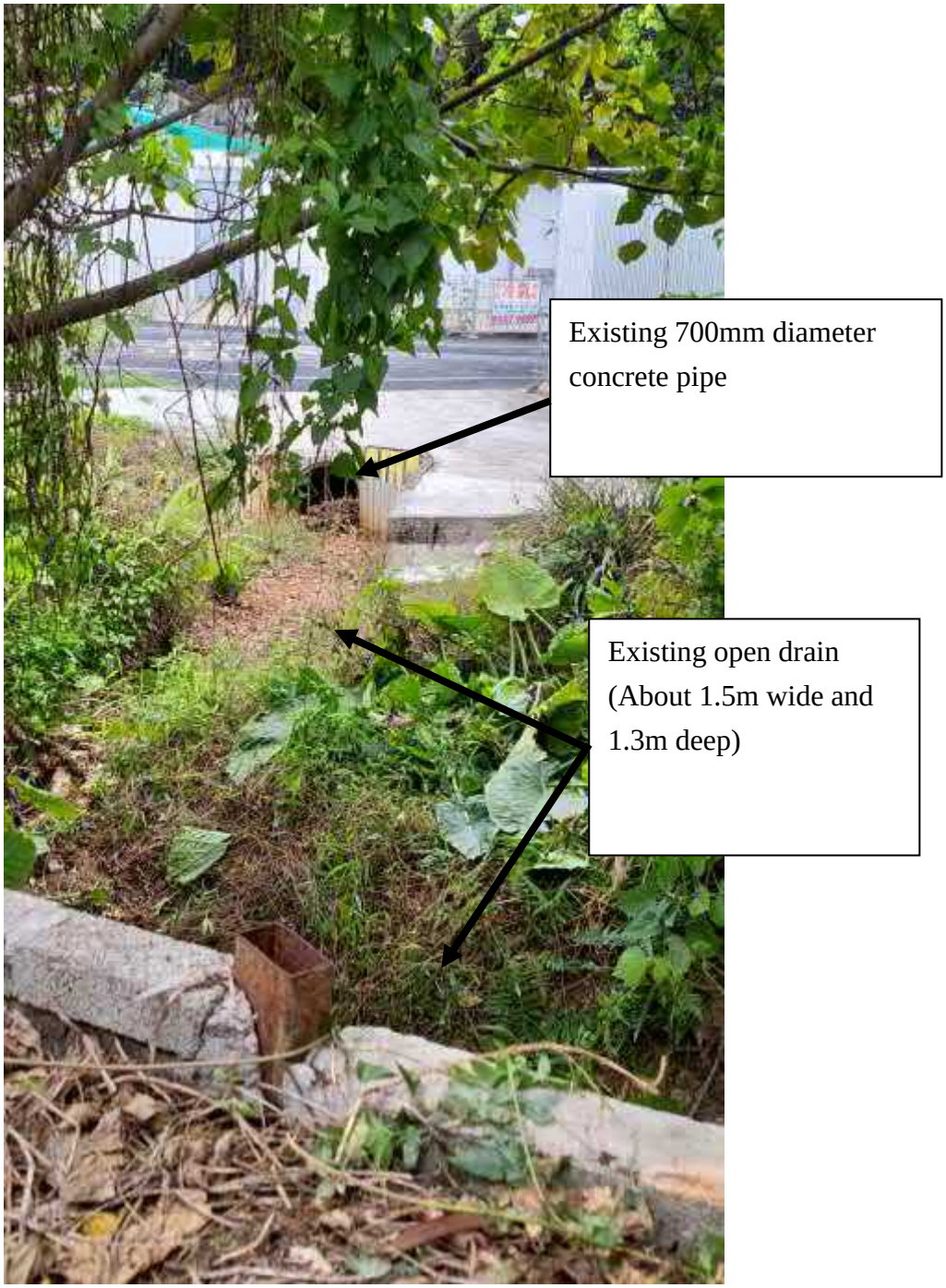
Photo 1 (The land to the south of the Application Site)

Photo 2 (The land to the east of the Application site abutting Lin Ma Hang Road)

Photo 3 (The land to the north of the Application Site)

Photo 4 (The land to the west of the Application Site which is significantly lower than the Application Site)

Photo 5 Existing open drain and connection to a 700mm diameter concrete pipe (Photo viewpoint is shown on the drainage plan)



Annex 1 Drainage Proposal

1.1 Existing Situation

A. Site particulars

1.1.1 The application site occupied an area of about 580m^2. It is proposed to fill the site with 200mm concrete for the warehouse use.

1.1.2 The area adjacent to the proposed development is mainly rural in nature. It is surrounded by temporary structures to the nort. To the east is Lin Ma Hang Road. Vacant land is found to the west and south of the site.

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

1.1.3 It is sloping from southeast to northwest from about +11.6mPD to +11.0mPD.

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

1.1.4 According to **Figure 4**, it is noted that the level of the application site is comparatively higher than the adjoining land. 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

1.1.5 As shown in **Figure 4,** an open drain is found to the immediate west of the application site.

1.2 Runoff Estimation

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

$$Q = k \times i \times A/3{,}600$$

Assuming that:

i. The area of the entire catchment is approximately 580m^2;
ii. For conservative reason, it is assumed that the value of run-off co-efficient (k) is taken as 1.

Difference in Land Datum = 11.6m – 11.0m = 0.6m

L = 28m

∴ Average fall = 0.6m in 28m or 1m in 46.67m

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

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

$t_c = 0.14465 [28/ (2.14^{0.2} \times 580^{0.1})]$

$t_c = 1.84$ 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 335 mm/hr

By Rational Method, $Q_1 = 1 \times 335 \times 580 / 3,600$

$\therefore Q_1 = 53.97$ l/s = 3,238.33 l/min = $0.054 m^3/s$

In accordance with the Chart or the Rapid Design of Channels in "Geotechnical Manual for Slopes", for an approximate gradient of about 1:65 and 1:90 in order to follow the gradient of the application site, 300mm surface U-channel is considered adequate to dissipate all the stormwater accrued by the application site.

1.3 Proposed Drainage Facilities

1.3.1 Subject to the calculations in 1.2 above, it is determined that proposed 300mm surface U-channel along the site periphery is adequate to intercept storm water passing through and generated at the application site (**Figure 3**).

1.3.2 Catchpit will be provided at the turning point of the surface U-channel.

1.3.3 The collected stormwater will then be dissipate to the culvert to the north of application site. The culvert is now receiving the stormwater from the application site and it is deemed adequate to receive the stormwater from the application site.

1.3.4 All the proposed drainage facilities will be provided and maintained at the

applicant's own expense.

1.3.5 The provision of the proposed surface channel will follow the gradient of the application site.

1.3.6 Prior to the commencement of drainage works, the applicant will seek the consent of the District Lands Office/North and relevant registered land owner for works outside the application site or outside the jurisdiction of the applicant.

1.3.7 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) 100mm will be reserved at the toe of the site hoarding to allow unobstructed flow of surface runoff.

1.4 Calculation of the drainage capacity of the Existing 700mm diameter concrete pipe

1.4.1 Rational method is adopted for estimating the designed run-off of the catchment of the 700mm concrete pipe (Figure 16)

$$Q = k \times i \times A/3{,}600$$

Assuming that:

i. The area of the entire catchment is approximately 2,100m^2 including the application site ; (Figure 16)

ii. For conservative reason, it is assumed that the value of run-off co-efficient (k) is taken as 1.

Difference in Land Datum = 26.5m – 11.0m = 15.5m

L = 113m

∴ Average fall = 15.5m in 113m or 1m in 7.29m

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

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

$t_c = 0.14465 [113/ (13.72^{0.2} \times 2{,}100^{0.1})]$

$t_c = 4.51$ 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 280 mm/hr

By Rational Method, $Q_1 = 1 \times 280 \times 2{,}100 / 3{,}600$

$\therefore Q_1 = 163.33$ l/s = 9,800 l/min = 0.163m^3/s

1.4.2 Manning's Formula is adopted for estimating the maximum capacity of the proposed 700mm concrete pipe

$Q2 = A \times R^{2/3} \times S^{1/2}/n$

Assuming that:

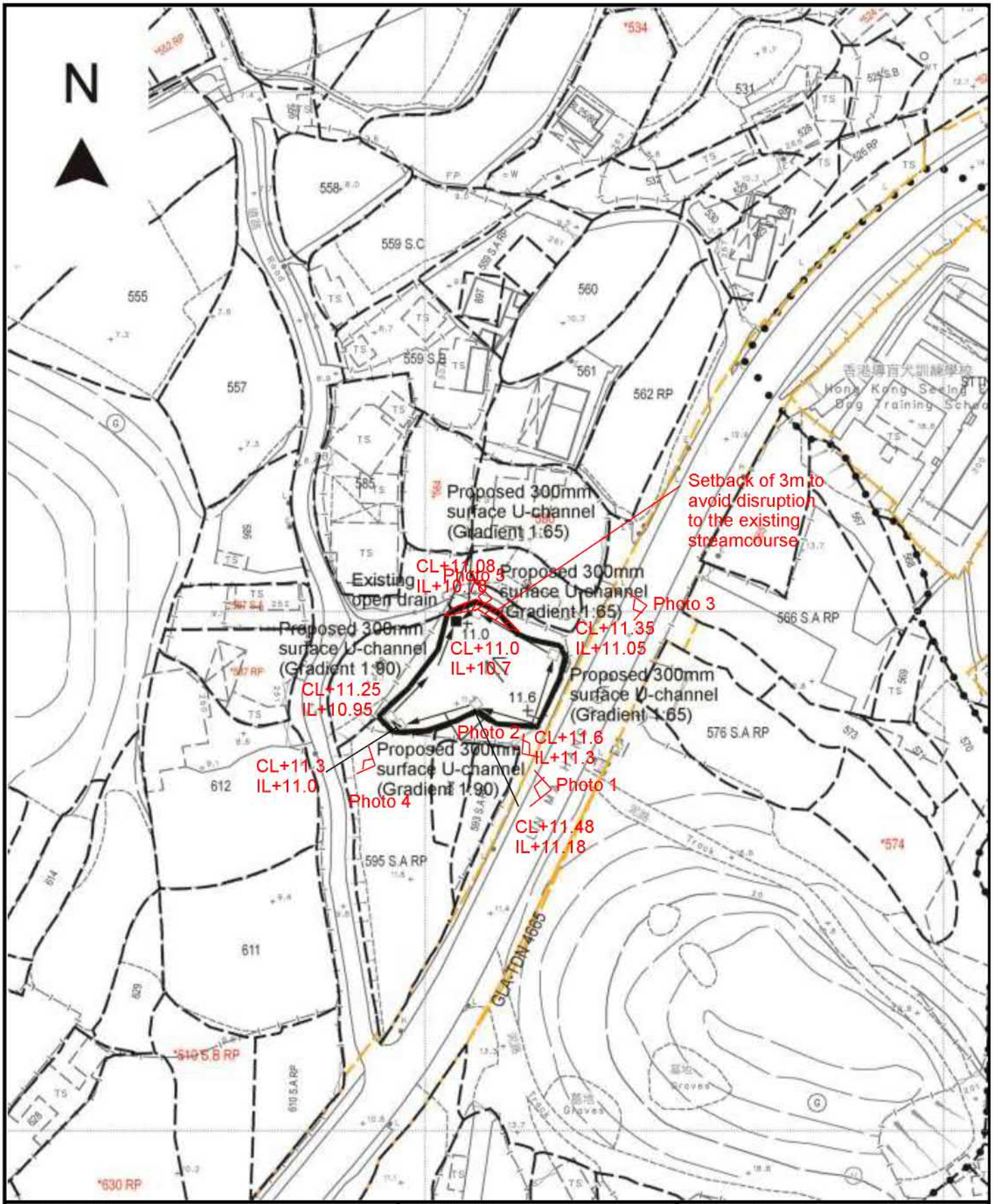
i. Gradient (S) of the pipe is taken as 1:100;
ii. Manning's roughness coefficient (n) is taken as 0.015 for concrete pipe;
iii. R = A/P; &

By Manning's Formula:

$Q2 = 0.38465 \times (0.1749)^{2/3} \times (0.01)^{1/2} / 0.015$

$= 0.8 m^3/s$

The estimated peak runoff of catchment (Q_1) is $0.163 m^3/s$ but the estimated maximum capacity of the proposed 700mm concrete pipe is (Q_2) $0.8 m^3/s$. That is to say the proposed 700mm concrete pipe has spare capacity to cater for the stormwater generated at application site.



Project 項目名稱:

Proposed Temporary Warehouse for Storage of Construction Material and Furniture for a Period of 3 Years and Filling of Land at Lots 589 & 590 RP in D.D.90, Lin Ma Hang Road, Ta Kwu Ling, N.T.

Drawing Title 圖目:

Proposed Drainage Plan

Drawing No. 圖號:

Figure 4

Remarks 備註:

+11.6 Level (in mPD)

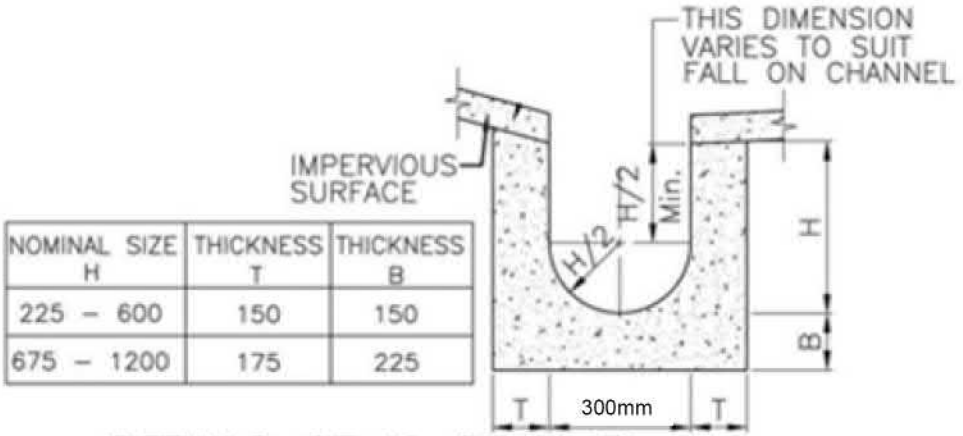
□ Proposed catchpit

⇐ Flow of surface runoff

■ Catchpit with sand trap

Scale 比例:

1:1000

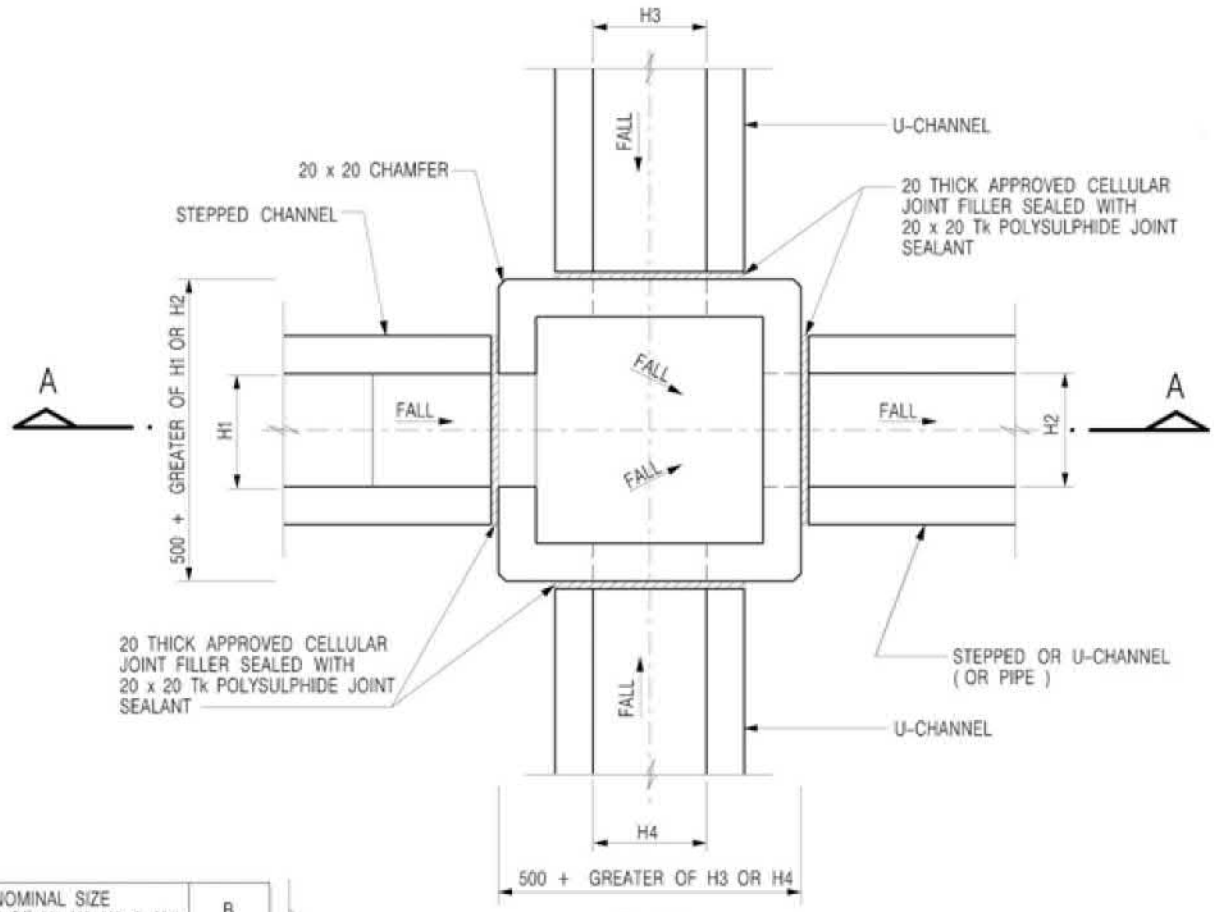


NOMINAL SIZE H	THICKNESS T	THICKNESS B
225 – 600	150	150
675 – 1200	175	225

DETAILS OF U–CHANNEL

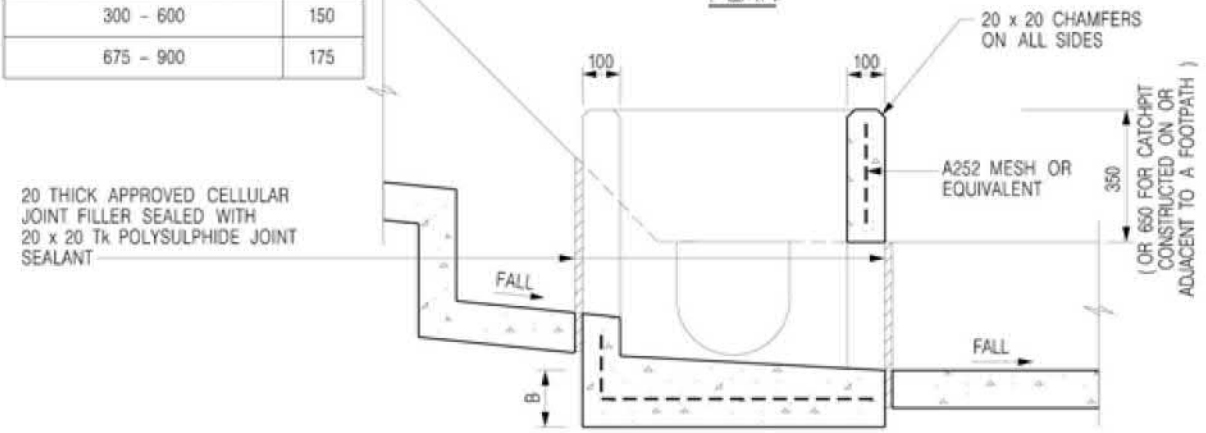
(REFERENCE : FIG. 8.11 OF GEOTECHNICAL MANUAL FOR SLOPES)
(N.T.S.)

Project 項目名稱: Proposed Temporary Warehouse for Storage of Construction Material and Furniture for a Period of 3 Years and Filling of Land at Lots 589 & 590 RP in D.D.90, Lin Ma Hang Road, Ta Kwu Ling, N.T.	Drawing Title 圖目: Details of Proposed Surface U-channel	Remarks 備註:
	Drawing No. 圖號: Figure 13	Scale 比例: Not to scale



PLAN

NOMINAL SIZE (LARGEST OF H1, H2, H3 & H4)	B
300 – 600	150
675 – 900	175

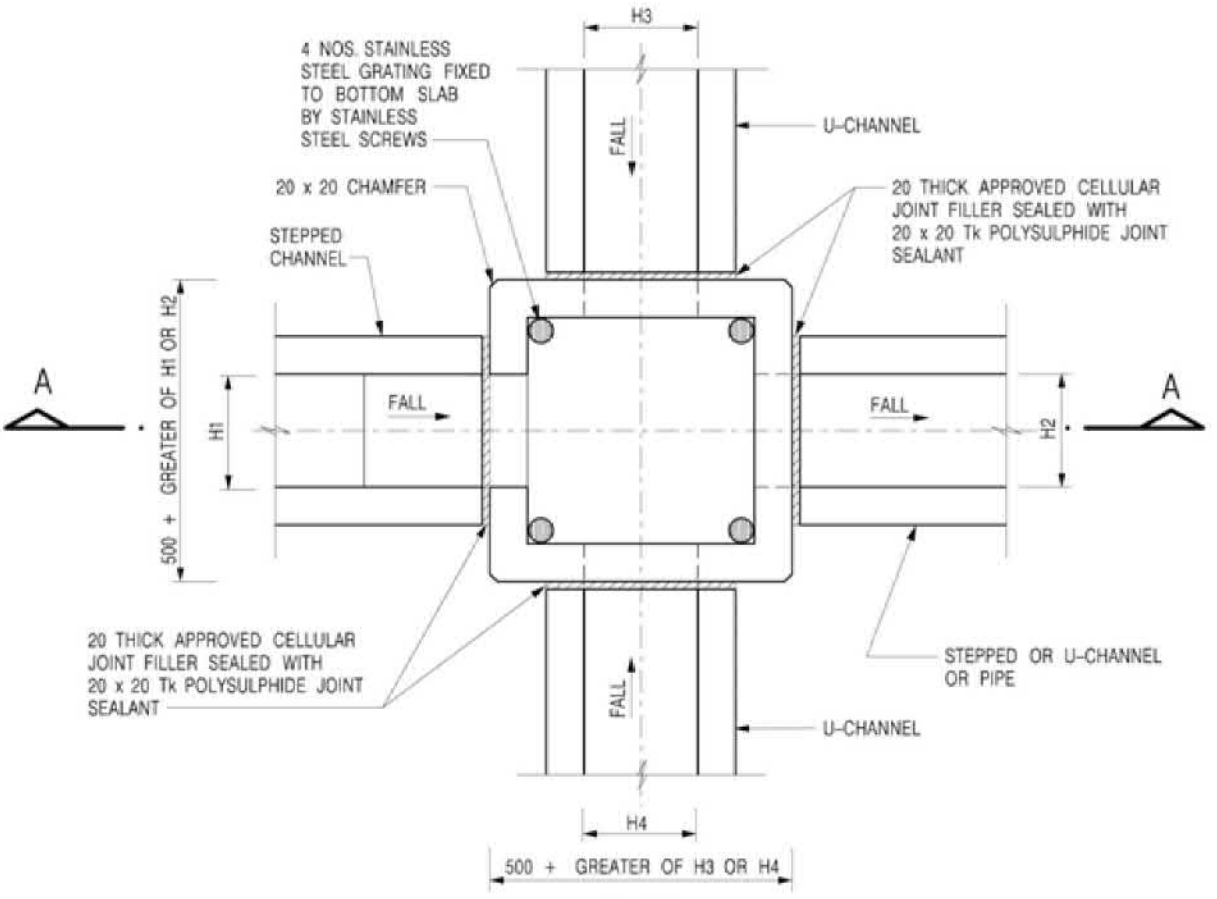


SECTION A – A

NOTES:

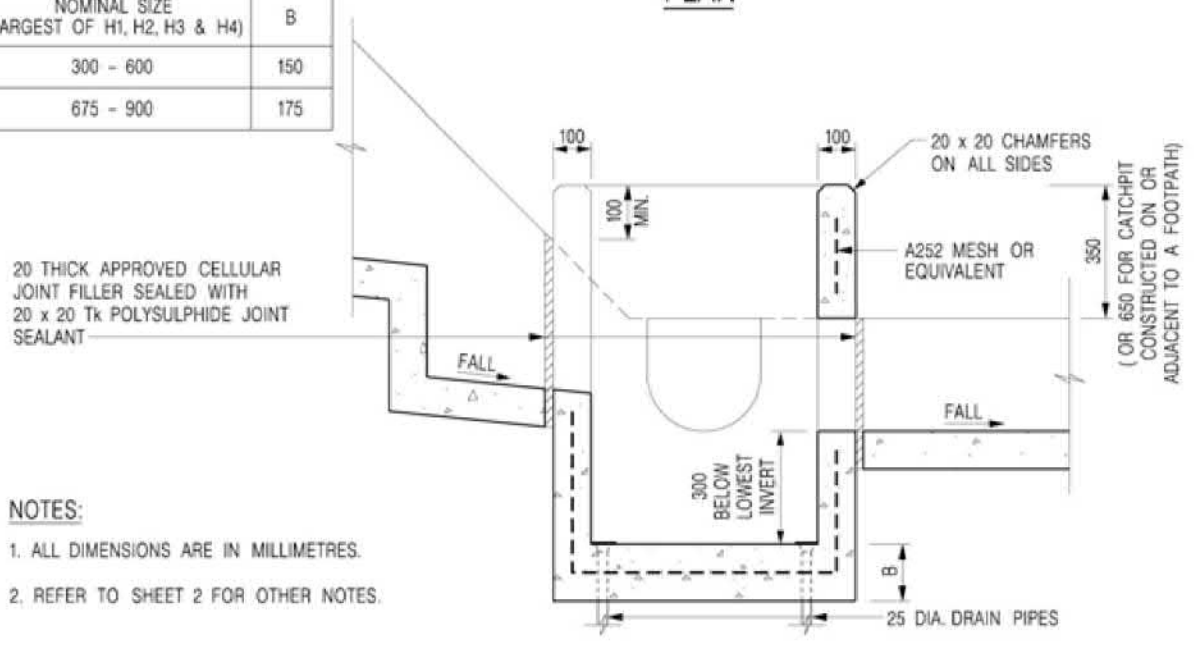
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFER TO SHEET 5 FOR OTHER NOTES.

Project 項目名稱: Proposed Temporary Warehouse for Storage of Construction Material and Furniture for a Period of 3 Years and Filling of Land at Lots 589 & 590 RP in D.D.90, Lin Ma Hang Road, Ta Kwu Ling, N.T.	Drawing Title 圖目: The Details of the Proposed Catchpit	Remarks 備註:
	Drawing No. 圖號: Figure 14	Scale 比例: Not to scale



PLAN

NOMINAL SIZE (LARGEST OF H1, H2, H3 & H4)	B
300 - 600	150
675 - 900	175

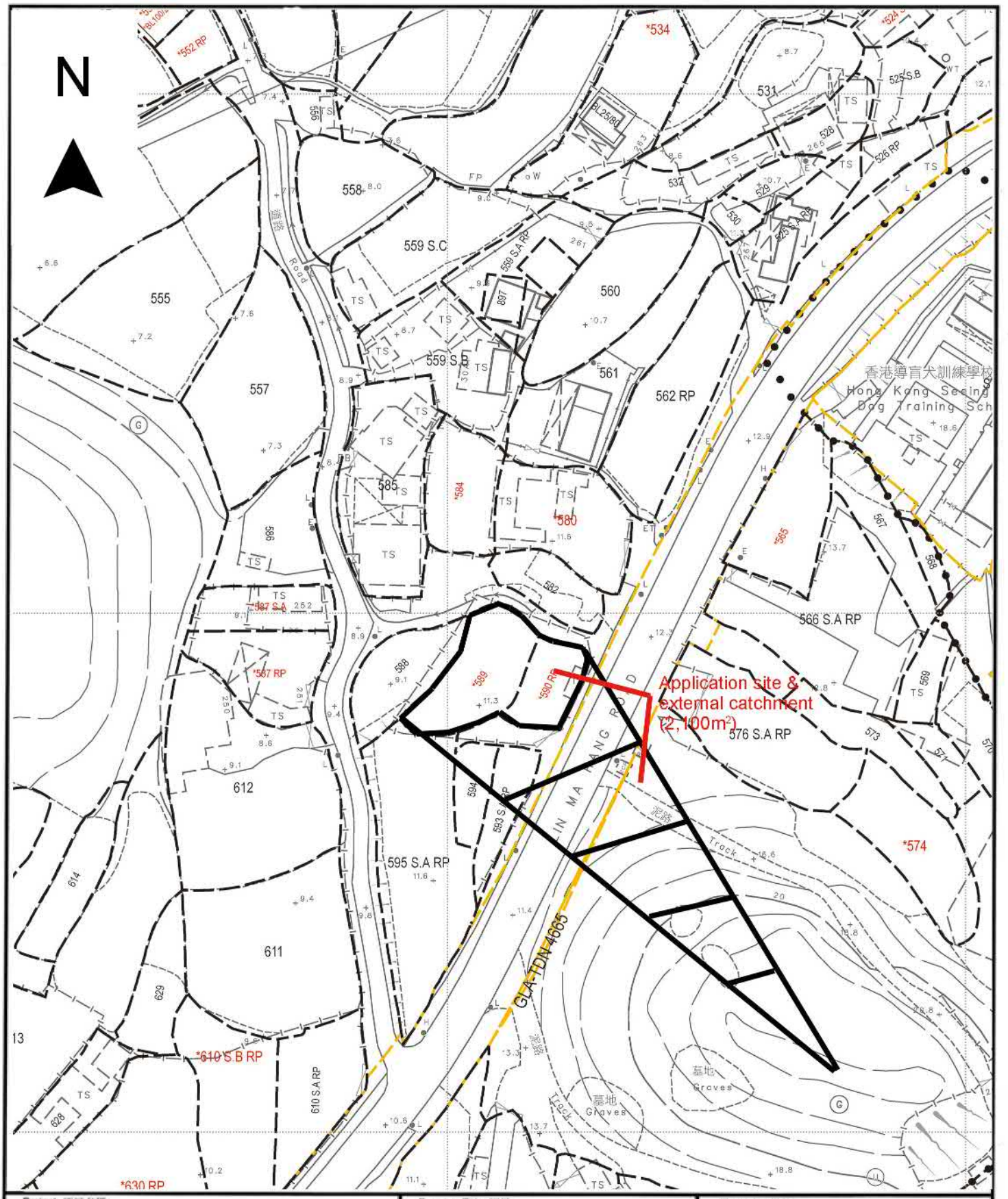


NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFER TO SHEET 2 FOR OTHER NOTES.

SECTION A - A

Project 項目名稱:	Drawing Title 圖則:	Remarks 備註:
Proposed Temporary Warehouse for Storage of Construction Material and Furniture for a Period of 3 Years and Filling of Land at Lots 589 & 590 RP in D.D.90, Lin Ma Hang Road, Ta Kwu Ling, N.T.	The Details of Catchpit with Desilting Function	
	Drawing No. 圖號: Figure 15	Scale 比例: Not to scale



Project 項目名稱:

Proposed Temporary Warehouse for Storage of Construction Material and Furniture for a Period of 3 Years and Filling of Land at Lots 589 & 590 RP in D.D.90, Lin Ma Hang Road, Ta Kwu Ling, N.T.

Drawing Title 圖目:

Catchment Area of Existing 700mm Concrete Pipe

Drawing No. 圖號:

Figure 16

Remarks 備註:

Scale 比例:

1:1000