

Annex 2 Drainage Assessment

2. Existing Situation

A. Site particulars

- 2.1.1 The subject site possesses an area of about 760m².
- 2.1.2 The site is occupied by some movable temporary structures and vehicles. Some temporary structures were found to the west and south of the application site and a Road is found to the north of the application site.
- 2.1.3 The application site has been hard paved and so no infiltration is assumed.

B. Level and gradient of the subject site & proposed surface channel

- 2.1.4 The application site is lowest at the centre of the site whereas the western end and eastern end of the site is higher than the centre portion of the application site.
- 2.1.5 In order to follow the topography of the subject site, the proposed surface U-channel will be constructed following the gradient of the site. As demonstrated in the calculation in succeeding paragraphs, 300mm surface U-channel will be capable to drain surface runoff accrued at the subject site and the said passing through the site from adjacent area.

C. Catchment area of the proposed drainage provision at the subject site

- 2.1.6 The level of the site is basically higher than the adjacent land except to the north which is a road. However, the land to the northwest of the site falls steeper than the application site so that the surface runoff from the north of the site will fall along with the road instead of falling onto the site. As such, no external catchment has been identified.

D. Particulars of the existing drainage facilities to accept the surface runoff collected at the application site

- 2.1.7 According to recent site inspection, there is a public drain to the northwest of the application site (Figure 5).

2.2 Runoff Estimation for the Catchment

2.2.1 Rational method is adopted for estimating the designed run-off

$$Q = k \times I \times A / 3,600$$

Assuming that:

- The area of the entire catchment is approximately 760m²; (Figure 5)
- The catchment is hard paved, it is assumed that the value of run-off co-efficient (k) is taken as 1.

$$\text{Difference in Land Datum} = 17.2\text{m} - 16.9\text{m} = 0.3\text{m}$$

$$L = 33\text{m}$$

$$\therefore \text{Average fall} = 0.3\text{m in } 33\text{m} \text{ or } 1\text{m in } 110\text{m}$$

According to the Brandsby-Williams Equation adopted from the "Stormwater Drainage Manual - Planning, Design and Management" published by the Drainage Services Department (DSD),

$$\text{Time of Concentration } (t_c) = 0.14465 [L / (H^{0.2} \times A^{0.1})]$$

$$t_c = 0.14465 [33 / (0.59^{0.2} \times 640^{0.1})]$$

$$t_c = 2.87 \text{ minutes}$$

With reference to the Intensity-Duration-Frequency Curves provided in the abovementioned manual, the mean rainfall intensity (I) for 1 in 50 recurrent flooding period is found to be 320 mm/hr

$$\text{By Rational Method, } Q_1 = 1 \times 320 \times 760 / 3,600$$

$$\therefore Q_1 = 67.56 \text{ l/s} = 4,053.33 \text{ l/min}$$

2.2.2 In accordance with the Chart or the Rapid Design of Channels in "Geotechnical Manual for Slopes", for an approximate gradient of 1:100 and 1:180, the proposed 300mm surface channel is considered adequate to dissipate all the stormwater accrued by the application site.

2.3 Proposed Drainage Facilities

2.3.1 Subject to the above calculations, it is determined that 300mm surface U-channel along the inner site periphery is adequate to intercept storm water passing through and generate at the subject site (Figure 5).

2.3.2 The intercepted stormwater will be discharged to the existing public drain to the northwest of the subject site. (Figure 5)

2.3.3 All the proposed drainage facilities will be provided and maintained at the applicant's own expense.

2.3.4 The provision of the proposed surface channel will follow the gradient of the application site. All the proposed drainage facilities will be constructed and maintained at the expense of the applicant.

2.3.5 All proposed works at the site periphery would not obstruct the flow of surface runoff from the adjacent areas, the provision of trees and surface channel at site boundary is detailed hereunder:

- (a) Soil excavation at site periphery, although at minimal scale, is inevitably for the provision of surface channel and landscaping. In the reason that the accumulation of excavated soil at the site periphery would obstruct the free flow of the surface runoff from the surroundings, the soil will be cleared at the soonest possible after the completion of the excavation process.
- (b) In view of that soil excavation may be continued for several working days, surface channel will be dug in short sections and all soil excavated will be cleared before the excavation of another short section.
- (c) Neither leveling work nor site formation works will be carried at the subject site. As such, the proposed development would neither alter nor obstruct the flow of surface runoff from adjacent areas.
- (d) Adequate reserve, say, 10cm, will be provided at the toe of the site hoarding to be provided at the application site.