

MONROE COUNTY ROAD COMMISSION  
STORM WATER DETENTION DESIGN  
FOR COMMERCIAL DEVELOPMENTS  
FOR SITES OF TWO (2) ACRES OR LESS

(FOR SITES GREATER THAN TWO (2) ACRES, USE MCDC STORAGE EQUATION MODEL)

ROAD \_\_\_\_\_

TOWNSHIP \_\_\_\_\_

PROJECT NAME \_\_\_\_\_

DESIGN ENGINEER \_\_\_\_\_

DATE \_\_\_\_\_

1. Determination of maximum allowable discharge:

Existing site tributary area currently draining to the road right of way =

\_\_\_\_\_ acres

$Q_{ALLOW} = \text{tributary area} \times 0.2 \text{ cfs/acre} = \text{_____ cfs}^*$

\* $Q_{ALLOW}$  may be reduced due to existing roadside system limited drainage capacity.

2. Type of existing roadside Drainage System:

Check one:

Open ditch

Enclosed storm sewer

County drain\*

\*If discharging into county drain, contact Monroe County Drain Commission for requirements.

3. Capacity of existing roadside Drainage System = \_\_\_\_\_ cfs  
(attach calculations).

4. Current ten (10) year flow utilizing existing roadside Drainage System

= \_\_\_\_\_ cfs (attach calculations)

5. If Step #4 + Step #1 is greater than 75% of Step #3, contact the Monroe County Road Commission for detailed analysis requirements.

6. Determination of proposed runoff area into right of way:

Total proposed area draining to the road right of way	_____ S.F.		
Pavement	_____ S.F. x 0.90	=	_____
Building	_____ S.F. x 0.90	=	_____
Grass	_____ S.F. x 0.20	=	_____
Other	_____ S.F. x _____	=	_____
<b>TOTAL</b>	_____ S.F. $\Sigma$ CA	=	_____

$$C_w = \frac{\Sigma C}{\text{Total A}} = \frac{\quad}{\quad}$$

$$C_w A (\text{in acres}) = \frac{C_w \times \text{Total S.F.}}{43,560} = \frac{\quad \times \quad}{43,560} = \frac{\quad}{\quad}$$

7. Determination of metering line:

Overflow elevation in parking lot = \_\_\_\_\_.

Open Ditch:

Discharge pipe crown elevation at outlet of open ditch or open ditch tailwater if greater = \_\_\_\_\_.

Closed System:

Storm sewer main crown elevation at outlet of closed system = \_\_\_\_\_.

Length of metering line \_\_\_\_\_ ft.

$$\text{HYDRAULIC GRADIENT} = S = \frac{\text{Overflow elev.} - \text{top/pipe elev.}}{\text{Length of meter line}} = \frac{\quad}{\quad}$$

$$\text{Conveyance Factors C.F.} = \frac{1.486}{n} \text{ AR}^{2/3} = \frac{\quad}{\quad}$$

DIAMETER PIPE MATERIAL AND ROUGHNESS COEFF. (MANNING "n")

(inches)	Smooth Wall PVC 0.008	Concrete 0.013	Corrugated PE 0.015 - 0.018
4	3.09		1.51
5			2.99
6	9.12		4.46
8	19.64	12.08	9.60
10	35.60	21.91	17.41
12	57.90	35.63	28.30
15	104.97	64.60	51.32

Meter Pipe Size and Type: \_\_\_\_\_ C.F. = \_\_\_\_\_.

8.  $Q_{DISCHARGE} = (C.F.) \times S^{1/2} =$  \_\_\_\_\_ cfs  $\leq$  ( QALLOW from Step #1  
 = \_\_\_\_\_ cfs)

9. Determination of Detention Volume:

T <sub>c</sub> (Min)	i <sub>10</sub> (In/Hr)	C <sub>w</sub> A(from Step #6) (A in Acres)	Q <sub>IN</sub> = i <sub>10</sub> *C <sub>w</sub> A	Q <sub>OUT</sub> = Q <sub>DISCHARGE</sub>	Q <sub>IN</sub> -Q <sub>OUT</sub> (cfs)	(Q <sub>IN</sub> -Q <sub>OUT</sub> )x T <sub>c</sub> x 60 (cf)
20	3.82					
30	3.09					
40	2.62					
50	2.28					
60	2.03					
70	1.82					
80	1.65					
90	1.51					
100	1.40					
110	1.29					
120	1.20					

Design Detention Volume \_\_\_\_\_ cf

Volume of Detention Basin \_\_\_\_\_ cf

(Attach all topographic surveys, calculations and floodplain maps)

Dated this \_\_\_\_\_ Day of \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
Signature Design Engineer

\_\_\_\_\_  
Print Name

\_\_\_\_\_ State of Michigan Professional Engineer License No.

After reviewing this worksheet along with any required attachments, the Monroe County Road Commission may require revisions which must be complied with, and/or additional information provided in order to assess the validity of the assumptions. Note that the attached Road Commission Drainage Covenant form must be completed and provided to the Monroe County Road Commission.