

Your Ref.: A/YL-KTN/1012

Our Ref.: P22096/TL24524

2 October 2024

The Secretary
Town Planning Board
15/F., North Point Government Offices
333 Java Road, North Point, Hong Kong

By Post and E-mail
tpbpd@pland.gov.hk

Dear Sir,

Submission of Further Information (FI)

**Proposed Temporary Warehouse (excluding Dangerous Goods Godown)
with Ancillary Office for a Period of 3 Years and Associated Filling of Land in
“Agriculture” Zone, Lots 1046, 1047 S.A, 1047 RP, 1049 S.A, 1049 S.B RP(Part),
1049 RP(Part) and 1054 in D.D. 109, Kam Tin, Yuen Long, New Territories
(S.16 Planning Application No. A/YL-KTN/1012)**

We write to submit FI in response to departmental comment(s) conveyed by the Planning Department for the captioned application.

Yours faithfully,
For and on behalf of
Goldrich Planners & Surveyors Ltd.



Francis LAU
Encl.

Further Information for Planning Application No. A/YL-KTN/1012**Response-to-Comment****Comments from the Drainage Services Department**

	Comment	Response
1.	According to Technical Note to prepare a Drainage Submission, the applicant should refer to DSD Advise Note No. 1 and should also employ a qualified engineer (Registered Professional Engineer in the Civil Engineering discipline) to complete the DIA as requested. The completed drainage submission should be signed and certified by the engineer before it is submitted to DSD for comment.	Noted. The DIA has been signed and certified by a qualified engineer.

The Applicant would like to provide further information for the application in response to comments from PlanD. Details are as follows:

- According to FSD, structures which are less than 1.8m apart are considered as adjoining structures. Additional FSIs (i.e. sprinkler system) are required if the total floor area of the structure exceeds 230 m². As such, 18 temporary structures with floor area of less than 230m² are proposed on Site.

- END -

Planning Application No. A/YL-KTN/1012

Drainage Impact Assessment Report

Date: June 2024



LO Kwok Kay
PRE(Civil)
PR0366579

1 Introduction

1.1 Background

Warehouse use is proposed on the application site, Lots 1046, 1047 S.A, 1047 RP, 1049 S.A, 1049 S.BRP (Part), 1049 RP (Part) and 1054 in D.D. 109, Yuen Long, New Territories.

Owing to concerns on possible drainage impact arising from the proposed redevelopment, a Drainage Impact Assessment (DIA) has been conducted to demonstrate the acceptability of drainage impact upon the surrounding environment.

1.2 Study Objectives

The objectives of this DIA are to assess the possible drainage impacts may be caused by the Proposed Development and to recommend the mitigation measures to alleviate such impacts if necessary.

2 Site Context

2.1 Site Location and Its Environs

The site is on Lots 1046, 1047 S.A, 1047 RP, 1049 S.A, 1049 S.BRP (Part), 1049 RP (Part) and 1054 in D.D. 109, Yuen Long, New Territories. It is located at Tai Kong Po. The eastern side of the site is immediately adjacent to a nullah (Kam Tin River). The norther side of the site is a small hill. The western and southern side of the site are some farmlands.

2.2 Proposed Use

The proposed use is for warehouses use. Warehouses are proposed on site.

2.3 Existing Drainage Condition

The Site is not currently served by any form of DSD's drainage facility. However, one existing nullah (Kam Tin River) is at the east of the Site. The surface runoff from the Site may be discharged this nullah via u-channels. (Refer to **Plan 7.1**)

Drainage Analysis

2.4 Assessment Methodology and Assumptions

This DIA has adopted the Rational Method for runoff estimation:

$$Q_p = 0.278 i \sum C_j A_j$$

Where

Q_p is peak runoff (m^3/s);

i is rainfall intensity (mm/hr);

A_j is the j^{th} catchment (m^2);

C_j is the runoff coefficient of the j^{th} catchment (dimensionless).

The details of the Rational Method can be referred to the Stormwater Drainage Manual (SDM) (DSD, 2018).

The storm constant in Table 3d has been referred to Corrigendum No. 1/2024.

Based on a 1:50 year flood protection standard in the SDM and the estimated time of concentration, the appropriate rainfall intensities (i) were calculated based on linear interpolation of the intermediate table values.

The assumptions of this DIA are summarised below:

- Rainstorm return period – 1 in 50 years
- Runoff coefficient for developed (paved) area – 0.95
- Runoff coefficient for steep grassland (heavysoil) – 0.35
- Manning's roughness coefficient for the proposed U-channels – 0.016

The capacities of the proposed concrete lined U-channels were checked by comparing with magnitudes of different combinations of the catchments. The Manning's roughness coefficient of 0.016 for surface channel (fair condition) as stated in Table 13 of SDM was assumed for the u-channels as referred in the SDM.

2.5 Assessment Results

Runoffs and capacities at the concerned location of the proposed U-channels was estimated in attached drainage calculations.

With the provision of the proposed drainage system for discharging into the existing nullah as shown in **Plan 7.1**, the Proposed Development would not cause adverse drainage impacts or increase in the flooding susceptibility of the surrounding areas.

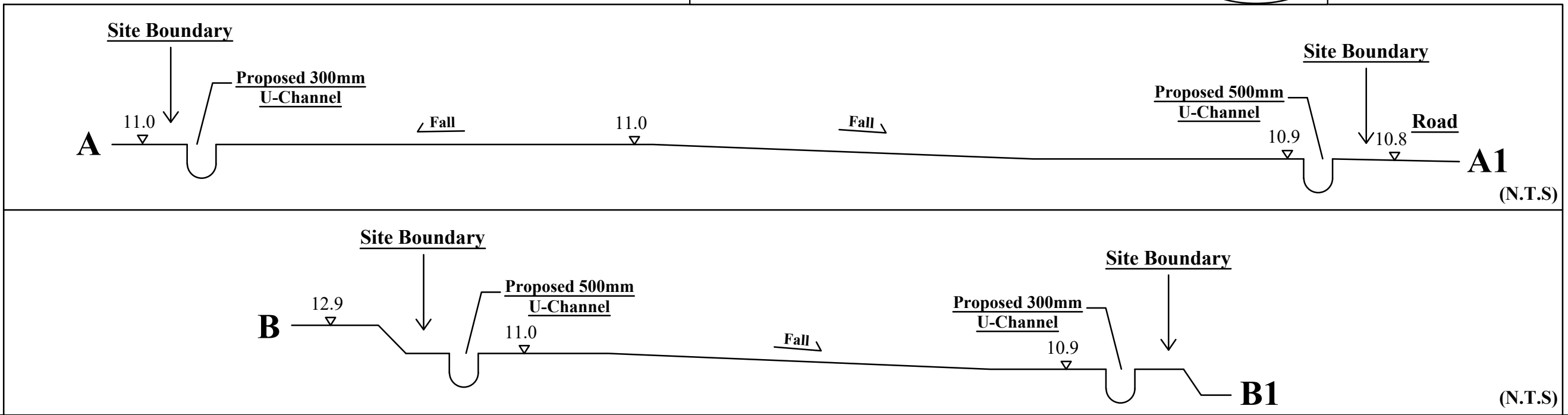
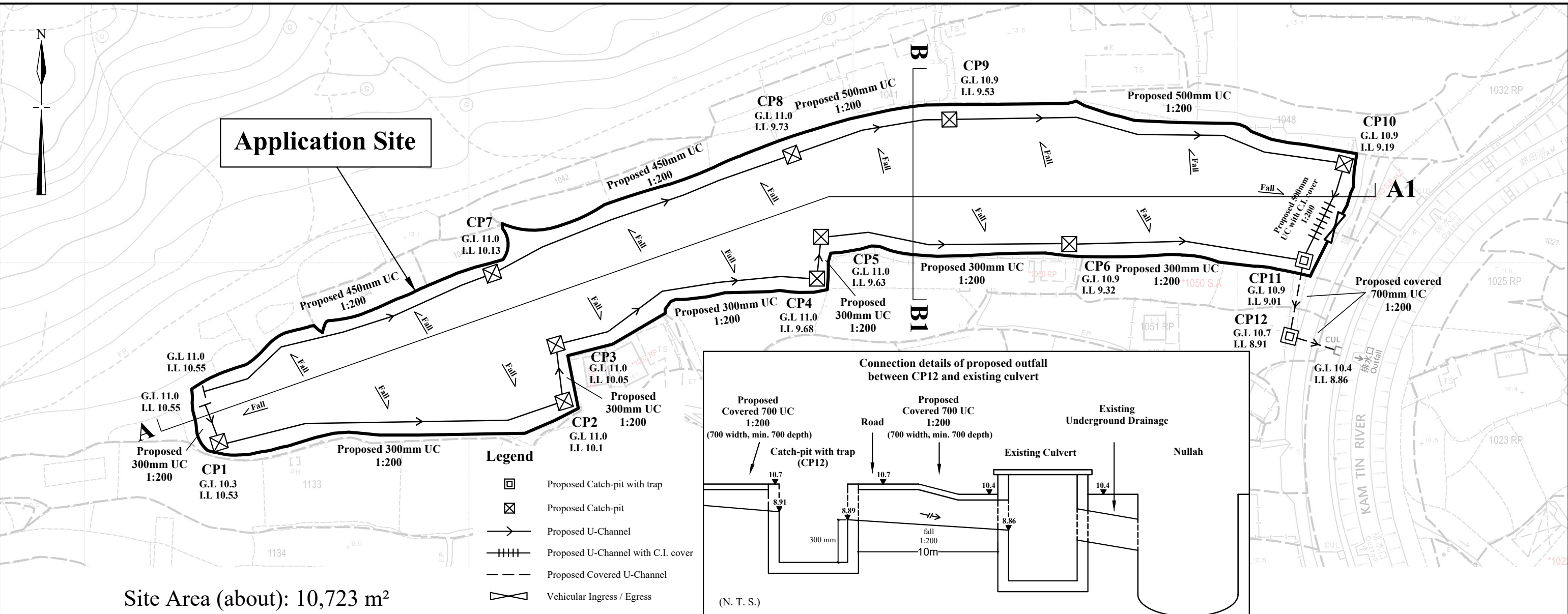
3 Conclusion

For collecting surface runoff within the Site, a series of U-channels have been designed.

The drainage analysis has demonstrated that subject to the implementation of the proposed drainage systems, the Proposed Development would not cause adverse drainage impacts or increase in the flooding susceptibility of the adjacent areas.



LO Kwok Kay
PRE(Civil)
PR0366579



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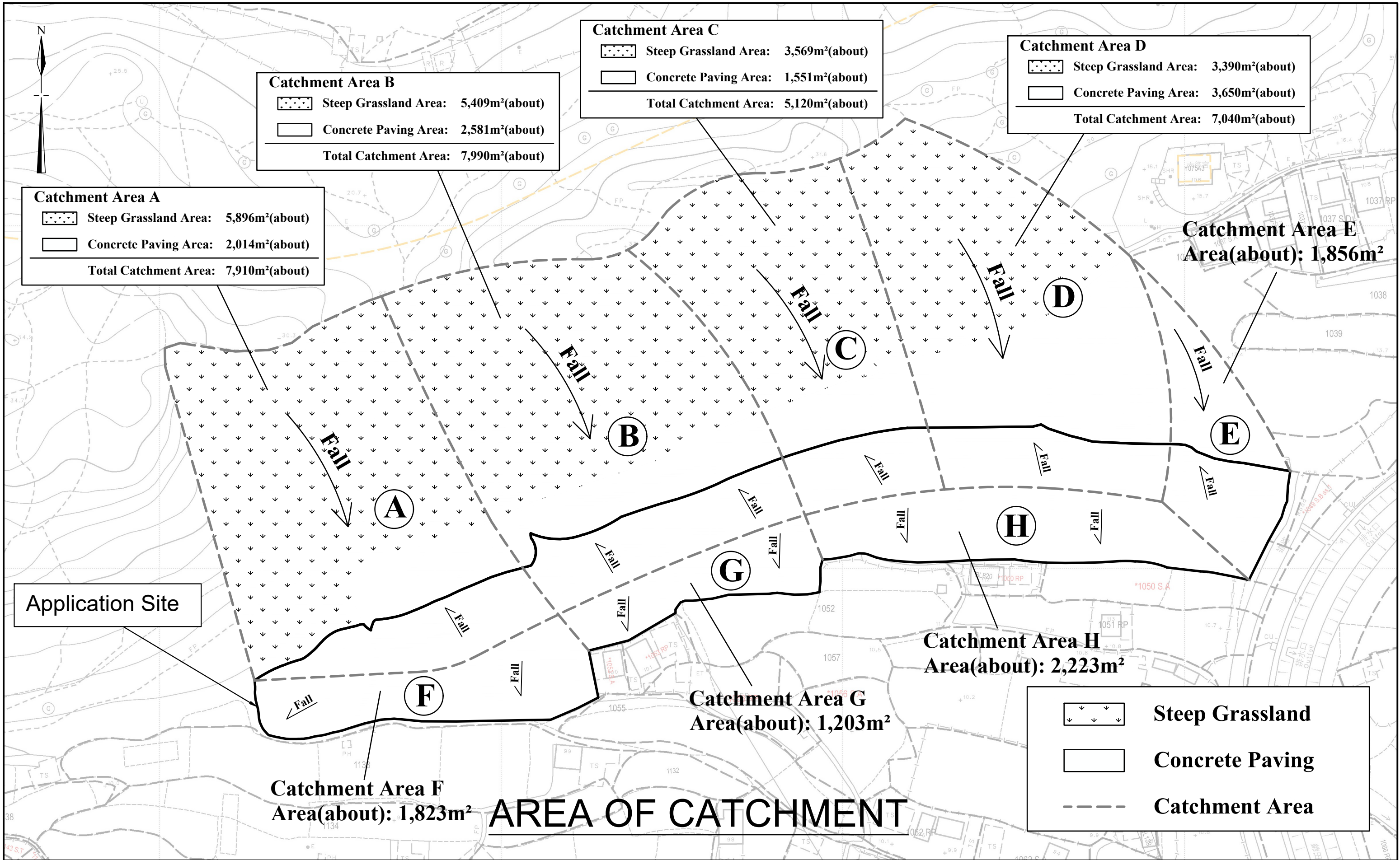
June 2024

Drainage Proposal

Lots 1046, 1047 S.A, 1047 RP, 1049 S.A, 1049 S.B RP (part),
 1049 RP (part) and 1054 in D.D. 109
 Kam Tin, Yuen Long

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Plan 7.1
 (P 22096)



1:1000 (A3)

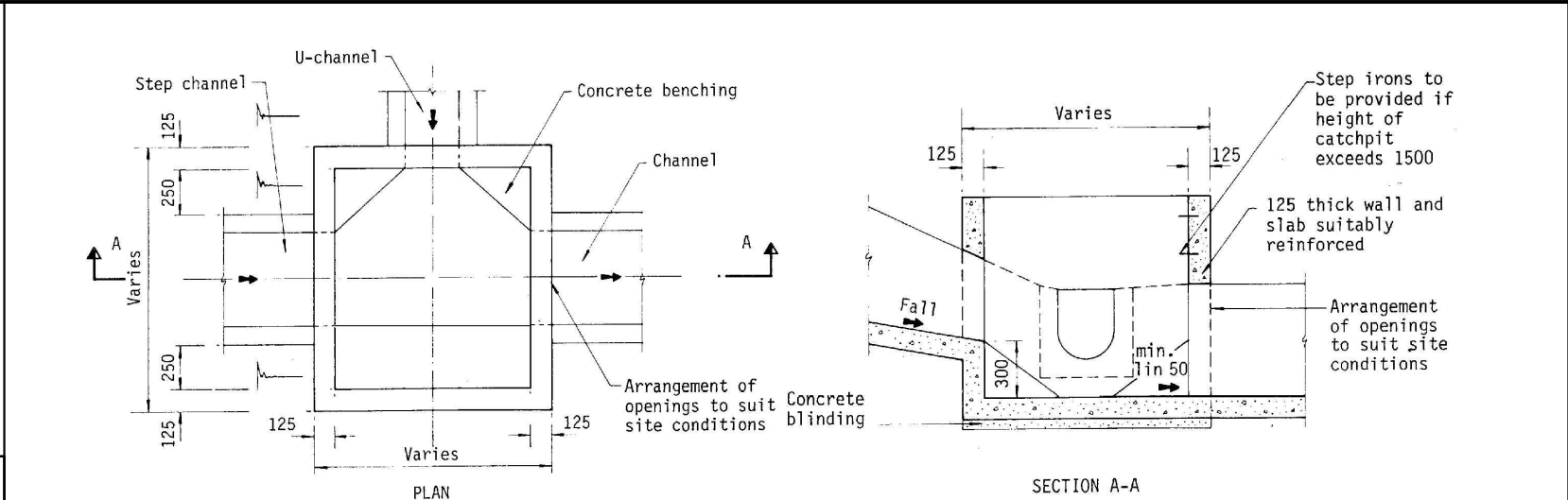
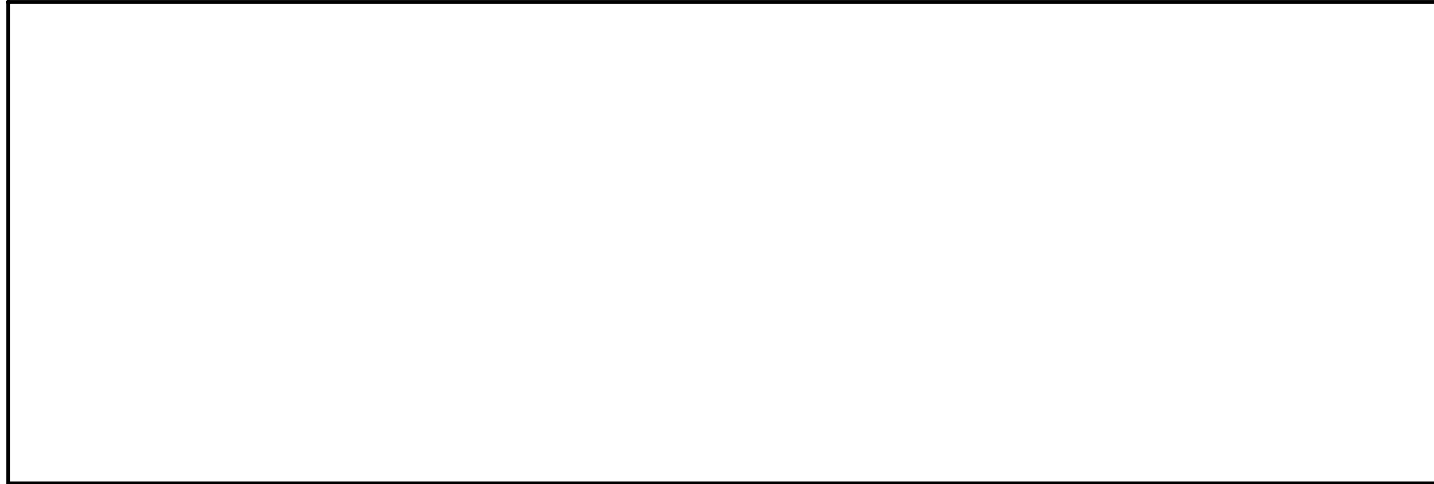
June 2024

Drainage Proposal

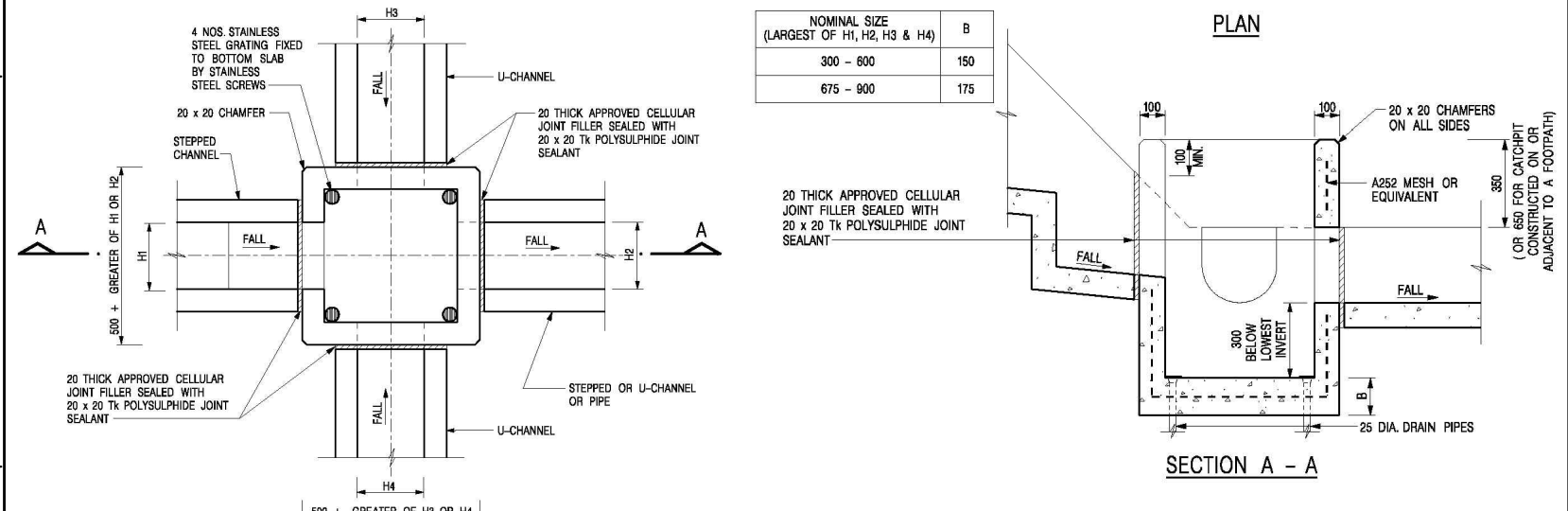
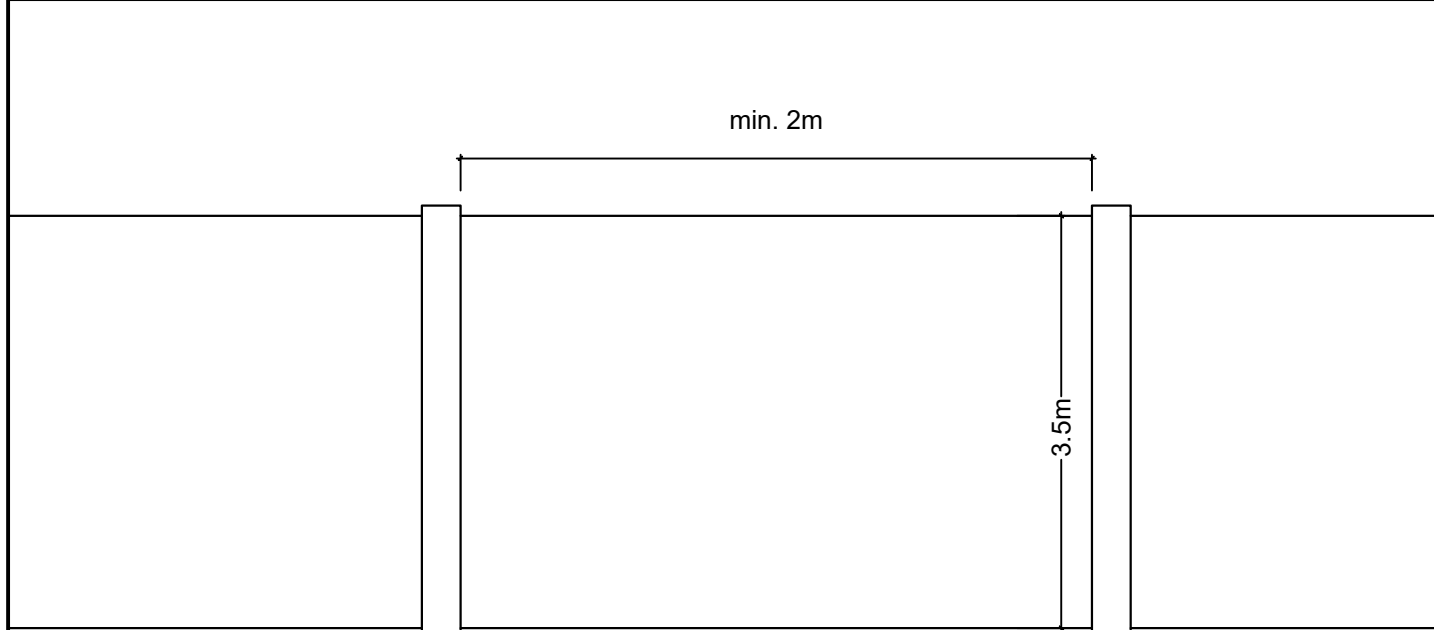
Lots 1046, 1047 S.A, 1047 RP, 1049 S.A, 1049 S.B RP (part),
 1049 RP (part) and 1054 in D.D. 109
 Kam Tin, Yuen Long

Goldrich Planners &
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Plan 7.2
 (P 22096)

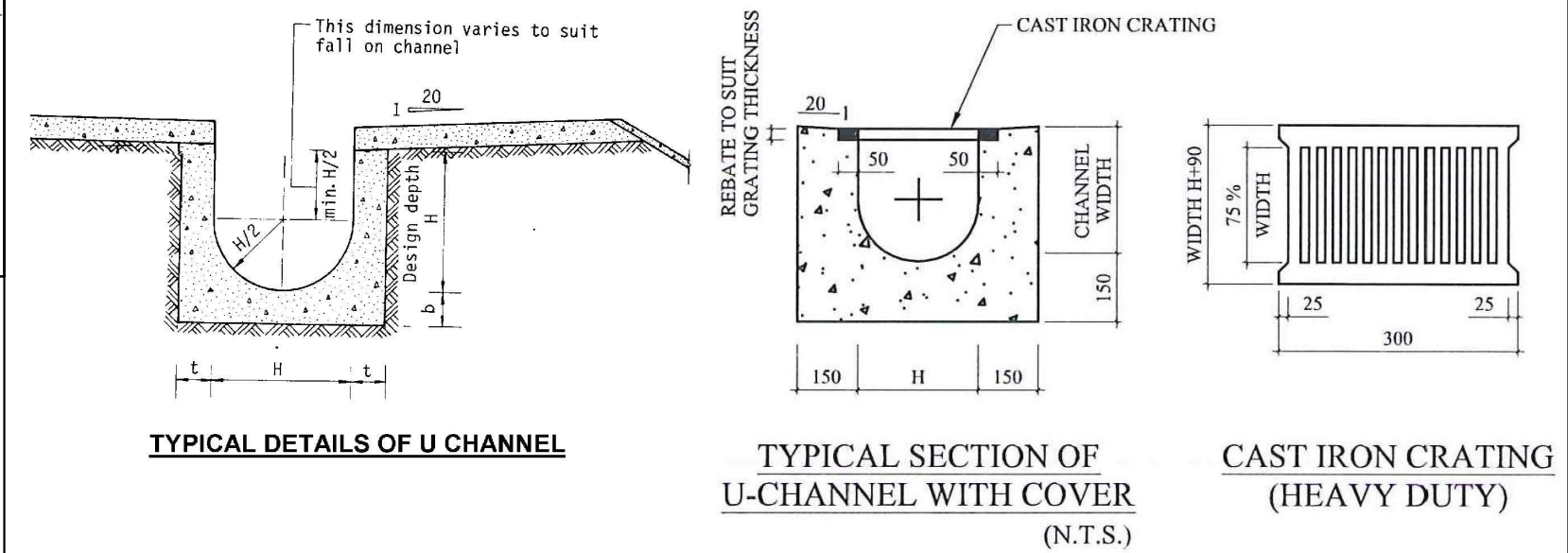


TYPICAL DETAILS OF CATCHPIT



DETAILS OF CATCHPIT WITH TRAP
(REFER TO CEDD'S STANDARD DWG. C2406/1)

Details of hoarding with 100mm opening
(N. T. S.)



N.T.S
June 2024

Drainage Proposal
Lots 1046, 1047 S.A, 1047 RP, 1049 S.A, 1049 S.B RP
(part), 1049 RP (part) and 1054 in D.D. 109
Kam Tin, Yuen Long

Goldrich Planners & Surveyors Ltd.
Plan 7.3
(P 22096)

1 For Catchment Area A

Area, A = 7910 m²
 Average slope, H = 21.4 m per 100m
 Distance on the line of natural flow, L = 90 m

Time of concentration, $t_o = 0.14465L / (H^{0.2}A^{0.1})$; = 0.14465 (90) / (21.4^{0.2}*7910^{0.1})
 = 2.9 min

Ref.

SDM 7.5.2 (d)

2 For Proposed U-Channel in catchment area A

	From	To
Ground level (mPD)	11.00	11.00
Invert level (mPD)	10.55	10.13

Width of u-channel, w = 450 mm
 Length of u-channel, L_c = 85 m
 Depth of vertical part of u-channel, d = 645 mm
 Gradient of u-channel, S_f = (1.55-10.13)/85 = 0.005

Cross-Section Area, a = $0.5 \pi r^2 + w d$ = 0.5 x 3.14 x 225² + 450 x 645
 = 0.370 m²
 Wetted Perimeter, p = $\pi r + 2 d$ = 3.14 x 225 + 2 x 645
 = 1.997 m
 Hydraulic radius, R = a / p
 = 0.185 m

SDM 8.2.1

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:-
 Allowable velocity, v = $R^{1/6} \times (RS_f)^{1/2} / n$ = (0.185)^{1/6} x (0.185 x 0.005)^{1/2} / 0.016
 = 1.43 m/s
 Time of flow, t_f = 1.0 min

SDM Table 13
 SDM Table 12

4 Use "Rational Method" for calculation of design flow

Design intensity, i = $a / (t_o + t_f + b)^c$
 = 474.6 / (2.9+1+2.9)^{0.42} for return period T = 50 years
 = 286

SDM 4.3.2
 SDM Table 3(d)

Type of surface	Runoff Coefficient C	Catchment Area A (m ²)	C x A
Steep Grassland (heavy soil)	0.35	5896.0	2063.6
Concrete Paving	0.95	2014.0	1913.3
SUM =			3976.9

SDM 7.5.2 (b)

Upstream flow, Q_u = 0 m³/s

Design flow, Q_d = 0.278i Σ C_fA_j + Q_u where A_j is in km²
 = 0.278 x 286 x 3976.9 / 1000000 + 0
 = 0.316 m³/s

SDM 7.5.2 (a)

Allowable flow, Q_a = a x v
 = 0.37 x 1.43
 = 0.528 m³/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

Scale: NA	Drainage Calculation	Goldrich Planners & Surveyors Ltd.
June 2024	Lots 1046, 1047 S.A, 1047 R.P., 1049 S.A, 1049 S.B RP (Part), 1049 RP (Part) and 1054 in D.D. 109, Kam Tin, Yuen Long	Page 1 (P22096)

1 For Catchment Area B

Area, A = 7990 m²
 Average slope, H = 42.4 m per 100m
 Distance on the line of natural flow, L = 80 m

Time of concentration, $t_c = 0.14465L / (H^{0.2}A^{0.1}) = 0.14465 (80) / (42.4^{0.2} \times 7990^{0.1})$
 = 2.2 min

Ref.

SDM 7.5.2 (d)

2 For Proposed U-Channel in catchment area B

	From	To
Ground level (mPD)	11.00	11.00
Invert level (mPD)	10.13	9.73

Width of u-channel, w = 450 mm
 Length of u-channel, L_c = 81 m
 Depth of vertical part of u-channel, d = 1050 mm
 Gradient of u-channel, S_f = (10.13-9.73)/81 = 0.005

Cross-Section Area, a = $0.5 \pi r^2 + w d = 0.5 \times 3.14 \times 225^2 + 450 \times 1050$
 = 0.552 m²
 Wetted Perimeter, p = $\pi r + 2 d = 3.14 \times 225 + 2 \times 1050$
 = 2.807 m
 Hydraulic radius, R = a / p
 = 0.197 m

SDM 8.2.1

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:-
 Allowable velocity, v = $R^{1/6} \times (RS_f)^{1/2} / n = (0.197)^{1/6} \times (0.197 \times 0.005)^{1/2} / 0.016$
 = 1.49 m/s
 Time of flow, t_f = 0.9 min

SDM Table 13
 SDM Table 12

4 Use "Rational Method" for calculation of design flow

Design intensity, i = $a / (t_c + t_f + b)^c$
 = $474.6 / (2.2+0.9+2.9)^{0.4}$ for return period T = 50 years
 = 298

SDM 4.3.2
 SDM Table 3(d)

Type of surface	Runoff Coefficient C	Catchment Area A (m ²)	C x A
Steep Grassland (heavy soil)	0.35	5409.0	1893.2
Concrete Paving	0.95	2581.0	2452.0
			SUM = 4345.1

SDM 7.5.2 (b)

Upstream flow, Q_u = 0.316 m³/s

Design flow, Q_d = $0.278i \sum C_j A_j + Q_u$ where A_j is in km²
 = $0.278 \times 298 \times 4345.1 / 1000000 + 0.316$
 = 0.675 m³/s

SDM 7.5.2 (a)

Allowable flow, Q_a = a x v
 = 0.552 x 1.49
 = 0.825 m³/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

Scale: NA

Drainage Calculation

Goldrich Planners &
 Surveyors Ltd.

June 2024

Lots 1046, 1047 S.A, 1047 R.P., 1049 S.A, 1049 S.B RP (Part),
 1049 RP (Part) and 1054 in D.D. 109, Kam Tin, Yuen Long

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1 For Catchment Area C

Area, A = 5120 m²
 Average slope, H = 23 m per 100m
 Distance on the line of natural flow, L = 92 m

Time of concentration, $t_c = 0.14465L / (H^{0.2}A^{0.1}) = 0.14465 (92) / (23^{0.2} \times 5120^{0.1})$
 = 3.0 min

Ref.

SDM 7.5.2 (d)

2 For Proposed U-Channel in catchment area C

	From	To
Ground level (mPD)	11.00	10.90
Invert level (mPD)	9.73	9.53

Width of u-channel, w = 500 mm
 Length of u-channel, L_c = 41 m
 Depth of vertical part of u-channel, d = 1125 mm
 Gradient of u-channel, S_f = (9.73-9.53)/41 = 0.005

Cross-Section Area, a = $0.5 \pi r^2 + w d = 0.5 \times 3.14 \times 250^2 + 500 \times 1125$
 = 0.661 m²
 Wetted Perimeter, p = $\pi r + 2 d = 3.14 \times 250 + 2 \times 1125$
 = 3.035 m
 Hydraulic radius, R = a / p
 = 0.218 m

SDM 8.2.1

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:-
 Allowable velocity, v = $R^{1/6} \times (RS_f)^{1/2} / n = (0.218)^{1/6} \times (0.218 \times 0.005)^{1/2} / 0.016$
 = 1.60 m/s
 Time of flow, t_f = 0.4 min

SDM Table 13
 SDM Table 12

4 Use "Rational Method" for calculation of design flow

Design intensity, i = $a / (t_c + t_f + b)^c$
 = $474.6 / (3+0.4+2.9)^{0.42}$ for return period T = 50 years
 = 292

SDM 4.3.2
 SDM Table 3(d)

Type of surface	Runoff Coefficient C	Catchment Area A (m ²)	C x A
Steep Grassland (heavy soil)	0.35	3569.0	1249.2
Concrete Paving	0.95	1551.0	1473.5
			SUM = 2722.6

SDM 7.5.2 (b)

Upstream flow, Q_u = 0.675 m³/s

Design flow, Q_d = $0.278i \sum C_j A_j + Q_u$ where A_j is in km²
 = $0.278 \times 292 \times 2722.6 / 1000000 + 0.675$
 = 0.896 m³/s

SDM 7.5.2 (a)

Allowable flow, Q_a = a x v
 = 0.661 x 1.6
 = 1.056 m³/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

Scale: NA

Drainage Calculation

Goldrich Planners &
 Surveyors Ltd.

June 2024

Lots 1046, 1047 S.A, 1047 R.P., 1049 S.A, 1049 S.B RP (Part),
 1049 RP (Part) and 1054 in D.D. 109, Kam Tin, Yuen Long

Page 3
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1 For Catchment Area D

Area, A = 7040 m²
 Average slope, H = 18.8 m per 100m
 Distance on the line of natural flow, L = 110 m

Time of concentration, $t_c = 0.14465L / (H^{0.2}A^{0.1}) = 0.14465 (110) / (18.8^{0.2} \times 7040^{0.1})$
 = 3.6 min

Ref.

SDM 7.5.2 (d)

2 For Proposed U-Channel in catchment area D

	From	To
Ground level (mPD)	10.90	10.90
Invert level (mPD)	9.53	9.20

Width of u-channel, w = 500 mm
 Length of u-channel, L_c = 70 m
 Depth of vertical part of u-channel, d = 1450 mm
 Gradient of u-channel, S_f = (9.53-9.2)/70 = 0.005

Cross-Section Area, a = $0.5 \pi r^2 + w d = 0.5 \times 3.14 \times 250^2 + 500 \times 1450$
 = 0.823 m²
 Wetted Perimeter, p = $\pi r + 2 d = 3.14 \times 250 + 2 \times 1450$
 = 3.685 m
 Hydraulic radius, R = a / p
 = 0.223 m

SDM 8.2.1

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:-
 Allowable velocity, v = $R^{1/6} \times (RS_f)^{1/2} / n = (0.223)^{1/6} \times (0.223 \times 0.005)^{1/2} / 0.016$
 = 1.58 m/s
 Time of flow, t_f = 0.7 min

SDM Table 13
 SDM Table 12

4 Use "Rational Method" for calculation of design flow

Design intensity, i = $a / (t_c + t_f + b)^c$
 = $474.6 / (3.6 + 0.7 + 2.9)^{0.4}$ for return period T = 50 years
 = 278

SDM 4.3.2
 SDM Table 3(d)

Type of surface	Runoff Coefficient C	Catchment Area A (m ²)	C x A
Steep Grassland (heavy soil)	0.35	3390.0	1186.5
Concrete Paving	0.95	3650.0	3467.5
			SUM = 4654.0

SDM 7.5.2 (b)

Upstream flow, Q_u = 0.896 m³/s

Design flow, Q_d = $0.278i \sum C_j A_j + Q_u$ where A_j is in km²
 = $0.278 \times 278 \times 4654 / 1000000 + 0.896$
 = 1.256 m³/s

SDM 7.5.2 (a)

Allowable flow, Q_a = a x v
 = 0.823 x 1.58
 = 1.300 m³/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

Scale: NA

Drainage Calculation

Goldrich Planners &
 Surveyors Ltd.

June 2024

Lots 1046, 1047 S.A, 1047 R.P., 1049 S.A, 1049 S.B RP (Part),
 1049 RP (Part) and 1054 in D.D. 109, Kam Tin, Yuen Long

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1 For Catchment Area E

Area, A = 1856 m²
 Average slope, H = 2.28 m per 100m
 Distance on the line of natural flow, L = 69 m

Time of concentration, $t_o = 0.14465L / (H^{0.2}A^{0.1}) = 0.14465 (69) / (2.28^{0.2} \times 1856^{0.1})$
 = 4.0 min

SDM 7.5.2 (d)

2 For Proposed U-Channel in catchment area E

	From	To
Ground level (mPD)	10.90	10.90
Invert level (mPD)	9.20	9.01

Width of u-channel, w = 500 mm
 Length of u-channel, L_c = 35 m
 Depth of vertical part of u-channel, d = 1645 mm
 Gradient of u-channel, S_f = (9.2-9.01)/35 = 0.006

Cross-Section Area, a = $0.5 \pi r^2 + w d = 0.5 \times 3.14 \times 250^2 + 500 \times 1645$
 = 0.921 m²

Wetted Perimeter, p = $\pi r + 2 d = 3.14 \times 250 + 2 \times 1645$
 = 4.075 m

Hydraulic radius, R = a / p
 = 0.226 m

SDM 8.2.1

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:-
 Allowable velocity, v = $R^{1/6} \times (RS_f)^{1/2} / n = (0.226)^{1/6} \times (0.226 \times 0.006)^{1/2} / 0.016$
 = 1.73 m/s
 Time of flow, t_f = 0.3 min

SDM Table 13
 SDM Table 12

4 Use "Rational Method" for calculation of design flow

Design intensity, i = $a / (t_o + t_f + b)^c$
 = $474.6 / (4 + 0.3 + 2.9)^{0.42}$ for return period T = 50 years
 = 279

SDM 4.3.2
 SDM Table 3(d)

Type of surface	Runoff Coefficient C	Catchment Area A (m ²)	C x A
Steep Grassland (heavy soil)	0.35	0.0	0.0
Concrete Paving	0.95	1856.0	1763.2
			SUM = 1763.2

SDM 7.5.2 (b)

Upstream flow, Q_u = 1.256 m³/s

Design flow, Q_d = $0.278i \sum C_j A_j + Q_u$ where A_j is in km²
 = $0.278 \times 279 \times 1763.2 / 1000000 + 1.256$
 = 1.393 m³/s

SDM 7.5.2 (a)

Allowable flow, Q_a = a x v
 = 0.921 x 1.73
 = 1.593 m³/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

Scale: NA

Drainage Calculation

Goldrich Planners &
 Surveyors Ltd.

June 2024

Lots 1046, 1047 S.A, 1047 R.P., 1049 S.A, 1049 S.B RP (Part),
 1049 RP (Part) and 1054 in D.D. 109, Kam Tin, Yuen Long

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1 For Catchment Area F

Area, A = 1823 m²
 Average slope, H = 0.1 m per 100m
 Distance on the line of natural flow, L = 27 m

Time of concentration, $t_c = 0.14465L / (H^{0.2}A^{0.1})$; = 0.14465 (27) / (0.1^{0.2}*1823^{0.1})
 = 2.9 min

Ref.

SDM 7.5.2 (d)

2 For Proposed U-Channel in catchment area F

	From	To
Ground level (mPD)	11.00	11.00
Invert level (mPD)	10.55	10.05

Width of u-channel, w = 300 mm
 Length of u-channel, L_c = 95 m
 Depth of vertical part of u-channel, d = 800 mm
 Gradient of u-channel, S_f = (1.55-10.05)/95 = 0.005

Cross-Section Area, a = $0.5 \pi r^2 + w d$ = 0.5 x 3.14 x 150² + 300 x 800
 = 0.275 m²
 Wetted Perimeter, p = $\pi r + 2 d$ = 3.14 x 150 + 2 x 800
 = 2.071 m
 Hydraulic radius, R = a / p
 = 0.133 m

SDM 8.2.1

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:-
 Allowable velocity, v = $R^{1/6} \times (RS_f)^{1/2} / n$ = (0.133)^{1/6} x (0.133 x 0.005)^{1/2} / 0.016
 = 1.18 m/s
 Time of flow, t_f = 1.3 min

SDM Table 13
 SDM Table 12

4 Use "Rational Method" for calculation of design flow

Design intensity, i = $a / (t_c + t_f + b)^c$
 = 474.6 / (2.9+1.3+2.9)^{0.4} for return period T = 50 years
 = 280

SDM 4.3.2
 SDM Table 3(d)

Type of surface	Runoff Coefficient C	Catchment Area A (m ²)	C x A
Steep Grassland (heavy soil)	0.35	0.0	0.0
Concrete Paving	0.95	1823.0	1731.9
			SUM = 1731.9

SDM 7.5.2 (b)

Upstream flow, Q_u = 0 m³/s

Design flow, Q_d = 0.278i Σ C_fA_j + Q_u where A_j is in km²
 = 0.278 x 280 x 1731.85 / 1000000 + 0
 = 0.135 m³/s

SDM 7.5.2 (a)

Allowable flow, Q_a = a x v
 = 0.275 x 1.18
 = 0.325 m³/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

Scale: NA

Drainage Calculation

Goldrich Planners &
 Surveyors Ltd.

June 2024

Lots 1046, 1047 S.A, 1047 R.P., 1049 S.A, 1049 S.B RP (Part),
 1049 RP (Part) and 1054 in D.D. 109, Kam Tin, Yuen Long

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1 For Catchment Area G

Area, A = 1203 m²
 Average slope, H = 0.1 m per 100m
 Distance on the line of natural flow, L = 23 m

Time of concentration, $t_c = 0.14465L / (H^{0.2}A^{0.1})$; = 0.14465 (23) / (0.1^{0.2}*1203^{0.1})
 = 2.6 min

Ref.

SDM 7.5.2 (d)

2 For Proposed U-Channel in catchment area G

	From	To
Ground level (mPD)	11.00	11.00
Invert level (mPD)	10.05	9.63

Width of u-channel, w = 300 mm
 Length of u-channel, L_c = 83 m
 Depth of vertical part of u-channel, d = 1220 mm
 Gradient of u-channel, S_f = (10.05-9.63)/83 = 0.005

Cross-Section Area, a = $0.5 \pi r^2 + w d$ = 0.5 x 3.14 x 150² + 300 x 1220
 = 0.401 m²
 Wetted Perimeter, p = $\pi r + 2 d$ = 3.14 x 150 + 2 x 1220
 = 2.911 m
 Hydraulic radius, R = a / p
 = 0.138 m

SDM 8.2.1

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:-
 Allowable velocity, v = $R^{1/6} \times (RS_f)^{1/2} / n$ = (0.138)^{1/6} x (0.138 x 0.005)^{1/2} / 0.016
 = 1.18 m/s
 Time of flow, t_f = 1.2 min

SDM Table 13
 SDM Table 12

4 Use "Rational Method" for calculation of design flow

Design intensity, i = $a / (t_c + t_f + b)^c$
 = 474.6 / (2.6+1.2+2.9)^{0.4} for return period T = 50 years
 = 287

SDM 4.3.2
 SDM Table 3(d)

Type of surface	Runoff Coefficient C	Catchment Area A (m ²)	C x A
Steep Grassland (heavy soil)	0.35	0.0	0.0
Concrete Paving	0.95	1203.0	1142.9
			SUM = 1142.9

SDM 7.5.2 (b)

Upstream flow, Q_u = 0.135 m³/s

Design flow, Q_d = 0.278i Σ C_fA_j + Q_u where A_j is in km²
 = 0.278 x 287 x 1142.85 / 1000000 + 0.135
 = 0.226 m³/s

SDM 7.5.2 (a)

Allowable flow, Q_a = a x v
 = 0.401 x 1.18
 = 0.473 m³/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

Scale: NA

Drainage Calculation

Goldrich Planners &
 Surveyors Ltd.

June 2024

Lots 1046, 1047 S.A, 1047 R.P., 1049 S.A, 1049 S.B RP (Part),
 1049 RP (Part) and 1054 in D.D. 109, Kam Tin, Yuen Long

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1 For Catchment Area F

Area, A = 2223 m²
 Average slope, H = 0.1 m per 100m
 Distance on the line of natural flow, L = 22 m

Time of concentration, $t_c = 0.14465L / (H^{0.2}A^{0.1})$; = 0.14465 (22) / (0.1^{0.2}*2223^{0.1})
 = 2.3 min

Ref.

SDM 7.5.2 (d)

2 For Proposed U-Channel in catchment area F

	From	To
Ground level (mPD)	11.00	10.90
Invert level (mPD)	9.63	9.01

Width of u-channel, w = 300 mm
 Length of u-channel, L_c = 123 m
 Depth of vertical part of u-channel, d = 1740 mm
 Gradient of u-channel, S_f = (9.63-9.01)/123 = 0.005

Cross-Section Area, a = $0.5 \pi r^2 + w d$ = 0.5 x 3.14 x 150² + 300 x 1740
 = 0.557 m²
 Wetted Perimeter, p = $\pi r + 2 d$ = 3.14 x 150 + 2 x 1740
 = 3.951 m
 Hydraulic radius, R = a / p
 = 0.141 m

SDM 8.2.1

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:-
 Allowable velocity, v = $R^{1/6} \times (RS_f)^{1/2} / n$ = (0.141)^{1/6} x (0.141 x 0.005)^{1/2} / 0.016
 = 1.20 m/s
 Time of flow, t_f = 1.7 min

SDM Table 13
 SDM Table 12

4 Use "Rational Method" for calculation of design flow

Design intensity, i = $a / (t_c + t_f + b)^c$
 = 474.6 / (2.3+1.7+2.9)^{0.4} for return period T = 50 years
 = 283

SDM 4.3.2
 SDM Table 3(d)

Type of surface	Runoff Coefficient C	Catchment Area A (m ²)	C x A
Steep Grassland (heavy soil)	0.35	0.0	0.0
Concrete Paving	0.95	2223.0	2111.9
			SUM = 2111.9

SDM 7.5.2 (b)

Upstream flow, Q_u = 0.226 m³/s

Design flow, Q_d = 0.278i Σ C_fA_j + Q_u where A_j is in km²
 = 0.278 x 283 x 2111.85 / 1000000 + 0.226
 = 0.392 m³/s

SDM 7.5.2 (a)

Allowable flow, Q_a = a x v
 = 0.557 x 1.2
 = 0.667 m³/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

Scale: NA

Drainage Calculation

Goldrich Planners &
 Surveyors Ltd.

June 2024

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1 For Connection between CP12 and Existing Culvert

Area, A = 0 m²
 Average slope, H = 0.1 m per 100m
 Distance on the line of natural flow, L = 0 m

Time of concentration, t_o = 0.14465L / (H^{0.2}A^{0.1}) = 0.14465 (0) / (0.1^{0.2}*0^{0.1})
 = 0.0 min

Ref.

SDM 7.5.2 (d)

2 For Proposed U-Channel between CP12 and Existing Culvert

	From	To
Ground level (mPD)	10.90	10.40
Invert level (mPD)	9.01	8.86

Width of u-channel, w = 700 mm
 Length of u-channel, L_c = 30 m
 Depth of vertical part of u-channel, d = 1190 mm
 Gradient of u-channel, S_f = (9.01-8.86)/30 = 0.005

Cross-Section Area, a = 0.5 π r² + w d = 0.5 x 3.14 x 350² + 700 x 1190
 = 1.025 m²
 Wetted Perimeter, p = π r + 2 d = 3.14 x 350 + 2 x 1190
 = 3.480 m
 Hydraulic radius, R = a / p
 = 0.295 m

SDM 8.2.1

3 Use Manning Equation for estimating velocity of stormwater

Take n = 0.016 for concrete lined channels:-
 Allowable velocity, v = R^{1/6} x (RS_f)^{1/2} / n = (0.295)^{1/6} x (0.295 x 0.005)^{1/2} / 0.016
 = 1.96 m/s
 Time of flow, t_f = 0.26 min

SDM Table 13
 SDM Table 12

4 Use "Rational Method" for calculation of design flow

Design intensity, i = a / (t_o + t_f + b)^c
 = 687 / (0+0.26+4.2)^{0.42} for return period T = 50 years
 = 367

SDM 4.3.2
 SDM Table 3(d)

Type of surface	Runoff Coefficient C	Catchment Area A (m ²)	C x A
Steep Grassland (heavy soil)	0.25	0.0	0.0
Concrete Paving	0.95	0.0	0.0
SUM =			0.0

SDM 7.5.2 (b)

Upstream flow, Q_u = 1.785 m³/s

Design flow, Q_d = 0.278i Σ C_jA_j + Q_u where A_j is in km²
 = 0.278 x 367 x 0 / 1000000 + 1.785
 = 1.785 m³/s

SDM 7.5.2 (a)

Allowable flow, Q_a = a x v
 = 1.025 x 1.96
 = 2.007 m³/s

> Q_d (O.K.)

Reference was made to Stormwater Drainage Manual (SDM) by DSD

Scale: NA

Drainage Calculation

Goldrich Planners &
 Surveyors Ltd.

June 2024

Lots 1046, 1047 S.A., 1047 R.P., 1049 S.A., 1049 S.B RP (Part),
 1049 RP (Part) and 1054 in D.D. 109, Kam Tin, Yuen Long

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