



PHASE II STORMWATER
MANAGEMENT PERMIT APPLICATION FORM

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

SAND FILTER SUPPLEMENT

*This form must be filled out, printed and submitted with all of the required information.
Make sure to also fill out and submit the Required Items Checklist (Section III).*

I. PROJECT INFORMATION

Project name	
Drainage structure ID	
Design Engineer	
Date	

II. DESIGN INFORMATION

Site Characteristics	
Drainage area (A_D)	_____ acre
Impervious area	_____ acre
% Impervious (I_A)	_____ %
Design rainfall depth (R_D)	_____ in
Peak Flow Calculations	
1-yr, 24-hr runoff depth	_____ in
1-yr, 24-hr intensity	_____ in/hr
Pre-development 1-yr, 24-hr runoff	_____ ft^3/sec
Post-development 1-yr, 24-hr runoff	_____ ft^3/sec
Pre/Post 1-yr, 24-hr peak control	_____ ft^3/sec
Storage Volume	
Runoff Coefficient (R_V)	_____ (unitless)
Minimum volume required (WQV)	_____ ft^3
Adjusted water quality volume (WQV _{Adj})	_____ ft^3
Maximum head on the sedimentation basin and sand filter ($h_{MaxFilter}$)	_____ ft
Maximum head elevation	_____ ft
Average head on the sedimentation basin and sand filter (h_A)	_____ ft
Type of Sand Filter	
Open sand filter?	_____ Y or N
If this is an open sand filter: The clearance between the bottom of the sand filter and the SHWT (d_{SHWT})	_____ ft
Is the BMP located at least 100ft from water supply wells?	_____ Y or N
Closed/pre-cast sand filter?	_____ Y or N
If this is a closed sand filter: The clearance between the bottom of the sand filter and the SHWT (d_{SHWT})	_____ ft
If this is a closed, underground closed sand filter: The clearance between the surface of the sand filter and the bottom of the roof of the underground structure (d_{Space})	_____ ft

II. DESIGN INFORMATION

Sand Filter

Depth of the sand media filter bed (d_F)	<input type="text"/>	ft
Coefficient of permeability for the sand filter (k)	<input type="text"/>	(ft/day)
Time to drain the sand filter (t)	<input type="text"/>	hours
Time to drain the sand filter (t)	<input type="text"/>	days
Minimum surface area of sand filter required (A_F)	<input type="text"/>	ft ²
Provided surface area of sand filter (A_F)	<input type="text"/>	ft ²

Sedimentation Basin

Minimum surface area of sedimentation basin required (A_S)	<input type="text"/>	ft ²
Provided surface area of sedimentation basin (A_S)	<input type="text"/>	ft ²

Treatment Volume

Minimum volume in sediment basin required, (WQVAdj)	<input type="text"/>	ft ³
Volume provided in the sedimentation basin and on top of the sand filter	<input type="text"/>	ft ³

Additional Information

Does volume in excess of the design volume bypass the sand filter?	<input type="text"/>	Y or N
Is an off-line flow-splitting device used?	<input type="text"/>	Y or N
Does the design use a level spreader to evenly distribute flow?	<input type="text"/>	Y or N
Is the BMP located at least 30ft from surface waters (50ft if SA waters)?	<input type="text"/>	Y or N
Are the vegetated side slopes equal to or less than 3:1	<input type="text"/>	Y or N
Is the BMP located in a recorded drainage easement with a recorded access easement to a public Right of Way (ROW)?	<input type="text"/>	Y or N
What is the width of the sedimentation chamber/forebay (W_{Sed})?	<input type="text"/>	ft
What is the depth of sand over the outlet pipe?	<input type="text"/>	ft

Note: If stormwater detention is to be provided with this BMP, provide stormwater detention design information on the "Dry Detention Basin without Water Quality Supplement" form.

Figure 1: Open Sand Filter

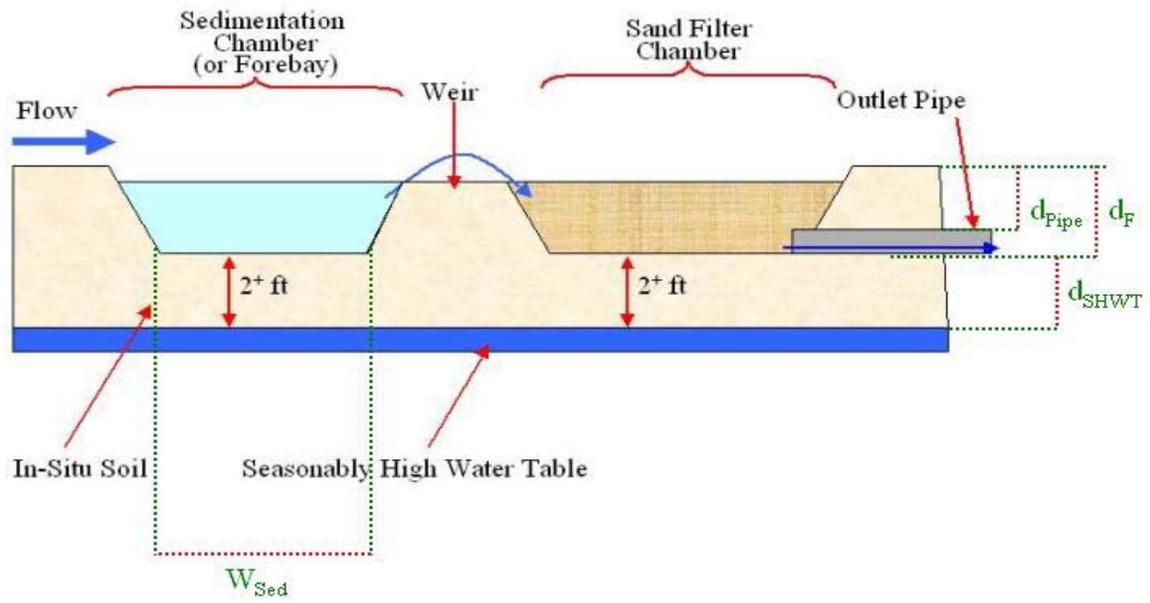
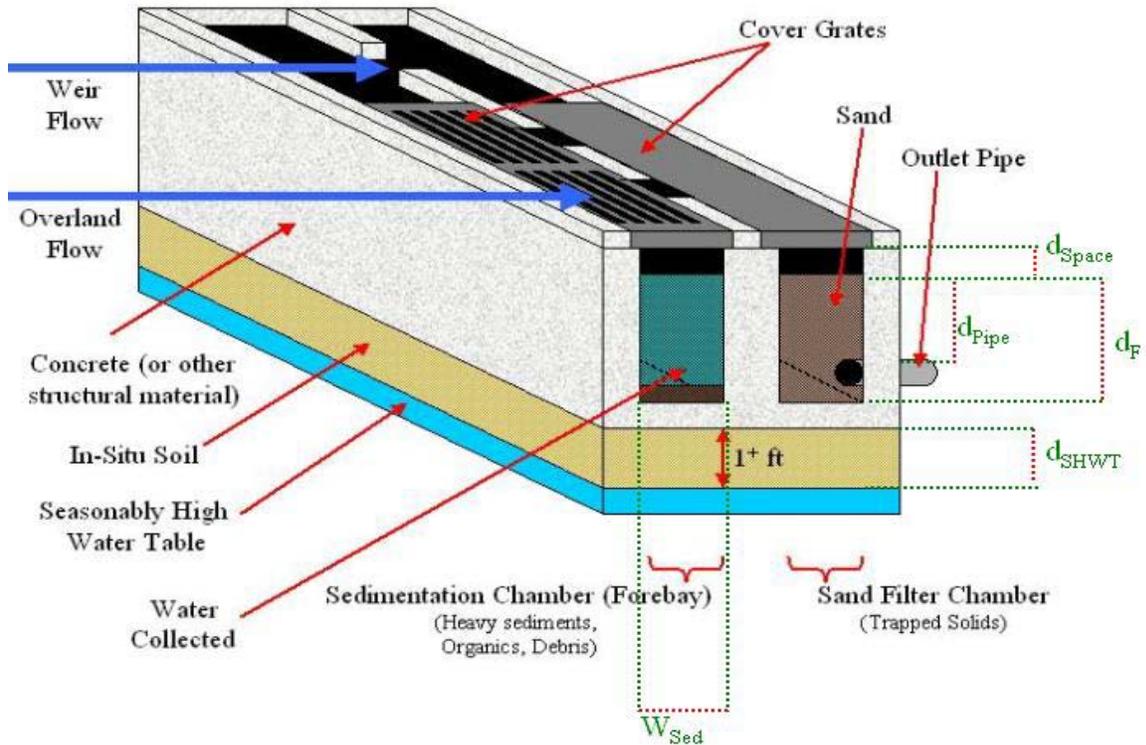


Figure 2: Closed Sand Filter



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.

- | | | |
|-------|-------|--|
| _____ | _____ | <p>1. Plans of the entire site with labeled drainage area boundaries, including runoff coefficient(s)</p> <ul style="list-style-type: none">- System dimensions (length, width, and depth) for both the sedimentation chamber and the filter chamber- Maintenance access,- Flow splitting device,- Proposed drainage easement and public right of way (ROW),- Design at ultimate build-out,- Off-site drainage (if applicable), and- Boundaries of drainage easement. |
| _____ | _____ | <p>2. Plan details for the sand filter showing:</p> <ul style="list-style-type: none">- System dimensions (length, width, and depth) for both the sedimentation chamber and the filter chamber,- Vegetated side slopes for both the sedimentation chamber and the filter chamber no steeper than 3:1,- Maintenance access,- Flow splitting device,- Proposed drainage easement and public right of way (ROW),- Design at ultimate build-out,- Off-site drainage (if applicable), and- Boundaries of drainage easement. |
| _____ | _____ | <p>3. Section view of the sand filter showing:</p> <ul style="list-style-type: none">- Depth(s) of the sedimentation chamber and sand filter chamber,- Depth of sand filter media- Connection between the sedimentation chamber and the sand filter chamber,- Seasonal High Water Table (SHWT) level(s)- Flow splitting device and outlet pipe, and- Clearance from the surface of the sand filter to the bottom of the roof of the underground structure is at least 5 feet (if applicable) |
| _____ | _____ | <p>4. Details and specifications of the flow splitting device showing:</p> <ul style="list-style-type: none">- Type of structure and construction material,- Interior & exterior dimensions of structure diameter, widths & height; wall thickness, bottom slab thickness and top slab thickness,- Elevations of structure invert and top of structure,- Sizes and invert elevations of all orifices and weirs,- Type of outlet pipe and construction material,- Length, diameter, invert in & out elevations and slope of outlet pipe, and- Dimensions for widths and depth of antifoatation block (if applicable). |

III. REQUIRED ITEMS CHECKLIST

- _____ 5. Seasonally high groundwater table must be at least 2 feet below the bottom of the filter for open-bottom designs.
- _____ 6. Seasonally high groundwater table must be at least 1 foot below the bottom of the filter for closed filter designs in order to prevent draining the water table and floatation. Exceptions will be made if these concerns are mitigated.
- _____ 7. Volume in excess of the design volume, as determined from the design storm, bypasses the sand filter.
- _____ 8. The design is located a minimum of 30 feet from surface waters.
- _____ 9. The design is located a minimum of 100 feet from water supply wells.
- _____ 10. The maximum contributing drainage basin is 5 acres.
- _____ 11. The minimum width (parallel to flow) of a sedimentation chamber or forebay is 1.5 feet.
- _____ 12. The sand filter completely drains within 40 hours.
- _____ 13. The sand media is specified as in Chapter 11 of the NCDENR Stormwater BMP Manual and is a minimum of 18" deep (minimum of 12" over the drainage pipes).
- _____ 14. A soils report that is based upon an actual field investigation, soil borings, and infiltration tests. County soil maps are not an acceptable source of soils information.
- _____ 15. The supporting calculations, including drainage area, runoff coefficients, time of concentration, peak flows, storage volumes, drawdown, bypass flows, and stormwater routing (if applicable).
- _____ 16. Operation and maintenance (O&M) agreement
- _____ 17. A copy of the deed restrictions (if required).
- _____ 18. The system design and construction details must show how the post construction peak flows for the 1 year and 10 year storm events are being detained. The calculations must also show how the 50 year storm event is being routed through the system.

Revision History:

- R1 11/25/2008 Added diagrams; added maximum head elevation; and turned off cell protection for provided treatment volume.
- R2 04/17/2009 Added comment box; removed all references to a vegetated filter; and relocated question concerning distance of BMP from water supply wells; adjust O&E text