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| Worksheet 7: Biofiltration Routing Method for Sizing Bioretention BMPs with Underdrains | | | | | |
| Part 1: Calculate Design Storm Volume | | | | | |
| 1 | Enter design capture storm depth, *d* (inches) | d= |  | inches |
| 2a | Enter the combined effect of provided HSCs, *dHSC* (inches)  (based on Worksheet 4) | dHSC= |  | inches |
| 2b | Calculate the remainder of the design capture storm depth, *dremainder* = d - dHSC | dremainder= |  | inches |
| 3a | Enter DMA area tributary to BMP(s), *A* (acres) excluding any self-retaining areas | A= |  | acres |
| 3b | Enter DMA Imperviousness, imp (unitless) after removal of self-retaining areas | imp= |  |  |
| 3c | Calculate runoff coefficient, *C= (0.75 x imp) + 0.15* | C= |  |  |
| 3d | Calculate runoff volume, *DCV = (C x dremainder x A x 43560 x (1/12)) (See Section E.2.2)* | DCV= |  | cu-ft |
| Part 2: Select Initial BMP Effective Footprint Area (can be iterative) | | | | | |
| 4a | Calculate minimum area required for BMP to avoid premature clogging from Section E.4.1 (as percent of impervious tributary area) | %Amin,clog= |  | % |
| 4b | Calculate minimum area required for BMP to meet volume reduction requirements (Partial Infiltration category only) using Section E.4.2. | %Amin,vol= |  | % |
| 4c | Effective footprint of BMP as percent of tributary impervious area, must be equal to or greater than both %Amin,clos and %Amin,vol (as applicable) | %ABMP\_EFF |  | % |
| 4d | Effective footprint of BMP (%ABMP\_EFF \* A \* imp) | ABMP\_EFF |  | sq-ft |
| Part 3: Calculate Retention Volume in BMP | | | | | |
| 5a | Determine gravel layer depth (18 inches or an alternative depth that will infiltrate within 48 hours) | Dgravel |  | inches |
| 5b | Calculate effective retention storage depth of gravel layer  Deff\_gravel = 0.4 porosity \* Dgravel (Partial Infiltration Category only) | Deff,gravel |  | inches |
| 6 | Calculate volume retained in gravel layer (Partial Infiltration Category only) Vgravel = Deff,gravel \* ABMP\_EFF \* (1 ft/12 inches) | Vgravel\_retain |  | cu-ft |
| 7a | Media depth Dmedia (24 inches typical) See BMP fact sheet (Appendix G) | Dmedia |  | inches |
| 8b | Calculate volume retained in soil media layer,  Vmedia =0.1\*Dmedia\*ABMP\_EFF \* (1 ft/12 inches) | Vmedia\_retain |  | cu-ft |
| Part 4: Calculate Required and Provided Biofiltered Volume | | | | |
| 9 | Calculate the remaining DCV by subtracting the retained volume in the gravel layer and media layer from the initial design volume, DCVremain= DCV-Vgravel\_retain-Vmedia\_retain | DCVremain |  | cu-ft |
| 10 | Calculate the required volume to be biofiltered by multiplying the remaining DCV by 1.5, Vtreat\_req = 1.5 \* DCVremain | Vtreat\_req |  | cu-ft |
| 11a | Surface storage ponding depth (6-12 inches typical) See BMP fact sheet (Appendix G) | Dponding |  | inches |
| 11b | Calculate effective depth of the biofiltration storage above the underdrain,  Dbiofilter\_effective = Dponding + 0.2 \* Dmedia | Dbiofilter\_ effective |  | in |
| 12a | Routing period (5 hours is default, proponent must justify any other value), Trout | Trout |  | hours |
| 12b | Media infiltration rate (2.5 inches/hour default, proponent must justify any other value) | Kmedia |  | in/hr |
| 12c | Calculate biofiltered volume,  Vtreated = (Dbiofilter\_effective + Kmedia\* Trout) \* ABMP\_EFF \* (1 ft/12 in) | Vtreated |  | cu-ft |
| 13 | Verify that Vtreated > Vtreat\_req. If it is not, must revise profile or footprint while conforming to criteria | | | |