



**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: **Woodfield Acquisitions, LLC**  
PROJECT: **Woodfield Wilmington**  
ADDRESS: **3950 Independence Boulevard**  
PERMIT #: **2017046**  
DATE: **November 2, 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 November 2, 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 November 2, 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.



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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 2<sup>nd</sup> day of November, 2017.

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

for Sterling Cheatham, City Manager  
City of Wilmington



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*\*unless noted otherwise*

**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.):

Woodfield Wilmington

2. Location of Project (street address):

3828 & 3970 Independence Boulevard

City: Wilmington County: New Hanover Zip: 28412

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

Approx. 0.30 miles South along Independence Blvd. from the Carolina Beach Road (US 421) & Independence Blvd. Intersection.

**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: 0.127 Ac.

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: Woodfield Acquisitions, LLC

Signing Official & Title: Scott Underwood

- a. Contact information for Applicant / Signing Official:

Street Address: 300 Mountain Maple Drive

City: Cary State: NC Zip: 27519

Phone: 919-740-8877 Fax: \_\_\_\_\_ Email: sunderwood@woodfieldinvestments.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: Wilson Ki

Signing Official & Title: Wilson Ki, Owner

- a. Contact information for Property Owner:

Street Address: 1804 Martin Luther King Pkwy #207

City: Durham State: NC Zip: 27707

Phone: 910-232-3730 Fax: \_\_\_\_\_ Email: wilson@homelifeinc.com

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 runoff will be treated using three wet detention ponds.

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2. Total Property Area: 657,756 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: 657,756 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	106,960
Impervious Pavement	141,288
Pervious Pavement (adj. total, with % credit applied)	0
Impervious Sidewalks	16,367
Pervious Sidewalks (adj. total, with % credit applied)	0
Other (describe) Pool Amenity Area	8775
Future Development	0
<b>Total Onsite Newly Constructed Impervious Surface</b>	<b>273,390</b>

10. Total Onsite Impervious Surface

(Existing Impervious Surface to remain + Onsite Newly Constructed Impervious Surface) = 273,390 square feet

11. Project percent of impervious area: (Total Onsite Impervious Surface / Total Project Area) x100 = 41.56 %

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

Impervious Pavement	10,577
Pervious Pavement (adj. total, with % credit applied)	
Impervious Sidewalks	16,044
Pervious Sidewalks (adj. total, with % credit applied)	
Other (describe)	
<b>Total Offsite Newly Constructed Impervious Surface</b>	<b>26,621</b>

13. Total Newly Constructed Impervious Surface  
(Total Onsite + Offsite Newly Constructed Impervious Surface) = 300,011 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	Banards Creek	Banards Creek	Banards Creek
Receiving Stream Index Number	18-80	18-80	18-90
Stream Classification	C ; Sw	C ; Sw	C ; Sw
Total Drainage Area (sf)	160,301	166,399	68,389
On-Site Drainage Area (sf)	160,301	166,399	68,389
Off-Site Drainage Area (sf)	0	0	0
<b>Total Impervious Area (sf)</b>	<b>118,378</b>	<b>112,966</b>	<b>42,046</b>
Buildings/Lots (sf)	42220	53076	11664
Impervious Pavement (sf)	69,398	43,988	27902
Pervious Pavement (sf)	0	0	0
Impervious Sidewalks (sf)	6760	7127	2480
Pervious Sidewalks (sf)	0	0	0
Other (sf) Amenity Area	0	8775	0
Future Development (sf)	0	0	0
Existing Impervious to remain (sf)	0	0	0
Offsite (sf)	0	0	0
Percent Impervious Area (%)	73.80	67.89	61.48

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

N/A



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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: Eric Seidel, PE

Consulting Firm: McKim and Creed, Inc.

a. Contact information for consultant listed above:

Mailing Address: 243 N. Front Street

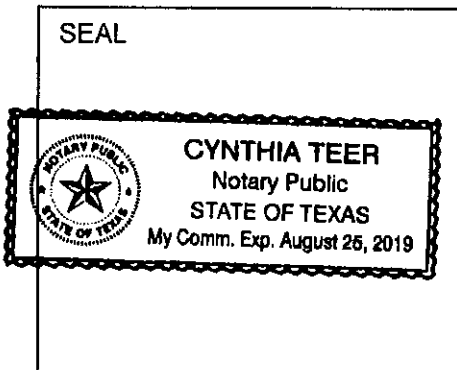
City: Wilmington State: NC Zip: 28401

Phone: 910-343-1048 Fax: 910-251-8282 Email: eseidel@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) Wilson Ki, 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) Scott Underwood with (print or type name of organization listed in Contact Information, item 1) Woodfield Acquisitions, LLC 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: [Handwritten Signature]  
Date: 4/4/2017

I, Cynthia Teer, a Notary Public for the State of Texas, County of Polk, do hereby certify that Wilson Ki personally appeared before me this day of 4/4, 2017.

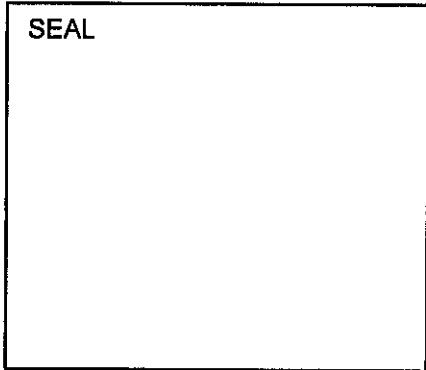
and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal,

Cynthia Lee

My commission expires: 8/25/2019

**VIII. APPLICANT'S CERTIFICATION**

I, (print or type name of person listed in Contact Information, item 1), Scott Underwood 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: \_\_\_\_\_

\_\_\_\_\_ 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,

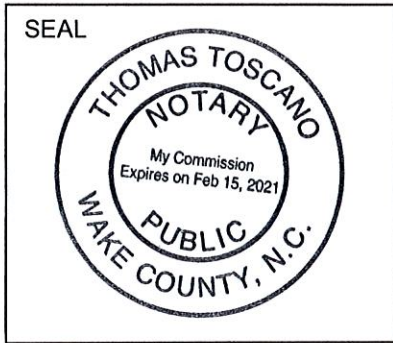
My commission expires: \_\_\_\_\_

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**

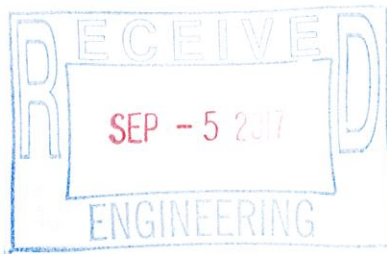
I, (print or type name of person listed in Contact Information, item 1), Scott Underwood certify that the information included on this permit application form is, to the best of my knowledge, correct and that the project will be constructed in conformance with the approved plans, that the required deed 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: 1/18/17

I, Thomas Toscano, a Notary Public for the State of North Carolina, County of Wake, do hereby certify that Michael Underwood personally appeared before me this day of Jan 18<sup>th</sup>, 2017, and acknowledge the due execution of the application for a stormwater

permit. Witness my hand and official seal,  
[Handwritten Signature] Thomas Toscano  
My commission expires: Feb 15, 2021



**STORMWATER MANAGEMENT PERMIT APPLICATION FORM  
401 CERTIFICATION APPLICATION FORM  
WET DETENTION 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.*

<b>I. PROJECT INFORMATION</b>	
Project name	Woodfield Wilmington Apartments
Contact person	Eric Seidel, PE
Phone number	(910) 218-2483
Date	9/4/2017
Drainage area number	1

<b>II. DESIGN INFORMATION</b>	
<b>Site Characteristics</b>	
Drainage area	160,301 ft <sup>2</sup>
Impervious area, post-development	118,378 ft <sup>2</sup>
% impervious	73.85 %
Design rainfall depth	1.5 in
	No Pervious Concrete Included
<b>Storage Volume: Non-SA Waters</b>	
Minimum volume required	14,320 ft <sup>3</sup>
Volume provided	35,105 ft <sup>3</sup>
	OK
	OK, volume provided is equal to or in excess of volume required.
<b>Storage Volume: SA Waters</b>	
1.5" runoff volume	ft <sup>3</sup>
Pre-development 1-yr, 24-hr runoff	ft <sup>3</sup>
Post-development 1-yr, 24-hr runoff	ft <sup>3</sup>
Minimum volume required	ft <sup>3</sup>
Volume provided	ft <sup>3</sup>
<b>Peak Flow Calculations</b>	
Is the pre/post control of the 1yr 24hr storm peak flow required?	N (Y or N) City of Wilmington SCS Routing
1-yr, 24-hr rainfall depth	in
Rational C, pre-development	(unitless)
Rational C, post-development	(unitless)
Rainfall intensity: 1-yr, 24-hr storm	in/hr
Pre-development 1-yr, 24-hr peak flow	3.40 ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr peak flow	9.25 ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak flow control	0.06 ft <sup>3</sup> /sec
<b>Elevations</b>	
Temporary pool elevation	13.60 fmsl
Permanent pool elevation	10.00 fmsl
SHWT elevation (approx. at the perm. pool elevation)	10.00 fmsl
Top of 10ft vegetated shelf elevation	10.50 fmsl
Bottom of 10ft vegetated shelf elevation	9.50 fmsl
Sediment cleanout, top elevation (bottom of pond)	2.00 fmsl
Sediment cleanout, bottom elevation	1.00 fmsl
Sediment storage provided	1.00 ft
Is there additional volume stored above the state-required temp. pool?	Y (Y or N)
Elevation of the top of the additional volume	13.6 fmsl
	OK

**II. DESIGN INFORMATION**

**Surface Areas**

Area, temporary pool	12,062 ft <sup>2</sup>	
Area REQUIRED, permanent pool	<del>6,765</del> ft <sup>2</sup>	6284 RAC 7/5/17
SA/DA ratio	<del>4.22</del> (unitless)	3.92
Area PROVIDED, permanent pool, A <sub>perm_pool</sub>	7,026 ft <sup>2</sup>	OK
Area, bottom of 10ft vegetated shelf, A <sub>bot_shelf</sub>	6,044 ft <sup>2</sup>	
Area, sediment cleanout, top elevation (bottom of pond), A <sub>bot_pond</sub>	1,280 ft <sup>2</sup>	

**Volumes**

Volume, temporary pool	35,105 ft <sup>3</sup>	OK
Volume, permanent pool, V <sub>perm_pool</sub>	28,709 ft <sup>3</sup>	
Volume, forebay (sum of forebays if more than one forebay)	5,601 ft <sup>3</sup>	
Forebay % of permanent pool volume	19.5%	OK

**SA/DA Table Data**

Design TSS removal	%	See Attached 2017 SA/DA Calcs
Coastal SA/DA Table Used?	(Y or N)	
Mountain/Piedmont SA/DA Table Used?	(Y or N)	
SA/DA ratio	(unitless)	
Average depth (used in SA/DA table):		
Calculation option 1 used? (See Figure 10-2b)	(Y or N)	
Volume, permanent pool, V <sub>perm_pool</sub>	ft <sup>3</sup>	
Area provided, permanent pool, A <sub>perm_pool</sub>	ft <sup>2</sup>	
Average depth calculated	ft	Need 3 ft min.
Average depth used in SA/DA, d <sub>av</sub> , (Round to nearest 0.5ft)	ft	
Calculation option 2 used? (See Figure 10-2b)	(Y or N)	
Area provided, permanent pool, A <sub>perm_pool</sub>	ft <sup>2</sup>	
Area, bottom of 10ft vegetated shelf, A <sub>bot_shelf</sub>	ft <sup>2</sup>	
Area, sediment cleanout, top elevation (bottom of pond), A <sub>bot_pond</sub>	ft <sup>2</sup>	
"Depth" (distance b/w bottom of 10ft shelf and top of sediment)	ft	
Average depth calculated	ft	
Average depth used in SA/DA, d <sub>av</sub> , (Round to nearest 0.5ft)	ft	

**Drawdown Calculations**

Drawdown through orifice?	Y	(Y or N)
Diameter of orifice (if circular)	1.75	in
Area of orifice (if-non-circular)		in <sup>2</sup>
Coefficient of discharge (C <sub>D</sub> )	0.60	(unitless)
Driving head (H <sub>o</sub> )	<del>0.53</del> ft	1.20
Drawdown through weir?		(Y or N)
Weir type		(unitless)
Coefficient of discharge (C <sub>w</sub> )		(unitless)
Length of weir (L)		ft
Driving head (H)		ft
Pre-development 1-yr, 24-hr peak flow	3.40	ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr peak flow	9.25	ft <sup>3</sup> /sec
Storage volume discharge rate (through discharge orifice or weir)	<del>0.06</del> ft <sup>3</sup> /sec	0.09
Storage volume drawdown time	<del>2.82</del> days	4.61 days

OK, draws down in 2-5 days.

**Additional Information**

Vegetated side slopes	3 :1	OK
Vegetated shelf slope	6 :1	Insufficient shelf slope.
Vegetated shelf width	6.0 ft	Insufficient shelf length.
Length of flowpath to width ratio	3 :1	OK
Length to width ratio	2.0 :1	OK
Trash rack for overflow & orifice?	Y	(Y or N) OK
Freeboard provided	1.0 ft	OK
Vegetated filter provided?	N	(Y or N) OK
Recorded drainage easement provided?	Y	(Y or N) OK
Capures all runoff at ultimate build-out?	Y	(Y or N) OK
Drain mechanism for maintenance or emergencies is:	Emergency Pump	

STORMWATER MANAGEMENT PERMIT APPLICATION FORM  
401 CERTIFICATION APPLICATION FORM  
**WET DETENTION 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	Woodfield Wilmington Apartments
Contact person	Eric Seidel, PE
Phone number	(910) 218-2483
Date	9/4/2017
Drainage area number	2

II. DESIGN INFORMATION	
------------------------	--

<b>Site Characteristics</b>	
Drainage area	166,399 ft <sup>2</sup>
Impervious area, post-development	112,966 ft <sup>2</sup>
% impervious	67.89 %
Design rainfall depth	1.5 in
	No Pervious Concrete Included
<b>Storage Volume: Non-SA Waters</b>	
Minimum volume required	13,749 ft <sup>3</sup>
Volume provided	26,007 ft <sup>3</sup>
	OK
	OK, volume provided is equal to or in excess of volume required.
<b>Storage Volume: SA Waters</b>	
1.5" runoff volume	ft <sup>3</sup>
Pre-development 1-yr, 24-hr runoff	ft <sup>3</sup>
Post-development 1-yr, 24-hr runoff	ft <sup>3</sup>
Minimum volume required	ft <sup>3</sup>
Volume provided	ft <sup>3</sup>
<b>Peak Flow Calculations</b>	
Is the pre/post control of the 1yr 24hr storm peak flow required?	N (Y or N) City of Wilmington SCS Routing
1-yr, 24-hr rainfall depth	in
Rational C, pre-development	(unitless)
Rational C, post-development	(unitless)
Rainfall intensity: 1-yr, 24-hr storm	in/hr
Pre-development 1-yr, 24-hr peak flow	3.53 ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr peak flow	9.61 ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak flow control	0.05 ft <sup>3</sup> /sec
<b>Elevations</b>	
Temporary pool elevation	16.10 fmsl
Permanent pool elevation	13.50 fmsl
SHWT elevation (approx. at the perm. pool elevation)	13.50 fmsl
Top of 10ft vegetated shelf elevation	14.00 fmsl
Bottom of 10ft vegetated shelf elevation	13.00 fmsl
Sediment cleanout, top elevation (bottom of pond)	5.00 fmsl
Sediment cleanout, bottom elevation	4.00 fmsl
Sediment storage provided	1.00 ft
Is there additional volume stored above the state-required temp. pool?	Y (Y or N)
Elevation of the top of the additional volume	16.1 fmsl
	OK

**II. DESIGN INFORMATION**

**Surface Areas**

Area, temporary pool	11,979 ft <sup>2</sup>	
Area REQUIRED, permanent pool	<del>5,350</del> 6,523 ft <sup>2</sup>	
SA/DA ratio	<del>3.22</del> (unitless) 3.92	
Area PROVIDED, permanent pool, A <sub>perm_pool</sub>	7,376 ft <sup>2</sup>	OK
Area, bottom of 10ft vegetated shelf, A <sub>bot_shelf</sub>	4,646 ft <sup>2</sup>	
Area, sediment cleanout, top elevation (bottom of pond), A <sub>bot_pond</sub>	330 ft <sup>2</sup>	

*flac*  
*9/5/17*

**Volumes**

Volume, temporary pool	26,007 ft <sup>3</sup>	OK
Volume, permanent pool, V <sub>perm_pool</sub>	25,568 ft <sup>3</sup>	
Volume, forebay (sum of forebays if more than one forebay)	5,012 ft <sup>3</sup>	
Forebay % of permanent pool volume	19.6% %	OK

**SA/DA Table Data**

Design TSS removal	%	See Attached 2017 SA/DA Calcs
Coastal SA/DA Table Used?	(Y or N)	
Mountain/Piedmont SA/DA Table Used?	(Y or N)	
SA/DA ratio	(unitless)	
Average depth (used in SA/DA table):		
Calculation option 1 used? (See Figure 10-2b)	(Y or N)	
Volume, permanent pool, V <sub>perm_pool</sub>	ft <sup>3</sup>	
Area provided, permanent pool, A <sub>perm_pool</sub>	ft <sup>2</sup>	
Average depth calculated	ft	Need 3 ft min.
Average depth used in SA/DA, d <sub>av</sub> , (Round to nearest 0.5ft)	ft	
Calculation option 2 used? (See Figure 10-2b)	(Y or N)	
Area provided, permanent pool, A <sub>perm_pool</sub>	ft <sup>2</sup>	
Area, bottom of 10ft vegetated shelf, A <sub>bot_shelf</sub>	ft <sup>2</sup>	
Area, sediment cleanout, top elevation (bottom of pond), A <sub>bot_pond</sub>	ft <sup>2</sup>	
"Depth" (distance b/w bottom of 10ft shelf and top of sediment)	ft	
Average depth calculated	ft	
Average depth used in SA/DA, d <sub>av</sub> , (Round to nearest 0.5ft)	ft	

**Drawdown Calculations**

Drawdown through orifice?	Y (Y or N)	
Diameter of orifice (if circular)	1.60 in	
Area of orifice (if-non-circular)	in <sup>2</sup>	
Coefficient of discharge (C <sub>D</sub> )	0.60 (unitless)	
Driving head (H <sub>0</sub> )	<del>0.47</del> 0.87 ft	
Drawdown through weir?	(Y or N)	
Weir type	(unitless)	
Coefficient of discharge (C <sub>w</sub> )	(unitless)	
Length of weir (L)	ft	
Driving head (H)	ft	
Pre-development 1-yr, 24-hr peak flow	3.53 ft <sup>3</sup> /sec	
Post-development 1-yr, 24-hr peak flow	9.61 ft <sup>3</sup> /sec	
Storage volume discharge rate (through discharge orifice or weir)	<del>0.05</del> 0.06 ft <sup>3</sup> /sec	
Storage volume drawdown time	<del>3.40</del> 4.81 days	OK, draws down in 2-5 days.

**Additional Information**

Vegetated side slopes	3 :1	OK
Vegetated shelf slope	6 :1	Insufficient shelf slope.
Vegetated shelf width	6.0 ft	Insufficient shelf length.
Length of flowpath to width ratio	4 :1	OK
Length to width ratio	4.0 :1	OK
Trash rack for overflow & orifice?	Y (Y or N)	OK
Freeboard provided	1.0 ft	OK
Vegetated filter provided?	N (Y or N)	OK
Recorded drainage easement provided?	Y (Y or N)	OK
Capures all runoff at ultimate build-out?	Y (Y or N)	OK
Drain mechanism for maintenance or emergencies is:	Emergency Pump	



STORMWATER MANAGEMENT PERMIT APPLICATION FORM  
401 CERTIFICATION APPLICATION FORM  
**WET DETENTION 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	Woodfield Wilmington Apartments
Contact person	Eric Seidel, PE
Phone number	(910) 218-2483
Date	9/4/2017
Drainage area number	3

II. DESIGN INFORMATION	
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<b>Site Characteristics</b>	
Drainage area	68,389 ft <sup>2</sup>
Impervious area, post-development	42,046 ft <sup>2</sup>
% impervious	61.48 %
Design rainfall depth	1.5 in
<b>Storage Volume: Non-SA Waters</b>	
Minimum volume required	5,158 ft <sup>3</sup> OK
Volume provided	12,384 ft <sup>3</sup> OK, volume provided is equal to or in excess of volume required.
<b>Storage Volume: SA Waters</b>	
1.5" runoff volume	ft <sup>3</sup>
Pre-development 1-yr, 24-hr runoff	ft <sup>3</sup>
Post-development 1-yr, 24-hr runoff	ft <sup>3</sup>
Minimum volume required	ft <sup>3</sup>
Volume provided	ft <sup>3</sup>
<b>Peak Flow Calculations</b>	
Is the pre/post control of the 1yr 24hr storm peak flow required?	N (Y or N) City of Wilmington SCS Routing
1-yr, 24-hr rainfall depth	in
Rational C, pre-development	(unitless)
Rational C, post-development	(unitless)
Rainfall intensity: 1-yr, 24-hr storm	in/hr
Pre-development 1-yr, 24-hr peak flow	1.22 ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr peak flow	3.50 ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak flow control	0.02 ft <sup>3</sup> /sec
<b>Elevations</b>	
Temporary pool elevation	19.40 fmsl
Permanent pool elevation	17.50 fmsl
SHWT elevation (approx. at the perm. pool elevation)	17.50 fmsl
Top of 10ft vegetated shelf elevation	18.00 fmsl
Bottom of 10ft vegetated shelf elevation	17.00 fmsl
Sediment cleanout, top elevation (bottom of pond)	12.00 fmsl
Sediment cleanout, bottom elevation	11.00 fmsl
Sediment storage provided	1.00 ft
Is there additional volume stored above the state-required temp. pool?	Y (Y or N)
Elevation of the top of the additional volume	19.4 fmsl OK

**II. DESIGN INFORMATION**

**Surface Areas**

Area, temporary pool	7,448 ft <sup>2</sup>	
Area REQUIRED, permanent pool	3,153 ft <sup>2</sup>	
SA/DA ratio	4.61 (unitless)	
Area PROVIDED, permanent pool, $A_{perm\_pool}$	3,642 ft <sup>2</sup>	OK
Area, bottom of 10ft vegetated shelf, $A_{bot\_shelf}$	2,643 ft <sup>2</sup>	
Area, sediment cleanout, top elevation (bottom of pond), $A_{bot\_pond}$	345 ft <sup>2</sup>	

**Volumes**

Volume, temporary pool	12,384 ft <sup>3</sup>	OK
Volume, permanent pool, $V_{perm\_pool}$	10,305 ft <sup>3</sup>	
Volume, forebay (sum of forebays if more than one forebay)	1,969 ft <sup>3</sup>	
Forebay % of permanent pool volume	19.1% %	OK

**SA/DA Table Data**

Design TSS removal	%	See Attached 2017 SA/DA Calcs
Coastal SA/DA Table Used?	(Y or N)	
Mountain/Piedmont SA/DA Table Used?	(Y or N)	
SA/DA ratio	(unitless)	

**Average depth (used in SA/DA table):**

Calculation option 1 used? (See Figure 10-2b)	(Y or N)	
Volume, permanent pool, $V_{perm\_pool}$	ft <sup>3</sup>	
Area provided, permanent pool, $A_{perm\_pool}$	ft <sup>2</sup>	
Average depth calculated	ft	Need 3 ft min.
Average depth used in SA/DA, $d_{av}$ , (Round to nearest 0.5ft)	ft	
Calculation option 2 used? (See Figure 10-2b)	(Y or N)	
Area provided, permanent pool, $A_{perm\_pool}$	ft <sup>2</sup>	
Area, bottom of 10ft vegetated shelf, $A_{bot\_shelf}$	ft <sup>2</sup>	
Area, sediment cleanout, top elevation (bottom of pond), $A_{bot\_pond}$	ft <sup>2</sup>	
"Depth" (distance b/w bottom of 10ft shelf and top of sediment)	ft	
Average depth calculated	ft	
Average depth used in SA/DA, $d_{av}$ , (Round to nearest 0.5ft)	ft	

**Drawdown Calculations**

Drawdown through orifice?	Y	(Y or N)	
Diameter of orifice (if circular)	1.25	in	
Area of orifice (if non-circular)		in <sup>2</sup>	
Coefficient of discharge ( $C_D$ )	0.60	(unitless)	
Driving head ( $H_o$ )	<del>0.30</del> 0.63	ft	
Drawdown through weir?		(Y or N)	
Weir type		(unitless)	
Coefficient of discharge ( $C_w$ )		(unitless)	
Length of weir (L)		ft	
Driving head (H)		ft	
Pre-development 1-yr, 24-hr peak flow	1.22	ft <sup>3</sup> /sec	
Post-development 1-yr, 24-hr peak flow	3.50	ft <sup>3</sup> /sec	
Storage volume discharge rate (through discharge orifice or weir)	<del>0.02</del> 0.03	ft <sup>3</sup> /sec	
Storage volume drawdown time	<del>2.60</del> 4.39	days	OK, draws down in 2-5 days.

*flat*  
*9/5/17*

**Additional Information**

Vegetated side slopes	3 :1	OK
Vegetated shelf slope	6 :1	Insufficient shelf slope.
Vegetated shelf width	6.0 ft	Insufficient shelf length.
Length of flowpath to width ratio	5 :1	OK
Length to width ratio	3.0 :1	OK
Trash rack for overflow & orifice?	Y	(Y or N) OK
Freeboard provided	1.0 ft	OK
Vegetated filter provided?	N	(Y or N) OK
Recorded drainage easement provided?	Y	(Y or N) OK
Capures all runoff at ultimate build-out?	Y	(Y or N) OK
Drain mechanism for maintenance or emergencies is:	Emergency Pump	

## Wet Detention 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.

The wet detention basin system is defined as the wet detention basin, pretreatment including forebays and the vegetated filter if one is provided.

**This system (check one):**

does  does not incorporate a vegetated filter at the outlet.

**This system (check one):**

does  does not incorporate pretreatment other than a forebay.

Important maintenance procedures:

- Immediately after the wet detention basin is established, the plants on the vegetated shelf and perimeter of the basin should be watered twice weekly if needed, until the plants become established (commonly six weeks).
- No portion of the wet detention pond should be fertilized after the first initial fertilization that is required to establish the plants on the vegetated shelf.
- Stable groundcover should be maintained in the drainage area to reduce the sediment load to the wet detention basin.
- If the basin must be drained for an emergency or to perform maintenance, the flushing of sediment through the emergency drain should be minimized to the maximum extent practical.
- Once a year, a dam safety expert should inspect the embankment.

After the wet detention pond is established, it should be inspected **once a month and within 24 hours after every storm event greater than 1.5 inches**. Records of operation and maintenance should be kept in a known set location and must 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 side slopes of the wet detention 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.
	Vegetation is too short or too long.	Maintain vegetation at a height of approximately six inches.

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

<b>BMP element:</b>	<b>Potential problem:</b>	<b>How I will remediate the problem:</b>
<b>The inlet device: pipe or swale</b>	The pipe is clogged.	Unclog the pipe. Dispose of the sediment off-site.
	The pipe is cracked or otherwise damaged.	Replace the pipe.
	Erosion is occurring in the swale.	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>The forebay</b>	Sediment has accumulated to a depth greater than the original design depth for sediment storage.	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.	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 pesticide is used, wipe it on the plants rather than spraying.
<b>The vegetated shelf</b>	Best professional practices show that pruning is needed to maintain optimal plant health.	Prune according to best professional practices
	The plant community and coverage is significantly (>25%) different from approved landscape plan.	Restore plant vegetation to approved condition. If landscape plan needs to be adjusted to specify vegetation more appropriate for site conditions, contact City Stormwater or Engineering Staff.
	Cattails or other invasive plants cover >25% of the veg't shelf. A monoculture of plants must be avoided)	Remove all invasives by physical removal or by wiping them with pesticide (do not spray) - consult a professional.
	Plants are dead, diseased or dying.	Determine the source of the problem: soils, hydrology, disease, etc. Remedy the problem and replace plants. Provide a one-time fertilizer application to establish the ground cover if a soil test indicates it is necessary.
<b>The main treatment area</b>	Sediment has accumulated to a depth greater than the original design sediment storage 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.

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

BMP element:	Potential problem:	How I will remediate the problem:
The main treatment area (continued)	Algal growth covers over 25% of the area.	Consult a professional to remove and control the algal growth.
	Cattails or other invasive plants cover >25% of the veg't shelf. A monoculture of plants must be avoided)	Remove all invasives by physical removal or by wiping them with pesticide (do not spray) - consult a professional.
The embankment	Shrubs have started to grow on the embankment.	Remove shrubs immediately.
	Evidence of muskrat or beaver activity is present.	Use traps to remove muskrats and consult a professional to remove beavers.
	A tree has started to grow on the embankment.	Consult a dam safety specialist to remove the tree.
	An annual inspection by an appropriate professional shows that the embankment needs repair. (if applicable)	Make all needed repairs.
The outlet device	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.
The receiving water	Erosion or other signs of damage have occurred at the outlet.	Contact the local NC Division of Water Quality Regional Office, or the 401 Oversight Unit at 919-733-1786.

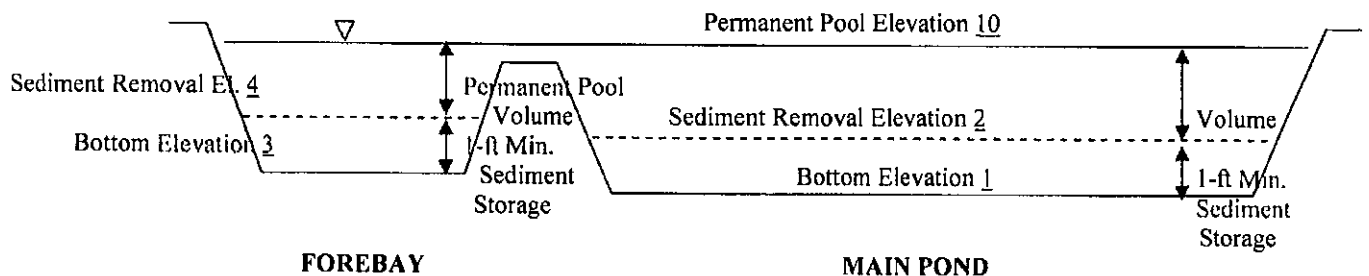
The measuring device used to determine the sediment elevation shall be such that it will give an accurate depth reading and not readily penetrate into accumulated sediments.

When the permanent pool depth reads 8 feet in the main pond, the sediment shall be removed.

When the permanent pool depth reads 6 feet in the forebay, the sediment shall be removed.

**BASIN DIAGRAM**

(fill in the blanks)



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 the City of Wilmington of any problems with the system or prior to any changes to the system or responsible party.

Project name: Woodfield Wilmington Apartments

BMP drainage basin number: 1

Print name: Woodfield Acquisitions, LLC / Scott Underwood

Title: Developer

Address: 300 Mountain Maple Drive

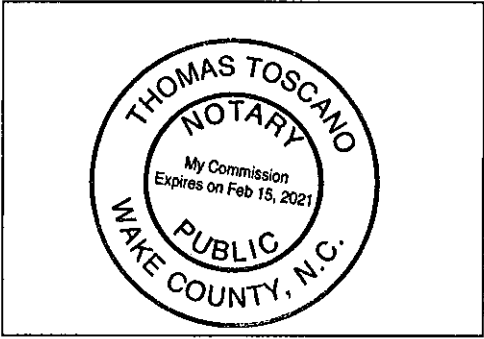
Phone: (919) 740-8877

Signature: *Michael Scott Underwood*

Date: 1/10/17

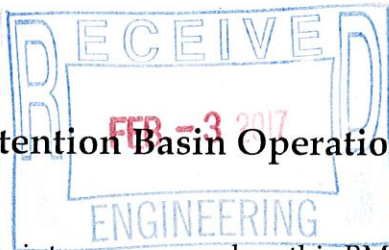
Note: The legally responsible party should not be a homeowners association unless more than 50% of the lots have been sold and a resident of the subdivision has been named the president.

I, Thomas Toscano, a Notary Public for the State of North Carolina, County of Wake, do hereby certify that Michael Scott Underwood personally appeared before me this 10 day of January, 2017, and acknowledge the due execution of the forgoing ~~wet detention~~ basin maintenance requirements. Witness my hand and official seal. *[Signature]*



SEAL

My commission expires Feb 15, 2021



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

## Wet Detention 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.

The wet detention basin system is defined as the wet detention basin, pretreatment including forebays and the vegetated filter if one is provided.

**This system (check one):**

does  does not incorporate a vegetated filter at the outlet.

**This system (check one):**

does  does not incorporate pretreatment other than a forebay.

Important maintenance procedures:

- Immediately after the wet detention basin is established, the plants on the vegetated shelf and perimeter of the basin should be watered twice weekly if needed, until the plants become established (commonly six weeks).
- No portion of the wet detention pond should be fertilized after the first initial fertilization that is required to establish the plants on the vegetated shelf.
- Stable groundcover should be maintained in the drainage area to reduce the sediment load to the wet detention basin.
- If the basin must be drained for an emergency or to perform maintenance, the flushing of sediment through the emergency drain should be minimized to the maximum extent practical.
- Once a year, a dam safety expert should inspect the embankment.

After the wet detention pond is established, it should be inspected **once a month and within 24 hours after every storm event greater than 1.5 inches**. Records of operation and maintenance should be kept in a known set location and must 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 side slopes of the wet detention 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.
	Vegetation is too short or too long.	Maintain vegetation at a height of approximately six inches.

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

<b>BMP element:</b>	<b>Potential problem:</b>	<b>How I will remediate the problem:</b>
The inlet device: pipe or swale	The pipe is clogged.	Unclog the pipe. Dispose of the sediment off-site.
	The pipe is cracked or otherwise damaged.	Replace the pipe.
	Erosion is occurring in the swale.	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.
The forebay	Sediment has accumulated to a depth greater than the original design depth for sediment storage.	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.	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 pesticide is used, wipe it on the plants rather than spraying.
The vegetated shelf	Best professional practices show that pruning is needed to maintain optimal plant health.	Prune according to best professional practices
	The plant community and coverage is significantly (>25%) different from approved landscape plan.	Restore plant vegetation to approved condition. If landscape plan needs to be adjusted to specify vegetation more appropriate for site conditions, contact City Stormwater or Engineering Staff.
	Cattails or other invasive plants cover >25% of the veg't shelf. A monoculture of plants must be avoided)	Remove all invasives by physical removal or by wiping them with pesticide (do not spray) - consult a professional.
	Plants are dead, diseased or dying.	Determine the source of the problem: soils, hydrology, disease, etc. Remedy the problem and replace plants. Provide a one-time fertilizer application to establish the ground cover if a soil test indicates it is necessary.
The main treatment area	Sediment has accumulated to a depth greater than the original design sediment storage 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.



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

BMP element:	Potential problem:	How I will remediate the problem:
The main treatment area (continued)	Algal growth covers over 25% of the area.	Consult a professional to remove and control the algal growth.
	Cattails or other invasive plants cover >25% of the veg't shelf. A monoculture of plants must be avoided)	Remove all invasives by physical removal or by wiping them with pesticide (do not spray) - consult a professional.
The embankment	Shrubs have started to grow on the embankment.	Remove shrubs immediately.
	Evidence of muskrat or beaver activity is present.	Use traps to remove muskrats and consult a professional to remove beavers.
	A tree has started to grow on the embankment.	Consult a dam safety specialist to remove the tree.
	An annual inspection by an appropriate professional shows that the embankment needs repair. (if applicable)	Make all needed repairs.
The outlet device	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.
The receiving water	Erosion or other signs of damage have occurred at the outlet.	Contact the local NC Division of Water Quality Regional Office, or the 401 Oversight Unit at 919-733-1786.

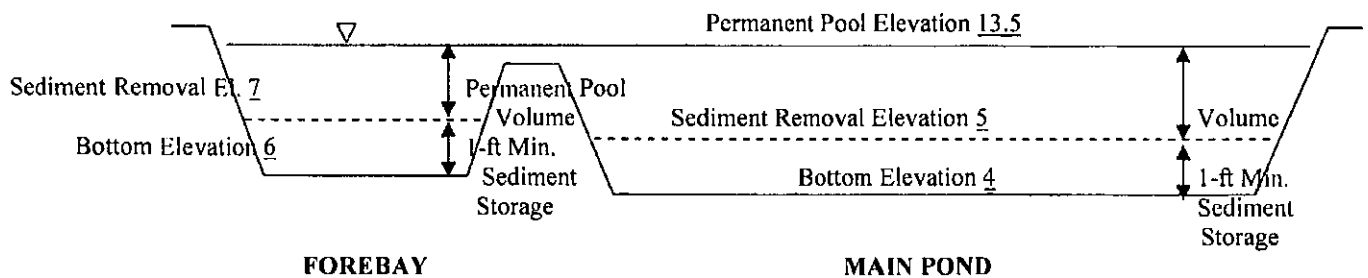
The measuring device used to determine the sediment elevation shall be such that it will give an accurate depth reading and not readily penetrate into accumulated sediments.

When the permanent pool depth reads 8.5 feet in the main pond, the sediment shall be removed.

When the permanent pool depth reads 6.5 feet in the forebay, the sediment shall be removed.

### BASIN DIAGRAM

(fill in the blanks)



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 the City of Wilmington of any problems with the system or prior to any changes to the system or responsible party.

Project name: Woodfield Wilmington Apartments

BMP drainage basin number: 2

Print name: Woodfield Acquisitions, LLC / Scott Underwood

Title: Developer

Address: 300 Mountain Maple Drive

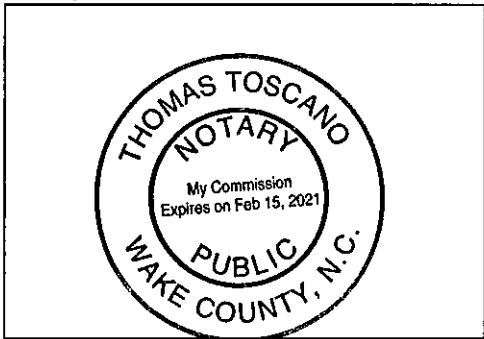
Phone: (919) 740-8877

Signature: *[Handwritten Signature]*

Date: 1/18/17

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, Thomas Toscano, a Notary Public for the State of North Carolina, County of Wake, do hereby certify that Michael Scott Underwood personally appeared before me this 18 day of January, 2017, and acknowledge the due execution of the forgoing wet detention basin maintenance requirements. Witness my hand and official seal, *[Handwritten Signature]*



SEAL

My commission expires Feb 15, 2021



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

## Wet Detention 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.

The wet detention basin system is defined as the wet detention basin, pretreatment including forebays and the vegetated filter if one is provided.

**This system (check one):**

does  does not incorporate a vegetated filter at the outlet.

**This system (check one):**

does  does not incorporate pretreatment other than a forebay.

Important maintenance procedures:

- Immediately after the wet detention basin is established, the plants on the vegetated shelf and perimeter of the basin should be watered twice weekly if needed, until the plants become established (commonly six weeks).
- No portion of the wet detention pond should be fertilized after the first initial fertilization that is required to establish the plants on the vegetated shelf.
- Stable groundcover should be maintained in the drainage area to reduce the sediment load to the wet detention basin.
- If the basin must be drained for an emergency or to perform maintenance, the flushing of sediment through the emergency drain should be minimized to the maximum extent practical.
- Once a year, a dam safety expert should inspect the embankment.

After the wet detention pond is established, it should be inspected **once a month and within 24 hours after every storm event greater than 1.5 inches**. Records of operation and maintenance should be kept in a known set location and must 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 side slopes of the wet detention 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.
	Vegetation is too short or too long.	Maintain vegetation at a height of approximately six inches.

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

<b>BMP element:</b>	<b>Potential problem:</b>	<b>How I will remediate the problem:</b>
The inlet device: pipe or swale	The pipe is clogged.	Unclog the pipe. Dispose of the sediment off-site.
	The pipe is cracked or otherwise damaged.	Replace the pipe.
	Erosion is occurring in the swale.	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.
The forebay	Sediment has accumulated to a depth greater than the original design depth for sediment storage.	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.	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 pesticide is used, wipe it on the plants rather than spraying.
The vegetated shelf	Best professional practices show that pruning is needed to maintain optimal plant health.	Prune according to best professional practices
	The plant community and coverage is significantly (>25%) different from approved landscape plan.	Restore plant vegetation to approved condition. If landscape plan needs to be adjusted to specify vegetation more appropriate for site conditions, contact City Stormwater or Engineering Staff.
	Cattails or other invasive plants cover >25% of the veg't shelf. A monoculture of plants must be avoided)	Remove all invasives by physical removal or by wiping them with pesticide (do not spray) - consult a professional.
	Plants are dead, diseased or dying.	Determine the source of the problem: soils, hydrology, disease, etc. Remedy the problem and replace plants. Provide a one-time fertilizer application to establish the ground cover if a soil test indicates it is necessary.
The main treatment area	Sediment has accumulated to a depth greater than the original design sediment storage 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.

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

BMP element:	Potential problem:	How I will remediate the problem:
The main treatment area (continued)	Algal growth covers over 25% of the area.	Consult a professional to remove and control the algal growth.
	Cattails or other invasive plants cover >25% of the veg't shelf. A monoculture of plants must be avoided)	Remove all invasives by physical removal or by wiping them with pesticide (do not spray) – consult a professional.
The embankment	Shrubs have started to grow on the embankment.	Remove shrubs immediately.
	Evidence of muskrat or beaver activity is present.	Use traps to remove muskrats and consult a professional to remove beavers.
	A tree has started to grow on the embankment.	Consult a dam safety specialist to remove the tree.
	An annual inspection by an appropriate professional shows that the embankment needs repair. (if applicable)	Make all needed repairs.
The outlet device	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.
The receiving water	Erosion or other signs of damage have occurred at the outlet.	Contact the local NC Division of Water Quality Regional Office, or the 401 Oversight Unit at 919-733-1786.

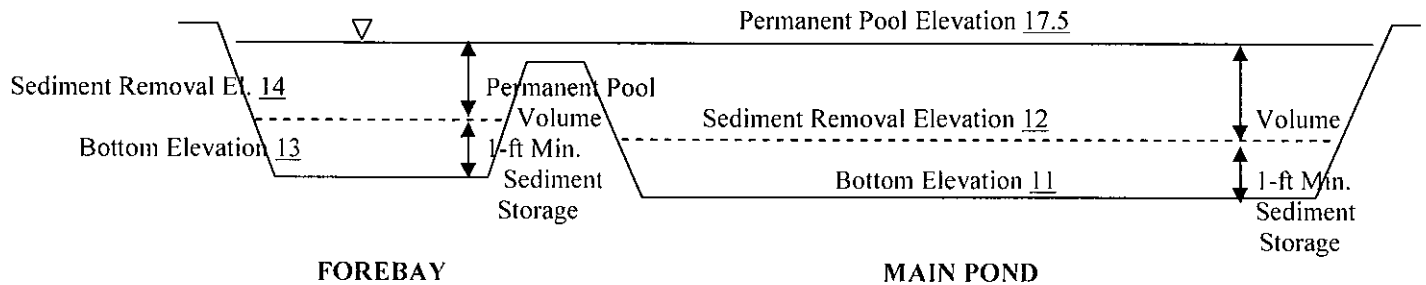
The measuring device used to determine the sediment elevation shall be such that it will give an accurate depth reading and not readily penetrate into accumulated sediments.

When the permanent pool depth reads 5.5 feet in the main pond, the sediment shall be removed.

When the permanent pool depth reads 3.5 feet in the forebay, the sediment shall be removed.

### BASIN DIAGRAM

(fill in the blanks)



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 the City of Wilmington of any problems with the system or prior to any changes to the system or responsible party.

Project name: Woodfield Wilmington Apartments

BMP drainage basin number: 3

Print name: Woodfield Acquisitions, LLC / Scott Underwood

Title: Developer

Address: 300 Mountain Maple Drive

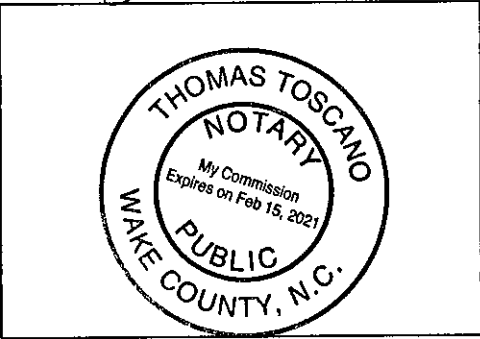
Phone: (919) 740-8877

Signature: *Michael Scott Underwood*

Date: 1/10/17

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, Thomas Toscano, a Notary Public for the State of North Carolina, County of Wake, do hereby certify that Michael Scott Underwood personally appeared before me this 18 day of January, 2017, and acknowledge the due execution of the forgoing wet detention basin maintenance requirements. Witness my hand and official seal.



SEAL

My commission expires Feb 15, 2021

## Permeable Pavement 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.

At all times, the pavement shall be kept free of:

- Debris and particulate matter through frequent blowing that removes such debris, particularly during the fall and spring.
- Piles of soil, sand, mulch, building materials or other materials that could deposit particulates on the pavement.
- Piles of snow and ice.
- Chemicals of all kinds, including deicers.

The permeable pavement will be inspected **once a quarter**. 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 to remediate the problem:
The perimeter of the permeable pavement	Areas of bare soil and/or erosive gullies	Regrade the soil if necessary to remove the gully, then plant ground cover and water until established.
	A vegetated area drains toward the pavement.	Regrade the area so that it drains away from the pavement, then plant ground cover and water until established.
The surface of the permeable pavement	Trash/debris present	Remove the trash/debris.
	Weeds	Do not pull the weeds (may pull out media as well). Spray them with a systemic herbicide such as glyphosate and then return within the week to remove them by hand. (Another option is to pour boiling water on them or steam them.)
	Sediment Rutting, cracking or slumping or damaged structure	Vacuum sweep the pavement. Consult an appropriate professional.
Observation well	Water present more than five days after a storm event	Clean out clogged underdrain pipes. Consult an appropriate professional for clogged soil subgrade.
Educational sign	Missing or is damaged.	Replace the sign.



Permit Number: \_\_\_\_\_  
(to be provided by DWQ)

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 DWQ of any problems with the system or prior to any changes to the system or responsible party.

Project name: Woodfield Wilmington Apartments

BMP drainage area or lot number: A, B, C, D, E, F, G, H

Print name: WF Independence Boulevard, LLC / Scott Underwood

Title: Developer

Address: 11425 Horsemans Trail Raleigh, NC 27613

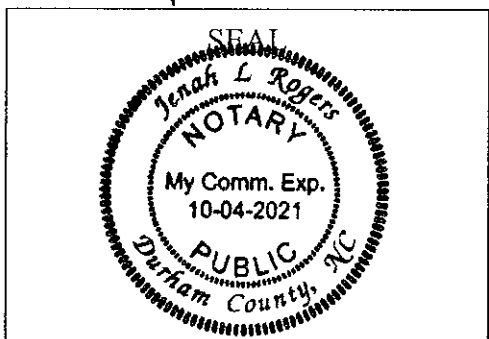
Phone: (919) 740-8877

Signature: M. Scott Underwood

Date: 6-21-17

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, Jenah L. Rogers, a Notary Public for the State of North Carolina, County of Durham, do hereby certify that M. Scott Underwood personally appeared before me this 21 day of June, 2017, and acknowledge the due execution of the forgoing permeable pavement maintenance requirements. Witness my hand and official seal, Jenah L. Rogers



My commission expires 10-04-2021