



Public Services

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

December 19, 2018

Ms. Leanne N. Lawrence, AIA-Dir., Facility, Planning & Construction
New Hanover County Schools
6410 Carolina Beach Road
Wilmington, NC 28412

**Subject: Stormwater Management Permit No. 2017012R2
College Park Elementary School
High Density Development**

Dear Ms. Lawrence:

The City of Wilmington Engineering Division has received a request for a revision to the Stormwater Management Permit for College Park Elementary. 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:

- Tree removal revisions
- See approved plan sheets C-2.2R and C-5.5R dated December 13, 2018.
- Correction: Permit revision number on plan sheets was issued as 2017012R1, correct permit revision is 2017012R2.

Please be aware all terms and conditions of the permit Issued on march 22, 2017 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.

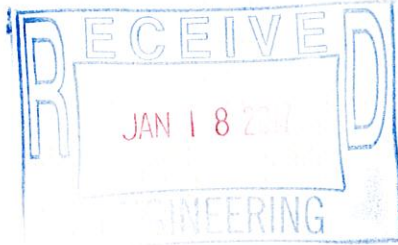
The revised stamped, approved stormwater management drawings will be released for construction by the Wilmington Planning Division under separate cover. Please replace any old plan sheets from the approved set with the new, revised sheet. An electronic copy of the approved drawing set, permit, application 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,

A handwritten signature in blue ink, appearing to read 'Sterling Cheatham'.

for Sterling Cheatham, City Manager
City of Wilmington

cc: Rob Balland, PE, Paramounte Engineering, Inc.
Jeff Walton, Associate Planner, City of Wilmington



**unless noted otherwise*



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STORMWATER MANAGEMENT PERMIT APPLICATION FORM
(Form SWP 2.2)

I. GENERAL INFORMATION

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

College Park Elementary School

2. Location of Project (street address):

5001 Oriole Drive

City: Wilmington County: New Hanover Zip: 28403

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

Travel along Oriole Drive from College Road, site is on your left after you cross over Racine Drive.

II. PERMIT INFORMATION

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

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

City of Wilmington: _____ State – NCDENR/DWQ: _____

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

If yes, list all applicable Stormwater Permit Numbers:

City of Wilmington: _____ State – NCDENR/DWQ: _____

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

CAMA Major Sedimentation/Erosion Control

NPDES Industrial Stormwater 404/401 Permit: Proposed Impacts: _____

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:

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**unless noted otherwise*

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: New Hanover County Schools

Signing Official & Title: Leanne N. Lawrence, AIA - Director, Facility Planning & Construction

- a. Contact information for Applicant / Signing Official:

Street Address: 6410 Carolina Beach Road

City: Wilmington State: NC Zip: 28412

Phone: 910-254-42810 Fax: _____ Email: patricia.lawrence@nhcs.net

Mailing Address (if different than physical address): _____

City: _____ State: _____ Zip: _____

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

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

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

Property Owner / Organization: _____

Signing Official & Title: _____

- a. Contact information for Property Owner:

Street Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Mailing Address (if different than physical address): _____

City: _____ State: _____ Zip: _____

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

Other Contact Person / Organization: _____

Signing Official & Title: _____

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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 utilizing a piped network that conveys the stormwater to 1 of 2 wet detention ponds on site.

2. Total Property Area: 673,021 square feet

3. Total Coastal Wetlands Area: 0 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: 673,021 square feet.

6. Existing Impervious Surface within Property Area: 145,580 square feet

7. Existing Impervious Surface to be Removed/Demolished: 145,580 square feet

8. Existing Impervious Surface to Remain: 0 square feet

9. Total Onsite (within property boundary) Newly Constructed Impervious Surface (in square feet):

Table with 2 columns: Category and Value. Rows include Buildings/Lots (58,772), Impervious Pavement (111,394), Pervious Pavement (adj. total, with % credit applied), Impervious Sidewalks (45,236), Pervious Sidewalks (adj. total, with % credit applied), Other (describe), Future Development (24,178), and Total Onsite Newly Constructed Impervious Surface (239,580).

10. Total Onsite Impervious Surface (Existing Impervious Surface to remain + Onsite Newly Constructed Impervious Surface) = 239,580 square feet

11. Project percent of impervious area: (Total Onsite Impervious Surface / Total Project Area) x100 = 36 %

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

Impervious Pavement	2,001
Pervious Pavement (adj. total, with % credit applied)	
Impervious Sidewalks	3,450
Pervious Sidewalks (adj. total, with % credit applied)	
Other (describe)	
Total Offsite Newly Constructed Impervious Surface	5,451

13. Total Newly Constructed Impervious Surface
 (Total Onsite + Offsite Newly Constructed Impervious Surface) = 245031 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	Wet Detention Basin BMP # 1	Wet Detention Basin BMP # 2	BMP #
Receiving Stream Name	Bradley Creek	Bradley Creek	
Receiving Stream Index Number	18-87-24-4-(1)	18-87-24-4-(1)	
Stream Classification	SC; HQW	SC; HQW	
Total Drainage Area (sf)	158558	514463	0
On-Site Drainage Area (sf)	158558	514463	
Off-Site Drainage Area (sf)			
Total Impervious Area (sf)	62202	177378	0
Buildings/Lots (sf)		58772	
Impervious Pavement (sf)	45794	65600	
Pervious Pavement, % credit (sf)			
Impervious Sidewalks (sf)	9434	35802	
Pervious Sidewalks, % credit (sf)			
Other (sf)			
Future Development (sf)	6974	17204	
Existing Impervious to remain (sf)			
Offsite (sf)			
Percent Impervious Area (%)	39.2	34.5	

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

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V. SUBMITTAL REQUIREMENTS

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

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

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

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

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

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

City of Wilmington – Engineering
Plan Review Section
414 Chestnut Street, Suite 200
Wilmington, NC 28402

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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, PE

Consulting Firm: Paramounte Engineering, Inc.

a. Contact information for consultant listed above:

Mailing Address: 122 Cinema Drive

City: Wilmington State: NC Zip: 28403

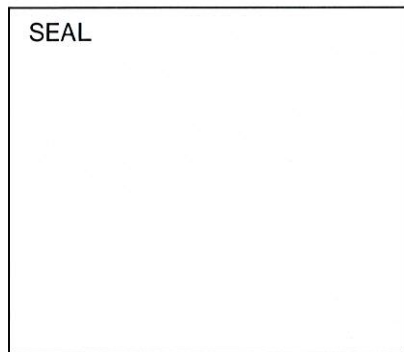
Phone: 910-791-6707 Fax: 910-791-6760 Email: rballand@paramounte-eng.com

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,

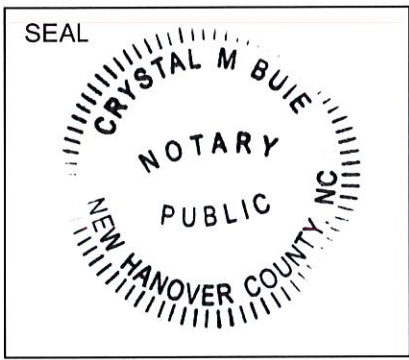
My commission expires: _____

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VIII. APPLICANT'S CERTIFICATION

I, *(print or type name of person listed in Contact Information, item 1)* , Leanne Lawrence, AIA - Director, Facility Planning & Construction 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: *Lee Me* Date: 11.22.16



I, Crystal M Buie, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Leanne Lawrence personally appeared before me this day of November 22, 2016, and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal,
Crystal M Buie
My commission expires: 5/18/2019

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STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM
WET DETENTION BASIN SUPPLEMENT

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

I. PROJECT INFORMATION	
Project name	College Park Elementary School
Contact person	Robert Balland, PE
Phone number	910-791-6707
Date	11/22/2016
Drainage area number	1

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

Site Characteristics	
Drainage area	158,558 ft ²
Impervious area, post-development	62,202 ft ²
% impervious	39.23 %
Design rainfall depth	1.5 in
Storage Volume: Non-SA Waters	
Minimum volume required	7,990 ft ³ OK
Volume provided	21,550 ft ³ OK, volume provided is equal to or in excess of volume required.
Storage Volume: SA Waters	
1.5" runoff volume	ft ³
Pre-development 1-yr, 24-hr runoff	ft ³
Post-development 1-yr, 24-hr runoff	ft ³
Minimum volume required	ft ³
Volume provided	ft ³
Peak Flow Calculations	
Is the pre/post control of the 1yr 24hr storm peak flow required?	N (Y or N)
1-yr, 24-hr rainfall depth	in
Rational C, pre-development	(unitless)
Rational C, post-development	(unitless)
Rainfall intensity: 1-yr, 24-hr storm	in/hr
Pre-development 1-yr, 24-hr peak flow	ft ³ /sec
Post-development 1-yr, 24-hr peak flow	ft ³ /sec
Pre/Post 1-yr, 24-hr peak flow control	ft ³ /sec
Elevations	
Temporary pool elevation	39.25 fmsl
Permanent pool elevation	37.50 fmsl
SHWT elevation (approx. at the perm. pool elevation)	36.45 fmsl
Top of 10ft vegetated shelf elevation	37.50 fmsl
Bottom of 10ft vegetated shelf elevation	36.50 fmsl
Sediment cleanout, top elevation (bottom of pond)	30.00 fmsl
Sediment cleanout, bottom elevation	29.00 fmsl
Sediment storage provided	1.00 ft
Is there additional volume stored above the state-required temp. pool?	Y (Y or N)
Elevation of the top of the additional volume	39.3 fmsl OK

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II. DESIGN INFORMATION

Surface Areas

Area, temporary pool	13,442 ft ²	
Area REQUIRED, permanent pool	5,452 ft ²	
SA/DA ratio	3.44 (unitless)	
Area PROVIDED, permanent pool, A_{perm_pool}	8,548 ft ²	OK
Area, bottom of 10ft vegetated shelf, A_{bot_shelf}	6,030 ft ²	
Area, sediment cleanout, top elevation (bottom of pond), A_{bot_pond}	750 ft ²	

Volumes

Volume, temporary pool	21,550 ft ³	OK
Volume, permanent pool, V_{perm_pool}	26,019 ft ³	
Volume, forebay (sum of forebays if more than one forebay)	5,044 ft ³	
Forebay % of permanent pool volume	19.4% %	OK

SA/DA Table Data

Design TSS removal	90 %	
Coastal SA/DA Table Used?	Y (Y or N)	
Mountain/Piedmont SA/DA Table Used?	N (Y or N)	
SA/DA ratio	3.44 (unitless)	
Average depth (used in SA/DA table):	4	
Calculation option 1 used? (See Figure 10-2b)	N (Y or N)	
Volume, permanent pool, V_{perm_pool}	26,019 ft ³	
Area provided, permanent pool, A_{perm_pool}	8,548 ft ²	
Average depth calculated	ft	Need 3 ft min.
Average depth used in SA/DA, d_{av} , (Round to nearest 0.5ft)	ft	
Calculation option 2 used? (See Figure 10-2b)	Y (Y or N)	
Area provided, permanent pool, A_{perm_pool}	8,548 ft ²	
Area, bottom of 10ft vegetated shelf, A_{bot_shelf}	6,030 ft ²	
Area, sediment cleanout, top elevation (bottom of pond), A_{bot_pond}	750 ft ²	
"Depth" (distance b/w bottom of 10ft shelf and top of sediment)	6.50 ft	
Average depth calculated	4.10 ft	OK
Average depth used in SA/DA, d_{av} , (Round to nearest 0.5ft)	4.0 ft	OK

Drawdown Calculations

Drawdown through orifice?	Y (Y or N)	
Diameter of orifice (if circular)	1.75 in	
Area of orifice (if-non-circular)	in ²	
Coefficient of discharge (C_D)	0.60 (unitless)	
Driving head (H_o)	0.58 ft	
Drawdown through weir?	N (Y or N)	
Weir type	(unitless)	
Coefficient of discharge (C_w)	(unitless)	
Length of weir (L)	ft	
Driving head (H)	ft	
Pre-development 1-yr, 24-hr peak flow	ft ³ /sec	
Post-development 1-yr, 24-hr peak flow	ft ³ /sec	
Storage volume discharge rate (through discharge orifice or weir)	0.06 ft ³ /sec	Storage volume discharge rate greater than pre-dev. 1yr24hr.
Storage volume drawdown time	4.02 days	OK, draws down in 2-5 days.

Additional Information

Vegetated side slopes	3 :1	OK
Vegetated shelf slope	6 :1	Insufficient shelf slope.
Vegetated shelf width	6.0 ft	Insufficient shelf length.
Length of flowpath to width ratio	3 :1	OK
Length to width ratio	1.8 :1	OK
Trash rack for overflow & orifice?	Y (Y or N)	OK
Freeboard provided	1.0 ft	OK
Vegetated filter provided?	N (Y or N)	OK
Recorded drainage easement provided?	N (Y or N)	Insufficient. Recorded drainage easement required.

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II. DESIGN INFORMATION

Captures all runoff at ultimate build-out?

Y (Y or N) OK

Drain mechanism for maintenance or emergencies is:

Pump

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STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM
WET DETENTION BASIN SUPPLEMENT

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

I. PROJECT INFORMATION	
Project name	College Park Elementary School
Contact person	Robert Balland, PE
Phone number	910-791-6707
Date	11/22/2016
Drainage area number	2

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

Site Characteristics		
Drainage area	514,463 ft ²	
Impervious area, post-development	177,378 ft ²	
% impervious	34.48 %	
Design rainfall depth	1.5 in	
Storage Volume: Non-SA Waters		
Minimum volume required	23,171 ft ³	OK
Volume provided	86,162 ft ³	OK, volume provided is equal to or in excess of volume required.
Storage Volume: SA Waters		
1.5" runoff volume	ft ³	
Pre-development 1-yr, 24-hr runoff	ft ³	
Post-development 1-yr, 24-hr runoff	ft ³	
Minimum volume required	ft ³	
Volume provided	ft ³	
Peak Flow Calculations		
Is the pre/post control of the 1yr 24hr storm peak flow required?	N (Y or N)	
1-yr, 24-hr rainfall depth	in	
Rational C, pre-development	(unitless)	
Rational C, post-development	(unitless)	
Rainfall intensity: 1-yr, 24-hr storm	in/hr	
Pre-development 1-yr, 24-hr peak flow	ft ³ /sec	
Post-development 1-yr, 24-hr peak flow	ft ³ /sec	
Pre/Post 1-yr, 24-hr peak flow control	ft ³ /sec	
Elevations		
Temporary pool elevation	34.50 fmsl	
Permanent pool elevation	32.60 fmsl	
SHWT elevation (approx. at the perm. pool elevation)	30.60 fmsl	
Top of 10ft vegetated shelf elevation	32.60 fmsl	
Bottom of 10ft vegetated shelf elevation	31.60 fmsl	
Sediment cleanout, top elevation (bottom of pond)	27.00 fmsl	
Sediment cleanout, bottom elevation	20.00 fmsl	
Sediment storage provided	7.00 ft	
Is there additional volume stored above the state-required temp. pool?	Y (Y or N)	
Elevation of the top of the additional volume	34.5 fmsl	OK

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II. DESIGN INFORMATION

Surface Areas

Area, temporary pool	48,758	ft ²	
Area REQUIRED, permanent pool	17,749	ft ²	
SA/DA ratio	3.45	(unitless)	
Area PROVIDED, permanent pool, A_{perm_pool}	25,840	ft ²	OK
Area, bottom of 10ft vegetated shelf, A_{bot_shelf}	20,767	ft ²	
Area, sediment cleanout, top elevation (bottom of pond), A_{bot_pond}	9,040	ft ²	

Volumes

Volume, temporary pool	86,162	ft ³	OK
Volume, permanent pool, V_{perm_pool}	95,875	ft ³	
Volume, forebay (sum of forebays if more than one forebay)	18,380	ft ³	
Forebay % of permanent pool volume	19.2%	%	OK

SA/DA Table Data

Design TSS removal	90	%	
Coastal SA/DA Table Used?	Y	(Y or N)	
Mountain/Piedmont SA/DA Table Used?	N	(Y or N)	
SA/DA ratio	3.45	(unitless)	

Average depth (used in SA/DA table):

Calculation option 1 used? (See Figure 10-2b)	N	(Y or N)	
Volume, permanent pool, V_{perm_pool}	95,875	ft ³	
Area provided, permanent pool, A_{perm_pool}	25,840	ft ²	
Average depth calculated		ft	Need 3 ft min.
Average depth used in SA/DA, d_{av} , (Round to nearest 0.5ft)		ft	
Calculation option 2 used? (See Figure 10-2b)	Y	(Y or N)	
Area provided, permanent pool, A_{perm_pool}	25,840	ft ²	
Area, bottom of 10ft vegetated shelf, A_{bot_shelf}	20,767	ft ²	
Area, sediment cleanout, top elevation (bottom of pond), A_{bot_pond}	9,040	ft ²	
"Depth" (distance b/w bottom of 10ft shelf and top of sediment)	4.60	ft	
Average depth calculated	3.80	ft	OK
Average depth used in SA/DA, d_{av} , (Round to nearest 0.5ft)	3.5	ft	Insufficient. Check calculation.

Drawdown Calculations

Drawdown through orifice?	Y	(Y or N)	
Diameter of orifice (if circular)	3.25	in	
Area of orifice (if non-circular)		in ²	
Coefficient of discharge (C_D)	0.60	(unitless)	
Driving head (H_o)	0.63	ft	
Drawdown through weir?	N	(Y or N)	
Weir type		(unitless)	
Coefficient of discharge (C_w)		(unitless)	
Length of weir (L)		ft	
Driving head (H)		ft	
Pre-development 1-yr, 24-hr peak flow		ft ³ /sec	
Post-development 1-yr, 24-hr peak flow		ft ³ /sec	
Storage volume discharge rate (through discharge orifice or weir)	0.22	ft ³ /sec	Storage volume discharge rate greater than pre-dev. 1yr24hr.
Storage volume drawdown time	4.45	days	OK, draws down in 2-5 days.

Additional Information

Vegetated side slopes	3 :1	OK
Vegetated shelf slope	6 :1	Insufficient shelf slope.
Vegetated shelf width	6.0 ft	Insufficient shelf length.
Length of flowpath to width ratio	3 :1	OK
Length to width ratio	2.4 :1	OK
Trash rack for overflow & orifice?	Y	(Y or N) OK
Freeboard provided	1.2 ft	OK
Vegetated filter provided?	N	(Y or N) OK
Recorded drainage easement provided?	N	(Y or N) Insufficient. Recorded drainage easement required.
Capures all runoff at ultimate build-out?	Y	(Y or N) OK
Drain mechanism for maintenance or emergencies is:	Pump	

Wet Detention Basin Operation and Maintenance Agreement

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

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

This system (check one):

does does not incorporate a vegetated filter at the outlet.

This system (check one):

does does not incorporate pretreatment other than a forebay.

Important maintenance procedures:

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

After the wet detention pond is established, it should be inspected **once a month and within 24 hours after every storm event greater than 1.5 inches**. Records of operation and maintenance should be kept in a known set location and must be available upon request. Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How I will remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The side slopes of the wet detention basin	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.
	Vegetation is too short or too long.	Maintain vegetation at a height of approximately six inches.

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FEB 07 2017

ENGINEERING

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

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

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

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

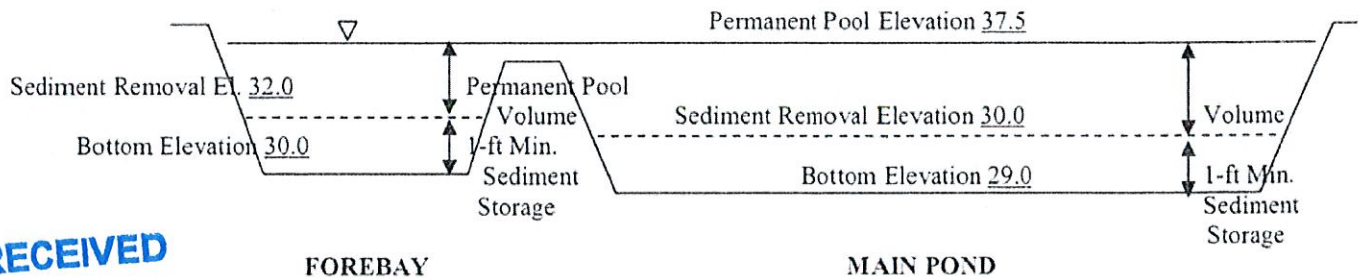
The measuring device used to determine the sediment elevation shall be such that it will give an accurate depth reading and not readily penetrate into accumulated sediments.

When the permanent pool depth reads 7.5 feet in the main pond, the sediment shall be removed.

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

BASIN DIAGRAM

(fill in the blanks)



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FEB 07 2017
ENGINEERING

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: College Park Elementary School

BMP drainage basin number: 1

Print name: Leanne N. Lawrence

Title: Director, Facility Planning & Construction

Address: 6410 Carolina Beach Road, Wilmington, NC 28412

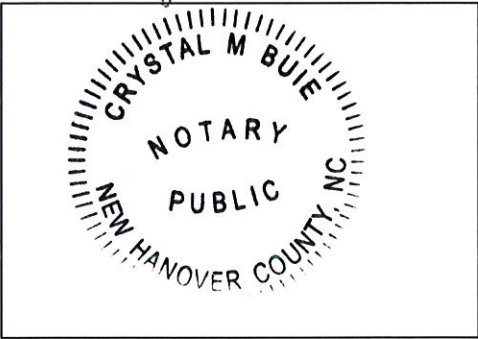
Phone: 910-254-4281

Signature: *Leanne N. Lawrence*

Date: 11.22.16

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, Crystal M Buie, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Leanne Lawrence personally appeared before me this 22 day of November, 2016, and acknowledge the due execution of the forgoing wet detention basin maintenance requirements. Witness my hand and official seal, Crystal M Buie



SEAL

My commission expires 5/18/2019

Wet Detention Basin Operation and Maintenance Agreement

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

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

This system (check one):

does does not incorporate a vegetated filter at the outlet.

This system (check one):

does does not incorporate pretreatment other than a forebay.

Important maintenance procedures:

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

After the wet detention pond is established, it should be inspected once a month and within 24 hours after every storm event greater than 1.5 inches. Records of operation and maintenance should be kept in a known set location and must be available upon request. Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How I will remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The side slopes of the wet detention basin	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.
	Vegetation is too short or too long.	Maintain vegetation at a height of approximately six inches.

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FEB 07 2017

ENGINEERING

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

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

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

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

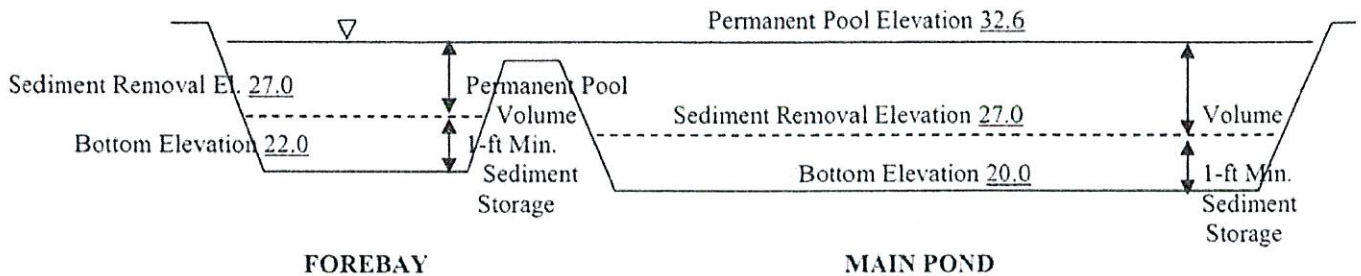
The measuring device used to determine the sediment elevation shall be such that it will give an accurate depth reading and not readily penetrate into accumulated sediments.

When the permanent pool depth reads 11.6 feet in the main pond, the sediment shall be removed.

When the permanent pool depth reads 6.6 feet in the forebay, the sediment shall be removed.

BASIN DIAGRAM

(fill in the blanks)



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FEB 07 2017

ENGINEERING

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: College Park Elementary School

BMP drainage basin number: 2

Print name: Leanne N. Lawrence

Title: Director, Facility Planning & Construction

Address: 6410 Carolina Beach Road, Wilmington, NC 28412

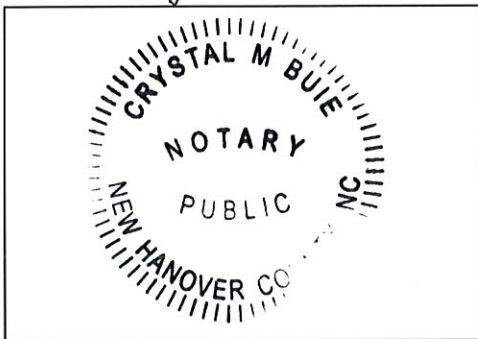
Phone: 910-254-4281

Signature: *Leanne N. Lawrence*

Date: 11.22.16

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, Crystal M Buie, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Leanne Lawrence personally appeared before me this 22nd day of November, 2016, and acknowledge the due execution of the forgoing wet detention basin maintenance requirements. Witness my hand and official seal, Crystal M Buie



SEAL

My commission expires 5/18/2019

Infiltration Basin Operation and Maintenance Agreement

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

Important maintenance procedures:

- The drainage area will be carefully managed to reduce the sediment load to the infiltration basin.
- Immediately after the infiltration basin is established, the vegetation will be watered twice weekly if needed until the plants become established (commonly six weeks).
- No portion of the infiltration basin will be fertilized after the initial fertilization that is required to establish the vegetation.
- The vegetation in and around the basin will be maintained at a height of approximately six inches.

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

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

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 infiltration 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.
The inlet device: pipe or swale	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.

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DEC 02 2016

BMP element:	Potential problem:	How I will remediate the problem:
The forebay	Sediment has accumulated and reduced the depth to 75% of the original design depth.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
	Erosion has occurred or riprap is displaced.	Provide additional erosion protection such as reinforced turf matting or riprap if needed to prevent future erosion problems.
	Weeds are present.	Remove the weeds, preferably by hand. If pesticides are used, wipe them on the plants rather than spraying.
The main treatment area	A visible layer of sediment has accumulated.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP. Replace any media that was removed in the process. Revegetate disturbed areas immediately.
	Water is standing more than 5 days after a storm event.	Replace the top few inches of filter media and see if this corrects the standing water problem. If so, revegetate immediately. If not, consult an appropriate professional for a more extensive repair.
	Weeds and noxious plants are growing in the main treatment area.	Remove the plants by hand or by wiping them with pesticide (do not spray).
The embankment	Shrubs or trees have started to grow on the embankment.	Remove shrubs or trees immediately.
	An annual inspection by an appropriate professional shows that the embankment needs repair.	Make all needed repairs.
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.

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: College Park Elementary

School _____

BMP drainage basin number: 1

Print name: Leanne N. Lawrence

Title: Director, Facility Planning & Construction

Address: 6410 Carolina Beach Road, Wilmington, NC 28412

Phone: 910-254-4281

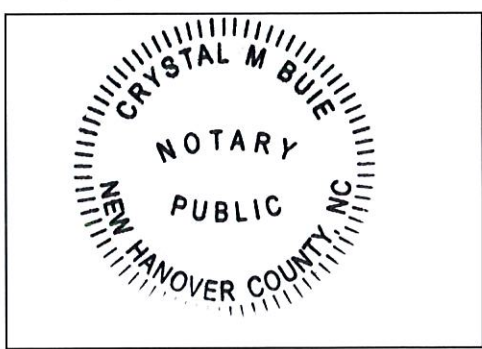
Signature: *Leanne N. Lawrence*

Date: 11.22.16

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, Crystal M. Bue, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Leanne Lawrence personally appeared before me this 22nd day of November, 2016, and acknowledge the due execution of the forgoing infiltration basin maintenance requirements. Witness my hand and official seal,

Crystal M. Bue



SEAL

My commission expires 5/18/2019

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

Infiltration Basin Operation and Maintenance Agreement

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

Important maintenance procedures:

- The drainage area will be carefully managed to reduce the sediment load to the infiltration basin.
- Immediately after the infiltration basin is established, the vegetation will be watered twice weekly if needed until the plants become established (commonly six weeks).
- No portion of the infiltration basin will be fertilized after the initial fertilization that is required to establish the vegetation.
- The vegetation in and around the basin will be maintained at a height of approximately six inches.

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

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

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 infiltration 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.
The inlet device: pipe or swale	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.

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DEC 02 2016

BMP element:	Potential problem:	How I will remediate the problem:
The forebay	Sediment has accumulated and reduced the depth to 75% of the original design depth.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
	Erosion has occurred or riprap is displaced.	Provide additional erosion protection such as reinforced turf matting or riprap if needed to prevent future erosion problems.
	Weeds are present.	Remove the weeds, preferably by hand. If pesticides are used, wipe them on the plants rather than spraying.
The main treatment area	A visible layer of sediment has accumulated.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP. Replace any media that was removed in the process. Revegetate disturbed areas immediately.
	Water is standing more than 5 days after a storm event.	Replace the top few inches of filter media and see if this corrects the standing water problem. If so, revegetate immediately. If not, consult an appropriate professional for a more extensive repair.
	Weeds and noxious plants are growing in the main treatment area.	Remove the plants by hand or by wiping them with pesticide (do not spray).
The embankment	Shrubs or trees have started to grow on the embankment.	Remove shrubs or trees immediately.
	An annual inspection by an appropriate professional shows that the embankment needs repair.	Make all needed repairs.
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.

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: College Park Elementary

School _____

BMP drainage basin number: 2

Print name: Leanne N. Lawrence

Title: Director, Facility Planning & Construction

Address: 6410 Carolina Beach Road, Wilmington, NC 28412

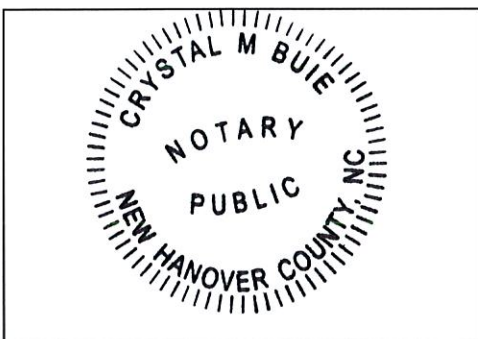
Phone: 910-254-4281

Signature: Leanne

Date: 11.22.16

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, Crystal M Buie, a Notary Public for the State of North Carolina, County of New Hanover, do hereby certify that Leanne Lawrence personally appeared before me this 22nd day of November, 2016, and acknowledge the due execution of the forgoing infiltration basin maintenance requirements. Witness my hand and official seal,



SEAL

Crystal M Buie

My commission expires 5/18/2019

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