5 Checking the Capacity of the 2 Existing Drainage Pipes

Manning Equation

$$V = \frac{HMD^{\frac{2}{3}} \times S_f^{0.5}}{n}$$

Hydraulic Mean Depth (HMD)	=	0.291 × D
HMD	=	0.291 × 0.7
HMD	=	0.204
n	=	0.013 $s/m^{1/3}$
		for good uncoated cast iron pipe
		(Table 13 of Stormwater Drainage Manual)
V	=	$[0.204^{2/3}]\times[0.01^{0.5}]/0.013$
V	=	2.67m/sec

Maximum Capacity $Q_{Max} = V \times A$

A	=	$2 \times \pi R^2$
A	=	$2 \times \pi 0.35^2$
A	=	$0.769m^2$
Q_{Max}	=	$2.67m/sec \times 0.769m^2$
Q_{Max}	=	$2.05m^3/sec$
$2.05m^3/sec$	>	$(0.114+0.093)m^3/sec$
$2.05m^3/sec$	>	$0.207m^3/sec$
Q_{Max}	>	Q

The runoff estimation is only a small fraction of the existing drainage channel's capacity

6 Checking the Capacity of the Existing Drainage Channel

Manning Equation

$$V = \frac{R^{\frac{2}{3}} \times S_f^{0.5}}{n}$$

$$R = \frac{L \times D}{2D + L}$$

L	=	1.9m
D	=	1.6m
R	=	[1.9×1.6]/[2×1.6+1.9]
R	=	0.596m
n	=	0.014 $s/m^{1/3}$ for concrete lined channels
		(Table 13 of Stormwater Drainage Manual)
V	=	$[0.596^{2/3}]\times[0.01^{0.5}]/0.014$
V	=	5.06m/sec

Maximum Capacity $Q_{Max} = V \times A$

A	=	L × D
A	=	1.9 × 1.6
A	=	$3.04m^2$
Q_{Max}	=	$5.06m/sec \times 3.04m^2$
Q_{Max}	=	$15.4m^3/sec$
$15.4m^3/sec$	>	$(0.112+0.127)m^3/sec$