

Drainage Calculation

Site Area A1 = 5019 m² = 0.005019 km²

Uphill Catchment Area to the immediate north of the site A2 = 2200 m² = 0.0022 km²

Calculation of Runoff,

$$Q = 0.278 C i A$$

$$C1 = 0.35 \quad (\text{p.37 of Stormwater Drainage Manual})$$

$$C2 = 0.9$$

$$\text{Take } i = 250 \text{ mm/hr}$$

$$\text{Therefore, } Q = 0.278 * 250 * (0.005019 * 0.35 + 0.0022 * 0.9)$$

$$= 0.2597 \text{ m}^3/\text{sec}$$

$$= \underline{15582 \text{ lit/min}}$$

Calculation Maximum Capacity of Proposed 450 mm dia. Underground pipe

$$\text{Manning Equation } V = R^{2/3} * S_f^{0.5} / n$$

Dia 450 mm

$$\text{Where } R = \pi r^2 / 2 \pi r \quad r = 0.225 \text{ m}$$

$$= r/2$$

$$= 0.1125 \text{ m}$$

$$n = 0.012 \text{ s/m}^{1/3} \quad (\text{Table 13 of Stormwater Drainage Manual})$$

$$1/75 \quad S_f = 0.0133$$

$$\text{Therefore, } V = 0.1125^{2/3} * 0.0133^{0.5} / 0.012$$

$$= 2.2396 \text{ m/sec}$$

$$\text{Maximum Capacity (Qmax)} = V * A$$

$$= 2.2396 * \pi r^2$$

$$= 0.356 \text{ m}^3/\text{sec}$$

$$1 \text{ nos of pipe} \quad = 0.356 \text{ m}^3/\text{sec}$$

$$= 21360 \text{ lit/min}$$

$$> 15582 \text{ lit/min}$$

Provide 450 mm dia underground pipe (1:75) is OK