CITY OF WILMINGTON
NORTH CAROLINA

Public Services
Engineering
212 Operations Center Drive
Wilmington, NC 28412
910 341-7807
910 341-5881 fax
wilmingtonnc.gov
Dial 711 TTY/Voice

COMPREHENSIVE STORMWATER MANAGEMENT PERMIT

HIGH DENSITY DEVELOPMENT

SECTION 1 – APPROVAL

Having reviewed the application and all supporting materials, the City of Wilmington has determined that the application is complete and the proposed development meets the requirements of the City of Wilmington's Comprehensive Stormwater Ordinance.

PERMIT HOLDER: **CCC Flats on Front, LLC**
PROJECT: **The Flats on Front**
ADDRESS: **1055 North Front Street**
PERMIT #: **2019023**
DATE: **April 23, 2019**

Therefore, the above referenced site is hereby approved and subject to all conditions set forth in Section 2 of this approval and all applicable provisions of the City of Wilmington Comprehensive Stormwater Management Ordinance.

This permit shall be effective from the date of issuance until April 23, 2029 and shall be subject to the following specified conditions and limitations:

Section 2 - CONDITIONS

1. This approval is valid only for the stormwater management system as proposed on the approved stormwater management plans dated April 23, 2019.

2. The project will be limited to the amount and type of built-upon area indicated in Section IV of the Stormwater Management Application Form submitted as part of the approved stormwater permit application package, and per the approved plans.

3. This permit shall become void unless the facilities are constructed in accordance with the approved stormwater management plans, specifications and supporting documentation, including information provided in the application and supplements.

4. The runoff from all built-upon area within any permitted drainage area must be directed into the permitted stormwater control system for that drainage area.

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5. The permittee shall submit a revised stormwater management application packet to the City of Wilmington and shall have received approval prior to construction, for any modification to the approved plans, including, but not limited to, those listed below:
    a. Any revision to any item shown on the approved plans, including the stormwater management measures, built-upon area, details, etc.
    b. Redesign or addition to the approved amount of built-upon area or to the drainage area.
    c. Further subdivision, acquisition, lease or sale of any part of the project area.
    d. Filling in, altering, or piping of any vegetative conveyance shown on the approved plan.
    e. Construction of any permitted future areas shown on the approved plans.

6. A copy of the approved plans and specifications shall be maintained on file by the Permittee.

7. During construction, erosion shall be kept to a minimum and any eroded areas of the system will be repaired immediately.

8. If the stormwater system was used as an Erosion Control device, it must be restored to design condition prior to operation as a stormwater treatment device, and prior to issuance of any certificate of occupancy for the project.

9. All areas must be maintained in a permanently stabilized condition. If vegetated, permanent seeding requirements must follow the guidelines established in the North Carolina Erosion and Sediment Control Planning and Design Manual unless an alternative is specified and approved by the City of Wilmington.

10. All applicable operation & maintenance agreements and easements pertaining to each stormwater treatment system shall be referenced on the final plat and recorded with the Register of Deeds upon final plat approval. If no plat is recorded for the site the operation and maintenance agreements and easements shall be recorded with the Register of Deeds so as to appear in the chain of title of all subsequent purchasers under generally accepted searching standards.

11. The stormwater management system shall be constructed in its entirety, vegetated and operational for its intended use prior to the construction of any built-upon surface unless prior approval is obtained. City Staff must be notified of any deviation prior to construction of the built-upon surface. Any deviation request shall include justification and must propose an alternative timeline or construction sequence. Notification shall not constitute approval. Any alternative timeline approved by City staff shall become an enforceable component of this permit.

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12. The permittee shall at all times provide the operation and maintenance necessary to assure the permitted stormwater system functions at optimum efficiency. The approved Operation and Maintenance Agreement must be followed in its entirety and maintenance must occur at the scheduled intervals including, but not limited to:
    a. Scheduled inspections (interval noted on the agreement).
    b. Sediment removal.
    c. Mowing and revegetation of slopes and the vegetated areas.
    d. Maintenance of landscape plants, including those within the landscape buffer and on the vegetated shelf.
    e. Immediate repair of eroded areas, especially slopes.
    f. Debris removal and unclogging of outlet structure, orifice device, flow spreader, catch basins and/or piping.
    g. Access to the outlet structure must be available at all times.

13. Records of inspection, maintenance and repair for the permitted stormwater system must be kept by the permittee for at least 5 years from the date of record and made available upon request to authorized personnel of the City of Wilmington. The records will indicate the date, activity, name of person performing the work and what actions were taken.

14. Upon completion of construction, before a Certificate of Occupancy shall be granted, and prior to operation or intended use of this permitted facility, the applicant shall submit to the City of Wilmington as-built plans for all stormwater management facilities. The plans shall show the final design specifications and the field location, type, depth, invert and planted vegetation of all measures, controls and devices, as-installed. A certification shall be submitted, along with all supporting documentation that specifies, under seal that the as-built stormwater measures, controls and devices are in compliance with the approved stormwater management plans. A final inspection by City of Wilmington personnel will be required prior to issuance of a certificate of occupancy or operation of the permitted facility.

15. This permit is not transferable except after application and approval by the City of Wilmington. In the event of a change of ownership, name change or change of address the permittee must submit a completed Name/Ownership Change form to the City of Wilmington at least 30 days prior to the change. It shall be signed by all applicable parties, and be accompanied by all required supporting documentation. Submittal of a complete application shall not be construed as an approved application. The application will be reviewed on its own merits by the City of Wilmington and may or may not be approved. The project must be in compliance with the terms of this permit in order for the transfer request to be considered. The permittee is responsible for compliance with all permit conditions until such time as the City of Wilmington approves the transfer request. Neither the sale of the project nor the conveyance of common area to a third party should be considered as an approved transfer of the permit.

16. Failure to abide by the conditions and limitations contained in this permit may subject the Permittee to enforcement action by the City of Wilmington, in accordance with Sections 18-52 and 18-53 and any other applicable section of the Land Development Code.

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17. The City of Wilmington may notify the permittee when the permitted site does not meet one or more of the minimum requirements of the permit. Within the time frame specified in the notice, the permittee shall submit a written time schedule to the City of Wilmington for modifying the site to meet minimum requirements. The permittee shall provide copies of revised plans and certification in writing to the City of Wilmington that the changes have been made.

18. The issuance of this permit does not preclude the Permittee from complying with any and all statutes, rules, regulations, or ordinances, which may be imposed by other government agencies (local, state, and federal) having jurisdiction.

19. In the event that the facilities fail to perform satisfactorily, including the creation of nuisance conditions, the Permittee shall take immediate corrective action, including those as may be required by the City of Wilmington, such as the construction of additional or replacement stormwater management systems.

20. The permittee grants City of Wilmington Staff permission to enter the property during normal business hours for the purpose of inspecting all components of the permitted stormwater management facility.

21. The permit issued shall continue in force and effect until revoked or terminated by the City of Wilmington. The permit may be modified, revoked and reissued or terminated for cause. The filing of a request for a permit modification, revocation and re-issuance or termination does not stay any permit condition.

22. The approved stormwater management plans and all documentation submitted as part of the approved stormwater management permit application package for this project are incorporated by reference and are enforceable parts of the permit.

23. The permittee shall submit a renewal request with all required forms and documentation at least 180 days prior to the expiration date of this permit.

24. If any one or more of the conditions of this permit is found to be unenforceable or otherwise invalidated, all remaining conditions shall remain in full effect.

Stormwater Management Permit issued this the 23rd day of April, 2019

S. Lee

for Sterling Cheatham, City Manager
City of Wilmington

SWP2019023

CITY OF WILMINGTON
NORTH CAROLINA

* Unless Otherwise Noted

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STORMWATER MANAGEMENT PERMIT APPLICATION FORM
(Form SWP 2.2)

I. GENERAL INFORMATION

1. Project Name (subdivision, facility, or establishment name - should be consistent with project name on plans, specifications, letters, operation and maintenance agreements, etc.):

   The Flats on Front

2. Location of Project (street address):

   1055 North Front St

   City: Wilmington County: New Hanover Zip: 28401

3. Directions to project (from nearest major intersection):

   From US-421 (heading south) turn left on US-74 E/Isabel Holmes Bridge. Merge onto N 3rd St. and the project is locate on the right.

II. PERMIT INFORMATION

1. Specify the type of project (check one): Low Density ✓ High Density
   Drains to an Offsite Stormwater System Drainage Plan Other
   If the project drains to an Offsite System, list the Stormwater Permit Number(s):

   City of Wilmington: _____ State – NCDENR/DWQ: _____

2. Is the project currently covered (whole or in part) by an existing City or State (NCDENR/DWQ) Stormwater Permit? Yes ✓ No
   If yes, list all applicable Stormwater Permit Numbers:

   City of Wilmington: _____ State – NCDENR/DWQ: _____

3. Additional Project Permit Requirements (check all applicable):
   CAMA Major ✓ Sedimentation/Erosion Control
   NPDES Industrial Stormwater 404/401 Permit: Proposed Impacts: _____
   If any of these permits have already been acquired please provide the Project Name, Project/Permit Number, issue date and the type of each permit:

   _____

CITY OF WILMINGTON ENGINEERING

III. CONTACT INFORMATION

1. Print Applicant / Signing Official's name and title (specifically the developer, property owner, lessee, designated government official, individual, etc. who owns the project):

   Applicant / Organization: CCC Flats on Front, LLC

   Signing Official & Title: William M. McClatchey, Jr., Manager

   a. Contact information for Applicant / Signing Official:

   Street Address: 3605 Glenwood Ave, Suite 445

   City: Raleigh State: NC Zip: 27612

   Phone: (404)735-2134 Fax: _____ Email: pjones@dpjresidential.com

   Mailing Address (if different than physical address): _____

   City: _____ State: _____ Zip: _____

   b. Please check the appropriate box. The applicant listed above is:

   ✓ The property owner (Skip to item 3)
   Lessee* (Attach a copy of the lease agreement and complete items 2 and 2a below)
   Purchaser* (Attach a copy of the pending sales agreement and complete items 2 and 2a below)
   Developer* (Complete items 2 and 2a below.)

2. Print Property Owner's name and title below, if you are the lessee, purchaser, or developer. (This is the person who owns the property that the project is on.)

   Property Owner / Organization: _____

   Signing Official & Title: _____

   a. Contact information for Property Owner:

   Street Address: _____

   City: _____ State: _____ Zip: _____

   Phone: _____ Fax: _____ Email: _____

   Mailing Address (if different than physical address): _____

   City: _____ State: _____ Zip: _____

3. (Optional) Print the name and title of another contact such as the project's construction supervisor or another person who can answer questions about the project:

   Other Contact Person / Organization: _____

   Signing Official & Title: _____

a. Contact information for person listed in item 3 above:

Street Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Mailing Address (if different than physical address): _____

City: _____ State: _____ Zip: _____

IV. PROJECT INFORMATION

1. In the space provided below, briefly summarize how the stormwater runoff will be treated.
   Stormwater will be treated using one (1) infiltration trench, one (1) biofiltration system, and two (2) underground filtration systems.

2. Total Property Area: 226,139 square feet
3. Total Coastal Wetlands Area: 0 square feet
4. Total Surface Water Area: 0 square feet
5. Total Property Area (2) – Total Coastal Wetlands Area (3) – Total Surface Water Area (4) = Total Project Area: 226,139 square feet.
6. Existing Impervious Surface within Property Area: 3,340 square feet
7. Existing Impervious Surface to be Removed/Demolished: 3,340 square feet
8. Existing Impervious Surface to Remain: 0 square feet
9. Total Onsite (within property boundary) Newly Constructed Impervious Surface (*in square feet*):

Buildings/Lots	74,716
Impervious Pavement	86,461
Pervious Pavement (adj. total, with % credit applied)	0
Impervious Sidewalks	15,039
Pervious Sidewalks (adj. total, with % credit applied)	0
Other (describe)	0
Future Development	0
Total Onsite Newly Constructed Impervious Surface	176,216

10. Total Onsite Impervious Surface
    (Existing Impervious Surface to remain + Onsite Newly Constructed Impervious Surface) = 176,216 square feet
11. Project percent of impervious area: (Total Onsite Impervious Surface / Total Project Area) x100 = 77.9 %

12. Total Offsite Newly Constructed Impervious Area (improvements made outside of property boundary, *in square feet*):

Impervious Pavement	
Pervious Pavement (adj. total, with % credit applied)	
Impervious Sidewalks (Multi-Use Trail)	3,031
Pervious Sidewalks (adj. total, with % credit applied)	
Other (describe)	
Total Offsite Newly Constructed Impervious Surface	3,031

13. Total Newly Constructed Impervious Surface
(Total Onsite + Offsite Newly Constructed Impervious Surface) = 179,247 square feet

14. Complete the following information for each Stormwater BMP drainage area. If there are more than three drainage areas in the project, attach an additional sheet with the information for each area provided in the same format as below. Low Density projects may omit this section and skip to Section V.

Basin Information	BMP #1	BMP #2	BMP #3
Receiving Stream Name	Cape Fear	Cape Fear	Cape Fear
Receiving Stream Index Number	18-(71)	18-(71)	18-(71)
Stream Classification	SC	SC	SC
Total Drainage Area (sf)	36,124	138,678	26,099
On-Site Drainage Area (sf)	36,124	138,678	26,099
Off-Site Drainage Area (sf)	0	0	0
Total Impervious Area (sf)	24,326	115,082	21,439
Buildings/Lots (sf)	12,403	32,719	16,453
Impervious Pavement (sf)	9,960	72,215	3,882
Pervious Pavement (sf)	0	0	0
Impervious Sidewalks (sf)	1,963	10,148	1,104
Pervious Sidewalks (sf)	0	0	0
Other (sf)	0	0	0
Future Development (sf)	0	0	0
Existing Impervious to remain (sf)	0	0	0
Offsite (sf)	0	0	0
Percent Impervious Area (%)	67.3	83.0	82.1

15. How was the off-site impervious area listed above determined? Provide documentation:

_____

BMP Drainage area information (continued)

Basin Information	BMP # 4	BMP # 5	Offsite BMP #
Receiving Stream Name	Cape Fear	Cape Fear	Cape Fear
Receiving Stream Index Number	18-(71)	18-(71)	18-(71)
Stream Classification	SC	SC	SC
Total Drainage Area (sf)	5,870	7,271	12,100
On-Site Drainage Area (sf)	5,870	7,271	12,100
Off-Site Drainage Area (sf)	0	0	0
Total Impervious Area (sf)	5,870	7,271	2,228
Buildings/Lots (sf)	5,870	7,271	0
Impervious Pavement (sf)	0	0	404
Pervious Pavement, % credit (sf)	0	0	0
Impervious Sidewalks (sf)	0	0	1,824
Pervious Sidewalks, % credit (sf)	0	0	0
Other (sf)	0	0	0
Future Development (sf)	0	0	0
Existing Impervious to remain (sf)	0	0	0
Offsite (sf)	0	0	0
Percent Impervious Area (%)	100	100	18.4
Basin Information	BMP #	BMP #	BMP #
Receiving Stream Name			
Receiving Stream Index Number			
Stream Classification			
Total Drainage Area (sf)			
On-Site Drainage Area (sf)			
Off-Site Drainage Area (sf)			
Total Impervious Area (sf)			
Buildings/Lots (sf)			
Impervious Pavement (sf)			
Pervious Pavement, % credit (sf)			
Impervious Sidewalks (sf)			
Pervious Sidewalks, % credit (sf)			
Other (sf)			
Future Development (sf)			
Existing Impervious to remain (sf)			
Offsite (sf)			
Percent Impervious Area (%)			

V. SUBMITTAL REQUIREMENTS

1. Supplemental and Operation & Maintenance Forms - One applicable City of Wilmington Stormwater BMP supplement form and checklist must be submitted for **each** BMP specified for this project. One applicable proposed operation and maintenance (O&M) form must be submitted for **each type** of stormwater BMP. Once approved, the operation and maintenance forms must be referenced on the final plat and recorded with the register of deeds office.

2. Deed Restrictions and Restrictive Covenants - For all subdivisions, outparcels, and future development, the appropriate property restrictions and protective covenants are required to be recorded prior to the sale of any lot. Due to variability in lot sizes or the proposed BUA allocations, a table listing each lot number, lot size, and the allowable built-upon area must be provided as an attachment to the completed and notarized deed restriction form. The appropriate deed restrictions and protective covenants forms can be downloaded at the link listed in section V (3). Download the latest versions for each submittal.

   In instances where the applicant is different than the property owner, it is the responsibility of the property owner to sign the deed restrictions and protective covenants form while the applicant is responsible for ensuring that the deed restrictions are recorded.

   By the notarized signature(s) below, the permit holder(s) certify that the recorded property restrictions and protective covenants for this project, if required, shall include all the items required in the permit and listed on the forms available on the website, that the covenants will be binding on all parties and persons claiming under them, that they will run with the land, that the required covenants cannot be changed or deleted without concurrence from the City of Wilmington, and that they will be recorded prior to the sale of any lot.

3. Only complete application packages will be accepted and reviewed by the City. A complete package includes all of the items listed on the City Engineering Plan Review Checklist, including the fee. Copies of the Engineering Plan Review Checklist, all Forms, Deed Restrictions as well as detailed instructions on how to complete this application form may be downloaded from:

   http://www.wilmingtonnc.gov/PublicServices/Engineering/PlanReview/StormwaterPermits.aspx

   The complete application package should be submitted to the following address:

   City of Wilmington – Engineering
   Plan Review Section
   212 Operations Center Dr
   Wilmington, NC 28412

VI. CONSULTANT INFORMATION AND AUTHORIZATION

1. Applicant: Complete this section if you wish to designate authority to another individual and/or firm (such as a consulting engineer and /or firm) so that they may provide information on your behalf for this project (such as addressing requests for additional information).

   Consulting Engineer: Kathryn Espinoza, PE

   Consulting Firm: McKim & Creed, Inc.

   a. Contact information for consultant listed above:

   Mailing Address: 243 N. Front Street

   City: Wilmington State: NC Zip: 28401

   Phone: 910-343-1048 Fax: 910-251-8282 Email: kespinoza@mckimcreed.com

VII. PROPERTY OWNER AUTHORIZATION (If Section III(2) has been filled out, complete this section)

I, (*print or type name of person listed in Contact Information, item 2*)_____, certify that I own the property identified in this permit application, and thus give permission to (*print or type name of person listed in Contact Information, item 1*)_____ with (*print or type name of organization listed in Contact Information, item 1*) _____ to develop the project as currently proposed. A copy of the lease agreement or pending property sales contract has been provided with the submittal, which indicates the party responsible for the operation and maintenance of the stormwater system.

As the legal property owner I acknowledge, understand, and agree by my signature below, that if my designated agent (*entity listed in Contact Information, item 1*) dissolves their company and/or cancels or defaults on their lease agreement, or pending sale, responsibility for compliance with the City of Wilmington Stormwater Permit reverts back to me, the property owner. As the property owner, it is my responsibility to notify the City of Wilmington immediately and submit a completed Name/Ownership Change Form within 30 days; otherwise I will be operating a stormwater treatment facility without a valid permit. I understand that the operation of a stormwater treatment facility without a valid permit is a violation of the City of Wilmington Municipal Code of Ordinances and may result in appropriate enforcement including the assessment of civil penalties.

SEAL

Signature: _____

_____Date:_____

I, _____, a Notary Public for the State of _____, County of _____, do hereby certify that _____ personally appeared before me this day of _____, _____,

and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal,

_____

My commission expires: _____

VIII. APPLICANT'S CERTIFICATION

I, *(print or type name of person listed in Contact Information, item 1)* , William M. McClatchey Jr, Manager certify that the information included on this permit application form is, to the best of my knowledge, correct and that the project will be constructed in conformance with the approved plans, that the required deed restrictions and protective covenants will be recorded, and that the proposed project complies with the requirements of the applicable stormwater rules under.

SEAL

TERESA L. BOWLING NOTARY PUBLIC WAKE COUNTY, NC

Signature: _____

Date: December 18, 2018

I, Teresa L Bowling, a Notary Public for the State of North Cardina, County of Wake, do hereby certify that William M. McClatchey, Jr. personally appeared before me this day of December 18, 2018, and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal.

Teresa Bowling

My commission expires: August 25, 2023

Permit Number: 2019023
(to be provided by DWQ)
City

NCDENR

DIVISION OF WATER QUALITY DWQ

STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM

CONTECH ENGINEERED SOLUTIONS **STORMFILTER SUPPLEMENT**

This form must be filled out on line, printed and submitted with all of the required information.
Make sure to also fill out and submit the Required Items Checklist (Section III) and the O&M Agreement (Section IV)

I. PROJECT INFORMATION

Project name	The Flats on Front SCM-1
Contact name	Kathryn Espinoza, PE
Phone number	910-343-1048
Date	April 9, 2019
Drainage area number	1

II. DESIGN INFORMATION

Site Characteristics			
Drainage area (A_D)	36,124.00	ft^2	OK
Impervious area	24,325.72	ft^2	
Impervious area	0.56	acres	
% Impervious (I_A)	67.3%	%	
Design rainfall depth (R_D)	1.50	in	
Peak Flow Calculations			
1-yr, 24-hr runoff depth		in	
1-yr, 24-hr intensity		in/hr	
Pre-development 1-yr, 24-hr runoff		ft^3/sec	
Post-development 1-yr, 24-hr runoff		ft^3/sec	
Pre/Post 1-yr, 24-hr peak control		ft^3/sec	
Storage Volume			
Design volume (WQV)	2,962.42	ft^3	
Adjusted water quality volume (WQV_{Adj})	2,221.81	ft^3	OK
Volume contained before filter	2,236.00	ft^3	
Runoff Coefficient (R_V)	0.66	(unitless)	
Pretreatment credit (estimated or calculated), %pre	30.00%		
Mass loading calculations			
Mean Annual Rainfall, P	57.00	in	
Agency required % removal	85.00%		
Percent Runoff Capture (% capture)	90.00%		
Mean Annual Runoff, V_t	101314.7127	ft^3	=P*Ad*Rv*(43560/12)*%capture
Event Mean Concentration of Pollutant, EMC	70.00	mg/l	(Suggestion: Use 60 for residential, 70 for Commercial, 100 for Industrial)
Annual Mass Load, M_{total}	442.47	lbs	=EMC*Vt*(28.3)*(0.000001)*(2.2046)
Filter System			
Filtration brand	StormFilter		
Cartridge height	27.00	in	
Specific Flow Rate, q	1.00	gpm/ft^2	
SHWT elevation	17.10	ft amsl	
Bottom of the StormFilter vault elevation	9.00	ft amsl	
Clearance (d_{SHWT})	-8.10		
Time to drain the StormFilter (t)	48.00	hours	OK. Submit drainage calculations.
Time to drain the StormFilter (t)	2.00	days	
Cartridge Quantity Calculation			
Mass removed by pretreatment system, M_{pre}	132.74	lbs	=Mtotal * %removal
Mass load to filters after pretreatment, M_{pass1}	309.73	lbs	=Mtotal - Mpre
Estimate the required filter efficiency, E_{filter}	0.79		=1+(%removal - 1)/(1 - %pre)
Mass to be captured by filters, M_{filter}	243.36	lbs	=Mpass1 * Efilter
Maximum Cartridge Flow rate, Q_{cart}	7.50	gpm	=q * (7.5 ft2/cartridge)
Mass load per cartridge, M_{cart} (lbs)	54.00	lbs	=lookup mass load per cartridge
Number of Cartridges required, N_{mass}	5.00		=ROUNDUP(Mfilter/Mcart,0)
Maximum Treatment Capacity	0.08		=Nmass*(Qcart/449)

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ENGINEERING

SUMMARY

Permit Number: 2019023
(to be provided by DWQ)
City

Maximum Treatment Flow Rate, cfs	0.08		
Cartridge Flow Rate, gpm	7.50		
Number of Cartridges	5.00		

Additional Information

Does volume in excess of the design volume bypass the filter?	Y	Y or N	OK
Is an off-line flow-splitting device used?	Y	Y or N	OK
If draining to SA waters: Does volume in excess of the design volume flow evenly distributed through a vegetated filter?		Y or N	
What is the length of the vegetated filter?		ft	
Does the design use a level spreader to evenly distribute flow?		Y or N	
Is the BMP located at least 30ft from surface waters (50ft if SA waters)?	Y	Y or N	OK
Are the vegetated side slopes equal to or less than 3:1	Y	Y or N	OK
Is the BMP located in a recorded drainage easement with a recorded access easement to a public Right of Way (ROW)?	Y	Y or N	OK

RECEIVED
APR - 9 2019
ENGINEERING

Permit Number: 2019023
(to be provided by DWQ)
City

NCDENR

DIVISION OF WATER QUALITY DWQ

STORMWATER MANAGEMENT PERMIT APPLICATION FORM
CERTIFICATION APPLICATION FORM

CONTECH ENGINEERED SOLUTIONS

STORMFILTER SUPPLEMENT

This form must be filled out on line, printed and submitted with all of the required information.
Make sure to also fill out and submit the Required Items Checklist (Section III) and the I&M Agreement (Section IV)

I. PROJECT INFORMATION

Project name	The Flats on Front SCM-2
Contact name	Kathryn Espinoza, PE
Phone number	910-343-1048
Date	April 9, 2019
Drainage area number	2

II. DESIGN INFORMATION

Site Characteristics

Drainage area (A_D)	138,672.00	ft^2	OK
Impervious area	115,081.72	ft^2	
Impervious area	2.64	acres	
% Impervious (I_A)	83.0%	%	
Design rainfall depth (R_D)	1.50	in	

Peak Flow Calculations

1-yr, 24-hr runoff depth		in
1-yr, 24-hr intensity		in/hr
Pre-development 1-yr, 24-hr runoff		ft^3/sec
Post-development 1-yr, 24-hr runoff		ft^3/sec
Pre/Post 1-yr, 24-hr peak control		ft^3/sec

Storage Volume

Design volume (WQV)	13,813.39	ft^3	
Adjusted water quality volume (WQV_{Adj})	10,360.05	ft^3	OK
Volume contained before filter	10,365.00	ft^3	
Runoff Coefficient (R_V)	0.80	(unitless)	
Pretreatment credit (estimated or calculated), %pre	30.00%		

Mass loading calculations

Mean Annual Rainfall, P	57.00	in	
Agency required % removal	85.00%		
Percent Runoff Capture (% capture)	90.00%		
Mean Annual Runoff, V_t	472418.0577	ft^3	=P*Ad*Rv*(43560/12)*%capture
Event Mean Concentration of Pollutant, EMC	70.00	mg/l	(Suggestion: Use 60 for residential, 70 for Commercial, 100 for Industrial)
Annual Mass Load, M_{total}	2063.20	lbs	=EMC*Vt*(28.3)*(0.000001)*(2.2046)

Filter System

Filtration brand	StormFilter		
Cartridge height	27.00	in	
Specific Flow Rate, q	1.00	gpm/ft^2	
SHWT elevation	17.90	ft amsl	
Bottom of the StormFilter vault elevation	16.50	ft amsl	
Clearance (d_{SHWT})	-1.40		
Time to drain the StormFilter (t)	48.00	hours	OK. Submit drainage calculations.
Time to drain the StormFilter (t)	2.00	days	

Cartridge Quantity Calculation

Mass removed by pretreatment system, M_{pre}	618.96	lbs	=Mtotal * %removal
Mass load to filters after pretreatment, M_{pass1}	1444.24	lbs	=Mtotal - Mpre
Estimate the required filter efficiency, E_{filter}	0.79		=1+(%removal - 1)/(1 - %pre)
Mass to be captured by filters, M_{filter}	1134.76	lbs	=Mpass1 * Efilter
Maximum Cartridge Flow rate, Q_{cart}	7.50	gpm	=q * (7.5 ft2/cartridge)
Mass load per cartridge, M_{cart} (lbs)	54.00	lbs	=lookup mass load per cartridge
Number of Cartridges required, N_{mass}	22.00		=ROUNDUP(Mfilter/Mcart,0)
Maximum Treatment Capacity	0.37		=Nmass*(Qcart/449)

SUMMARY

Permit Number: 2019023
(to be provided by DWQ)
City

Maximum Treatment Flow Rate, cfs	0.37		
Cartridge Flow Rate, gpm	7.50		
Number of Cartridges	22.00		

Additional Information

Does volume in excess of the design volume bypass the filter?	Y	Y or N	OK
Is an off-line flow-splitting device used?	Y	Y or N	OK
If draining to SA waters: Does volume in excess of the design volume flow evenly distributed through a vegetated filter?		Y or N	
What is the length of the vegetated filter?		ft	
Does the design use a level spreader to evenly distribute flow?		Y or N	
Is the BMP located at least 30ft from surface waters (50ft if SA waters)?	Y	Y or N	OK
Are the vegetated side slopes equal to or less than 3:1	Y	Y or N	OK
Is the BMP located in a recorded drainage easement with a recorded access easement to a public Right of Way (ROW)?	Y	Y or N	OK

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NCDENR

DWR
Division of Water Resources

STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM

INFILTRATION TRENCH SUPPLEMENT

This form must be filled out, printed and submitted.
The Required Items Checklist (Part III) must be printed, filled out and submitted along with all of the required information.

I. PROJECT INFORMATION

Project name	Flats on Front
Contact person	Kathryn Espinoza, PE
Phone number	910-343-1048
Date	4/23/2019
Drainage area number	SCM 3

II. DESIGN INFORMATION

Site Characteristics

Drainage area	26,099.00	ft^2	
Impervious area	21,439.00	ft^2	
Percent impervious	82.1%	%	
Design rainfall depth	1.50	in	

Peak Flow Calculations

1-yr, 24-hr rainfall depth	3.70	in	
1-yr, 24-hr intensity	0.16	in/hr	
Pre-development 1-yr, 24-hr discharge	0.02	ft^3/sec	
Post-development 1-yr, 24-hr discharge	1.43	ft^3/sec	
Pre/Post 1-yr, 24-hr peak flow control	1.41	ft^3/sec	

Storage Volume: Non-SA Waters

Minimum volume required	2,575.00	ft^3	
Volume provided	2,586.00	ft^3	OK for non-SR waters

Storage Volume: SA Waters

1.5" runoff volume		ft^3	
Pre-development 1-yr, 24-hr runoff volume		ft^3	
Post-development 1-yr, 24-hr runoff volume		ft^3	
Minimum volume required		ft^3	
Volume provided		ft^3	

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Soils Report Summary

Soil type	Urban		
Infiltration rate	4.52	in/hr	
SHWT elevation	20.20	fmsl	

Trench Design Parameters

Drawdown time	0.22	days	OK
Perforated pipe diameter	24.00	in	
Perforated pipe length	89.00	ft	
Number of laterals	5		
Stone type (if used)	57		
Stone void ratio	40		
Stone is free of fines?	Y	(Y or N)	OK

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Trench Elevations			
Bottom elevation	22.30	fmsl	OK
Storage/overflow elevation	24.80	fmsl	
Top elevation	25.30	fmsl	
Trench Dimensions			
Length (long dimension)	91.00	ft	
Width (short dimension)	16.00	ft	
Height (depth)	3.00	ft	OK
Additional Information			
Maximum volume to each inlet into the trench?		ac-in	
Length of vegetative filter for overflow		ft	
Number of observation wells	2		OK
Distance to structure	15.00	ft	OK
Distance from surface waters	700.00	ft	OK
Distance from water supply well(s)	–	ft	OK
Separation from impervious soil layer		ft	
Depth of naturally occuring soil above SHWT	2.00	ft	OK
Bottom covered with 4-in of clean sand?	Y	(Y or N)	OK
Proposed drainage easement provided?	Y	(Y or N)	OK
Capures all runoff at ultimate build-out?	Y	(Y or N)	OK
Bypass provided for larger storms?	Y	(Y or N)	OK
Trench wrapped with geotextile fabric?	Y	(Y or N)	OK
Pretreatment device provided	Inlet Sumps		

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Filterra Sizing in North Carolina

Design Engineer:	LRS	Blue Cells = Input
Date	2/26/2019	Black Cells = Calculation

Site Information

Project Name	The Flats on Front SCM-4	
Project State	North Carolina	
Project Location	Wilmington	
Drainage Area, Ad	0.13 ac	
Impervious Area, Ai	0.13 ac	
Impervious Runoff Coefficient, Ci	0.95	
Pervious Area, Ap	0.00	
Pervious Area Runoff Coefficient, Cp	0.50	
% Impervious	100%	
Weighted Runoff Coefficient, Cw	0.95	

Filterra Sizing Calculations

Filter Surface Area / Drainage Area Ratio	0.39%	Per NCDEQ Manual, Chapter D.3, Table 1
Required Filterra Media Surface Area,	22 ft^2	

Filterra System

Filterra Configuration	Internal Bypass Pipe	
Filterra Model ID	FTIBP 6' x 4'	

Filterra Sizing in North Carolina

Design Engineer:	LRS	Blue Cells = Input
Date	2/25/2019	Black Cells = Calculation

Site Information

Project Name	The Flats on Front SCM-5	
Project State	North Carolina	
Project Location	Wilmington	
Drainage Area, Ad	0.17 ac	
Impervious Area, Ai	0.17 ac	
Impervious Runoff Coefficient, Ci	0.95	
Pervious Area, Ap	0.00	
Pervious Area Runoff Coefficient, Cp	0.50	
% Impervious	100%	
Weighted Runoff Coefficient, Cw	0.95	

Filterra Sizing Calculations

Filter Surface Area / Drainage Area Ratio	0.39%	Per NCDEQ Manual, Chapter D.3, Table 1
Required Filterra Media Surface Area,	29 ft^2	

Filterra System

Filterra Configuration	Internal Bypass Pipe	
Filterra Model ID	FTIBP 8' x 4'	

Permit Number: 2019023
(to be provided by DWQ)
City

StormFilter Operation and Maintenance Agreement

I will keep a maintenance record on this BMP. This maintenance record will be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the removal efficiency of the BMP.

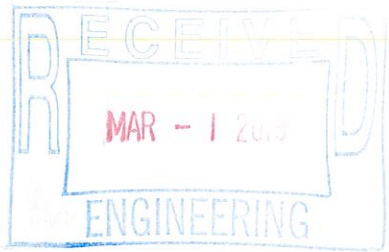
Important maintenance procedures:

- The drainage area will be carefully managed to reduce the sediment load to the StormFilter.
- The sedimentation chamber or forebay will be cleaned out whenever sediment depth exceeds six inches.

The StormFilter system will be inspected **quarterly.** Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How I will remediate the problem:
Entire BMP	Trash/debris is present.	Remove the trash/debris.
Adjacent pavement (if applicable)	Sediment is present on the pavement surface.	Sweep or vacuum the sediment as soon as possible.
Flow diversion structure	The structure is clogged.	Unclog the conveyance and dispose of any sediment offsite.
	The structure is damaged.	Make any necessary repairs or replace if damage is too large for repair.
StormFilter Cartridges	Cartridges not performing as designed – see Contech I&M document to determine if cartridge maintenance is required.	Replace cartridges per manufacturer's recommendations.
Outlet device	Clogging has occurred.	Clean out the outlet device. Dispose of the sediment offsite.
	The outlet device is damaged	Repair or replace the outlet device.
Receiving water	Erosion or other signs of damage have occurred at the outlet.	Contact the NC Division of Water Quality 401 Oversight Unit at 919-733-1786.



Permit Number:_____
(to be provided by DWQ)

All other operation and maintenance activities should be in accordance with Contech's **StormFilter Inspection and Maintenance Procedures** document. Any problems that are found shall be repaired immediately. I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above and have received and understand Contech's **StormFilter Inspection and Maintenance Procedures** document. I agree to notify DWQ of any problems with the system or prior to any changes to the system or responsible party.

Project name:Flats on Front

BMP drainage area number:SCM 1 , 2

Print name:William M. McClatchey Jr

Title:Manager

Address:3605 Glenwood Ave., Suite 445 Raleigh, NC 27612

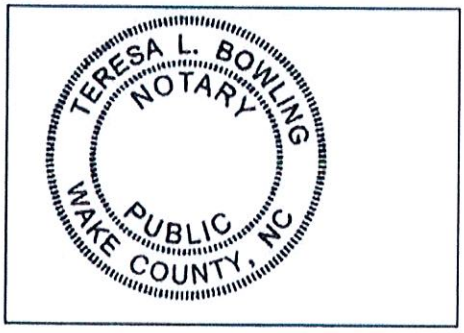
Phone:(404)735-2134

Signature:

Date: December 18, 2018

Note: The legally responsible party should not be a homeowners association unless more than 50% of the lots have been sold and a resident of the subdivision has been named the president.

I, Teresa L Bowling, a Notary Public for the State of North Carolina County of Wake, do hereby certify that William M. McClatchey, Jr. personally appeared before me this 18th day of December, 2018, and acknowledge the due execution of the forgoing sand filter maintenance requirements. Witness my hand and official seal,



Teresa L Bowling, Notary Public

SEAL

My commission expires August 25, 2023

Permit Number: 2019023
(to be provided by City of Wilmington)
BMP Drainage Basin #: 3

Infiltration Trench Operation and Maintenance Agreement

I will keep a maintenance record on this BMP. This maintenance record will be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the removal efficiency of the BMP.

Important maintenance procedures:

- The drainage area of the infiltration trench will be carefully managed to reduce the sediment load to the sand filter.
- The water level in the monitoring wells will be recorded once a month and after every storm event greater than 1.5 inches if in a Coastal County.

The infiltration trench will be inspected **once a quarter and within 24 hours after every storm event greater than 1.5 inches.** Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How I will remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The grass filter strip or other pretreatment area	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.
	Sediment has accumulated to a depth of greater than six inches.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
The flow diversion structure (if applicable)	The structure is clogged.	Unclog the conveyance and dispose of any sediment off-site.
	The structure is damaged.	Make any necessary repairs or replace if damage is too large for repair.

BMP element:	Potential problem:	How I will remediate the problem:
The trench	Water is ponding on the surface for more than 24 hours after a storm.	Remove the accumulated sediment from the infiltration system and dispose in a location that will not impact a stream or the BMP.
	The depth in the trench is reduced to 75% of the original design depth.	Remove the accumulated sediment from the infiltration system and dispose in a location that will not impact a stream or the BMP.
	Grass or other plants are growing on the surface of the trench.	Remove the plants, preferably by hand. If pesticide is used, wipe it on the plants rather than spraying.
The observation well(s)	The water table is within one foot of the bottom of the system for a period of three consecutive months.	Contact the DWQ Stormwater Unit immediately at 919-733-5083.
	The outflow pipe is clogged.	Provide additional erosion protection such as reinforced turf matting or riprap if needed to prevent future erosion problems.
	The outflow pipe is damaged.	Repair or replace the pipe.
The emergency overflow berm	Erosion or other signs of damage have occurred at the outlet.	The emergency overflow berm will be repaired or replaced if beyond repair.
The receiving water	Erosion or other signs of damage have occurred at the outlet.	Contact the NC Division of Water Quality 401 Oversight Unit at 919-733-1786.

Permit Number: _____
(to be provided by City of Wilmington)

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above. I agree to notify City of Wilmington of any problems with the system or prior to any changes to the system or responsible party.

Project name: Flats on Front

BMP drainage basin number: SCM #3

Print name: William M. McClatchey Jr.

Title: Manager

Address: 3605 Glenwood Ave., Suite 445 Raleigh, NC 27612

Phone: (404)735-2134

Signature: _____

Date: December 18, 2018

Note: The legally responsible party should not be a homeowners association unless more than 50% of the lots have been sold and a resident of the subdivision has been named the president.

I, Teresa L Bowling, a Notary Public for the State of North Carolina, County of Wake, do hereby certify that William M. McClatchey, Jr. personally appeared before me this 18th day of December, 2018, and acknowledge the due execution of the forgoing infiltration trench maintenance requirements. Witness my hand and official seal,

TERESA L. BOWLING NOTARY PUBLIC WAKE COUNTY, NC

SEAL

Teresa L Bowling

Teresa L Bowling, Notary Public

My commission expires August 25, 2023

Permit Number: 2019023
(to be provided by DWQ)
City

Filterra Operation and Maintenance Agreement

I will keep a maintenance record on this BMP. This maintenance record will be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the removal efficiency of the BMP.

Important maintenance procedures:

- The drainage area will be carefully managed to reduce the sediment load to the Filterra System.
- Contech includes a 1-year maintenance plan with each system purchase.
- Owners must promptly notify the (maintenance) supplier of any damage to the plant(s), which constitute(s) an integral part of the bioretention technology.

The Filterra System will be inspected quarterly. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection shall be performed as recommended in the most current version of the Filterra Owner's Manual available from the manufacturer. Corrective action shall be taken immediately to repair deficiencies or problems with the installed Filterra system.

Permit Number:_____
(to be provided by DWQ)

All other operation and maintenance activities should be in accordance with Contech's Filterra Inspection and Maintenance Procedures document. Any problems that are found shall be repaired immediately. I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above and have received and understand Contech's Filterra Inspection and Maintenance Procedures document. I agree to notify DWQ of any problems with the system or prior to any changes to the system or responsible party.

Project Name: The Flats on Front

BMP drainage area number: SCM 4&5

Print name: William M. McClatchey Jr

Title: Manager of Chaucer Creek Capital LLC, Manager of CCC Flats on Front LLC, Owner

Address: 3605 Glenwood Ave. Suite 445, Raleigh, NC 27612

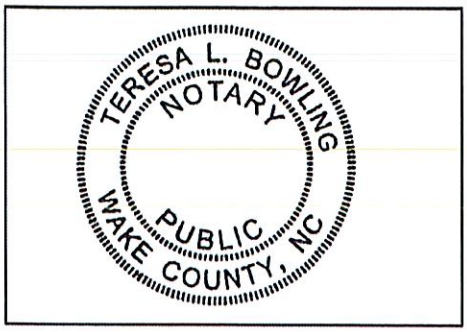
Phone: (404)735-2134

Signature:

Date: March 20, 2019

Note: The legally responsible party should not be a homeowners association unless more than 50% of the lots have been sold and a resident of the subdivision has been named the president.

I, Teresa L. Bowling, a Notary Public for the State of North Carolina, County of Wake, do hereby certify that William M. McClatchey, Jr. personally appeared before me this 20th day of March, 2019, and acknowledge the due execution of the forgoing Filterra maintenance requirements. Witness my hand and official seal,



SEAL

Teresa L. Bowling, Notary Public

My commission expires August 25, 2023