



**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: Cape Fear Public Utility Authority**  
**PROJECT: Sweeney Water Plant**  
**ADDRESS: 1833 5<sup>th</sup> Avenue North**  
**PERMIT #: 2008035**  
**DATE: 2/1/2016**

Therefore, the above referenced site is hereby approved and subject to all conditions set forth in Section 2 of this approval and all applicable provisions of the City of Wilmington Comprehensive Stormwater Management Ordinance.

This permit shall be effective from the date of issuance until 2/1/2026 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 1/28/2016 and the plans previously approved by City Stormwater Discharge Permit 2008035 on 8/21/2008.
2. The project will be limited to the amount and type of built-upon area indicated in Section IV of the Stormwater Management Application Form submitted as part of the approved stormwater permit application package, and per the approved plans.
3. This permit shall become void unless the facilities are constructed in accordance with the approved stormwater management plans, specifications and supporting documentation, including information provided in the application and supplements.
4. The runoff from all built-upon area within any permitted drainage area must be directed into the permitted stormwater control system for that drainage area.
5. The permittee shall submit a revised stormwater management application packet to the City of Wilmington and shall have received approval prior to construction, for any modification to the approved plans, including, but not limited to, those listed below:
  - a. Any revision to any item shown on the approved plans, including the stormwater management measures, built-upon area, details, etc.
  - b. Redesign or addition to the approved amount of built-upon area or to the drainage area.
  - c. Further subdivision, acquisition, lease or sale of any part of the project area.
  - d. Filling in, altering, or piping of any vegetative conveyance shown on the approved plan.
  - e. Construction of any permitted future areas shown on the approved plans.



**Public Services**

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

6. A copy of the approved plans and specifications shall be maintained on file by the Permittee.
7. During construction, erosion shall be kept to a minimum and any eroded areas of the system will be repaired immediately.
8. If the stormwater system was used as an Erosion Control device, it must be restored to design condition prior to operation as a stormwater treatment device, and prior to issuance of any certificate of occupancy for the project.
9. All areas must be maintained in a permanently stabilized condition. If vegetated, permanent seeding requirements must follow the guidelines established in the North Carolina Erosion and Sediment Control Planning and Design Manual unless an alternative is specified and approved by the City of Wilmington.
10. All applicable operation & maintenance agreements and easements pertaining to each stormwater treatment system shall be referenced on the final plat and recorded with the Register of Deeds upon final plat approval. If no plat is recorded for the site the operation and maintenance agreements and easements shall be recorded with the Register of Deeds so as to appear in the chain of title of all subsequent purchasers under generally accepted searching standards.
11. The stormwater management system shall be constructed in its entirety, vegetated and operational for its intended use prior to the construction of any built-upon surface unless prior approval is obtained. City Staff must be notified of any deviation prior to construction of the built-upon surface. Any deviation request shall include justification and must propose an alternative timeline or construction sequence. Notification shall not constitute approval. Any alternative timeline approved by City staff shall become an enforceable component of this permit.
12. The permittee shall at all times provide the operation and maintenance necessary to assure the permitted stormwater system functions at optimum efficiency. The approved Operation and Maintenance Agreement must be followed in its entirety and maintenance must occur at the scheduled intervals including, but not limited to:
  - a. Scheduled inspections (interval noted on the agreement).
  - b. Sediment removal.
  - c. Mowing and revegetation of slopes and the vegetated areas.
  - d. Maintenance of landscape plants, including those within the landscape buffer and on the vegetated shelf.
  - e. Immediate repair of eroded areas, especially slopes.
  - f. Debris removal and unclogging of outlet structure, orifice device, flow spreader, catch basins and/or piping.
  - g. Access to the outlet structure must be available at all times.
13. Records of inspection, maintenance and repair for the permitted stormwater system must be kept by the permittee for at least 5 years from the date of record and made available upon request to authorized personnel of the City of Wilmington. The records will indicate the date, activity, name of person performing the work and what actions were taken.



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14. A final inspection by City of Wilmington personnel will be required prior to issuance of a certificate of occupancy or operation of the permitted facility.
15. This permit is not transferable except after application and approval by the City of Wilmington. In the event of a change of ownership, name change or change of address the permittee must submit a completed Name/Ownership Change form to the City of Wilmington at least 30 days prior to the change. It shall be signed by all applicable parties, and be accompanied by all required supporting documentation. Submittal of a complete application shall not be construed as an approved application. The application will be reviewed on its own merits by the City of Wilmington and may or may not be approved. The project must be in compliance with the terms of this permit in order for the transfer request to be considered. The permittee is responsible for compliance with all permit conditions until such time as the City of Wilmington approves the transfer request. Neither the sale of the project nor the conveyance of common area to a third party should be considered as an approved transfer of the permit.
16. Failure to abide by the conditions and limitations contained in this permit may subject the Permittee to enforcement action by the City of Wilmington, in accordance with Sections 18-52 and 18-53 and any other applicable section of the Land Development Code.
17. The City of Wilmington may notify the permittee when the permitted site does not meet one or more of the minimum requirements of the permit. Within the time frame specified in the notice, the permittee shall submit a written time schedule to the City of Wilmington for modifying the site to meet minimum requirements. The permittee shall provide copies of revised plans and certification in writing to the City of Wilmington that the changes have been made.
18. The issuance of this permit does not preclude the Permittee from complying with any and all statutes, rules, regulations, or ordinances, which may be imposed by other government agencies (local, state, and federal) having jurisdiction.
19. In the event that the facilities fail to perform satisfactorily, including the creation of nuisance conditions, the Permittee shall take immediate corrective action, including those as may be required by the City of Wilmington, such as the construction of additional or replacement stormwater management systems.
20. The permittee grants City of Wilmington Staff permission to enter the property during normal business hours for the purpose of inspecting all components of the permitted stormwater management facility.
21. The permit issued shall continue in force and effect until revoked or terminated by the City of Wilmington. The permit may be modified, revoked and reissued or terminated for cause. The filing of a request for a permit modification, revocation and re-issuance or termination does not stay any permit condition.
22. The approved stormwater management plans and all documentation submitted as part of the approved stormwater management permit application package for this project are incorporated by reference and are enforceable parts of the permit.
23. The permittee shall submit a renewal request with all required forms and documentation at least 180 days prior to the expiration date of this permit.

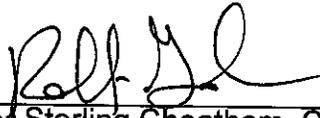


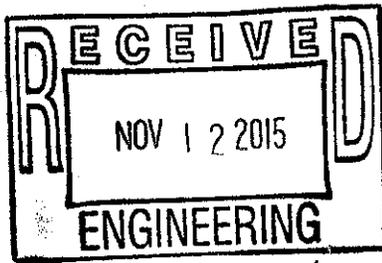
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24. If any one or more of the conditions of this permit is found to be unenforceable or otherwise invalidated, all remaining conditions shall remain in full effect.

Stormwater Management Permit issued this the 1<sup>st</sup> day of February, 2016

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



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 Wilmington, NC 28412  
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*unless otherwise noted*

**STORMWATER MANAGEMENT PERMIT APPLICATION FORM**  
 (Form SWP 2.2)

**I. GENERAL INFORMATION**

1. Project Name (subdivision, facility, or establishment name - should be consistent with project name on plans, specifications, letters, operation and maintenance agreements, etc.):

CFPUA - Sweeney Water Plant Parking Lot Expansion

2. Location of Project (street address):

1833 5th Avenue North

City: Wilmington County: New Hanover Zip: 28401

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

From the intersection of J.E.L. Wade Drive & Cornelius Harnett Drive, follow J.E.L. Wade Drive north for approximately 1000 feet. The site will be straight ahead.

**II. PERMIT INFORMATION**

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

If the project drains to an Offsite System, list the Stormwater Permit Number(s):

City of Wilmington: \_\_\_\_\_ State - NCDENR/DWQ: \_\_\_\_\_

2. Is the project currently covered (whole or in part) by an existing City or State (NCDENR/DWQ) Stormwater Permit?  Yes  No

If yes, list all applicable Stormwater Permit Numbers:

City of Wilmington: \_\_\_\_\_ State - NCDENR/DWQ: SW8 940330

3. Additional Project Permit Requirements (check all applicable):

CAMA Major  Sedimentation/Erosion Control

NPDES Industrial Stormwater  ~~404/401 Permit~~: Proposed Impacts: \_\_\_\_\_

If any of these permits have already been acquired please provide the Project Name, Project/Permit Number, issue date and the type of each permit:

\_\_\_\_\_

**III. CONTACT INFORMATION**

1. Print Applicant / Signing Official's name and title (specifically the developer, property owner, lessee, designated government official, individual, etc. who owns the project):

Applicant / Organization: Cape Fear Public Utility Authority  
Signing Official & Title: James R. Flechtner, Executive Director

- a. Contact information for Applicant / Signing Official:

Street Address: 235 Government Center Drive  
City: Wilmington State: NC Zip: 28403  
Phone: 910-332-6625 Fax: 910-332-6413 Email: jim.flechtner@cfpua.org  
Mailing Address (if different than physical address): same  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

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

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

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

Property Owner / Organization: \_\_\_\_\_  
Signing Official & Title: \_\_\_\_\_

- a. Contact information for Property Owner:

Street Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_  
Mailing Address (if different than physical address): \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

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

Other Contact Person / Organization: \_\_\_\_\_  
Signing Official & Title: \_\_\_\_\_

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

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

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

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

Mailing Address (if different than physical address): \_\_\_\_\_

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

#### IV. PROJECT INFORMATION

1. In the space provided below, briefly summarize how the stormwater runoff will be treated.

Stormwater runoff from the impervious and pervious areas will sheet flow to a pipe conveyance system for eventual discharge to five (5) dry detention basins by way of a series of swales, curb inlets, and/or curbs.

2. Total Property Area: 12.43 ac (project) ~~square feet~~ 14.25 ac (total drainage area)
3. Total Coastal Wetlands Area: \_\_\_\_\_ square feet
4. Total Surface Water Area: \_\_\_\_\_ square feet
5. Total Property Area (2) – Total Coastal Wetlands Area (3) – Total Surface Water Area (4) = Total Project Area: 12.43 ac (project) ~~square feet~~ 14.25 ac (total drainage area)
6. Existing Impervious Surface within Property Area: 199,058 square feet
7. Existing Impervious Surface to be Removed/Demolished: \_\_\_\_\_ square feet
8. Existing Impervious Surface to Remain: 199,058 square feet
9. Total Onsite (within property boundary) Newly Constructed Impervious Surface (*in square feet*):

Buildings/Lots	73,838 sf
Impervious Pavement	38,865 sf
Pervious Pavement (adj. total, with % credit applied)	
Impervious Sidewalks	2,921 sf
Pervious Sidewalks (adj. total, with % credit applied)	
Other (describe)	1,798 sf
Future Development	51 sf
<b>Total Onsite Newly Constructed Impervious Surface</b>	<b>117,473 sf</b>

10. Total Onsite Impervious Surface

(Existing Impervious Surface to remain + Onsite Newly Constructed Impervious Surface) = 316,531 square feet

11. Project percent of impervious area: (Total Onsite Impervious Surface / Total Project Area) x100 = 51.0%

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

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

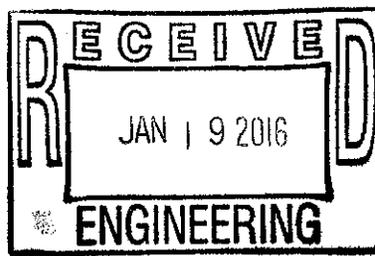
13. Total Newly Constructed Impervious Surface  
 (Total Onsite + Offsite Newly Constructed Impervious Surface) = 316,531 square feet

14. Complete the following information for each Stormwater BMP drainage area. If there are more than three drainage areas in the project, attach an additional sheet with the information for each area provided in the same format as below. Low Density projects may omit this section and skip to Section V.

Basin Information	BMP # 1	BMP # 4	BMP #
Receiving Stream Name	NE Cape Fear River	NE Cape Fear River	See next page for BVA
Receiving Stream Index Number	18-74-(61)	18-74-(61)	
Stream Classification	SC; Sw	SC; Sw	
Total Drainage Area (sf)	11,803 sf	59,165 sf	
On-Site Drainage Area (sf)	11,803 sf	59,165 sf	
Off-Site Drainage Area (sf)	0 sf	0 sf	
<b>Total Impervious Area (sf)</b>	<b>2,512 sf</b>	<b>10,418 sf</b>	
Buildings/Lots (sf)	0 sf	0 sf	
Impervious Pavement (sf)	2,512 sf	4,148 sf	
Pervious Pavement (sf)	0 sf	0 sf	
Impervious Sidewalks (sf)	0 sf	0 sf	
Pervious Sidewalks (sf)	0 sf	0 sf	
Other (sf)	0 sf	0 sf	
Future Development (sf)	0 sf	51 sf	
Existing Impervious to remain (sf)	0 sf	4,421 sf	
Offsite (sf)	0 sf	1,798 sf	
Percent Impervious Area (%)	21.3%	10,418 sf	

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

Survey and field inspection



**BMP Drainage area information (continued)**

Basin Information	Dry Detention Basin BMP # 1	Dry Detention Basin BMP # 2	Dry Detention Basin BMP # 3
Receiving Stream Name	NE Cape Fear River	NE Cape Fear River	NE Cape Fear River
Receiving Stream Index Number	18-74-(61)	18-74-(61)	18-75-(61)
Stream Classification	SC, Sw	SC, Sw	SC, Sw
Total Drainage Area (sf)	11803	39322	25708
On-Site Drainage Area (sf)	11803	39322	25708
Off-Site Drainage Area (sf)	0	0	0
<b>Total Impervious Area (sf)</b>	6791	26681	28660
Buildings/Lots (sf)	0	7119	15500
Impervious Pavement (sf)	2512	5133	0
Pervious Pavement, % credit (sf)	0	0	0
Impervious Sidewalks (sf)	0	871	176
Pervious Sidewalks, % credit (sf)	0	0	0
Other (sf) (pre-1988)	4279	13558	12984
Future Development (sf)	0	0	0
Existing Impervious to remain (sf)	0	0	0
Offsite (sf)	0	0	0
Percent Impervious Area (%)	21.3	33.4	61.0
Basin Information	Dry Detention Basin BMP # 4	Dry Detention Basin BMP # 5	(Type of BMP) BMP # O/S
Receiving Stream Name	NE Cape Fear River	NE Cape Fear River	NE Cape Fear River
Receiving Stream Index Number	18-74-(61)	18-74-(61)	18-74-(61)
Stream Classification	SC, Sw	SC, Sw	SC, Sw
Total Drainage Area (sf)	59165	105948	381744
On-Site Drainage Area (sf)	59165	105948	381744
Off-Site Drainage Area (sf)	0	0	0
<b>Total Impervious Area (sf)</b>	21921	160712	393512
Buildings/Lots (sf)	0	51219	139384
Impervious Pavement (sf)	4148	23553	51166
Pervious Pavement, % credit (sf)	0	0	5626
Impervious Sidewalks (sf)	0	972	2882
Pervious Sidewalks, % credit (sf)	0	0	0
Other (sf) (pre-1988)	11503	84968	194454
Future Development (sf)	51	0	0
Existing Impervious to remain (sf)	4421	0	0
Offsite (sf)	1798	0	0
Percent Impervious Area (%)	17.6	71.5	52.1

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## V. SUBMITTAL REQUIREMENTS

1. Supplemental and Operation & Maintenance Forms - One applicable City of Wilmington Stormwater BMP supplement form and checklist must be submitted for **each** BMP specified for this project. One applicable proposed operation and maintenance (O&M) form must be submitted for **each type** of stormwater BMP. Once approved, the operation and maintenance forms must be referenced on the final plat and recorded with the register of deeds office.
2. Deed Restrictions and Restrictive Covenants - For all subdivisions, outparcels, and future development, the appropriate property restrictions and protective covenants are required to be recorded prior to the sale of any lot. Due to variability in lot sizes or the proposed BUA allocations, a table listing each lot number, lot size, and the allowable built-upon area must be provided as an attachment to the completed and notarized deed restriction form. The appropriate deed restrictions and protective covenants forms can be downloaded at the link listed in section V (3). Download the latest versions for each submittal.

In instances where the applicant is different than the property owner, it is the responsibility of the property owner to sign the deed restrictions and protective covenants form while the applicant is responsible for ensuring that the deed restrictions are recorded.

**By the notarized signature(s) below, the permit holder(s) certify that the recorded property restrictions and protective covenants for this project, if required, shall include all the items required in the permit and listed on the forms available on the website, that the covenants will be binding on all parties and persons claiming under them, that they will run with the land, that the required covenants cannot be changed or deleted without concurrence from the City of Wilmington, and that they will be recorded prior to the sale of any lot.**

3. Only complete application packages will be accepted and reviewed by the City. A complete package includes all of the items listed on the City Engineering Plan Review Checklist, including the fee. Copies of the Engineering Plan Review Checklist, all Forms, Deed Restrictions as well as detailed instructions on how to complete this application form may be downloaded from:

<http://www.wilmingtonnc.gov/PublicServices/Engineering/PlanReview/StormwaterPermits.aspx>

The complete application package should be submitted to the following address:

City of Wilmington – Engineering  
Plan Review Section  
212 Operations Center Dr  
Wilmington, NC 28412

**VI. CONSULTANT INFORMATION AND AUTHORIZATION**

1. Applicant: Complete this section if you wish to designate authority to another individual and/or firm (such as a consulting engineer and /or firm) so that they may provide information on your behalf for this project (such as addressing requests for additional information).

Consulting Engineer: Rob Balland, P.E.

Consulting Firm: Paramounte Engineering, Inc.

a. Contact information for consultant listed above:

Mailing Address: 5911 Oleander Drive, Suite 201

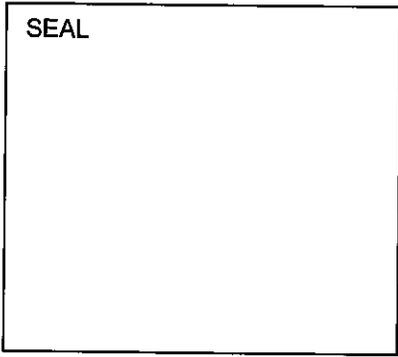
City: Wilmington State: NC Zip: 28403

Phone: 910-791-6707 Fax: 910-791-6760 Email: rballand@paramounte-eng.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: \_\_\_\_\_

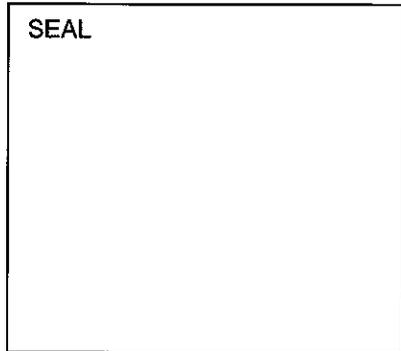
I, \_\_\_\_\_, a Notary Public for the State of \_\_\_\_\_, County of \_\_\_\_\_, do hereby certify that \_\_\_\_\_ personally appeared before me this day of \_\_\_\_\_.

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) James R. Flechtner 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.

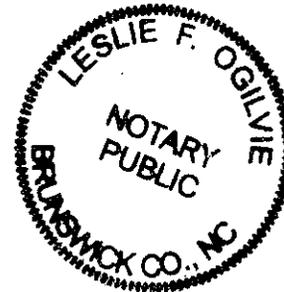


Signature: *James R. Flechtner*  
Date: 11/10/15

I, Leslie F. Ogilvie, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that James R. Flechtner personally appeared before me this <sup>10<sup>th</sup></sup> day of November, 2015, and acknowledge the due execution of the application for a stormwater

permit. Witness my hand and official seal,

*Leslie F. Ogilvie*  
My commission expires: 8/24/2018





STORMWATER MANAGEMENT PERMIT APPLICATION FORM

401 CERTIFICATION APPLICATION FORM

**DRY EXTENDED DETENTION BASIN SUPPLEMENT**

*This form must be filled out, printed and submitted.*

*The Required Items Checklist (Part III) must be printed, filled out and submitted along with all the required information.*



**I. PROJECT INFORMATION**

Project name	Sweeney Water Treatment Plant
Contact person	Rob Balland, P.E.
Phone number	910-791-8707
Date	27-Oct
Drainage area number	1

**II. DESIGN INFORMATION**

**Site Characteristics**

Drainage area	11,803.00	ft <sup>2</sup>
Impervious area	2,512.00	ft <sup>2</sup>
% Impervious	0.21	
Design rainfall depth	1.00	in

**Peak Flow Calculations**

1-yr, 24-hr rainfall depth	3.80	in
Rational C, pre-development	0.48	(unitless)
Rational C, post-development	0.28	(unitless)
Rainfall intensity: 1-yr, 24-hr storm	0.16	in/hr
Pre-development 1-yr, 24-hr peak flow	0.03	ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr peak flow	0.02	ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak control	-0.01	ft <sup>3</sup> /sec

**Storage Volume: Non-SA Waters**

Minimum required volume	252.00	ft <sup>3</sup>	
Provided volume		ft <sup>3</sup>	
Sediment storage volume provided	419.00	ft <sup>3</sup>	OK

**Storage Volume: SA Waters**

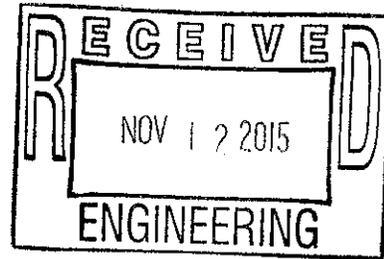
1.5" runoff volume		ft <sup>3</sup>
Pre-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>
Post-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>
Minimum required volume		ft <sup>3</sup>
Provided volume		ft <sup>3</sup>
Sediment storage volume provided		ft <sup>3</sup>

**Basin Design Parameters**

Drawdown time	1.34	days	OK
SHWT elevation	25.00	fmsl	
Basin bottom elevation	26.00	fmsl	Raise basin bottom, Must be at least 2-ft above SHWT
Storage elevation	28.39	fmsl	
Basin side slopes	2.0	:1	Side Slopes are too steep, maximum 3:1
Top elevation	33.00	fmsl	OK
Freeboard provided	4.61	ft	OK

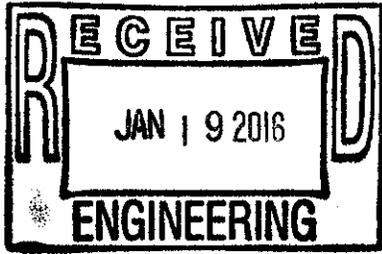
**Basin Bottom Dimensions**

Basin length	44.00	ft	
Basin width	35.00	ft	
Length to width ratio	1.26	:1	Increase length to width ratio to at least 1.5:1



**Additional Information**

Total runoff volume captured by basin	<u>0.07</u>	ac-in	Forebay is not required
Forebay provided	<u>N</u>	(Y or N)	
Is basin in a recorded drainage easement?	<u>N</u>	(Y or N)	Need to a recorded drainage easement
Does basin capture all runoff at ultimate build-out?	<u>Y</u>	(Y or N)	OK
Is a sediment depth indicator included?	<u>Y</u>	(Y or N)	OK
Does the basin include a drain?	<u>Y</u>	(Y or N)	OK



Permit Number: \_\_\_\_\_  
 (to be provided by City of Wilmington)  
 BMP Drainage Basin #: 1

## Dry Extended Detention Basin Operation and Maintenance Agreement

I will keep a maintenance record on this BMP. This maintenance record will be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the removal efficiency of the BMP.

The dry extended detention basin system is defined as the dry detention basin, outlet structure, pretreatment including forebays and the vegetated filter if one is provided.

**This system (check one):**

does  does not incorporate a vegetated filter at the outlet.

**This system (check one):**

does  does not incorporate pretreatment other than a forebay.

**Important maintenance procedures:**

- The drainage area will be managed to reduce the sediment load to the dry extended detention basin.
- Immediately after the dry extended detention basin is established, the vegetation will be watered twice weekly if needed until the plants become established (commonly six weeks).
- No portion of the dry extended detention pond will be fertilized after the first initial fertilization that is required to establish the vegetation.
- I will maintain the vegetation in and around the basin at a height of approximately six inches.
- Once a year, a dam safety expert will inspect the embankment.

After the dry extended detention basin is established, it will be inspected **once a quarter and within 24 hours after every storm event greater than 1.5 inches**. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How I will remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The perimeter of the dry extended detention basin	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.

<b>BMP element:</b>	<b>Potential problem:</b>	<b>How I will remediate the problem:</b>
<b>The inlet device: pipe or swale</b>	The pipe is clogged (if applicable).	Unclog the pipe. Dispose of the sediment off-site.
	The pipe is cracked or otherwise damaged (if applicable).	Replace the pipe.
	Erosion is occurring in the swale (if applicable).	Regrade the swale if necessary to smooth it over and provide erosion control devices such as reinforced turf matting or riprap to avoid future problems with erosion.
<b>The forebay</b>	Sediment has accumulated and reduced the depth to 75% of the original design depth (see diagram below).	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
	Erosion has occurred or riprap is displaced.	Provide additional erosion protection such as reinforced turf matting or riprap if needed to prevent future erosion problems.
	Weeds are present.	Remove the weeds, preferably by hand. If pesticides are used, wipe them on the plants rather than spraying.
<b>The main treatment area</b>	Sediment has accumulated and reduced the depth to 75% of the original design depth (see diagram below).	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. Revegetate disturbed areas immediately with sod (preferred) or seed protected with securely staked erosion mat.
	Water is standing more than 5 days after a storm event.	Check outlet structure for clogging. If it is a design issue, consult an appropriate professional.
	Weeds and noxious plants are growing in the main treatment area.	Remove the plants by hand or by wiping them with pesticide (do not spray).

BMP element:	Potential problem:	How I will remediate the problem:
The embankment	Shrubs or trees have started to grow on the embankment.	Remove shrubs or trees immediately.
	Grass cover is unhealthy or eroding.	Restore the health of the grass cover - consult a professional if necessary.
	Signs of seepage on the downstream face.	Consult a professional.
	Evidence of muskrat or beaver activity is present.	Use traps to remove muskrats and consult a professional to remove beavers.
	An annual inspection by an appropriate professional shows that the embankment needs repair.	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 NC Division of Water Quality 401 Oversight Unit at 919-733-1786.

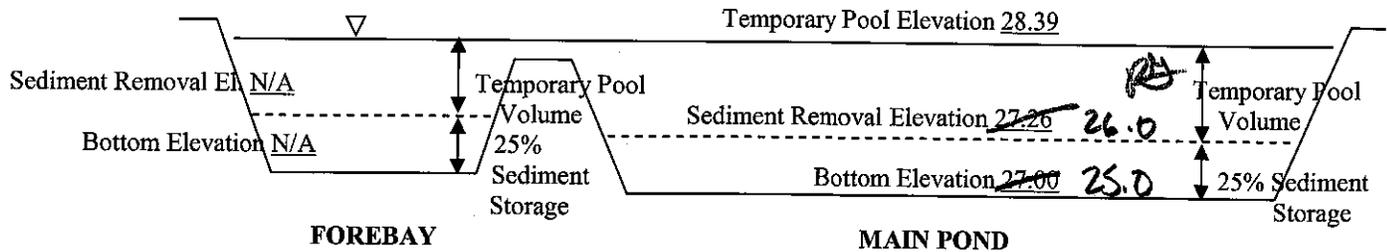
The measuring device used to determine the sediment elevation shall be such that it will give an accurate depth reading and not readily penetrate into accumulated sediments.

When the basin depth reads 27.26 feet in the main pond, the sediment shall be removed.

When the basin depth reads N/A feet in the forebay, the sediment shall be removed.

### BASIN DIAGRAM

(fill in the blanks)



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

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above. I agree to notify the City of Wilmington of any problems with the system or prior to any changes to the system or responsible party.

Project name: Sweeney Water Treatment Plant

BMP drainage basin number: 1

Print name: Cape Fear Public Utility Authority / Frank Styers

Title: Chief Operations Officer

Address: 235 Government Center Drive, Wilmington, NC 28403

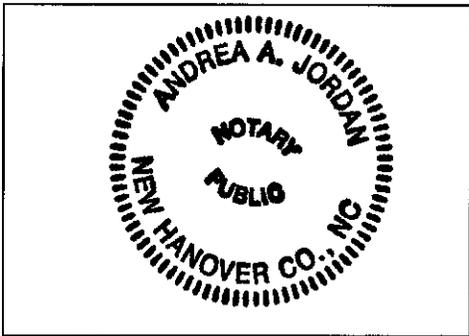
Phone: 910-332-6625

Signature: Frank Styers

Date: 1/12/16

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, Andrea A. Jordan, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Frank Styers personally appeared before me this 12 day of January, 2016, and acknowledge the due execution of the forgoing dry detention basin maintenance requirements. Witness my hand and official seal,



SEAL

My commission expires 1/5/20



STORMWATER MANAGEMENT PERMIT APPLICATION FORM



401 CERTIFICATION APPLICATION FORM

**DRY EXTENDED DETENTION BASIN SUPPLEMENT**

*This form must be filled out, printed and submitted.*

*The Required Items Checklist (Part III) must be printed, filled out and submitted along with all the required information.*

**I. PROJECT INFORMATION**

Project name	Sweeney Water Treatment Plant
Contact person	Lisa Manning
Phone number	910-392-4462
Date	5/27/2008
Drainage area number	2

**II. DESIGN INFORMATION**

**Site Characteristics**

Drainage area	39,322.00	ft <sup>2</sup>
Impervious area	13,123.00	ft <sup>2</sup>
% Impervious	0.33	
Design rainfall depth	1.00	in

**Peak Flow Calculations**

1-yr, 24-hr rainfall depth	3.80	in
Rational C, pre-development	0.43	(unitless)
Rational C, post-development	0.42	(unitless)
Rainfall intensity: 1-yr, 24-hr storm	0.16	in/hr
Pre-development 1-yr, 24-hr peak flow	0.62	ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr peak flow	0.61	ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak control	-0.01	ft <sup>3</sup> /sec

**Storage Volume: Non-SR Waters**

Design volume	1,148.00	ft <sup>3</sup>	
Sediment storage volume provided	2,020.00	ft <sup>3</sup>	OK

**Storage Volume: SR Waters**

1-yr, 24-hr rainfall depth		in
Pre-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>
Post-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>

**Basin Design Parameters**

Drawdown time	1.44	days	OK
SHWT elevation	10.50	fmsl	
Basin bottom elevation	12.50	fmsl	OK
Storage elevation	14.00	fmsl	
Basin side slopes	3.0	:1	OK
Top elevation	15.50	fmsl	OK
Freeboard provided	1.50	ft	OK

**Basin Bottom Dimensions**

Basin length	74.00	ft	
Basin width	35.00	ft	
Length to width ratio	2.11	:1	OK

**Additional Information**

Total runoff volume captured by basin	0.31	ac-in	Forebay is not required
Forebay provided	N	(Y or N)	
Is basin in a recorded drainage easement?	N	(Y or N)	Need to a recorded drainage easement
Does basin capture all runoff at ultimate build-out?	Y	(Y or N)	OK
Is a sediment depth indicator included?	Y	(Y or N)	OK
Does the basin include a drain?	Y	(Y or N)	OK

Unchanged  
 from SW8940330  
 PJ

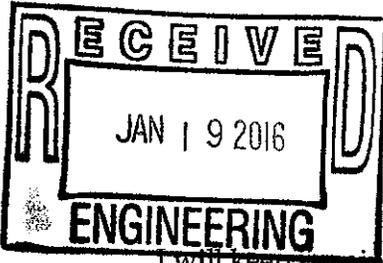
**REQUIRED ITEMS CHECKLIST**

Please indicate the page or plan sheet numbers where the supporting documentation can be found. **An incomplete submittal package will result in a request for additional information. This will delay final review and approval of the project.** Initial in the space provided to indicate the following design requirements have been met. If the applicant has designated an agent, the agent may initial below. **If a requirement has not been met, attach justification.**

Basin 2

Initials	Page/ Plan Sheet No.	
<u>LM</u>	<u>B6</u> <u>B7</u> <u>- Drainage Areas 11x17</u> <u>- Drainage Area Design Sheet 2 of 5</u>	1. Plans (1" = 50' or larger) of the entire site showing: - Design at ultimate build-out, - Off-site drainage (if applicable), - Delineated drainage basins (include Rational C coefficient per basin), - Basin dimensions, - Pretreatment system, - Maintenance access, - Proposed drainage easement and public right of way (ROW), - Overflow device, and - Boundaries of drainage easement.
<u>LM</u>	<u>B17</u> <u>B27</u> <u>B28</u> <u>B31</u> <u>B32</u>	2. Plan details (1" = 30' or larger) for the bioretention cell showing: - Basin dimensions - Pretreatment system, - Maintenance access, - Outlet structure, - Overflow device, - Flow distribution detail for basin inflow, and - Vegetation specifications.
<u>LM</u>	<u>B17</u>	3. Section view of the dry detention basin (1" = 20' or larger) showing: - Side slopes, 3:1 or lower, - Pretreatment and treatment areas, and - Inlet and outlet structures.
<u>LM</u>	<u>B31</u>	6. A construction sequence that shows how the dry detention basin will be protected from sediment until the entire drainage area is stabilized.
<u>LM</u>	<u>- Pipe Calculations</u> <u>- Drainage Area Design Sheets</u>	7. The supporting calculations.
<u>LM</u>	<u>O&amp;M</u>	8. A copy of the signed and notarized operation and maintenance (O&M) agreement.
<u>LM</u>	<u>N/A</u>	9. A copy of the deed restrictions (if required).
<u>LM</u>	<u>SHWTE Attachment</u>	10. A soils report that is based upon an actual field investigation, soil borings, and infiltration tests. County soil maps are not an acceptable source of soils information.

Permit Number: \_\_\_\_\_  
 (to be provided by City of Wilmington)  
 BMP Drainage Basin #: 2



## Dry Extended Detention Basin Operation and Maintenance Agreement

I will keep a maintenance record on this BMP. This maintenance record will be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the removal efficiency of the BMP.

The dry extended detention basin system is defined as the dry detention basin, outlet structure, pretreatment including forebays and the vegetated filter if one is provided.

**This system (check one):**

does  does not incorporate a vegetated filter at the outlet.

**This system (check one):**

does  does not incorporate pretreatment other than a forebay.

**Important maintenance procedures:**

- The drainage area will be managed to reduce the sediment load to the dry extended detention basin.
- Immediately after the dry extended detention basin is established, the vegetation will be watered twice weekly if needed until the plants become established (commonly six weeks).
- No portion of the dry extended detention pond will be fertilized after the first initial fertilization that is required to establish the vegetation.
- I will maintain the vegetation in and around the basin at a height of approximately six inches.
- Once a year, a dam safety expert will inspect the embankment.

After the dry extended detention basin is established, it will be inspected **once a quarter and within 24 hours after every storm event greater than 1.5 inches**. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How I will remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The perimeter of the dry extended detention basin	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.

<b>BMP element:</b>	<b>Potential problem:</b>	<b>How I will remediate the problem:</b>
<b>The inlet device: pipe or swale</b>	The pipe is clogged (if applicable).	Unclog the pipe. Dispose of the sediment off-site.
	The pipe is cracked or otherwise damaged (if applicable).	Replace the pipe.
	Erosion is occurring in the swale (if applicable).	Regrade the swale if necessary to smooth it over and provide erosion control devices such as reinforced turf matting or riprap to avoid future problems with erosion.
<b>The forebay</b>	Sediment has accumulated and reduced the depth to 75% of the original design depth (see diagram below).	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
	Erosion has occurred or riprap is displaced.	Provide additional erosion protection such as reinforced turf matting or riprap if needed to prevent future erosion problems.
	Weeds are present.	Remove the weeds, preferably by hand. If pesticides are used, wipe them on the plants rather than spraying.
<b>The main treatment area</b>	Sediment has accumulated and reduced the depth to 75% of the original design depth (see diagram below).	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. Revegetate disturbed areas immediately with sod (preferred) or seed protected with securely staked erosion mat.
	Water is standing more than 5 days after a storm event.	Check outlet structure for clogging. If it is a design issue, consult an appropriate professional.
	Weeds and noxious plants are growing in the main treatment area.	Remove the plants by hand or by wiping them with pesticide (do not spray).

BMP element:	Potential problem:	How I will remediate the problem:
The embankment	Shrubs or trees have started to grow on the embankment.	Remove shrubs or trees immediately.
	Grass cover is unhealthy or eroding.	Restore the health of the grass cover - consult a professional if necessary.
	Signs of seepage on the downstream face.	Consult a professional.
	Evidence of muskrat or beaver activity is present.	Use traps to remove muskrats and consult a professional to remove beavers.
	An annual inspection by an appropriate professional shows that the embankment needs repair.	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 NC Division of Water Quality 401 Oversight Unit at 919-733-1786.

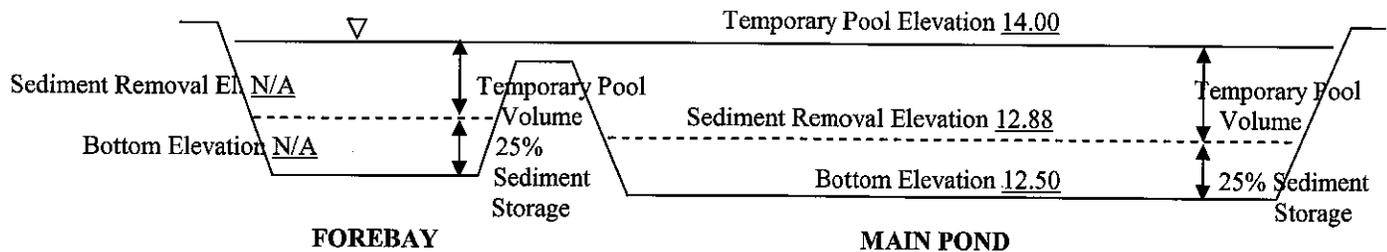
The measuring device used to determine the sediment elevation shall be such that it will give an accurate depth reading and not readily penetrate into accumulated sediments.

When the basin depth reads 12.88 feet in the main pond, the sediment shall be removed.

When the basin depth reads N/A feet in the forebay, the sediment shall be removed.

### BASIN DIAGRAM

(fill in the blanks)



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

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above. I agree to notify the City of Wilmington of any problems with the system or prior to any changes to the system or responsible party.

Project name: Sweeney Water Treatment Plant

BMP drainage basin number: 2

Print name: Cape Fear Public Utility Authority / Frank Styers

Title: Chief Operations Officer

Address: 235 Government Center Drive, Wilmington, NC 28403

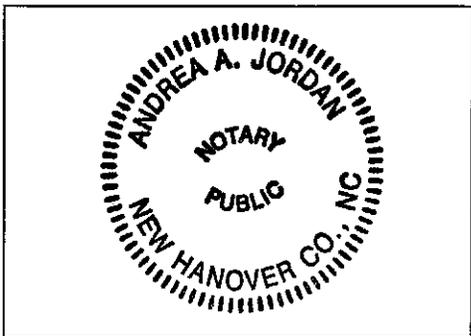
Phone: 910-332-6625

Signature: Frank Styers

Date: 1/12/16

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, Andrea A. Jordan, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Frank Styers personally appeared before me this 12 day of January, 2016, and acknowledge the due execution of the forgoing dry detention basin maintenance requirements. Witness my hand and official seal,



SEAL

My commission expires 1/5/20



STORMWATER MANAGEMENT PERMIT APPLICATION FORM

401 CERTIFICATION APPLICATION FORM

DRY EXTENDED DETENTION BASIN SUPPLEMENT



This form must be filled out, printed and submitted.

The Required Items Checklist (Part III) must be printed, filled out and submitted along with all the required information.

**I. PROJECT INFORMATION**

Project name	Sweeney Water Treatment Plant
Contact person	Lisa Manning
Phone number	910-392-4462
Date	5/27/2008
Drainage area number	3

**II. DESIGN INFORMATION**

**Site Characteristics**

Drainage area	25,708.00	ft <sup>2</sup>
Impervious area	15,676.00	ft <sup>2</sup>
% Impervious	0.61	
Design rainfall depth	1.00	in

**Peak Flow Calculations**

1-yr, 24-hr rainfall depth	3.80	in
Rational C, pre-development	0.55	(unitless)
Rational C, post-development	0.64	(unitless)
Rainfall intensity: 1-yr, 24-hr storm	0.16	in/hr
Pre-development 1-yr, 24-hr peak flow	0.05	ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr peak flow	0.06	ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak control	0.01	ft <sup>3</sup> /sec

Unchanged  
from SW8940330  
RM

**Storage Volume: Non-SR Waters**

Design volume	1,283.00	ft <sup>3</sup>
Sediment storage volume provided	1,313.00	ft <sup>3</sup> OK

**Storage Volume: SR Waters**

1-yr, 24-hr rainfall depth		in
Pre-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>
Post-development 1-yr, 24-hr runoff volume		ft <sup>3</sup>

**Basin Design Parameters**

Drawdown time	2.40	days	OK
SHWT elevation	21.00	fmsl	
Basin bottom elevation	23.00	fmsl	OK
Storage elevation	25.50	fmsl	
Basin side slopes	3.0	:1	OK
Top elevation	26.50	fmsl	OK
Freeboard provided	1.00	ft	OK

**Basin Bottom Dimensions**

Basin length	64.00	ft	
Basin width	18.00	ft	
Length to width ratio	3.56	:1	OK

**Additional Information**

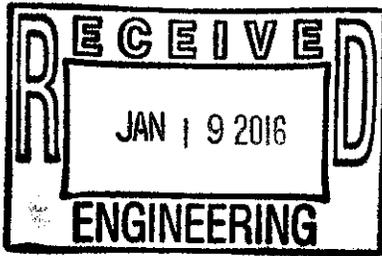
Total runoff volume captured by basin	0.35	ac-in	Forebay is not required
Forebay provided	N	(Y or N)	
Is basin in a recorded drainage easement?	N	(Y or N)	Need to a recorded drainage easement
Does basin capture all runoff at ultimate build-out?	Y	(Y or N)	OK
Is a sediment depth indicator included?	Y	(Y or N)	OK
Does the basin include a drain?	Y	(Y or N)	OK

**REQUIRED ITEMS CHECKLIST**

Please indicate the page or plan sheet numbers where the supporting documentation can be found. An incomplete submittal package will result in a request for additional information. This will delay final review and approval of the project. Initial in the space provided to indicate the following design requirements have been met. If the applicant has designated an agent, the agent may initial below. If a requirement has not been met, attach justification.

Basin 3

Initials	Page/ Plan Sheet No.	
<u>LM</u>	<u>B6</u> <u>B8</u> <u>- Drainage Areas 11+17</u> <u>- Drainage Area Design Sheet 3 of 5</u>	1. Plans (1" = 50' or larger) of the entire site showing: - Design at ultimate build-out, - Off-site drainage (if applicable), - Delineated drainage basins (include Rational C coefficient per basin), - Basin dimensions, - Pretreatment system, - Maintenance access, - Proposed drainage easement and public right of way (ROW), - Overflow device, and - Boundaries of drainage easement.
<u>LM</u>	<u>B17</u> <u>B27</u> <u>B28</u> <u>B31</u> <u>B32</u>	2. Plan details (1" = 30' or larger) for the bioretention cell showing: - Basin dimensions - Pretreatment system, - Maintenance access, - Outlet structure, - Overflow device, - Flow distribution detail for basin inflow, and - Vegetation specifications.
<u>LM</u>	<u>B17</u>	3. Section view of the dry detention basin (1" = 20' or larger) showing: - Side slopes, 3:1 or lower, - Pretreatment and treatment areas, and - Inlet and outlet structures.
<u>LM</u>	<u>B31</u>	6. A construction sequence that shows how the dry detention basin will be protected from sediment until the entire drainage area is stabilized.
<u>LM</u>	<u>- Pipe Calculations</u> <u>- Drainage Area Design Sheet</u>	7. The supporting calculations.
<u>LM</u>	<u>O+M</u>	8. A copy of the signed and notarized operation and maintenance (O&M) agreement.
<u>LM</u>	<u>N/A</u>	9. A copy of the deed restrictions (if required).
<u>LM</u>	<u>STATE Attachment</u>	10. A soils report that is based upon an actual field investigation, soil borings, and infiltration tests. County soil maps are not an acceptable source of soils information.



Permit Number: \_\_\_\_\_  
 (to be provided by City of Wilmington)  
 BMP Drainage Basin #: 3

## Dry Extended Detention Basin Operation and Maintenance Agreement

I will keep a maintenance record on this BMP. This maintenance record will be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the removal efficiency of the BMP.

The dry extended detention basin system is defined as the dry detention basin, outlet structure, pretreatment including forebays and the vegetated filter if one is provided.

**This system (check one):**

does  does not incorporate a vegetated filter at the outlet.

**This system (check one):**

does  does not incorporate pretreatment other than a forebay.

**Important maintenance procedures:**

- The drainage area will be managed to reduce the sediment load to the dry extended detention basin.
- Immediately after the dry extended detention basin is established, the vegetation will be watered twice weekly if needed until the plants become established (commonly six weeks).
- No portion of the dry extended detention pond will be fertilized after the first initial fertilization that is required to establish the vegetation.
- I will maintain the vegetation in and around the basin at a height of approximately six inches.
- Once a year, a dam safety expert will inspect the embankment.

After the dry extended detention basin is established, it will be inspected **once a quarter and within 24 hours after every storm event greater than 1.5 inches**. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How I will remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The perimeter of the dry extended detention basin	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.

<b>BMP element:</b>	<b>Potential problem:</b>	<b>How I will remediate the problem:</b>
<b>The inlet device: pipe or swale</b>	The pipe is clogged (if applicable).	Unclog the pipe. Dispose of the sediment off-site.
	The pipe is cracked or otherwise damaged (if applicable).	Replace the pipe.
	Erosion is occurring in the swale (if applicable).	Regrade the swale if necessary to smooth it over and provide erosion control devices such as reinforced turf matting or riprap to avoid future problems with erosion.
<b>The forebay</b>	Sediment has accumulated and reduced the depth to 75% of the original design depth (see diagram below).	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
	Erosion has occurred or riprap is displaced.	Provide additional erosion protection such as reinforced turf matting or riprap if needed to prevent future erosion problems.
	Weeds are present.	Remove the weeds, preferably by hand. If pesticides are used, wipe them on the plants rather than spraying.
<b>The main treatment area</b>	Sediment has accumulated and reduced the depth to 75% of the original design depth (see diagram below).	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. Revegetate disturbed areas immediately with sod (preferred) or seed protected with securely staked erosion mat.
	Water is standing more than 5 days after a storm event.	Check outlet structure for clogging. If it is a design issue, consult an appropriate professional.
	Weeds and noxious plants are growing in the main treatment area.	Remove the plants by hand or by wiping them with pesticide (do not spray).

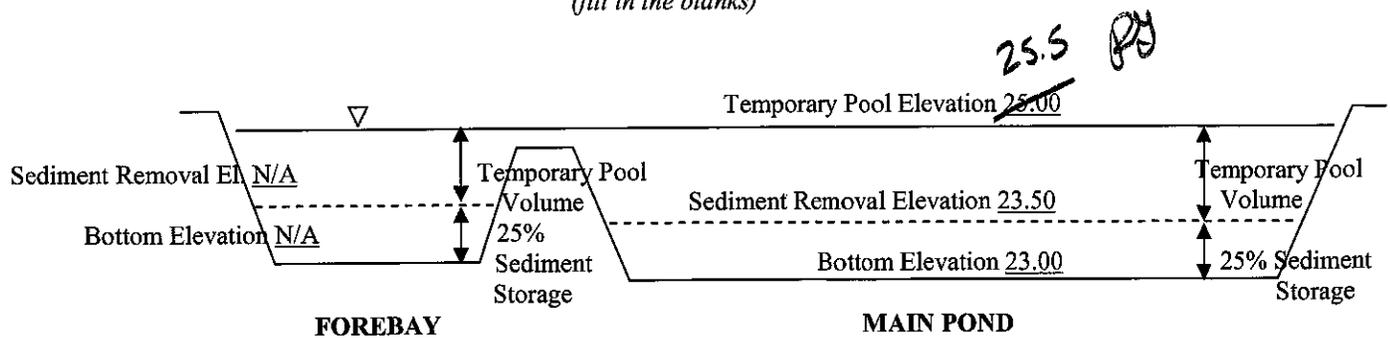
BMP element:	Potential problem:	How I will remediate the problem:
The embankment	Shrubs or trees have started to grow on the embankment.	Remove shrubs or trees immediately.
	Grass cover is unhealthy or eroding.	Restore the health of the grass cover - consult a professional if necessary.
	Signs of seepage on the downstream face.	Consult a professional.
	Evidence of muskrat or beaver activity is present.	Use traps to remove muskrats and consult a professional to remove beavers.
	An annual inspection by an appropriate professional shows that the embankment needs repair.	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 NC Division of Water Quality 401 Oversight Unit at 919-733-1786.

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

When the basin depth reads 23.50 feet in the main pond, the sediment shall be removed.

When the basin depth reads N/A feet in the forebay, the sediment shall be removed.

**BASIN DIAGRAM**  
(fill in the blanks)



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

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above. I agree to notify the City of Wilmington of any problems with the system or prior to any changes to the system or responsible party.

Project name: Sweeney Water Treatment Plant

BMP drainage basin number: 3

Print name: Cape Fear Public Utility Authority / Frank Styers

Title: Chief Executive Officer

Address: 235 Government Center Drive, Wilmington, NC 28403

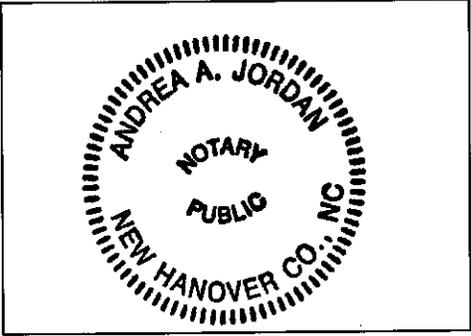
Phone: 910-332-6625

Signature: Frank Styers

Date: 1/12/16

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, Andrea A. Jordan, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Frank Styers personally appeared before me this 12 day of January, 2016, and acknowledge the due execution of the forgoing dry detention basin maintenance requirements. Witness my hand and official seal,



SEAL

My commission expires 1/5/20



STORMWATER MANAGEMENT PERMIT APPLICATION FORM



401 CERTIFICATION APPLICATION FORM  
**DRY EXTENDED DETENTION BASIN SUPPLEMENT**

*This form must be filled out, printed and submitted.*

*The Required Items Checklist (Part III) must be printed, filled out and submitted along with all the required information.*

**I. PROJECT INFORMATION**

Project name	Sweeney Water Treatment Plant
Contact person	Rob Balland, P.E.
Phone number	910-791-6707
Date	27-Oct
Drainage area number	4

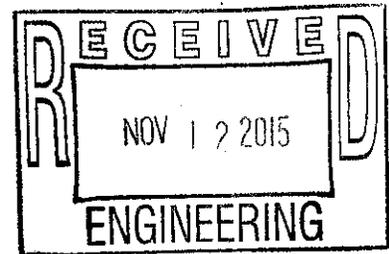
**II. DESIGN INFORMATION**

**Site Characteristics**

Drainage area	59,165.00	ft <sup>2</sup>
Impervious area	10,418.00	ft <sup>2</sup>
% Impervious	0.18	
Design rainfall depth	1.00	in

**Peak Flow Calculations**

1-yr, 24-hr rainfall depth	3.80	in
Rational C, pre-development	0.33	(unitless)
Rational C, post-development	0.31	(unitless)
Rainfall intensity: 1-yr, 24-hr storm	0.16	in/hr
Pre-development 1-yr, 24-hr peak flow	0.64	ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr peak flow	0.60	ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak control	-0.04	ft <sup>3</sup> /sec



**Storage Volume: Non-SA Waters**

Minimum required volume	1,000.00	ft <sup>3</sup>	
Provided volume		ft <sup>3</sup>	
Sediment storage volume provided	3,322.00	ft <sup>3</sup>	OK

**Storage Volume: SA Waters**

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

**Basin Design Parameters**

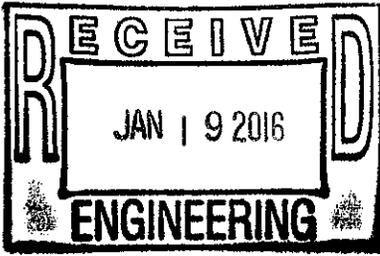
Drawdown time	2.16	days	OK
SHWT elevation	27.00	fmsl	
Basin bottom elevation	30.00	fmsl	OK
Storage elevation	31.25	fmsl	
Basin side slopes	3.0	:1	OK
Top elevation	32.00	fmsl	OK
Freeboard provided	0.75	ft	Need more freeboard, minimum of 1-ft required

**Basin Bottom Dimensions**

Basin length	72.00	ft	
Basin width	53.00	ft	
Length to width ratio	1.35	:1	Increase length to width ratio to at least 1.5:1

**Additional Information**

Total runoff volume captured by basin	<u>0.28</u> ac-in	Forebay is not required
Forebay provided	<u>N</u> (Y or N)	
Is basin in a recorded drainage easement?	<u>N</u> (Y or N)	Need to a recorded drainage easement
Does basin capture all runoff at ultimate build-out?	<u>Y</u> (Y or N)	OK
Is a sediment depth indicator included?	<u>Y</u> (Y or N)	OK
Does the basin include a drain?	<u>Y</u> (Y or N)	OK



Permit Number: \_\_\_\_\_  
 (to be provided by City of Wilmington)  
 BMP Drainage Basin #: 4

## Dry Extended Detention Basin Operation and Maintenance Agreement

I will keep a maintenance record on this BMP. This maintenance record will be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the removal efficiency of the BMP.

The dry extended detention basin system is defined as the dry detention basin, outlet structure, pretreatment including forebays and the vegetated filter if one is provided.

**This system (check one):**

does  does not incorporate a vegetated filter at the outlet.

**This system (check one):**

does  does not incorporate pretreatment other than a forebay.

**Important maintenance procedures:**

- The drainage area will be managed to reduce the sediment load to the dry extended detention basin.
- Immediately after the dry extended detention basin is established, the vegetation will be watered twice weekly if needed until the plants become established (commonly six weeks).
- No portion of the dry extended detention pond will be fertilized after the first initial fertilization that is required to establish the vegetation.
- I will maintain the vegetation in and around the basin at a height of approximately six inches.
- Once a year, a dam safety expert will inspect the embankment.

After the dry extended detention basin is established, it will be inspected **once a quarter and within 24 hours after every storm event greater than 1.5 inches**. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How I will remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The perimeter of the dry extended detention basin	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.

<b>BMP element:</b>	<b>Potential problem:</b>	<b>How I will remediate the problem:</b>
<b>The inlet device: pipe or swale</b>	The pipe is clogged (if applicable).	Unclog the pipe. Dispose of the sediment off-site.
	The pipe is cracked or otherwise damaged (if applicable).	Replace the pipe.
	Erosion is occurring in the swale (if applicable).	Regrade the swale if necessary to smooth it over and provide erosion control devices such as reinforced turf matting or riprap to avoid future problems with erosion.
<b>The forebay</b>	Sediment has accumulated and reduced the depth to 75% of the original design depth (see diagram below).	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
	Erosion has occurred or riprap is displaced.	Provide additional erosion protection such as reinforced turf matting or riprap if needed to prevent future erosion problems.
	Weeds are present.	Remove the weeds, preferably by hand. If pesticides are used, wipe them on the plants rather than spraying.
<b>The main treatment area</b>	Sediment has accumulated and reduced the depth to 75% of the original design depth (see diagram below).	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. Revegetate disturbed areas immediately with sod (preferred) or seed protected with securely staked erosion mat.
	Water is standing more than 5 days after a storm event.	Check outlet structure for clogging. If it is a design issue, consult an appropriate professional.
	Weeds and noxious plants are growing in the main treatment area.	Remove the plants by hand or by wiping them with pesticide (do not spray).

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

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above. I agree to notify the City of Wilmington of any problems with the system or prior to any changes to the system or responsible party.

Project name: Sweeney Water Treatment Plant

BMP drainage basin number: 4

Print name: Cape Fear Public Utility Authority / Frank Styers

Title: Chief Operations Officer

Address: 235 Government Center Drive, Wilmington, NC 28403

Phone: 910-332-6625

Signature: Frank Styers

Date: 1/12/16

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, Andrea A. Jordan, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Frank Styers personally appeared before me this 12 day of January, 2016, and acknowledge the due execution of the forgoing dry detention basin maintenance requirements. Witness my hand and official seal,



SEAL

My commission expires 1/5/20



STORMWATER MANAGEMENT PERMIT APPLICATION FORM



401 CERTIFICATION APPLICATION FORM  
**DRY EXTENDED DETENTION BASIN SUPPLEMENT**

This form must be filled out, printed and submitted.

The Required Items Checklist (Part III) must be printed, filled out and submitted along with all the required information.

**PROJECT INFORMATION**

Project name	Sweeney Water Treatment Plant
Contact person	Lisa Manning
Phone number	910-392-4462
Date	5/27/2008
Drainage area number	5

**DESIGN INFORMATION**

<b>Site Characteristics</b>	
Drainage area	105,948.00 ft <sup>2</sup>
Impervious area	75,744.00 ft <sup>2</sup>
% Impervious	0.71
Design rainfall depth	1.00 in
<b>Peak Flow Calculations</b>	
1-yr, 24-hr rainfall depth	3.80 in
Rational C, pre-development	0.79 (unitless)
Rational C, post-development	0.72 (unitless)
Rainfall intensity: 1-yr, 24-hr storm	0.16 in/hr
Pre-development 1-yr, 24-hr peak flow	0.31 ft <sup>3</sup> /sec
Post-development 1-yr, 24-hr peak flow	0.28 ft <sup>3</sup> /sec
Pre/Post 1-yr, 24-hr peak control	-0.03 ft <sup>3</sup> /sec

unchanged  
 from SW8940330

<b>Storage Volume: Non-SR Waters</b>	
Design volume	6,122.00 ft <sup>3</sup>
Sediment storage volume provided	16,730.00 ft <sup>3</sup> OK

<b>Storage Volume: SR Waters</b>	
1-yr, 24-hr rainfall depth	_____ in
Pre-development 1-yr, 24-hr runoff volume	_____ ft <sup>3</sup>
Post-development 1-yr, 24-hr runoff volume	_____ ft <sup>3</sup>

<b>Basin Design Parameters</b>	
Drawdown time	0.96 days OK
SHWT elevation	27.00 fmsl
Basin bottom elevation	27.00 fmsl Raise basin bottom, Must be at least 2-ft above SHWT
Storage elevation	30.00 fmsl
Basin side slopes	3.0 :1 OK
Top elevation	32.00 fmsl OK
Freeboard provided	2.00 ft OK

<b>Basin Bottom Dimensions</b>	
Basin length	100.00 ft
Basin width	38.00 ft
Length to width ratio	2.63 :1 OK

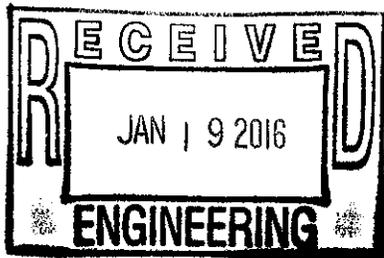
<b>Additional Information</b>	
Total runoff volume captured by basin	1.69 ac-in Forebay is not required
Forebay provided	N (Y or N)
Is basin in a recorded drainage easement?	N (Y or N) Need to a recorded drainage easement
Does basin capture all runoff at ultimate build-out?	Y (Y or N) OK
Is a sediment depth indicator included?	Y (Y or N) OK
Does the basin include a drain?	Y (Y or N) OK

**III. REQUIRED ITEMS CHECKLIST**

Please indicate the page or plan sheet numbers where the supporting documentation can be found. **An incomplete submittal package will result in a request for additional information. This will delay final review and approval of the project.** Initial in the space provided to indicate the following design requirements have been met. If the applicant has designated an agent, the agent may initial below. If a requirement has not been met, attach justification.

Basin 5

Initials	Page/ Plan Sheet No.	
<u>LM</u>	<u>B6</u> <u>B7</u> <u>- Drainage Areas 11 &amp; 17</u> <u>- Drainage Area Design Sheet 5 of 5</u>	1. Plans (1" = 50' or larger) of the entire site showing: <ul style="list-style-type: none"> <li>- Design at ultimate build-out,</li> <li>- Off-site drainage (if applicable),</li> <li>- Delineated drainage basins (include Rational C coefficient per basin),</li> <li>- Basin dimensions,</li> <li>- Pretreatment system,</li> <li>- Maintenance access,</li> <li>- Proposed drainage easement and public right of way (ROW),</li> <li>- Overflow device, and</li> <li>- Boundaries of drainage easement.</li> </ul>
<u>LM</u>	<u>B17</u> <u>B27</u> <u>B28</u> <u>B29A</u> <u>B31</u> <u>B32</u>	2. Plan details (1" = 30' or larger) for the bioretention cell showing: <ul style="list-style-type: none"> <li>- Basin dimensions</li> <li>- Pretreatment system,</li> <li>- Maintenance access,</li> <li>- Outlet structure,</li> <li>- Overflow device,</li> <li>- Flow distribution detail for basin inflow, and</li> <li>- Vegetation specifications.</li> </ul>
<u>LM</u>	<u>B17</u>	3. Section view of the dry detention basin (1" = 20' or larger) showing: <ul style="list-style-type: none"> <li>- Side slopes, 3:1 or lower,</li> <li>- Pretreatment and treatment areas, and</li> <li>- Inlet and outlet structures.</li> </ul>
<u>LM</u>	<u>B31</u>	6. A construction sequence that shows how the dry detention basin will be protected from sediment until the entire drainage area is stabilized.
<u>LM</u>	<u>- Pipe Calculations</u> <u>- Drainage Area Design Sheet</u>	7. The supporting calculations.
<u>LM</u>	<u>O + M</u>	8. A copy of the signed and notarized operation and maintenance (O&M) agreement.
<u>LM</u>	<u>N/A</u>	9. A copy of the deed restrictions (if required).
<u>LM</u>	<u>STATE Attachment</u>	10. A soils report that is based upon an actual field investigation, soil borings, and infiltration tests. County soil maps are not an acceptable source of soils information.



Permit Number: \_\_\_\_\_  
 (to be provided by City of Wilmington)  
 BMP Drainage Basin #: 5

## Dry Extended Detention Basin Operation and Maintenance Agreement

I will keep a maintenance record on this BMP. This maintenance record will be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the removal efficiency of the BMP.

The dry extended detention basin system is defined as the dry detention basin, outlet structure, pretreatment including forebays and the vegetated filter if one is provided.

**This system (check one):**

does  does not incorporate a vegetated filter at the outlet.

**This system (check one):**

does  does not incorporate pretreatment other than a forebay.

**Important maintenance procedures:**

- The drainage area will be managed to reduce the sediment load to the dry extended detention basin.
- Immediately after the dry extended detention basin is established, the vegetation will be watered twice weekly if needed until the plants become established (commonly six weeks).
- No portion of the dry extended detention pond will be fertilized after the first initial fertilization that is required to establish the vegetation.
- I will maintain the vegetation in and around the basin at a height of approximately six inches.
- Once a year, a dam safety expert will inspect the embankment.

After the dry extended detention basin is established, it will be inspected **once a quarter and within 24 hours after every storm event greater than 1.5 inches**. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How I will remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The perimeter of the dry extended detention basin	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.

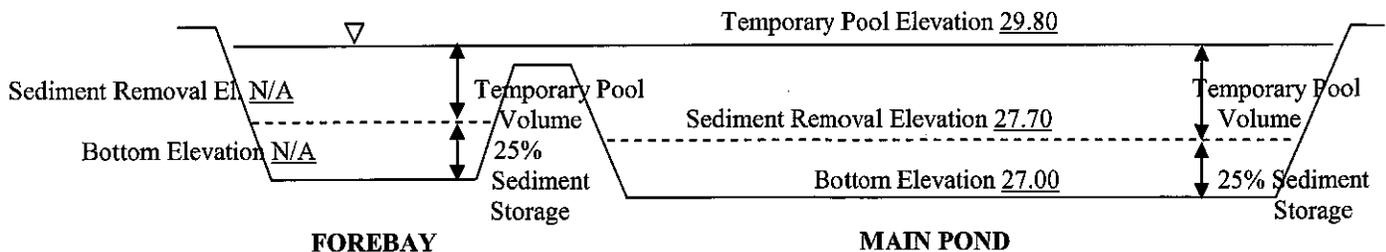
BMP element:	Potential problem:	How I will remediate the problem:
The embankment	Shrubs or trees have started to grow on the embankment.	Remove shrubs or trees immediately.
	Grass cover is unhealthy or eroding.	Restore the health of the grass cover - consult a professional if necessary.
	Signs of seepage on the downstream face.	Consult a professional.
	Evidence of muskrat or beaver activity is present.	Use traps to remove muskrats and consult a professional to remove beavers.
	An annual inspection by an appropriate professional shows that the embankment needs repair.	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 NC Division of Water Quality 401 Oversight Unit at 919-733-1786.

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

When the basin depth reads 27.70 feet in the main pond, the sediment shall be removed.

When the basin depth reads N/A feet in the forebay, the sediment shall be removed.

**BASIN DIAGRAM**  
(fill in the blanks)



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

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above. I agree to notify the City of Wilmington of any problems with the system or prior to any changes to the system or responsible party.

Project name: Sweeney Water Treatment Plant

BMP drainage basin number: 5

Print name: Cape Fear Public Utility Authority / Frank Styers

Title: Chief Operations Officer

Address: 235 Government Center Drive, Wilmington, NC 28403

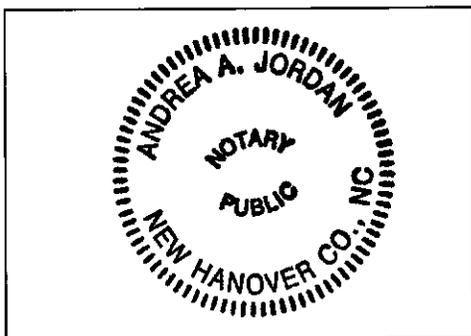
Phone: 910-332-6625

Signature: Frank Styers

Date: 1/12/14

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SEAL

My commission expires 1/5/20



STORMWATER MANAGEMENT PERMIT APPLICATION FORM  
401 CERTIFICATION APPLICATION FORM

**PERMEABLE PAVEMENT SUPPLEMENT**

*This form must be filled out, printed and submitted.*

*The Required Items Checklist (Part III) must be printed, filled out and submitted along with all of the required information.*

**I. PROJECT INFORMATION**

Project Name	Sweeney Water Treatment Plant
Contact Person	Lisa Manning
Phone Number	910-392-4462
Date	5/27/2008
Drainage Area / Lot Number	Off-Site
Lot Owner's Signature	

**II. DESIGN INFORMATION**

**Soils Report Summary**

Soil type	o Silty Sand to Sandy Silt	
Infiltration rate	>0.52 in/hr	OK
SHWT elevation	27.00 fmsl	

**Credit Calculation**- Enter an "x" in the appropriate cell below

Within 1/2 mile of & draining to SA waters?	Y/N	
Permeable concrete without a gravel base		
Permeable concrete with at least 6" gravel base	X	
Flexible pavements with at least 4" gravel base		
Flexible pavements with at least 7" gravel base		
Bottom elevation of the permeable pavement cross-section	29.70 fmsl	OK
SA of permeable pavement being proposed	5,626.00 ft <sup>2</sup>	
Resulting BUA counted as impervious	2,250.40 ft <sup>2</sup>	

**Additional Information**

Slope of permeable pavement	0.77 %	Maximum of 0.5% allowed
Construction sequence minimizes compaction to soils?	Y Y/N	OK
Traffic volume (vehicles per day)	2.00 v/day	OK
Washed stone is specified for the gravel layer (if used)?	Y Y/N	OK
Concetrated flow from roofs & other surfaces directed away?	Y Y/N	OK

**Additional Information for Residential Lots Only**

Total BUA allocated to this lot	ft <sup>2</sup>
Remaining lot BUA available	ft <sup>2</sup>

Managed Grass Factor:

0.6

Unchanged  
from SW8940330  
*[Signature]*

**To be completed by permittee / HOA:**

Application Approved

Application Rejected

Reason for rejecting application: \_\_\_\_\_

Signature of permittee / HOA: \_\_\_\_\_

Date \_\_\_\_\_

**III REQUIRED ITEMS CHECKLIST**

Please indicate the page or plan sheet numbers where the supporting documentation can be found. **An incomplete submittal package will result in a request for additional information. This will delay final review and approval of the project.** Initial in the space provided to indicate the following design requirements have been met. If the applicant has designated an agent, the agent may initial below. **If a requirement has not been met, attach justification.**

Permeable Pavement

Initials	Page/ Plan Sheet No.	
<u>LM</u>	<u>B6</u> <u>B9</u> <u>- Drainage Areas</u> <u>11 x 77</u>	1. Plans (1" = 50' or larger) of the entire site showing: - Design at ultimate build-out, - Off-site drainage (if applicable), - Delineated drainage basins (include Rational C coefficient per basin), - Location of permeable pavement, - Roof and other surface flow directed away from permeable pavement,
<u>LM</u>	<u>B29A</u> <u>- SHWT</u> <u>Attachment</u> <u>basin 4+5</u>	2. Section view of the permeable pavement (1" = 20' or larger) showing: - Layers, and - SHWT
<u>LM</u>	<u>- Geotechnical</u> <u>Invest.</u> <u>Report</u> <u>Attachment</u>	3. A soils report that is based upon an actual field investigation, soil borings, and infiltration tests. The results of the soils report must be verified in the field by DWQ, by completing & submitting the soils investigation request form. County soil maps are not an acceptable source of soils information.
<u>LM</u>	<u>B29A</u> <u>B31</u> <u>Specs</u>	4. A construction sequence that shows how the permeable pavement will be protected from sediment until the entire drainage area is stabilized.
<u>LM</u>	<u>Additional</u> <u>Drainage Areas</u> <u>Sheet</u>	5. The supporting calculations.
<u>LM</u>	<u>O&amp;M</u>	6. A copy of the signed and notarized operation and maintenance (O&M) agreement.
<u>LM</u>	<u>N/A</u>	7. A copy of the deed restrictions (if required).

Example #1

Project is a lot with a maximum allowed BUA of 5,000 sq. ft. that drains to class SC waters.  
Project proposes a 1,000 sq. ft. permeable concrete driveway with a 6" gravel base.  
Managed grass factor = 0.6  
 $1000 \times 0.6 = 600$  square feet is counted as managed grass.  
 $1000 - 600 = 400$  square feet is counted as built-upon area.  
 $5000 - 400 = 4,600$  square feet available for house and other BUA.

Example #2

Project is a high density commercial site with a 5,000 square foot parking lot.  
Project is within 1/2 mile of and draining to SA waters. An infiltration system is proposed.  
The parking lot will handle <100 cars per day and is a flexible pavement with a 4" gravel base.  
Managed grass factor is one half of 0.4. = 0.2  
 $5000 \times 0.2 = 1000$  square feet is counted as managed grass.  
 $5000 - 1000 = 4,000$  square is counted as impervious.  
The total BUA used to calculate the minimum volume draining to the infiltration system can be reduced by 1,000 square feet.

## Permeable Pavement Operation and Maintenance Agreement

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**Important operation and maintenance procedures:**

- Stable groundcover will be maintained in the drainage area to reduce the sediment load to the permeable pavement.
- The area around the perimeter of the permeable pavement will be stabilized and mowed, with clippings removed.
- Any weeds that grow in the permeable pavement will be sprayed with pesticide immediately. Weeds will not be pulled, since this could damage the fill media.
- Once a year, the permeable pavement surface will be vacuum swept.
- At no time shall wet sweeping (moistening followed by sweeping) be allowed as a means of maintenance.
- There shall be no repair or treatment of Permeable Pavement surfaces with other types of pavement surfaces. All repairs to Permeable Pavement surfaces must be accomplished utilizing permeable pavement which meets the original pavement specifications.
- Concentrated runoff from roof drains, piping, swales or other point sources, directly onto the permeable pavement surface shall not be allowed. These areas must be diverted away from the permeable pavement.



**Initial Inspection:** Permeable Pavements shall be inspected monthly for the first three months for the following:

<b>BMP element:</b>	<b>Potential problem:</b>	<b>How to remediate the problem:</b>
<b>The perimeter of the permeable pavement</b>	Areas of bare soil and/or erosive gullies have formed.	In the event that rutting or failure of the groundcover occurs, the eroded area shall be repaired immediately and permanent groundcover re-established. Appropriate temporary Erosion Control measures (such as silt fence) shall be installed in the affected area during the establishment of permanent groundcover, and any impacted area of permeable pavement is to be cleaned via vacuum sweeping.
<b>The surface of the permeable pavement</b>	Rutting / uneven settlement	This indicates inadequate compaction of the pavement base / sub-base. If rutting or uneven settlement on the order of 1/2 inch or greater occurs, permeable pavement shall be removed and base / sub-base re-compacted, smoothed, and permeable pavement shall then be re-installed. Base and sub-base compaction shall be monitored by a licensed geotechnical engineer to ensure that infiltration capacity of base and sub-base are not compromised by compaction and smoothing processes.
	The pavement does not dewater between storms, or water is running off.	Vacuum sweep the pavement. If the pavement still does not dewater, consult a professional.

Permit Number: \_\_\_\_\_  
 (to be provided by City of Wilmington)  
 Drainage Area / Lot Number: \_\_\_\_\_

The permeable pavement will be inspected **once a quarter and within 24 hours after every storm event greater than 1.5 inches**. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

<b>BMP element:</b>	<b>Potential problem:</b>	<b>How to remediate the problem:</b>
<b>The perimeter of the permeable pavement</b>	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.
	Vegetation is too short or too long.	Maintain vegetation at a height of 3 to 6 inches (remove clippings).
<b>The surface of the permeable pavement</b>	Trash/debris is present.	Remove the trash/debris.
	Weeds are growing on the surface of the permeable pavement.	Do not pull the weeds (may pull out media as well). Spray them with pesticide.
	Sediment is present on the surface.	Vacuum sweep the pavement.
	The structure is deteriorating or damaged.	Consult an appropriate professional. Damaged areas of the pavement shall be removed and repaired.
	The pavement does not dewater between storms.	Vacuum sweep the pavement. If the pavement still does not dewater, consult a professional. Permanently clogged pavement shall be removed and repaired.

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

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above. I agree to notify City of Wilmington of any problems with the system or prior to any changes to the system or responsible party.

Project name: Sweeney Water Treatment Plant

BMP drainage area or lot number: Off-site

Print name: Cape Fear Public Utility Authority / Frank Styers

Title: Chief Operations Officer

Address: 235 Government Center Drive, Wilmington, NC 28403

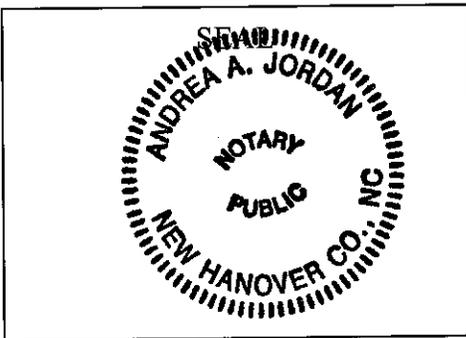
Phone: 910-332-6625

Signature: Frank Styers

Date: 1/12/16

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, Andrea A. Jordan, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Frank Styers personally appeared before me this 12 day of January, 2016, and acknowledge the due execution of the forgoing permeable pavement maintenance requirements. Witness my hand and official seal,



My commission expires 1/5/20