Remove sediment accumulation
☐ Remove floating debris and/or debris on slopes
☐ Remove vegetation in pond that has reduced surface area

Other
☐
☐

Additional comments and maintenance concerns:

_____
_____
_____
_____
_____
_____
_____

Proper operation and maintenance are the sole responsibility of the property owner, and a vital part of ensuring the effectiveness of your detention facility. If you fail to complete the above maintenance in a timely manner, please be advised that the City of Wilmington reserves the right to complete the maintenance, and assess the owner for any costs or damages incurred. You will be notified if the City chooses to pursue this action.

Please inform this office of the date when work is completed, and if you should have any questions or comments concerning these items or future maintenance issues, please feel free to contact me at (910) 341-4694.

Inspected by: Jim Quinn Title: Stormwater Specialist

Summary of Plan Review Activities

Project Name	Project Type	Permit #	Permit Issue Date	Type of New BMP	Pervious (Y or N)	# of new BMPs Onsite	Notes
Carolina Collision	SWP HD	2017027/2017028	7/6/2017	Wet Pond	N	1	
NHRMC Pedestrian Bridge	Revision	2006014R1	7/6/2017	None	N	0	No new SCM's
Flying Machine Brewery	SWP HD	2017029	7/17/2017	Wet Pond	N	1	
Land Rover-Jaguar	SWP offsite	2017030	7/18/2017	None	N	0	Smith Creek Station Offsite Pond
Baker BMW of Wilmington	Revision	99032R1	8/4/2017	Wet Pond	N	1	1 Wet Pond
Greenfield Commercial	SWP HD	2017033	8/4/2017	PC Only	Y	1	21,926 sf of PC
WTC Partial Hospital	SWP HD	2017032	8/7/2017	PC, Wet Pond, Bioretention, Inf Trench	Y	6	1 Wet Pond, 2 Bioretention, 2 Infiltration Trench, 5,297 sf of PC
Wilmington Area Rebuilding Ministry	Drain Plan	2017034	8/11/2017	None	N	0	No SCM's required
Carmax of Wilmington	SWP HD	2017035	8/17/2017	Wet Pond	N	1	1 Wet Pond
Autumn Hall Phase IV Residential	Revision	2006046R10	8/24/2017	None	N	0	No new SCM's
The Homeplace (aka Beasley Place Subdivision)	SWP HD	2017036	8/30/2017	Wet Pond	N	1	1 Wet Pond
NHRMC Orthopedic Hospital	Revision	2006014R2	9/1/2017	PC, Inf Trench	Y	3	Ex Inf Trench, 35,057 sf new PC
Ashes Drive Office Building	SWP offsite	2017037	9/8/2017	None	Y	1	Westfall Office Offsite Pond, 11,257 sf of PC (unpermitted)
Airlie at Wrightsville Sound	SWP HD	2017038	9/8/2017	PC, Inf Trench, Stormfilter	Y	5	3 Inf Trenches, 1 stormfilter, 16,602 sf of PC
South Front Apts.	Revision	2011022R3	9/8/2017	PC	Y	1	5,024 sf of new PC
Dawson Street Lofts	Revision	2002042R3	9/14/2017	None	N	0	No new SCM's
The Pointe at Barclay , Bldg 4	SWP offsite	2016004R2	9/17/2017	None	N	0	Barclay West Offsite Pond
Bearman CPA Office	Drain Plan	2017039	9/26/2017	None	N	0	No SCM's required
NHRMC Wound Care Parking Lot	Drain Plan	2017040	9/29/2017	None	N	0	No SCM's required
Schwartz Center Renovation & Addition	Drain Plan	2017041	10/2/2017	None	N	0	No SCM's required
Mac's Speed Shop	Drain Plan	2017042	10/3/2017	None	N	0	No SCM's required
Cypress Cove Apartments	SWP HD	2017043	10/10/2017	Wet Ponds	N	4	4 Wet Ponds
Hidden Pines (aka Woodcrest Gardens)	Drain Plan	2017044	10/10/2017	None	N	0	No SCM's required
Shinnwood Cottages	SWP LD	2017045	10/12/2017	Swales	N	3	3 Curb Outlet Swales, natural infiltration
Woodfield Apartments	SWP HD	2017046	11/2/2017	Wet Ponds	N	3	3 Wet Ponds
WTC Partial Hospital	Revision	2017032R1	11/2/2017	None	N	0	No new SCM's
Carolina Marine Terminal Load Out Annex	Revision	2005018R4	11/9/2017	None	N	0	No new SCM's
Kids Making It	Drain Plan	2017047	11/16/2017	None	N	0	No SCM's required
Civil Works Contracting	SWP HD	2017048	11/30/2017	Inf Basins	N	2	2 Infiltration Basins
Holiday Inn Express & Suites	SWP offsite	2017049	11/30/2017	None	N	0	Lakeside Estates Offsite Pond
Pine Valley Branch Library	SWP offsite	2017051	12/6/2017	None	N	0	Fulton Station Offsite Pond
Tongue and Groove Office	Drain Plan	2017050	12/11/2017	None	N	0	No SCM's required
Riverlights Conv 3	SWP HD	2017031	12/13/2017	Inf Basins, Wet Pond	N	7	6 Infiltration Basins, 1 Wet Pond
NHRMC Parking Expansion	SWP HD	2017052	12/13/2017	PC, Wet Pond	Y	2	1 Wet Pond, 8,515 sf of PC
Sunset Park Substation	SWP HD	2017053	12/18/2017	Infiltration	N	1	Natural Infiltration Area
Concrete Batching Plant (Raleigh St.)	SWP HD	2017054	12/22/2017	Wet Pond	N	1	1 Wet Pond
Law Office of Jason Vaughn	Drain Plan	2018001	1/2/2018	None	N	0	No SCM's required
200 Market Street	Drain Plan	2018002	1/8/2018	None	N	0	No SCM's required
TD Bank Site Redevelopment	Drain Plan	2018003	1/9/2018	None	N	0	No SCM's required
Pacific Place Sub	SWP HD	2018013	1/18/2018	Wet Pond	N	1	1 Wet Pond
Monkey Junction Self Storage	SWP HD	2018005	1/18/2018	Wet Pond	N	1	1 Wet Pond
Riverlights Age Qualified Phase II & III	SWP HD	2017003R1	1/19/2018	None	N	0	No new SCM's
The Vault on 17th (aka 17th Street Mini Storage)	Revision	2017023R2	1/24/2018	None	N	0	No new SCM's
Helmsdale at Landfall Phase II	Revision	2014015R1	1/29/2018	None	N	0	No new SCM's (repermit of expired plan)
Airlie at Wrightsville Sound	Revision	2017038R1	1/29/2018	None	N	0	No new SCM's
Smith & Gsell Design Studio	Drain Plan	2018006	2/6/2018	None	N	0	No SCM's required
Live Oak Bank Building 3 / Fitpark	Revision	2011034R3	2/9/2018	None	N	0	Tiburon Parc Offsite Pond
Tiburon Parc	Revision	2011033R3	2/12/2018	None	N	0	Expansion of Existing Wet Pond
920 Princess St	Drain Plan	2018004	2/13/2018	None	N	0	No SCM's required
Dockside Place	Drain Plan	2018007	2/19/2018	None	N	0	No SCM's required
Dollar General Dawson St	SWP HD	2018008	2/22/2018	Inf Trench	N	1	1 Infiltration Trench
Valvoline Instant Oil Change	SWP HD	2018010	2/28/2018	SW Wetland	N	1	1 Stormwater Wetland
Flying Machine Brewery	Revision	2017029R1	3/6/2018	None	N	0	No new SCM's
Intracoastal Internal Medicine	SWP offsite	2018012	3/7/2018	None	N	0	Shipyard Commons Pond
Riverlights Conv Ph 9	SWP LD	2018009	3/16/2018	None	N	0	Swales and natural infiltration for flood control
Riverplace	Redev. Excl.	2018014	3/20/2018	None	N	0	No SCM's required
The Pearl	Drain Plan	2018015	3/21/2018	PC Only	Y	1	985 sf of PC
Marsh Point Subdivision	Drain Plan	2018016	3/21/2018	None	N	0	No SCM's required
Renaissance Market	SWP offsite	2018017	3/28/2018	None	N	0	Westfall Office Offsite Pond
Carolina Collision	Revision	2017028R1	4/10/2018	None	N	0	No new SCM's
3rd Street Transit Station	SWP HD	2018018	4/19/2018	PC Only	Y	1	2,860 sf of PC
Marshes at Rivers Edge	Revision	2003029R2	4/24/2018	None	N	0	No new SCM's
Corning Credit Union	SWP offsite	2018019	4/25/2018	None	N	0	17th St Commercial Wet Pond
Offices at Barclay Phase I	SWP offsite	2018011	4/26/2018	None	N	0	Barclay West Pond
Wilmington Treatment Center Expansion	Revision	2007064R3	5/1/2018	None	N	0	No new SCM's
Masonboro Lodge Phase II	Drain Plan	2014017R1	5/1/2018	None	N	0	No new SCM's, repermitting expired permit
Cape Fear Boulevard Apartments	Drain Plan	2018020	5/3/2018	None	N	0	No SCM's required
Garris Road Storage	Revision	2000013R1	5/11/2018	None	N	0	No new SCM's
Dollar General Carolina Beach Rd	SWP HD	2018021	5/23/2018	Wet Pond	N	0	1 Wet Pond
The Forks (aka Museum Area Subdivision)	Revision	2014023R2	5/30/2018	None	N	0	No new SCM's
Riverlights Conventional Ph 4	Revision	2017031R2	5/31/2018	None	N	0	No new SCM's
Coastal Finance Retail Center	SWP HD	2018022	6/1/2018	Wet Pond	N	0	1 Wet Pond
Greenfield Commercial	Revision	2017033R2	6/1/2018	None	N	0	No new SCM's
NHRMC Central Plant Expansion	Revision	2006014CR2	6/7/2018	None	N	0	Silverstream Offsite Facility
City of Wilmington Police Fire & City Training Facility	SWP HD	2018023	6/11/2018	SW Wetland	N	0	2 Stormwater Wetlands
Seahawk Cove Clubhouse	Revision	2016019R1	6/14/2018	None	N	0	No new SCM's, upsize 1 Infiltration trench
Burnt Mill Business Park, Lot 22	Revision	2017016R1	6/20/2018	None	N	0	No new SCM's
Roland Grise Middle Renovations	SWP HD	2018024	6/21/2018	Inf Trench	N	0	1 Infiltration Trench
AAA Car Wash - South College Road	SWP HD	2018025	6/28/2018	Inf Trench, PC	Y	2	1 Infiltration Trench, 6,927 sf of PC

APPENDIX G: POLLUTION PREVENTION & GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

Form G-7 Sheet 1 of 1

EMPLOYEE TRAINING CHECKLIST

TRAINING TOPIC	SCHEDULE	ATTENDEES
NPDES PERMIT REQUIREMENTS Purpose of NPDES Program Permit Conditions	Annually	Members of Pollution Prevention Team
STORMWATER POLLUTION PREVENTION PLAN Purpose of SPPP Identification of potential pollutant sources Methods to reduce pollutants in stormwater Best Management Practices	Annually	Members of Pollution Prevention Team
SPILL PREVENTION AND RESPONSE PLAN Identification of potential spill areas Location of potential pollutant sources Spill response team Spill response procedure Spill response equipment Spill reporting procedure	Annually	All employees (other than administrative)
PREVENTATIVE MAINTENANCE Identify equipment (if any) Facility inspection requirement and schedule Documentation	Annually	All employees (other than administrative)
GOOD HOUSEKEEPING PROGRAM Regular cleanup procedures Material storage practices Facility inspection requirement and schedule Documentation	Annually	All employees (other than administrative)

The employee signature below indicates completion of the Stormwater Pollution Prevention training program.

Employee Signature: _____

Type/Print Employee Name and Title: JOHN P. FORTUIN FLEET MANAGER

Date Training Received: 9/28/17

Instructor: _____

APPENDIX H: TOTAL MAXIMUM DAILY LOADS (TMDL)

Bradley & Hewletts Creek Watershed Restoration Plan

- Heal Our Waterways Program
- Cumulative Year End Reports for Contractual/Cooperative Agreements with:
  - New Hanover Soil & Water Conservation District (HOWBMP)

DATE OF EVENT/ ACTIVITY	EVENT/ACTIVITY	AUDIENCE	DELIVERED BY (AGENCY)	METHOD OF DELIVERY / MESSAGE	ATTENDANCE/ PARTICIPATION
Events					
11/30/2017	GIC Tree Program Public Meeting	General Public	GIC	Public input session at Council Chambers.	76 members of the public
2/22/2018	Lower Cape Fear Stewardship Development Awards	Local environmental and concerned professionals	Heal Our Waterways	HOW program display - "BMP… Easy as 1-2-3"	75 participants
4/21/2018	Earth Day Festival	General Public	Heal Our Waterways	Program display - "BMP… Easy as 1-2-3"	7,000+ Wilmington area residents in attendance
Presentations					
3/6/2018	Shandy Point Neighborhood Presentation	Neighborhood Residents	Heal Our Waterways, NCCF	PowerPoint presentation about anticipated neighborhood installation	18 residents
3/22/2018	Rotary Presentation	Wilmington West Rotary Club	Heal Our Waterways	PowerPoint presentation about Heal Our Waterways Program	27 members
5/2/2018	Rain Garden Presentation	Surfrider Cape Fear Chapter members and the general public	Heal Our Waterways	PowerPoint presentation about rain gardens	7 attendees
6/2/2018	Rain Garden Workshop	Surfrider Cape Fear Chapter members and the general public	Heal Our Waterways, NHSWCD	Workshop about rain gardens	14 attendees
6/29/2018	Lancaster Linear Infiltration Basin Planting Workshop	Workshop Attendees - General Public affiliated with NHC Arboretum and NCSU	NCSU	Workshop about wetland plants	27 attendees
Informational Website					
Ongoing	Heal Our Waterways informational website healourwaterways.org	Watershed residents General public	Heal Our Waterways	Continuously updated, dedicated Heal Our Waterways website	1,400 unique page views since July 1, 2017. 1,724 total page views. Data as of May 24, 2018.
Media Advertising Campaigns					
Ongoing	City of Wilmington YouTube.com Channel	YouTube.com viewers	WECT staff	Two :15 rain barrel public service announcements with local celebrity news anchor, Jon Evans	Inform public about installation and use of rain barrels.

March - May 2018	WECT TV-6	WECT web and mobile viewers	WECT	Web and mobile digital platforms: Video ads Skyscraper ads Mobile ads Video pre-roll ads Media banner Weather Channel	Target Audience: Zip codes 28403 & 28409 Web & Mobile Ads Served: 313,237 Ads Clicked: 3,035 Engagement Rate: .97% Total cost: $4,530
February 2018	Fairway Outdoor billboards, 2 locations	Wilmington area motorists, area residents	Fairway Outdoor	Rain Barrel billboard directing viewers to access the HOW website	Target Audience: Watershed area motorists Frequency: Ad ran for eight seconds every minute for 28 days in 2 locations Total cost: $2,438
March-May 2018	WHQR Radio 91.3 FM	Radio listeners	WHQR	Local NPR affiliate underwriting message - 36 drivetime, 40 run of station.	Target Audience: General public, homeowners Ads Served: 76 ads over 12 weeks Reach: 40,000 listeners per week Total cost: $1,680

News Coverage

7/23/2017	Video on WWAY News	Online viewers General public	WWAY News Staff	Online news clip - UNCW creates rain garden to reduce polluted runoff	WWAY online news viewers
7/20/2017	"City of Wilm items of interest" bulletin	Local media and city/public service representatives	City Communications Manager	Email highlighting City of Wilmington items of interest for the media, including UNCW rain garden	46 email recipients representing various local media outlets and organizations
7/20/2017	WECT 6 News Story	WECT 6 online readers	WECT Staff	Online article - Rain garden installed on UNCW campus	WECT Online news readers
July 2017	Article in "Changing Tides" newsletter	Home and property owners adjacent to New Hanover County easements	New Hanover Soil and Water Conservation District	Print article - Project Spotlight: Szmant Rain Garden in Hewletts Creek Watershed	Approx. 230 readers per issue
5/7/2018	NC Coastal Federation Press Release	Online viewers General public	NC Coastal Federation	Website article - New Hanover County towns, businesses reduce stormwater runoff	Website viewers, local media
June 2018	Article in "Changing Tides" newsletter	Home and property owners adjacent to New Hanover County easements	New Hanover Soil and Water Conservation District	Print Articles - *Project Spotlight: Residential Rain Garden in Hewletts Creek Watershed* and *Heal Our Waterways*	Approx. 230 readers per issue

Social Media Campaigns

Ongoing	Twitter site campaign	Twitter followers Interested public	Heal Our Waterways	Dedicated Heal Our Waterways account handle	Currently have 217 followers
Ongoing	Facebook site campaign	Facebook followers Interested public	Heal Our Waterways	Dedicated Heal Our Waterways page	Currently have 168 page "likes", 171 followers

Distributing promos/giveaways

2/22/2018	Lower Cape Fear Stewardship Development Awards	Local environmental and concerned professionals	Heal Our Waterways	Distribution of educational materials	87 participants
3/6/2018	Shandy Point Neighborhood Presentation	Neighborhood Residents	Heal Our Waterways, NCCF	Distribution of educational materials	18 residents
3/22/2018	Rotary Presentation	Wilmington West Rotary Club	Heal Our Waterways	Distribution of educational materials	27 members
4/21/2018	Earth Day Fesitval	General Public	Heal Our Waterways	Distribution of educational materials	5,000+ Wilmington area residents in attendance
5/2/2018	Rain Garden Presentation	Surfrider Cape Fear Chapter members and the general public	Heal Our Waterways	Distribution of educational materials	7 attendees

Local Cable Access (GTV-8)

Airs on rotating schedule	GTV-8 City's cable access channel	Cable access TV viewers	Stormwater staff WECT staff GTV-8 staff	Downspout disconnection and rain barrel public service announcements with local celebrity news anchor Jon Evans	Inform public about re-routing downspouts and installing and using rain barrels

Watershed Resident Mailings, Displays, Signs, Pamphlets

1/18/2018	Targeted direct mail	Residents in Bradley & Hewletts Creek Watersheds and ICW direct drainage areas	Heal Our Waterways	Mailed postcards informing residents of website update.	16,114 mailings to inform residents of website update and resources available to them.
4/16/2018	Targeted direct mail	Residents in Bradley & Hewletts Creek Watersheds and ICW direct drainage areas	Heal Our Waterways	Mailed postcards informing residents of BMPs and a rain barrel giveaway	16,251 mailings to inform residents of BMPs and a rain barrel giveaway.

Newsletters and E-newsletters

1/23/2018	Constant Contact E-newsletter	Newsletter subscribers	Heal Our Waterways	E-newsletter with Watershed Coordinator and program introduction	208 residents
4/19/2018	Constant Contact E-newsletter	Newsletter subscribers	Heal Our Waterways	E-newsletter with rain barrel giveaway info	216 residents

Grant Projects

Began April 2017	EPA 319 Grant NCCF	Hewlett and Bradley Creek Watersheds, White Oak River Basin	NCCF Stormwater Services Heal Our Waterways	NPS Pollutant Control Grant to install at least 12 retrofits, prioritized by volume reduction and cost-effectiveness	Collaboration with NCCF to implement projects that align with and expand upon the Bradley & Hewletts Creek Watershed Restoration plan
Began Jan 2015 - Ended March 2018	EPA 319 Grant NCSU Hewletts Creek Watershed BMP Installations (A collaborative approach to voluntary watershed restoration)	Hewletts Creek	NCSU Stormwater Services	Stormwater improvement projects on private and city property	Collaboration with NCSU to implement projects that align with the Bradley & Hewletts Creek Watershed Restoration plan (Final year)

Began August 2015 - Ended October 2017	EPA EEG Grant Lynnwood bioretention area	Hewletts Creek, Glen Meade residents residing within Hewletts Creek Watershed	NCCF NCSU Stormwater Services Heal Our Waterways	Bioinfiltration area installed to reduce runoff volume in Glen Meade Neighborhood Educational doorhangers and postcards sent to residents about upcoming BMP installation Awareness visits conducted to discuss installation with four adjacent residents Signage posted at site of BMP about intended use and functionality Trifold mailer sent to encourage neighborhood attendance of planting day and advertising rain barrel giveaway Pre-test and post-test surveys collected and designed to assess effectiveness of HOW educational outreach campaign	Collaboration with NC Coastal Federation, NC State, and City of Wilmington Stormwater Services to design and construct project 86 doorhangers distributed 86 postcards sent 86 trifold mailers sent 86 pre-test surveys sent, 9 undeliverable, 16 completed and returned 86 post-test surveys sent, 8 undeliverable, 19 completed and returned Four randomly selected residents won rain barrels at planting day One randomly selected survey respondent won a gift card for each survey group (pre and post-test winners)
Began December 2016	Green Infrastructure Center Tree Grant	Citywide	GIC City Planning, Stormwater, Parks	Citywide study to look at tree canopy and opportunities to use trees to mitigate stormwater	Collaboration with the Green Infrastructure Center, and City Planning, Stormwater, and Parks Divisions
Applied April 2018	EPA 319 Grant UNCW NCCF	Bradley Creek Watershed	UNCW, NCCF, Stormwater	Several planned stormwater retrofits on UNCW campus.	Collaboration with UNCW, NCCF, and City Stormwater

Watershed Coordinator Trainings

8/30-31/2017	Planning and Facilitating Collaborative Meetings	Professionals from the Public and Private sectors	NOAA	Two-day workshop focused on hosting and managing difficult public and stakeholder meetings.	50 participants
1/24/2018	The Rise and Fall of the Industrial Oyster	Environmental Professionals/Interested Viewers	NCDEQ Office of Environmental Education & Public Affairs	History of oyster industry in US.	Webcast attended by Watershed Coordinator
3/14 & 3/15/2018	2018 WRRI Conference	Environmental professionals	WRRI - Talks given from a wide range of water-quality related professionals	PowerPoint presentations and panel discussions on stormwater, water quality, and environmental education	200+ attendees from NC and across the nation

3/21/2018	Water Quality Monitoring with UNCW scientists	Watershed coordinator	UNCW scientists from Aquatic Ecology lab	UNCW scientists and Watershed Coordinator collected samples from tidal creeks.	Watershed Coordinator and 2 UNCW scientists
3/27/2018	Lower Cape Fear River Program meeting	Local environmental professionals	Dr. Mike Mallen & LCFRP members	PowerPoint presentation	LCFRP members and other interested professionals
4/12/2018	2018 State and Municipal Perspectives on Stormwater Public Education and Outreach	Stormwater professionals	APWA - Speakers from the NCDEQ, local governments, and education partnerships	PowerPoint presentations & networking luncheon	Event attended by Watershed Coordinator and Education Program Manager

Citizen Contacts- Site Visits

8/18/2018	Homeowner site visit	Homeowner	Heal Our Waterways	Site visit to homeowner's property after contact via website.	1 homeowner
1/16/2018	Residential rain garden site assessment	Homeowner	Heal Our Waterways NHSWCD	Site visit to homeowner's property for BMP assessment	2 homeowners
2/7/2018	Residential rain garden site assessment	Homeowner	Heal Our Waterways NHSWCD	Site visit to homeowner's property for BMP assessment	1 homeowner
5/21/2018	Home landscape site visit	3 Homeowners	Heal Our Waterways	Site visit to homeowner's property for BMP & erosion assessment	3 homeowner

BMP Projects Installed

7/1/2017	UNCW campus rain garden at Schwartz Residence Hall	Hewletts Creek Watershed	UNCW Surfrider Club Student Environmental Concerns Organization UNCW Sustainability UNCW Landscaping	Provide onsite stormwater infiltration and volume reduction	Total volume reduction: unknown at time of printing.
2/19/2018	Permeable pavement at Waterman's Brewing	Waterman's Brewing	NCCF contractor in accordance with EPA 319 Grant	Provide onsite stormwater infiltration and volume reduction educate customers about BMP use	Total volume reduction: 1001.879 cu ft.
2/19/2018	Permeable pavement at New Hanover County Arboretum	New Hanover County Arboretum	NCCF contractor in accordance with EPA 319 Grant	Provide onsite stormwater infiltration and volume reduction; educate visitors about BMP use	Total volume reduction: 1611.718 cu ft.
June 2018	Rain garden at Andrews Reach HOA	Andrews Reach neighborhood homeowners and visitors	Rainstorm Solutions (company) for NHSWCD in contract with COW	Provide onsite stormwater infiltration and volume reduction; educate homeowners and visitors about BMP use	Total volume reduction: 300 cu ft.
June 2018	Rain garden at Dixon residence	Homeowner	Rainstorm Solutions (company) for NHSWCD in contract with COW	Provide onsite stormwater infiltration and volume reduction; educate homeowner and visitors about BMP use	Total volume reduction: 154 cu ft.
June 2018	Rain garden at Milliken residence	Homeowners	Rainstorm Solutions (company) for NHSWCD in contract with COW	Provide onsite stormwater infiltration and volume reduction; educate homeowners and visitors about BMP use	Total volume reduction: 157 cu ft.

June 2018	Rain garden at Rosov residence	Homeowners	Rainstorm Solutions (company) for NHSWCD in contract with COW	Provide onsite stormwater infiltration and volume reduction; educate homeowners and visitors about BMP use	Total volume reduction: 198 cu ft.

COW = City of Wilmington

HOW = Heal Our Waterways program

HOWBMP = Heal Our Waterways Best Management Program

NCCF = North Carolina Coastal Federation

NCSU = NC State University

NHSWCD = New Hanover Soil & Water Conservation District

FB = Facebook

UNCW = University of North Carolina at Wilmington

FY 1718

NEW HANOVER SOIL & WATER CONSERVATION DISTRICT
230 Market Place Drive, Suite 100
Wilmington, NC 28403

HOWBMP Quarterly Progress Report #4: April 1 – June 30, 2018

Heal Our Waterways- Best Management Practice Installations (HOWBMP) Program
NHSWCD mission is to protect and enhance water quality throughout New Hanover County through land conservation, stormwater management, technical support to citizens and organizations, and conservation education and outreach activities.

To achieve this mission, NHSWCD has contractual relationships with city, county, and state organizations. These partnerships enable NHSWCD to deliver enhanced water quality projects and programs, as well as professional technical assistance to citizens and businesses.

Scope of Services

New Hanover Soil & Water Conservation District will serve as a project manager for the Heal Our Waterways- Best Management Practice (BMP) Installations Program (HOWBMP). The HOWBMP Program supports the council-adopted Bradley & Hewletts Creek Watershed Restoration Plan, with the goal of reducing polluted stormwater runoff entering the creeks in order to improve water quality.

NHSWCD will provide project management and oversight for the installation of BMPs within the designated watersheds in conjunction with the Heal Our Waterways program. 'Project management' includes activities such as the execution of a BMP project from start to finish including program promotion, identifying sites and projects, collaboration, current owner title search, obtaining HOA covenants/restrictions/permits, budgeting, technical assistance, design/engineering, permitting, contracting, construction, homeowner/business/media relations, selection and reimbursement of contractors, monitoring, and reporting.

BMPs will be identified for the purpose of reducing runoff volume and pollution into Hewletts Creek, Bradley Creek, and the associated areas that drain directly into the Intracoastal Waterway. A potential BMP project's location, type, estimated volume reduction, and proposed budget will require written notification to, and approval from, City Stormwater Services prior to any design, construction or other contracted work. Acceptable BMPs are listed on the GIS Atlas form.

A recommended minimum of 4-6 volume-reduction BMPs resulting in a total of approximately 700-1000 cubic feet of volume reduction should be installed during each annual

contract period. However, collaboration and written approval from the City would allow flexibility for unexpected project opportunities to deviate from the recommended minimum. BMP projects can be prioritized based on cost per cubic foot of volume reduction, as necessary.

During site evaluations, NHSWCD will educate property owners about the HOW Program (i.e. information about the specific BMP, maintenance, annual spot checks, HOW Brochure distribution, etc.) Once BMPs are installed, NHSWCD will provide the property owner with more specific BMP maintenance hardcopy information, Creek Friendly yard sign, and other pertinent information and program items.

Monitoring, or spot-checks, of completed BMP installations will be performed annually by NHSWCD for compliance. Monitoring will be required for five years for residential sites, and ten years for commercial or municipal/other BMP sites. NHSWCD will maintain a spot check tracking database for all installations and submit it at the end of each annual contract period.

The BMP installations will be funded by the City with a lump-sum allocation of $20,000 to NHSWD at the beginning of the contract period. Any unused funds from this allocation will be reimbursed to the City at the end of the contract period. NHSWCD will also reimburse the City for any returned funds from non-compliant property owners. NHSWCD will issue any necessary tax forms to contractors or property owners.

Reporting

Quarterly progress reports and invoices will be submitted in accordance with the following provisions:

Quarterly reports and invoices for contract fees are due within 10 days of the quarter end date and will follow templates and instructions set forth by Stormwater Services.

Submit cumulative quarterly progress reports and invoices for work performed according to the following quarters: July 1 - Sept 30; October 1 - Dec. 31; January 1 -March 31; April 1 - June 30. The 4th quarter progress report will serve as a compiled year end summary report.

The quarterly invoices should use the supplied template which shows the % of each service completed each quarter, invoice amount, and amount remaining to be paid. Copies of invoices for BMP installations will be provided to the City with quarterly reports/invoices, and also included with individual BMP project packet(s). Invoices will be paid once quarterly progress report and invoice are received and reviewed by the City for adequate progress. Non-performance or inadequate progress may result in non-payment or reduction of payment. No pre-payment of services will occur.

Reports and invoices that do not follow templates/instructions will be returned for correction; payment will be processed once updated reports and invoices are received, reviewed, and approved.

NHSWCD will maintain all records, reports, and invoices related to this contract on a fiscal year (FY) basis (July 1-June 30). These records should be retained for a period of at least 5 years. In addition, an annual compilation CD or DVD copy will be provided to the City of Wilmington Stormwater Services by July 10th for the prior FY. These files are public record and should be accessible.

For each BMP project, NHSWCD will provide the City with the necessary BMP project packet to include:

BMP Info-

- Heal Our Waterways GIS Atlas Form
- Calculations sheet from Engineer - sizing and volume calculations
- Specific BMP design (ie. Rain garden, bioretention area, cistern, etc.)

Site Specific Info-

- Site plan (include aerials if available)
- Before & After photos of site (pre-BMP & post-BMP)
- Proof of property ownership through title search
- HOA covenants & restrictions, ownership title, stormwater permits, etc.
- Copy of written email request/approval for BMP from City

Contractor Info-

- Itemized Contractor Invoice(s) – for design, installation, plants, etc. (Contractor invoice(s) should also be included on the quarterly invoice.)

Homeowner Info-

- Maintenance Agreement with homeowner/business owner
- HOWBMP Pre-Inspection Checklist

The annual, cumulative spot check tracking summary will be submitted annually by the end of each contract period.

Fee Schedule

Lump Sum: NHSWCD shall receive a lump sum of **$20,000** annually upon execution and approval of this contract to specifically fund Best Management Practice (BMP) installations in the Hewletts and Bradley Creek Watersheds. Copies of invoices for these BMP installations will be provided to the City with the quarterly reports/invoices and as part of the BMP packet for each project.

Contract Fee: NHSWCD shall provide quarterly reports, invoices, and BMP project packets according to the schedule defined in Reporting for the total fee amount of **$7,318** to execute the HOWBMP program.

Total Cost: The total cost of the Project shall not exceed **$27,318** without written approval of the City. Such approval shall be in the form of a written amendment to this Agreement approved by the City Manager or City Council, if required, and signed by the parties.

Contact person: Stormwater Services requires one main point of contact for the implementation, management, communication and reporting of this annual contract. This staff person will be the individual that implements the majority of contract services, and therefore will be the most familiar with the contract. The designated contact person is: **Dru Harrison**

July 1 - September 30, 2017
Met with HOA of Andrew's Reach and discussed potential for community rain garden as well as Stormwater 101 presentation. Also met with contractor, Mike Heath from Rainstorm Solutions, to discuss calculations sheet and needs of city and District for HOW program.

October 1 – December 31, 2017
Continued communication between Andrew's reach home owners and contractor to schedule installation in the Spring. Promoted program at Cape Fear Fair and Expo.

January 1 – March 31, 2018
Met with two homeowners in Hewlett's Creek watershed for site visits with city staff and with contractor. Applicants were Dixon at 4005 Halifax Rd and Milliken at 1706 Lincoln Rd. Plants for projects cannot be purchased until April 15th. Installation of all projects will start after this date.

April 1 – June 30, 2018
Installed rain gardens for Andrew's Reach HOA, Rosov, Milliken, and Dixon. Also completed rain garden and education/outreach through the local Surfrider chapter at the York residents. Spoke with 3 additional homeowners, 1 business, and 1 HOA about installation of BMPs and program for next fiscal year.

Report compiled by: Dru Harrison **Date:** 6/30/18

APPENDIX I: REGULATORY ENFORCEMENT ACTIONS

In 17-18 the Public Services Department Compliance Officer provided stormwater education and investigated approximately 103 requests. The majority were reports of illicit discharges to the storm drainage system followed by reports of violation of the Pet Waste section of the Stormwater Ordinance. The following table is a detail summary of the requests for compliance intervention for stormwater pollution issues.

ENFORCEMENT ACTIONS 2017-2018

Reporting period (FY18) July 1, 2017- June 30, 2018

Nature of Complaint	Number of Reports	Resolved thru Public Educati	NOVs Incidents	Referred to DWQ	# Civil Penalties
Pet Waste	10	100%	0	N/A	0
Outreach	8		0	N/A	N/A
Illicit Discharge/Sediment	85	85.9%	12	9	0
Illicit Connection	*1*	*0.0%*	*1*	*0*	*0*
Dry Weather Flow	*1*	*100.0%*	*0*	*0*	
SSO	*6*	*100.0%*	*0*	*0*	*0*
Totals for 1,2 and 3	103	87%	13	9	0

CIVIL PENALTIES 2017-2018

Nature of Compliant	Responsible Party	Address of violation	Date of Violation	Total Penalty
N/A	N/A	N/A	N/A	$0.00

DEFINITIONS: Nature of Complaint

Illicit Discharge/Sediment (Part 1, Sec. 12-22)

Complaints include reports of illicit discharges as defined by the ordinance. Reports include allowable as well as illegal discharges which is determined after the investigation is completed. Assessment when completed prescribes corrective action and can sometimes elevate to enforcement. All resolution of an incident typically includes education provided to the responsible party regarding stormwater pollution and awareness of the city ordinance as well as the potential fines for non-compliance and repeat offenders. Written NOVs are issued for serious offences.

Illicit Connection (Part 1, Sec. 12-23)

Reports are the result of an illicit connection that impacted the City's stormwater system with an illegal discharge. Assessment when completed prescribes corrective action and can sometimes elevate to enforcement. All resolution of an incident typically includes education provided to the responsible party regarding stormwater pollution and awareness of the city ordinance as well as the potential fines for non-compliance and repeat offenders. Written NOVs are issued for serious offences.

SSO (Part 1, Sec.12-24)

Sewer overflows from the CFPUA system, both reportable and not reportable. Process is described in Illicit Discharge Section. Resolution of the incident also includes reviewing the DWQ SSO reporting form for cause and ensuring distribution of educational material pertaining to preventing grease related spills to residents near and contributing to the incident.

Pet Waste (Part 2, Sec. 12-28)

The pet waste complaint category included any report of violation of the City's Pet Waste Ordinance. These complaints which are reported by citizens or city employees, due to their nature, may not be substantiated after the investigation. Resolution of an incident includes distributing educational material to all parties involved on the adverse health effects of pet waste pollution, and prevention, as well as the City's ordinance requirements and the potential fines for violations.

Blockages (Part 2, Sec. 12-29)

Blockage reports include any complaint reported which were thought to have the potential to impede the flow of stormwater in the City's maintained drainage system. Resolution of the incident includes education to citizens involved directly or within the immediate area of the incident explaining how to prevent willful blockages of the stormwater system.

Yard Waste (Part 2, Sec. 12-29)

Yard waste complaints include calls the City received reporting violations of the City's stormwater ordinance which prohibits the intentional raking, sweeping, blowing, washing, directing or placing of yard waste into any part of the public drainage system which might impede the flow of water through the system or compromise water quality. Resolution of an incident includes removal of debris and distribution of educational material and/or explanation of the ordinance with the possible fines.

APPENDIX J: MAJOR OUTFALL LOCATIONS AND DESCRIPTION TABLE

Watershed	Latitude	Longitude	Size	Material	Number	Classification	Map Date	Condition
Barnards Creek	34.15865	-77.91188	6.0 X 8.0	RCP	Double	NPDES outfall found	2/20/2012	Good
Barnards Creek	34.16482	-77.92585	60	RCP	Double	NPDES outfall found	2/20/2012	Good
Barnards Creek	34.16657	-77.92957	60	RCP	Triple	NPDES Industrial outfall found	11/21/2011	Good
Barnards Creek	34.16113	-77.93105	42	RCP	Single	NPDES outfall found	11/2/2011	Good
Barnards Creek	34.16134	-77.93815	18	RCP	Quad	NPDES Industrial outfall found	11/14/2011	Good
Bradley Creek	34.20898	-77.83556	3.0 X 5.0	RCP	Single	NPDES outfall found	1/6/2012	Good
Bradley Creek	34.21320	-77.82715	2.0 X 4.0	RCP	Single	NPDES outfall found	8/29/2000	Good
Bradley Creek	34.21952	-77.84568	90	CAP	Double	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.21911	-77.85177	72	CMP	Double	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.20939	-77.83654	54	RCP	Single	NPDES outfall found	1/6/2012	Good
Bradley Creek	34.23066	-77.85234	54	CMP	Double	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.23284	-77.84028	54	CMP	Double	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.21585	-77.82498	48	CMP	Single	NPDES outfall found	1/31/2012	Good
Bradley Creek	34.21997	-77.86130	42	CMP	Single	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.22630	-77.85231	42	CMP	Single	NPDES outfall found	1/13/2012	Good

Bradley Creek	34.20829	-77.83101	36	RCP	Single	NPDES outfall found	1/6/2012	Fair
Bradley Creek	34.20899	-77.83554	36	CMP	Single	NPDES outfall found	1/6/2012	Poor
Bradley Creek	34.20900	-77.83553	36	CMP	Single	NPDES outfall found	1/6/2012	Fair
Bradley Creek	34.21669	-77.83399	30	CMP	Single	NPDES outfall found	1/31/2012	Fair
Bradley Creek	34.21427	-77.83470	24	RCP	Single	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.21440	-77.83926	24	RCP	Double	NPDES outfall found	1/13/2012	Good
Bradley Creek	34.22066	-77.83784	24	RCP	Single	NPDES outfall found	1/31/2012	Good
Burnt Mill Creek	34.22878	-77.90517	11.0 X 12.0	RCP	Double	NPDES outfall found	2/28/2012	Good
Burnt Mill Creek	34.22870	-77.88923	5.0 X 6.0	CMP	Double	NPDES outfall found	2/28/2012	Good
Burnt Mill Creek	34.24617	-77.93366	72	SMP	Single	NPDES outfall found	2/28/2012	Fair
Burnt Mill Creek	34.23148	-77.91302	66	RCP	Single	NPDES outfall found	11/24/2010	Good
Burnt Mill Creek	34.24430	-77.92571	60	RCP	Single	NPDES outfall found	9/29/2010	Good
Burnt Mill Creek	34.23402	-77.91972	54	RCP	Single	NPDES outfall found	10/26/2010	Good
Burnt Mill Creek	34.23232	-77.91568	42	RCP	Double	NPDES outfall found	11/9/2010	Good
Burnt Mill Creek	34.23397	-77.91877	42	RCP	Single	NPDES outfall found	11/24/2010	Good
Burnt Mill Creek	34.23989	-77.92258	36	RCP	Single	NPDES outfall found	10/5/2010	Good
Burnt Mill Creek	34.24025	-77.92318	36	RCP	Single	NPDES outfall found	10/5/2010	Good

Burnt Mill Creek	34.25344	-77.92354	30	RCP	Double	NPDES outfall found	3/2/2012	Good
Drains directly to ICW	34.19570	-77.83301	48	RCP	Single	NPDES outfall found	1/6/2012	Good
Drains directly to ICW	34.19629	-77.82915	48	RCP	Single	NPDES outfall found	1/6/2012	Good
Drains directly to ICW	34.22229	-77.81978	48	IRON	Single	NPDES outfall found	1/17/2012	Good
Drains directly to ICW	34.22234	-77.81985	48	IRON	Single	NPDES outfall found	1/17/2012	Good
Drains directly to ICW	34.19503	-77.83000	36	RCP	Single	NPDES outfall found	11/22/2011	Good
Drains directly to ICW	34.19904	-77.82758	36	RCP	Single	NPDES outfall found	1/6/2012	Good
Drains directly to ICW	34.22121	-77.81566	36	RCP	Single	NPDES outfall found	1/17/2012	Good
Drains directly to ICW	34.22432	-77.81658	30	CMP	Single	NPDES outfall found	1/17/2012	Good
Drains directly to ICW	34.22433	-77.81659	30	CMP	Single	NPDES outfall found	1/17/2012	Good
Drains directly to ICW	34.22432	-77.81658	24	CMP	Single	NPDES outfall found	1/17/2012	Good
Drains directly to ICW	34.16461	-77.85628	2.5 X 5.0	CMP	Single	NPDES outfall found	7/19/2011	Fair
Greenfield Lake	34.19852	-77.93558	4.0 X 6.0	CMP	Triple	NPDES outfall found	2/22/2012	Good

Greenfield Lake	34.20094	-77.93381	60	RCP	Double	NPDES outfall found	2/22/2012	Good
Greenfield Lake	34.21255	-77.93161	60	CMP	Quad		2/22/2012	Good
Greenfield Lake	34.21429	-77.93563	48	RCP	Single	NPDES outfall found	2/23/2012	Good
Greenfield Lake	34.20127	-77.93568	42	RCP	Double	NPDES outfall found	2/22/2012	Good
Greenfield Lake	34.19964	-77.93615	36	RCP	Single	NPDES outfall found	2/22/2012	Good
Greenfield Lake	34.20462	-77.93537	36	RCP	Single	NPDES outfall found	2/22/2012	Good
Greenfield Lake	34.20751	-77.92997	30	RCP	Triple	NPDES outfall found	2/22/2012	Good
Hewletts Creek	34.18153	-77.86851	5.0 X 16.0	OTHER	Other	NPDES outfall found	11/17/2011	Good
Hewletts Creek	34.18020	-77.87198	90	CMP	Single	NPDES outfall found	11/3/2011	Good
Hewletts Creek	34.19421	-77.85211	60	CMP	Single	NPDES outfall found	11/21/2011	Fair
Hewletts Creek	34.17296	-77.85090	48	RCP	Double	NPDES outfall found	7/28/2011	Good
Hewletts Creek	34.18735	-77.85761	48	RCP	Single	NPDES outfall found	11/3/2011	Good
Hewletts Creek	34.19359	-77.85549	48	RCP	Triple	NPDES outfall found	11/18/2011	Good
Hewletts Creek	34.17112	-77.85107	42	RCP	Single	NPDES outfall found	7/19/2011	Good
Hewletts Creek	34.17879	-77.86842	42	RCP	Single	NPDES outfall found	2/16/2001	Good
Hewletts Creek	34.19498	-77.85447	42	RCP	Double	NPDES outfall found	11/18/2011	Good
Hewletts Creek	34.19680	-77.84352	42	CMP	Single	NPDES outfall found	11/22/2011	Fair

Hewletts Creek	34.20042	-77.86258	42	CMP	Single	NPDES outfall found	11/8/2011	Fair
Hewletts Creek	34.18468	-77.85373	36	RCP	Single	NPDES outfall found	2/26/2001	Good
Hewletts Creek	34.17878	-77.86844	30	RCP	Single	NPDES outfall found	11/7/2011	Good
Hewletts Creek	34.19419	-77.85209	18	RCP	Single	NPDES outfall found	2/6/2001	Good
Hewletts Creek	34.19430	-77.88617	2.0 X 4.4	RCP	Single	NPDES outfall found	2/24/2011	Good
Hewletts Creek	34.19471	-77.88822	6.0 X 8.0	RCP	Triple	NPDES outfall found	2/2/2011	Good
Hewletts Creek	34.19793	-77.88484	7.7 X 15.0	CAP	Single	NPDES outfall found	2/24/2011	Good
Howe Creek	34.24536	-77.82717	7.0 X 9.0	RCP	Double	NPDES outfall found	5/16/2007	Good
Howe Creek	34.25450	-77.82624	72	RCP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.24701	-77.82334	66	CMP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.24211	-77.82454	60	RCP	Single	NPDES outfall found	1/31/2012	Good
Howe Creek	34.24226	-77.82714	48	RCP	Single	NPDES outfall found	1/31/2012	Good
Howe Creek	34.24700	-77.82333	48	CMP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.26158	-77.82611	48	RCP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.24225	-77.82718	42	RCP	Single	NPDES outfall found	1/31/2012	Good
Howe Creek	34.25029	-77.82655	42	RCP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.25030	-77.82655	42	RCP	Single	NPDES outfall found	2/1/2012	Good

Howe Creek	34.24083	-77.82759	36	RCP	Single	NPDES outfall found	5/16/2007	Good
Howe Creek	34.24304	-77.82263	36	RCP	Double	NPDES outfall found	2/1/2012	Good
Howe Creek	34.24519	-77.82714	36	RCP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.24551	-77.82710	36	RCP	Single	NPDES outfall found	2/1/2012	Good
Howe Creek	34.24749	-77.82369	36	CMP	Single	NPDES outfall found	2/1/2012	Good
Cape Fear River	34.20807	-77.95086	10.0 X 10.0	RCP	Single	NPDES outfall found	3/15/2011	Good
Cape Fear River	34.21225	-77.94608	5.8 X 8.4	RCP	Triple	NPDES outfall found	3/25/2011	Good
Cape Fear River	34.19774	-77.95482	66	RCP	Single	NPDES Industrial outfall found	11/14/2011	Good
Cape Fear River	34.20913	-77.94735	48	RCP	Double	NPDES outfall found	4/1/2011	Good
Cape Fear River	34.18028	-77.95095	36	RCP	Single	NPDES Industrial outfall found	11/14/2011	Good
Cape Fear River	34.16995	-77.94822	30	RCP	Single	NPDES Industrial outfall found	11/29/2011	Good
Cape Fear River	34.21504	-77.94755	24	RCP	Single	NPDES Industrial outfall found	3/21/2011	Good
Cape Fear River	34.17135	-77.94984	18	RCP	Single	NPDES Industrial outfall found	2/21/2012	Good
Cape Fear River	34.17294	-77.94902	18	RCP	Single	NPDES Industrial outfall found	11/29/2011	Good
Cape Fear River	34.18391	-77.95205	18	RCP	Single	NPDES Industrial outfall found		Good
Cape Fear River	34.24197	-77.95273	3.0 X 10.0	RCP	Single	NPDES outfall found	6/10/2011	Good
Cape Fear River	34.21631	-77.94661	54	RCP	Single	NPDES Industrial outfall found	3/15/2011	Good

Cape Fear River	34.21646	-77.94663	54	RCP	Single	NPDES Industrial outfall found	4/11/2011	Good
Cape Fear River	34.22374	-77.95034	54	RCP	Single	NPDES outfall found	9/28/2009	Good
Cape Fear River	34.23969	-77.95146	48	RCP	Single	NPDES outfall found	5/27/2011	Inaccessible
Cape Fear River	34.24087	-77.95156	42	RCP	Single	NPDES outfall found	6/8/2011	Good
Cape Fear River	34.24089	-77.95155	42	RCP	Single	NPDES outfall found	6/8/2011	Good
Cape Fear River	34.24333	-77.95131	36	RCP	Single	NPDES outfall found	6/10/2011	Good
Cape Fear River	34.24991	-77.95037	36	RCP	Single	NPDES outfall found	6/14/2011	Good
Cape Fear River	34.25033	-77.94992	36	RCP	Single	NPDES outfall found	6/14/2011	Good
Cape Fear River	34.25729	-77.94434	36	RCP	Single	NPDES Industrial outfall found	6/10/2011	Good
Cape Fear River	34.24314	-77.95131	30	CPP	Single	NPDES outfall found	6/10/2011	Good
Cape Fear River	34.24977	-77.95055	30	RCP	Single	NPDES outfall found	6/14/2011	Good
Cape Fear River	34.25050	-77.94980	30	RCP	Single	NPDES outfall found	6/14/2011	Good
Cape Fear River	34.22764	-77.95054	24	CMP	Single	NPDES outfall found	5/16/2011	Good
Cape Fear River	34.22889	-77.94994	24	CMP	Single	NPDES outfall found	9/28/2009	Fair
Cape Fear River	34.24200	-77.95272	24	RCP	Single	NPDES outfall found	6/10/2011	Good
Cape Fear River	34.24319	-77.95121	24	CMP	Single	NPDES outfall found	6/10/2011	Fair
Cape Fear River	34.24964	-77.95067	24	RCP	Single	NPDES outfall found	6/14/2011	Good
Cape Fear River	34.25245	-77.94726	24	RCP	Single	NPDES Industrial outfall found	6/14/2011	Good

Cape Fear River	34.25728	-77.94432	24	RCP	Single	NPDES Industrial outfall found	6/10/2011	Good
Cape Fear River	34.24335	-77.95138	12	RCP	Single	NPDES outfall found	6/10/2011	Poor
Cape Fear River	34.25565	-77.94679	12	VCP	Single	NPDES Industrial outfall found	6/14/2011	Poor
Cape Fear River	34.23014	-77.94946	Inaccessible - submerged	RCP	Single	NPDES outfall	5/25/2011	Inaccessible
Smith Creek	34.25505	-77.87846	6.8 X 8.0	RCP	Single	NPDES outfall found	2/21/2012	Good
Smith Creek	34.25536	-77.87357	9.0 X 11.0	RCP	Double	NPDES Industrial outfall found	2/21/2012	Good
Smith Creek	34.25739	-77.94108	Not Found	UNKNOWN	Single	NPDES outfall submerged	2/28/2012	Unknown
Smith Creek	34.25711	-77.90656	7.0 X 8.0	RCP	Single	NPDES outfall found	2/21/2012	Good
Smith Creek	34.25756	-77.91249	6.0 X 7.0	RCP	Single	NPDES Industrial outfall found	2/21/2012	Good
Smith Creek	34.25718	-77.90675	72	RCP	Triple	NPDES outfall found	2/21/2012	Good
Smith Creek	34.25403	-77.89263	66	RCP	Single	NPDES outfall found	2/21/2012	Good
Smith Creek	34.25297	-77.93964	48	RCP	Single	NPDES outfall found	2/28/2012	Good
Smith Creek	34.25437	-77.90027	48	RCP	Single	NPDES outfall found	2/21/2012	Good
Smith Creek	34.25718	-77.88761	42	RCP	Single	NPDES outfall found	2/21/2012	Fair
Smith Creek	34.25761	-77.91556	42	RCP	Single	NPDES Industrial outfall found	2/21/2012	Good
Whiskey Creek	34.16376	-77.86289	72	CMP	Single	NPDES outfall found	3/27/2001	Good

Whiskey Creek	34.16654	-77.86775	42	RCP	Single	NPDES outfall found	7/18/2011	Good
Whiskey Creek	34.16362	-77.86228	36	RCP	Single	NPDES outfall found	3/27/2001	Good
Whiskey Creek	34.16670	-77.86858	36	RCP	Single	NPDES outfall found	7/18/2011	Good
Whiskey Creek	34.16671	-77.86860	36	RCP	Single	NPDES outfall found	7/18/2011	Good
Whiskey Creek	34.16779	-77.87648	5.5 X 7.0	CMP	Single	NPDES outfall found	7/18/2011	Good

APPENDIX K: DEFINITIONS

Act
See Clean Water Act.

Best Management Practice (BMP)
Measures or practices used to reduce the amount of pollution entering surface waters. BMPs can be structural or non-structural and may take the form of a process, activity, physical structure or planning (see non-structural BMP).

Built-upon Area
That portion of a development project that is covered by impervious or partially impervious surface including, but not limited to, buildings; pavement and gravel areas such as roads, parking lots, and paths; and recreation facilities such as tennis courts. "Built-upon area" does not include a wooden slatted deck, the water area of a swimming pool, or pervious or partially pervious paving material to the extent that the paving material absorbs water or allows water to infiltrate through the paving material.

Clean Water Act
The Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), as amended, 33 USC 1251, et. seq.

Common Plan of Development
A construction or land disturbing activity is part of a larger common plan of development if it is completed in one or more of the following ways:

- In separate stages
- In separate phases
- In combination with other construction activities

It is identified by the documentation (including but not limited to a sign, public notice or hearing, sales pitch, advertisement, loan application, drawing, plats, blueprints, marketing plans, contracts, permit application, zoning request, or computer design) or physical demarcation (including but not limited to boundary signs, lot stakes, or surveyor markings) indicating that construction activities may occur on a specific plot. It can include one operator or many operators.

Department
Department means the North Carolina Department of Environment and Natural Resources

Division (DWQ)
The Division of Water Quality, Department of Environment and Natural Resources.

Director
The Director of the Division of Water Quality, the permit issuing authority.

Dry Weather Flow
Any flow in the MS4 that occurs after a 72 hour period without rain.

EMC
The North Carolina Environmental Management Commission.

Illicit Discharge
Any discharge to a MS4 that is not composed entirely of stormwater except .discharges pursuant to an NPDES permit (other than the NPDES MS4 permit), allowable non-stormwater discharges, and discharges resulting from fire-fighting activities.

Industrial Activity
For the purposes of this permit, industrial activities shall mean all industrial activities as defined in 40 CFR 122.26.

Large or Medium Municipal Separate Storm Sewer System
All municipal separate storm sewers that are either:

(a) Located in an incorporated place with a population of 100,000 or more as determined by the Decennial Census by the Bureau of Census; or
(b) Located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties; or
(c) Owned or operated by a municipality other than those described in paragraph (a) or (b) and that are designated by the Director as part of the large or medium separate storm sewer system.

Major municipal separate storm sewer outfall (or "major outfall")
Major municipal separate storm sewer outfall (or "major outfall") means a municipal separate storm sewer outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (discharge from a single conveyance other than circular pipe which is associated with a drainage area of more than 50 acres); or for municipal separate storm sewers that receive storm water from lands zoned for industrial activity (based on comprehensive zoning plans or the equivalent), an outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (discharge from other than a circular pipe associated with a drainage area of 2 acres or more).

Municipal Separate Storm Sewer System (MS4)
Pursuant to 40 CFR 122.26(b)(8) means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

(a) Owned or operated by the United States, a State, city, town, county, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under Section 208 of the Clean Water Act (CWA) that discharges to waters of the United States or waters of the State.

(b) Designed or used for collecting or conveying stormwater;
(c) Which is not a combined sewer; and
(d) Which is not part of a Publicly Owned Treatment Works (POTW) as defined in 40 CFR 122.2

Non-stormwater Discharge Categories
The following are categories of non-stormwater discharges that the permittee shall address if it identifies them as significant contributors of pollutants to the storm sewer system: water line flushing, landscape irrigation, diverted stream flows, rising groundwater, uncontaminated groundwater infiltration, [as defined in 40 CFR 35.2005(20)], uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water (discharges or flows from fire fighting activities are excluded from the definition of illicit discharge and only need to be addressed where they are identified as significant sources of pollutants to waters of the United States).

Non-structural BMP
Non-structural BMPs are preventive actions that involve management and source controls such as: (I) Policies and ordinances that provide requirements and standards to direct growth to identified areas, protect sensitive areas such as wetlands and riparian areas, maintain and/or increase open space, provide buffers along sensitive water bodies, minimize impervious surfaces, and/or minimize disturbance of soils and vegetation; (2) policies or ordinances that encourage infill development in higher density urban areas, and areas with existing storm sewer infrastructure; (3) education programs for developers and the public about minimizing water quality impacts; (4) other measures such as minimizing the percentage of impervious area after development, use of measures to minimize directly connected impervious areas, and source control measures often thought of as good housekeeping, preventive maintenance and spill prevention.

Outfall
Outfall means a point source as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States.

Permittee
The owner or operator issued this permit.

Point Source Discharge of Stormwater
Any discernible, confined and discrete conveyance including, but not specifically limited to, any pipe, ditch, channel, tunnel, conduit, well, or discrete fissure from which stormwater is or may be discharged to waters of the state.

Redevelopment
Means any rebuilding activity unless that rebuilding activity;
(a) Results in no net increase in built-upon area, and
(b) Provides equal or greater stormwater control than the previous development.

Representative Storm Event
A storm event that measures greater than 0.1 inches of rainfall and that is preceded by at least 72 hours in which no storm event measuring greater than 0.1 inches has occurred. A single storm event may contain up to 10 consecutive hours of no precipitation. For example, if it rains for 2 hours without producing any collectable discharge, and then stops, a sample may be collected if a rain producing a discharge begins again within the next 10 hours.

Storm Sewer System
Is a conveyance or system of conveyances which are designed or used to collect or convey stormwater runoff that is not part of a combined sewer system or treatment works. This can include, but is not limited to, streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains that convey stormwater runoff.

Stormwater Associated with Industrial Activity
The discharge from any point source which is used for collecting and conveying stormwater and which is directly related to manufacturing, processing or raw material storage areas at an industrial site. Facilities considered to be engaged in "industrial activities" include those activities defined in 40 CFR 122.26(b)(l4). The term does not include discharges from facilities or activities excluded from the NPDES program

Stormwater Management Program (SWMP)
The term Stormwater Management Program (SWMP) refers to the stormwater management program that is required by the Phase I and Phase II regulations to be developed by MS4 permittees.

Stormwater Plan
The Stormwater Plan is the written plan that is used to describe the various control measures and activities the permittee will undertake to implement the stormwater management program. The Stormwater Plan is a consolidation of all of the permittee's relevant ordinances or other regulatory requirements, the description of all programs and procedures (including standard forms to be used for reports and inspections) that will be implemented and enforced to comply with the permit and to document the selection, design, and installation of all stormwater control measures.

Stormwater Runoff
The flow of water which results from precipitation and which occurs immediately following rainfall or as a result of snowmelt.

Total Maximum Daily Load (TMDL)
A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL is a detailed water quality assessment that provides the scientific foundation for an implementation plan. The implementation plan outlines the steps necessary to reduce pollutant loads in a certain body of water to restore and maintain water quality standards in all seasons. The Clean Water Act, Section 303, establishes the water quality standards and TMDL programs.

Watershed Restoration Plan
For purposes of this permit, a Watershed Restoration Plan is any plan developed in consultation with the Division for voluntary implementation with the intent of enhancing water quality and/or implementing stormwater BMPs within 303(d) listed waters.