



Public Services

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

January 23, 2020

Mr. Joseph S. Taylor, Manager
Echo Farms, LLC
3 Centre Drive
Monroe Township, NJ 08831

**Subject: Stormwater Management Permit No. 2018027R3
Woodlands at Echo Farms - Ph. 1 - Tract 3B
High Density Development**

Dear Mr. Taylor:

The City of Wilmington Engineering Division has received a request for a revision to the Stormwater Management Permit for Woodlands at Echo Farms - Ph. 1 - Tract 3B. Having reviewed the application and all supporting materials, the City of Wilmington has determined that the proposed revision meets the requirements of the City of Wilmington's Comprehensive Stormwater Ordinance.

The revisions include:

- Addition of the Woodlands Road Improvements plan set. See approved plans dated January 23, 2020.
- Correction: The plans signed on January 23, 2020 with permit revision number 2018027R2 should have been signed as 2018027R3.

Please be aware all terms and conditions of the permit Issued on July 9, 2018 remain in full force and effect. Any additional changes to the approved plans must be approved by this office prior to construction. The issuance of the plan revision does not preclude the permittee from complying with all other applicable statutes, rules, regulations or ordinances which may have jurisdiction over the proposed activity and obtaining a permit or approval prior to construction.

The revised stamped, approved stormwater management drawings will be released for construction by the Wilmington Planning Division under separate cover. Please replace any old plan sheets from the approved set with the new, revised sheet. An electronic copy of the approved drawing set, permit, application and supplementary documents will be maintained by the Wilmington Engineering Division. If you have any questions, or need additional information, please contact Richard Christensen at (910) 341-7813 or richard.christensen@wilmingtonnc.gov

Sincerely,

for Sterling Cheatham, City Manager
City of Wilmington

cc: T. Jason Clark, PE, Norris & Tunstall Consulting Engineers, P.C.
Brian Chambers, Senior Planner, City of Wilmington



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 414 Chestnut St, Suite 200
 Wilmington, NC 28401
 910 341-7807
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**unless noted otherwise*

*N+T # 18100
 (Incl. 16083
 Tract 3B)*

STORMWATER MANAGEMENT PERMIT APPLICATION FORM
 (Form SWP 2.2)

I. GENERAL INFORMATION

- 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 (Added in Offsite Roadway Improvements)
- Location of Project (street address):
4114 Echo Farms Boulevard
 City: Wilmington County: New Hanover Zip: 28412
- Directions to project (from nearest major intersection):
From the intersection of Independence Blvd. & US 421 (Carolina Beach Rd.), travel Southeast ~4,610'. Echo Farms is on the left.

II. PERMIT INFORMATION

- 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: _____
- 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: 2018027 (07-09-18) State - NCDENR/DWQ: _____
- Additional Project Permit Requirements (check all applicable):
 CAMA Major Sedimentation/Erosion Control
 NPDES Industrial Stormwater 404/401 Permit: Proposed Impacts: _____
 If any of these permits have already been acquired please provide the Project Name, Project/Permit Number, issue date and the type of each permit:
All required permits have been submitted & are under review.

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: Echo Farms, LLC

Signing Official & Title: Joseph S. Taylor, Manager

- a. Contact information for Applicant / Signing Official:

Street Address: c/o Matrix Development Group, 3 Centre Drive

City: Monroe Township State: NJ Zip: 08831

Phone: 732-521-2900 Fax: 609-395-8289 Email: jtaylor@matrixcompanies.com

Mailing Address (if different than physical address): c/o Matrix Development Group, CN 4000

City: Cranbury State: NJ Zip: 08512

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

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

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

Property Owner / Organization: _____

Signing Official & Title: _____

- a. Contact information for Property Owner:

Street Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Mailing Address (if different than physical address): _____

City: _____ State: _____ Zip: _____

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

Other Contact Person / Organization: _____

Signing Official & Title: _____

N&T #18100
(Incl. 16083
Tract 3B)

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 in four (4) stormwater ponds.

2. Total Property Area: 1,603,960 square feet

Tract 3B (Phase 1) + Offsite Roadway Improvements

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: 1,603,960 square feet.

6. Existing Impervious Surface within Property Area: 40,575 square feet (Cart Path)

7. Existing Impervious Surface to be Removed/Demolished: 40,575 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	349,600
Impervious Pavement	167,871
Pervious Pavement (adj. total, with 0 % credit applied)	0
Impervious Sidewalks	45,969
Pervious Sidewalks (adj. total, with 0 % credit applied)	0
Other (describe) MUP	22,392
Future Development	56,660
Total Onsite Newly Constructed Impervious Surface	642,492

10. Total Onsite Impervious Surface

(Existing Impervious Surface to remain + Onsite Newly Constructed Impervious Surface) = 642,492 square feet

11. Project percent of impervious area: (Total Onsite Impervious Surface / Total Project Area) x100 = 40 %

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

Impervious Pavement	26,566
Pervious Pavement (adj. total, with 0 % credit applied)	0
Impervious Sidewalks	1,229
Pervious Sidewalks (adj. total, with 0 % credit applied)	0
Other (describe) MUP	0
Total Offsite Newly Constructed Impervious Surface	27,795

13. Total Newly Constructed Impervious Surface

(Total Onsite + Offsite Newly Constructed Impervious Surface) = 670287 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.

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

Basin Information	(Type of BMP) BMP # 1	(Type of BMP) BMP # 2	(Type of BMP) BMP # 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
Total Impervious Area (sf)	152650	353758	84721
Buildings/Lots (sf)	85900	208200	36500
Impervious Pavement (sf)	35966	88611	23383
Pervious Pavement, <i>0</i> % credit (sf)	0	0	0
Impervious Sidewalks (sf)	9967	22968	7383
Pervious Sidewalks, <i>0</i> % credit (sf)	0	0	0
Other (sf) <i>MUP</i>	817	17319	1930
Future Development (sf)	20000	16660	10000
Existing Impervious to remain (sf)	0	0	2635
Offsite (sf) <i>New</i>	0	0	2890
Percent Impervious Area (%)	42.5%	36.31%	33.65%

** offsite*

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

GIS & Survey

** 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)*

*N&T #18100
(Incl. 16083
Tract 3B)*

BMP Drainage area information (continued)

SW Pond 3.4

*offsite
Roadway
Improvements*

Basin Information	(Type of BMP) BMP # 4	(Type of BMP) BMP #	(Type of BMP) BMP #
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	0
On-Site Drainage Area (sf)	148196	0	
Off-Site Drainage Area (sf)	20989	87213	
Total Impervious Area (sf)	64054	21371	0
Buildings/Lots (sf)	19000	0	
Impervious Pavement (sf)	19011	0	
Pervious Pavement, <i>Ø</i> % credit (sf)	0	0	
Impervious Sidewalks (sf)	4276	0	
Pervious Sidewalks, <i>Ø</i> % credit (sf)	0	0	
Other (sf) <i>MUP</i>	2126	0	
Future Development (sf)	10000	0	
Existing Impervious to remain (sf)	7850	0	
Offsite (sf) <i>New</i>	1791	21371	
Percent Impervious Area (%)	37.86%	24.5%	
Basin Information	(Type of BMP) BMP #	(Type of BMP) BMP #	(Type of BMP) BMP #
Receiving Stream Name			
Receiving Stream Index Number			
Stream Classification			
Total Drainage Area (sf)	0	0	0
On-Site Drainage Area (sf)			
Off-Site Drainage Area (sf)			
Total Impervious Area (sf)	0	0	0
Buildings/Lots (sf)			
Impervious Pavement (sf)			
Pervious Pavement, % credit (sf)			
Impervious Sidewalks (sf)			
Pervious Sidewalks, % credit (sf)			
Other (sf)			
Future Development (sf)			
Existing Impervious to remain (sf)			
Offsite (sf)			
Percent Impervious Area (%)			

** offsite*

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

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
414 Chestnut Street, Suite 200
Wilmington, NC 28402

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: John S. Tunstall, P.E. or T. Jason Clark, P.E.

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

a. Contact information for consultant listed above:

Mailing Address: 1900 Eastwood Road, Suite 11

City: Wilmington State: NC Zip: 28403

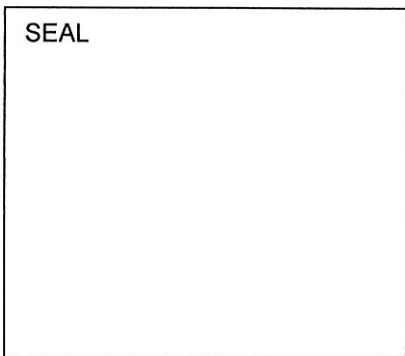
Phone: 910-343-9653 Fax: 910-343-9604 Email: jtunstall@ntengineers.com or jclark@ntengineers.com

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

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

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

Signature: _____ Date: _____

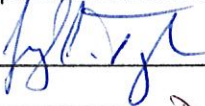


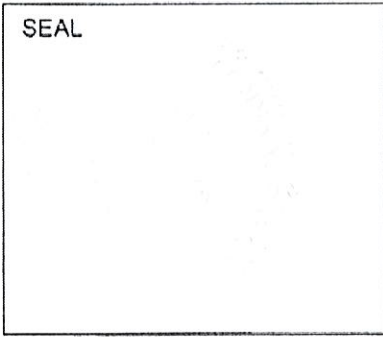
I, _____, a Notary Public for the State of _____, County of _____, do hereby certify that _____ personally appeared before me this day of _____, _____, and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal,

My commission expires: _____

VIII. APPLICANT'S CERTIFICATION

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

Signature:  Date: 3.25.19



I, Donna M. Papkin, a Notary Public for the State of New Jersey, County of Middlesex, do hereby certify that Joseph S. Taylor personally appeared before me this day of March 25, 2019, and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal.
Donna M. Papkin
My commission expires: _____

Donna M. Papkin
Notary Public of New Jersey
ID# 50090750
My Commission Expires October 1, 2023

High Density Residential Subdivisions
Deed Restrictions & Protective Covenances

NT#16083
(Tract 3B)

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, Joseph S. Taylor, Manager of 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 _____, 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 19 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: _____ Date: 3/22/18

I, Jennifer A. Torre, a Notary Public in the State of New Jersey, County of Monmouth, do hereby certify that Joseph S. Taylor personally appeared before me this the 22nd day of March, 2018, and acknowledge the due execution of the foregoing instrument. Witness my hand and official seal,

SEAL.

Signature Jennifer A. Torre
My Commission expires _____



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APR 9 2018
ENGINEERING

WET POND

Woodlands at Echo Farms - PH1 - Tract 3B

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

THE DRAINAGE AREA

Drainage area number	Pond 3.1	Break down of BUA in the drainage area (both new and existing):	
Total coastal wetlands area (sq ft)	0 sf	- Parking / driveway (sq ft)	35,966 sf
Total surface water area (sq ft)	0 sf	- Sidewalk (sq ft)	9,967 sf
Total drainage area (sq ft)	664,524 sf	- Roof (sq ft)	85,900 sf
BUA associated with existing development (sq ft)	0 sf	- Roadway (sq ft) MUP	817 sf
Proposed new BUA (sq ft)	300,374 sf	- Other, please specify in the comment box below (sq ft)	167,724 sf
Percent BUA of drainage area	45.2%	Total BUA (sq ft)	300,374 sf

Future

COMPLIANCE WITH THE APPLICABLE STORMWATER PROGRAM

Stormwater program(s) that apply (please specify):	2017 Coastal SW Rules	Design rainfall depth (in)	1.5 in
		Minimum volume required (cu ft)	37,945 cf
		Design volume of SCM (cu ft)	40,962 sf

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)	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:	N/A	#9 If yes, is documentation provided per Wet Pond MDC (9)?	No
#5 Volume of the forebay (cubic feet)	9,518	#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	#11 Species of turf that will be used on the dam and embankment	Bermuda
#5 Depth of forebay at exit (inches)	48 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)	48 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.

RECEIVED
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ENGINEERING

WET POND

11083 (Tract 3B) Revised 04-05-18

Woodlands at Echo Farms - PH1 - Tract 3B

THE DRAINAGE AREA

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

Future

COMPLIANCE WITH THE APPLICABLE STORMWATER PROGRAM

Stormwater program(s) that apply (please specify):	Design rainfall depth (in)
2017 Coastal SW Rules	Minimum volume required (cu ft)
	Design volume of SCM (cu ft)

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
#4 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
#5 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
#6 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
#2 Elevation of the top of the temporary pool (fmsl)	6.2 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)	16,242	#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)	48 in	#11 Describe the planting plan for the vegetated shelf:	
#5 Depth of forebay at exit (inches)	36 in	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)	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

3

THE DRAINAGE AREA

Drainage area number	Pond 3.3	Break down of BUA in the drainage area (both new and existing):
Total coastal wetlands area (sq ft)	0 sf	- Parking / driveway (sq ft)
Total surface water area (sq ft)	0 sf	- Sidewalk (sq ft)
Total drainage area (sq ft)	251790 sf	- Roof (sq ft)
BUA associated with existing development (sq ft)	0 sf	- Roofway (sq ft) MUP
Proposed new BUA (sq ft)	84721 sf	- Other, please specify in the comment box below (sq ft)
Percent BUA of drainage area	34%	Total BUA (sq ft)

COMPLIANCE WITH THE APPLICABLE STORMWATER PROGRAM

Stormwater program(s) that apply (please specify):	Design rainfall depth (in)	1.5 in
2017 Coastal SW Rules	Minimum volume required (cu ft)	11105 cf
	Design volume of SCM (cu ft)	16672 cf

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)	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:		#9 If yes, is documentation provided per Wet Pond MDC (9)?	
N/A		#10 Is a trash rack or other device provided to protect the outlet system?	Yes
#5 Volume of the forebay (cubic feet)	10524	#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 & 72 in	#11 Describe the planting plan for the vegetated shelf:	
#5 Depth of forebay at exit (inches)	48 in & 60 in	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		Pond 3.4	
Drainage area number		0 sf	19011 sf
Total coastal wetlands area (sq ft)		0 sf	4276 sf
Total surface water area (sq ft)		169185 sf	19000 sf
Total drainage area (sq ft)		0 sf	2126 sf
BUA associated with existing development (sq ft)		64054 sf	19641 SF*
Proposed new BUA (sq ft)		366	64054 sf
Percent BUA of drainage area		31.86%	
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		Yes
#2 Is the SCM located on or near contaminated soils?	No		Yes
#3 What are the side slopes of the SCM (H:V)?	3:1, 6:1, 2:1		Yes
#3 Does the SCM have retaining walls, gabion walls or other engineered side slopes?	No		No
#4 Are the inlets, outlets, and receiving stream protected from erosion (10-year storm)?	Yes		Yes
#5 Is there a bypass for flows in excess of the design flow?	Yes		Yes
#6 What is the method for dewatering the SCM for maintenance?	Pump (preferred)		Yes
WET POND MDC FROM 02H-.1053			
#1 Method used	SA/DA		6 ft
#1 Surface area of the main permanent pool (square feet)	5060 sf		Submerged
#1 Volume of the main permanent pool (cubic feet)	13745 cf		6.25 ft
#2 Average depth of the main pool (feet)	3.9 ft		5.25 ft
#2 Was the vegetated shelf included in the calculation of average depth?	No		6:1
#2 Elevation of the bottom of the permanent pool (fmsl)	0 ft		1.5 in
#2 Elevation of the top of the permanent pool (fmsl)	6.25 ft		71.04 hrs
#3 Depth provided for sediment storage (inches)	7.5 ft		Yes
#4 Are the inlet(s) and outlet located in a manner that avoids short-circuiting?	12 in		Yes
#4 Describe any measures, such as berms or baffles, that will be taken to improve the flow path:	Yes		No
N/A			No
#5 Volume of the forebay (cubic feet)	2584		Yes
#5 Is this 15-20% of the volume in the main pool?	Yes		Yes
#5 Depth of forebay at entrance (inches)	75 in		Bermuda
#5 Depth of forebay at exit (inches)	63 in		
#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

N&T #16083
(Tract 3B)

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: Joseph S. Taylor Phone Number: (732)521-2900

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.
- Not Built Yet b. Engineers certification for the existing off-site system has been submitted to DWQ.
- Not Built Yet c. There are no outstanding Notices of Violation for the off-site system.
- Not Built Yet 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: Joseph S. Taylor, Manager of Echo Farms, LLC

Address: c/o Matrix Development Group, CN 4000 Cranbury, NJ 08512

Phone: 732-521-2900 Date: 3.25.19

Signature: [Handwritten Signature]

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, Donna M. Papkin, a Notary Public for the State of New Jersey, County of Middlesex, do hereby certify that Joseph S. Taylor personally appeared before me this 25th day of March, 2019, and acknowledge the due execution of the forgoing document including the stormwater collection system maintenance requirements. Witness my hand and official seal,

Donna M. Papkin
Notary Public

My commission expires _____
Donna M. Papkin
Notary Public of New Jersey
ID# 50090750
My Commission Expires October 1, 2023

SEAL

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).

NJT #16083
(Tract 3B)

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.

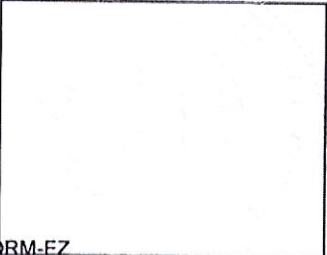
* Responsible Party: **Joseph S. Taylor**
 Title & Organization: **Manager of Echo Farms, LLC**
 Street address: **c/o Matrix Development Group, CN 4000**
 City, state, zip: **Cranbury, NJ 08512**
 Phone number(s): **732-521-2900**
 Email: **jtaylor@matrixcompanies.com**

Signature: *[Signature]* Date: 3.25.19

I, Donna M. Papkin, a Notary Public for the State of New Jersey
 County of Middlesex, do hereby certify that Joseph S. Taylor
 personally appeared before me this 25th day of March 2019 and

acknowledge the due execution of the Operations and Maintenance Agreement.

Witness my hand and official seal, Donna M. Papkin



Donna M. Papkin
 Notary Public of New Jersey
 ID# 50090750
 My Commission Expires October 1, 2023



Seal

My commission expires

Donna M. Papkin
~~Notary Public of New Jersey~~
ID# 50090750
My Commission Expires **October 1, 2023**

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)

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.
	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).
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 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

3.2B-2 +

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