Greenville County Technical Specification for:

SC-11 Porous Baffles

1.0 Porous Baffle Systems

1.1 Description

Porous baffle systems are used inside temporary sediment detainment structures such as sediment traps and sediment basins to reduce the velocity and turbulence of water flowing through the structure by spreading the flow across the entire width of the basin. The reduction of turbulent flow facilitates the settling of sediment and improves sediment retention efficiency for sediment detainment structures.

1.2 Materials

Provide porous baffle system material consisting of either turf reinforcement matting (TRM), coconut erosion control blanket, or excelsior erosion control blanket meeting the requirements of this Specification. **Do not use** silt fence material for porous baffle systems under this Specification.

1.2.1 Porous Baffle TRM Material

Provide turf reinforcement matting (TRM) composed of non-degradable synthetic fibers, filaments, nets, processed into a permanent, three-dimensional matrix. The non-degradable three-dimensional matrix may be infilled with coconut or excelsior materials. Do not use TRMs infilled with straw materials.

Provide TRMs with properties derived from quality control testing listed in the American Association of State Highway and Transportation Officials (AASHTO) National Transportation Product Evaluation Program (NTPEP) for Erosion Control Products (ECP) and conforming to the performance and physical requirements shown in Table 1.

Table 1: Minimum TRM Porous Baffle Material Performance Requirements

Physical Property[1]	Test Method	Required Value
Light Penetration (% openings)	ASTM D 6567 or Equivalent	10% Min 35% Max
Tensile Strength[2]	ASTM D 6818	145 X 110 lb/ft min.
Ultraviolet Stability (retained strength after 1000 hrs of exposure)	ASTM D 4355	80%

[1] Unless otherwise indicated, numerical values represent the MARV

[2] Minimum tensile strength in both machine and cross machine directions, under dry or saturated conditions using ASTM D6818.

1.2.2 Porous Baffle Coconut / Excelsior Blanket Material

Provide Coconut / Excelsior erosion control blankets (ECBs) composed of un-dyed and unbleached 100% natural fibers that are totally biodegradable. Do not use erosion control blankets composed of straw.

Provide Coconut / Excelsior erosion control blankets with properties derived from quality control testing listed in the American Association of State Highway and Transportation Officials (AASHTO) National Transportation Product Evaluation Program (NTPEP) for Erosion Control Products (ECP) and conforming to the performance and physical requirements shown in Table 2.

Table 2: Minimum Coconut / Excelsior Blanket Porous Baffle Material Performance Requirements

Physical Property	Test Method	Required Value
Light Penetration (% openings)	ASTM D 6567 or Equivalent	10% Min 35% Max
Tensile Strength[1] (machine direction)	ASTM D 6818 ASTM D 4595	145 lb/ft Min

1 Minimum tensile strength in the machine direction under wet conditions.

When Coconut / Excelsior erosion control blankets are folded over a support wire or rope to create a double layer of material, it is acceptable to use a material with higher values for Light Penetration (% openings). When the double layer is formed, it shall have equivalent light penetration to that required of single layered porous baffles. The material's properties shall be derived from quality control testing listed in the American Association of State Highway and Transportation Officials (AASHTO) National Transportation Product Evaluation Program (NTPEP) for Erosion Control Products (ECP) and conforming to the performance and physical requirements shown in Table 3.

Table 3: Minimum Coconut / Excelsior Blanket Porous Baffle Material Performance Requirements for Use as a Double Layer

Physical Property	Test Method	Required Value
Light Penetration (% openings)	ASTM D 6567 or Equivalent	30% Min 60% Max
Tensile Strength[1] (machine direction)	ASTM D 6818 ASTM D 4595	145 lb/ft Min

1 Minimum tensile strength in the machine direction under wet conditions.

1.2.3 Steel Posts

Furnish steel posts meeting the following minimum physical requirements:

- Minimum length of 5 feet.
- Composed of high strength steel with minimum yield strength of 50,000 psi.
- Standard "T" section with a nominal face width of 1.38 inches and nominal "T" length of 1.48 inches.
- Weighs 1.25 pounds per foot (± 8%).
- Painted with a water based baked enamel paint.
- Has a soil stabilization plate made of 15-gauge steel with a minimum cross section area of 17 square inches.

Use steel posts with the addition of a metal soil stabilization plate welded near the bottom. When the post is driven to the proper depth, the plate will be below the ground level for added stability. Attach soil stabilization plates to the steel posts according to Table 4.

Table 4: Soil Stabilization Plate Requirements

Post Length (feet)	Top of Soil Stabilization Plate Relative to Bottom of Steel Post (inches)
5.0 and 5.5	13.0
6.0, 6.5, and 7.0	15.25

1.2.4 Quality Assurance

Provide porous baffle material listed on the most recent edition of *SCDOT Qualified Product List 83* in the appropriate category, or equivalent for single layer TRM and Coconut / Excelsior ECB applications.

Provide material meeting the requirements of Table 3 of this specification for double layer porous baffle applications.

Porous baffle material acceptance is granted based on the manufacturer's certification and testing with the American Association of State Highway and Transportation Officials (AASHTO) National Transportation Product Evaluation Program (NTPEP) for Erosion Control Products (ECP).

At the time of delivery, the Engineer will provide the porous baffle material packing list containing complete identification, including but not limited to the following:

- Manufacturer name and location,
- Manufacturer telephone number and fax number,
- Manufacturer's e-mail address and web address, and
- Porous baffle material name, model and/or serial number.
- Certification that the specific porous baffle material meets the physical and performance criteria of this specification.

1.3 Construction Requirements

Install the porous baffle systems in sediment detention structures perpendicular to the flow of water to ensure porous baffles achieve coalescent flows through the sediment detention structure. Extend porous baffle systems up the side slopes of the detention structure to prevent flow around the porous baffle system.

Ensure the inlet zone is accessible for frequent maintenance as the majority of sediment is trapped before the first baffle. Secure the porous baffle system to the basin bottom and sides using 12-inch anchors (stakes, pins, or staples). If necessary, install a support wire/rope across the top of the porous baffle system to prevent sagging. The expected design life of porous baffle systems is 6-12 months, but may require replacement more frequently if blocked or damaged.

Porous baffle systems made of a support wire/rope and a double layer of material must have both layers of material secured to the basin bottom and sides using 12-inch anchors (stakes, pins, or staples) or by trenching.

1.3.1 Installation

Construct the porous baffle system inside sediment traps and sediment basins with appropriately sized zones to ensure flow is coalesced to the maximum extent. Ensure porous baffles are installed perpendicular to flow within the sediment control structure. Install porous baffle systems across the entire width of the sediment basin/trap.

For sediment traps or basins greater than 25 feet in length, install three rows of porous baffle systems, dividing the sediment dam or basin chamber into four equally sized separate chambers. Install porous baffles with spacing to create appropriately sized zones as listed in Table 5.

Table 5: Three Row Porous Baffle Locations

Porous Baffle Row	Installation Location
1	¼ Length of Basin
2	½ Length of Basin
3	¾ Length of Basin

For sediment traps or basins less than or equal to 25 feet in length, install two rows of porous baffle systems, dividing the sediment dam or basin chamber into three equally sized separate chambers. Install porous baffles with spacing to create appropriately sized zones as listed in Table 6.

Table 6: Two Row Porous Baffle Location

Porous Baffle Row	Installation Location
1	1/3 Length of Basin
2	2/3 Length of Basin

Do not install porous baffle systems until the sediment trap or basin is excavated and graded with a level bottom surface.

Install steel posts and porous baffle system material according to Table 7.

Table 7: Porous Baffle Installation Requirements

Min. Porous Baffle Material Height Above Bottom (ft)	Steel Post Length (ft)
3*	5
4*	6
5*	7

*As directed by the Engineer, height may be greater based on the 10-year 24-hour design water surface elevation of the basin. In no case will the porous baffle material height be higher than the primary spillway elevation of the sediment basin or sediment trap.

Install steel posts on maximum 4-foot centers across the structure bottom and up the embankments. Drive steel posts to a minimum depth of 2 feet or to the maximum extent practicable.

Attach porous baffle system material to the upstream side of the steel posts using heavy-duty plastic ties, or wire ties that are evenly spaced and placed in a manner to prevent sagging or tearing of the fabric. In all cases, affix ties spaced at maximum 6-inch intervals.

Porous baffle systems made of a support wire/rope and a double layer of material must have both layers of material attached to the steel posts using heavy duty plastic ties or wire ties.

Use 12-inch anchors (stakes, pins, or staples) spaced on 1-foot intervals to secure the porous baffle system material to the bottom and up the sediment basin/trap embankments. An alternative installation method is trenching the porous baffle material into the basin bottom by excavating and backfilling a 6-inch deep by 6-inch wide trench.

Porous baffle systems made of a support wire/rope and a double layer of material must have both layers of material anchored or trenched to the basin bottom and side slopes.

In cases where the porous baffle material sags between support posts, or in cases where a double layer of porous baffle material is to be used, weave a 9-gauge steel wire or rope support across the top of the porous baffle system to prevent sagging. Drive a steel post on each side of the sediment trapping structure and attach one side of the support wire to the post. Pull the support wire tight and attach the support wire to each porous baffle system steel post and the opposing steel wire support post.

Purchase porous baffle material in continuous rolls and cut to the specific length of the baffle to avoid joints. When joints are necessary, wrap the materials together at a support steel post with both ends fastened to the post, with a 12-inch minimum overlap.

1.3.2 Inspection and Maintenance

Inspect porous baffle system every 7 days and inspections are recommended within 24-hours after each rainfall event that produces ½-inches or more of precipitation until final stabilization is achieved. Immediately correct any deficiencies. Check for sediment buildup and structure integrity. Remove sediment when it reaches 50% of the height of the first baffle row.

Check where runoff has eroded a channel beneath the baffle, or where the baffle has sagged or collapsed. Ensure that baffle material stays securely installed along the basin sides and in the bottom. Ensure the baffle system does not sag across the top of the baffle system. Replace baffle material if torn or if evidence of deterioration is noted.

Remove porous baffles and replace whenever it has deteriorated to the extent that it reduces the effectiveness of the porous baffle system. Maintain access to the porous baffles and replace promptly if the baffle collapses, tears, decomposes or becomes ineffective. Remove sediment deposits when it reaches ½ the baffle height in the first baffle cell. Remove sediment deposits with care to avoid damage during cleanout. Install additional porous systems as directed by the Engineer where deficiencies exist.

1.3.3 Acceptance

Obtain Engineer acceptance and approval for all porous baffle system installations.