CITY OF BRYAN, OHIO
Storm Water Detention Calculations

Detention calculations are to be submitted with a site plan for approval at the time of application for a building permit. The following form is to be used for storage volume and meter line sizing.

Project _____ Location _____

Calculation by _____ Date_____ Checked by_____ Date_____

Proposed Conditions

Gross Area: _____ Acres = _____ S.F. (A_T)

Pavement Area: _____ S.F. Building Area: _____ S.F.

Total Impervious Area: _____ S.F. * 0.90 = _____ (CA_I)

Net Pervious Area: Gross Area – Impervious = _____ S.F. * 0.20 = _____ (CA_P)

Wt. C. = C_W = $CA_I / A_T + CA_P / A_T$ = _____

Allowable Q

Q allow = CiA = 0.20 * 3.0 * A_T / 43560 = _____

Note: i_5 = 3.0"/hour (5 year, 20 min.)

DETENTION VOLUME REQUIRED

t_c (min)	i_{25} in/hr	C_wA A=Acres	Q in Q25	Q out = Q allow	Q in – Q out	(Q in – Q out)* t_c*60 Volume (ft^3)	Design Detention Volume (ft^3)
20	4.40						
25	4.00						
30	3.40						
35	3.20						
40	2.80						
50	2.40						
60	2.10						
70	1.80						
80	1.70						
90	1.50						
100	1.40						

Note: Design Detention Volume shall be the peak volume reached within the time t_c.

Meter Line Sizing (Culvert Analysis)

$$H = \frac{V^2}{2g}\left(1 + K_e + \frac{29n^2L}{R\ 4/3}\right)$$

$$2gH = V^2\left(1 + K_e + \frac{29n^2L}{R\ 4/3}\right)$$

$$V^2 = \frac{2gH}{\left(1 + K_e + \frac{29n^2L}{R\ 4/3}\right)}$$

Data:

1. Length of meter line (L) _____ ft.
2. Slope of meter line _____ %
3. Size of meter line _____ in.
4. Pipe type & "n" _____
5. Entrance Co-efficient (K_e) = 0.5
6. Assumed Max. Head (H) _____ ft.
7. Hydr. Radius (R) _____ ft.
   (R 4/3) _____

Assumed Head (H)	H * 2g	$1 + K_e + \frac{29n^2L}{R\ 4/3}$	V^2	V	Area of Pipe (A)	Flow Q.

Note:

- No meter line shall be less than 6" diameter. If calculations show otherwise, please note as such.
- Assumed Head (H) is measured from top of meter line at outlet to water elevation in detention facility.