	Surveying	Engineering	Project Management
	Job Name: MIA-C.R. 25A-3.54		Job No.: CTCTR0001
	Location: Tipp City, OH		Sheet: 1 of 3
	Task: Water Quality Calculations		
	Calculated By: DMG		Date: 4/23/2019
	Checked By:		Date:

Earth Disturbed Area:

EDA = 2.64 AC

Treatment Required:

T% = 20%   (Redevelopment, no new impervious in new permanent R/W)

$T_{Req.}$ = 0.53 AC

BMP Calculations (Manufactured System):

WQ_F = (C) * (i) * (A)

A_{Total} = 0.57 AC   (Total contributing area)

$A_{Imp.}$ = 0.57 AC   (Contributing impervious area) (C = 0.9)

$A_{Per.}$ = 0 AC   (Contributing pervious area) (C = 0.3)

$C_{Comp.}$ = 0.9

<u>Overland Flow</u>

Equation 1:

$$t_o = \frac{(1.8) * (1.1-C) * (L)^{1/2}}{(s)^{1/3}}$$

Where: t_{o1} = Time of Concentration (minutes)

C = Coefficient of runoff

L = Distance to most remote location in drainage area (feet)

s = Overland slope (percent)

<u>Shallow Concentrated Flow</u>

Equation 2:

$$V = (3.28) * (k) * (s)^{0.5}$$

Where: V = Velocity (fps)

k = Intercept coefficient

s = Overland slope (percent)

Equation 3:

$$t_s \text{ or } t_d = \frac{L}{(60) * (V)}$$

Where: t_s or t_d = Time of Concentration (minutes)

L = Flow length (feet)

V = Velocity (fps)

Surveying   **Engineering**   **Project Management**

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Date:

CARPENTER
MARTY transportation

Time of Concentration #1 (Overland Flow):

C = 0.9
L = 285 ft
s = 0.53 %

$$t_o = \frac{(1.8) * (1.1-0.9) * (285)^{1/2}}{(0.53)^{1/3}} = \quad 7.5 \text{ min.}$$

Time of Concentration #2 (Pipe Flow; D2-D3):

k = 0.619   (L&D, Vol. 2, Table 1101-1; Paved area)
L = 63 ft
s = 1.43 %

V = (3.28) * (0.619) * (1.43)^0.5   =   2.43 fps

$$t_s = \frac{63}{(60) * (2.43)} = \quad 0.4 \text{ min.}$$

Time of Concentration #3 (Pipe Flow; D3-D3

k = 0.619   (L&D, Vol. 2, Table 1101-1; Paved area)
L = 275 ft
s = 0.32 %

V = (3.28) * (0.619) * (0.32)^0.5   =   1.15 fps

$$t_s = \frac{275}{(60) * (1.15)} = \quad 4 \text{ min.}$$

t_c =   7.5 + 0.4 + 4 +   =   **11.9 min.**

i =   1.68 in/hr   (L&D, Vol. 2, Figure 1115-3, using tc of 12 min)

WQ_F = (0.9) * (1.68) * (0.57)   =   0.86 cfs

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CARPENTER MARTY *transportation*

Manufactured System Selection (L&D, Vol. 2, Section 1117.1):

Using Tables 1117-1 and 1117-2
- ----> Manufactured System Type 1 (based on WQf = 0.86 cfs)
- ----> No. 3 Manhole, With 84" Base ID and 6" Weir
- ----> Two (2) 10' lengths of 611, 12" Type B Conduit
- ----> System Width = 15'
- ----> System Length = 30'

MANUFACTURED SYSTEM DETAIL