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PAUL MARTIN & SONS - DETENTION DESIGN

8-29-2019

GROSS AREA - 71,196 ft² x $\frac{1 \text{ AC}}{43560 \text{ ft}^2}$ = 1.64 AC.

BUILDING AREA - (80' x 140') = 11,200 ft² x $\frac{1 \text{ AC}}{43560 \text{ ft}^2}$ = 0.26 AC.

CONC AREA - 6525 ft² + 2350 ft² + 365 ft² + 590 ft² = 9830 ft²
9830 ft² x $\frac{1 \text{ AC}}{43560 \text{ ft}^2}$ = 0.23 AC.

755 AMERICAN
STORM
CALCULATIONS

GRAVEL AREA = 1.64 A. - 0.26 A. - 0.23 A = 1.15 A

GRASS AREA/CROPLAND - 0 ft² = 0 A.

DESIGN FOR 2 YEAR STORM (24 HR STORM)

i = 2.60 in/hr (20 min) TABLE OH-1 TR55OHIO

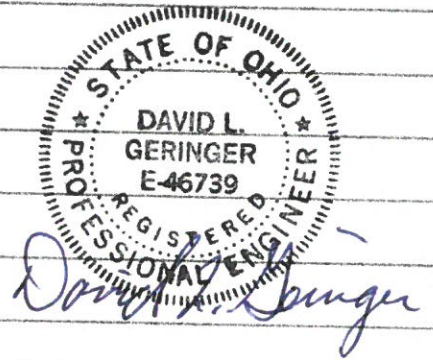
C_{ROOF} = 0.90 C_{PAVEMENT} = 0.90 C_{GRAVEL} = 0.50 C_{GRASS} = 0.20

C_{AVG} = (0.26)(0.90) + (0.23)(0.90) + (1.15 A)(0.50)
1.64 A.

C_{AVG} = 0.62

PRE-DEVELOPMENT "C" = 0.20

POST-DEVELOPMENT "C" = 0.62



Q_{2A} = (0.20)(2.60 in/hr)(1.64 ACRES) = 0.85 CFS

Q_{2B} = (0.62)(2.60 in/hr)(1.64 ACRES) = 2.64 CFS

$\frac{Q_{2B} - Q_{2A}}{Q_{2A}} = \frac{[(2.64 \text{ CFS}) - (0.85 \text{ CFS})]}{(0.85 \text{ CFS})} = 2.11$ OR 211%

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PAUL MARTIN - DETENTION DESIGN

9-3-2019

STORM FREQUENCY: BECAUSE STORMWATER RUNOFF INCREASED 211%

CRITICAL STORM = 25 YEAR FREQUENCY, 24 HR STORM

USE 8" PVC METER LINE w/ 2.5' HEAD

(SEE ENCLOSED CALCS)

REQUIRED DETENTION POND CAPACITY - 3757 ft³

ADD 50% SAFETY FACTOR TO CAPACITY

$$\text{VOLUME} = 1.50 \times 3757 \text{ ft}^3$$

$$\text{VOLUME} = 5636 \text{ ft}^3 \text{ REQUIRED}$$

$$\text{ACTUAL VOLUME} = 6750 \text{ ft}^3$$

Determination of Design Detention Volume

Data:

1. Gross Area (Sq. Ft.)	71196 sq. ft.			
2. Pavement Area (Sq. Ft.)	9830 sq. ft.			
3. Building Area (Sq. Ft.)	11200 sq. ft.			
4. Other Impervious Areas (Sq. Ft.)	50166 sq. ft.			
5. Total Impervious Area (Sq. Ft.)	21030 sq. ft.	(Runoff Co.)	0.90	18927 sq. ft.
6. Total Other Impervious Area (Sq. Ft.)	50166 sq. ft.	(Runoff Co.)	0.50	25083 sq. ft.
7. Net Pervious Area (Sq. Ft.)	0 sq. ft.	(Runoff Co.)	0.20	0 sq. ft.
8. Weighted Runoff coefficient	0.62			
9. Weighted Runoff coefficient x Area	1.01			
10. Rainfall Intensity	4.40 in/hr			
10. Quantity of Runoff (Qallow.)	1.44 c.f.s.			
11. Maximum Flow (Qmax.)	1.55 c.f.s.			
(Determined by Assumed Max. Head)				

Time of Concentration (tc)	Rainfall Intensity (in/hr.)	CwA A = Acres	Runoff Quantity (Qin)	Runoff Quantity (Qout)	Qin - Qout	(Qin-Qout) x tc x 60 (cu. ft.)
20.0	4.40	1.01	4.45	1.55	2.90	3475
30.0	3.60	1.01	3.64	1.55	2.09	3757
40.0	3.00	1.01	3.03	1.55	1.48	3554
50.0	2.60	1.01	2.63	1.55	1.08	3231
60.0	2.30	1.01	2.32	1.55	0.77	2786
70.0	2.10	1.01	2.12	1.55	0.57	2401
80.0	1.90	1.01	1.92	1.55	0.37	1774
90.0	1.70	1.01	1.72	1.55	0.17	905
100.0	1.60	1.01	1.62	1.55	0.07	399
110.0	1.50	1.01	1.52	1.55	-0.03	-228
120.0	1.40	1.01	1.41	1.55	-0.14	-976
130.0	1.30	1.01	1.31	1.55	-0.24	-1845

CONTROLS

Design Detention Volume	3757
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