



## **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: **Country Club of Landfall**  
PROJECT: **Landfall Sports Center**  
ADDRESS: **1750 Drysdale Dr.**  
PERMIT #: **2017004**  
DATE: **2/13/2017**

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 2/13/2027 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 2/10/2017.
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.



**Public Services**

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

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.
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.



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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 Engineering 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.
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.



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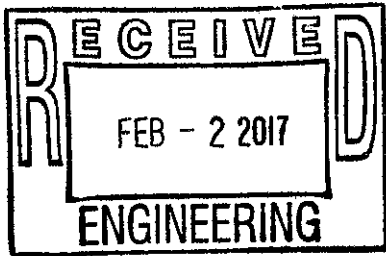
21. The permit issued shall continue in force and effect until revoked or terminated by the City of Wilmington. The permit may be modified, revoked and reissued or terminated for cause. The filing of a request for a permit modification, revocation and re-issuance or termination does not stay any permit 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 13<sup>th</sup> day of February, 2017

A handwritten signature in black ink, appearing to read 'Sterling Cheatham', is written over a horizontal line.

for Sterling Cheatham, City Manager  
City of Wilmington

2617004



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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.):

Country Club of Landfall - Landfall Sports Center

2. Location of Project (street address):

1750 Drysdale Drive

City: Wilmington County: New Hanover Zip: 28405

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

From the intersection of Military Cutoff Road and Drysdale, drive east 0.25 miles to the entrance to the Landfall Sports Center

**II. PERMIT INFORMATION**

1. Specify the type of project (check one): Low Density  High Density   
Drains to an Offsite Stormwater System  Drainage Plan  Other Redevelopment Project   
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:

**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: Country Club of Landfall

Signing Official & Title: Jessie Reutter, General Manager

- a. Contact information for Applicant / Signing Official:

Street Address: 800 Sun Runner Place

City: Wilmington State: NC Zip: 28405

Phone: 910-256-8411 Fax: 910-256-7644 Email: jessie.reutter@countrycluboflandfall.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.

The stormwater from the new rooftops will be collected in a gutter system and routed underground and connected to the existing gravity stormwater collection system. The stormwater flows to off-site treatment areas.

- 2. Total Property Area: 533,174 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: 533,174 square feet.
- 6. Existing Impervious Surface within Property Area: 225,152 square feet
- 7. Existing Impervious Surface to be Removed/Demolished: 16,605 square feet
- 8. Existing Impervious Surface to Remain: 208,547 square feet
- 9. Total Onsite (within property boundary) Newly Constructed Impervious Surface (*in square feet*):

Buildings/Lots	3,176
Impervious Pavement (asphalt + brick pavers: 513 + 1,034+633)	2,180
Pervious Pavement (adj. total, with % credit applied)	
Impervious Sidewalks (sidewalk + pool area: 1,310 + 9,880)	11,190
Pervious Sidewalks (adj. total, with % credit applied)	
Other (describe) (utility lines)	
Future Development	
<b>Total Onsite Newly Constructed Impervious Surface</b>	<b>16,546</b>

- 10. Total Onsite Impervious Surface  
(Existing Impervious Surface to remain + Onsite Newly Constructed Impervious Surface) = 225,093 square feet
- 11. Project percent of impervious area: (Total Onsite Impervious Surface / Total Project Area) x100 = 42.22 %

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	
Pervious Sidewalks (adj. total, with % credit applied)	
Other (describe)	
<b>Total Offsite Newly Constructed Impervious Surface</b>	0

13. Total Newly Constructed Impervious Surface

(Total Onsite + Offsite Newly Constructed Impervious Surface) = 16,546 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 #	BMP #	BMP #
Receiving Stream Name	(Wrightsville Recreational Area) White Oak River Basin		
Receiving Stream Index Number	18-87-24	18-87-24	
Stream Classification	SB:#	SB:#	
Total Drainage Area (sf)			
On-Site Drainage Area (sf)	15,410 <sup>PS</sup>	2,265	
Off-Site Drainage Area (sf)	15,554		
<b>Total Impervious Area (sf)</b>			
Buildings/Lots (sf) (Roof)	12,534	1,143	
Impervious Pavement (sf)			
Pervious Pavement (sf)			
Impervious Sidewalks (sf)			
Pervious Sidewalks (sf)			
Other (sf) (Grass)	<del>3,020</del> <sup>PS</sup>	<del>1,122</del> <sup>PS</sup>	
Future Development (sf)			
Existing Impervious to remain (sf)			
Offsite (sf)			
Percent Impervious Area (%)	80.58	50.46	

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

NA



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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: David E. Criser, P.E.

Consulting Firm: Criser Troutman Tanner Consulting Engineers

a. Contact information for consultant listed above:

Mailing Address: 3809 Peachtree Avenue, Suite 102

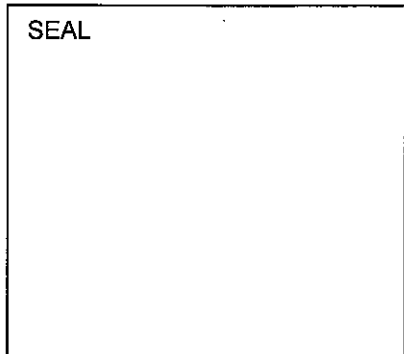
City: Wilmington State: NC Zip: 28403

Phone: 910-397-2929 Fax: 910-397-2971 Email: dcriser@cttengineering.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.



Signature: \_\_\_\_\_

\_\_\_\_\_ Date: \_\_\_\_\_

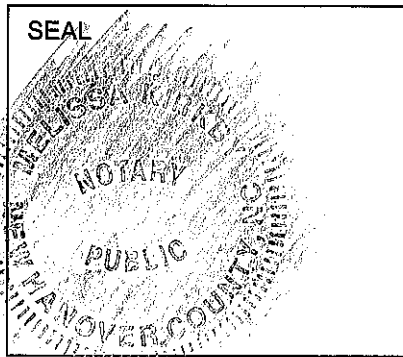
I, \_\_\_\_\_, a Notary Public for the State of \_\_\_\_\_, County of \_\_\_\_\_, do hereby certify that \_\_\_\_\_ personally appeared before me this day of \_\_\_\_\_, \_\_\_\_\_.

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) Jessi Reutter 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: Jessi Reutter

Date: 8/26/16

I, Melissa Kirkby, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Jessi Reutter personally appeared before me this day of August 26, 2016 and acknowledge the due execution of the application for a stormwater

permit. Witness my hand and official seal.

Melissa Kirkby

My commission expires: 03/02/2021

**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	Landfall Sport Center
Contact Person	David Criser
Phone Number	910-397-2929
Date	2-Feb-17
Drainage Area Number	Infiltration Area No. 1

**II. DESIGN INFORMATION**

**Site Characteristics**

Drainage area	15,410.00	ft <sup>2</sup>
Impervious area	12,534.00	ft <sup>2</sup>
Percent impervious	0.81	%
Design rainfall depth	1.50	in

**Peak Flow Calculations**

1-yr, 24-hr rainfall depth	_____	in
1-yr, 24-hr intensity	_____	in/hr
Pre-development 1-yr, 24-hr discharge	_____	ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr discharge	_____	ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak flow control	_____	ft <sup>3</sup> /sec

This is a redevelopment project therefore pre and post calculations are not required

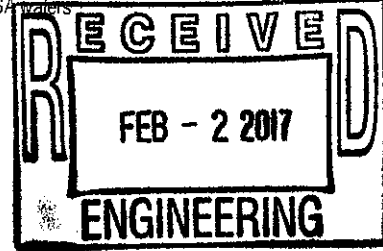
**Storage Volume: Non-SA Waters**

Minimum design volume required	1,596.00	ft <sup>3</sup>
Design volume provided	1,660.00	ft <sup>3</sup>

Based on runoff from 1.5" rainfall  
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	sandy loam
Infiltration rate	0.50 in/hr
SHWT elevation	25.20 fmsl

used minimum, S&ME report states 2 inches min.

**Basin Design Parameters**

Drawdown time	0.04	days	OK
Basin side slopes	4.00	:1	OK
Basin bottom elevation	27.20	fmsl	OK
Storage elevation	28.05	fmsl	
Storage Surface Area	2,259.00	ft <sup>2</sup>	
Top elevation	28.50	fmsl	

**Basin Bottom Dimensions**

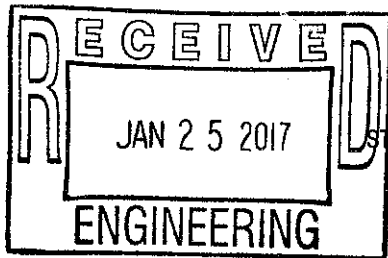
Basin length	85.00	ft
Basin width	30.00	ft
Bottom Surface Area	1,660.00	ft <sup>2</sup>

Approximate as basin is irregular shape  
Approximate as basin is irregular shape

02.02.17  
KCFIRM 02. F-0113

**Additional Information**

Maximum runoff to each inlet to the basin?	0.32	ac-in	OK
Length of vegetative filter for overflow	na	ft	OK
Distance to structure	na	ft	OK
Distance from surface waters	4,300.00	ft	OK
Distance from water supply well(s)		ft	Unknown - no wells on property
Separation from impervious soil layer		ft	Unknown - Not discovered during SHWT investigation
Naturally occurring soil above shwt	2.00	ft	OK
Bottom covered with 4-in of clean sand?	na	(Y or N)	OK
Proposed drainage easement provided?	na	(Y or N)	OK
Captures all runoff at ultimate build-out?	y	(Y or N)	For the basin area
Bypass provided for larger storms?	y	(Y or N)	overflow weir provided in addition to outlet pipe
Pretreatment device provided	na		



Permit No. \_\_\_\_\_  
(to be provided by DWQ)

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	Landfall Sport Center
Contact Person	David Criser
Phone Number	910-397-2929
Date	25-Jan-17
Drainage Area Number	Infiltration Area No. 2

**II. DESIGN INFORMATION**

**Site Characteristics**

Drainage area	2,265.00	ft <sup>2</sup>
Impervious area	1,143.00	ft <sup>2</sup>
Percent impervious	0.50	%
Design rainfall depth	1.50	in

Pre-post calculations not required, Have completed what parts are applicable for situation proposed to store 1 1/2 inches of water between Area 1 & Area 2

**Peak Flow Calculations**

1-yr, 24-hr rainfall depth		in
1-yr, 24-hr intensity		in/hr
Pre-development 1-yr, 24-hr discharge		ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr discharge		ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak flow control		ft <sup>3</sup> /sec

This is a redevelopment project therefore pre and post calculations are not required

**Storage Volume: Non-SA Waters**

Minimum design volume required	178.00	ft <sup>3</sup>
Design volume provided	210.00	ft <sup>3</sup>

Based on runoff from 1.5" rainfall  
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	sandy loam
Infiltration rate	0.50 in/hr
SHWT elevation	25.80 fmsl

used minimum, S&ME report states 2 inches min.

**Basin Design Parameters**

Drawdown time	0.01	days	OK
Basin side slopes	4.00	:1	OK
Basin bottom elevation	28.00	fmsl	OK
Storage elevation	28.25	fmsl	
Storage Surface Area	899.00	ft <sup>2</sup>	
Top elevation	28.70	fmsl	

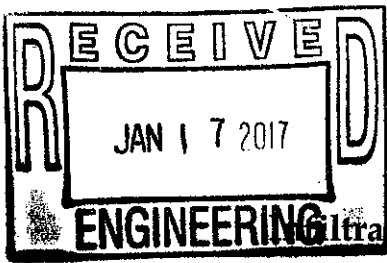
**Basin Bottom Dimensions**

Basin length	62.00	ft
Basin width	17.00	ft
Bottom Surface Area	783.00	ft <sup>2</sup>

Professional Engineer Seal  
NORTH CAROLINA  
PROFESSIONAL ENGINEER  
SEAL  
11270  
DAVID E. CRISER  
01/25/17  
N.C. FIRM No. F-0113

**Additional Information**

Maximum runoff to each inlet to the basin?	0.04	ac-in	OK
Length of vegetative filter for overflow	na	ft	OK
Distance to structure	na	ft	OK
Distance from surface waters	4,300.00	ft	OK
Distance from water supply well(s)		ft	Unknown - no wells on property
Separation from impervious soil layer		ft	Unknown - not discovered during SHWT investigation
Naturally occurring soil above shwt	2.62	ft	OK
Bottom covered with 4-in of clean sand?	na	(Y or N)	OK
Proposed drainage easement provided?	na	(Y or N)	OK
Captures all runoff at ultimate build-out?	y	(Y or N)	For the Basin Area
Bypass provided for larger storms?	y	(Y or N)	overflow weir provided
Pretreatment device provided	na		



Permit Number: \_\_\_\_\_  
 (to be provided by City of Wilmington)  
 BMP Drainage 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.

<b>BMP element:</b>	<b>Potential problem:</b>	<b>How I will remediate the problem:</b>
<b>The entire BMP</b>	Trash/debris is present.	Remove the trash/debris.
<b>The perimeter of the infiltration basin</b>	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.
<b>The inlet device: pipe or swale</b>	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.

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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: Landfall Sports Center

BMP drainage basin number: 1 and 2

Print name: Jessie Reutter

Title: General Manager, Country Club of Landfall

Address: 800 Sun Runner Place, Wilmington, NC 28405

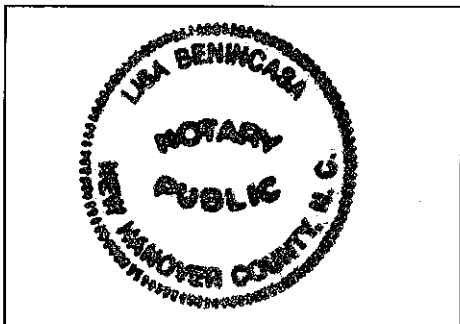
Phone: 910-256-8411

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

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, Lisa Benincasa, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Jessie Reutter personally appeared before me this 9<sup>th</sup> day of January, 2017, and acknowledge the due execution of the forgoing infiltration basin maintenance requirements. Witness my hand and official seal,



SEAL

My commission expires December 01, 2020

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