



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: **Midway Development, LLC**
PROJECT: **Hawthorne at the Station**
ADDRESS: **527 Old MacCumber Station Rd.**
PERMIT #: **2013006**

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 March 20, 2023 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 March 19, 2013.
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
414 Chestnut St, Suite 200
Wilmington, NC 28401
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.



Public Services

Engineering
414 Chestnut St, Suite 200
Wilmington, NC 28401
910 341-7807
910 341-5881 fax
wilmingtonnc.gov
Dial 711 TTY/Voice

14. Upon completion of construction, before a Certificate of Occupancy shall be granted, and prior to operation or intended use of this permitted facility, the applicant shall submit to the City of Wilmington as-built plans for all stormwater management facilities. The plans shall show the final design specifications and the field location, type, depth, invert and planted vegetation of all measures, controls and devices, as-installed. A certification shall be submitted, along with all supporting documentation that specifies, under seal that the as-built stormwater measures, controls and devices are in compliance with the approved stormwater management plans. A final inspection by City of Wilmington Engineering 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.



Public Services

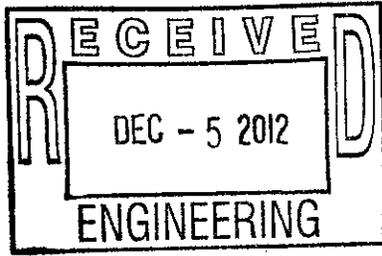
Engineering
414 Chestnut St, Suite 200
Wilmington, NC 28401
910 341-7807
910 341-5881 fax
wilmingtonnc.gov
Dial 711 TTY/Voice

21. The permit issued shall continue in force and effect until revoked or terminated by the City of Wilmington. The permit may be modified, revoked and reissued or terminated for cause. The filing of a request for a permit modification, revocation and re-issuance or termination does not stay any permit condition.
22. The approved stormwater management plans and all documentation submitted as part of the approved stormwater management permit application package for this project are incorporated by reference and are enforceable parts of the permit.
23. The permittee shall submit a renewal request with all required forms and documentation at least 180 days prior to the expiration date of this permit.
24. If any one or more of the conditions of this permit is found to be unenforceable or otherwise invalidated, all remaining conditions shall remain in full effect.

Stormwater Management Permit issued this the 20th day of March, 2013



for Sterling Cheatham, City Manager
City of Wilmington



unless otherwise noted



Public Services
Engineering
414 Chestnut St, Suite 200
Wilmington, NC 28401
910 341-7807
910 341-5881 fax
wilmingtonnc.gov
Dial 711 TTY/Voice



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.):

HAUTHORLE AT THE STATION

2. Location of Project (street address):

527 OLD MACCUMBER STATION ROAD

City: Wilmington County: New Hanover Zip: _____

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

600' EAST OF OLD MACCUMBER STATION ROAD AND MILITARY (CUTOFF ROAD)

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: NO 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:

Scanned

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: HAWTHORNE - MIDWAY WILMINGTON, LLC

Signing Official & Title: SAMANTHA DAVENPORT, MANAGER / PROPERTY OWNER

a. Contact information for Applicant / Signing Official:

Street Address: 806 GREEN VALLEY ROAD SUITE 301

City: GREENSBORO State: N.C. Zip: 27408

Phone: 336-275-9513 Fax: 336-275-9512 Email: _____

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: HAWTHORNE - MIDWAY WILMINGTON, LLC

Signing Official & Title: SAMANTHA DAVENPORT, MANAGER / PROPERTY OWNER

a. Contact information for Property Owner:

Street Address: 806 GREEN VALLEY ROAD

City: GREENSBORO State: NC Zip: 27408

Phone: 336-275-9513 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: MEGA BUILDERS, LLC

Signing Official & Title: MICHAEL P. WINSTEAD, JR., MANAGER / GENERAL CONTRACTOR

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

Street Address: 2920-C MARTINSVILLE ROAD

City: GREENSBORO State: N.C. Zip: 27408

Phone: 336-544-6205 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.

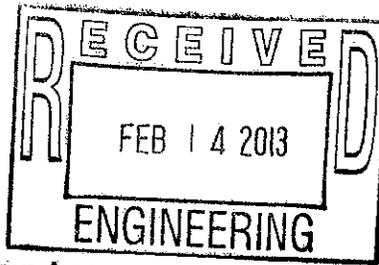
STORMWATER WILL BE TREATED BY USE OF PERVIOUS CONCRETE AND
INFILTRATION BASINS

- 2. Total Property Area: 654,489 square feet
- 3. Total Coastal Wetlands Area: 149,411 square feet
- 4. Total Surface Water Area: 0 square feet
- 5. Total Property Area (2) – Total Coastal Wetlands Area (3) – Total Surface Water Area (4) = Total Project Area: 505,078 square feet.
- 6. Existing Impervious Surface within Property Area: 0 square feet
- 7. Existing Impervious Surface to be Removed/Demolished: 0 square feet
- 8. Existing Impervious Surface to Remain: 0 square feet
- 9. Total Onsite (within property boundary) Newly Constructed Impervious Surface (in square feet):

Buildings/Lots	95,106
Impervious Pavement	4,011
Pervious Pavement (adj. total, with 75 % credit applied)	20,367
Impervious Sidewalks	12,822
Pervious Sidewalks (adj. total, with % credit applied)	
Other (describe) <u>POOL DECK & CURB & GUTTER</u>	17,677
Future Development	
Total Onsite Newly Constructed Impervious Surface	155,983.0

10. Total Onsite Impervious Surface
(Existing Impervious Surface to remain + Onsite Newly Constructed Impervious Surface) = 155,983 square feet

11. Project percent of impervious area: (Total Onsite Impervious Surface / Total Project Area) x100 = 23.8 %



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

Impervious Pavement	5,240
Pervious Pavement (adj. total, with % credit applied)	
Impervious Sidewalks	9,000
Pervious Sidewalks (adj. total, with % credit applied)	
Other (describe) <i>DRIVE PAVEMENT</i>	1,120
Total Offsite Newly Constructed Impervious Surface	0 15,360

13. Total Newly Constructed Impervious Surface

(Total Onsite + Offsite Newly Constructed Impervious Surface) = 0 171,343 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.

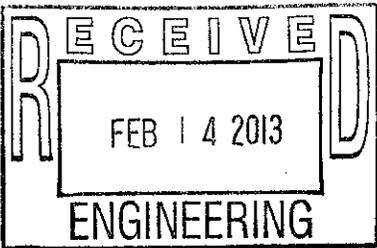
Basin Information	INFILTRATION BASIN (Type of BMP) BMP #	INFILTRATION BASIN (Type of BMP) BMP #	INFILTRATION BASIN (Type of BMP) BMP #
Receiving Stream Name	<i>HOWE CREEK</i>	<i>HOWE CREEK</i>	<i>HOWE CREEK</i>
Receiving Stream Index Number	<i>18-87-23</i>	<i>18-87-23</i>	<i>18-87-23</i>
Stream Classification	<i>SA/OLW</i>	<i>SA/OLW</i>	<i>SA/OLW</i>
Total Drainage Area (sf)	<i>44,867</i>	<i>53,143</i>	<i>41,818</i>
On-Site Drainage Area (sf)	<i>44,867</i>	<i>53,143</i>	<i>41,818</i>
Off-Site Drainage Area (sf)	<i>-</i>	<i>-</i>	<i>-</i>
Total Impervious Area (sf)	<i>29,611.0</i>	<i>27,141.0</i>	<i>25,989.0</i>
Buildings/Lots (sf)	<i>21,419</i>	<i>15,719</i>	<i>18,030</i>
Impervious Pavement (sf)	<i>-</i>	<i>-</i>	<i>-</i>
Pervious Pavement, % credit (sf)	<i>-</i>	<i>-</i>	<i>-</i>
Impervious Sidewalks (sf)	<i>733</i>	<i>3,094</i>	<i>465</i>
Pervious Sidewalks, % credit (sf)	<i>-</i>	<i>-</i>	<i>-</i>
Other (sf) <i>POOL & POOL DECK</i>	<i>-</i>	<i>5,796</i>	<i>-</i>
Future Development (sf)	<i>- 7,489</i>	<i>2,542</i>	<i>- 7,489</i>
Existing impervious to remain (sf)	<i>-</i>	<i>-</i>	<i>-</i>
Offsite (sf)	<i>-</i>	<i>-</i>	<i>-</i>
Percent Impervious Area (%)	<i>66.0</i>	<i>51.1</i>	<i>62.1</i>

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

N/A

Basin Information	(Type of BMP) BMP # 1	(Type of BMP) BMP # 2	(Type of BMP) BMP # 3	(Type of BMP) BMP # 4	(Type of BMP) BMP # 5	(Type of BMP) BMP #
Receiving Stream Name	Howe Creek					
Receiving Stream Index Number	18-87-23	18-87-23	18-87-23	18-87-23	18-87-23	
Stream Classification	54/02W	54/02W	54/02W	54/02W	54/02W	
Total Drainage Area (sf)	54,014.0	18,731.0	32,541.0	18,295.0	60,984.0	0
On-Site Drainage Area (sf)	54,014.0	18,731.0	32,541.0	18,295.0	60,984.0	0
Off-Site Drainage Area (sf)	—	—	—	—	—	—
Total Impervious Area (sf)	19,201.0	7,800.0	10,950.0	0	24,899.0	0
Buildings/Lots (sf)	6,341	3,468	5,422	3,388	6,341	0
Impervious Pavement (sf)	—	—	—	—	—	—
Pervious Pavement, 75 % credit (sf)	8,737	2,746	3,439	2,653	4,011	—
Impervious Sidewalks (sf)	1,612	1,006	3,078	951	1,863	—
Pervious Sidewalks, % credit (sf)	—	—	—	—	—	—
Other (sf) City? Curbs?	2,511	520	2,011	504	3,743	—
Future Development (sf)	—	—	—	—	—	—
Existing Impervious to remain (sf)	—	—	—	—	—	—
Offsite (sf)	—	—	—	—	—	—
Percent Impervious Area (%)	35.5	41.6	41.6	41.0	40.8	—

Pervious Concrete
 Pervious Concrete
 Pervious Concrete
 Pervious Concrete
 Pervious Concrete



V. SUBMITTAL REQUIREMENTS

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

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

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

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

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

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

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

VI. CONSULTANT INFORMATION AND AUTHORIZATION

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

Consulting Engineer: CHARLES P. TUBBY, VR. P.E.

Consulting Firm: CPT ENGINEERING AND SURVEYING, INC.

a. Contact information for consultant listed above:

Mailing Address: 4100 TYHAW ST.

City: HIGH POINT State: NC Zip: 27265

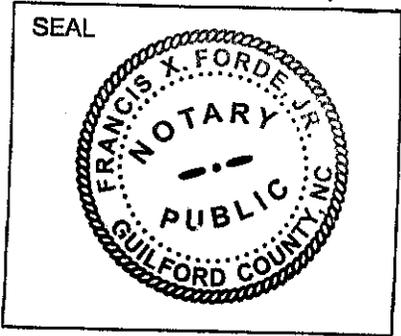
Phone: 336-812-8800 Fax: 336-812-8780 Email: CHARTO@CPTENGINEERING.COM

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) SAMANTHA DAVENPORT, MANAGER OF HAWTHORNE MIDWAY WILMINGTON, LLC 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: By: Samantha Davenport Date: _____
SAMANTHA DAVENPORT, MANAGER

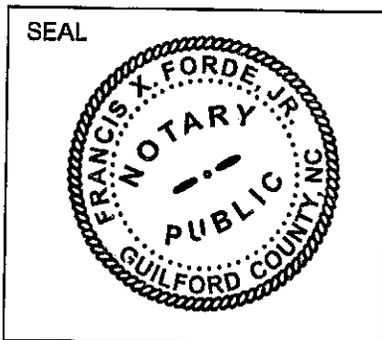


I, FRANCIS X. FORDE, JR., a Notary Public for the State of NORTH CAROLINA, County of GUILFORD, do hereby certify that SAMANTHA DAVENPORT personally appeared before me this day of 29th day of November, 2012 and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal,
[Signature]
My commission expires: MAY 12, 2014

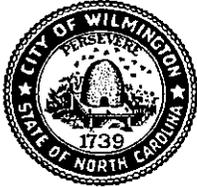
VIII. APPLICANT'S CERTIFICATION

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

Signature: By: Samantha Davenport Date: 11/29/2012
HAWTHORNE - MIDWAY WILMINGTON, LLC
SAMANTHA DAVENPORT, MANAGER



I, FRANCIS X. FORDE, JR., a Notary Public for the State of NORTH CAROLINA, County of GUILFORD, do hereby certify that SAMANTHA DAVENPORT personally appeared before me this day of 29th day of November, 2012 and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal.
Francis X. Forde, Jr.
My commission expires: MAY 12, 2014



STORMWATER MANAGEMENT PERMIT APPLICATION FORM
 401 CERTIFICATION APPLICATION FORM
INFILTRATION 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.

Permit No. _____
 (to be provided by DWQ)

Public Services
 Engineering
 414 Chestnut St, Suite 200
 Wilmington, NC 28401
 910 341-7807
 910 341-5881 fax
 wilingtonnc.gov
 Dial 711 TTY/Voice

I. PROJECT INFORMATION

Project Name	Hawthorne at the Station
Contact Person	Bruce Nooe, P.E. CPT Engineering and Surveying, Inc.
Phone Number	336-812-8800
Date	11/15/2012; Rev. 2/11/13
Drainage Area Number	1

II. DESIGN INFORMATION

Site Characteristics

Drainage area	44,866.00	ft ²
Impervious area	29,641.00	ft ²
Percent impervious	0.66	%
Design rainfall depth	1.50	in

Peak Flow Calculations

1-yr, 24-hr rainfall depth	3.84	in
1-yr, 24-hr intensity	4.27	in/hr
Pre-development 1-yr, 24-hr discharge	1.41	ft ³ /sec
Post-development 1-yr, 24-hr discharge	0.09	ft ³ /sec
Pre/Post 1-yr, 24-hr peak flow control	-1.32	ft ³ /sec

Storage Volume: Non-SA Waters

Minimum design volume required	NA	ft ³
Design volume provided	NA	ft ³

OK for non-SA waters

Storage Volume: SA Waters

1.5" runoff volume	3589.00	ft ³
Pre-development 1-yr, 24-hr runoff volume	718.00	ft ³
Post-development 1-yr, 24-hr runoff volume	9,189.00	ft ³
Minimum required volume	8471.00	ft ³
Volume provided	14,870.00	ft ³

OK

Soils Report Summary

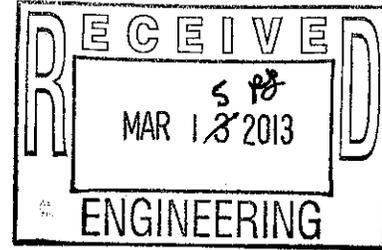
Soil type	BP
Infiltration rate	1.00 in/hr
SHWT elevation	20.20 fmsl

Basin Design Parameters

Drawdown time	1.52	days	OK
Basin side slopes	3.00	:1	OK
Basin bottom elevation	22.20	fmsl	OK
Storage elevation	23.65	fmsl	
Storage Surface Area	10,285.00	ft ²	
Top elevation	25.00	fmsl	

Basin Bottom Dimensions

Basin length	230.00	ft
Basin width	35.00	ft
Bottom Surface Area	9,386.00	ft ²



Additional Information

Maximum runoff to each inlet to the basin?	0.98	ac-in	OK
Length of vegetative filter for overflow	No	ft	OK
Distance to structure	35.00	ft	OK
Distance from surface waters	350.00	ft	OK
Distance from water supply well(s)	440.00	ft	OK
Separation from impervious soil layer	>10'	ft	OK
Naturally occurring soil above shwt	2.00	ft	OK
Bottom covered with 4-in of clean sand?	Yes	(Y or N)	OK
Proposed drainage easement provided?	No	(Y or N)	OK
Capures all runoff at ultimate build-out?	Yes	(Y or N)	OK
Bypass provided for larger storms?	No	(Y or N)	OK
Pretreatment device provided	No		



STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM
INFILTRATION BASIN SUPPLEMENT

Public Services
Engineering
414 Chestnut St, Suite 200
Wilmington, NC 28401
910 341-7807
910 341-5881 fax
wilmingtonnc.gov
Dial 711 TTY/Voice

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 Hawthorne at the Station
 Contact Person Bruce Nooe, P.E. CPT Engineering and Surveying, Inc.
 Phone Number 336-812-8800
 Date 11/15/2012 Rev.: 2/11/13
 Drainage Area Number 2

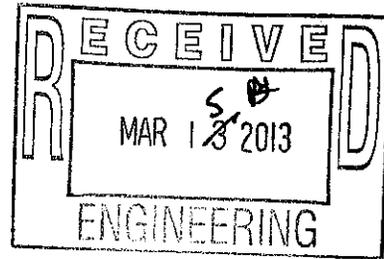
II. DESIGN INFORMATION

Site Characteristics

Drainage area	<u>53,143.00</u>	<u>ft²</u>
Impervious area	<u>27,141.00</u>	<u>ft²</u>
Percent impervious	<u>0.51</u>	<u>%</u>
Design rainfall depth	<u>1.50</u>	<u>in</u>

Peak Flow Calculations

1-yr, 24-hr rainfall depth	<u>3.84</u>	<u>in</u>
1-yr, 24-hr intensity	<u>4.27</u>	<u>in/hr</u>
Pre-development 1-yr, 24-hr discharge	<u>1.67</u>	<u>ft³/sec</u>
Post-development 1-yr, 24-hr discharge	<u>0.21</u>	<u>ft³/sec</u>
Pre/Post 1-yr, 24-hr peak flow control	<u>-1.46</u>	<u>ft³/sec</u>



Storage Volume: Non-SA Waters

Minimum design volume required	<u>NA</u>	<u>ft³</u>
Design volume provided	<u>NA</u>	<u>ft³</u>

OK for non-SA waters

Storage Volume: SA Waters

1.5" runoff volume	<u>3388.00</u>	<u>ft³</u>
Pre-development 1-yr, 24-hr runoff volume	<u>850.00</u>	<u>ft³</u>
Post-development 1-yr, 24-hr runoff volume	<u>8,673.00</u>	<u>ft³</u>
Minimum required volume	<u>7823.00</u>	<u>ft³</u>
Volume provided	<u>11,026.00</u>	<u>ft³</u>

OK

Soils Report Summary

Soil type	<u>BP</u>	
Infiltration rate	<u>4.00</u>	<u>in/hr</u>
SHWT elevation	<u>17.80</u>	<u>fmsl</u>

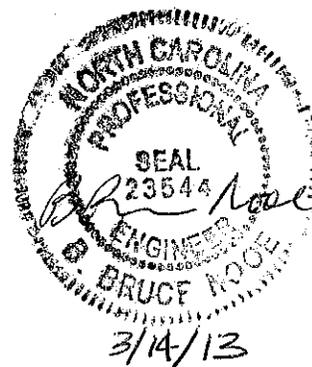
Basin Design Parameters

Drawdown time	<u>0.50</u>	<u>days</u>
Basin side slopes	<u>3.00</u>	<u>:1</u>
Basin bottom elevation	<u>21.10</u>	<u>fmsl</u>
Storage elevation	<u>22.75</u>	<u>fmsl</u>
Storage Surface Area	<u>7,595.00</u>	<u>ft²</u>
Top elevation	<u>24.00</u>	<u>fmsl</u>

OK
OK
OK

Basin Bottom Dimensions

Basin length	<u>150.00</u>	<u>ft</u>
Basin width	<u>35.00</u>	<u>ft</u>
Bottom Surface Area	<u>5,799.00</u>	<u>ft²</u>



Additional Information

Maximum runoff to each inlet to the basin?	0.94	ac-in	OK
Length of vegetative filter for overflow	NA	ft	OK
Distance to structure	35.00	ft	OK
Distance from surface waters	260.00	ft	OK
Distance from water supply well(s)	600.00	ft	OK
Separation from impervious soil layer	>10'	ft	OK
Naturally occurring soil above shwt	2.00	ft	OK
Bottom covered with 4-in of clean sand?	Yes	(Y or N)	OK
Proposed drainage easement provided?	No	(Y or N)	OK
Capures all runoff at ultimate build-out?	Yes	(Y or N)	OK
Bypass provided for larger storms?	No	(Y or N)	OK
Pretreatment device provided	No		



STORMWATER MANAGEMENT PERMIT APPLICATION FORM
 401 CERTIFICATION APPLICATION FORM
INFILTRATION 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.

Permit No. _____
 (to be provided by DWQ)

Public Services
 Engineering
 414 Chestnut St, Suite 200
 Wilmington, NC 28401
 910 341-7807
 910 341-5881 fax
 wilingtonnc.gov
 Dial 711 TTY/Voice

I. PROJECT INFORMATION

Project Name Hawthorne at the Station
 Contact Person Bruce Nooe, P.E. CPT Engineering and Surveying, Inc.
 Phone Number 336-812-8800
 Date 11/15/2012 Rev.: 2/11/13
 Drainage Area Number 3

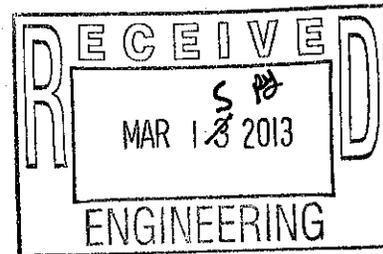
II. DESIGN INFORMATION

Site Characteristics

Drainage area 41,818.00 ft²
 Impervious area 25,984.00 ft²
 Percent impervious 0.62 %
 Design rainfall depth 1.50 in

Peak Flow Calculations

1-yr, 24-hr rainfall depth 3.84 in
 1-yr, 24-hr intensity 4.27 in/hr
 Pre-development 1-yr, 24-hr discharge 1.32 ft³/sec
 Post-development 1-yr, 24-hr discharge 0.18 ft³/sec
 Pre/Post 1-yr, 24-hr peak flow control -1.14 ft³/sec



Storage Volume: Non-SA Waters

Minimum design volume required NA ft³
 Design volume provided NA ft³

OK for non-SA waters

Storage Volume: SA Waters

1.5" runoff volume 3189.00 ft³
 Pre-development 1-yr, 24-hr runoff volume 669.00 ft³
 Post-development 1-yr, 24-hr runoff volume 8,163.00 ft³
 Minimum required volume 7494.00 ft³
 Volume provided 12,460.00 ft³

OK

Soils Report Summary

Soil type BP
 Infiltration rate 6.60 in/hr
 SHWT elevation 17.00 fmsl

Basin Design Parameters

Drawdown time 0.60 days OK
 Basin side slopes 3.00 :1 OK
 Basin bottom elevation 19.20 fmsl OK
 Storage elevation 20.80 fmsl
 Storage Surface Area 8,486.00 ft²
 Top elevation 22.00 fmsl

Basin Bottom Dimensions

Basin length 130.00 ft
 Basin width 45.00 ft
 Bottom Surface Area 6,767.00 ft²



Additional Information

Maximum runoff to each inlet to the basin?	0.88	ac-in	OK
Length of vegetative filter for overflow	NA	ft	OK
Distance to structure	45.00	ft	OK
Distance from surface waters	175.00	ft	OK
Distance from water supply well(s)	650.00	ft	OK
Separation from impervious soil layer	>10'	ft	OK
Naturally occurring soil above shwt	2.00	ft	OK
Bottom covered with 4-in of clean sand?	Yes	(Y or N)	OK
Proposed drainage easement provided?	No	(Y or N)	OK
Captures all runoff at ultimate build-out?	Yes	(Y or N)	OK
Bypass provided for larger storms?	No	(Y or N)	OK
Pretreatment device provided	No		



STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM



PERMEABLE PAVEMENT SUPPLEMENT

This form must be completely 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: Hawthorne at the Station
 Contact Person: Chuck Truby
 Phone Number: 336-812-8800
 Date: 11/15/2012
 Drainage Area: #1 1.24 Acs.

II. DESIGN INFORMATION

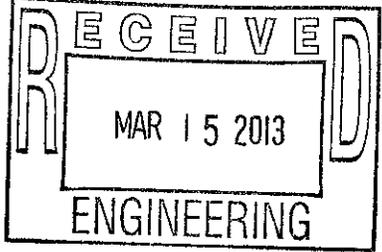
Soils Report Summary

Hydrologic soil group (HSG) of subgrade: B
 Infiltration rate: 3.00 in/hr

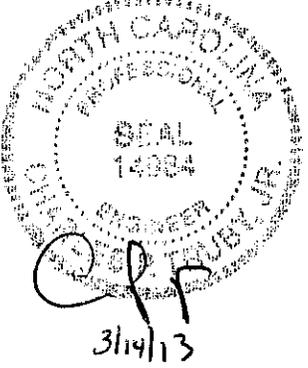
Pavement Design Summary

Permeable Pavement (PP) design type	Infiltration - HSG A/B	
SA of PP being proposed (A _p)	34,947	ft ²
Resulting BUA counted as impervious for main application form	8,737	ft ²
Adjacent BUA directed to PP (A _c)	10,464	ft ²
Ratio of A _c to A _p	0.30	(unitless)
Flow from pervious surfaces is directed away from PP?	Yes	OK
Design rainfall depth	3.83"	in
Permeable pavement surface course type	PC	
Layer 1 - Washed aggregate size (ex. No. 57)	No. 57	
Layer 1 - Aggregate porosity (n)	0.40	(unitless) OK
Layer 2 - Washed aggregate size (ex. No. 57)	N/A	
Layer 2 - Aggregate porosity (n)	N/A	(unitless) Please verify; Must be between 0 & 1
Minimum total aggregate depth for design rainfall (D _{wq})	6.0	in
Drawdown/infiltration time for D _{wq}	5.0	days
How is 10-yr, 24-hr storm handled?	infiltrated	OK
Aggregate depth to infiltrate 10-yr, 24-hr storm (D ₁₀)	6.0	in
Drawdown/infiltration time of 10-yr, 24-hr storm	5.00	days
Actual provided total aggregate depth	6.0	in
Top of aggregate base layer elevation	24.50	fmsl
Storage elevation of design rainfall depth	24.40	fmsl
Overflow elevation	25.00	fmsl
Bottom elevation at subgrade	24.00	fmsl
SHWT elevation	21.00	fmsl
Underdrain diameter	N/A	in

BUA Credit for Permeable Pavement Footprint:
75% BUA Credit



#REF!



Detention Systems *(skip for infiltration systems)*

Diameter of orifice	_____	in
Coefficient of discharge (C_D)	_____	(unitless)
Driving head (H_o)	_____	ft
Storage volume discharge rate (through discharge orifice)	_____	ft ³ /sec
Storage volume drawdown time	_____	days
Pre-development 1-yr, 24-hr peak flow	_____	ft ³ /sec
Post-development 1-yr, 24-hr peak flow	_____	ft ³ /sec

Additional Information

Slope of soil subgrade at bottom of permeable pavement	0.30	%	OK
Slope of the permeable pavement surface	0.30	%	OK
Construction sequence minimizes compaction to soils?	Yes		OK
Subsoil preparation specified (must select one)	scarified		
Meets industry standards for structural requirements?	Yes		OK
<u>Washed</u> stone is specified for the aggregate?	Yes		OK
Required signage specified on plans?	Yes		OK
Number of observation wells provided	2		OK
Distance to structure	15.00	ft	
Distance to surface waters	700.00	ft	OK
Distance to water supply well(s)	100.00	ft	OK



STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM
PERMEABLE PAVEMENT SUPPLEMENT



*This form must be completely 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 Hawthorne at the Station
 Contact Person Chuck Truby
 Phone Number 336-812-8800
 Date 11/15/2012
 Drainage Area #2 0.43 Acs.

II. DESIGN INFORMATION

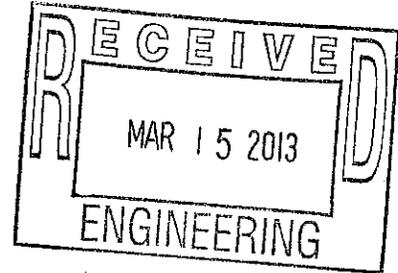
Soils Report Summary

Hydrologic soil group (HSG) of subgrade B
 Infiltration rate 3.00 in/hr

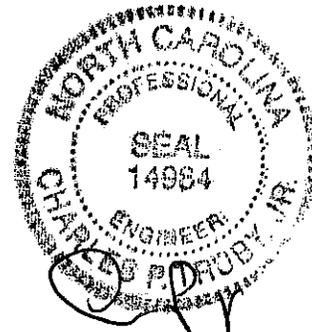
Pavement Design Summary

Permeable Pavement (PP) design type	<u>Infiltration - HSG A/B</u>	
SA of PP being proposed (A _p)	<u>10,982</u>	ft ²
Resulting BUA counted as impervious for main application form	<u>2,746</u>	ft ²
Adjacent BUA directed to PP (A _c)	<u>5,054</u>	ft ²
Ratio of A _c to A _p	<u>0.46</u>	(unitless)
Flow from pervious surfaces is directed away from PP?	<u>Yes</u>	OK
Design rainfall depth	<u>3.83"</u>	in
Permeable pavement surface course type	<u>PC</u>	
Layer 1 - Washed aggregate size (ex. No. 57)	<u>No. 57</u>	
Layer 1 - Aggregate porosity (n)	<u>0.40</u>	(unitless) OK
Layer 2 - Washed aggregate size (ex. No. 57)	<u>N/A</u>	
Layer 2 - Aggregate porosity (n)	<u>0.40</u>	(unitless) OK
Minimum total aggregate depth for design rainfall (D _{wq})	<u>6.0</u>	in
Drawdown/infiltration time for D _{wq}	<u>5.0</u>	days
How is 10-yr, 24-hr storm handled?	<u>infiltrated</u>	OK
Aggregate depth to infiltrate 10-yr, 24-hr storm (D ₁₀)	<u>6.0</u>	in
Drawdown/infiltration time of 10-yr, 24-hr storm	<u>5.00</u>	days
Actual provided total aggregate depth	<u>6.0</u>	in
Top of aggregate base layer elevation	<u>24.80</u>	fmsl
Storage elevation of design rainfall depth	<u>24.75</u>	fmsl
Overflow elevation	<u>25.30</u>	fmsl
Bottom elevation at subgrade	<u>24.30</u>	fmsl
SHWT elevation	<u>22.00</u>	fmsl
Underdrain diameter	<u>N/A</u>	in

BUA Credit for Permeable Pavement Footprint:
75% BUA Credit



#REF!



3/14/13

Detention Systems (skip for infiltration systems)

Diameter of orifice	_____	in
Coefficient of discharge (C _d)	_____	(unitless)
Driving head (H _o)	_____	ft
Storage volume discharge rate (through discharge orifice)	_____	ft ³ /sec
Storage volume drawdown time	_____	days
Pre-development 1-yr, 24-hr peak flow	_____	ft ³ /sec
Post-development 1-yr, 24-hr peak flow	_____	ft ³ /sec

Additional Information

Slope of soil subgrade at bottom of permeable pavement	0.30	%	OK
Slope of the permeable pavement surface	0.30	%	OK
Construction sequence minimizes compaction to soils?	Yes		OK
Subsoil preparation specified (must select one)	scarified		
Meets industry standards for structural requirements?	Yes		OK
Washed stone is specified for the aggregate?	Yes		OK
Required signage specified on plans?	Yes		OK
Number of observation wells provided	1		OK
Distance to structure	15.00	ft	
Distance to surface waters	700.00	ft	OK
Distance to water supply well(s)	100.00	ft	OK



STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM
PERMEABLE PAVEMENT SUPPLEMENT



This form must be completely 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	Hawthorne at the Station
Contact Person	Chuck Truby
Phone Number	336-812-8800
Date	11/15/2012
Drainage Area	#3 0.77 Acs.

II. DESIGN INFORMATION

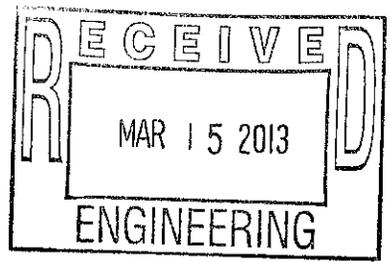
Soils Report Summary

Hydrologic soil group (HSG) of subgrade	B
Infiltration rate	3.00 in/hr

Pavement Design Summary

Permeable Pavement (PP) design type	Infiltration - HSG A/B	
SA of PP being proposed (A _p)	13,756	ft ²
Resulting BUA counted as impervious for main application form	3,439	ft ²
Adjacent BUA directed to PP (A _c)	10,511	ft ²
Ratio of A _c to A _p	0.76	(unitless) OK
Flow from pervious surfaces is directed away from PP?	Yes	OK
Design rainfall depth	3.83"	in
Permeable pavement surface course type	PC	
Layer 1 - Washed aggregate size (ex. No. 57)	No. 57	
Layer 1 - Aggregate porosity (n)	0.40	(unitless) OK
Layer 2 - Washed aggregate size (ex. No. 57)	N/A	
Layer 2 - Aggregate porosity (n)	0.40	(unitless) OK
Minimum total aggregate depth for design rainfall (D _{wq})	6.0	in
Drawdown/infiltration time for D _{wq}	5.0	days OK
How is 10-yr, 24-hr storm handled?	infiltrated	
Aggregate depth to infiltrate 10-yr, 24-hr storm (D ₁₀)	6.0	in
Drawdown/infiltration time of 10-yr, 24-hr storm	5.00	days
Actual provided total aggregate depth	12.0	in OK
Top of aggregate base layer elevation	24.50	fmsl
Storage elevation of design rainfall depth	24.05	fmsl
Overflow elevation	24.70	fmsl
Bottom elevation at subgrade	23.50	fmsl
SHWT elevation	21.00	fmsl
Underdrain diameter	N/A	in

BUA Credit for Permeable Pavement Footprint:
75% BUA Credit



#REF!



3/14/13

Detention Systems (skip for infiltration systems)

Diameter of orifice	_____	in
Coefficient of discharge (C_d)	_____	(unitless)
Driving head (H_o)	_____	ft
Storage volume discharge rate (through discharge orifice)	_____	ft ³ /sec
Storage volume drawdown time	_____	days
Pre-development 1-yr, 24-hr peak flow	_____	ft ³ /sec
Post-development 1-yr, 24-hr peak flow	_____	ft ³ /sec

Additional Information

Slope of soil subgrade at bottom of permeable pavement	0.30	%	OK
Slope of the permeable pavement surface	0.30	%	OK
Construction sequence minimizes compaction to soils?	Yes		OK
Subsoil preparation specified (must select one)	scarified		
Meets industry standards for structural requirements?	Yes		OK
<u>Washed</u> stone is specified for the aggregate?	Yes		OK
Required signage specified on plans?	Yes		OK
Number of observation wells provided	1		OK
Distance to structure	15.00	ft	
Distance to surface waters	450.00	ft	OK
Distance to water supply well(s)	400.00	ft	OK



STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM
PERMEABLE PAVEMENT SUPPLEMENT



This form must be completely 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: Hawthorne at the Station
 Contact Person: Chuck Truby
 Phone Number: 336-812-8800
 Date: 11/15/2012
 Drainage Area: #4 0.42 Acs.

II. DESIGN INFORMATION

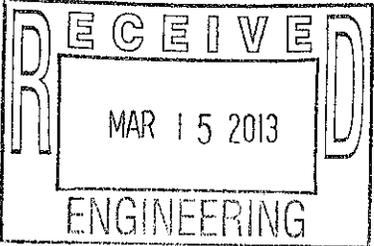
Soils Report Summary

Hydrologic soil group (HSG) of subgrade: B
 Infiltration rate: 3.00 in/hr

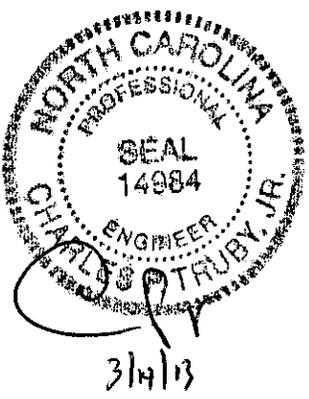
Pavement Design Summary

Permeable Pavement (PP) design type	Infiltration - HSG A/B	
SA of PP being proposed (A _p)	10,613	ft ²
Resulting BUA counted as impervious for main application form	2,653	ft ²
Adjacent BUA directed to PP (A _c)	4,843	ft ²
Ratio of A _c to A _p	0.46	(unitless) OK
Flow from pervious surfaces is directed away from PP?	Yes	OK
Design rainfall depth	3.83"	in
Permeable pavement surface course type	PC	
Layer 1 - Washed aggregate size (ex. No. 57)	No. 57	
Layer 1 - Aggregate porosity (n)	0.40	(unitless) OK
Layer 2 - Washed aggregate size (ex. No. 57)	N/A	
Layer 2 - Aggregate porosity (n)	0.40	(unitless) OK
Minimum total aggregate depth for design rainfall (D _{wq})	6.0	in
Drawdown/infiltration time for D _{wq}	5.0	days OK
How is 10-yr, 24-hr storm handled?	infiltrated	
Aggregate depth to infiltrate 10-yr, 24-hr storm (D ₁₀)	6.0	in
Drawdown/infiltration time of 10-yr, 24-hr storm	5.00	days
Actual provided total aggregate depth	6.0	in OK
Top of aggregate base layer elevation	24.50	fmsl
Storage elevation of design rainfall depth	24.45	fmsl
Overflow elevation	25.00	fmsl
Bottom elevation at subgrade	24.00	fmsl
SHWT elevation	21.00	fmsl
Underdrain diameter	N/A	in

BUA Credit for Permeable Pavement Footprint:
75% BUA Credit



#REF!



Detention Systems (skip for infiltration systems)

Diameter of orifice	_____	in
Coefficient of discharge (C_D)	_____	(unitless)
Driving head (H_o)	_____	ft
Storage volume discharge rate (through discharge orifice)	_____	ft ³ /sec
Storage volume drawdown time	_____	days
Pre-development 1-yr, 24-hr peak flow	_____	ft ³ /sec
Post-development 1-yr, 24-hr peak flow	_____	ft ³ /sec

Additional Information

Slope of soil subgrade at bottom of permeable pavement	0.30	%	OK
Slope of the permeable pavement surface	0.30	%	OK
Construction sequence minimizes compaction to soils?	Yes		OK
Subsoil preparation specified (must select one)	scarified		
Meets industry standards for structural requirements?	Yes		OK
Washed stone is specified for the aggregate?	Yes		OK
Required signage specified on plans?	Yes		OK
Number of observation wells provided	1		OK
Distance to structure	15.00	ft	
Distance to surface waters	280.00	ft	OK
Distance to water supply well(s)	550.00	ft	OK



STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM



PERMEABLE PAVEMENT SUPPLEMENT

*This form must be completely 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	Hawthorne at the Station
Contact Person	Chuck Truby
Phone Number	336-812-8800
Date	11/15/2012
Drainage Area	#5 1.40 Acs.

II. DESIGN INFORMATION

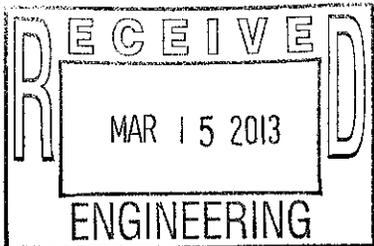
Soils Report Summary

Hydrologic soil group (HSG) of subgrade	B
Infiltration rate	3.00 in/hr

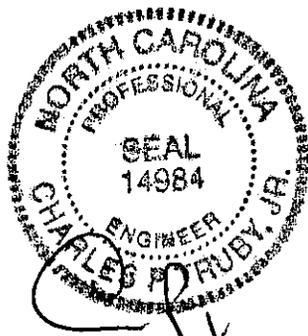
Pavement Design Summary

Permeable Pavement (PP) design type	Infiltration - HSG A/B	
SA of PP being proposed (A _p)	35,685	ft ²
Resulting BUA counted as impervious for main application form	8,921	ft ²
Adjacent BUA directed to PP (A _c)	15,978	ft ² OK
Ratio of A _c to A _p	0.45	(unitless)
Flow from pervious surfaces is directed away from PP?	Yes	OK
Design rainfall depth	3.83"	in
Permeable pavement surface course type	PC	
Layer 1 - Washed aggregate size (ex. No. 57)	No. 57	
Layer 1 - Aggregate porosity (n)	0.40	(unitless) OK
Layer 2 - Washed aggregate size (ex. No. 57)	N/A	
Layer 2 - Aggregate porosity (n)	0.40	(unitless) OK
Minimum total aggregate depth for design rainfall (D _{wq})	6.0	in
Drawdown/infiltration time for D _{wq}	5.0	days OK
How is 10-yr, 24-hr storm handled?	infiltrated	
Aggregate depth to infiltrate 10-yr, 24-hr storm (D ₁₀)	6.0	in
Drawdown/infiltration time of 10-yr, 24-hr storm	5.00	days
Actual provided total aggregate depth	6.0	in OK
Top of aggregate base layer elevation	24.50	fmsl
Storage elevation of design rainfall depth	24.45	fmsl
Overflow elevation	24.85	fmsl
Bottom elevation at subgrade	24.00	fmsl
SHWT elevation	20.50	fmsl
Underdrain diameter	N/A	in

BUA Credit for Permeable Pavement Footprint:
75% BUA Credit



#REF!



3/14/13

Detention Systems *(skip for infiltration systems)*

Diameter of orifice	_____	in
Coefficient of discharge (C _D)	_____	(unitless)
Driving head (H _o)	_____	ft
Storage volume discharge rate (through discharge orifice)	_____	ft ³ /sec
Storage volume drawdown time	_____	days
Pre-development 1-yr, 24-hr peak flow	_____	ft ³ /sec
Post-development 1-yr, 24-hr peak flow	_____	ft ³ /sec

Additional Information

Slope of soil subgrade at bottom of permeable pavement	0.30	%	OK
Slope of the permeable pavement surface	0.30	%	OK
Construction sequence minimizes compaction to soils?	Yes		OK
Subsoil preparation specified (must select one)	scarified		
Meets industry standards for structural requirements?	Yes		OK
<u>Washed</u> stone is specified for the aggregate?	Yes		OK
Required signage specified on plans?	Yes		OK
Number of observation wells provided	1		OK
Distance to structure	15.00	ft	
Distance to surface waters	200.00	ft	OK
Distance to water supply well(s)	730.00	ft	OK

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

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.

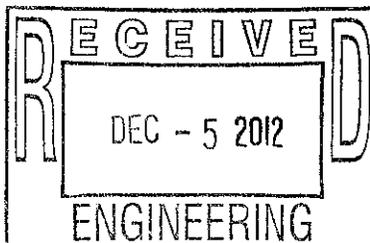
Important maintenance procedures:

- 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.



Scanned

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: HAWTHORNE AT THE STATION

BMP drainage basin number: 1, 2, 3

Print name: HAWTHORNE-MIDWAY WILMINGTON, LLC

Title: PROPERTY OWNER

Address: 806 GREEN VALLEY ROAD, SUITE 311, GREENSBORO, NC

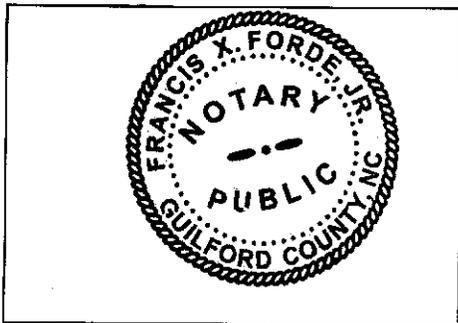
Phone: 336-275-9513

Signature: By: SAMANTHA DAVENPORT, MANAGER

Date: NOVEMBER 30, 2012

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, FRANCIS X. FORDE, JR., a Notary Public for the State of NORTH CAROLINA, County of GUILFORD, do hereby certify that SAMANTHA DAVENPORT, MANAGER OF HAWTHORNE-MIDWAY WILMINGTON, LLC personally appeared before me this 30th day of NOVEMBER, 2012, and acknowledge the due execution of the forgoing infiltration basin maintenance requirements. Witness my hand and official seal,



Francis X. Forde, Jr.
NOTARY PUBLIC

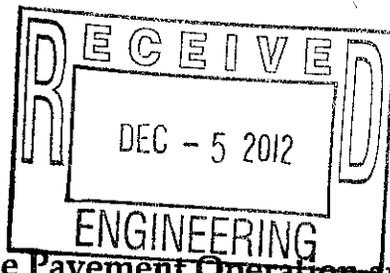
PRINTED NAME: FRANCIS X. FORDE, JR.

My COMMISSION EXPIRES: MAY 12, 2014

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

SEAL

My commission expires _____



Permit Number: _____
 (to be provided by DWQ)
 Drainage Area / Lot Number: _____

Permeable Pavement Operation and Maintenance Agreement

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

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

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

The permeable pavement will be inspected once a quarter. Records of operation and maintenance will be kept in a known set location and will be available upon request.

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

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

Scanned

Permit Number: _____
(to be provided by DWQ)

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

Project name: HAWTHORNE AT THE STATION

BMP drainage area or lot number: 4.31 ACRES

Print name: HAWTHORNE - MIDWAY WILMINGTON, LLC

Title: PROPERTY OWNER

Address: 806 GREEN VALLEY RD., Ste. 311, GREENSBORO, NC

Phone: 336-275-9513

HAWTHORNE - MIDWAY WILMINGTON, LLC

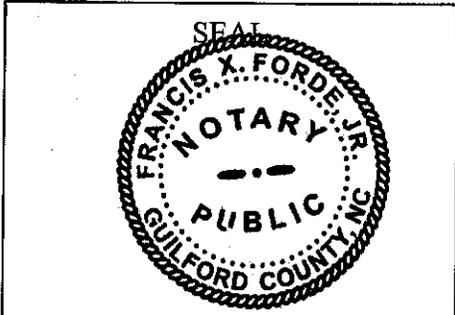
Signature: By: Samantha Davenport

SAMANTHA DAVENPORT, MANAGER

Date: November, 2012

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, FRANCIS X. FORDE, JR., a Notary Public for the State of NORTH CAROLINA, County of GUIN FORD, do hereby certify that SAMANTHA DAVENPORT, MANAGER OF HAWTHORNE - MIDWAY WILMINGTON, LLC personally appeared before me this 30th day of November, 2012, and acknowledge the due execution of the forgoing permeable pavement maintenance requirements. Witness my hand and official seal,



Francis X. Forde
NOTARY PUBLIC

PRINTED NAME: FRANCIS X. FORDE, JR.

My commission expires MAY 12, 2014