Sizing Worksheet - INF-3 Bioretention

Designer: Project Proponent: Date: Project: Location:	
Type of Vegetation:	
Pretreatment Feature:	
Outflow Collection:	
Step 1: Determine water quality design volume	
1-1. Enter Project area (acres), $A_{project}$ If this BMP captures runoff from a portion of the project area, enter the tributary area	$A_{project}$ = acres
1-2. Enter Project impervious fraction, *Imp* (e.g. 60% = 0.60)	Imp=
1-3. Determine pervious runoff coefficient using Table C-1, C_p	C_p =
1-4. Calculate runoff coefficient, $C = 0.95*imp + C_p (1-imp)$	C =
1-5. Enter design rainfall depth of the storm (in), P_i	P_i = in
1-6. Calculate rainfall depth (ft), $P = P_i/12$	P = ft
1-7. Calculate water quality design volume (ft^3), $SQDV=43560\times C*P*A_{project}$	SQDV= ft^3
Step 2: Determine the design percolation rate	
2-1. Enter measured soil infiltration rate (in/hr) (0.3 in/hr minimum), $P_{measured}$	$P_{measured}$ = in/hr
2-2. Determine percolation rate correction factor, S_A based on suitability assessment (see Section 6 INF-3)	S_A =
2-3. Determine percolation rate correction factor, S_B based on design (see Section 6 INF-3)	S_B =
2-4. Calculate combined safety factor, $S = S_A \times S_b$	S =
2-5. Calculate the design percolation rate (in/hr), $P_{design} = P_{measured}/S$	P_{design} = in/hr

Step 3: Calculate Bioretention Infiltrating surface area		
3-1. Enter water quality design volume (ft^3), *SQDV*	SQDV =	ft^3
3-2. Enter design percolation rate (in/hr), P_{design}	P_{design} =	in/hr
3.3 Enter the required drain time (48 hours), $t_{ponding}$	$t_{ponding}$ =	hours
3-3. Calculate the maximum depth of surface ponding that can be infiltrated within the required drain time (ft): $d_{max} = (P_{design} \times t_{ponding})/12$	d_{max} =	ft
3-4. Select surface ponding depth (ft), d_p, such that $d_p \leq d_{max}$	d_p =	ft
3-5. Select thickness of amended media (ft,2 feet minimum, 3 preferred), l_{media}	l_{media} =	ft
3-6. Enter porosity of amended media (roughly 25% or 0.25 ft/ft), n_{media}	n_{media}=	ft/ft
3-7. Select thickness of optional gravel layer (ft), l_{gravel}	l_{gravel} =	ft
3-8. Enter porosity of gravel (roughly 30% or 0.3 ft/ft), n_{gravel}	n_{gravel}=	ft/ft
3-9. Calculate the total effective storage depth of bioretention facility (ft): $d_{effective} \leq (d_p + n_{media}l_{media} + n_{gravel}l_{gravel})$	$d_{effective}$=	ft
3-10. Check that the entire effective depth infiltrates in required drainage time, 72 hours: $t_{total} = (d_{effective}/P_{design}) \times 12$ If t_{total} > 72 hours, reduce surface ponding depth and/or amended media thickness and/or gravel thickness and return to 3-4. If $t_{total} \leq$ 72 hours, proceed to 3-11.	t_{total} =	hours
3-11. Calculate the required infiltrating surface area (ft^2): $A_{req} = SQDV/d_{effective}$	A_{req} =	ft^2
Step 4: Calculate Bioretention Area Total Footprint		
4-1. Calculate total footprint required by including a buffer for side slopes and freeboard (ft^2) [A_{req} is measured at the as the filter bottom area (toe of side slopes)], A_{tot}	A_{tot} =	ft^2
Step 5: Provide conveyance capacity for filter clogging		
5-1.The infiltration facility should be placed off-line, but an emergency overflow must still be provided in the event the filter becomes clogged. Design emergency overflow in accordance with applicable standards of the Ventura County Flood Control District or local jurisdiction.		