

Senior Project

Area = 1,516,656 s.f. 34.818 Acres

Slopes : Ground Average Slope = 0.00147
Open Channel Slope = 0.0002538

Post Development Area

Streets = 149,024 s.f. Concrete
131, Driveways = 58,950 s.f.
131, Houses = 393,000 s.f.
Total Imper. = 600,974 s.f. @ Rational Method
Coeff = .95

Discharge Length of property = 901 ft
" " " open Channel = 1681 ft

Calculations t_c

— Open Channel

$$\begin{aligned} \text{Egn 4-60 } t_c &= \left(\frac{0.938}{t_e^{0.4}} \right) \left(\frac{n L}{\sqrt{S_0}} \right)^{0.6} \\ &= \left(\frac{0.938}{4.8^{0.4}} \right) \left(\frac{0.03 \times 1681}{\sqrt{0.0002538}} \right)^{0.6} \end{aligned}$$

$$t_c = 63.09 \text{ min}$$

— Overland Flow

$$\begin{aligned} \alpha &= \frac{k_m \sqrt{S}}{n} & m &= 5/3 \\ & & k_m &= 1.49 \text{ for ft/s} \\ & & n &= 0.35 \\ \alpha &= \left(\frac{(1.49) \sqrt{0.00147}}{0.35} \right) = 0.16322 \end{aligned}$$

$$\text{Egn 6-6 } t_c = \left(\frac{L}{\alpha t_e^{m-1}} \right)^{1/m} = \left(\frac{901}{(0.16322) (4.8)^{5/3-1}} \right)^{3/5}$$

$$t_c = 100.31 \text{ min}$$

$$\text{Total } t_c \quad 163.4 \text{ min} = 2.7 \text{ hr}$$