##### MDC Scorecard for Wet Detention Basins

| Blue = In current 15A NCAC 2H .1008 rule language  Red = TRW recommendation  Black = From BMP Manual | | **Is this proposed MDC necessary for the Wet Detention Basin to:** | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Function in perpetuity? | Protect WQ standards? | Remove TSS? | Optimize TN & TP removal? | Optimize bacteria removal? | Not necessary, just a good idea |
| 1. | SITING. The permanent pool elevation shall not be more than 6 inches below the SHWT elevation. (BMP Manual) |  |  |  |  |  |  |
| 2. | SITING. The BMP shall not be located to produce adverse impacts on water levels in adjacent wetlands. (TRW) |  |  |  |  |  |  |
| 3. | GEOMETRY. A minimum length-to-width ratio of 1.5:1 is required, but a flow path of at least 3:1 is recommended. (BMP Manual text) |  |  |  |  |  |  |
| 4. | PERMANENT POOL SURFACE AREA. The pond shall be designed with a surface area sufficient to remove 85 percent of total suspended solids (e)(3) |  |  |  |  |  |  |
| 5. | PERMANENT POOL SURFACE AREA. The permanent pool surface area shall be determined using Tables 10-1, 10-2, 10-3 and 10-4 [SA/DA Tables]. (BMP Manual MDE) |  |  |  |  |  |  |
| 6. | PERMANENT POOL SURFACE AREA. The permanent pool surface area shall be determined by the following equation: SA =IA/ DA \* .03, Where SA is the permanent pool surface area in square feet, IA is the connected impervious area on site in square feet and DA is the drainage area in square feet. In no case shall the permanent pool surface area be less than 1% of the drainage area. (TRW) |  |  |  |  |  |  |
| 7. | PERMANENT POOL DEPTH. The design permanent pool level mean depth shall be a minimum of three feet. (e)(3) |  |  |  |  |  |  |
| 8. | PERMANENT POOL DEPTH. The average depth shall be calculated as described in Figure 10-2b. (BMP Manual MDE) |  |  |  |  |  |  |
| 9. | PERMANENT POOL DEPTH. The maximum depth shall be 20 feet to avoid thermal upwelling. The depth of the basin shall be considered as the depth above the sediment storage elevation and below the permanent pool elevation. The contours of the basin should be designed to achieve this depth and reduce the velocity of flow through the basin to prevent scouring and resuspension of settled solids. The basin depth may be calculated by dividing the volume of the permanent pool below the bottom of the vegetated shelf by the surface area of the bottom of the vegetated shelf and adding 6 inches. (TRW) |  |  |  |  |  |  |
| 10, | PERMANENT POOL DEPTH. A minimum sediment storage depth of 1 foot shall be incorporated into the basin. (TRW) |  |  |  |  |  |  |
| 11. | FREEBOARD. Freeboard shall be a minimum of one foot above the maximum stage of the basin. (BMP Manual) |  |  |  |  |  |  |
| 12. | PERMANENT POOL VOLUME. The pond shall be designed to account for sufficient sediment storage to allow for the proper operation of the facility between scheduled cleanout periods. (e)(10) |  |  |  |  |  |  |
| 13. | DESIGN STORAGE VOLUME. The design storage volume shall be above the permanent pool (e)(1). |  |  |  |  |  |  |
| 14. | DESIGN STORAGE VOLUME. The design storage volume shall compromise the volume between the permanent pool and the peak stage of the basin for the design storm. (TRW) |  |  |  |  |  |  |
| 15. | DESIGN STORAGE VOLUME. The volume resulting from the design storm shall have an HRT of 14 days calculated by the following equation: Vpp = (HRT-Tdd)/14 x Vtp, Where HRT = hydraulic residence time in days, Vpp = volume of the permanent pool in cubic feet, Vtp = volume of the temporary pool in cubic feet, and Tdd = the draw down time for the permanent pool volume in days. (TRW) |  |  |  |  |  |  |
| 16. | PRETREATMENT. Pretreatment of the runoff by the use of vegetative filters may be used to minimize sedimentation and eutrophication of the detention pond. (e)(5) |  |  |  |  |  |  |
| 17. | PRETREATMENT. The inlet structure must be designed to minimize turbulence using baffles or other appropriate design features and shall be located in a manner that avoids short circuiting in the pond. (e)(4) |  |  |  |  |  |  |
| 18. | PRETREATMENT. Wet detention ponds shall be designed with a forebay to enhance sedimentation at the inlet to the pond; (e)(6) The forebay volume shall be about 20% of the total permanent pool volume, leaving about 80% of the design volume in the main pool. (BMP Manual) |  |  |  |  |  |  |
| 19. | FOREBAY. A fixed vertical sediment depth marker should be installed in the forebay to measure sediment deposition. (BMP Manual text – chapter 5) |  |  |  |  |  |  |
| 20. | The elevation of the separation structure between the forebay and the main treatment area may not exceed 1 foot below the design storm elevation. The water flowing over (and possibly through) the separation structure must be at a nonerosive velocity. (BMP Manual text – chapter 5) |  |  |  |  |  |  |
| 21. | BASIN SIDE SLOPES. The basin side slopes for the storage volume above the permanent pool shall be stabilized with vegetation down to the permanent pool level and shall be designed in accordance with Subpara­graph (c)(2) of this Rule; (e)(7) |  |  |  |  |  |  |
| 22. | BASIN SIDE SLOPES. The pond shall be designed with side slopes below the 10-foot shelf stabilized per what the soils will support and per the design professional’s judgment. (BMP Manual) |  |  |  |  |  |  |
| 23. | VEGETATED SHELF. The pond shall be designed to provide for a vegetative shelf around the perimeter of the basin. This shelf shall be gently sloped (6:1 or flatter) and shall consist of native vegetation; (e)(9) A minimum 10-foot wide vegetated shelf shall be installed around the perimeter. The inside edge of the shelf shall be 6” below the permanent pool elevation; the outside edge of the shelf shall be 6” above the permanent pool elevation. (BMP Manual) [Note the disagreement.] |  |  |  |  |  |  |
| 24. | DRAWDOWN RATE. The discharge rate from these systems following the one inch rainfall design storm shall be such that the draw down to the permanent pool level occurs within five days, but not in less than two days. (e)(2) |  |  |  |  |  |  |
| 25. | DISCHARGE RATE. The pond shall discharge the storage volume at a rate equal to or less than the predevelopment discharge rate for the one-year, 24-hour storm. SL2008-0211(2b.)(4)(c) |  |  |  |  |  |  |
| 26. | VEGETATED FILTER STRIP. Basin discharge shall be evenly distributed across a minimum 30 foot wide vegetated filter strip unless it is designed to remove 90% TSS. (A 50-foot filter is required in some locations.) (c)(4) |  |  |  |  |  |  |
| 27. | FOUNTAINS. Fountains shall follow the requirements in this chapter. Other fountain designs may also be considered if it can be shown that they will not resuspend sediment or cause erosion in the pond. (BMP Manual text) |  |  |  |  |  |  |
| 28. | VEGETATION. Trees and woody shrubs shall not be planted on the pond embankment. (BMP Manual text) |  |  |  |  |  |  |
| 29. | VEGETATION. Wet detention basins should incorporate several (minimum of three (3)) diverse species of shallow water emergent and shallow land herbaceous vegetation on the vegetated shelf. A minimum of 50 plants per 200 sf of shelf area shall be planted. (BMP Manual text) |  |  |  |  |  |  |
| 30.. | VEGETATION. If the wet detention pond is likely to dewater between storms due to infiltration or use of the permanent pool for irrigation, then the plants on the vegetated shelf should be selected to survive in conditions that alternate between wet and dry. (DEMLR staff suggestion) |  |  |  |  |  |  |
| 31. | VEGETATION. All trees and shrubs should be set back so that the branches will not extend over the basin. (BMP Manual text) |  |  |  |  |  |  |
| 32. | VEGETATION. Do not plant weeping love grass on the vegetated side slopes because it does not provide long-term slope stabilization. (BMP Manual text) |  |  |  |  |  |  |
| 33. | VEGETATION. On the tops of berms and on the exterior slopes of containment berms, maintain turf grass in access areas; Centipede grass is recommended. Well-maintained grass stabilizes the embankment, enhances access to the facility, and makes inspection and other maintenance easier. (BMP Manual text) |  |  |  |  |  |  |
| 34. | OUTLET. A drawdown orifice should have a turned-down elbow in order to prevent trash or other material floating on the surface from clogging the pipe. |  |  |  |  |  |  |
| 35. | OUTLET. The design engineer must present flotation force calculations for any outlet design subject to flotation forces. (BMP Manual text) |  |  |  |  |  |  |
| 36. | OUTLET. A filter diaphragm and drain system should be provided along the barrel of the principal spillway to prevent piping. DEMLR strongly prefers filter diaphragms to the older design anti-seep collar. (BMP Manual text) |  |  |  |  |  |  |
| 37. | OUTLET. If reinforced concrete pipe is used for the principal spillway, “O-ring” gaskets (ASTM C361) should be used to create watertight joints and should be inspected during Installation. (BMP Manual text) |  |  |  |  |  |  |
| 38. | OUTLET. A trash rack or other device shall be provided to prevent large debris from entering the outlet system. (BMP Manual text – chapter 5) |  |  |  |  |  |  |
| 39. | OUTLET. Durable materials, such as reinforced concrete, are preferable to corrugated metal in most instances. The riser should be placed in or at the face of the embankment such that maintenance access is facilitated and flotation forces are reduced. (BMP Manual text) |  |  |  |  |  |  |
| 40. | CONSTRUCTION. The wet detention pond shall be constructed according to the approved plans. A one-time fertilization may be applied to the vegetation if a soil test indicates it is necessary. (BMP Manual text) |  |  |  |  |  |  |
| 41. | CONSTRUCTION. Temporary drainage or erosion control measures should be used to reduce the potential for damage to the wet detention basin before the site is stabilized. The control measures may include stabilizing the surface with erosion mats, sediment traps, and diversions. Vegetative cover and the emergency spillway also should be completed as quickly as possible during construction. (BMP manual text) |  |  |  |  |  |  |
| 42. | MAINTENANCE. The basin shall be maintained in accordance with Table 10-6 of this chapter. (BMP Manual text) |  |  |  |  |  |  |
| Nutrient  DC 1 | Floating wetlands can be added to the wet detention pond to increase the nutrient removal rates. (+?% for TN and +?% for TP) (suggestion based on BMP Manual text) |  |  |  |  |  |  |
| Temp Rec 1 | Trees and shrubs can be planted to maximize pond shading, primarily along the south, east, and west sides of the basin to reduce temperature impacts. (BMP Manual text) |  |  |  |  |  |  |
| Temp Rec 2 | The outlet structure can be modified to withdraw from a deeper point in the permanent pool to reduce temperature impacts. (DEMLR staff suggestion) |  |  |  |  |  |  |