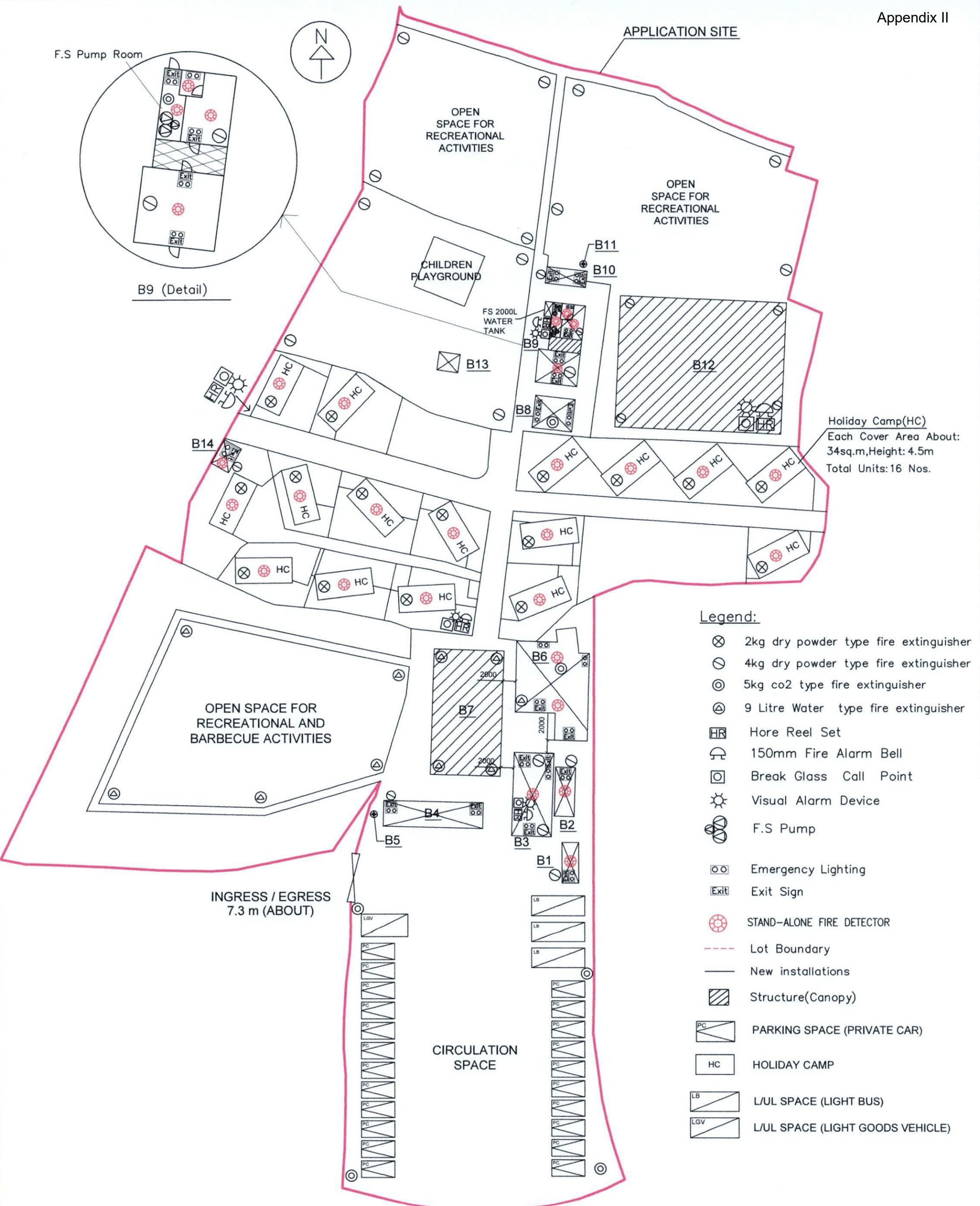


Appendix I - Comparison of Details Between the Current and Previous Application

Development Parameters	Previous Application (No. A/YL-KTN/1044) (a)	Current Application (b)	Differences (b) - (a)
Site Area	7,369 m ² (about)	11,456 m ² (about)	+4,087 m ² , (+55.5 %) (about)
Covered Area	1,849 m ² (about) (1,305 m ² for structures + 544 m ² for holiday camp)	1,704 m ² (about) (1,160 m ² for structures + 544 m ² for holiday camp)	-145 m ² , (-7.8 %) (about)
Uncovered Area	5,520 m ² (about)	9,752 m ² (about)	+4,232 m ² , (+76.7 %) (about)
PR	0.25 (about)	0.15 (about)	-0.1, (-40.0 %) (about)
Site Coverage	25 % (about)	15 % (about)	-10 %, (-40.0 %) (about)
No of Structure	14 (structures) + 16 (holiday camps)	14 (structures) + 16 (holiday camps)	-
GFA	1,849 m ² (about) (1,305 m ² for structures + 544 m ² for holiday camp)	1,704 m ² (about) (1,160 m ² for structures + 544 m ² for holiday camps)	-145 m ² , (-7.8 %) (about)
Building Height	2.4 m - 8 m (about)	1.9 m - 8 m (about)	-0.5 m ² , (-20.8 %) (about) (lowest building height)
No. of Storey	1	1	-
Parking Space for Private Cars	20	22	+2, (+10 %) (about)
Loading/Unloading (L/UL) Space for Light Goods Vehicles	1	1	-
L/UL Space for Light Bus	1	3	+2, (+200 %) (about)
Operation Hours	Mondays to Sundays 07:00 - 22:00 (Except for overnight)	Mondays to Sundays 07:00 - 22:00 (Except for overnight)	-

	holiday camping activities)	holiday camping activities)	
--	-----------------------------	-----------------------------	--



INTERCEPT FIRE & SECURITY
TECHNICIANS LIMITED

Project:
Proposed Temporary Holiday Camp,
Place of Recreation Sports or
Culture.Barbecue Site and Eating
Place With Ancillary Facilities for a
period of 3 years and Associated
Filling Land At Various Lots in
D.D.107 and D.D109,Fung Kat Heung,
Kam Tin,Yuen Long

Title:
Proposed Fire Service
Installation Layout Plan

Drawn by:	W.C.WONG
Date:	2026-05-25
Scale:	1: 500@ A3
Ref No:	A/YL-KTN/
Drawing No:	2026-33-1/2P

Fire Notes:

- Existing Sufficient emergency lighting be provided throughout the entire building in accordance with BS5266-1:2016 and BS EN 1838:2013 and the FSD Circular Letter no.4/2021.
 - Existing Sufficient directional and exit sign be provided in accordance with BS 5266-1:2016 and FSD Circulars letter No 5/2008.
 - Sufficient portable hand-operated approved appliance shall be provided as required by occupancy and as marked on plans.
 - Existing A hose reel system should be provided in accordance with the FSI Cop 2022. The hose reel system be supplied by a 2.0m³ F.S Water tank. There be sufficient hose reel to ensure that every part of each building can be reached by a length of not more than 30m of hose reel tubing. The F.S water tank, F.S pump room and hose reel be clearly marked on plans.
 - Existing Fire alarm system be provided throughout the entire building in accordance with BS 5839-1:2017 and the FSD Circular Letter 6/2021 . One actuation point and one audio warning device to be located at each hose reel point. The actuation point include facilities for fire pump start and audio/Visual warning device initiation.
 - Existing Hose Reel pump(HR-P1,HR-P2&HR-JP) and 1.no 5kg co2 type fire extinguisher be provided at F.S pump Room.
 - Source of secondary power supply for FSI be provided.
 - Sufficient Stand-alone Fire Detector shall be provided for each enclosed structure . The Stand-alone Fire Detector shall be provided in accordance with the "Stand-alone Fire Detector General Guidelines on Purchase,Installation & Maintenance [Sep 2021]".
- where two or more Stand-alone Fire Detectors are installed in an enclosed structure, all Stand-alone Fire Detectors shall be interconnected(either wired or wirelessly) such that when one of the Stand-alone Fire Detector triggered,all connected Stand-alone Detectors shall sound an alarm simultaneously.

STRUCTURE	USE	STOREY	BUILDING HEIGHT	GFA(ABOUT)
B1	STORE ROOM	1	3.0m	20sq.m
B2	STORE ROOM	1	3.0m	23sq.m
B3	RECEPTION&OFFICE	1	3.5m	80sq.m
B4	WASHROOM	1	3.2m	40sq.m
B5	WATER TANK	1	3.0m	2.0sq.m
B6	EATING PLACE	1	4.8m	145sq.m
B7	RAIN SHELTER FOR BARBECUE ACTIVITIES	1	4.0m	200sq.m
B8	KITCHEN	1	3.0m	30sq.m
B9	F.S PUMP ROOM F.S WATER TANK AND EATING PLACE	1	4.0m	76sq.m
B10	WASHROOM	1	3.1m	19sq.m
B11	WATER TANK	1	1.9m	1.0sq.m
B12	RAIN SHELTER FOR RECREATIONAL SPORTS OR CULTURAL ACTIVITIES	1	8.0m	500sq.m
B13	WINDMILL(DECORATION)	1	5.0m	9sq.m
B14	STORE ROOM	1	2.4m	15sq.m

INTERCEPT FIRE & SECURITY
TECHNICIANS LIMITED

Project:
Proposed Temporary Holiday Camp,
Place of Recreation Sports or
Culture.Barbecue Site and Eating
Place With Ancillary Facilities for a
period of 3 years and Associated
Filling Land At Various Lots in
D.D.107 and D.D109,Fung Kat Heung,
Kam Tin,Yuen Long

Title:
Proposed Fire Service
Installation Layout Plan

Drawn by:
Date:
Scale:

W.C.WONG
2026-05-25
NO Scale @ A3

Ref No:
Drawing No:

A/YL-KTN/
2026-33-2/2P

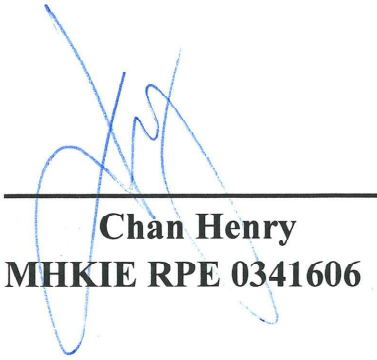
Our Ref: 31126

**TEMPORARY PLACE OF RECREATION, SPORTS OR
CULTURE, BARBECUE SITE AND EATING PLACE**

**LOTS 1775 RP, 1785 RP, 1786, 1787 S.B, 1787, 1790 RP IN D.D 107
AND LOTS 21(PART), 22(PART), 28(PART) IN DD109
FUNG KAT HENUNG KAM TIN, YUEN LONG
(Application No. A/YL-KTN/1044)**

DRAINAGE IMPACT ASSESSMENT

MAY 2026



**Chan Henry
MHKIE RPE 0341606**

Henry Chan & Partners Consultant Engineering Limited

CONTENTS

1. SYNOPSIS
2. INTRODUCTION
3. SITE DESCRIPTION
4. EXISTING STORMWATER DRAINAGE SYSTEM OF THE APPLICATION SITE
5. CONCLUSIONS AND RECOMMENDATION

- Appendix A Response to Comments (R to C) Table (DSD) for Dec 2025 Report
- Appendix B The Application Site Location Plan
- Appendix C The Application Site with Lots No.
- Appendix D Topographic Survey Records of Existing 300 UC
- Appendix E Constructed 275 UC Layout Plan
- Appendix F Estimated Pond Capacity abstract from December 2025
- Appendix G Estimation of Existing Pond Retention Time under existing condition
- (i) Existing Catchment for Pond
 - (ii) Estimated on Existing Pond Retention Time
- Appendix H Estimated Pond Retention Time under this Application
- Figure 1 to Figure 7
- Appendix I Channel Design
- Figure 8 Typical Details

1. Synopsis

The drainage proposal for Temporary Place of Recreation, Sports or Culture, Barbecue Site and Eating place with Ancillary Facilities at lots 1786, 1787 S.B , 1787 S.B., 1787 RP in D.D 107 and lots 21(part), 22(part), 28(part) in DD109 which prepared by Wings & Associates Consulting Engineers Ltd (W&A) and submitted by R-Riches Property Consultants Ltd on 5 December 2025. The drainage proposal was rejected by Planning Department on 9 April 2026.

Subsequently, Lots 1775 RP, 1785 RP and 1790 RP in DD are included in the Application Site, hence, the Application Site area is larger than that in April 2026 submission. In May 2026, Henry Chan & Partners Consultant Engineering Ltd is engaged to carry out drainage impact assessment (DIA) to this revised Application Site Layout Plan in Appendix B & C (with Lots No.).

This DIA has been prepared taking into account the enlarged site boundary, and in response to the comments given by the Drainage Services Department (DSD) on 9 April 2026. (R to C table in Appendix A refers)

2. Introduction

The Applicant is operating a venue for day camping, barbecue site and recreational activities at Lots 1786, 1787 S.B & 1787 RP in DD107, subject of a previous application (Ref. No. A/TL-KTN/693) approved on 10 February 2022. The extent of this day camp area is shown on the plan attached in Appendix E. This Application Site further extend the camping area for temporary storage, reception of facility and car park. Hence, Lots 1775 RP, 1785 RP 1790RP in DD107, Lots 22(Part), 28(Part) in DD109 are included in this Application.

This DIA Report presents the impact of proposed additional drains due to the proposed extension of recreation, sports or culture, barbecue site, and eating place with ancillary facilities on the private lots. This Report is reference to SDM Corrigendum Nos. 1/2022 and 1/2024, and DSD's comments offered on W&A drainage proposal report in December 2025.

3. Site Description

The Application Site is located at Fung Kat Heung, Kam Tin, Yuen Long. An unnamed road to the west that serves as the vehicle access to San Tam Road. There is a steep descent and a ponding area at Lot 21 in D.D. 109, which is used for collecting stormwater.

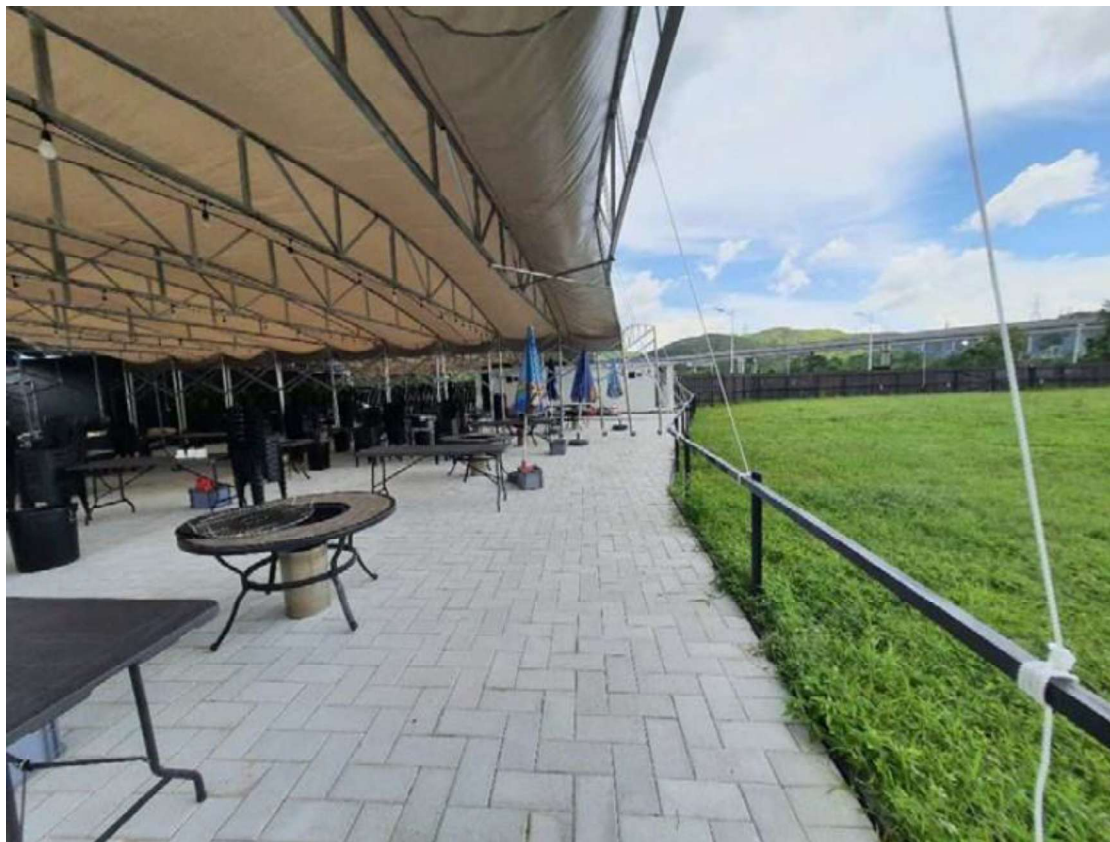


Site Lot Plan

The lot covers an area of about 2685m² with wooden fence wall which will not block the surface runoff in or out the Site. Approximately 3930m² of the plan area (34% of total catchment area) is covered by structures or paved by concrete. Additionally, there is about 1657m² of plan area (8% of total catchment area) consists of a pond. General views of the Application Site existing conditions are presented as follows:



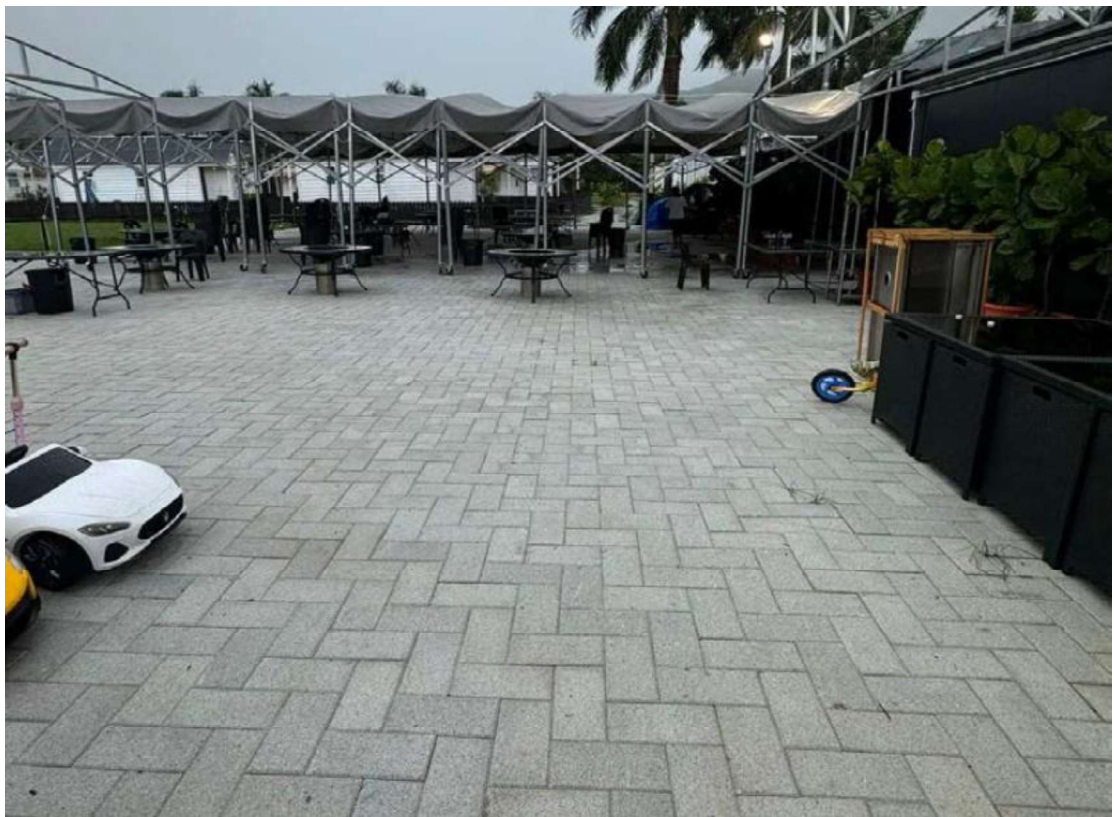
P1 - Fence Wall of Lots No.21, 22 & 28 in DD109



P2 – General view of Lots No.21, 22 & 28 in DD109



P3 –General view of Lots No.21, 22 & 28 in DD109



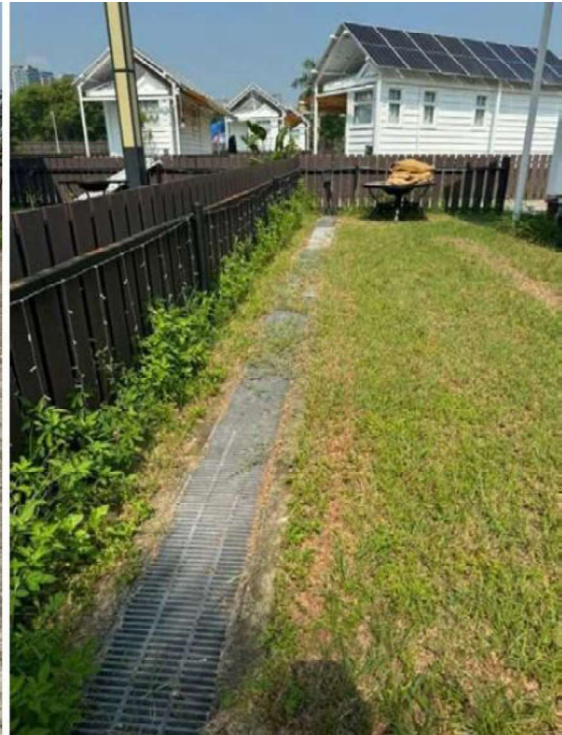
P4 – General view of Lots No.21, 22 & 28 in DD109



P5 - General view of Lots No.21, 22 & 28 in DD109



P6 & P7 Existing Pond at Lot 21 in DD109 for collecting Stormwater



P8 & P9 - General view of Lots No.1786, 1787 S,B & 1787 RP in DD107



P10 & P11 - General view of Lots No.1786, 1787 S,B & 1787 RP in DD107

4. Existing Drainage System of the Application Site And Pond Capacity

- 4.1 As shown on previous topographic survey plan attached in Appendix D, there is an existing constructed 300 UC. The constructed fall directions in this channel are random. There is another set of constructed drainage system for the existing camp site consisting of a 270 UC (Appendix E refers). Both drainage systems serve their respective catchments and discharged into an existing pond. Despite the fact that the 300 UC is expected to be inefficient due to its random fall directions along its flow path, there has been no flooding recorded in the area.
- 4.2 The existing pond capacity retrieved from Dec 2025 Report is attached in Appendix F for reference. The pond capacity based on the GeoInfo Map and the topographic survey is estimated to be 1370.3 m³.

5. Retention Capacity Of Pond In Lot 21

5.1 Pond retention time for existing condition

(Existing Drainage in Lots 1789, 1787 S.B and 1787 RP in DD107 only)

The existing pond in Lot 21 serves to retain all surface runoff from adjacent areas. The extent of catchment areas is shown in Appendix G.

The hydraulic calculation and design of the u-channel refer to the Stormwater Manual, SDM Corrigendum No.1/2024 and SDM Corrigendum No.1/2022.

Design Assumption of Hydraulic Calculation:

Runoff Coefficient for Hard Paved area – 0.95

Runoff Coefficient for grass area – 0.25

Return Period – 50 years

Storm Constants (HKO Headquarters)

a = 505.5, b = 3.29, c = 0.355

Design flow: $= 0.77 \text{ m}^3/\text{s}$
Pond Capacity: $= 1370.3 \text{ m}^3$ (From Previous drainage proposal)
Retention time: $= 1370.3 / 0.770 / 60 \approx 34 \text{ mins.}$

5.2 With Proposed Drainage System for the Application Site

As shown in Figure 1 to 7, presently the catchment areas remained unchanged. However, this is due to the proposed additional drainage system for the enlarged site area. Additionally, some areas will be lawn, and gravel covered or hard paved during operation. These additional drain paths and the alternation of surface run-off coefficients will affect the retention time of the Pond. Hence, based on the following design assumptions:

Runoff coefficient for hard paved – 0.95
Runoff coefficient for gravel area – 0.65
Runoff for lawn area – 0.25

Return period and storm constants same as 5.1.

Pond retention time for proposed drainage system

Design flow: $= 0.767 \text{ m}^3/\text{s}$
Pond Capacity: $= 1370.3 \text{ m}^3$ (From previous drainage proposal)
Retention time: $= 1370.3 / 0.767 / 60 \approx 30 \text{ mins.}$

- 5.3 Although the Application Site is larger in plan area, the catchment areas around the Pond in Lot 21 have not actually been altered since there was no proposed earth works or landscaping works that will alter the existing ground profile around the Pond. Only some areas will be hard paved or covered in gravel, within proposed surface channels to intercept the runoff and discharge into the Pond.

Therefore, based on the Pond retention times estimated under 5.1 & 5.2, the estimated time for the Pond to reach its full capacity under a severe storm period is marginally reduced by only 4 minutes.

6. Conclusion

- 6.1 The existing run-off of the area discharge into an existing Pond located in Lot 21. The area under study neither fall within flood prone areas (such as low-lying areas and flooding blackspots) nor involve pond filling. There has been no report of flooding since the camp site went into operation in 2022.
- 6.2 The increased in site area to cater for the increase facilities to be provided for the BBQ campsite has basically not increased the catchment areas.
- 6.3 Two sets of hydraulic calculations based on existing ground conditions and the proposed alternations under this applications have been carried out to assess the stormwater drainage impact.

The design makes reference to current SDM Corrigendum, together with DSD comments offered under previous application in Dec 2025. The results indicate that the estimated retention time for the Pond to reach its full capacity will only decreased slightly by 4 minutes. Hence, it can be concluded that the stromwater drainage impact under this application is minimal.

- 6.4 Based on detailed channel design under this study, it is recommended that:
 - (i) Existing 270 UC be increased in size to 400UC.
 - (ii) The existing 300 UC, whose flow direction appears improper and inefficient be removed, and a new 325 UC be reconstruct alongside.
 - (iii) Proposed channels be added in the area to ensure efficient run-off into the Pond.

APPENDIX A

Response to Comment Table Based on Comments in
Dec 2025 Report

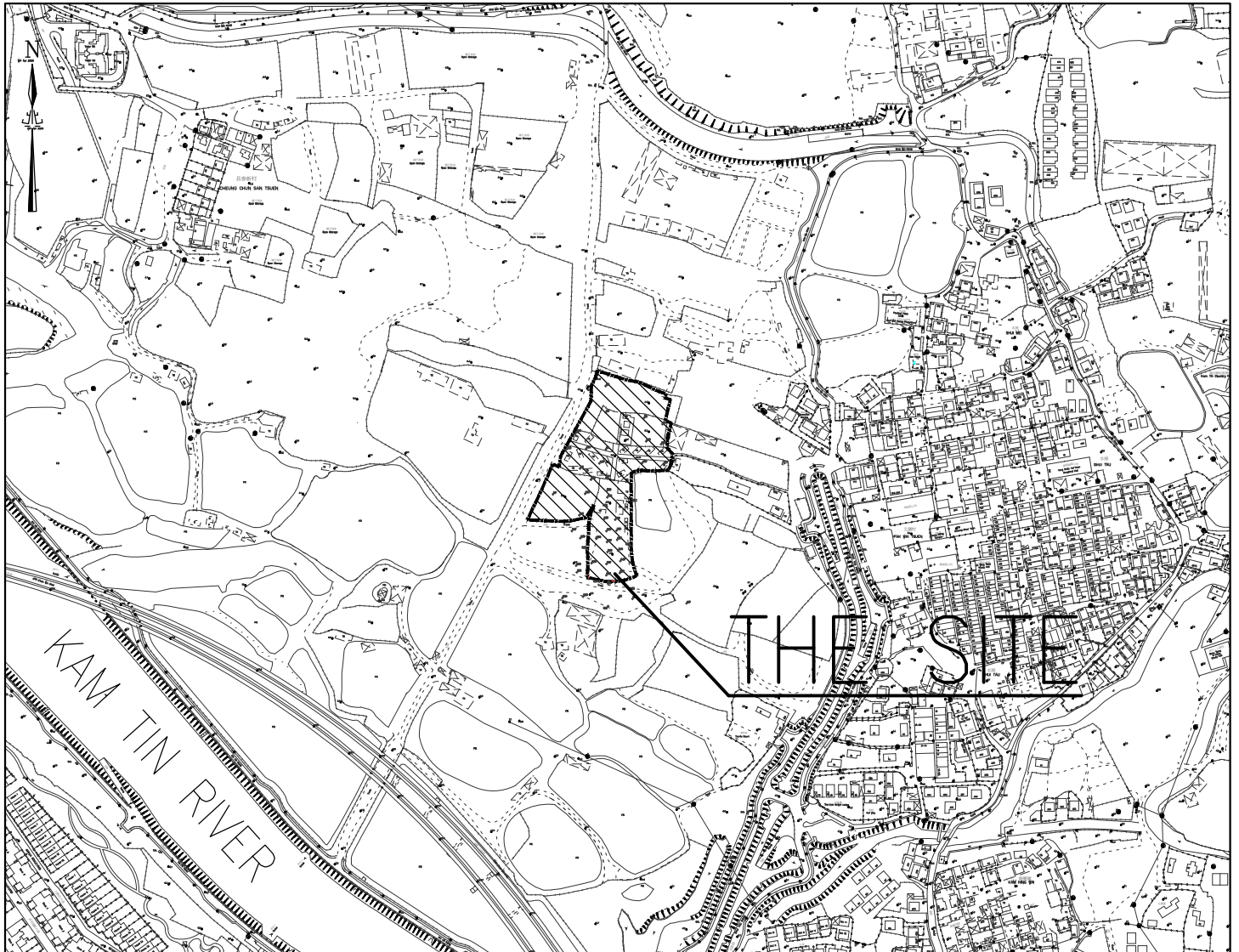
RESPONSE TO COMMENTS for LandsD's Letter dated 9 April 2026

DSD/LD Comment	Response to DSD/LD Comments
(A) Specific Comments	
1 The applicant should indicate the proposed and existing ground levels of the application site and ground levels of adjacent areas on the drainage plan.	Noted. The proposed level, existing ground level and ground levels of adjacent areas are shown in the drainage plan.
2 Peripheral surface channels shall be provided along the site boundary to collect the surface runoff accrued on the application site and to intercept the overland flow from the adjacent lands. It is noted that there is proposed land filling works for the development. Proper surface channels should be provided at the lower level / platform and wall toe to collect the overland flow to/from adjacent areas	Noted. The peripheral surface channel is proposed at the East and South of the Application Site. The adjacent ground at the North and West of the Application Site are incline outward, hence, no peripheral surface channel is proposed. It is confirmed that no land filling works will be carried out.
3 The newly promulgated Stormwater Drainage Manual - Corrigendum shall be considered in the hydraulic calculation. Also, storm constants of Hong Kong Observatory Headquarters instead of North District Area shall be adopted in the hydraulic calculation.	Noted. The hydraulic calculation has been revised according to the latest Corrigendum. The storm constants use data from the Hong Kong Observatory Headquarters in this submission.
4 Section 4: The applicant should review design return period and storm constants.	Noted. Referring to Table 10 of the Stormwater Drainage Manual, the flood levels of the site location should follow the Main Rural Catchment Drainage. Hence, a 50-year return periods is adopted. The storm constants of the Hong Kong Observatory Headquarters are applied in the hydraulic calculation.
5 Drawing (No.: WNG/24168/C/DRA/002) & Appendix B: The applicant should consider catchment area between Catchment 1 and existing pond. Also, the applicant should review catchment area and	Noted. The catchment area is revised to include the area between Catchment 1 and existing pond. The runoff coefficient is revised to following: Hard paved area - 0.95,

runoff coefficient adopted in the submitted hydraulic calculation.	Area covered by gravel – 0.65 & Lawn area – 0.25.
6 Drawings (No.: WNG/24168/C/DRA/001 & WNG/25086/C/DRA/003) & Appendix B: The applicant should clarify size of the proposed surface channel (Branch 3). Also, the applicant should review invert levels of the proposed drainage facilities. Invert levels of drainage facilities at the upstream should be higher than that at the downstream.	Noted. The drawing is revised accordingly.
7 Drawings (No.: WNG/25086/C/DRA/003 & WNG/24168/C/DRA/004): The applicant should clarify discrepancy of size and location of the proposed drainage facilities. Besides, the proposed surface channel (Branch 1) is missing in Section C-C.	Noted. The drawing is revised accordingly.
8 Drawing (No.: WNG/25086/C/DRA/003): The applicant should clarify discharge point of the proposed catchpit C.P.E. The applicant should provide details for the connection of the proposed and existing drainage facilities mentioned in the proposal.	Noted. Further to the revised drawing, the discharge point should be catchpit CP5. The detail for the connection of the proposed and existing drainage is shown on Figure 8.

APPENDIX B

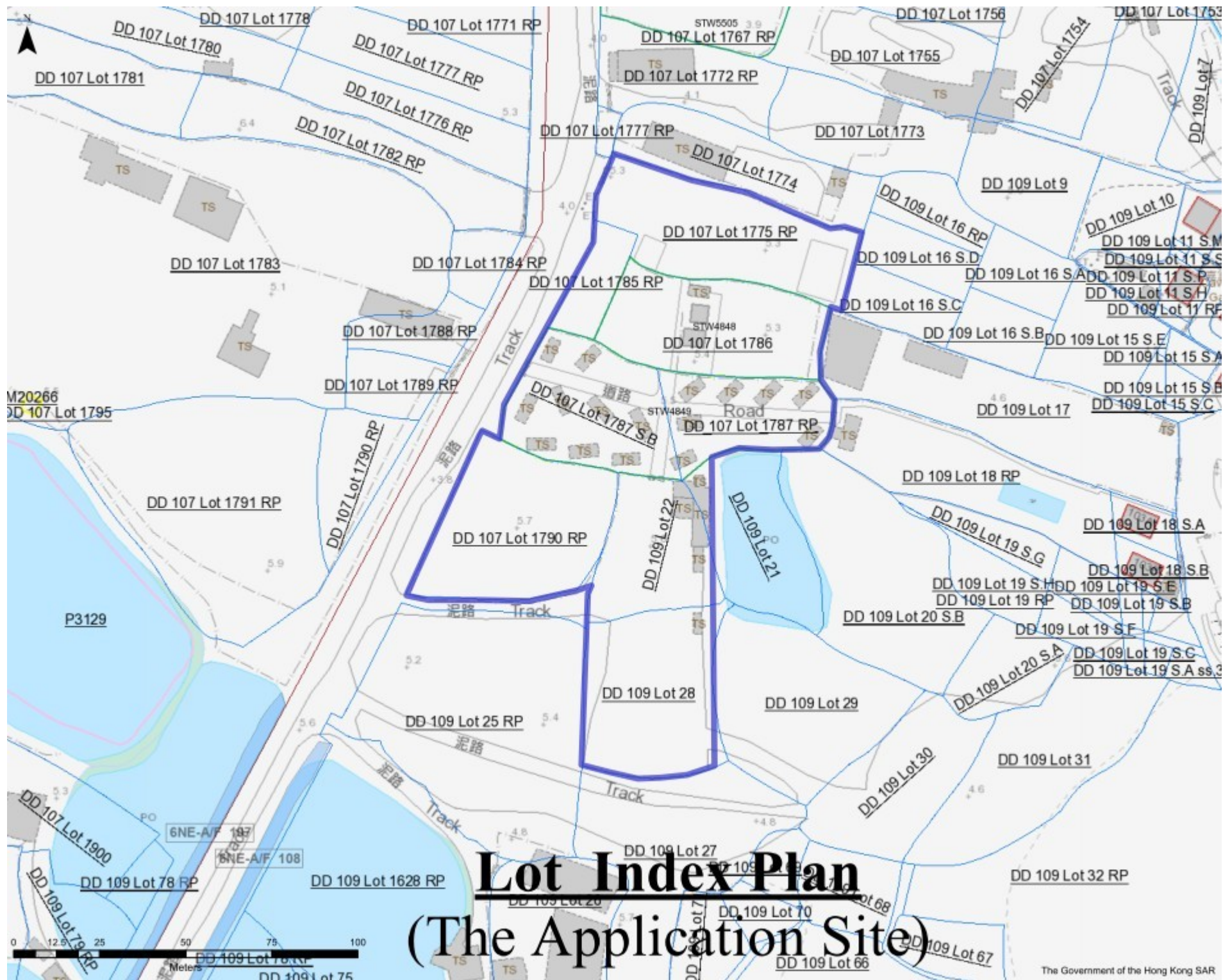
The Application Site Location Plan



SITE LOCATION PLAN

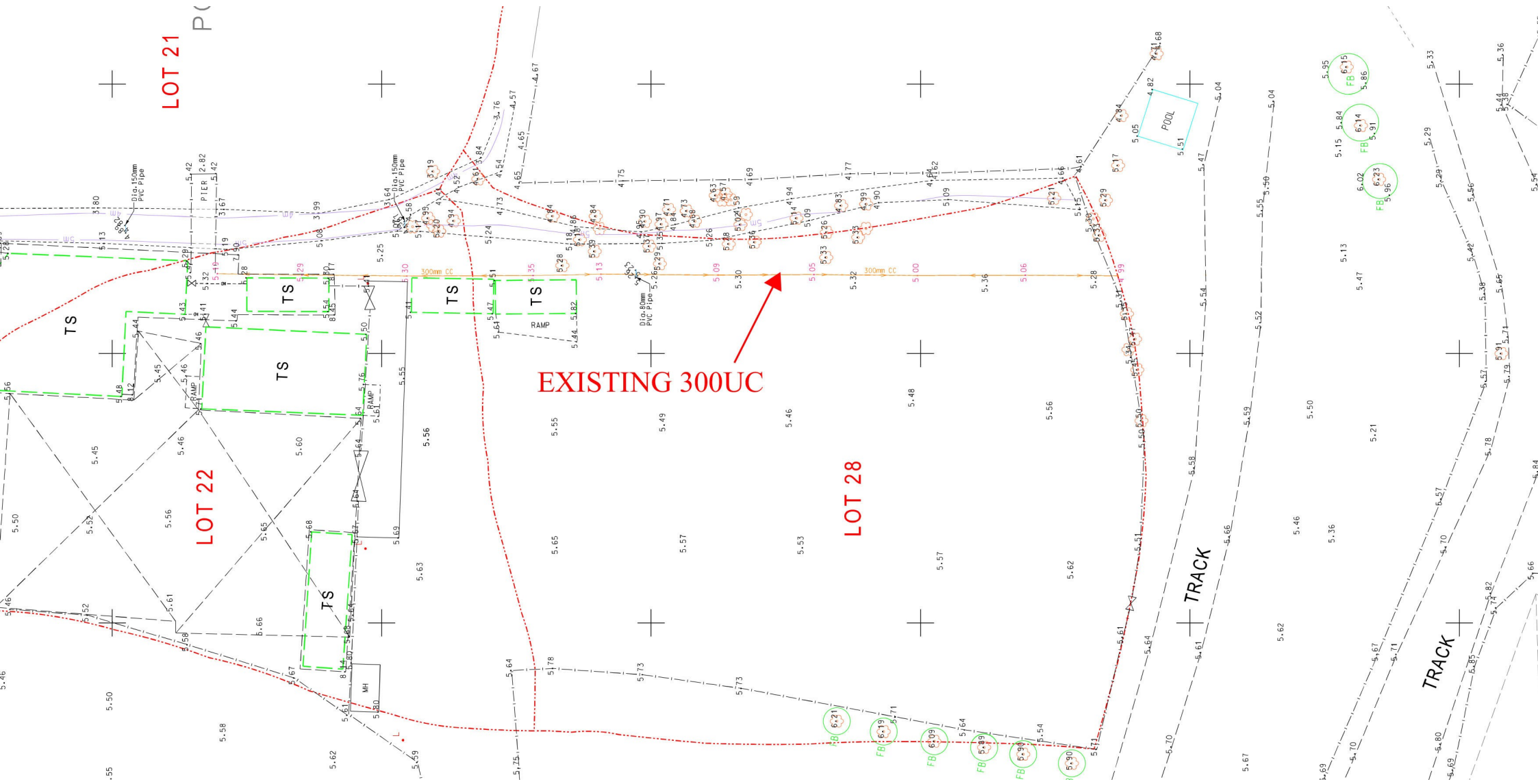
APPENDIX C

The Application Site with Lots No.



APPENDIX D

Topographic Survey Records of Existing 300 UC

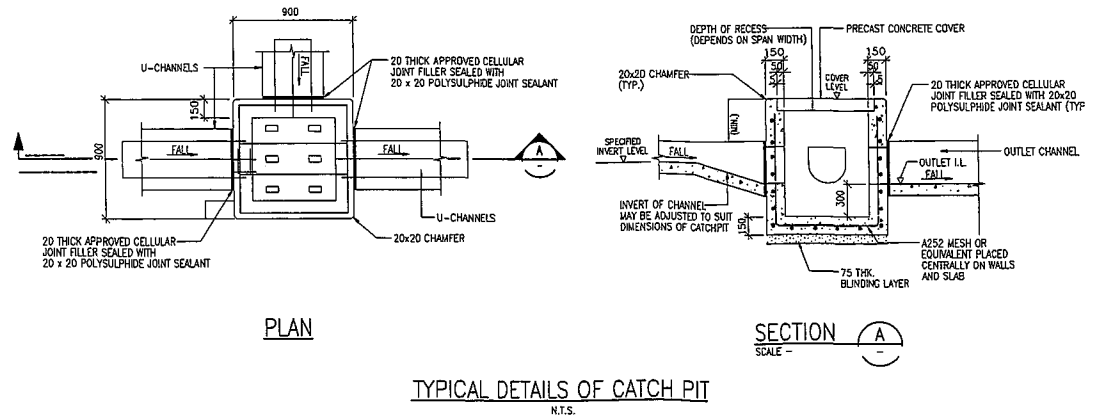
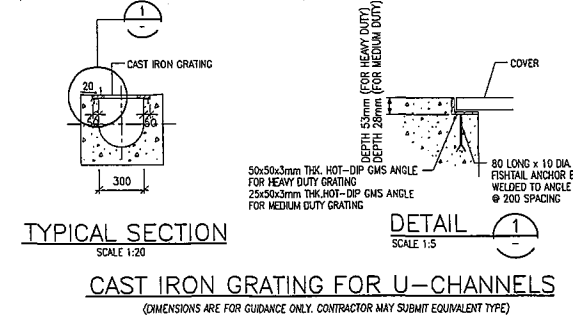
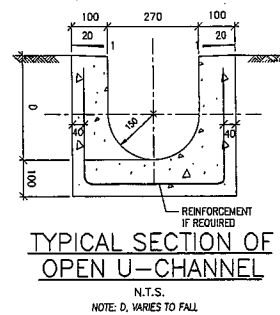
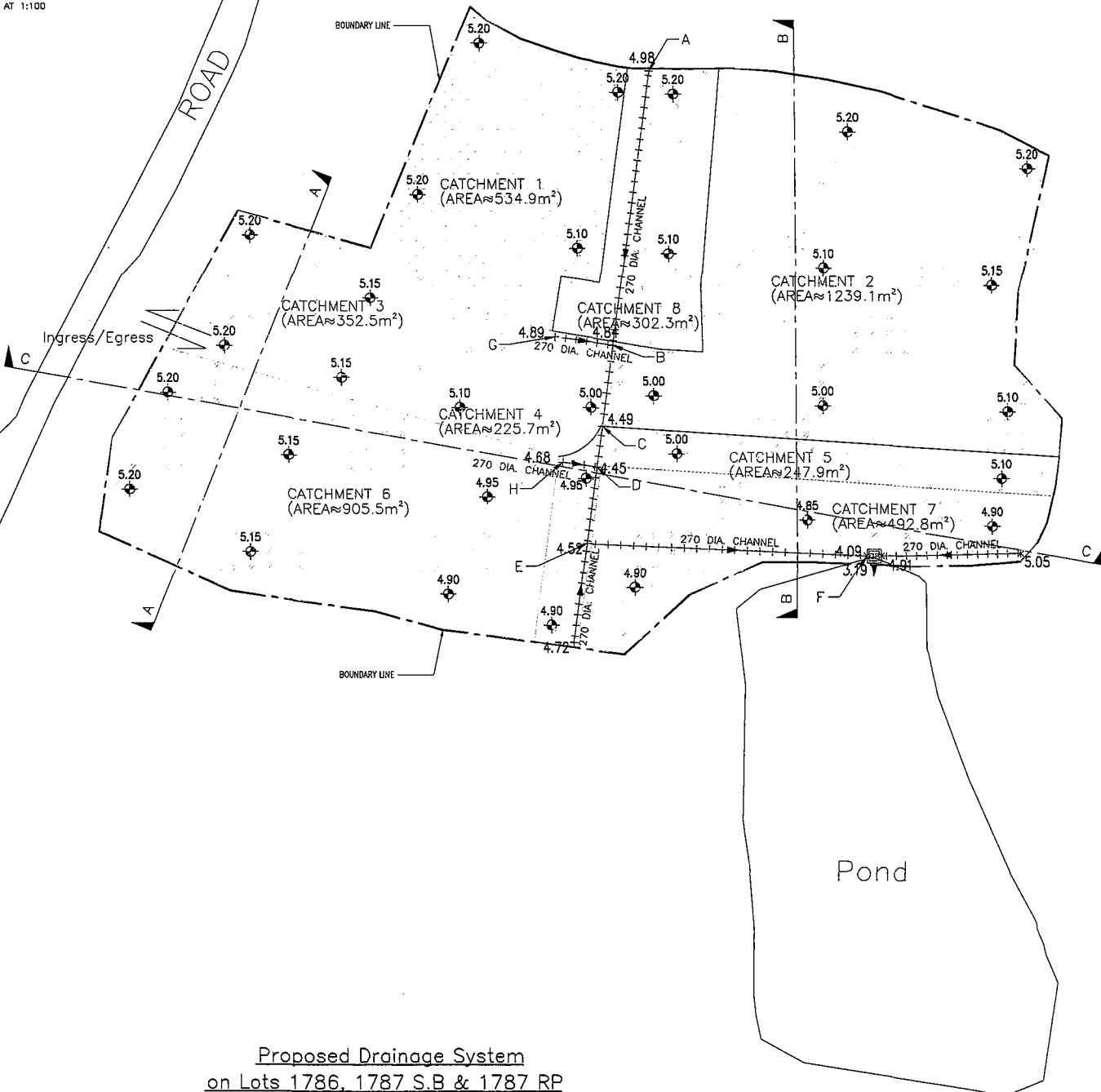


APPENDIX E

Constructed 275UC Layout Plan

- Legend
- Form Area
 - Vehicle Access (Paved Concrete)
 - Footpath (Paved Concrete)
 - Playground (Soil Floor)
 - 5.20 FINISH GROUND LEVEL
 - 4.85 CHANNEL INVERT LEVEL
 - CATCHPIT
 - 300 DIA. CHANNEL
 - 300mm DIA. U-CHANNEL

- NOTES:
- COVER WILL BE PROVIDED FOR THE PROPOSED CHANNEL CROSSING CARRIAGEWAY OR WALKWAY.
 - ALL CHANNEL TO BE AT 1:100 FALL.



BO REF.					
F.S.D. REF.					
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
ALL MEASUREMENTS MUST BE CHECKED AT THE SITE - DO NOT SCALE DRAWING - ALL DRAWING SPECIFICATIONS AND THEIR COPY RIGHT ARE THE PROPERTY OF ENGINEERS, ARCHITECTS, DESIGNERS AND SHALL BE RETURNED AT THE COMPLETION OF THE WORK - THIS DRAWING IS NOT VALID FOR FOR CONSTRUCTION PURPOSES UNLESS EXPRESSLY CERTIFIED.					
SIGNATURE FOR SUBMISSION/ CONSTRUCTION					
PROJECT NO:		P20315			
DRAWN BY:		AW			
DESIGNED BY:		RM			
CHECKED BY:		AT			
APPROVED BY:		VT			
SCALE:		AS SHOWN			
CAD FILE:					
PROJECT:					
Temporary Place of Recreation, Sports or Culture (Hobby Farm and Caravan Holiday Camp) at Lots No. 1786,1787 S.B and 1787 RP in D.D. 107, Fung Kat Heung, Kam Tin, Yuen Long					
DRAWING TITLE:					
DRAINAGE PLAN & DETAILS					
DRAWING NO:				REV:	
S-1				A	
 ?? 慕德工程有限公司 WINGS & ASSOCIATES CONSULTING ENGINEERS LTD.					

APPENDIX F

Estimated Pond Capacity Abstract from
December 2025 Report

Storm Constants give,

- a = 454.9, b = 3.44, c = 0.412

(From SDM CORRIGENDUM No. 1/2024,

Table 3a – Storm Constants for Different Return Periods of HKO Headquarters)

4.2 Design Summary

The capacity of the existing pond is calculated using the area and depth obtained from the GeoInfo Map and topographic survey. The retention time of existing pond is calculated as below.

Design flow from D.D. 107 (Appendix D): = 0.16 m³/s

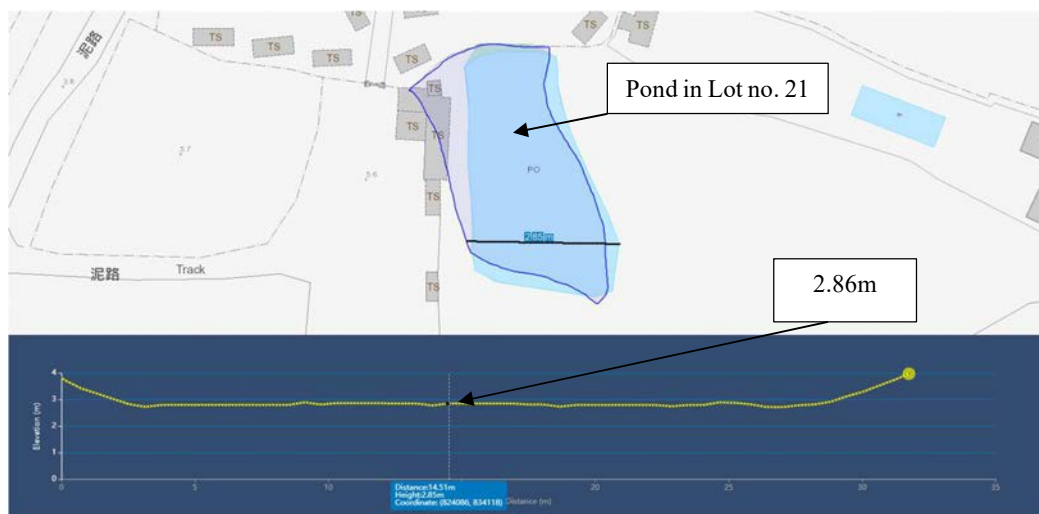
Design flow from D.D. 109 (Appendix B): = 0.11 m³/s

Design flow from external run-off (Appendix B): = 0.08 m³/s

Maximum design flow: = 0.16+0.11+0.08 = 0.35 m³/s

Pond Capacity: = area x depth
= area x (ground level near pier – existing water level)
= 1202m² x (4.0-2.86)m = 1370.3 m³

Retention time: = 1370.3 / 0.35 / 60 = **65 mins**

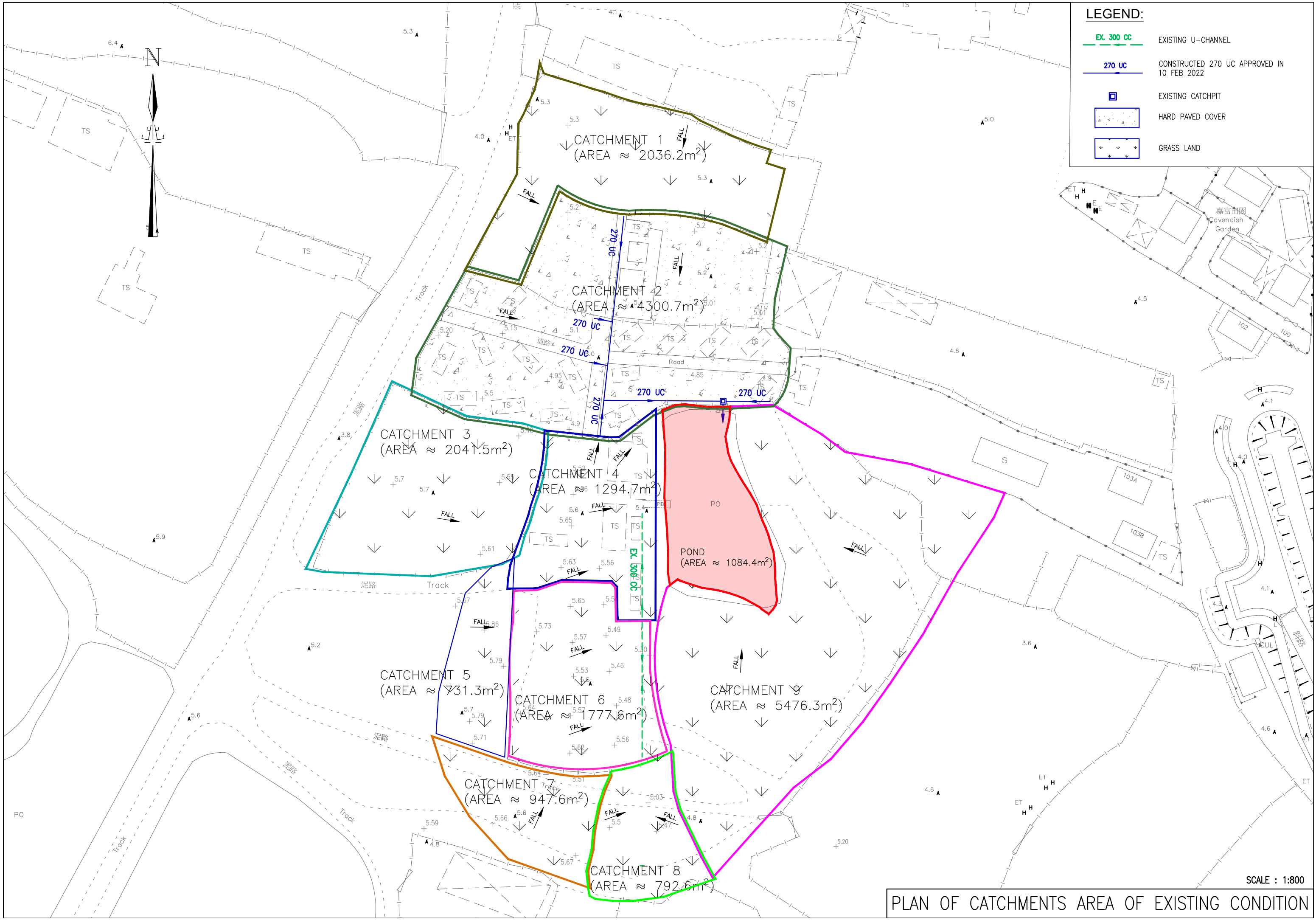


Section of pond in Lot No.21 from Geotechnical Information Infrastructure

APPENDIX G

Estimation of Existing Pond Retention Time under existing condition

- (i) Existing Catchment for Pond
- (ii) Estimated on Existing Pond Retention Time



Estimation of Runoff: (Existing Condition)

Catchment Location	Catchment Area, A m ²	Longest Distance, L (m)	Average Fall, H _{avg} (m per 100)	Time of Concentration, t (min)	Runoff Coefficient, K	Rainfall Increase due to Climate Change	Rainfall Intensity, i (mm/hr)	Design Flow m ³ /s	Maximum runoff, Q (litre/min)
1	2036.20	121.00	0.52	9.33	0.25	1.1	226.09	0.032	1918
2	4300.70	92.00	0.54	6.52	0.95	1.1	247.23	0.281	16835
3	2041.50	94.00	0.42	7.54	0.25	1.1	238.70	0.034	2030
4	1294.70	39.00	0.54	3.12	0.25	1.1	287.51	0.026	1551
5	731.30	77.00	0.55	6.50	0.25	1.1	247.43	0.013	754
6	1777.60	102.00	0.28	8.99	0.25	1.1	228.24	0.028	1690
7	947.60	105.00	0.27	9.98	0.25	1.1	222.08	0.015	877
8	792.60	95.00	0.28	9.12	0.25	1.1	227.41	0.013	751
9	5476.30	75.00	1.39	4.30	0.25	1.1	270.85	0.103	6180
Pond	1084.40	0.001	0.001	0.000	1.00	1.1	364.34	0.110	6585
Total:									26407

	Shortest Distance	H1	H2
Catchment 1	97	5.3	4.8
Catchment 2	74	5.2	4.8
Catchment 3	71	5.7	5.4
Catchment 4	28	5.55	5.4
Catchment 5	73	5.8	5.4
Catchment 6	71	5.6	5.4
Catchment 7	98	5.66	5.4
Catchment 8	98	5.67	5.4
Catchment 9	36	4.5	4
Pond			

Legend:

- A = area of catchment (m²)
- L = distance in metres measured on the line of natural flow between the design section and that point of the catchment from which water would take the longest time to reach the design section
- H = average fall (m per 100m) from the summit of catchment to the point of design
- t_d = time of concentration (min)
- $$= 0.14465 \times \frac{L}{H^{0.2} \times A^{0.1}}$$
- i = design mean intensity of rainfall (mm/hr) which is dependent upon the time of concentration
- The return-period of design rainfall intensity is 1 in 50 years using algebraic equation in Section 4.3.3
- $$= \frac{a}{(t_d + b)^c}$$
- Return Period, 50 Years
- Storm Constants(HKO Headquarters): a = 505.50 b = 3.29 c = 0.355
- K = runoff coefficient
- = 0.25 for lawn area, 0.95 for hard paved area & 1 for pond
- Q = maximum runoff (litre/min)
- $$= \frac{K \ i \ A}{60}$$

$$\text{Average Fall, } H_{\text{avg}} = \frac{H1 - H2}{I \times 100}$$

2.2 Estimation of Surface Channel Capacity:

Catchments Considered	Q _{total} (litre/min)	Design Flow m ³ /s
1+2+3+4+5+6+7+8+9+Pond	26407	0.653

2.3 Pond Retention time

$$\begin{aligned} \text{Retention time} &= \text{Pond Capacity} \times \frac{0.653}{0.653} \div 60 \\ &= 1370 \div 0.653 \div 60 \\ &= \underline{\underline{35 \text{ Mins.}}} \end{aligned}$$

* From previous drainage proposal

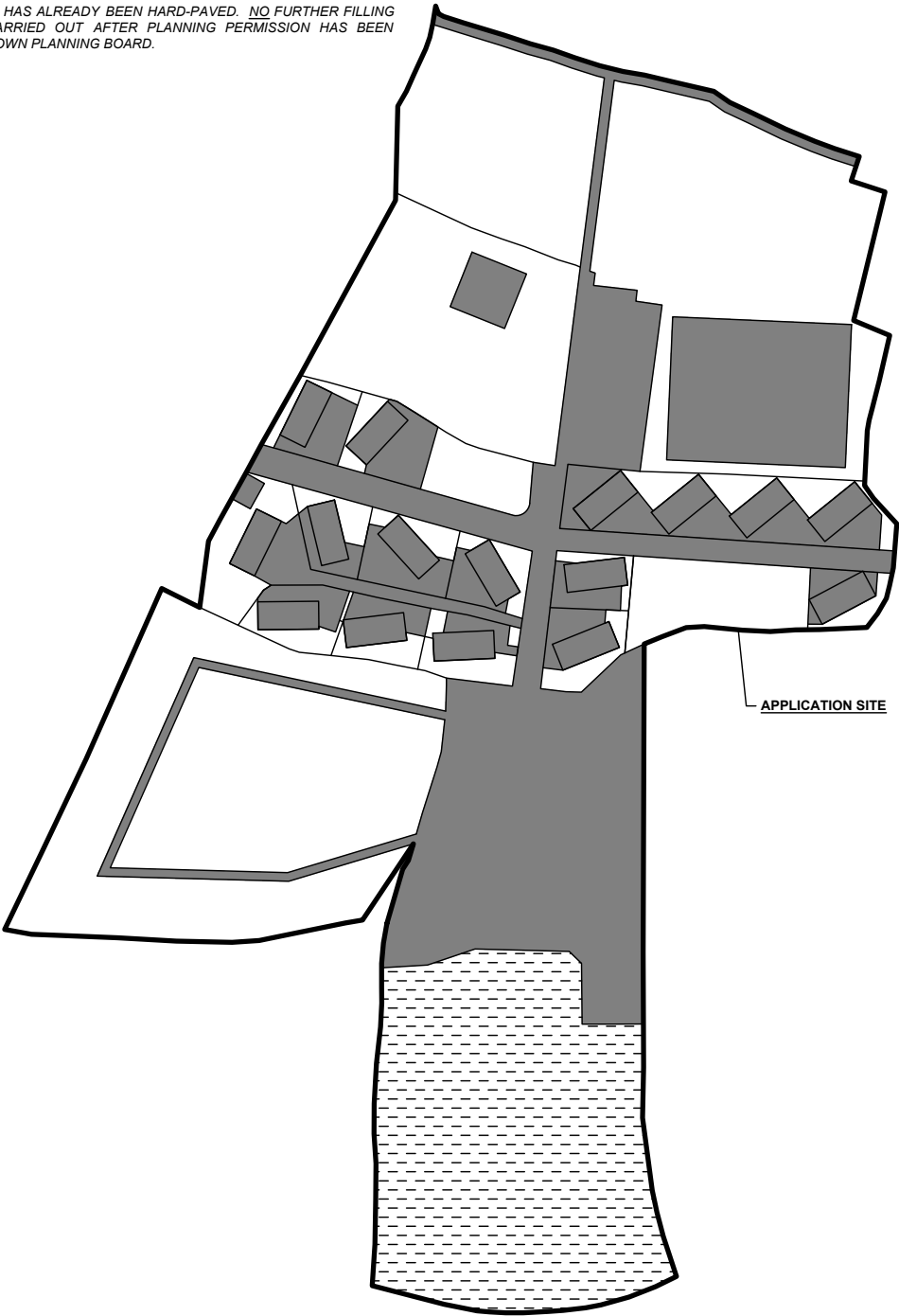
APPENDIX H

- Estimation of Existing Pond Retention Time
under this Application
- Figure 1 to 7

EXISTING CONDITION OF THE APPLICATION SITE

APPLICATION SITE AREA	: 11,456 m ²	(ABOUT)
EXISTING HARD-PAVED AREA	: 4,110 m ²	(ABOUT)
DEPTH OF LAND FILLING	: NOT MORE THAN 0.2 m	
PROPOSED SITE LEVELS	: +5.4 mPD TO +5.6 mPD	(ABOUT)
MATERIAL OF LAND FILLING	: CONCRETE	
PURPOSE OF LAND FILLING	: SITE FORMATION OF STRUCTURE AND CIRCULATION SPACE	
AREA COVERED BY GRAVEL	: 1,777 m ²	(ABOUT)
PURPOSE OF COVERING BY GRAVEL	: PARKING AND LOADING / UNLOADING PURPOSES	
AREA OF LAWN	: 5,569 m ²	(ABOUT)
PURPOSE OF LAWN AREA	: HOLIDAY CAMP, OPEN SPACE AND FOR RECREATIONAL, SPORTS OR CULTURAL ACTIVITIES	

THE APPLICATION SITE HAS ALREADY BEEN HARD-PAVED. NO FURTHER FILLING OF LAND WILL BE CARRIED OUT AFTER PLANNING PERMISSION HAS BEEN GRANTED FROM THE TOWN PLANNING BOARD.



LEGEND

	APPLICATION SITE
	HARD PAVED AREA
	AREA COVERED BY GRAVEL
	LAWN AREA

*SITE BOUNDARY FOR IDENTIFICATION PURPOSE ONLY.

	PROJECT TEMPORARY HOLIDAY CAMP, PLACE OF RECREATION, SPORTS OR CULTURE, BARBECUE SITE AND EATING PLACE WITH ANCILLARY FACILITIES AND ASSOCIATED FILLING OF LAND FOR A PERIOD OF 3 YEARS	ADDRESS VARIOUS LOTS IN D.D. 107 AND D.D. 109, FUNG KAT HEUNG, KAM TIN, YUEN LONG, NEW TERRITORIES	SCALE 1 : 1000 @ A4		TITLE FILLING OF LAND		
			DRAWN BY MN	DATE 28.4.2026	DWG NO. PLAN 6	VER. 001	
			REVISED BY	DATE			

Estimation of Runoff: (With Proposed Drainage for the Application Site)

Catchment Location	Catchment Area, A m ²	Longest Distance, L (m)	Average Fall, H _{avg} (m per 100)	Time of Concentration, t (min)	Runoff Coefficient, K	Rainfall Increase due to Climate Change	Rainfall Intensity, i (mm/hr)	Design Flow m ³ /s	Maximum runoff, Q (litre/min)
1	2036.20	121.00	0.52	9.33	0.25	1.1	226.09	0.032	1918
2	4300.70	92.00	0.54	6.52	0.95	1.1	247.23	0.281	16835
3	2041.50	98.00	0.41	7.92	0.25	1.1	235.75	0.033	2005
4	1294.70	42.00	0.45	3.47	0.95	1.1	282.10	0.096	5783
5	731.30	115.00	0.51	9.86	0.25	1.1	222.82	0.011	679
6	1777.60	102.00	0.28	8.99	0.65	1.1	228.24	0.073	4395
7	947.60	107.00	0.27	10.17	0.25	1.1	220.96	0.015	872
8	792.60	95.00	0.27	9.14	0.25	1.1	227.29	0.013	751
9	5476.30	75.00	1.39	4.30	0.25	1.1	270.85	0.103	6180
Pond	1084.40	0.001	0.001	0.000	1.00	1.1	364.34	0.110	6585
Total:								33239	

Legend:

- A = area of catchment (m²)
- L = distance in metres measured on the line of natural flow between the design section and that point of the catchment from which water would take the longest time to reach the design section
- H_{avg} = average fall (m per 100m) from the summit of catchment to the point of design
- t_d = time of concentration (min)
- $$= 0.14465 \times \frac{L}{H^{0.2} \times A^{0.1}}$$
- i = design mean intensity of rainfall (mm/hr) which is dependent upon the time of concentration
The return-period of design rainfall intensity is 1 in 50 years using algebraic equation in Section 4.3.3
- $$= \frac{a}{(t_d + b)^c}$$
- Return Period, 50 Years
Storm Constants(HKO Headquarters): a = 505.50 b = 3.29 c = 0.355
- K = runoff coefficient
= 0.25 for lawn area, 0.65 for gravel area, 0.95 for hard paved area & 1 for pond
- Q = maximum runoff (litre/min)
- $$= \frac{K \ i \ A}{60}$$

	Shortest Distance (I)	H1	H2
Catchment 1	97	5.3	4.8
Catchment 2	74	5.2	4.8
Catchment 3	74	5.7	5.4
Catchment 4	33	5.55	5.4
Catchment 5	79	5.8	5.4
Catchment 6	71	5.6	5.4
Catchment 7	98	5.66	5.4
Catchment 8	99	5.67	5.4
Catchment 9	36	4.5	4
Pond			

$$\text{Average Fall, } H_{\text{avg}} = \frac{H1 - H2}{I \times 100}$$

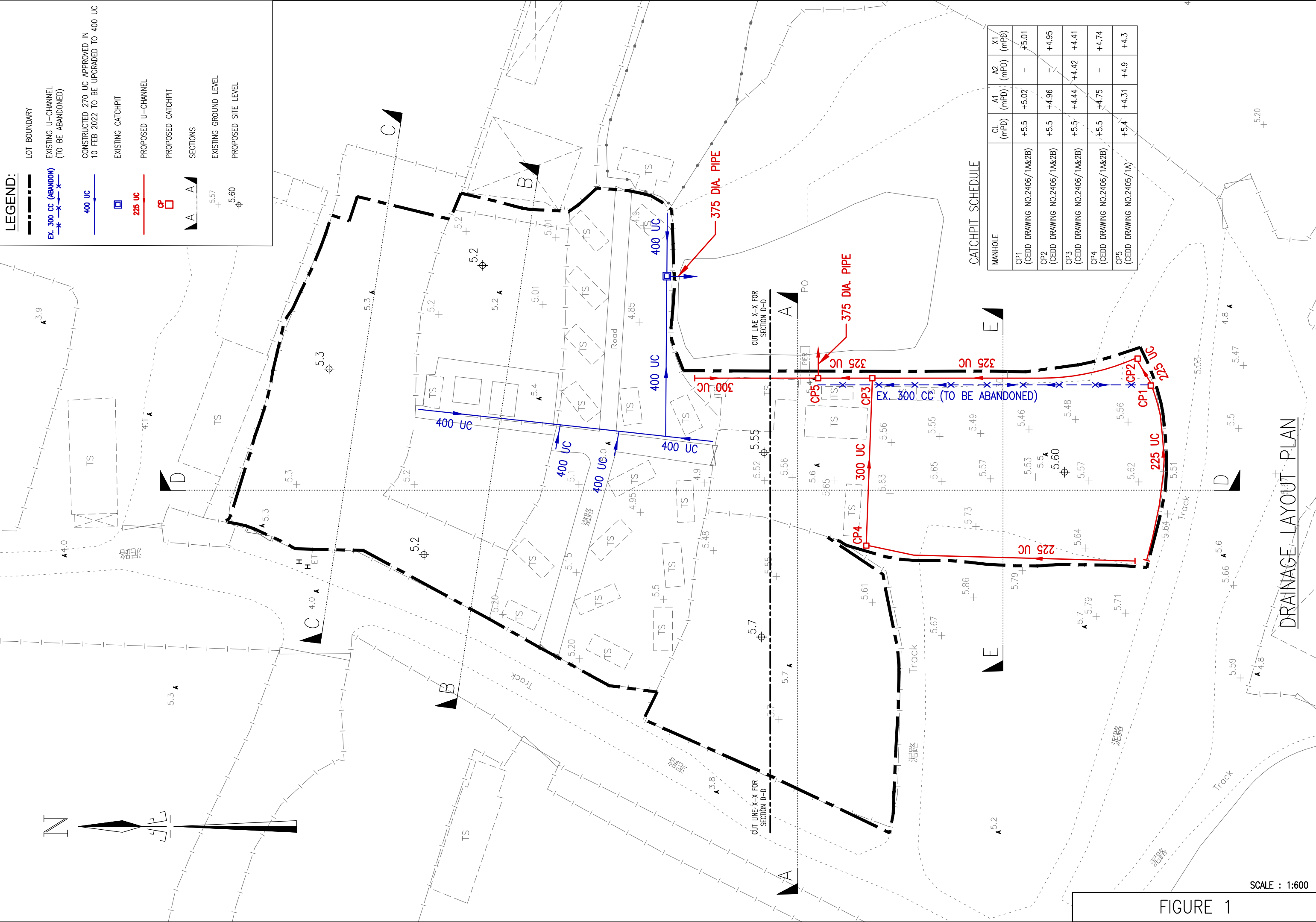
2.2 Estimation of Surface Channel Capacity:

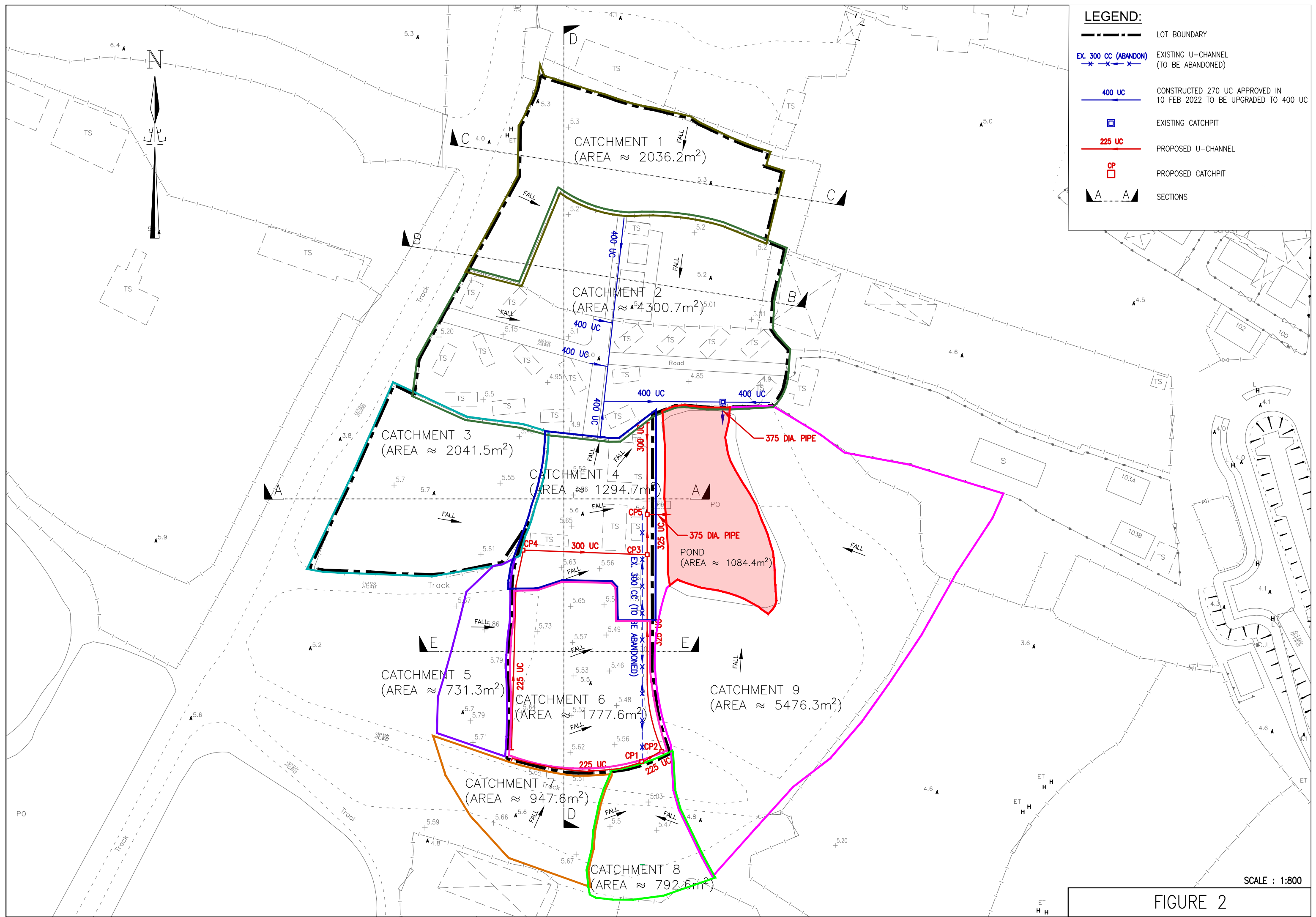
Catchments Considered	Qtotal (litre/min)	Design Flow m ³ /s
1+2+3+4+5+6+7+8+9+Pond	33239	0.767

2.3 Pond Retention time

$$\begin{aligned} \text{Retention time} &= \text{Pond Capacity} * / 0.767 / 60 \\ &= 1370 / 0.767 / 60 \\ &= \underline{\underline{30 \text{ Mins.}}} \end{aligned}$$

* From previous drainage proposal



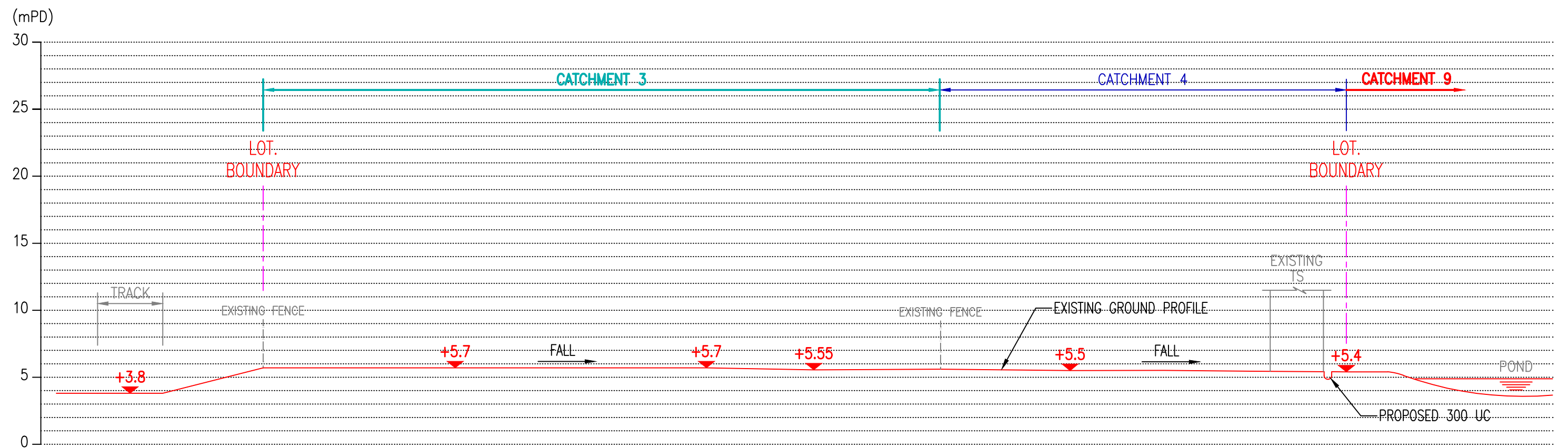


LEGEND:

	LOT BOUNDARY
	EX. 300 CC (ABANDON) EXISTING U-CHANNEL (TO BE ABANDONED)
	400 UC CONSTRUCTED 270 UC APPROVED IN 10 FEB 2022 TO BE UPGRADED TO 400 UC
	EXISTING CATCHPIT
	225 UC PROPOSED U-CHANNEL
	CP PROPOSED CATCHPIT
	SECTIONS

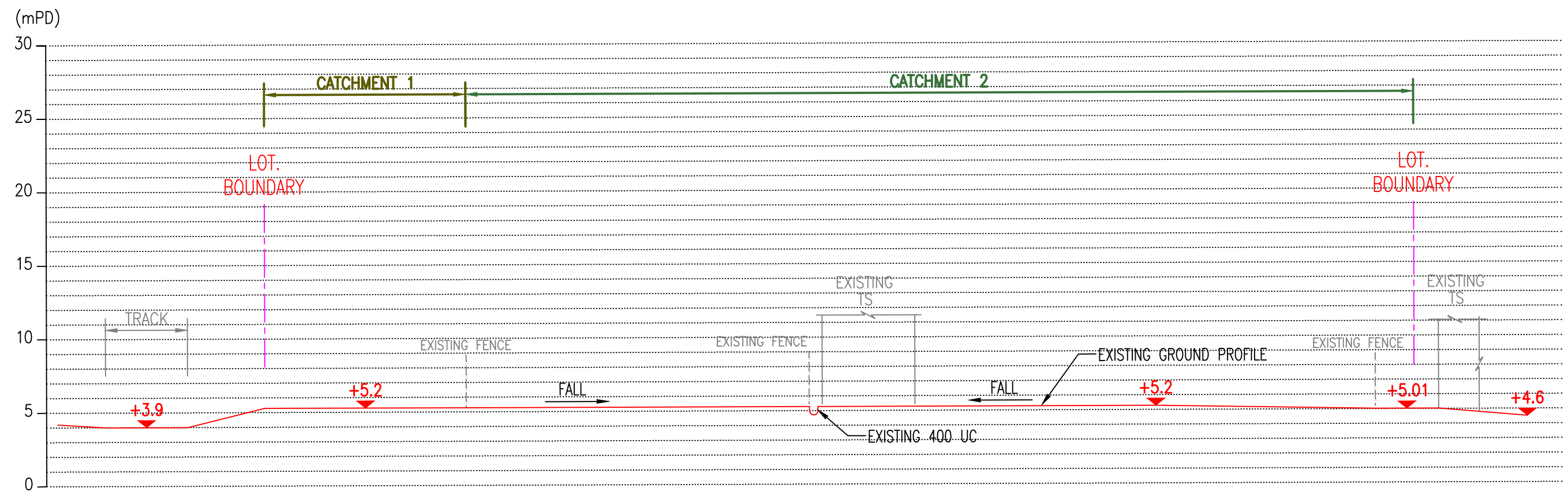
SCALE : 1:800

FIGURE 2



SECTION A-A
1 : 300

FIGURE 3



SECTION B-B
1 : 300

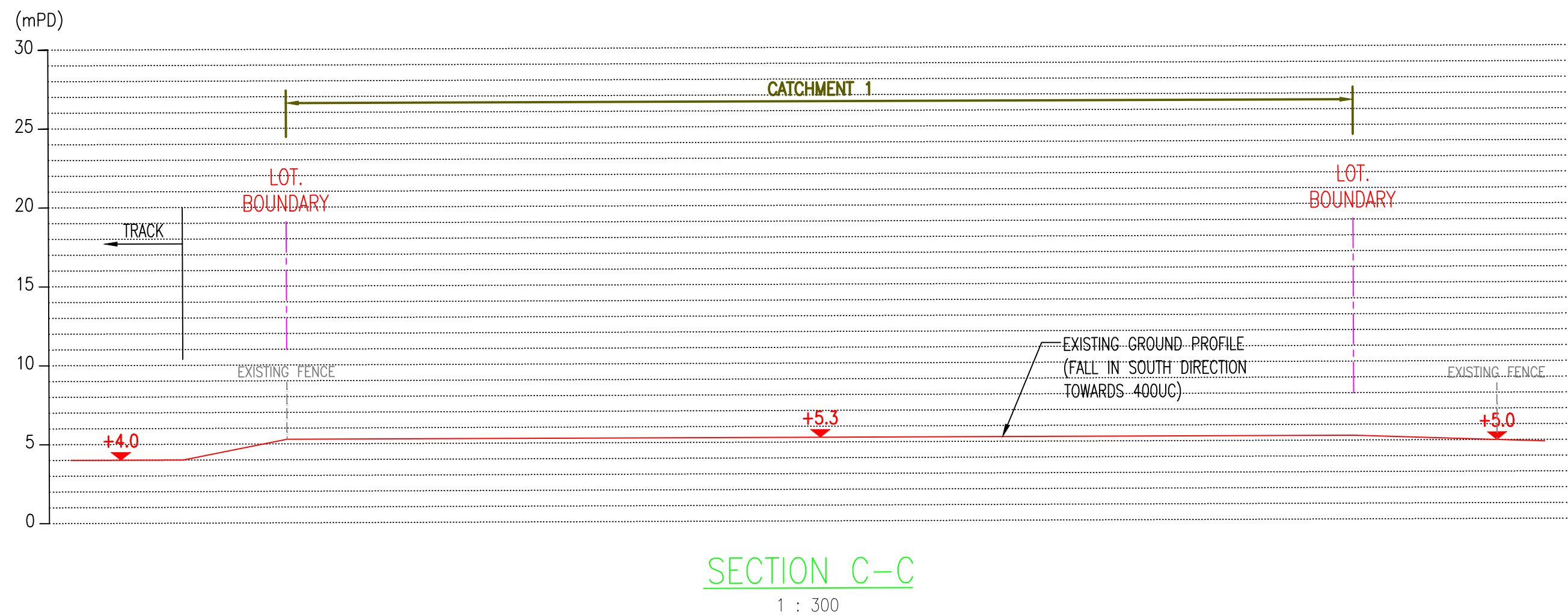
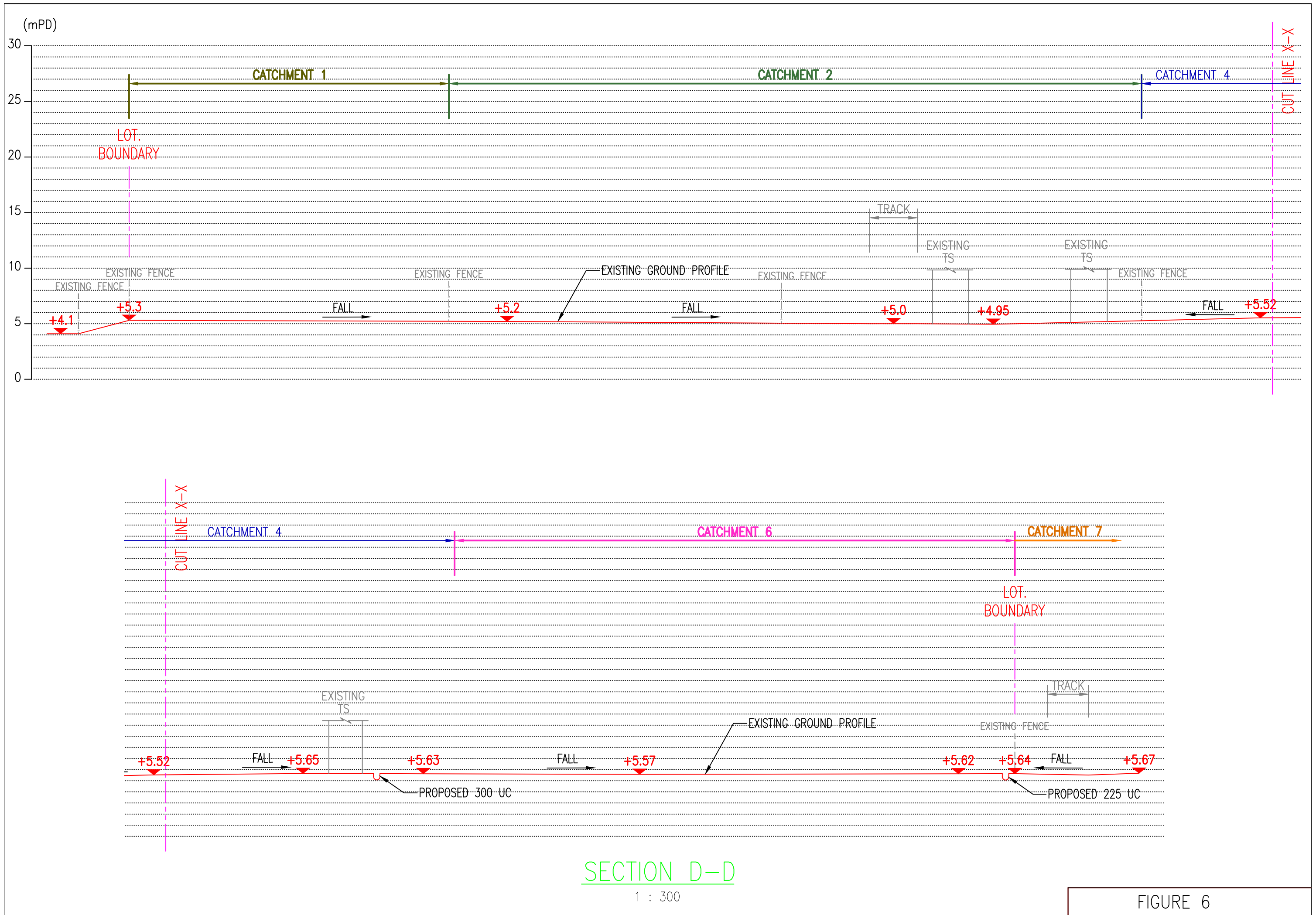


FIGURE 5



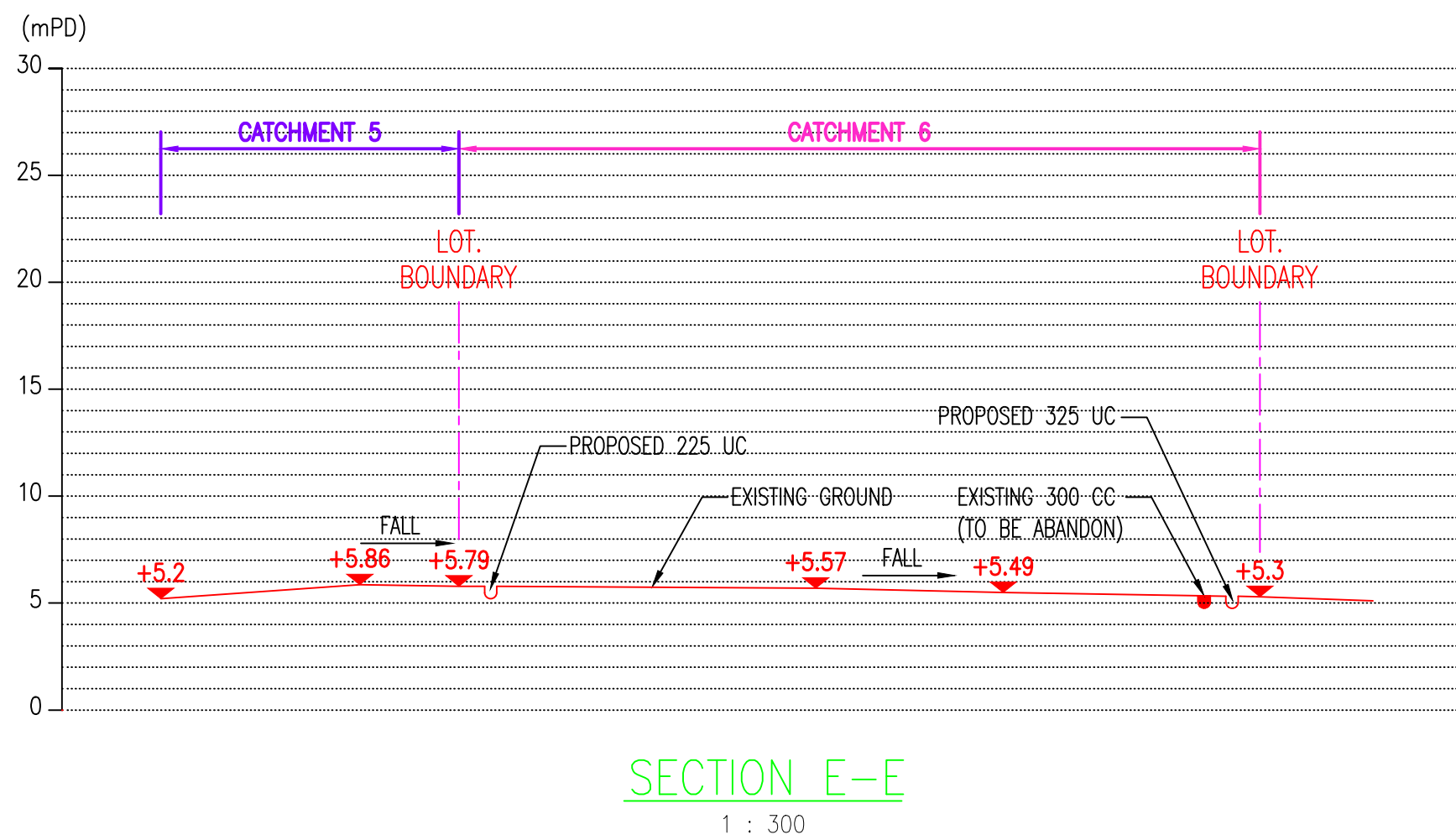


FIGURE 7

APPENDIX I

Channel Design

- Figure 8

[illegible]
$$\text{Average Fall, } H_{\text{avg}} = \frac{H_1 - H_2}{I \times 100}$$

A	=	area of catchment (m ²)
L	=	distance in metres measured on the line of natural flow between the design section and that point of the catchment from which water would take the longest time to reach the design section
H _{avg}	=	average fall (m per 100m) from the summit of catchment to the point of design
t _d	=	time of concentration (min)
	=	$0.14465 \times \frac{L}{H^{0.2} \times A^{0.1}}$
i	=	design mean intensity of rainfall (mm/hr) which is dependent upon the time of concentration
	=	The return-period of design rainfall intensity is 1 in 50 years using algebraic equation in Section 4.3.3
	=	$\frac{a}{(t_d + b)^c}$
	=	<u>Return Period, 50 Years</u>
	=	Storm Constants(HKO Headquarters) a = 505.50 b = 3.29 c = 0.355
K	=	runoff coefficient
	=	0.25 for lawn area, 0.95 for hard paved area & 1 for pond
Q	=	maximum runoff (litre/min)
	=	$\frac{K \ i \ A}{60}$

[illegible]

n	= Manning's coefficient (Table 13)
	= 0.012
R	= Hydraulic Radius
	= $\frac{A}{P}$
V	= Manning 's flow velocity equation (m/sec)
	= $\frac{R^{0.67} \times S^{0.5}}{n}$
Q	= Manning 's flow capacity equation (litre/min)
	= $\frac{V \times A \times 1000}{60}$

Estimation of Runoff: (With Proposed Drainage for the Application Site)

Catchment Location	Catchment Area, A m ²	Longest Distance, L (m)	Average Fall, H _{avg} (m per 100)	Time of Concentration, t (min)	Runoff Coefficient, K	Rainfall Increase due to Climate Change	Rainfall Intensity, i (mm/hr)	Design Flow m ³ /s	Maximum runoff, Q (litre/min)
3	2041.50	98.00	0.41	7.92	0.25	1.1	235.75	0.033	2005
4	1294.70	42.00	0.45	3.47	0.95	1.1	282.10	0.096	5783
5	731.30	115.00	0.51	9.86	0.25	1.1	222.82	0.011	679
6	1777.60	102.00	0.28	8.99	0.65	1.1	228.24	0.073	4395
7	947.60	107.00	0.27	10.17	0.25	1.1	220.96	0.015	872
8	792.60	95.00	0.27	9.14	0.25	1.1	227.29	0.013	751
								Total:	14486

	Shortest Dis	H1	H2
Catchment 3	74	5.7	5.4
Catchment 4	33	5.55	5.4
Catchment 5	79	5.8	5.4
Catchment 6	71	5.6	5.4
Catchment 7	98	5.66	5.4
Catchment 8	99	5.67	5.4

Legend:

- A = area of catchment (m²)
L = distance in metres measured on the line of natural flow between the design section and that point of the catchment from which water would take the longest time to reach the design section
H_{avg} = average fall (m per 100m) from the summit of catchment to the point of design
t = time of concentration (min)

$$= 0.14465 \times \frac{L}{H^{0.2} \times A^{0.1}}$$

i = design mean intensity of rainfall (mm/hr) which is dependent upon the time of concentration
The return-period of design rainfall intensity is 1 in 10 years/1 in 200 years using Fig.8.2, Geotechnical Manual for Slope
K = runoff coefficient
= 1.0 for conservative design
Q = maximum runoff (litre/min)

$$= \frac{K \times i \times A}{60}$$

$$\text{Average Fall, } H_{\text{avg}} = \frac{H1 - H2}{I \times 100}$$

Return Period, 50 Years

Storm Constants(HKO Headquarters) a = 505.50 b = 3.29 c = 0.355

2.2 Estimation of Surface Channel Capacity:

Catchments Considered	Qtotat (litre/min)	Gradient	Size	Type	Velocity (m/s)	Design Flow m ³ /s	Capacity (litre/min)	
3+4	7788	1 in 100	300	U	1.66	<4.0 O.K.	0.130	8949 O.K.
5	679	1 in 100	225	U	1.37	<4.0 O.K.	0.011	4155 O.K.
7+8	1623	1 in 100	225	U	1.37	<4.0 O.K.	0.085	4155 O.K.
6+7+8	6018	1 in 100	325	U	1.75	<4.0 O.K.	0.100	11078 O.K.
3+4+5+6+7+8	14486	1 in 100	400	U	2.01	<4.0 O.K.	0.241	19273 O.K.
Outlet pipe	14486	1 in 23	375	pipe	2.24		1.35	31270.8 O.K.

Legends:

- n = Manning's coefficient
= 0.013
R = Hydraulic Radius

$$= \frac{A}{P}$$

V = Manning 's flow velocity equation (m/sec)

$$= \frac{R^{0.67} \times S^{0.5}}{n}$$

Q = Manning 's flow capacity equation (litre/min)

$$= V \times A \times 1000 \times 60$$

APPENDIX 1 : Recommended roughness values

Classification (assumed clean and new unless otherwise stated)	Suitable values of k_s (mm)		
	Good	Normal	Poor
Smooth materials (pipes)			
Drawn non-ferrous pipes of aluminium, brass, copper, lead etc, and non-metallic pipes of Alkathene, glass, perspex etc	--	0.003	--
Asbestos-cement	0.015	0.03	0.06 [#]
Metal			
Spun bitumen or concrete lined	--	0.03	--
# Cast iron, epoxy lining, coupling joints	--	0.015	0.03
# Ductile iron, Polyethylene lining, push-fit joints	--	0.06	0.15
# Ductile iron, Polyurethane lining, push-fit joints	0.015	0.03	0.06
Wrought iron	0.03	0.06	0.15
Rusty wrought iron	0.15	0.6	3.0
Uncoated steel	0.015	0.03	0.06
# Steel, epoxy lining, push-fit joints	0.03	0.06	0.15
Galvanised iron, coated cast iron generally [#]	0.06	0.15	0.3
Uncoated cast iron	0.15	0.3	0.6
Tate relined pipes	0.15	0.3	0.6
Old tuberculated water mains as follows:			
Slight degree of attack	0.6	1.5	3.0
Moderate degree of attack	1.5	3.0	6.0
Appreciable degree of attack	6.0	15	30
Severe degree of attack	15	30	60
(Good: up to 20 years use; Normal: 40 to 50 years use; Poor: 80 to 100 years use)			
Wood			
Wood stave pipes, planed plank conduits	0.3	0.6	1.5
Concrete			
# Prestressed	0.03	0.06	0.15
Precast concrete pipes with "O" ring joints	0.06	0.15	0.6
Spun precast concrete pipes with "O" ring joints	0.06	0.15	0.3
Monolithic construction against steel forms	0.3	0.6	1.5
Monolithic construction against rough forms	0.6	1.5	--
Clayware			
Glazed or unglazed pipe:			
With sleeve joints	0.03	0.06	0.15
With spigot and socket joints and "O" ring seals			
-- dia < 0.150 m	--	0.03	--
-- dia > 0.150 m	--	0.06	--
Pitch fibre			
(lower value refers to full bore flow)	0.003	0.03	
# Glass reinforced plastic (GRP)	0.03	0.06	--
uPVC			
# Twin-walled, with coupling joints	0.003	0.006	
Standard, with chemically cemented joints	--	0.03	--
Standard, with spigot and socket joints, "O" ring seals at 6 to 9 metre intervals	--	0.06	--

A15

(p.3 of 4)

$k_s = 0.060 \text{ mm}$
 $S = 0.00400 \text{ to } 0.02000$

Water (or sewage) at 15°C ;
 full bore conditions.

ie hydraulic gradient =
 1 in 250 to 1 in 50

velocities in ms^{-1}
 discharges in litres/sec

Gradient (Equivalent) Pipe diameters in mm

	150	200	225	250	275	300	350	375	400	450	500	525	600	630
0.00400	0.770	0.929	1.003	1.074	1.142	1.207	1.332	1.392	1.450	1.562	1.669	1.721	1.870	1.928
1/ 250	13.599	29.196	39.889	52.717	67.823	85.345	128.17	153.72	182.20	248.39	327.66	372.46	528.81	601.01
0.00420	0.790	0.954	1.030	1.102	1.172	1.239	1.367	1.428	1.488	1.602	1.712	1.765	1.919	1.978
1/ 238	13.961	29.967	40.940	54.102	69.600	87.578	131.51	157.73	186.94	254.84	336.14	382.10	542.47	616.51
0.00440	0.810	0.978	1.055	1.130	1.201	1.270	1.401	1.463	1.524	1.642	1.754	1.809	1.966	2.026
1/ 227	14.314	30.720	41.966	55.455	71.338	89.760	134.78	161.64	191.57	261.14	344.44	391.52	555.80	631.66
0.00460	0.830	1.001	1.081	1.157	1.230	1.300	1.434	1.498	1.561	1.681	1.796	1.851	2.012	2.074
1/ 217	14.660	31.457	42.970	56.779	73.037	91.894	137.97	165.46	196.10	267.30	352.55	400.73	568.85	646.47
0.00480	0.849	1.024	1.105	1.183	1.258	1.330	1.467	1.532	1.596	1.719	1.836	1.893	2.057	2.120
1/ 208	14.998	32.179	43.953	58.075	74.701	93.984	141.10	169.21	200.53	273.33	360.48	409.74	581.62	660.97
0.00500	0.868	1.047	1.130	1.209	1.285	1.359	1.498	1.565	1.630	1.756	1.876	1.934	2.101	2.166
1/ 200	15.330	32.886	44.917	59.345	76.332	96.032	144.16	172.88	204.88	279.24	368.26	418.58	594.13	675.17
0.00550	0.913	1.101	1.188	1.272	1.352	1.429	1.575	1.646	1.714	1.846	1.971	2.032	2.208	2.276
1/ 182	16.133	34.597	47.247	62.417	80.274	100.98	151.57	181.75	215.38	293.52	387.06	439.93	624.36	709.51
0.00600	0.956	1.153	1.244	1.331	1.415	1.496	1.649	1.722	1.794	1.931	2.063	2.127	2.310	2.381
1/ 167	16.902	36.234	49.477	65.355	84.046	105.72	158.66	190.24	225.43	307.18	405.04	460.35	653.28	742.33
0.00650	0.998	1.203	1.298	1.389	1.476	1.560	1.720	1.796	1.871	2.014	2.151	2.217	2.409	2.482
1/ 154	17.640	37.806	51.618	68.177	87.668	110.27	165.47	198.39	235.07	320.30	422.30	479.95	681.03	773.84
0.00700	1.038	1.252	1.350	1.444	1.535	1.622	1.788	1.867	1.945	2.093	2.235	2.304	2.503	2.580
1/ 143	18.351	39.320	53.680	70.895	91.156	114.65	172.02	206.24	244.35	332.92	438.92	498.81	707.74	804.18
0.00750	1.077	1.298	1.400	1.498	1.591	1.682	1.854	1.936	2.016	2.170	2.317	2.388	2.594	2.674
1/ 133	19.039	40.783	55.672	73.520	94.525	118.88	178.35	213.81	253.32	345.11	454.96	517.03	733.53	833.46
0.00800	1.115	1.343	1.449	1.550	1.646	1.740	1.917	2.002	2.085	2.244	2.396	2.470	2.683	2.765
1/ 125	19.704	42.199	57.601	76.061	97.785	122.97	184.47	221.14	262.00	356.91	470.49	534.66	758.49	861.79
0.00850	1.152	1.387	1.496	1.600	1.700	1.796	1.979	2.067	2.152	2.316	2.473	2.549	2.768	2.853
1/ 118	20.350	43.573	59.471	78.525	100.95	126.94	190.41	228.25	270.41	368.35	485.54	551.75	782.69	889.26
0.00900	1.187	1.429	1.541	1.648	1.751	1.850	2.039	2.129	2.217	2.386	2.547	2.625	2.851	2.938
1/ 111	20.977	44.908	61.288	80.920	104.02	130.80	196.18	235.16	278.59	379.46	500.16	568.35	806.19	915.95
0.00950	1.222	1.471	1.586	1.696	1.802	1.904	2.097	2.190	2.280	2.454	2.620	2.700	2.932	3.022
1/ 105	21.588	46.207	63.057	83.250	107.01	134.55	201.79	241.88	286.54	390.27	514.39	584.51	829.06	941.91
0.01000	1.255	1.511	1.629	1.742	1.851	1.955	2.154	2.249	2.342	2.520	2.690	2.773	3.011	3.103
1/ 100	22.183	47.473	64.781	85.521	109.92	138.21	207.26	248.43	294.29	400.81	528.25	600.25	851.34	967.20
0.01100	1.320	1.589	1.713	1.831	1.945	2.055	2.264	2.364	2.461	2.648	2.826	2.913	3.163	3.259
1/ 91	23.332	49.916	68.106	89.903	115.54	145.26	217.81	261.06	309.24	421.12	554.98	630.60	894.30	1016.0
0.01200	1.383	1.663	1.793	1.917	2.036	2.151	2.369	2.473	2.575	2.770	2.957	3.047	3.308	3.409
1/ 83	24.431	52.253	71.287	94.092	120.92	152.01	227.90	273.14	323.53	440.55	580.54	659.62	935.37	1062.6
0.01300	1.442	1.735	1.870	1.999	2.123	2.242	2.469	2.578	2.684	2.887	3.082	3.176	3.448	3.552
1/ 77	25.486	54.496	74.340	98.114	126.08	158.49	237.58	284.73	337.24	459.19	605.06	687.46	974.78	1107.3
0.01400	1.500	1.803	1.944	2.078	2.206	2.330	2.566	2.679	2.789	3.000	3.202	3.300	3.582	3.690
1/ 71	26.503	56.656	77.280	101.99	131.05	164.72	246.91	295.89	350.44	477.13	628.67	714.27	1012.7	1150.4
0.01500	1.555	1.870	2.015	2.154	2.287	2.415	2.660	2.777	2.890	3.109	3.318	3.419	3.711	3.824
1/ 67	27.484	58.742	80.119	105.73	135.84	170.74	255.90	306.66	363.19	494.45	651.46	740.14	1049.3	1192.0
0.01600	1.609	1.934	2.084	2.228	2.365	2.498	2.750	2.871	2.988	3.214	3.430	3.535	3.837	3.953
1/ 63	28.434	60.761	82.866	109.34	140.48	176.56	264.61	317.09	375.52	511.21	673.50	765.17	1084.7	1232.2
0.01700	1.661	1.996	2.151	2.299	2.441	2.578	2.838	2.962	3.083	3.316	3.539	3.647	3.958	4.078
1/ 59	29.356	62.719	85.530	112.85	144.98	182.21	273.05	327.19	387.48	527.46	694.88	789.43	1119.1	1271.2
0.01800	1.712	2.057	2.216	2.368	2.515	2.655	2.923	3.051	3.176	3.416	3.645	3.756	4.076	4.199
1/ 56	30.251	64.620	88.118	116.26	149.35	187.70	281.25	337.01	399.09	543.24	715.63	813.00	1152.4	1309.0
0.01900	1.761	2.116	2.280	2.436	2.586	2.731	3.006	3.138	3.266	3.512	3.748	3.862	4.191	4.317
1/ 53	31.122	66.471	90.636	119.58	153.61	193.03	289.23	346.56	410.39	558.59	735.83	835.93	1184.9	1345.9
0.02000	1.809	2.173	2.341	2.502	2.656	2.804	3.087	3.222	3.353	3.606	3.848	3.965	4.302	4.433
1/ 50	31.971	68.274	93.090	122.81	157.75	198.23	297.00	355.86	421.39	573.55	755.50	858.26	1216.5	1381.7
	110	140	160	180	190	210	250	260	280	320	350	370	420	440

θ_{medial} for part-full circular pipes.

$k_s = 0.060 \text{ mm}$ $S = 0.00400 \text{ to } 0.02000$

$k_s = 0.060 \text{ mm}$
 $S = 0.02000 \text{ to } 0.10000$

Water (or sewage) at 15°C ;
 full bore conditions.

A15
 (p.4 of 4)

ie hydraulic gradient =
 1 in 50 to 1 in 10

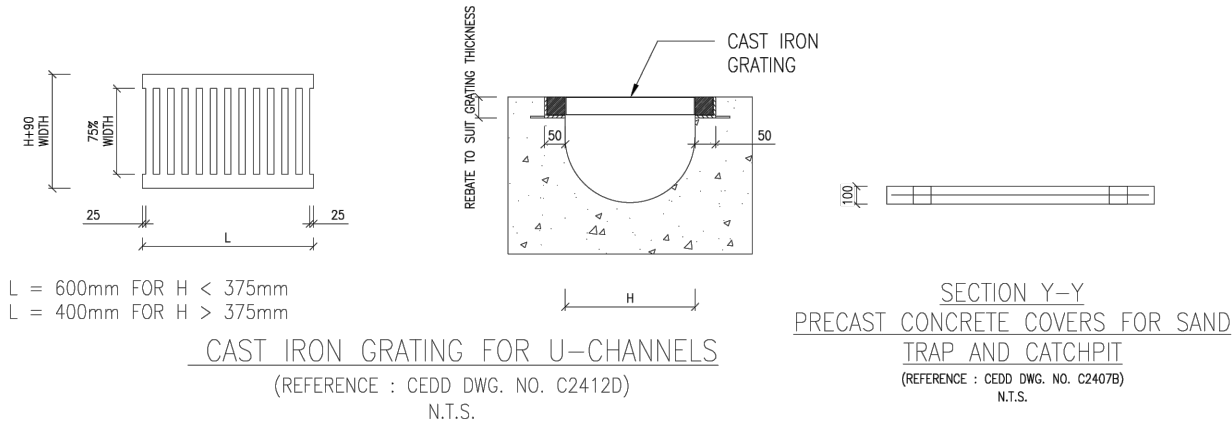
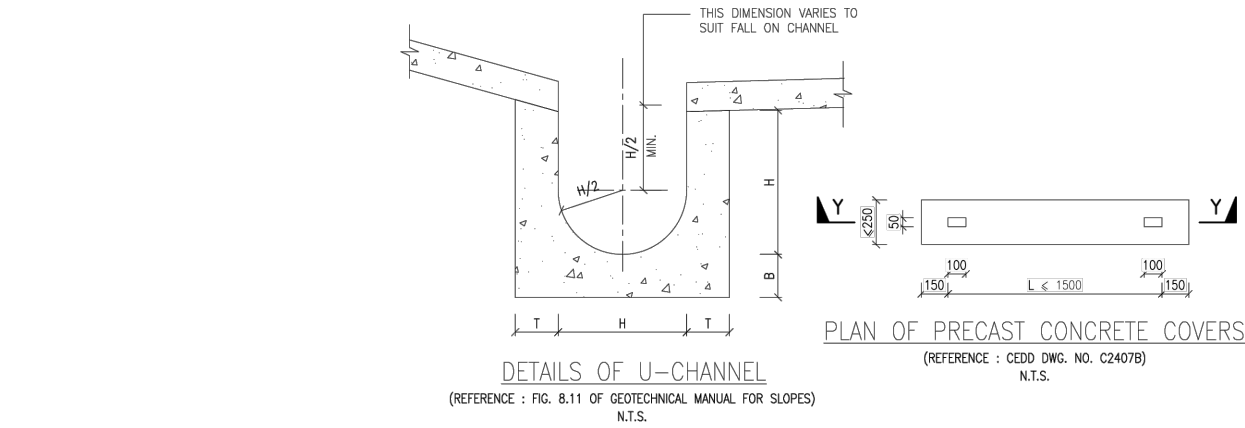
velocities in ms^{-1}
 discharges in litres/sec

Gradient	(Equivalent) Pipe diameters in mm													
	150	200	225	250	275	300	350	375	400	450	500	525	600	630
0.02000	1.809	2.173	2.341	2.502	2.656	2.804	3.087	3.222	3.353	3.606	3.848	3.965	4.302	4.433
1/ 50	31.971	68.274	93.090	122.81	157.75	198.23	297.00	355.86	421.39	573.55	755.50	858.26	1216.5	1381.7
0.02200	1.902	2.284	2.460	2.629	2.790	2.946	3.243	3.384	3.522	3.788	4.041	4.164	4.518	4.654
1/ 45.5	33.609	71.753	97.822	129.04	165.74	208.26	311.99	373.80	442.62	602.39	793.44	901.33	1277.4	1450.9
0.02400	1.991	2.390	2.574	2.750	2.919	3.082	3.392	3.540	3.684	3.961	4.226	4.354	4.724	4.867
1/ 41.7	35.176	75.078	102.35	135.00	173.38	217.85	326.32	390.95	462.91	629.95	829.70	942.50	1335.7	1517.0
0.02600	2.076	2.491	2.683	2.867	3.043	3.212	3.535	3.689	3.839	4.127	4.403	4.536	4.922	5.070
1/ 38.5	36.679	78.270	106.69	140.71	180.72	227.05	340.07	407.40	482.37	656.40	864.48	981.99	1391.5	1580.5
0.02800	2.158	2.589	2.788	2.979	3.161	3.337	3.672	3.832	3.988	4.287	4.573	4.712	5.112	5.266
1/ 35.7	38.127	81.343	110.87	146.22	187.77	235.90	353.30	423.24	501.11	681.86	897.97	1020.0	1445.3	1641.5
0.03000	2.237	2.684	2.890	3.087	3.276	3.458	3.805	3.970	4.132	4.442	4.738	4.881	5.295	5.455
1/ 33.3	39.524	84.309	114.90	151.53	194.58	244.45	366.07	438.53	519.19	706.43	930.28	1056.7	1497.2	1700.4
0.03200	2.313	2.775	2.988	3.192	3.387	3.575	3.933	4.104	4.271	4.591	4.897	5.045	5.473	5.638
1/ 31.3	40.877	87.179	118.81	156.67	201.18	252.72	378.43	453.32	536.68	730.19	961.54	1092.2	1547.4	1757.4
0.03400	2.387	2.864	3.083	3.293	3.495	3.689	4.058	4.234	4.406	4.736	5.051	5.204	5.645	5.815
1/ 29.4	42.188	89.962	122.59	161.65	207.56	260.74	390.41	467.65	553.64	753.23	991.84	1126.6	1596.1	1812.6
0.03600	2.459	2.950	3.176	3.392	3.599	3.799	4.179	4.360	4.537	4.877	5.201	5.358	5.812	5.987
1/ 27.8	43.462	92.665	126.27	166.49	213.77	268.52	402.04	481.57	570.11	775.61	1021.3	1160.0	1643.4	1866.3
0.03800	2.530	3.033	3.266	3.488	3.701	3.906	4.296	4.483	4.664	5.014	5.347	5.509	5.975	6.154
1/ 26.3	44.701	95.294	129.85	171.20	219.81	276.10	413.36	495.12	586.13	797.37	1049.9	1192.5	1689.3	1918.5
0.04000	2.598	3.115	3.353	3.581	3.800	4.010	4.411	4.602	4.788	5.147	5.489	5.655	6.133	6.317
1/ 25.0	45.909	97.856	133.33	175.79	225.69	283.48	424.38	508.31	601.74	818.58	1077.8	1224.1	1734.1	1969.3
0.04200	2.665	3.194	3.439	3.672	3.896	4.112	4.523	4.719	4.910	5.277	5.628	5.797	6.288	6.477
1/ 23.8	47.087	100.36	136.73	180.26	231.43	290.67	435.14	521.18	616.96	839.26	1105.0	1255.0	1777.8	2018.9
0.04400	2.730	3.272	3.522	3.761	3.991	4.212	4.632	4.833	5.028	5.404	5.763	5.937	6.439	6.632
1/ 22.7	48.238	102.80	140.05	184.63	237.03	297.70	445.64	533.75	631.83	859.46	1131.5	1285.1	1820.4	2067.3
0.04600	2.793	3.348	3.604	3.848	4.083	4.309	4.739	4.944	5.144	5.528	5.895	6.073	6.586	6.784
1/ 21.7	49.363	105.18	143.29	188.91	242.51	304.58	455.91	546.04	646.37	879.20	1157.5	1314.6	1862.1	2114.6
0.04800	2.856	3.422	3.684	3.934	4.173	4.404	4.843	5.053	5.257	5.650	6.025	6.206	6.730	6.932
1/ 20.8	50.464	107.52	146.47	193.09	247.87	311.30	465.96	558.06	660.59	898.52	1182.9	1343.5	1903.0	2161.0
0.05000	2.917	3.495	3.762	4.017	4.262	4.497	4.945	5.159	5.368	5.769	6.151	6.337	6.872	7.078
1/ 20.0	51.543	109.81	149.58	197.18	253.12	317.89	475.80	569.84	674.52	917.45	1207.8	1371.7	1942.9	2206.3
0.05500	3.064	3.671	3.951	4.219	4.475	4.722	5.193	5.417	5.636	6.056	6.458	6.652	7.213	7.429
1/ 18.2	54.150	115.34	157.10	207.08	265.81	333.81	499.58	598.30	708.18	963.18	1267.9	1440.0	2039.5	2315.9
0.06000	3.205	3.839	4.132	4.411	4.679	4.938	5.429	5.663	5.892	6.331	6.750	6.953	7.540	7.765
1/ 16.7	56.643	120.62	164.29	216.54	277.94	349.02	522.31	625.50	740.35	1006.9	1325.4	1505.2	2131.8	2420.7
0.06500	3.341	4.001	4.305	4.596	4.875	5.144	5.655	5.900	6.137	6.594	7.031	7.242	7.853	8.088
1/ 15.4	59.034	125.69	171.18	225.62	289.57	363.62	544.11	651.59	771.21	1048.8	1380.5	1567.8	2220.3	2521.1
0.07000	3.471	4.156	4.472	4.774	5.064	5.343	5.873	6.127	6.373	6.848	7.301	7.521	8.154	8.398
1/ 14.3	61.336	130.57	177.82	234.35	300.77	377.66	565.09	676.70	800.91	1089.1	1433.6	1628.0	2305.5	2617.8
0.07500	3.597	4.306	4.633	4.946	5.246	5.535	6.084	6.346	6.602	7.093	7.562	7.789	8.445	8.697
1/ 13.3	63.558	135.28	184.23	242.78	311.58	391.22	585.34	700.93	829.57	1128.1	1484.8	1686.1	2387.7	2711.1
0.08000	3.718	4.451	4.789	5.112	5.422	5.720	6.288	6.559	6.822	7.330	7.814	8.049	8.726	8.987
1/ 12.5	65.707	139.84	190.42	250.93	322.03	404.33	604.93	724.37	857.30	1165.7	1534.3	1742.3	2467.2	2801.4
0.08500	3.836	4.592	4.940	5.273	5.592	5.900	6.485	6.764	7.036	7.559	8.058	8.300	8.998	9.267
1/ 11.8	67.791	144.26	196.43	258.84	332.16	417.04	623.92	747.09	884.17	1202.2	1582.3	1796.8	2544.2	2888.8
0.09000	3.951	4.728	5.087	5.429	5.758	6.075	6.676	6.964	7.244	7.782	8.296	8.545	9.263	9.540
1/ 11.1	69.815	148.55	202.26	266.51	342.00	429.38	642.35	769.15	910.26	1237.7	1628.9	1849.7	2619.1	2973.8
0.09500	4.062	4.861	5.230	5.582	5.919	6.244	6.863	7.158	7.446	7.999	8.527	8.782	9.521	9.805
1/ 10.5	71.784	152.72	207.93	273.98	351.57	441.39	660.29	790.61	935.64	1272.1	1674.2	1901.2	2691.9	3056.4
0.10000	4.171	4.991	5.369	5.730	6.076	6.410	7.044	7.348	7.642	8.210	8.752	9.014	9.771	10.06
1/ 10.0	73.701	156.78	213.46	281.26	360.90	453.09	677.76	811.51	960.37	1305.7	1718.4	1951.3	2762.8	3136.9
	180	240	270	300	320	350	410	440	470	550	600	600	700	750

θ_{medial} for part-full circular pipes.

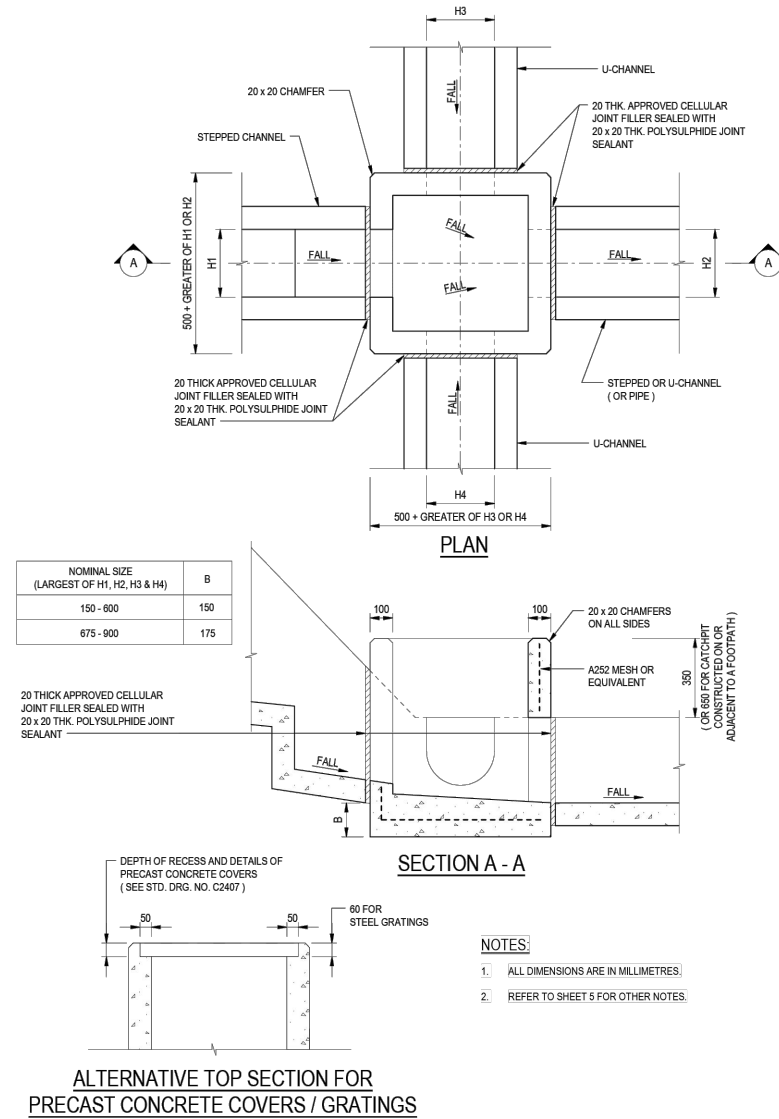
$S = 0.02000 \text{ to } 0.10000$

$k_s = 0.060 \text{ mm}$

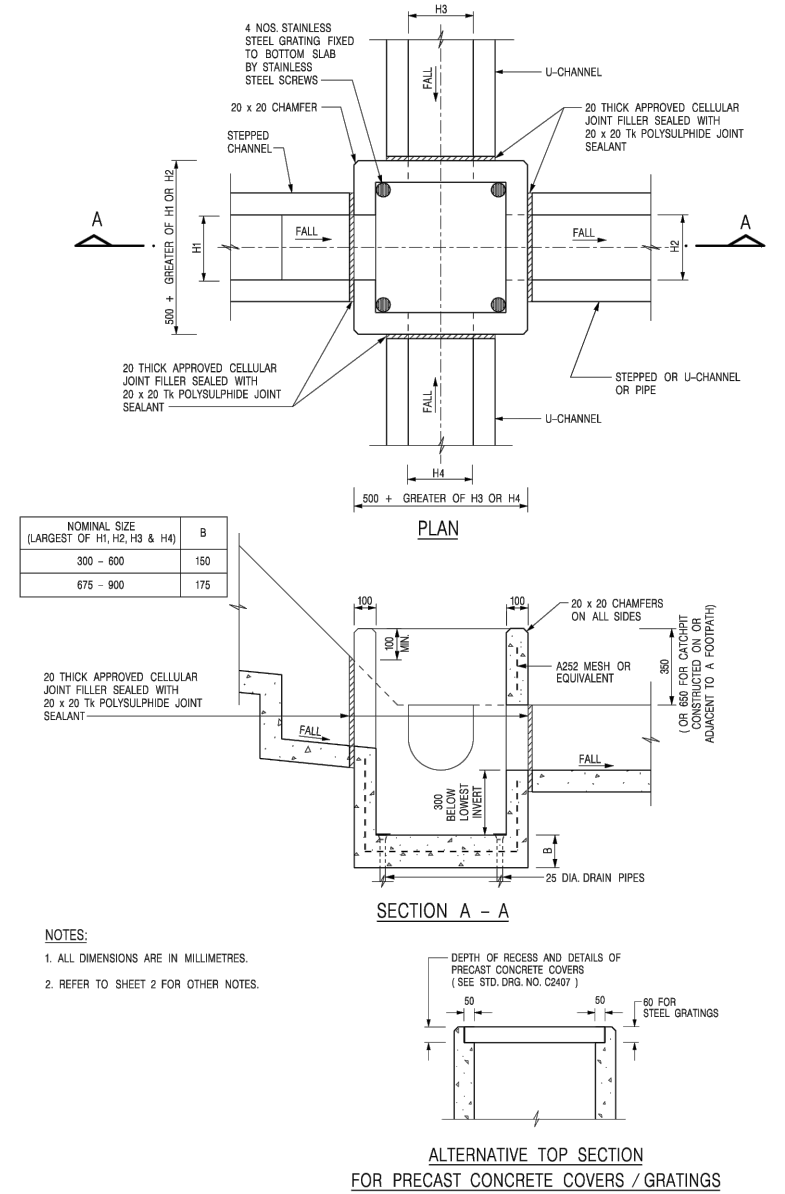


NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES.
- ALL CONCRETE SHALL BE GRADE 20 /20.
- CONCRETE SURFACE FINISH SHALL BE CLASS U2 OR F2 AS APPROPRIATE.
- FOR DETAILS OF JOINT, REFER TO STD. DRG. NO. C2413.
- CONCRETE TO BE COLOURED AS SPECIFIED.
- UNLESS REQUESTED BY THE MAINTENANCE PARTY AND AS DIRECTED BY THE ENGINEER, CATCHPIT WITH TRAP IS NORMALLY NOT PREFERRED DUE TO PONDING PROBLEM.
- UPON THE REQUEST FROM MAINTENANCE PARTY, DRAIN PIPES AT CATCHPIT BASE CAN BE USED BUT THIS IS FOR CATCHPITS LOCATED AT SLOPE TOE ONLY AND AS DIRECTED BY THE ENGINEER.
- FOR CATCHPITS CONSTRUCTED ON OR ADJACENT TO A FOOTPATH, STEEL GRATINGS (SEE DETAIL 'A' ON STD. DRG. NO. C2405 /2) OR CONCRETE COVERS (SEE STD. DRG. NO. C2407) SHALL BE PROVIDED AS DIRECTED BY THE ENGINEER.
- IF INSTRUCTED BY THE ENGINEER, HANDRAILING (SEE DETAIL 'J' ON STD. DRG. NO. C2405 /5; EXCEPT ON THE UPSLOPE SIDE) IN LIEU OF STEEL GRATINGS OR CONCRETE COVERS CAN BE ACCEPTED AS AN ALTERNATIVE SAFETY MEASURE FOR CATCHPITS NOT ON A FOOTPATH NOR ADJACENT TO IT. TOP OF THE HANDRAILING SHALL BE 1 000 mm MIN. MEASURED FROM THE ADJACENT GROUND LEVEL.
- MINIMUM INTERNAL CATCHPIT WIDTH SHALL BE 1 000 mm FOR CATCHPITS WITH A HEIGHT EXCEEDING 1 000 mm MEASURED FROM THE INVERT LEVEL TO THE ADJACENT GROUND LEVEL. AND, STEP IRONS (SEE DSD STD. DRG. NO. DS1043) AT 300 c/c STAGGERED SHALL BE PROVIDED. THICKNESS OF CATCHPIT WALL FOR INSTALLATION OF STEP IRONS SHALL BE INCREASED TO 150 mm.
- FOR RETROFITTING AN EXISTING CATCHPIT WITH STEEL GRATING, SEE DETAIL 'G' ON STD. DRG. NO. C2405 /4.
- SUBJECT TO THE APPROVAL OF THE ENGINEER, OTHER MATERIALS CAN ALSO BE USED AS COVERS / GRATINGS.



STANDARD CATCHPIT DETAILS



CATCHPIT WITH TRAP

