

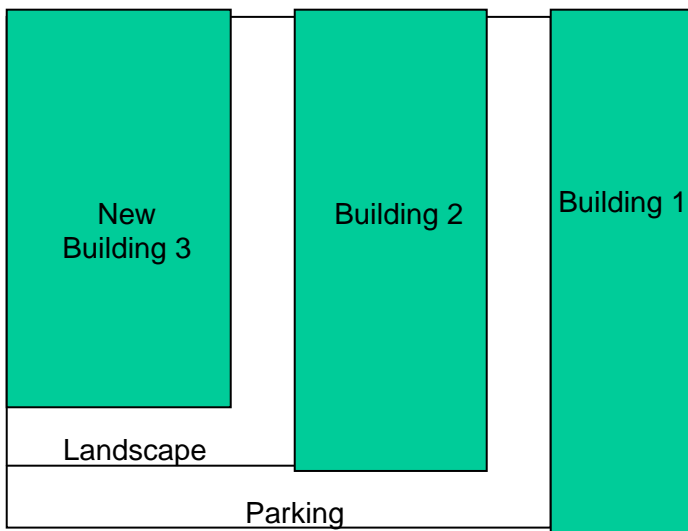
Flow-based and Volume-based Sizing Examples

- Water Quality Volume Method: WEF/ASCE method – Example 1..... E - 3
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BMP Sizing Example for Building 1 Redevelopment

Original Site Description

Building 1 = 30,000 ft²
Building 2 = 36,000 ft²
Building 3 = 24,000 ft²
Parking = 19,000 ft²
Landscaping = 15,000 ft²
Total Site = 124,000 ft²
Total Impervious Surface = 109,000 ft²
50% of Impervious surface = 54,500 ft²



Assumptions

Imperviousness of New Building 3: $i = 1$ (100% impervious)

Roof dimensions of New Building 3: 100 feet x 300 feet

Impervious surface area of New Building 3: 30,000 square feet x (1 acre/43,560 square feet) = 0.69 acres

Length from farthest point on roof to downspout (discharge point – assuming downspout discharges directly to BMP) = 300 feet

Slope of roof = 0.5%

Project site: located in west Salinas (west of Hwy 101) on low permeability clay loam soils.

Water Quality Volume Method: WEF/ASCE method – Example 1

Step		Step	Value	Units
1	Precipitation depth (P_6) for the mean annual runoff producing storm at Salinas: Based on an analysis of the long-term rainfall record for the Salinas airport, the rainfall depth for the 24-hour, 85 th percentile storm event = 0.6 inches. (Convert inches to feet = $P_6/12$)	1	0.6	inches
			0.05	feet
2	Calculate runoff coefficient (C) for New Building 3 using $C = 0.858(i^3) - 0.78(i^2) + 0.77(i) + 0.041$. Since the building is 100% impervious $i = 100/100 = 1$, and therefore $C = 0.89$	2	0.89	unit less
3	Select time to drain BMP: (usually 48 hours, 24 hours, or 12 hours) and enter appropriate Regression constant (a): If drain time is 48 hours, enter 1.963 on Step 3 If drain time is 24 hours, enter 1.582 on Step 3 If drain time is 12 hours, enter 1.312 on Step 3 (Use 48 hours as most conservative)	3	1.963	unit less
4	Determine the area that will drain to the IMP or other treatment control BMP (e.g. impervious surface area of New Building 3): $A = 30,000 \text{ ft}^2$	4	30,000	square feet
5	Calculate detention storage volume (WQ_v) from: $WQ_v = AP_0$ Where $P_0 = (aC)P_6$	5	2,621	cubic feet

Water Quality Flow Method: CASQA method – Example 2

Step		Step	Value	Units
1	<p>Calculate 85th percentile rainfall intensity for Salinas:</p> <p>Based on an analysis of the long-term rainfall record for the Salinas airport, the 85th percentile rainfall intensity = 0.11 inches/hour. This method requires the rainfall intensity to be multiplied by 2, therefore I = 0.22 inches/hour</p>	1	0.22	in/hr
2	<p>Calculate runoff coefficient (C):</p> <p>Per Table 4-4 of the SWDS: C for Roofs = 1.0</p>	2	1.0	unit less
3	<p>Determine the area that will drain to the IMP or other treatment control BMP in acres (e.g. impervious surface area of New Building 3):</p> <p>$A = 30,000 \text{ ft}^2 / (43,560 \text{ ft}^2 \text{ per acre})$</p>	3	0.69	acres
4	<p>Design Flow (Q = CIA):</p> <p>Multiply line 1 by line 2 and by line 3</p>	4	0.15	cfs