



**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: **Woodlands at Echo Farms, LLC**  
PROJECT: **Woodlands at Echo Farms - Ph. 1 - Tract 3B**  
ADDRESS: **4114 Echo Farms Boulevard**  
PERMIT #: **2018027R4**  
DATE: **March 4, 2020**

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 July 9, 2028 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 June 28, 2018.
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.

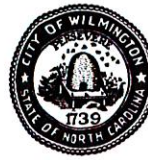


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5. The permittee shall submit a revised stormwater management application packet to the City of Wilmington and shall have received approval prior to construction, for any modification to the approved plans, including, but not limited to, those listed 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 stormwater treatment systems as well as access to nearest right-of-way must be located in recorded easements.
11. All applicable operation & maintenance agreements and easements pertaining to each stormwater treatment system shall be referenced on the final plat and recorded with the Register of Deeds upon final plat approval. If no plat is recorded for the site the operation and maintenance agreements and easements shall be recorded with the Register of Deeds so as to appear in the chain of title of all subsequent purchasers under generally accepted searching standards.
12. The stormwater management system shall be constructed in its entirety, vegetated and operational for its intended use prior to the construction of any built-upon surface unless prior approval is obtained. City Staff must be notified of any deviation prior to construction of the built-upon surface. Any deviation request shall include justification and must propose an alternative timeline or construction sequence. Notification shall not constitute approval. Any alternative timeline approved by City staff shall become an enforceable component of this permit.





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13. The permittee shall at all times provide the operation and maintenance necessary to assure the permitted stormwater system functions at optimum efficiency. The approved Operation and Maintenance Agreement must be followed in its entirety and maintenance must occur at the scheduled intervals including, but not limited to:
  - a. Scheduled inspections (interval noted on the agreement).
  - b. Sediment removal.
  - c. Mowing and revegetation of slopes and the vegetated areas.
  - d. Maintenance of landscape plants, including those within the landscape buffer and on the vegetated shelf.
  - e. Immediate repair of eroded areas, especially slopes.
  - f. Debris removal and unclogging of outlet structure, orifice device, flow spreader, catch basins and/or piping.
  - g. Access to the outlet structure must be available at all times.
14. Records of inspection, maintenance and repair for the permitted stormwater system must be kept by the permittee for at least 5 years from the date of record and made available upon request to authorized personnel of the City of Wilmington. The records will indicate the date, activity, name of person performing the work and what actions were taken.
15. Upon completion of construction, before a Certificate of Occupancy shall be granted, and prior to operation or intended use of this permitted facility, the applicant shall submit to the City of Wilmington as-built plans for all stormwater management facilities. The plans shall show the final design specifications and the field location, type, depth, invert and planted vegetation of all measures, controls and devices, as installed. A certification shall be submitted, along with all supporting documentation that specifies, under seal that the as-built stormwater measures, controls and devices are in compliance with the approved stormwater management plans. A final inspection by City of Wilmington personnel will be required prior to issuance of a certificate of occupancy or operation of the permitted facility.
16. This permit is not transferable except after application and approval by the City of Wilmington. In the event of a change of ownership, name change or change of address the permittee must submit a completed Name/Ownership Change form to the City of Wilmington at least 30 days prior to the change. It shall be signed by all applicable parties and be accompanied by all required supporting documentation. Submittal of a complete application shall not be construed as an approved application. The application will be reviewed on its own merits by the City of Wilmington and may or may not be approved. The project must be in compliance with the terms of this permit in order for the transfer request to be considered. The permittee is responsible for compliance with all permit conditions until such time as the City of Wilmington approves the transfer request. Neither the sale of the project nor the conveyance of common area to a third party should be considered as an approved transfer of the permit.
17. Failure to abide by the conditions and limitations contained in this permit may subject the Permittee to enforcement action by the City of Wilmington, in accordance with Sections 18-52 and 18-53 and any other applicable section of the Land Development Code.





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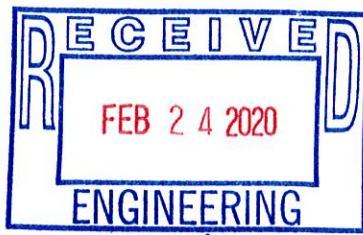
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18. The City of Wilmington may notify the permittee when the permitted site does not meet one or more of the minimum requirements of the permit. Within the time frame specified in the notice, the permittee shall submit a written time schedule to the City of Wilmington for modifying the site to meet minimum requirements. The permittee shall provide copies of revised plans and certification in writing to the City of Wilmington that the changes have been made.
19. The issuance of this permit does not preclude the Permittee from complying with any and all statutes, rules, regulations, or ordinances, which may be imposed by other government agencies (local, state, and federal) having jurisdiction.
20. In the event that the facilities fail to perform satisfactorily, including the creation of nuisance conditions, the Permittee shall take immediate corrective action, including those as may be required by the City of Wilmington, such as the construction of additional or replacement stormwater management systems.
21. The permittee grants City of Wilmington Staff permission to enter the property during normal business hours for the purpose of inspecting all components of the permitted stormwater management facility.
22. The permit issued shall continue in force and effect until revoked or terminated by the City of Wilmington. The permit may be modified, revoked and reissued or terminated for cause. The filing of a request for a permit modification, revocation and re-issuance or termination does not stay any permit condition.
23. The approved stormwater management plans and all documentation submitted as part of the approved stormwater management permit application package for this project are incorporated by reference and are enforceable parts of the permit.
24. The permittee shall submit a renewal request with all required forms and documentation at least 180 days prior to the expiration date of this permit.
25. If any one or more of the conditions of this permit is found to be unenforceable or otherwise invalidated, all remaining conditions shall remain in full effect.

Stormwater Management Permit issued this the 4th day of March, 2020

  
\_\_\_\_\_  
for Sterling Cheatham, City Manager  
City of Wilmington





\*unless noted otherwise



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STORMWATER MANAGEMENT PERMIT APPLICATION FORM
(Form SWP 2.3)

N&T #20010 (Ownership Transfer)
(Includes 16083 - Tract 3B &
18100 - Offsite Improvements)

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.):
Woodlands at Echo Farms - PH1 - Tract 3B
2. Location of Project (street address):
4114 Echo Farms Boulevard
City: Wilmington County: New Hanover Zip: 28412

II. PERMIT INFORMATION

- 1. Specify the type of project (check one): [ ] Low Density [x] High Density
[ ] Offsite Stormwater System [ ] Drainage Plan [ ] Redevelopment [ ] Other
If the project drains to an Offsite System, list the Stormwater Permit Number(s):
City of Wilmington: State - NCDEQ/DEMLR:
2. Is the project currently covered (whole or in part) by an existing City or State (NCDEQ/DEMLR) Stormwater Permit? [x] Yes [ ] No
If yes, list all applicable Stormwater Permit Numbers:
City of Wilmington: 2018027R3 (01-23-2020) State - NCDEQ/DEMLR:
3. Additional Project Permit Requirements (check all applicable):
[ ] CAMA Major [x] Sedimentation/Erosion Control [ ] 404/401 Permit

III. CONTACT INFORMATION

- 1. Print Applicant / Signing Official's name and title (the developer, property owner, lessee, designated government official, individual, etc. who owns the project):
Applicant / Organization: Woodlands at Echo Farms, LLC
Signing Official & Title: Kerry Avant, Manager

a. Contact information for Applicant / Signing Official:

Address: 2919 Breezewood Avenue, Suite 400

City: Fayetteville State: NC Zip: 28303

Phone: 910-486-4864 Email: KerryAvant@hhhomes.com

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

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

2. Print Property Owner's name and title (if different from the applicant).

Property Owner / Organization: \_\_\_\_\_

Signing Official & Title: \_\_\_\_\_

a. Contact information for Property Owner:

Street Address: \_\_\_\_\_

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

Phone: \_\_\_\_\_ Email: \_\_\_\_\_

3. (Optional) Other Contact name and title (such as a construction supervisor) who would like to be copied on all correspondence:

Other Contact Person / Organization: \_\_\_\_\_

Signing Official & Title: \_\_\_\_\_

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

Street Address: \_\_\_\_\_

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

Phone: \_\_\_\_\_ Email: \_\_\_\_\_

4. Agent Authorization: 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: John S. Tunstall, P.E.

Consulting Firm: Norris & Tunstall Consulting Engineers, P.C.

a. Contact information for consultant listed above:

Mailing Address: 2602 Iron Gate Drive, Suite 102

City: Wilmington State: NC Zip: 28412

Phone: 910-343-9653 Email: jtunstall@ntengineers.com

**& anorris@ntengineers.com**



**IV. PROJECT INFORMATION**

1. Total Property Area: 1603960 square feet Tract 3B (Phase 1) + Offsite Roadway Improvements
2. Total Coastal Wetlands Area: 0 square feet
3. Total Surface Water Area: 0 square feet
4. Total Property Area (1) – Total Coastal Wetlands Area (2) – Total Surface Water Area (3) = Total Project Area: 1603960 square feet.
5. Existing Impervious Surface within Project Area: 40575 square feet (Cart Path)
6. Existing Impervious Surface to be Removed/Demolished: 40575 square feet
7. Existing Impervious Surface to Remain: 0 square feet
8. Total Onsite (within property boundary) Newly Constructed Impervious Surface (in square feet):

Buildings/Lots	349600
Impervious Pavement	167871
Pervious Pavement (total area / adjusted area w credit applied)	0 /
Impervious Sidewalks	45969
Pervious Sidewalks (total area / adjusted area w credit applied)	0 /
Other (Describe)	22392
Future Development	56660
<b>Total Onsite Newly Constructed Impervious Surface</b>	<b>642492</b>

9. Total Onsite Impervious Surface  
(Existing Impervious Surface to remain + Onsite Newly Constructed Impervious Surface) 642492 square feet
10. Net Change in Onsite Impervious Surface (+ for net increase, - for net decrease) 601917 square feet
11. Project percent of impervious area: (Total Onsite Impervious Surface / Total Project Area) x100 = 40 %
12. Total Offsite Newly Constructed Impervious Area (in square feet):

Impervious Pavement	<del>25566</del> <u>26,566</u>
Pervious Pavement (total area / adjusted area w credit applied)	0 /
Impervious Sidewalks	1229
Pervious Sidewalks (total area / adjusted area w credit applied)	0 /
Other (Describe)	0
<b>Total Offsite Newly Constructed Impervious Surface</b>	<b>27795</b>

3/2/2020  
by RAC

13. Complete the following information for each Stormwater SCM drainage area. Low Density and Drainage Plan projects (with no permeable pavements) may omit this section and skip to Section V.

**\*\* SW Pond 3.1    SW Pond 3.2    SW Pond 3.3**

Basin Information	Type of SCM SCM # 1	Type of SCM SCM # 2	Type of SCM SCM # 3
Receiving Stream Name	Barnard's Creek	Barnard's Creek	Barnard's Creek
Receiving Stream Index Number	18-80	18-80	18-80
Stream Classification	C; SW	C; SW	C; SW
Total Drainage Area (sf)	359465	974303	251790
On-Site Drainage Area (sf)	339495	863364	225595
Off-Site Drainage Area (sf)	19970	110939	26195
Buildings/Lots (sf)	85900	208200	36500
Impervious Pavement (sf)	35966	88611	23383
Pervious Pavement (total / adjusted) (sf)	0 /	0 /	0 /
Impervious Sidewalks (sf)	9967	22968	7383
Pervious Sidewalks (total / adjusted) (sf)	0 /	0 /	0 /
Other (sf)            MUP	817	17319	1930
Future Development (sf)	20000	16660	10000
Existing Impervious to remain (sf)	0	0	2635
Offsite (sf)            New	0	0	2890
<b>Total Impervious Area (sf)</b>	<b>152650</b>	<b>353758</b>	<b>84721</b>
<b>Percent Impervious Area (%)</b>	<b>42.5%</b>	<b>36.31%</b>	<b>33.65%</b>

\* Offsite

**SW Pond 3.4    Offsite Roadway Improvements**

Basin Information	Type of SCM SCM # 4	Type of SCM SCM #	Type of SCM SCM #
Receiving Stream Name	Barnard's Creek	Barnard's Creek	
Receiving Stream Index Number	18-80	18-80	
Stream Classification	C; SW	C; SW	
Total Drainage Area (sf)	169185	87213	
On-Site Drainage Area (sf)	148196	0	
Off-Site Drainage Area (sf)	20989	87213	
Buildings/Lots (sf)	19000	0	
Impervious Pavement (sf)	19011	0	
Pervious Pavement (total / adjusted) (sf)	0 /	0 /	/
Impervious Sidewalks (sf)	4276	0	
Pervious Sidewalks (total / adjusted) (sf)	0 /	0 /	/
Other (sf)            MUP	2126	0	
Future Development (sf)	10000	0	
Existing Impervious to remain (sf)	7850	0	
Offsite (sf)            New	1791	21371	
<b>Total Impervious Area (sf)</b>	<b>64054</b>	<b>21371</b>	
<b>Percent Impervious Area (%)</b>	<b>37.86%</b>	<b>24.5%</b>	

\* Offsite

\* Offsite existing that drains into pond from existing Echo Development.

\*\* This DA drains offsite to Pond 3.1B in Tract 3A (Ponds 3.2, 3.3 & 3.4 remain unchanged).



**V. SUBMITTAL REQUIREMENTS**

Only complete application packages will be accepted and reviewed by the City. A complete package includes all of the items listed below. Copies of forms, deed restrictions, checklists as well as detailed instructions on how to complete this application form may be downloaded from the City of Wilmington Plan Review website below:

<https://www.wilmingtonnc.gov/departments/engineering/plan-review/stormwater-permits>

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

Please indicate that the following required information have been provided by initialing in the space provided for each item.

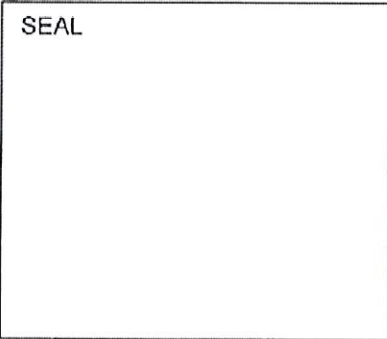
- |                                                                                                                                                                                                                          | Initials |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 1. One completed Stormwater Management Permit Application Form.                                                                                                                                                          | JST/aon  |
| 2. One completed Supplement Form for each SCM proposed (signed, sealed and dated).                                                                                                                                       | JST/aon  |
| 3. One completed Operation & Maintenance agreement for each <u>type</u> of SCM.                                                                                                                                          | JST/aon  |
| 4. Proposed Deed Restrictions and Restrictive Covenants (for all subdivisions)                                                                                                                                           | JST/aon  |
| 5. Appropriate stormwater permit review fee. (N/A for Permit Transfer)                                                                                                                                                   | N/A      |
| 6. Minimum requirements identified on the Engineering Plan Review Checklist have been addressed.                                                                                                                         | N/A      |
| 7. One set of calculations (sealed, signed and dated).                                                                                                                                                                   | N/A      |
| 8. A detailed narrative (one to two pages) describing the stormwater treatment/management system for the project.                                                                                                        | N/A      |
| 9. A USGS map identifying the site location. If the receiving stream is reported as class SA or the receiving stream drains to class SA waters within ½ mile of the site boundary, include the ½ mile radius on the map. | N/A      |
| 10. A copy of the soils report, if applicable. Must meet NCDEQ SCM Manual and MDC requirements for the type of SCM proposed. The report must include boring logs and a map of boring locations.                          | N/A      |
| 11. One full set of plans <u>folded to 8.5" x 14"</u> .                                                                                                                                                                  | N/A      |
| 12. A map delineating and labeling the drainage area for each SCM proposed.                                                                                                                                              | N/A      |
| 13. A map delineating and labeling the drainage area for each inlet and conveyance proposed.                                                                                                                             | N/A      |
| 14. A digital copy of the entire submittal package (can be submitted via flash drive, CD, email, dropbox or other file sharing system).                                                                                  | JST/aon  |

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

I, \_\_\_\_\_, certify that I own the property identified in this permit application, and thus give permission to \_\_\_\_\_ with \_\_\_\_\_ 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 \_\_\_\_\_ 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: \_\_\_\_\_

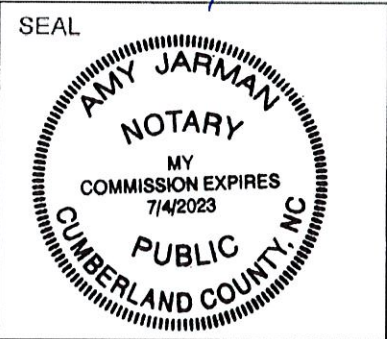


I, \_\_\_\_\_, a Notary Public for the State of \_\_\_\_\_, County of \_\_\_\_\_, do hereby certify that \_\_\_\_\_ personally appeared before me this day of \_\_\_\_\_, \_\_\_\_\_ and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal,  
\_\_\_\_\_  
My commission expires: \_\_\_\_\_

**VII. APPLICANT'S CERTIFICATION**

I, Kerry Avant, Manager certify that the information included on this permit application form is, to the best of my knowledge, correct and that the project will be constructed in conformance with the approved plans, that the required deed restrictions and protective covenants will be recorded, and that the proposed project complies with the requirements of the applicable rules under the City's Comprehensive Stormwater Ordinance.

Signature: Kerry L. Avant Date: 2/18/2020



I, Amy Jarman, a Notary Public for the State of NC, County of Cumberland, do hereby certify that Kerry L. Avant personally appeared before me this day of February 18, 2020, and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal,  
[Signature]  
My commission expires: 7/4/23



**High Density Residential Subdivisions**  
**Deed Restrictions & Protective Covenances**

**N&T #20010 (Ownership Transfer)**

(Includes 16083 – Tract 3B & 18100 – Offsite Improvements)

In accordance with Article 14, Division III of the City of Wilmington Land Development Code, deed restrictions and protective covenants are required for High Density Residential Subdivisions where lots will be subdivided and sold and runoff will be treated in an engineered stormwater control facility. Deed restrictions and protective covenants are necessary to ensure that the development maintains a "built-upon" area consistent with the design criteria used to size the stormwater control facility.

I, **Kerry Avant, Manager of Woodlands at Echo Farms, LLC**, acknowledge, affirm and agree by my signature below, that I will cause the following deed restrictions and covenants to be recorded prior to the sale of any lot:

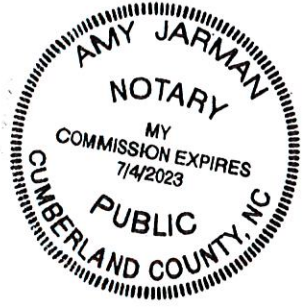
1. *The following covenants are intended to ensure ongoing compliance with the city of Wilmington Stormwater Management Permit Number **2018027R3**, as issued by the City of Wilmington/Engineering*
2. *The City of Wilmington is made a beneficiary of these covenants to the extent necessary to maintain compliance with the stormwater management permit.*
3. *These covenants are to run with the land and be binding on all persons and parties claiming under them.*
4. *The covenants pertaining to stormwater may not be altered or rescinded without the express written consent of the City of Wilmington.*
5. *Alteration of the drainage as shown on the approved plan may not take place without the concurrence of the City of Wilmington*
6. *The maximum allowable built-upon area per lot is 3,800 square feet. This allotted amount includes any built-upon area constructed within the lot property boundaries, and that portion of the right-of-way between the front lot line and the edge of the pavement. Built upon area includes, but is not limited to, structures, asphalt, concrete, gravel, brick, stone, slate, coquina and parking areas, but does not include raised, open wood decking, or the water surface of swimming pools.*
7. *All runoff from the built-upon areas on the lot must drain into the permitted system. This may be accomplished through a variety of means including roof drain gutters which drain to the street, grading the lot to drain toward the street, or grading perimeter swales to collect the lot runoff and directing them into a component of the stormwater collection system. Lots that will naturally drain into the system are not required to provide these additional measures.*
8. Lot 17 extends into 12.5 foot line of the Conservation Resource. Due to this, the allowable BUA within this 12.5 foot line is limited to 1,386 SF.

Signature: *Kerry C Avant* Date: *2/18/2020*

I, *Amy Jarman*, a Notary Public in the State of *NC*,  
County of *Cumberland*, do hereby certify that *Kerry C. Avant*  
personally appeared before me this the *18* day of *February*, 20 *20*, and acknowledge the due execution of the foregoing instrument. Witness my hand and official seal,

SEAL

Signature *[Signature]*  
My Commission expires *7/4/23*





**SUPPLEMENT-EZ FORM COVER PAGE**

NAT # 16083  
(Removed 3.1)



Please indicate the types, quantities and locations of SCMs that will be used on this project:

Quantity	Location(s)
	Infiltration System
	Bioretention Cell
3	Wet Pond See Plans
	Stormwater Wetland
	Permeable Pavement
	Sand Filter
	Rainwater Harvesting
	Green Roof
	Level Spreader-Filter Strip
	Disconnected Impervious Surface
	Treatment Swale
	Dry Pond

[Refresh Sheet \(Click Button Below\)](#)

**Project Name:**

Woodlands at Echo Farms - PH1 - Tract 3B

**Address**

4114 Echo Farms Boulevard

**City / Town**

Wilmington, NC

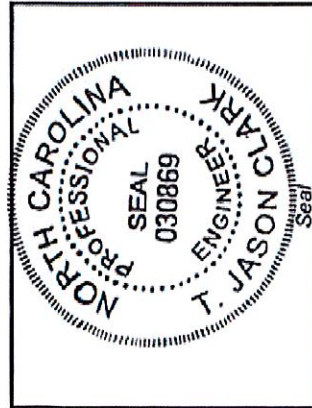
**Designer information for this project:**

**Name and Title:** T. Jason Clark, P.E.  
**Organization:** Norris & Tunstall Consulting Engineers, P.C.  
**Street address:** 1900 Eastwood Road, Suite 11  
**City, State, Zip:** Wilmington, NC 28403  
**Phone number(s):** 910-343-9653  
**Email:** tjclark@ntengineers.com cc: anorris@ntengineers.com

**Applicant:**

**Company:** Echo Farms, LLC  
**Contact:** Joseph S. Taylor, Manager  
**Mailing Address:** c/o Matrix Development Group, CN 4000  
**City, State, Zip:** Cranbury, NJ 08512  
**Phone number(s):** 732-521-2900  
**Email:** jtaylor@matrixcompanies.com

**Designer**



[Refresh Sheet \(Click Button Below\)](#)

*[Signature]*  
Signature of Designer  
Date: 4/29/2019

**Certification Statement:**

I certify, under penalty of law, that this Supplement-EZ form and all supporting information were prepared under my direction or supervision;  
 - that the information provided in the form is, to the best of my knowledge and belief, true, accurate, and complete; and

- that the engineering plans, specifications, operation and maintenance agreements and other supporting information are consistent with the information provided here.

I am aware that there are significant penalties for submitting false information including the possibility of fines and imprisonment for knowing violations as well as a report being made to my professional board.

**RECEIVED**

**APR 29 2019**

**ENGINEERING**



# WET POND

Woodlands at Echo Farms - PH1 - Tract 3B

16083  
(Tract 3B)  
Revised  
4-5-18

THE DRAINAGE AREA		Pond 3.1	Break down of BUA in the drainage area (both new and existing):	
Drainage area number		0 sf	- Parking / driveway (sq ft)	35,966 sf
Total coastal wetlands area (sq ft)		0 sf	- Sidewalk (sq ft)	9,967 sf
Total surface water area (sq ft)		664,524 sf	- Roof (sq ft)	85,900 sf
Total drainage area (sq ft)		0 sf	- Roadway (sq ft) <i>MUP</i>	817 sf
BUA associated with existing development (sq ft)		300,374 sf	- Other, please specify in the comment box below (sq ft) <i>Future</i>	16,7724 sf
Proposed new BUA (sq ft)		45.2%	<b>Total BUA (sq ft)</b>	300,374 sf
Percent BUA of drainage area				
<b>COMPLIANCE WITH THE APPLICABLE STORMWATER PROGRAM</b>				
Stormwater program(s) that apply (please specify):				
2017 Coastal SW Rules				
<b>GENERAL MDC FROM 02H .1050</b>				
#1	Method used	SA/DA	#6 Width of the vegetated shelf (feet)	6 ft
#1	Surface area of the main permanent pool (square feet)	13,862 sf	#6 Location of vegetated shelf	Submerged
#1	Volume of the main permanent pool (cubic feet)	53412 cf	#6 Elevation of top of shelf (fmsl)	10 ft
#2	Average depth of the main pool (feet)	5.1 ft	#6 Elevation of bottom of shelf (fmsl)	9 ft
#2	Was the vegetated shelf included in the calculation of average depth?	No	#6 Slope of vegetated shelf (H:V)	6:1
#2	Elevation of the bottom of the permanent pool (fmsl) <i>Sediment Removal Elev.</i>	3 ft	#7 Diameter of drawdown orifice (inches)	3.0 in
#2	Elevation of the top of the permanent pool (fmsl)	10 ft	#7 Drawdown time for the temporary pool (hours)	59 hrs
#2	Elevation of the top of the temporary pool (fmsl)	12 ft	#7 Does the orifice drawdown from below the top surface of the permanent pool?	yes
#3	Depth provided for sediment storage (inches)	12 in	#8 Does the pond minimize impacts to the receiving channel from the 1-yr. 24-hr storm?	yes
#4	Are the inlet(s) and outlet located in a manner that avoids short-circuiting?	Yes	#9 Are fountains proposed?	no
#4	Describe any measures, such as berms or baffles, that will be taken to improve the flow path:		#9 If yes, is documentation provided per Wet Pond MDC (9)?	No
N/A			#10 Is a trash rack or other device provided to protect the outlet system?	YES
#5	Volume of the forebay (cubic feet)	9,518	#11 Are the dam and embankment planted in non-clumping turf grass?	YES
#5	Is this 15-20% of the volume in the main pool?	yes	#11 Species of turf that will be used on the dam and embankment	Bermuda
#5	Depth of forebay at entrance (inches)	60 in	#11 Describe the planting plan for the vegetated shelf: Minimum of 3 diverse species of herbaceous, native species. Minimum 50 plants per 200 SF of shelf.	
#5	Depth of forebay at exit (inches)	48 in		
#5	Does water flow out of the forebay in a non-erosive manner?	yes		
#5	Clean-out depth for forebay (inches)	48 in		
#5	Will the forebay be cleaned out when the depth is reduced to less than the above?	yes		
<b>ADDITIONAL INFORMATION</b>				
Please use this space to provide any additional information about this wet pond that you think is relevant to the review:				

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# WET POND

16083 (Tract 3B) Revised 04-05-18

Woodlands at Echo Farms - PH1 - Tract 3B

## THE DRAINAGE AREA

Drainage area number	Pond 3.2	2
Total coastal wetlands area (sq ft)	0 sf	Break down of BUA in the drainage area (both new and existing):
Total surface water area (sq ft)	0 sf	- Parking / driveway (sq ft)
Total drainage area (sq ft)	974303 sf	- Sidewalk (sq ft)
BUA associated with existing development (sq ft)	0 sf	- Roof (sq ft)
Proposed new BUA (sq ft)	353758 sf	- Roadway (sq ft) <i>mud</i>
Percent BUA of drainage area	36.31%	- Other, please specify in the comment box below (sq ft) <i>Future</i>
<b>Total BUA (sq ft)</b>		

## COMPLIANCE WITH THE APPLICABLE STORMWATER PROGRAM

Stormwater program(s) that apply (please specify):  
 2017 Coastal SW Rules

## GENERAL MDC FROM 02H .1050

#1 Is the SCM sized to treat the SW from all surfaces at build-out?	yes	#7 If applicable, with the SCM be cleaned out after construction?	yes
#2 Is the SCM located on or near contaminated soils?	no	#8 Does the maintenance access comply with General MDC (8)?	yes
#3 What are the side slopes of the SCM (H:V)?	3:1, 6:1, 2:1	#9 Does the drainage easement comply with General MDC (9)?	yes
#3 Does the SCM have retaining walls, gabion walls or other engineered side slopes?	no	#10 If the SCM is on a single family lot, does the plat comply with General MDC (10)?	no
#4 Are the inlets, outlets, and receiving stream protected from erosion (10-year storm)?	yes	#11 Is there an O&M Agreement that complies with General MDC (11)?	yes
#5 Is there a bypass for flows in excess of the design flow?	yes	#12 Is there an O&M Plan that complies with General MDC (12)?	yes
#6 What is the method for dewatering the SCM for maintenance?	Pump (preferred)	#13 Was the SCM designed by an NC licensed professional?	yes

## WET POND MDC FROM 02H .1053

#1 Method used	SA/DA	#6 Width of the vegetated shelf (feet)	6 ft
#1 Surface area of the main permanent pool (square feet)	22955 sf	#6 Location of vegetated shelf	Submerged
#1 Volume of the main permanent pool (cubic feet)	83189 cf	#6 Elevation of top of shelf (fmsl)	5 ft
#2 Average depth of the main pool (feet)	3.5 ft	#6 Elevation of bottom of shelf (fmsl)	4 ft
#2 Was the vegetated shelf included in the calculation of average depth?	no	#6 Slope of vegetated shelf (H:V)	6:1
#2 Elevation of the bottom of the permanent pool (fmsl)	0, 2.2	#7 Diameter of drawdown orifice (inches)	4.0 in
#2 Elevation of the top of the permanent pool (fmsl)	5 ft	#7 Drawdown time for the temporary pool (hours)	50.4 hrs
#3 Depth provided for sediment storage (inches)	6.2 ft	#7 Does the orifice drawdown from below the top surface of the permanent pool?	yes
#4 Are the inlet(s) and outlet located in a manner that avoids short-circuiting?	12 in	#8 Does the pond minimize impacts to the receiving channel from the 1-yr. 24-hr storm?	yes
#4 Describe any measures, such as berms or baffles, that will be taken to improve the flow path:	yes	#9 Are fountains proposed?	no
N/A		#9 If yes, is documentation provided per Wet Pond MDC (9)?	no
#5 Volume of the forebay (cubic feet)	16,242	#10 Is a trash rack or other device provided to protect the outlet system?	yes
#5 Is this 15-20% of the volume in the main pool?	yes	#11 Are the dam and embankment planted in non-clumping turf grass?	yes
#5 Depth of forebay at entrance (inches)	48 in	#11 Species of turf that will be used on the dam and embankment	Bermuda
#5 Depth of forebay at exit (inches)	36 in	#11 Describe the planting plan for the vegetated shelf:	
#5 Does water flow out of the forebay in a non-erosive manner?	yes	Minimum of 3 diverse species of herbaceous, native species. Minimum 50 plants per 200 SF of shelf.	
#5 Clean-out depth for forebay (inches)	36 in		
#5 Will the forebay be cleaned out when the depth is reduced to less than the above?	yes		

## ADDITIONAL INFORMATION

Please use this space to provide any additional information about this wet pond that you think is relevant to the review.  
 Pond is made up of 3 separate ponds, connected by equalization piping.

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# WET POND

16083 (Tract 3B) Revised 04-05-18

Woodlands at Echo Farms - PH1 - Tract 3B

## THE DRAINAGE AREA

Drainage area number	Pond 3.3	3
Total coastal wetlands area (sq ft)	0 sf	23383 sf
Total surface water area (sq ft)	0 sf	7383 sf
Total drainage area (sq ft)	251790 sf	36500 sf
BUA associated with existing development (sq ft)	0 sf	1930 sf
Proposed new BUA (sq ft)	84721 sf	15525 SF*
Percent BUA of drainage area	34%	84721 sf

## COMPLIANCE WITH THE APPLICABLE STORMWATER PROGRAM

Stormwater program(s) that apply (please specify):

2017 Coastal SW Rules

## GENERAL MDC FROM 02H .1050

#1 Is the SCM sized to treat the SW from all surfaces at build-out?	Yes	#7 If applicable, with the SCM be cleaned out after construction?	Yes
#2 Is the SCM located on or near contaminated soils?	No	#8 Does the maintenance access comply with General MDC (8)?	Yes
#3 What are the side slopes of the SCM (H:V)?	3:1, 6:1, 2:1	#9 Does the drainage easement comply with General MDC (9)?	Yes
#3 Does the SCM have retaining walls, gabion walls or other engineered side slopes?	No	#10 If the SCM is on a single family lot, does the plat comply with General MDC (10)?	No
#4 Are the inlets, outlets, and receiving stream protected from erosion (10-year storm)?	Yes	#11 Is there an O&M Agreement that complies with General MDC (11)?	Yes
#5 Is there a bypass for flows in excess of the design flow?	Yes	#12 Is there an O&M Plan that complies with General MDC (12)?	Yes
#6 What is the method for dewatering the SCM for maintenance?	Pump (preferred)	#13 Was the SCM designed by an NC licensed professional?	Yes

## WET POND MDC FROM 02H .1053

#1 Method used	SAVDA	#6 Width of the vegetated shelf (feet)	6 ft
#1 Surface area of the main permanent pool (square feet)	17301 sf	#6 Location of vegetated shelf	Submerged
#1 Volume of the main permanent pool (cubic feet)	55642 cf	#6 Elevation of top of shelf (fmsl)	13 ft
#2 Average depth of the main pool (feet)	4.4 ft	#6 Elevation of bottom of shelf (fmsl)	12 ft
#2 Was the vegetated shelf included in the calculation of average depth?	No	#6 Slope of vegetated shelf (H:V)	6:1
#2 Elevation of the bottom of the permanent pool (fmsl)	7.9 ft	#7 Diameter of drawdown orifice (inches)	2.5 in
#2 Elevation of the top of the permanent pool (fmsl)	13 ft	#7 Drawdown time for the temporary pool (hours)	56.64 hrs
#2 Elevation of the top of the temporary pool (fmsl)	13.75 ft	#7 Does the orifice drawdown from below the top surface of the permanent pool?	Yes
#3 Depth provided for sediment storage (inches)	12 in	#8 Does the pond minimize impacts to the receiving channel from the 1-yr, 24-hr storm?	Yes
#4 Are the inlet(s) and outlet located in a manner that avoids short-circuiting?	Yes	#9 Are fountains proposed?	No
#4 Describe any measures, such as berms or baffles, that will be taken to improve the flow path.	N/A	#9 If yes, is documentation provided per Wet Pond MDC (9)?	Yes
#5 Volume of the forebay (cubic feet)	10524	#10 Is a trash rack or other device provided to protect the outlet system?	Yes
#5 Is this 15-20% of the volume in the main pool?	Yes	#11 Are the dam and embankment planted in non-clumping turf grass?	Yes
#5 Depth of forebay at entrance (inches)	60 in & 72 in	#11 Species of turf that will be used on the dam and embankment	Bermuda
#5 Depth of forebay at exit (inches)	48 in & 60 in	#11 Describe the planting plan for the vegetated shelf:	Minimum of 3 diverse species of herbaceous, native species. Minimum 50 plants per 200 SF of shelf.
#5 Does water flow out of the forebay in a non-erosive manner?	Yes		
#5 Clean-out depth for forebay (inches)	48 in & 60 in		
#5 Will the forebay be cleaned out when the depth is reduced to less than the above?	Yes		

## ADDITIONAL INFORMATION

Please use this space to provide any additional information about this wet pond that you think is relevant to the review.

\*BUA - Other - 10,000 SF Future; 5,525 SF Offsite.

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# WET POND

16083 (Tract 3B) Revised 4-5-18

Woodlands at Echo Farms - PH1 - Tract 3B

## THE DRAINAGE AREA

Drainage area number	Pond 3.4	4
Total coastal wetlands area (sq ft)	0 sf	Break down of BUA in the drainage area (both new and existing):
Total surface water area (sq ft)	0 sf	- Parking / driveway (sq ft)
Total drainage area (sq ft)	169185 sf	- Sidewalk (sq ft)
BUA associated with existing development (sq ft)	0 sf	- Road (sq ft)
Proposed new BUA (sq ft)	64054 sf	- Roadway (sq ft) <b>MUP</b>
Percent BUA of drainage area	<b>31.86%</b>	- Other, please specify in the comment box below (sq ft)
		<b>Total BUA (sq ft)</b>
		19011 sf
		4276 sf
		19000 sf
		2126 sf
		19641 SF*
		64054 sf

## COMPLIANCE WITH THE APPLICABLE STORMWATER PROGRAM

Stormwater program(s) that apply (please specify):

2017 Coastal SW Rules

## GENERAL MDC FROM 02H .1050

#1 Is the SCM sized to treat the SW from all surfaces at build-out?	Yes	#7 If applicable, with the SCM be cleaned out after construction?	Yes
#2 Is the SCM located on or near contaminated soils?	No	#8 Does the maintenance access comply with General MDC (8)?	Yes
#3 What are the side slopes of the SCM (H:V)?	3:1, 6:1, 2:1	#9 Does the drainage easement comply with General MDC (9)?	Yes
#3 Does the SCM have retaining walls, gabion walls or other engineered side slopes?	No	#10 If the SCM is on a single family lot, does the plat comply with General MDC (10)?	No
#4 Are the inlets, outlets, and receiving stream protected from erosion (10-year storm)?	Yes	#11 Is there an O&M Agreement that complies with General MDC (11)?	Yes
#5 Is there a bypass for flows in excess of the design flow?	Yes	#12 Is there an O&M Plan that complies with General MDC (12)?	Yes
#6 What is the method for dewatering the SCM for maintenance?	Pump (preferred)	#13 Was the SCM designed by an NC licensed professional?	Yes

## WET POND MDC FROM 02H .1053

#1 Method used	SAVDA	#6 Width of the vegetated shelf (feet)	6 ft
#1 Surface area of the main permanent pool (square feet)	5060 sf	#6 Location of vegetated shelf	Submerged
#1 Volume of the main permanent pool (cubic feet)	13745 cf	#6 Elevation of top of shelf (fmsl)	6.25 ft
#2 Average depth of the main pool (feet)	3.9 ft	#6 Elevation of bottom of shelf (fmsl)	5.25 ft
#2 Was the vegetated shelf included in the calculation of average depth?	No	#6 Slope of vegetated shelf (H:V)	6:1
#2 Elevation of the bottom of the permanent pool (fmsl)	0 ft	#7 Diameter of drawdown orifice (inches)	1.5 in
#2 Elevation of the top of the permanent pool (fmsl)	6.25 ft	#7 Drawdown time for the temporary pool (hours)	71.04 hrs
#2 Elevation of the top of the temporary pool (fmsl)	7.5 ft	#7 Does the orifice drawdown from below the top surface of the permanent pool?	Yes
#3 Depth provided for sediment storage (inches)	12 in	#8 Does the pond minimize impacts to the receiving channel from the 1-yr, 24-hr storm?	Yes
#4 Are the inlet(s) and outlet located in a manner that avoids short-circuiting?	Yes	#9 Are fountains proposed?	No
#4 Describe any measures, such as berms or baffles, that will be taken to improve the flow path:	N/A	#9 If yes, is documentation provided per Wet Pond MDC (9)?	No
#5 Volume of the forebay (cubic feet)	2584	#10 Is a trash rack or other device provided to protect the outlet system?	Yes
#5 Is this 15-20% of the volume in the main pool?	Yes	#11 Are the dam and embankment planted in non-clumping turf grass?	Yes
#5 Depth of forebay at entrance (inches)	75 in	#11 Species of turf that will be used on the dam and embankment	Bermuda
#5 Depth of forebay at exit (inches)	63 in	#11 Describe the planting plan for the vegetated shelf:	Minimum of 3 diverse species of herbaceous, native species. Minimum 50 plants per 200 SF of shelf.
#5 Does water flow out of the forebay in a non-erosive manner?	Yes		
#5 Clean-out depth for forebay (inches)	33 in		
#5 Will the forebay be cleaned out when the depth is reduced to less than the above?	Yes		

## ADDITIONAL INFORMATION

Please use this space to provide any additional information about this wet pond that you think is relevant to the review.

\*BUA - Other - 10,000 SF Future: 9,641 SF Offsite.

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STORMWATER MANAGEMENT PERMIT APPLICATION FORM

**OFF-SITE SYSTEM SUPPLEMENT**

FOR DEVELOPMENT DRAINING TO PERMITTED OFF-SITE TREATMENT SYSTEMS

*This form may be photocopied for use as an original*

NT # 20010 (Ownership Transfer)  
(Includes 1pp83 - Tract 3B +  
18100 - Offsite Improvements)

City of Wilmington Stormwater Management Plan Review:

A complete stormwater management plan submittal includes a stormwater management permit application, an off-site system supplement for each off-site stormwater treatment system, appropriate supplement forms for any on-site stormwater treatment systems, and plans and specifications showing all stormwater conveyances and drainage details for the project.

**I. PROJECT INFORMATION**

Project Name : Woodlands at Echo Farms - PH1 - Tract 3B

Contact Person: Kerry Avant Phone Number: (910)486-4864

Is all drainage from the project directed to the off-site system? (check one):  Yes  No

**II. OFF-SITE SYSTEM INFORMATION** (please complete the following information for the off-site system that will treat runoff from your project):

Permit No. \_\_\_\_\_

Project Name: Woodlands Tract 3A

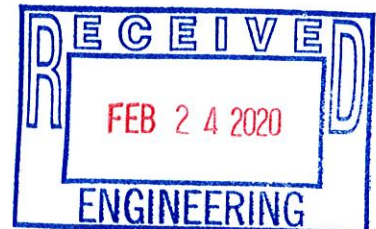
Type of System (wet pond, infiltration basin, etc.): Wet Pond

Lot No. (if part of a subdivision): \_\_\_\_\_

How much built upon area draining to the permitted treatment system has been allocated to this project? 152,650 SF

**III. REQUIRED ITEMS CHECKLIST**

Prior to issuing an off-site permit, verification of the following information must be provided. Initial in the space provided to indicate that the following requirements have been met and supporting documentation is attached. If the applicant has designated an agent in the Stormwater Management Permit Application Form, the agent may initial below. If a requirement has not been met, attach justification.



Applicants Initials

Not Built Yet  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- a. Deed restrictions limiting the built-upon area on the site have been recorded.
- b. Engineers certification for the existing off-site system has been submitted to DWQ.
- c. There are no outstanding Notices of Violation for the off-site system.
- d. Off-site system is in compliance with the issued permit.

**IV. STORMWATER COLLECTION SYSTEM MAINTENANCE REQUIREMENTS**

- 1. Mowing will be accomplished as needed according to the season. Grass height will not exceed six inches at any time.
- 2. Accumulated sediment and trash will be removed from the collection system as necessary. Swales and ditches will be reseeded or sodded following sediment removal.
- 3. Eroded areas of swales and ditches will be repaired and reseeded. Swales and ditches will be revegetated as needed based on monthly inspections.
- 4. The collection system, including catch basins, curb cuts, velocity reduction devices, and piping, will be inspected monthly or after every significant runoff producing rainfall event. Trash and debris will be cleared away from grates, curb cuts, velocity reduction devices, and piping.
- 5. The collection system may not be altered in any way without prior approval from the City of Wilmington Engineering Division.

I acknowledge and agree by my signature below that I am responsible for maintaining the stormwater collection system in accordance with the five 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.

Print Name and Title: Kerry Avant, Manager of Woodlands at Echo Farms, LLC

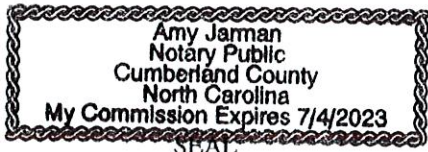
Address: 2919 Breezewood Avenue, Suite 400 Fayetteville, NC 28303

Phone: 910-486-4864 Date: 2/18/2020

Signature: *Kerry C. Avant*

*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, Amy Jarman, a Notary Public for the State of NC, County of Cumberland, do hereby certify that Kerry C. Avant personally appeared before me this 18 day of February, 2020, and acknowledge the due execution of the forgoing document including the stormwater collection system maintenance requirements. Witness my hand and official seal,



*[Signature]*  
Notary Public  
My commission expires 7/4/23  
Page 2 of 2



# Operation & Maintenance Agreement

**Project Name:** Woodlands at Echo Farms - PH1 - Tract 3B

**Project Location:** 4114 Echo Farms Boulevard, Wilmington, NC

## Cover Page

Maintenance records shall be kept on the following BMP(s). This maintenance record shall 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 pollutant removal efficiency of the BMP(s).

*(Includes 16083 - Tract 3B + 18100 - offsite improvements)*

*NT #20010 (Ownership Transfer)*

The BMP(s) on this project include (check all that apply & corresponding O&M tables will be added automatically):

Bioretention Cell	Quantity:		Location(s):	
Dry Detention Basin	Quantity:		Location(s):	
Grassed Swale	Quantity:		Location(s):	
Green Roof	Quantity:		Location(s):	
Infiltration Basin	Quantity:		Location(s):	
Infiltration Trench	Quantity:		Location(s):	
Level Spreader/VFS	Quantity:		Location(s):	
Permeable Pavement	Quantity:		Location(s):	
Proprietary System	Quantity:		Location(s):	
Rainwater Harvesting	Quantity:		Location(s):	
Sand Filter	Quantity:		Location(s):	
Stormwater Wetland	Quantity:		Location(s):	
Wet Detention Basin	Quantity:	3	Location(s):	See Plans
Disconnected Impervious Area	Present:	No	Location(s):	
User Defined BMP	Present:	No	Location(s):	

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed for each BMP above, and attached O&M tables. I agree to notify NCDENR of any problems with the system or prior to any changes to the system or responsible party.

\* Responsible Party: **Kerry Avant**

Title & Organization: **Manager of Woodlands at Echo Farms, LLC**

Street address: **2919 Breezewood Avenue, Suite 400**

City, state, zip: **Fayetteville, NC 28303**

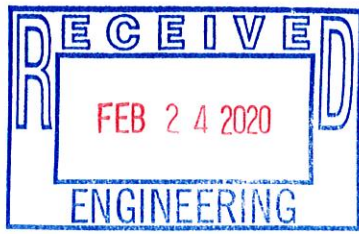
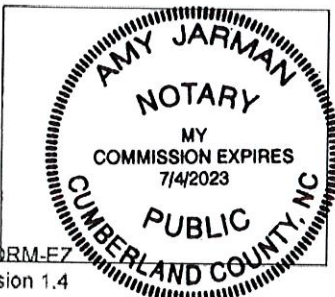
Phone number(s): **910-486-4864**

Email: **KerryAvant@hhhomes.com**

Signature: *Kerry C. Avant* Date: *2/18/2020*

I, *Amy Jarman*, a Notary Public for the State of *NC*  
 County of *Cumberland*, do hereby certify that *Kerry C. Avant*  
 personally appeared before me this *18* day of *February* *2020* and  
 acknowledge the due execution of the Operations and Maintenance Agreement.

Witness my hand and official seal, *[Signature]*





Seal

My commission expires

7/4/23



## Wet Detention Pond Maintenance Requirements

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

### 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 1.0 inches (or 1.5 inches if in a Coastal County)**. 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 perimeter of the BMP	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.
The inlet device	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.
	Stone verge is clogged or covered in sediment (if applicable).	Remove sediment and replace with clean stone.
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
	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.
	Weeds are present.	Remove the weeds, preferably by hand. If pesticide is used, wipe it on the plants rather than spraying.



**Wet Detention Pond Maintenance Requirements (Continued)**

<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.
	Algal growth covers over 50% of the area.	Consult a professional to remove and control the algal growth.
	Cattails, phragmites or other invasive plants cover 50% of the basin surface.	Remove the plants by wiping them with pesticide (do not spray).
<b>The embankment</b>	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.
<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 local NC Department of Environment and Natural Resources Regional Office.
<p align="center">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.</p>		



**Wet Detention Pond Design Summary**

Wet Pond Diagram

WET POND ID		FOREBAY		MAIN POND	
3.2		3.2B-2A + 3.2B-3A		3.2B-1 3.2B-3	
Pretreatment other than forebay?	No	Permanent Pool El.	5	Permanent Pool El.	5
Has Veg. Filter?	No	Temporary Pool El:	6.2	Temporary Pool El:	6.2
		Clean Out Depth:	3	Clean Out Depth:	3
		Sediment Removal El:	2	Sediment Removal El:	0
		Bottom Elevation:	1	Bottom Elevation:	-1
3.3		3.3B-1A 3.3B-1B		3.3B-1 3.3B-2	
Pretreatment other than forebay?	No	Permanent Pool El.	13	Permanent Pool El.	13
Has Veg. Filter?	No	Temporary Pool El:	13.75	Temporary Pool El:	13.75
		Clean Out Depth:	4	Clean Out Depth:	6
		Sediment Removal El:	9	Sediment Removal El:	7
		Bottom Elevation:	8	Bottom Elevation:	6
3.4					
Pretreatment other than forebay?	No	Permanent Pool El.	6.25	Permanent Pool El.	6.25
Has Veg. Filter?	No	Temporary Pool El:	7.5	Temporary Pool El:	7.5
		Clean Out Depth:	2.75	Clean Out Depth:	6.25
		Sediment Removal El:	3.5	Sediment Removal El:	0
		Bottom Elevation:	0	Bottom Elevation:	-1

3.2B-2 +

3.3B-1 3.3B-2