



PHASE II STORMWATER
MANAGEMENT PERMIT APPLICATION FORM

Permit Number _____
Project Number _____
(No.'s to be provided by C.O.K.)

GRASSED SWALE SUPPLEMENT

This form must be filled out, printed and submitted.

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

I. PROJECT INFORMATION

Project name	
Drainage structure ID	
Design Engineer	
Date	

II. DESIGN INFORMATION

Site Characteristics

Drainage area		acres
Impervious area		acres
Percent impervious		%
Design rainfall depth		inch

Peak Flow Calculations

10-yr storm runoff depth		in
10-yr storm intensity		in/hr
Post-development 10-yr storm peak flow		ft ³ /sec

Velocity

Maximum non-erosive velocity (peak 10-year storm)		ft/sec
Soil characteristics (enter "x" below)		
Sand/silt (easily erodible)		
Clay mix (erosion resistant)		
Grass Type (enter "x" below)		
Bermuda		
Tall fescue		
Bahagrass		
Kentucky bluegrass		
Grass-legume mixture		

Swale type: Fill out *one* of the options below:

Option 1: Curb Outlet Swale, Low Density:

		(Y or N)
Maximum velocity		
Side slopes		:1
Channel slope		%
Swale length		ft
Distance between SHWT and channel invert at curb outlet		ft

Option 2: Conveyance Swale, Low Density:

		(Y or N)
Maximum velocity		ft/sec
Side slopes		:1
Channel slope		%

Option 3: Conveyance Swale, Seeking Pollutant Credit:

		(Y or N)
Maximum velocity for 10-yr storm		ft/sec
Side slopes		:1
Channel slope		%
Swale length		ft

II. DESIGN INFORMATION

Swale Characteristics

Swale Shape: Enter an "x" in the appropriate cell below:

Trapezoidal	
Parabolic	
V-shaped	
Width of the bottom of the swale	ft
Width of the top of the swale	ft
Flow depth	ft
Freeboard depth	ft
Total depth	0.00 ft

Additional Information

Is the swale sized for all runoff from ultimate build-out?	(Y or N)
Is the BMP located in a proposed drainage easement with a recorded access easement to a public Right of Way (ROW)?	(Y or N)
Is the project being permitted as high density?	(Y or N)
What is the ground level elevation at the swale?	ft
What is the elevation of the bottom of the swale?	ft
What is the SHWT elevation?	ft
Distance from the bottom of the swale to the SHWT	0.00 ft

OK

III. REQUIRED ITEMS CHECKLIST

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

Initials	Page/ Plan Sheet No.	
_____	_____	1. Plans of the entire site showing: <ul style="list-style-type: none"> - Design at ultimate build-out, - Off-site drainage (if applicable), - Delineated drainage basins (include Rational C coefficient per basin), - Swale dimensions (width, length, depth), - Maintenance access, - Proposed drainage easement and public right of way (ROW), - Grass species, and - Boundaries of drainage easement.
_____	_____	2. Plan details for the grassed swale showing: <ul style="list-style-type: none"> - Swale dimensions (width, length, depth), - Maintenance access, - Proposed drainage easement and public right of way (ROW), - Design at ultimate build-out, - Grass species, - Off-site drainage (if applicable),and - Boundaries of drainage easement.
_____	_____	3. Section view of the grassed swale showing: <ul style="list-style-type: none"> - Side slopes (no steeper than 5:1), - Longitudinal slope (maximum 5%), - Freeboard (minimum 0.5-foot) - Swale dimensions, and - SHWT level(s) (1-foot minimum distance from bottom of swale to SHWT).
_____	_____	4. Maximum velocity shall be 1 ft/sec for the 10-year 24-hour storm if seeking pollutant removal credit, otherwise shall be as specified in Table 14-2 of the NC Erosion and Sediment Control Manual.
_____	_____	5. Side slope shall be no greater than 5:1 for curb outlet swales or if seeking pollutant removal credit, otherwise shall be no steeper than 3:1.
_____	_____	6. Swale length shall be 100 feet or greater for curb outlet swales and 150 feet or greater if seeking pollutant removal credit.
_____	_____	7. Supporting calculations, including maximum velocity for applicable storms.
_____	_____	8. A copy of the operation and maintenance (O&M) agreement.
_____	_____	9. A copy of the deed restrictions (if required).

Revision History:

R1	11/07/2008	Removed volume calculation from Item No. 7 in Required Items Checklist per BMP Manual Errata, updated July 24, 2008
R2	04/17/2009	Adjusted project information and units; revised form and added checks to comply with DENR guidance document for SHWT and added sections/data entry for low density conveyance swales and high density projects section; adjusted O&E text.