

## 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: **NNP IV - Cape Fear River, LLC**  
PROJECT: **Riverlights Watercraft Ferry Avenue Extension**  
ADDRESS: **4410 River Road**  
PERMIT #: **2019040**  
DATE: **07/19/2019**

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 07/19/2029 and shall be subject to the following specified conditions and limitations:

#### Section 2 - CONDITIONS

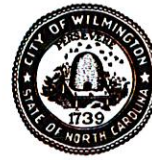
1. This approval is valid only for the stormwater management system as proposed on the approved stormwater management plans dated 07/19/2019.
2. The project will be limited to the amount and type of built-upon area indicated in Section IV of the Stormwater Management Application Form submitted as part 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.
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 stormwater treatment systems as well as access to nearest right-of-way must be located in recorded easements.
11. 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.
12. 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.
13. 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.
14. 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.





**Public Services**

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

15. 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.
16. 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.
17. 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.
18. 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.
19. 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.
20. 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.
21. 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.



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22. 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.
23. 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.
24. 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.
25. 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.

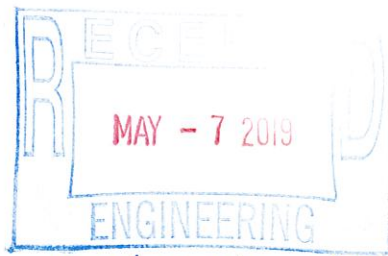
Stormwater Management Permit issued this the 19th day of July, 2019

A handwritten signature in blue ink, appearing to read "S. Cheatham", is written over a horizontal line.

for Sterling Cheatham, City Manager  
City of Wilmington



SWP2019040



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



\*Unless otherwise  
Noted

### 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.):

RiverLights Watercraft Ferry Avenue Extension

2. Location of Project (street address):

4410 River Road

City: Wilmington County: New Hanover Zip: 28412

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

From Carolina Beach Road (US-421), turn right at Independence Boulevard (SR1209) and a left at River Road (SR1100). This site is located between Barnard's Creek and Mott's Creek.

#### 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:

New Hanover County Grading Permit #58-17 Revision #1

**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: NNP IV- Cape Fear River, LLC

Signing Official & Title: Donald J Henry, Vice President - Development

- a. Contact information for Applicant / Signing Official:

Street Address: 109 Pier Master Point, Suite 209

City: Wilmington State: NC Zip: 28412

Phone: (910)473-5409 Fax: \_\_\_\_\_ Email: jhenry@newlandco.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): \_\_\_\_\_

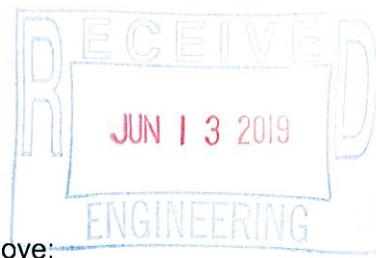
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

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: Andy Kerkhoff

Signing Official & Title: Construction Manager





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

Street Address: 109 Pier Master Point, Suite 209

City: Wilmington State: NC Zip: 28412

Phone: (910)951-0707 Fax: \_\_\_\_\_ Email: akerkoff@newlandco.com

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 basin two (2) rain tank systems and one (1) natural infiltration area.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Total Property Area: 604,924 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: 604,924 square feet.

6. Existing Impervious Surface within Property Area: 0 square feet

7. Existing Impervious Surface to be Removed/Demolished: 0 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	0
Impervious Pavement	76,542
Pervious Pavement (adj. total, with 75 % credit applied)	0
Impervious Sidewalks	19,295
Pervious Sidewalks (adj. total, with % credit applied)	0
Other (describe)	0
Future Development	255,896
<b>Total Onsite Newly Constructed Impervious Surface</b>	<b>351,733</b>

10. Total Onsite Impervious Surface

(Existing Impervious Surface to remain + Onsite Newly Constructed Impervious Surface) = 351,733 square feet

11. Project percent of impervious area: (Total Onsite Impervious Surface / Total Project Area) x100 = 58.1 %

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

Impervious Pavement	2,276
Pervious Pavement (adj. total, with % credit applied)	
Impervious Sidewalks	646
Pervious Sidewalks (adj. total, with % credit applied)	
Other (describe)	
<b>Total Offsite Newly Constructed Impervious Surface</b>	<b>2,922</b>

13. Total Newly Constructed Impervious Surface

(Total Onsite + Offsite Newly Constructed Impervious Surface) = 354,655 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)	151,878	205,487	83,566
On-Site Drainage Area (sf)	151,878	205,487	83,566
Off-Site Drainage Area (sf)	0	0	0
<b>Total Impervious Area (sf)</b>	<b>87,402</b>	<b>132,455</b>	<b>46,563</b>
Buildings/Lots (sf)	0	0	0
Impervious Pavement (sf)	27,977	21,609	12,133
Pervious Pavement (sf)	0	0	0
Impervious Sidewalks (sf)	8,895	4,995	2,433
Pervious Sidewalks (sf)	0	0	0
Other (sf)	0	0	0
Future Development (sf)	50,530	105,851	31,997
Existing Impervious to remain (sf)	0	0	0
Offsite (sf)	0	0	0
Percent Impervious Area (%)	57.5	64.5	55.7

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

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**BMP Drainage area information (continued)**

Basin Information	NATURAL INFIL. BMP # 4	BMP #	BMP #
Receiving Stream Name	CAPE FEAR		
Receiving Stream Index Number	18-(71)		
Stream Classification	SC		
Total Drainage Area (sf)	421,986		
On-Site Drainage Area (sf)	180,640		
Off-Site Drainage Area (sf)	241,346		
<b>Total Impervious Area (sf)</b>	<b>85,313</b>		
Buildings/Lots (sf)	0		
Impervious Pavement (sf)	14,823		
Pervious Pavement, % credit (sf)	0		
Impervious Sidewalks (sf)	2,972		
Pervious Sidewalks, % credit (sf)	0		
Other (sf)	0		
Future Development (sf)	67,518		
Existing Impervious to remain (sf)	0		
Offsite (sf)	0		
Percent Impervious Area (%)	20.2		
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)			
<b>Total Impervious Area (sf)</b>			
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 (%)			

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## 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) , Donald J. Henry 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.



Signature: [Handwritten Signature]  
Date: 4/22/19

I, Tara L. Cardinal, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Donald J. Henry personally appeared before me this day of April 22, 2019, and acknowledge the due execution of the application for a stormwater

permit. Witness my hand and official seal,

[Handwritten Signature: Tara L. Cardinal]  
My commission expires: Sept 19, 2022





STORMWATER MANAGEMENT PERMIT APPLICATION FORM  
 401 CERTIFICATION APPLICATION FORM  
**INFILTRATION BASIN 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	RiverLights - Watercraft Ferry Avenue Extension
Contact Person	Kathryn Espinoza, PE
Phone Number	910-343-1048
Date	4/30/2019
Drainage Area Number	1 (SCM 1)

**II. DESIGN INFORMATION**

**Site Characteristics**

Drainage area	151,878.00	ft <sup>2</sup>
Impervious area	87,402.00	ft <sup>2</sup>
Percent impervious	57.55	%
Design rainfall depth	1.00	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	0.07	ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr discharge	3.41	ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak flow control	3.35	ft <sup>3</sup> /sec

**Storage Volume: Non-SA Waters**

Minimum design volume required	7,188.00	ft <sup>3</sup>	
Design volume provided	17,795.00	ft <sup>3</sup>	OK for non-SA waters

**Storage Volume: SA Waters**

1.5" runoff volume		ft <sup>3</sup>
Pre-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>
Post-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>
Minimum required volume		ft <sup>3</sup>
Volume provided		ft <sup>3</sup>

**Soils Report Summary**

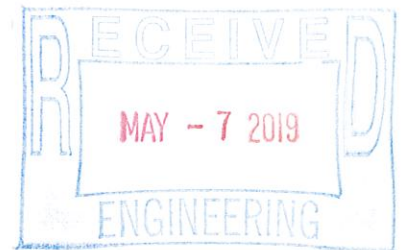
Soil type	Kureb (Kr)
Infiltration rate	20.35 in/hr
SHWT elevation	3.90 fmsl

**Basin Design Parameters**

Drawdown time	0.05	days	OK
Basin side slopes	8.00	:1	OK
Basin bottom elevation	5.90	fmsl	OK
Storage elevation	8.00	fmsl	
Storage Surface Area	13,022.00	ft <sup>2</sup>	
Top elevation	8.25	fmsl	

**Basin Bottom Dimensions**

Basin length	204.00	ft
Basin width	53.00	ft
Bottom Surface Area	4,306.00	ft <sup>2</sup>



City

**Additional Information**

Maximum runoff to each inlet to the basin?	-	ac-in	Maximum of 2 acre-inches allowed
Length of vegetative filter for overflow	-	ft	OK
Distance to structure	100.00	ft	OK
Distance from surface waters	450.00	ft	OK
Distance from water supply well(s)	-	ft	OK
Separation from impervious soil layer	-	ft	OK
Naturally occurring 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
Pretreatment device provided	sump in catch basin		





STORMWATER MANAGEMENT PERMIT APPLICATION FORM  
 401 CERTIFICATION APPLICATION FORM  
**INFILTRATION BASIN 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	RiverLights - Watercraft Ferry Avenue Extension
Contact Person	Kathryn Espinoza, PE
Phone Number	910-343-1048
Date	4/30/2019
Drainage Area Number	2 (SCM 2)

**II. DESIGN INFORMATION**

**Site Characteristics**

Drainage area	205,487.00	ft <sup>2</sup>
Impervious area	132,455.00	ft <sup>2</sup>
Percent impervious	64.46	%
Design rainfall depth	1.00	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	0.07	ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr discharge	6.89	ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak flow control	6.82	ft <sup>3</sup> /sec

**Storage Volume: Non-SA Waters**

Minimum design volume required	10,790.00	ft <sup>3</sup>
Design volume provided	18,947.00	ft <sup>3</sup>

OK for non-SA waters

**Storage Volume: SA Waters**

1.5" runoff volume		ft <sup>3</sup>
Pre-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>
Post-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>
Minimum required volume		ft <sup>3</sup>
Volume provided		ft <sup>3</sup>

**Soils Report Summary**

Soil type	Kureb	
Infiltration rate	20.98	in/hr
SHWT elevation	3.20	fmsl

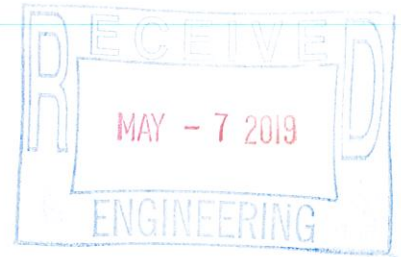
**Basin Design Parameters**

Drawdown time	0.05	days
Basin side slopes	1.00	:1
Basin bottom elevation	5.20	fmsl
Storage elevation	7.10	fmsl
Storage Surface Area	6,792.00	ft <sup>2</sup>
Top elevation	8.02	fmsl

OK  
 Side Slopes are too steep, maximum 3:1  
 OK

**Basin Bottom Dimensions**

Basin length	75.04	ft
Basin width	90.51	ft
Bottom Surface Area	6,792.00	ft <sup>2</sup>



**Additional Information**

Maximum runoff to each inlet to the basin?	-	ac-in	Maximum of 2 acre-inches allowed
Length of vegetative filter for overflow	-	ft	OK
Distance to structure	50.00	ft	OK
Distance from surface waters	50.00	ft	OK
Distance from water supply well(s)	-	ft	OK
Separation from impervious soil layer	-	ft	OK
Naturally occurring 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
Pretreatment device provided	Sump in CB		





STORMWATER MANAGEMENT PERMIT APPLICATION FORM  
 401 CERTIFICATION APPLICATION FORM

**INFILTRATION BASIN 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	RiverLights - Watercraft Ferry Avenue Extension
Contact Person	Kathryn Espinoza, PE
Phone Number	910-343-1048
Date	4/30/2019
Drainage Area Number	3 (SCM 3)

**II. DESIGN INFORMATION**

**Site Characteristics**

Drainage area	83,566.00	ft <sup>2</sup>
Impervious area	46,563.00	ft <sup>2</sup>
Percent impervious	55.72	%
Design rainfall depth	1.00	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	0.07	ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr discharge	2.22	ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak flow control	2.15	ft <sup>3</sup> /sec

**Storage Volume: Non-SA Waters**

Minimum design volume required	3,840.00	ft <sup>3</sup>
Design volume provided	7,368.00	ft <sup>3</sup>

OK for non-SA waters

**Storage Volume: SA Waters**

1.5" runoff volume		ft <sup>3</sup>
Pre-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>
Post-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>
Minimum required volume		ft <sup>3</sup>
Volume provided		ft <sup>3</sup>

**Soils Report Summary**

Soil type	Kureb
Infiltration rate	30.30 in/hr
SHWT elevation	2.81 fmsl

**Basin Design Parameters**

Drawdown time	0.03	days
Basin side slopes	1.00	:1
Basin bottom elevation	5.00	fmsl
Storage elevation	6.75	fmsl
Storage Surface Area	2,707.00	ft <sup>2</sup>
Top elevation	7.82	fmsl

OK  
 Side Slopes are too steep, maximum 3:1  
 OK

**Basin Bottom Dimensions**

Basin length	93.80	ft
Basin width	28.86	ft
Bottom Surface Area	2,707.00	ft <sup>2</sup>



City

**Additional Information**

Maximum runoff to each inlet to the basin?  
 Length of vegetative filter for overflow  
 Distance to structure  
 Distance from surface waters  
 Distance from water supply well(s)  
 Separation from impervious soil layer  
 Naturally occurring soil above shwt  
 Bottom covered with 4-in of clean sand?  
 Proposed drainage easement provided?  
 Capures all runoff at ultimate build-out?  
 Bypass provided for larger storms?  
 Pretreatment device provided

-	ac-in	Maximum of 2 acre-inches allowed
-	ft	OK
50.00	ft	OK
50.00	ft	OK
-	ft	OK
-	ft	OK
2.19	ft	OK
Y	(Y or N)	OK
Y	(Y or N)	OK
Y	(Y or N)	OK
Y	(Y or N)	OK
Sump in CB		





STORMWATER MANAGEMENT PERMIT APPLICATION FORM  
 401 CERTIFICATION APPLICATION FORM

**INFILTRATION BASIN 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	RiverLights - Watercraft Ferry Avenue Extension
Contact Person	Kathryn Espinoza, PE
Phone Number	910-343-1048
Date	4/30/2019
Drainage Area Number	4 (SCM 4)

**II. DESIGN INFORMATION**

**Site Characteristics**

Drainage area	421,986.00	ft <sup>2</sup>
Impervious area	85,313.00	ft <sup>2</sup>
Percent impervious	20.22	%
Design rainfall depth	1.00	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	0.07	ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr discharge	2.98	ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak flow control	2.91	ft <sup>3</sup> /sec

**Storage Volume: Non-SA Waters**

Minimum design volume required	8,157.00	ft <sup>3</sup>
Design volume provided	22,146.00	ft <sup>3</sup>

OK for non-SA waters

**Storage Volume: SA Waters**

1.5" runoff volume		ft <sup>3</sup>
Pre-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>
Post-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>
Minimum required volume		ft <sup>3</sup>
Volume provided		ft <sup>3</sup>

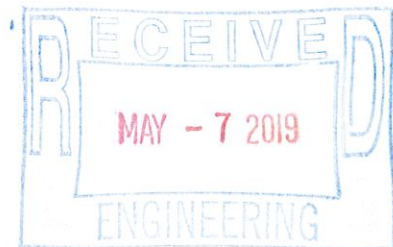
**Soils Report Summary**

Soil type	Kureb (Kr)
Infiltration rate	27.72 in/hr
SHWT elevation	0.77 fmsl

**Basin Design Parameters**

Drawdown time	0.03	days
Basin side slopes	10.00	:1
Basin bottom elevation	6.65	fmsl
Storage elevation	10.04	fmsl
Storage Surface Area	13,288.00	ft <sup>2</sup>
Top elevation	11.00	fmsl

OK  
OK  
OK



**Basin Bottom Dimensions**

Basin length	177.00	ft
Basin width	114.00	ft
Bottom Surface Area	340.00	ft <sup>2</sup>

**Additional Information**

Maximum runoff to each inlet to the basin?	-	ac-in	Maximum of 2 acre-inches allowed
Length of vegetative filter for overflow	-	ft	OK
Distance to structure	50.00	ft	OK
Distance from surface waters	50.00	ft	OK
Distance from water supply well(s)	-	ft	OK
Separation from impervious soil layer	-	ft	OK
Naturally occurring soil above shwt	5.88	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
Pretreatment device provided	sump in catch basin		



## Infiltration Basin 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.

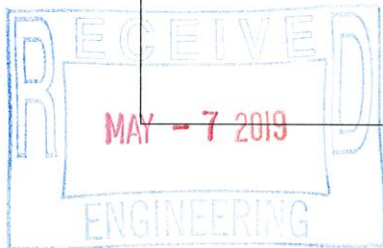
**Important maintenance procedures:**

- The drainage area will be carefully managed to reduce the sediment load to the infiltration basin.
- Immediately after the infiltration basin is established, the vegetation will be watered twice weekly if needed until the plants become established (commonly six weeks).
- No portion of the infiltration basin will be fertilized after the initial fertilization that is required to establish the vegetation.
- The vegetation in and around the basin will be maintained at a height of approximately six inches.

After the infiltration basin is established, it 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 perimeter of the infiltration basin	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.
The inlet device: pipe or swale	The pipe is clogged (if applicable).	Unclog the pipe. Dispose of the sediment off-site.
	The pipe is cracked or otherwise damaged (if applicable).	Replace the pipe.
	Erosion is occurring in the swale (if applicable).	Regrade the swale if necessary to smooth it over and provide erosion control devices such as reinforced turf matting or riprap to avoid future problems with erosion.



<b>BMP element:</b>	<b>Potential problem:</b>	<b>How I will remediate the problem:</b>
<b>The forebay</b>	Sediment has accumulated and reduced the depth to 75% of the original design depth.	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.
	Erosion has occurred or riprap is displaced.	Provide additional erosion protection such as reinforced turf matting or riprap if needed to prevent future erosion problems.
	Weeds are present.	Remove the weeds, preferably by hand. If pesticides are used, wipe them on the plants rather than spraying.
<b>The main treatment area</b>	A visible layer of sediment has accumulated.	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. Replace any media that was removed in the process. Revegetate disturbed areas immediately.
	Water is standing more than 5 days after a storm event.	Replace the top few inches of filter media and see if this corrects the standing water problem. If so, revegetate immediately. If not, consult an appropriate professional for a more extensive repair.
	Weeds and noxious plants are growing in the main treatment area.	Remove the plants by hand or by wiping them with pesticide (do not spray).
<b>The embankment</b>	Shrubs or trees have started to grow on the embankment.	Remove shrubs or trees immediately.
	An annual inspection by an appropriate professional shows that the embankment needs repair.	Make all needed repairs.
<b>The outlet device</b>	Clogging has occurred.	Clean out the outlet device. Dispose of the sediment off-site.
	The outlet device is damaged	Repair or replace the outlet device.
<b>The receiving water</b>	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: 20190410  
(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: RiverLights Development - Watercraft Ferry Avenue Extension  
BMP drainage basin number: SCM 1 & 4

Print name: Donald J Henry, NNP IV-Cape Fear River, LLC

Title: Vice President Development

Address: 109 Pier Master Point, Suite 209, Wilmington NC 28412

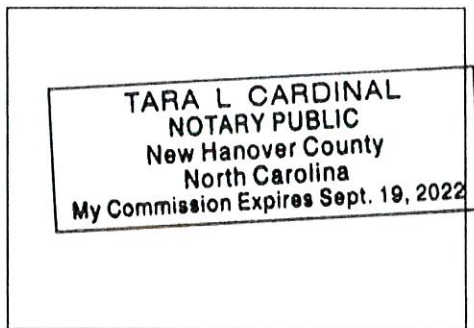
Phone: (910) 473-5409

Signature: 

Date: 4/22/19

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, Tara L. Cardinal, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Donald J Henry personally appeared before me this 22 day of APRIL, 2019, and acknowledge the due execution of the forgoing infiltration trench maintenance requirements. Witness my hand and official seal,



SEAL

My commission expires Sept 19, 2022

Permit Number: \_\_\_\_\_  
*(to be provided by City of Wilmington)*



## 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.

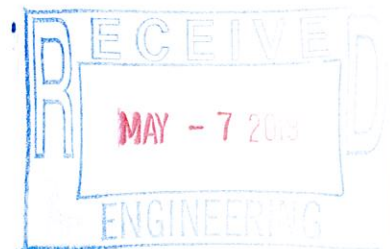
Important maintenance procedures:

- 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.



<b>BMP element:</b>	<b>Potential problem:</b>	<b>How I will remediate the problem:</b>
<b>The trench</b>	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.
<b>The observation well(s)</b>	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.
<b>The emergency overflow berm</b>	Erosion or other signs of damage have occurred at the outlet.	The emergency overflow berm will be repaired or replaced if beyond repair.
<b>The receiving water</b>	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: 2019040  
(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 the City of Wilmington of any problems with the system or prior to any changes to the system or responsible party.

Project name: RiverLights Development-Watercraft Ferry Avenue Extension

BMP drainage basin number: SCM 2 & 3

Print name: Donald J Henry, NNP IV-Cape Fear River, LLC

Title: Vice President, Development

Address: 109 Pier Master Point, Suite 209, Wilmington NC 28412

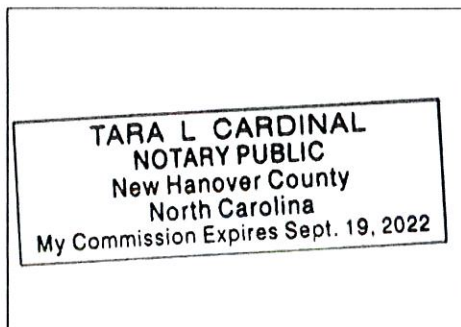
Phone: (910) 473-5409

Signature: [Handwritten Signature]

Date: 4/22/19

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, Tara L. Cardinal, a Notary Public for the State of North Carolina County of New Hanover, do hereby certify that Donald J. Henry personally appeared before me this 22 day of April, 2019, and acknowledge the due execution of the forgoing infiltration basin maintenance requirements. Witness my hand and official seal,



SEAL

My commission expires Sept 19, 2022