WET POND/WETLAND CALCULATOR

This calculator sizes the components of a wet pond or wetland such that it treats the Water Quality Volume (WQv).

Input cell =		User enters value
Default value =		User should only change value if able to provide explanation for adjustment
Calculation cell =		User should not change cell

CALCULATOR

Wet Ponds and Wetlands Calculator - by Water Quality Volume

1	Water Quality Volume - WQv	4,400	cubic feet
2	**Forebay volume calculator (min size)**	**440**	cubic feet
3	Wet Pond or Wetland	Wetland	
4	**Permanent pool volume calculator**	**4,400**	cubic feet
5	**Live storage volume calculator**	**4,400**	cubic feet
6	**Dimensions Calculator**		
7	Permanent Pool Depth	2	feet (typically 1.5 to 2 feet average depth for wetlands, 4 to 6 feet for
8	Live Storage Volume Depth	1.5	feet (typically 1 to 2 feet for wetlands, 1 to 3 feet for wet pond)
9	Total Depth at WQv - d	3.5	feet
10	Basin Length to Width Ratio (L/W)	2.5	generally between 2 and 4
11	Basin Side Slope	3	feet/feet (ratio of horizontal to vertical, for example, 3 for 3H:1V)
12	Width of Basin Bottom	26	feet
13	Length of Basin Bottom	65	feet
14	Width of Basin at Permanent Pool Depth	38	feet
	Length of Basin at Permanent Pool Depth	77	feet
	Width of Basin at WQv Depth	47	feet
	Length of Basin at WQv Depth	86	feet
15	Permanent Pool Volume	4,560	cubic feet (must be greater than 2x WQv)
	Live Storage Volume	5,177	cubic feet (must be greater than WQv)
16	**Check of Permanent Pool Volume**	**Okay**	
	Check of Live Storage Volume	**Okay**	
17	Drain time for WQv - t	48	hours (between 24-28, recommend 48 hours)
18	Approx. Orifice Diameter for Drain Time	1.3	inches (refine outlet control sizing and configuration during design)
19	Flow Rate thru Orifice	27	gpm (flow rate when basin is at WQv depth)

INSTRUCTIONS

Follow the steps below to determine the required size of your wet pond/wetland.

Step	
1	Enter the Water Quality Volume (WQv) for the DMA. The WQv is calculated in Step 14 of the Water Quality Volume and Water Quality Flow Rat
2	The required volume for the forebay is shown here (typically 10 to 25% of the WQv).
3	Select whether you are designing a wet pond or wetland.
4	The required permanent pool volume is calculated here. The permanent pool should be equal to the WQv for wetlands and two times the WQv f
5	The required live storage volume is calculated here. This is typically equal to the WQv.
6	Use the following steps of the Dimensions Calculator to determine the basin configuration.
7	Enter the depth of the permanent pool. Wetlands include shallower areas (0 to 18 inch depth) for increased plant growth as well as deeper micro depth). Enter the average depth of the wetlands' permanent pool. There is typically a 1.5 to 2 feet average depth for wetlands, 4 to 6 feet for wet
8	Enter the live storage depth (i.e., the water depth above the permanent pool used to captured the WQv event). Depths are typically 1 to 2 feet fo feet for wet ponds. This depth DOES NOT include freeboard, which is typically 1 foot above the maximum design depth (freeboard should be ad
9	The total depth of the basin at the WQv level is calculated here.
10	Enter the length to width ratio of the basin. A ratio between 2 and 4 is recommended.
11	Enter the side slope of the basin. The slope of earthen side walls should be no steeper than 3:1 (i.e., at least 3 feet horizontal for each 1 foot ver vertical hardscaped sidewalls.
12	Enter the width of the pond bottom at the invert of the basin.
13	The length of the basin bottom is calculated here.
14	The width and length of the basin at the permanent pool depth and at the design water depth (i.e., WQv depth) are calculated here.
15	The basin's permanent pool volume and the live storage volume are calculated here. Adjust the basin width and/or depth until the volumes are g the permanent pool volume and WQv calculated in Steps 4 and 5.
16	This step checks that the permanent pool and live storage volumes meet the required volumes calculated in Steps 4 and 5. If either volume is le increase the basin width (Step 12) or depths (Steps 7 and 8).
17	The WQv design drain time is entered here. The time should be between 24 and 48 hours, with 48 hours being recommended.
18	The diameter of the orifice needed to drain the WQv in the design drain time is shown here. This planning level estimate of the required outlet co revised during design. The minimum allowable orifice size is 1-inch diameter.
19	The step calculates the estimated flow rate through the orifice when the water level is at the WQv depth.

DEFINITIONS

Water Quality Volume (WQv)	The runoff volume to be managed by the stormwater BMP such that treatment requirements are m calculated by the Water Quality Volume and Water Quality Flow Rate Calculator.
Live Storage Volume	The temporary ponding area above the permanent pool that stores the WQv volume.
Permanent Pool Volume	The volume of water that is permanently in the wet pond/wetland.
Forebay Volume	A sediment forebay should be used to isolate gross sediments as they enter the facility and to simp
Permanent Pool Depth	The depth from the invert of the basin to the top of the permanent pool water level. This depth may
Live Storage Volume Depth	Depth from the top of the permanent pool to the top of the live storage area.
Depth at WQv (d)	The depth of the basin from the top of the live storage volume to the invert of the basin. Does not ir
Freeboard	The vertical distance between the maximum design water depth and the top of the basin embankm
Orifice	An orifice is a flow restrictor. It drains the pond slowly to improve water treatment through settling c
Drain Time (t)	The time for the storage area to drain the water quality volume.