DETENTION VAULT CALCULATOR

These calculators size a detention vault to treat the Water Quality Volume (WQv), or calculate the volume of water treated given user entered available dimensions.

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

Detention Vault Calculator - by Water Quality Volume

1	Water Quality Volume - WQv	2,500	cubic feet
2	Available Live Storage Depth	4	feet (typically between 3 and 7 ft)
3	Length to Width Ratio (L/W)	2.0	typically between 2 and 4
4	**Length**	**35.4**	feet
	Width	**17.7**	feet
5	Drain Time	48	hrs (recommend 48 hrs)
6	Ave. Discharge Rate for Drain Time	6.5	gpm

Detention Vault Calculator - by Available Area

7	Available Base Area	500	square feet
8	Design Live Storage Depth	4	feet
9	**Treated Volume**	**2,000**	cubic feet

INSTRUCTIONS

Use either steps 1 through 6 to determine the required dimensions of the vault. Or use steps 7 through 9 to check what volume of water is treated given the available area for a vault.

Step

To Determine The Required Dimensions for the Vault

1	Enter the Water Quality Volume (WQv) for the drainage management area (DMA). The WQv is calculated in Step 14 of the Water Quality Volume and Water Quality Flow Rate
2	Enter the proposed live storage depth of the vault. This is typically between 3 to 7 feet not including freeboard. This depth also does not include the depth of the permanent wet pool. It is recommended that the wet pool depth be greater than 3 feet.
3	Enter the proposed length to width ratio of the vault. A ratio > 2:1 is preferred. A 2:1 ratio should be entered as "2", a 3:1 as "3", etc.
4	The length and width of the vault are calculated.
5	Enter the drawdown time for the vault (48 hrs is recommended).
6	The average discharge rate from the vault to obtain the desired drain time is calculated. During design, outlet controls must be sized accordingly to achieve the desired WQv drain time.

To Determine the Volume of Water Treated by an Available Area

7	Enter the available area to install the vault (base area).
8	Enter the proposed live storage depth of the vault. Generally 5 feet not including freeboard.
9	The volume of water treated by the proposed detention vault is shown here. If this volume is less than the required WQv then additional treatments will likely be required.

DEFINITIONS

Water Quality Volume (WQv)	The runoff volume to be managed by the stormwater BMP such that treatment requirements are met. The WQv is calculated by the Water Quality Volume and Water Quality Flow Rate Calculator.
Live Storage Depth	The depth of water storage in the vault. Does not include freeboard or depth of permanent pool.
Length	The longitudinal length of the vault
Width	The width of the vault
Base Area	The area of the base of the vault
Drain Time (t)	The time for the storage area to drain the water quality volume.