

主旨: [REDACTED] [FI] S.16 Application No. A/YL-KTN/1253 - Further Information
附件: FI2 for A_YL-KTN_1253 (20261002).pdf

From: Danny Ng [REDACTED]
Sent: Friday, October 2, 2026 10:15 AM
To: tpbpd/PLAND [REDACTED]

Subject: [FI] S.16 Application No. A/YL-KTN/1253 - Further Information

Dear Sir,

We write to submit further information, including a revised drainage impact assessment (DIA) for the consideration of Government departments (*enclosed*).

Should you require more information, please do not hesitate to contact us. Thank you for your kind attention.

Kind Regards,

Danny NG | Town Planner
R-riches Group (HK) Limited

R-riches Property Consultants Limited | R-riches Planning Limited | R-riches Construction Limited

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

By Email

2 October 2026

Dear Sir,

2nd Further Information

**Temporary Holiday Camp, Place of Recreation, Sports or Culture, Barbecue Site
and Eating Place with Ancillary Facilities and Associated Filling of Land and Pond
for a Period of 3 Years in "Agriculture" Zone,
Various Lots in D.D. 107 and D.D. 109, Fung Kat Heung, Kam Tin, Yuen Long, New Territories**

(S.16 Planning Application No. A/YL-KTN/1253)

We write to submit further information, including a revised drainage impact assessment (DIA) for the consideration of Government departments (**Appendix I**).

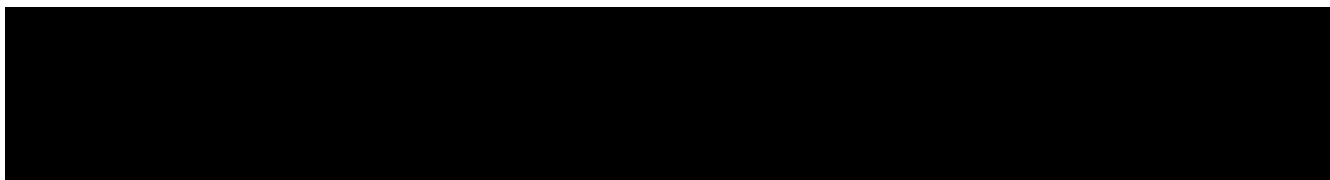
Should you require more information regarding the application, please contact the undersigned at your convenience. Thank you for your kind attention.

Yours faithfully,

For and on behalf of
R-riches Planning Limited



Danny NG
Town Planner



Responses on DSD's Requirements and Reminders

Planning Application No.: A/YL-KTN/1253

Location: Lots No. 1775 RP, 1785 RP, 1786, 1787 S.B., 1787, 1790 RP IN D.D.107

AND LOTS 21(PART), 22(PART), 28(PART) IN D.D.109

Site Area:	11456	m ²
Land filling works involved?	Yes / No	
Maximum increase in formation level:		m
Maximum level difference with adjoining lot:		m
Filling of pond(s) involved?	Yes / No	
Estimated size of pond to be filled:		m ³

No.	(A) DSD's Requirements	Fulfilled in the submission? (Yes / No)
1	For sites considered complex (those 1 hectare or larger, in flood-prone areas, or involving pond filling or major earthworks), you should hire a qualified engineer (Registered Professional Engineer in the Civil Engineering discipline) to follow DSD Advice Note No. 1 and submit a proposal signed and certified by the engineer. For other sites, it is also advisable to hire a qualified engineer to prepare your drainage proposal.	Yes
2	The proposed development should neither obstruct overland flow nor adversely affect any existing natural streams, village drains, ditches and the adjacent areas, etc., unless there is proper diversion.	Yes
3	Adequate surface channels shall be provided to collect and convey the surface runoff accrued on the application site.	Yes
4	If there is existing surface runoff flowing from the adjoining lots towards the application site, peripheral surface channels with sufficient drainage capacity, set at a level lower than the adjoining lots, should be constructed to collect and convey the runoff (See Sketch A).	Yes
5	Where boundary walls or hoarding are erected, adequate openings should be provided to allow existing overland flow from the adjoining lots to pass through (see Sketch A).	Yes
6	The applicant shall be required to place all the proposed works 3m away from the top of the bank of any existing watercourses or natural streams. All the proposed works in the vicinity of the watercourses should not create any adverse drainage impacts, both during and after construction. Adequate measures should be provided by the applicant to DSD's satisfaction in order to prevent the subject site from being eroded and flooded and to ensure that the capacity of watercourses and the flooding susceptibility of the adjoining areas would not be adversely affected by the proposed development.	Yes
7	The applicant should indicate the proposed and existing ground levels of the application site and ground levels of adjacent areas on the drainage plan.	Yes
8	Cross sections showing the proposed drainage facilities and existing and proposed ground levels of the application site with respect to the adjacent areas should be given.	Yes
9	The proposal should indicate how the runoff (the flow direction) within the site and from the adjacent areas would be discharged to the proposed drainage system.	Yes
10	Sand trap or provision alike should be clearly indicated on the proposed drainage plan and provided before the collected runoff is discharged to the existing drainage facilities.	Yes

11	The applicant should clearly indicate the full alignment of the discharge path from the application site all the way down to the ultimate discharge point (e.g. a well-established stream course/public drainage system).	Yes
12	The applicant should clearly indicate the existing drainage facilities on the proposed drainage plan. Site photos of existing drainage facilities including the discharge point (e.g. existing local village drain and its downstream drainage facilities) should be provided in order to demonstrate the presence and reflect condition of the existing drainage system. Also, the applicant should provide site photo(s) to demonstrate size of the existing drainage facilities.	Yes
13	Cover levels and invert levels of the proposed and existing drainage facilities should be shown on the drainage plan. Invert levels of drainage facilities at the upstream should be higher than that at the downstream. Also, gradients and sizes of the proposed and existing drainage facilities should be shown on the drainage plan.	Yes
14	The applicant should demonstrate with hydraulic calculation that the proposed drainage facilities are adequate to collect, convey and discharge the surface runoff accrued on the application site and the overland flow intercepted from the adjacent lands. External catchment shall be properly considered	Yes
15	Connection to existing drainage facilities should be designed and constructed to prevent back flows at the drainage outlet when water level at the existing drainage facilities is high.	Yes
16	Stormwater Drainage Manual (SDM) and the newly promulgated SDM - Corrigendum published by DSD shall be considered in the hydraulic calculation. Also, storm constants of HKO Headquarters shall be adopted. In general, a 10-year design return period is sufficient for village drainage systems.	Yes
17	Deposition of sediment in stormwater drainage system should be considered in the hydraulic calculation as per the requirement in Stormwater Drainage Manual (Section 9.3).	Yes
18	The applicant should check flow velocity of the proposed drainage facilities. The flow velocity is suggested to be within a range, i.e. 0.75 m/s to 3.0 m/s.	Yes
19	Catchpit should be provided at where a proposed surface channel changes direction / gradient.	Yes
20	The applicant should provide construction details of the proposed drainage facilities.	Yes
21	The applicant should provide details for connection of the proposed and existing drainage facilities.	Yes
22	Grating should be provided for the surface channels.	Yes
23	Precast concrete pipe should generally be used for stormwater connection.	Yes
24	Connection of the proposed and existing drainage facilities shall be designed and constructed such that there is no water leakage at the proposed connection.	Yes
25	For the construction details of the proposed drainage facilities, reference should be made to current CEDD's standard drawings.	Yes
	(B) DSD's Reminders	Fulfilled in the submission? (Yes / No)
1	Any existing drainage facilities within/outside the application site should not be disturbed or interfered with until any necessary diversion works, which have been accepted by the owner of the existing drainage facilities, have been satisfactorily completed. Such diversion works should be carried out by the applicant at his/her own cost. Moreover, sufficient allowance for future maintenance of the existing drainage facilities should be provided.	Yes

2	No construction debris, silt and sediments, or cementitious materials should be discharged into or deposited inside any existing natural streams, watercourses, drains, ditches or sewers from the application site without prior approval. Any blockage or damage arising from the proposed development shall be made good at the cost of the applicant and to DSD's satisfaction. The applicant shall also be liable for and shall indemnify against all claims and demands arising out of or in connection with this regard.	Yes
3	The applicant should be reminded to minimize the possible adverse environmental impacts on any existing watercourses in his design and during construction. EPD and AFCD should be consulted on possible environmental and/or ecological impacts of the proposed development which is in the vicinity of any existing watercourses.	Yes
4	The applicant is required to rectify/modify the drainage system if they are found to be inadequate or ineffective during operation. The applicant shall also be liable for and shall indemnify claims and demands arising out of damage or nuisance caused by a failure of the drainage system.	Yes
5	For any proposed connection to DSD's drainage facilities, the applicant should submit form HBP1 to this Division for application of technical audit. Upon our acceptance of the connection application, the applicant shall carry out the proposed connection works in accordance with DSD's Standard Drawings at the resources of the applicant.	Yes
6	If the existing drainage facilities, to which the applicant proposed to discharge the stormwater from the application site was not maintained by this office, the applicant should identify the owner of the existing drainage facilities and seek agreement from the owner prior to commencement of the proposed works. In the case that it is a local village drains, DO/YL should be consulted.	Yes
7	The applicant should consult DLO/YL and seek consent from the relevant owners for any drainage works to be carried out outside his lot boundary before commencement of the drainage works.	Yes
8	Comments from HyD, TD and RMO shall be sought if drainage works are proposed to be carried out within highway polygon or on carriageway.	Yes

**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

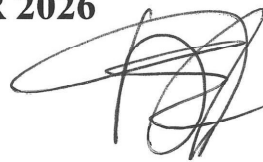
AND LOTS 21(PART), 22(PART), 28(PART) IN DD109

FUNG KAT HENUNG KAM TIN, YUEN LONG

(Application No. A/YL-KTN/1253)

DRAINAGE IMPACT ASSESSMENT

SEPTEMBER 2026



**LEE WAI HUNG DANIEL
CVL RP0114219**

Henry Chan & Partners Consultant Engineering Limited

CONTENTS

1. SYNOPSIS
2. PROPOSED DEVELOPMENT
3. SITE DESCRIPTION
4. EXISTING DRAINAGE SYSTEM OF THE APPLICATION SITE AND POND CAPACITY
5. RETENTION CAPACITY OF POND IN LOT 21
6. DRAINAGE IMPACT OF THE PROPOSED DEVELOPMENT
7. CONCLUSION

- Appendix A Response to Comments (R to C) Table (DSD) for Sep. 2026 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 22 September 2026. (R to C table in Appendix A refers)

2. Proposed Development

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. In this proposed development, subject 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.

It should be noted that the proposed development has no land filling works and there is no change to existing ground levels.

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.

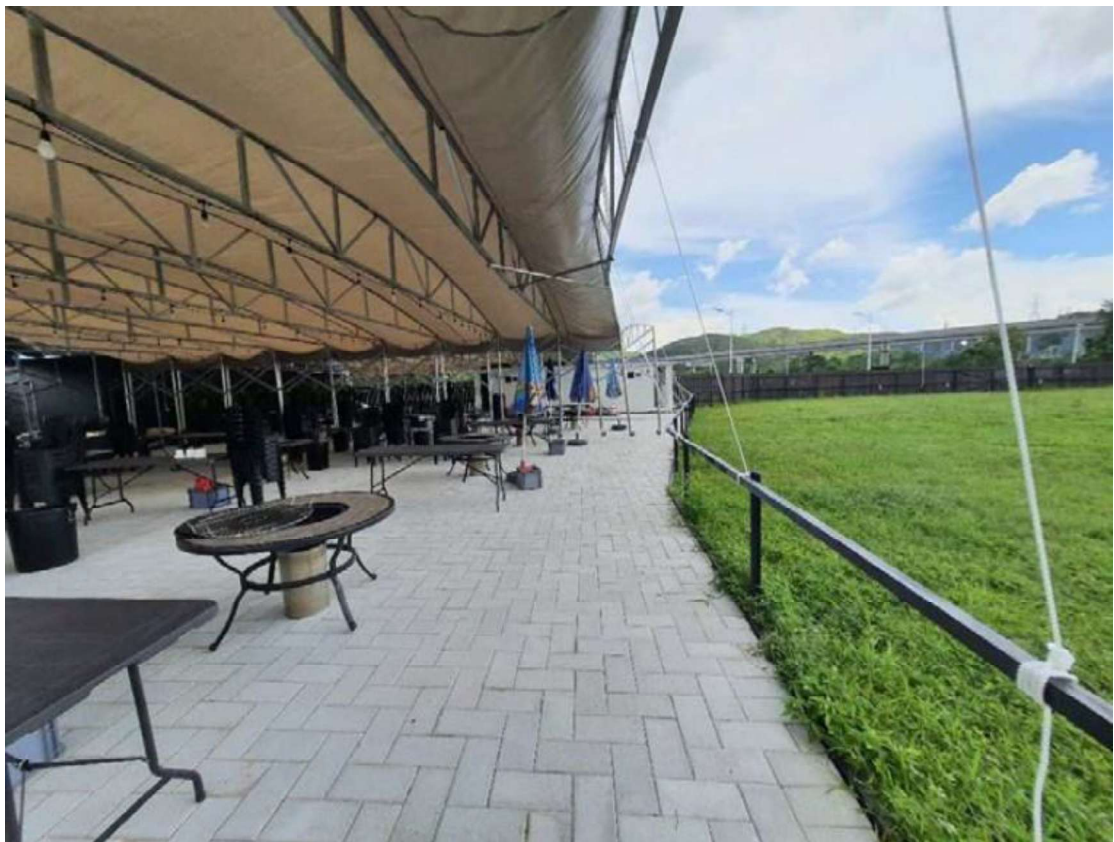


Site Lot Plan

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:



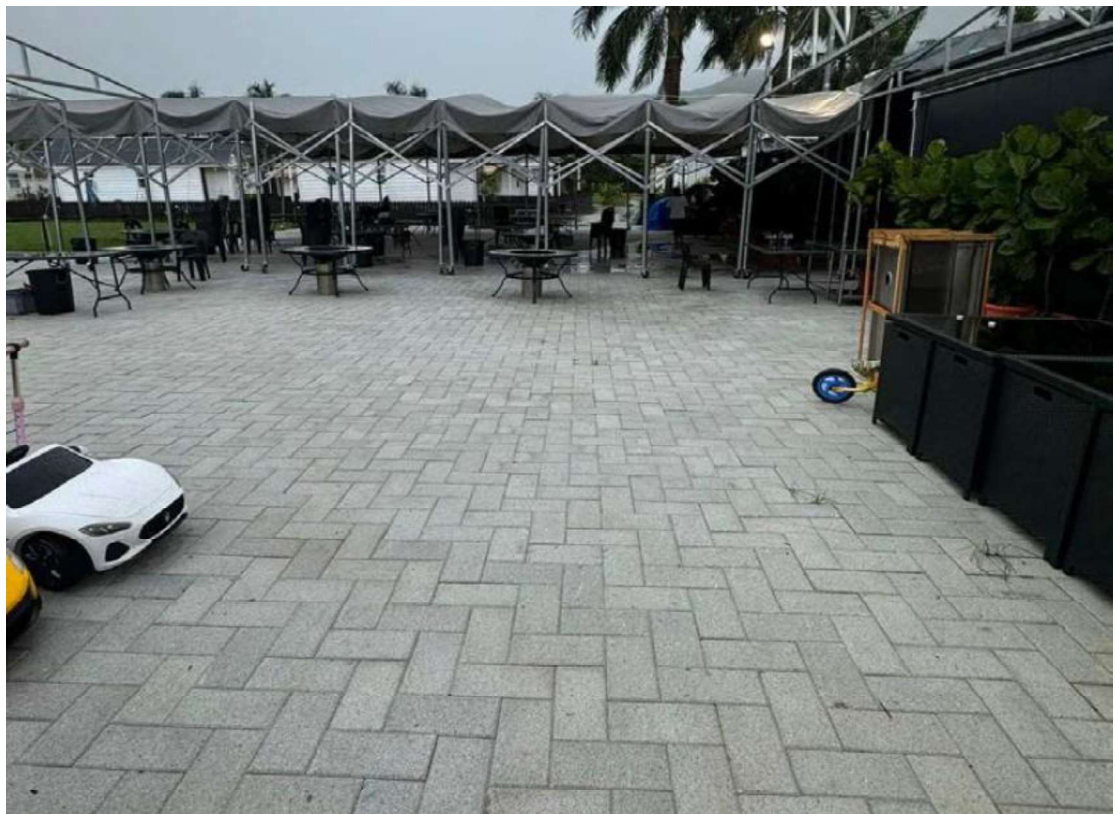
P1 - Fence Wall of Lots No.21, 22 & 28 in DD109



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: $= 0.667 \text{ m}^3/\text{s}$
Pond Capacity: $= 1370.3 \text{ m}^3$ (From Previous drainage proposal)

Retention time: $= 1370.3 / 0.667 / 60 \approx 34 \text{ mins.}$

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: $= 0.782 \text{ m}^3/\text{s}$
Pond Capacity: $= 1370.3 \text{ m}^3$ (From previous drainage proposal)

Retention time: $= 1370.3 / 0.782 / 60 \approx 29 \text{ mins.}$

- 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 5 minutes.

6. Drainage Impact of the Proposed Development

The Application Site levels are generally higher than the surrounding adjacent ground levels. (Figure 1 to 7 refers)

A small proportion of the ground will be hard paved as shown on plan attached in Appendix H.

Therefore, the changes in paving condition and the corresponding surface run-off due to the proposed development has insignificant impact to its adjacent ground. The proposed drainage system to this Application Site is shown in Figure 1 to 7 in Appendix H.

7. Conclusion

- 7.1 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.
- 7.2 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.
- 7.3 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 stormwater drainage impact under this application is minimal.

- 7.4 Based on detailed channel design under this study, it is recommended that:

- (i) Existing 270 UC be increased in size to 420UC.

- (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
22 September 2026

RESPONSE TO COMMENTS for LandsD's Letter dated 22 September 2026

DSD/LD Comment	Response to DSD/LD Comments
(a) Please clarify the discrepancy of the pond area mentioned in September 2025 Report in Appendix F (1202m ²) and Figure 2 in Appendix H (1084.4m ²).	(a) Noted. The pond area is revised to 1202m ² in Figure 2 and related calculation.
(b) Consideration should be given to provide catchpit(s) at the turning points of the proposed upgraded u-channels.	(b) Noted. Catchpits are provided in all turning points of the proposed upgraded u-channels.
(c) Please review if “Existing 400 UC” as shown on Section B-B in Figure 4 should read “Proposed 400UC”.	Noted. “Existing 400UC” is revised to “CONSTRUCTED 270 UC APPROVED IN 10 FEB 2022 TO BE UPGRADED TO 420 UC”
(d) As shown on Section B-B, the existing ground level is higher than the area at the right. Please provide peripheral surface channel to collect the surface runoff accrued on the application site.	Noted. A 225mm peripheral channel is proposed at east of Catchment B to collect the surface runoff
(e) Please include the C.L. and I.L. of channels at starting point and existing catchpit(s) in the drainage plan.	Noted. Drainage layout plan revised accordingly.
(f) Please provide the connection details at the discharge point and indicate details (e.g. cover level, invert level and watercourse bottom level) in the drawing.	Noted. The connection detail is provide in Fig. 8 for reference.
(g) Please demonstrate the adopted distance (on plan) measured on the line of natural flow between the summit and the point under consideration for the calculation of time of concentration.	Noted. The distance applied in the calculation of time of concentration is show on the layout plan for runoff estimation in Appendix G & H .

(h) According to Appendix I, it is noted in the calculation of drainage capacity and Table A15 that a 400 mm dia. pipe in 1: 83 would be adopted at the downstream of the existing catchpit which is not consistent to the plan (375 mm dia. pipe in 1:83). Please clarify.	Noted. The existing pipe should be a 375 mm dia. uPVC pipe, and the gradient should be 1:23. The drainage plan and the calculations have been revised accordingly.
(i) Please review Manning's coefficient and be reminded to adopt the values commonly used for design as per SDM.	Noted. The Manning's coefficient revised to 0.014, which is commonly used for design.
(j) Please supplement the calculation of hydraulic radius in Table 2.2 of Appendix I.	Noted. The calculation of the hydraulic radius(R) is show on the Table 2.2.
(k) Please review whether the catchment 5 should be considered in the hydraulic calculation of the proposed 325 UC.	Noted. The channel proposed in the middle of Catchment 4 considers Catchments 3, 4, and 5. The proposed channel has been revised to 325UC.
(l) Please review whether the material of the proposed outlet pipes should be precast concrete instead of prestressed concrete and update the roughness coefficient as appropriate. Reference should be made to Stormwater Drainage Manual published by DSD. Please indicate clearly the material of the outlet pipes on the drainage plan.	Noted. The outlet pipe capacity has been revised to reflect the updated roughness coefficient. The pipe material is indicated on the drainage plan.
(m) The details of catchpit with sand trap or provision alike was indicated on Figure 8 in Appendix H. However, the feature of catchpit with sand trap was not clearly indicated on plan and legend. Please review.	Noted. The catchpit with sandtrap (CP5) is indicated on plan and catchpit schedule.

(n) The development should neither obstruct overland flow and nor adversely affect existing natural streams, village drains, ditches and the adjacent areas, etc.	Noted.
(o) The planning application number of the drainage impact assessment should be read as “A/YL-KTN/1253” instead.	Noted. The application No. stated in the report cover is revised to “A/YL-KTN/1253”.
(p) The application site is in the vicinity of an existing pond. The applicant shall be required to place all the proposed works 3m away from the pond. All the proposed works in the vicinity of the pond should not create adverse drainage impacts, both during and after construction. Proposed flooding mitigation measures if necessary shall be provided at the resources of the applicant to satisfaction of this Division or the Town Planning Board.	Noted
(q) The applicant should be reminded to minimize the possible adverse environmental impacts on the existing pond in his design and during construction. DEP and DAFC should be consulted on possible environmental and/or ecological impacts of the development.	Noted
(r) The existing drainage facilities, to which the applicant proposed to discharge the stormwater from the application site was not maintained by this office. The applicant should identify the owner of the existing drainage facilities and seek agreement from the owner prior to commencement of the proposed	Noted.

works. In the case that it is a local village drains, DO/YL should be consulted.	
(s) The applicant should resolve any conflict/disagreement with relevant lot owner(s) and seek permission from DLO/YL for laying new drains/channels/catchpits and/or modifying/upgrading existing ones in other private lots or on Government Land, where required, outside the	Noted.
(t) Where walls or hoarding are erected along the site boundary, adequate openings should be provided to allow existing overland flow from the adjoining lots to pass through (please see Sketch A).	Noted.
(u) The applicant is required to rectify the drainage system if they are found to be inadequate or ineffective during operation. The applicant shall also be liable for and shall indemnify claims and demands arising out of damage or nuisance caused by a failure of the drainage system.	Noted.

APPENDIX B

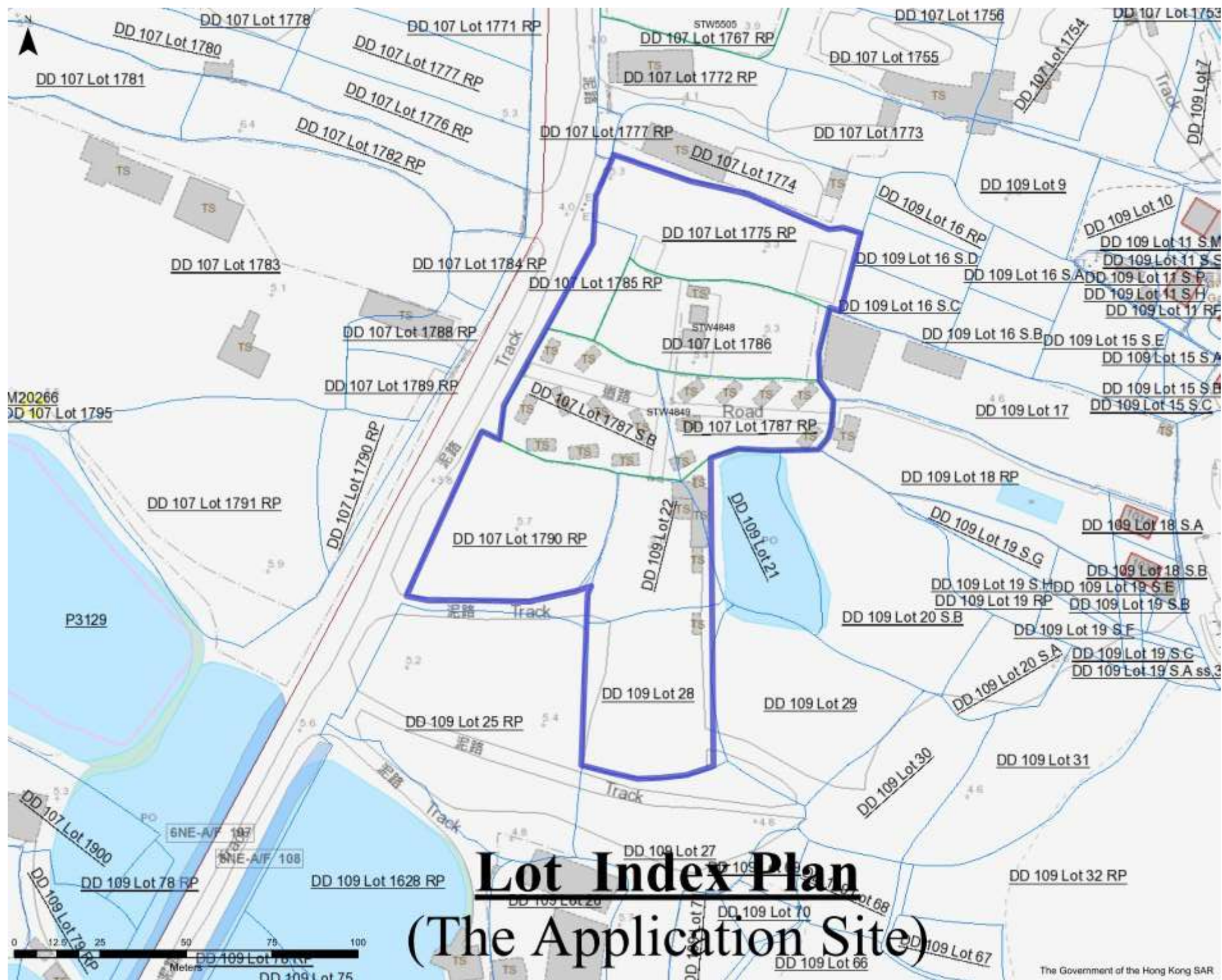
The Application Site Location Plan



SITE LOCATION PLAN

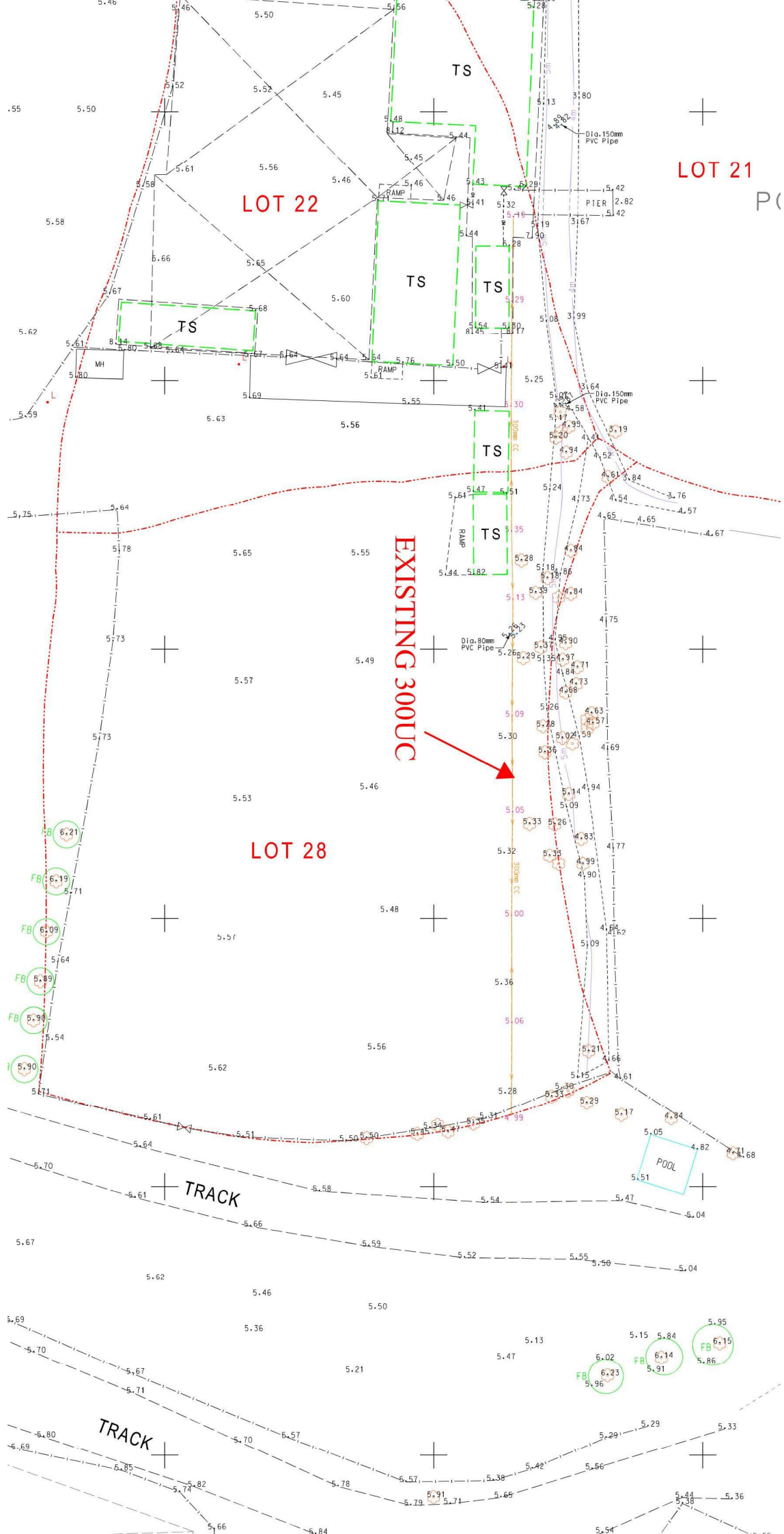
APPENDIX C

The Application Site with Lots No.



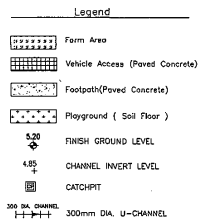
APPENDIX D

Topographic Survey Records of Existing 300 UC



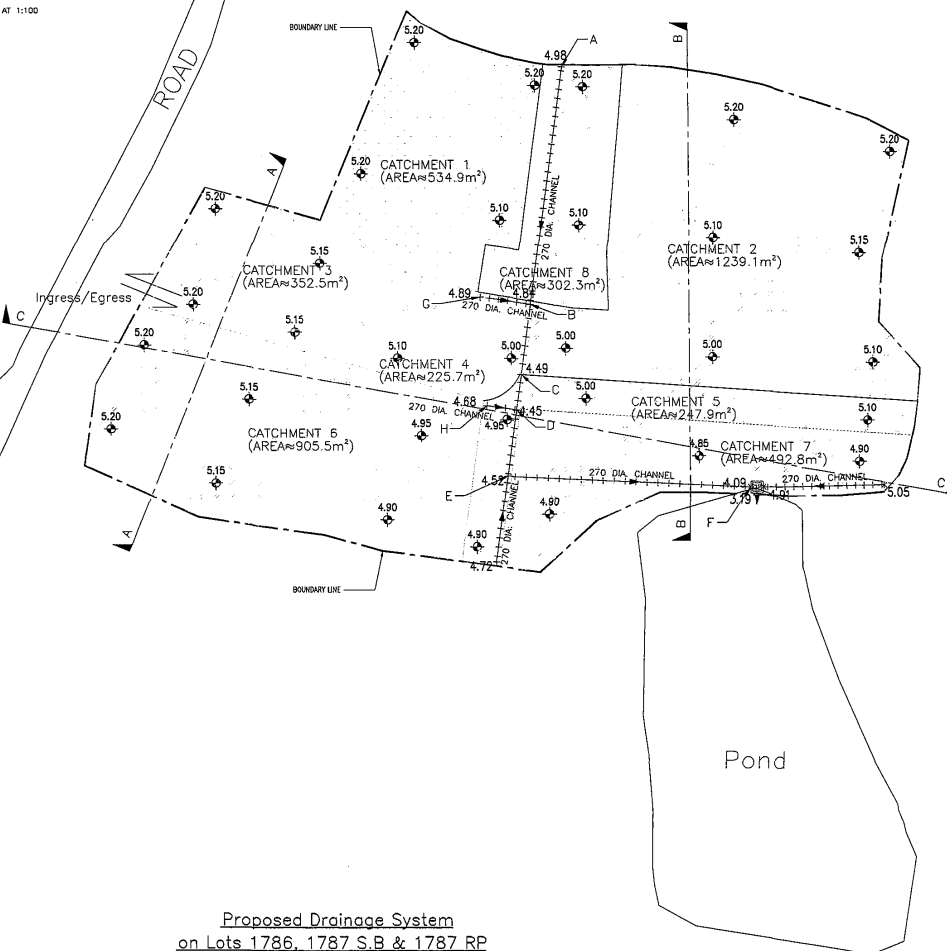
APPENDIX E

Constructed 275UC Layout Plan

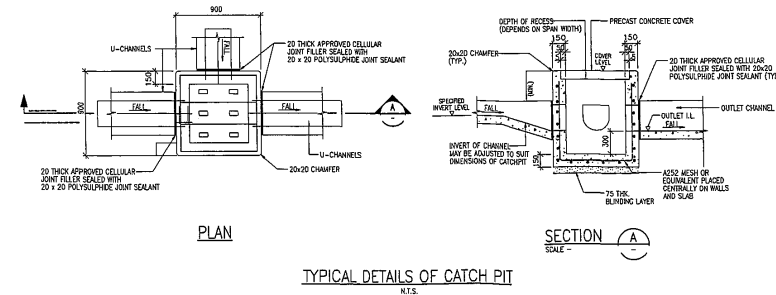
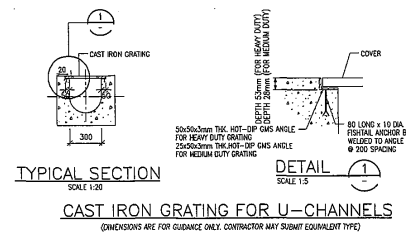
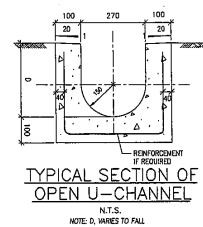


NOTES:

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



Proposed Drainage System
on Lots 1786, 1787 S.B & 1787 RP



80 REF.	
F.S.D. REF.	
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
WING & ASSOCIATES CONSULTING ENGINEERS LTD.	

APPENDIX F

Estimated Pond Capacity Abstract from
December 2025 Report

*Temporary Place of Recreation,
Sports or Culture (Hobby Farm, Caravan Holiday Camp)
and at Lots No. 21, 22 & 28 in D.D. 109 and
Lots No. 1786, 1787 S.B and 1787 RP in D.D 107,
Fung Kat Heung, Kam Tin, Yuen Long*

Drainage Proposal (Issue 3)

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

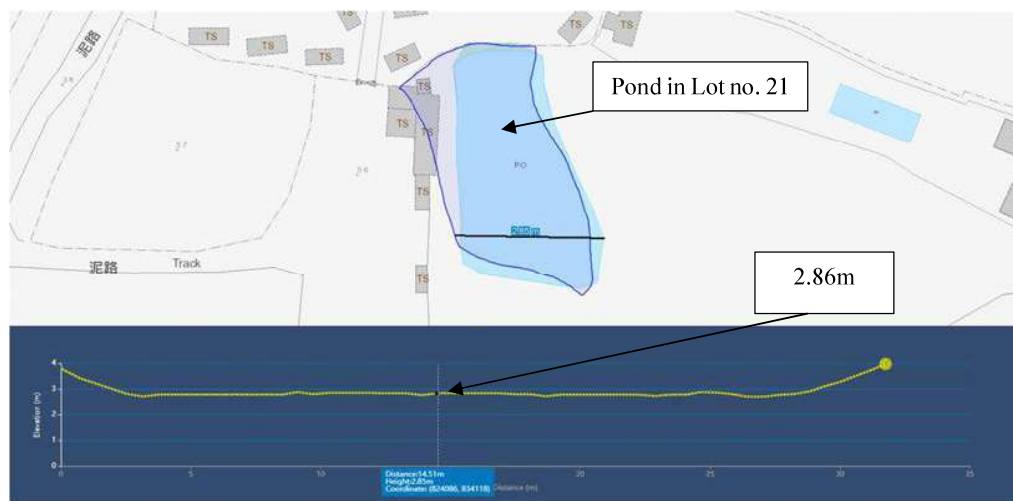
Design flow from D.D. 109 (Appendix B): = 0.11 m³/s

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**

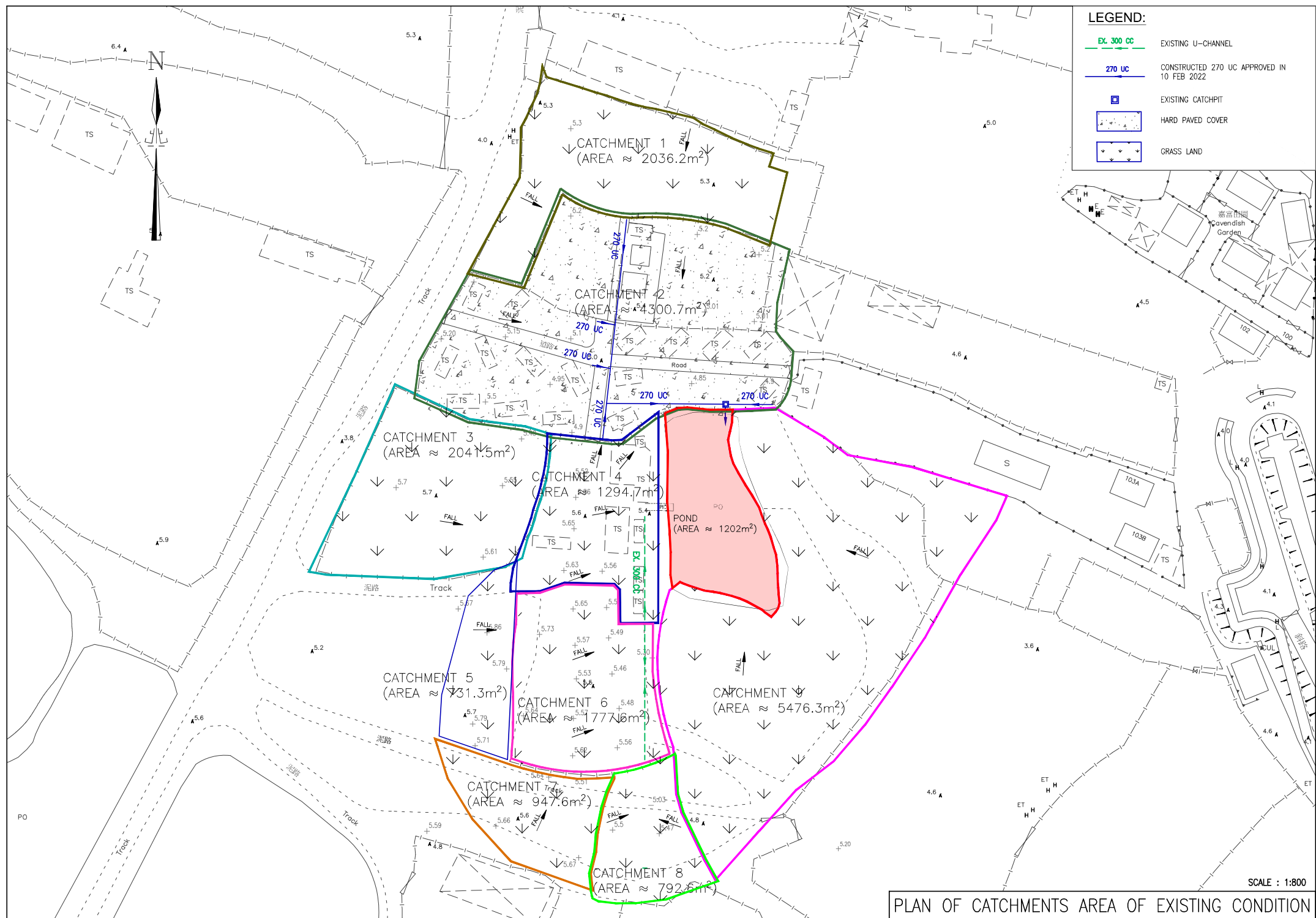


Section of pond in Lot No.21 from Geotechnical Information Infrastructure

APPENDIX G

Estimation of Existing Pond Retention Time under existing condition

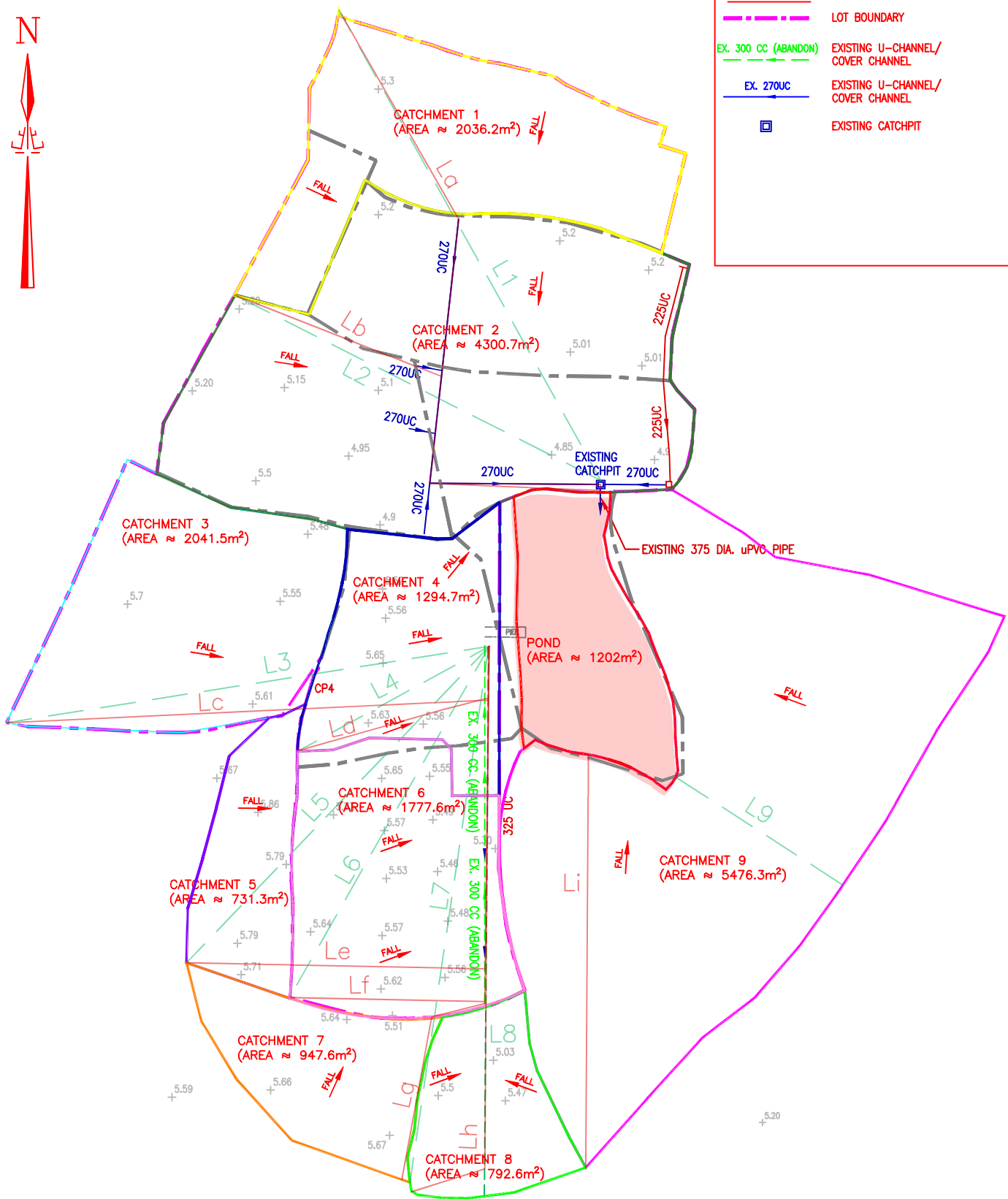
- (i) Existing Catchment for Pond
- (ii) Estimated on Existing Pond Retention Time





LEGEND:

- LOT BOUNDARY
- EX. 300 CC (ABANDON)
- EX. 270UC
- EXISTING U-CHANNEL/COVER CHANNEL
- EXISTING U-CHANNEL/COVER CHANNEL
- EXISTING CATCHPIT



LONG DISDANCE

- CATCHMENT 1 $L_a=121m$
- CATCHMENT 2 $L_b=92m$
- CATCHMENT 3 $L_c=98m$
- CATCHMENT 4 $L_d=46m$
- CATCHMENT 5 $L_e=115m$
- CATCHMENT 6 $L_f=102m$
- CATCHMENT 7 $L_g=107m$
- CATCHMENT 8 $L_h=108m$
- CATCHMENT 9 $L_i=75m$

SHORT DISDANCE

- CATCHMENT 1 $L_1=97m$
- CATCHMENT 2 $L_2=74m$
- CATCHMENT 3 $L_3=89m$
- CATCHMENT 4 $L_4=40m$
- CATCHMENT 5 $L_5=79m$
- CATCHMENT 6 $L_6=71m$
- CATCHMENT 7 $L_7=98m$
- CATCHMENT 8 $L_8=99m$
- CATCHMENT 9 $L_9=36m$

SCALE : 1:1000

LAYOUT PLAN FOR RUNOFF ESTIMATION
FOR EXISTING CONDITION

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 _d (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	1.11	228.14	0.032	1936
2	4300.70	92.00	0.54	6.52	0.95	1.11	249.47	0.283	16988
3	2041.50	98.00	0.34	8.22	0.25	1.11	235.69	0.033	2005
4	1294.70	46.00	0.37	3.95	0.25	1.11	277.82	0.025	1499
5	731.30	115.00	0.51	9.86	0.25	1.11	224.84	0.011	685
6	1777.60	102.00	0.28	8.99	0.25	1.11	230.32	0.028	1706
7	947.60	105.00	0.27	9.98	0.25	1.11	224.10	0.015	885
8	792.60	108.00	0.27	10.39	0.25	1.11	221.68	0.012	732
9	5476.30	75.00	1.39	4.30	0.25	1.11	273.31	0.104	6236
Pond	1202.00	0.001	0.001	0.000	1.00	1.11	367.65	0.123	7365
Total:									40036

	Shortest Distance	H1	H2
Catchment 1	97	5.3	4.8
Catchment 2	74	5.2	4.8
Catchment 3	89	5.7	5.4
Catchment 4	40	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			

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)
- $$= \frac{K \ i \ A}{60}$$

$$\text{Average Fall, } H_{\text{avg}} = \frac{H1 - H2}{1 \times 100}$$

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	40036	0.667

2.3 Pond Retention time

$$\begin{aligned} \text{Retention time} &= \text{Pond Capacity} \times \frac{0.667}{60} \\ &= 1370 \times \frac{0.667}{60} \\ &= \underline{\underline{34 \text{ Mins.}}} \end{aligned}$$

* From previous drainage proposal

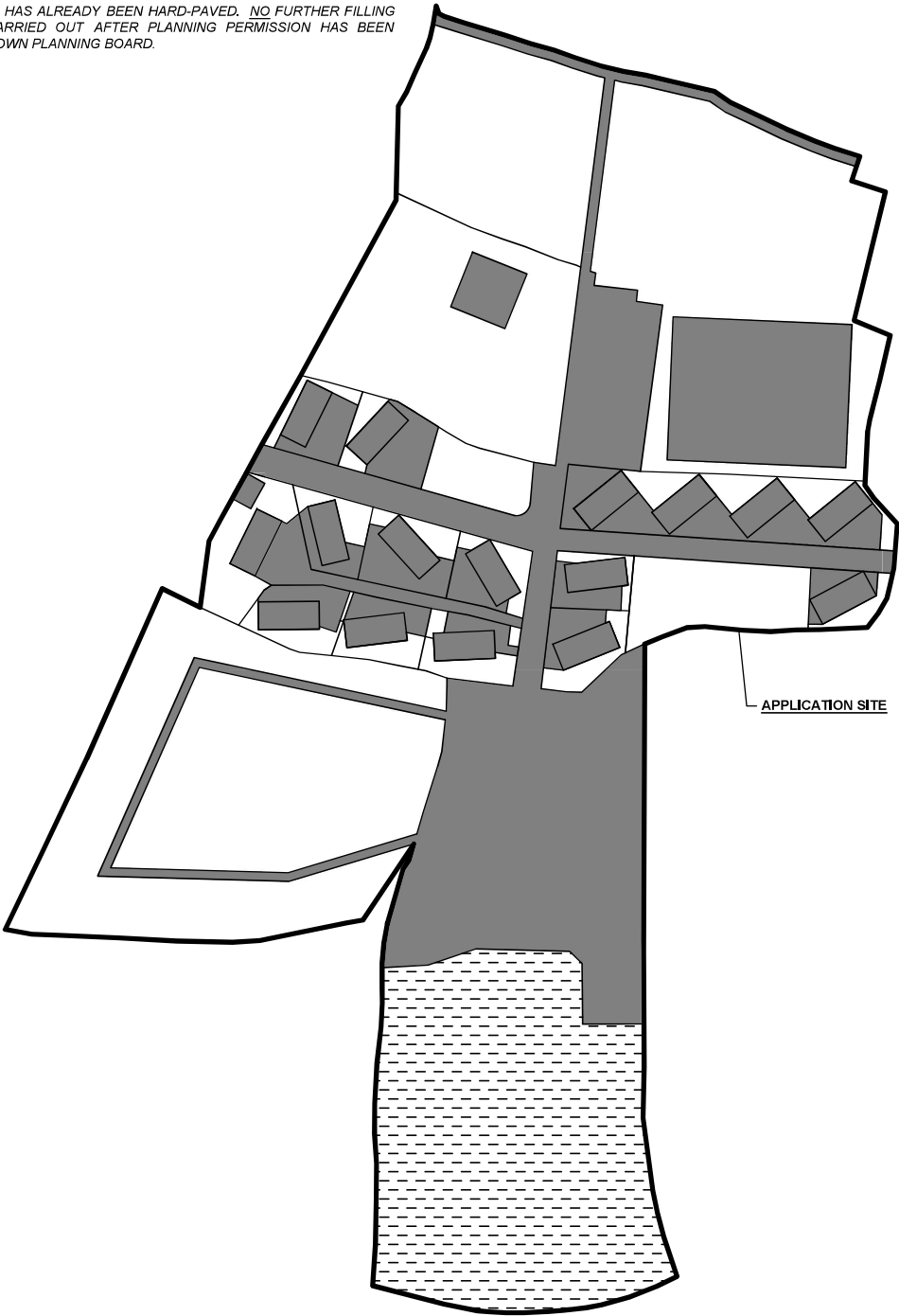
APPENDIX H

- 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.

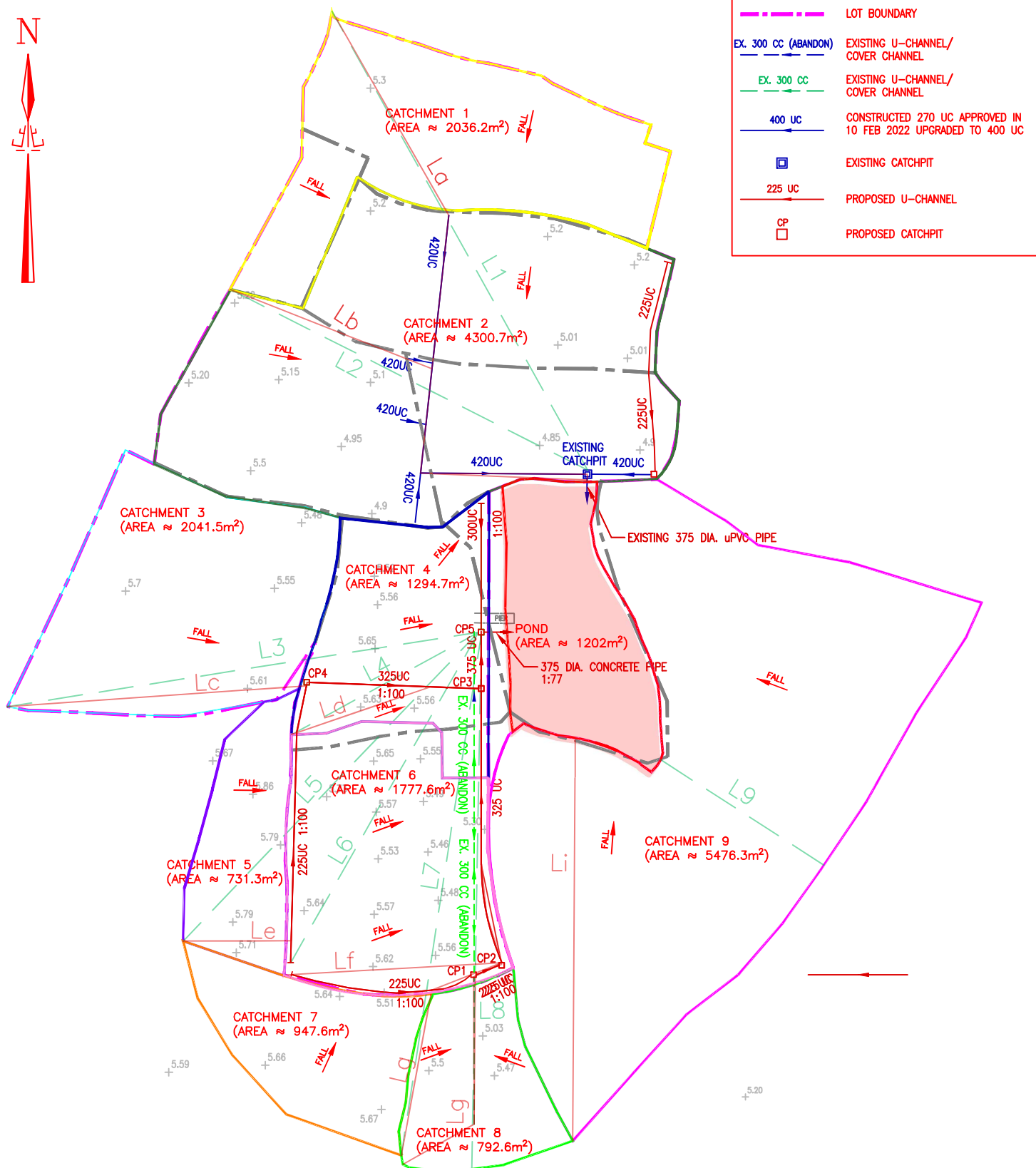


LEGEND

	APPLICATION SITE
	HARD PAVED AREA
	AREA COVERED BY GRAVEL
	LAWN AREA

*SITE BOUNDARY FOR IDENTIFICATION PURPOSE ONLY.

 R-RICHES PLANNING LIMITED	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		 NORTH W E S
			DRAWN BY MN	DATE 28.4.2026			
			REVISED BY	DATE	DWG NO. PLAN 6	VER. 001	



CATCHMENT 1 La=121m
CATCHMENT 2 Lb=92m
CATCHMENT 3 Lc=99m
CATCHMENT 4 Ld=47m
CATCHMENT 5 Le=112m
CATCHMENT 6 Lf=102m
CATCHMENT 7 Lg=107m
CATCHMENT 8 Lh=110m
CATCHMENT 9 Li=75m

CATCHMENT	1	L1=97m
CATCHMENT	2	L2=74m
CATCHMENT	3	L3=89m
CATCHMENT	4	L4=40m
CATCHMENT	5	L5=79m
CATCHMENT	6	L6=71m
CATCHMENT	7	L7=98m
CATCHMENT	8	L8=99m
CATCHMENT	9	L9=36m

LAYOUT PLAN FOR RUNOFF ESTIMATION FOR PROPOSED DRAINAGE WORKS

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	1.11	228.14	0.032	1936
2	4300.70	92.00	0.54	6.52	0.95	1.11	249.47	0.283	16988
3	2041.50	99.00	0.34	8.31	0.25	1.11	235.08	0.033	2000
4	1294.70	47.00	0.37	4.04	0.95	1.11	276.65	0.095	5671
5	731.30	112.00	0.51	9.60	0.25	1.11	226.42	0.011	690
6	1777.60	102.00	0.28	8.99	0.65	1.11	230.32	0.074	4435
7	947.60	107.00	0.27	10.17	0.25	1.11	222.97	0.015	880
8	792.60	110.00	0.27	10.58	0.25	1.11	220.58	0.012	728
9	5476.30	75.00	1.39	4.30	0.25	1.11	273.31	0.104	6236
Pond	1202.00	0.001	0.001	0.000	1.00	1.11	367.65	0.123	7365
Total:									46930

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	89	5.7	5.4
Catchment 4	40	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			

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

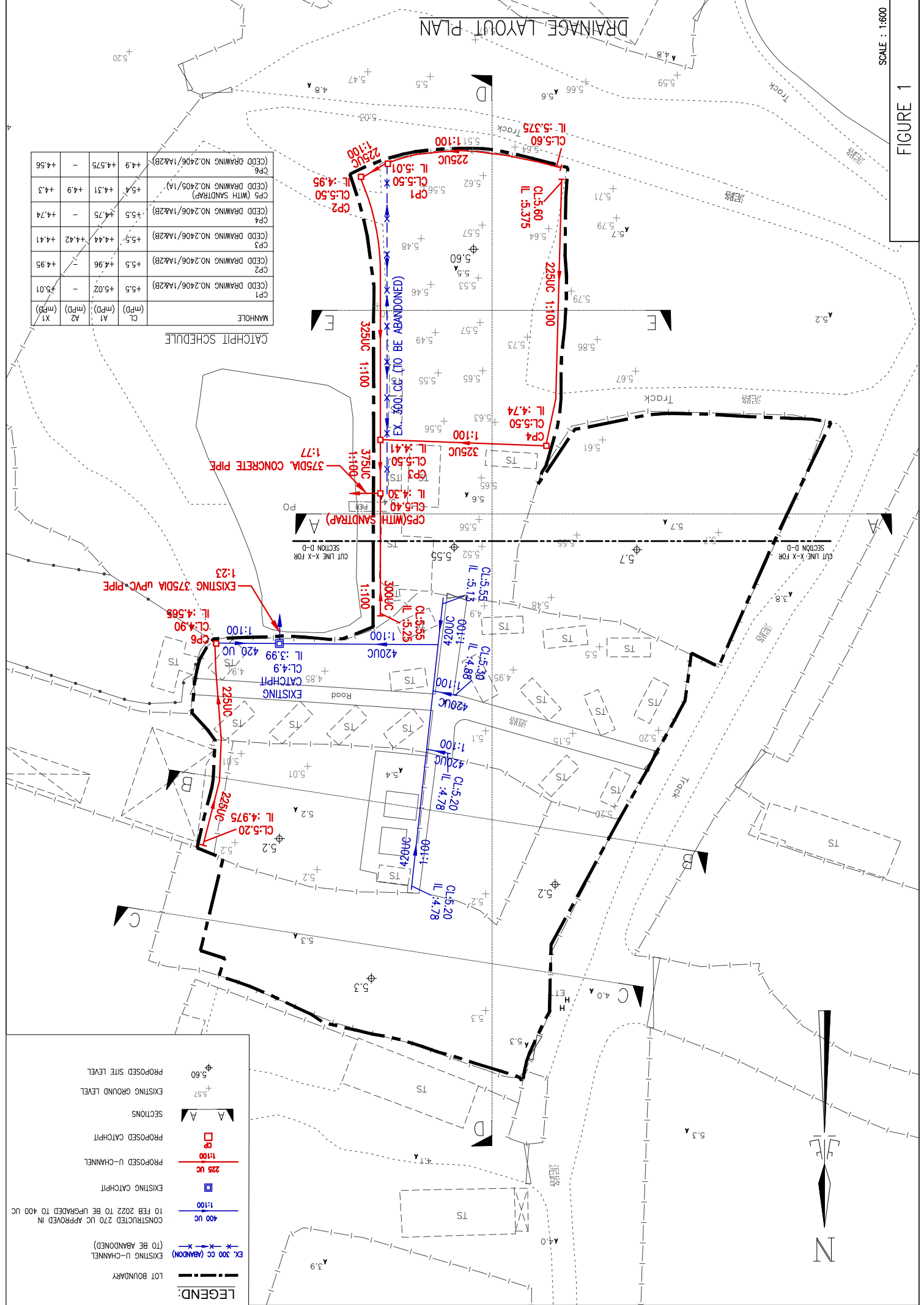
2.2 Estimation of Surface Channel Capacity:

Catchments Considered	Qtotal (litre/min)	Design Flow m ³ /s
1+2+3+4+5+6+7+8+9+Pond	46930	0.782

2.3 Pond Retention time

$$\begin{aligned} \text{Retention time} &= \text{Pond Capacity} \times \frac{0.782}{60} \\ &= 1370 \times \frac{0.782}{60} \\ &= \underline{\underline{29 \text{ Mins.}}} \end{aligned}$$

* From previous drainage proposal



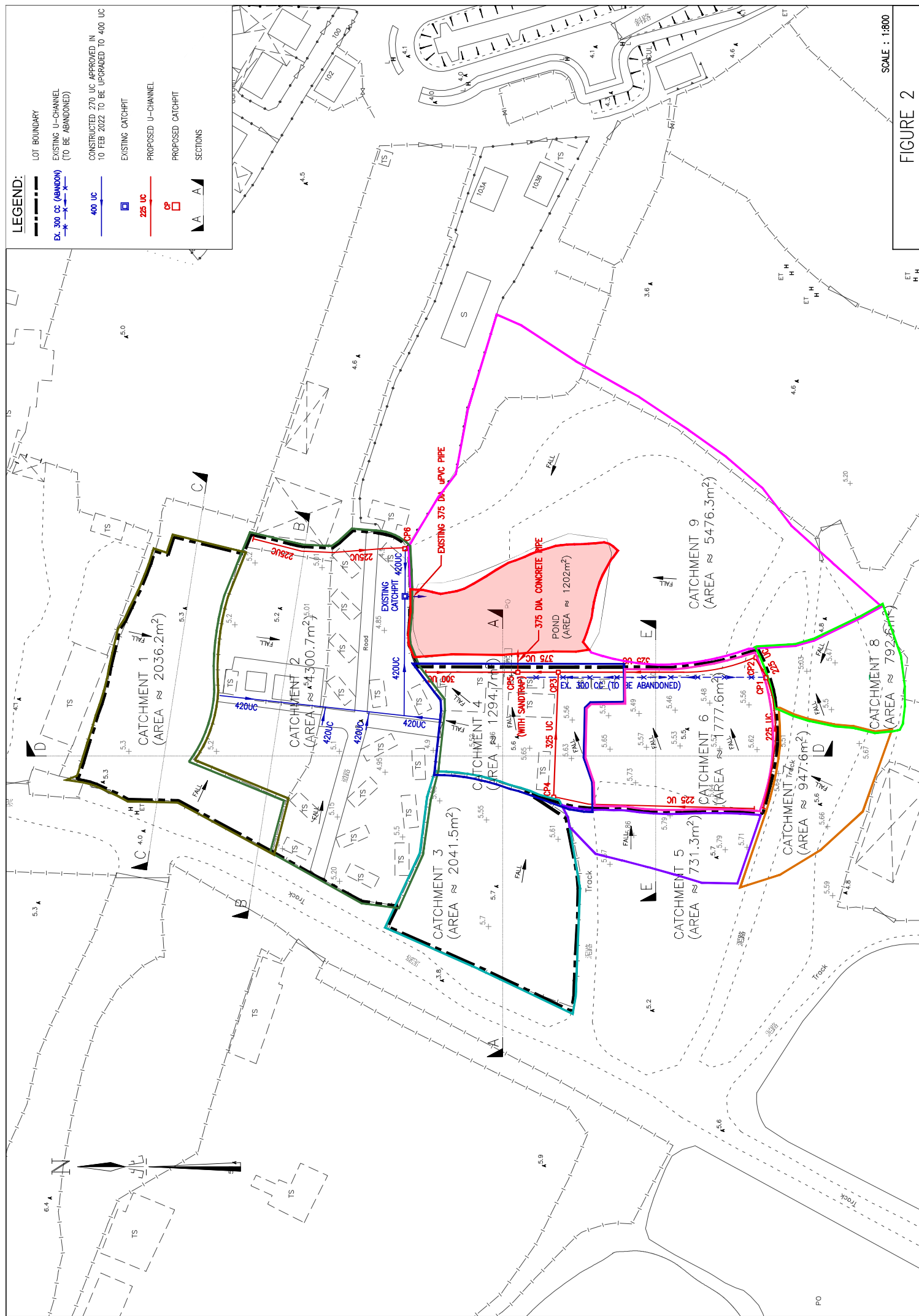
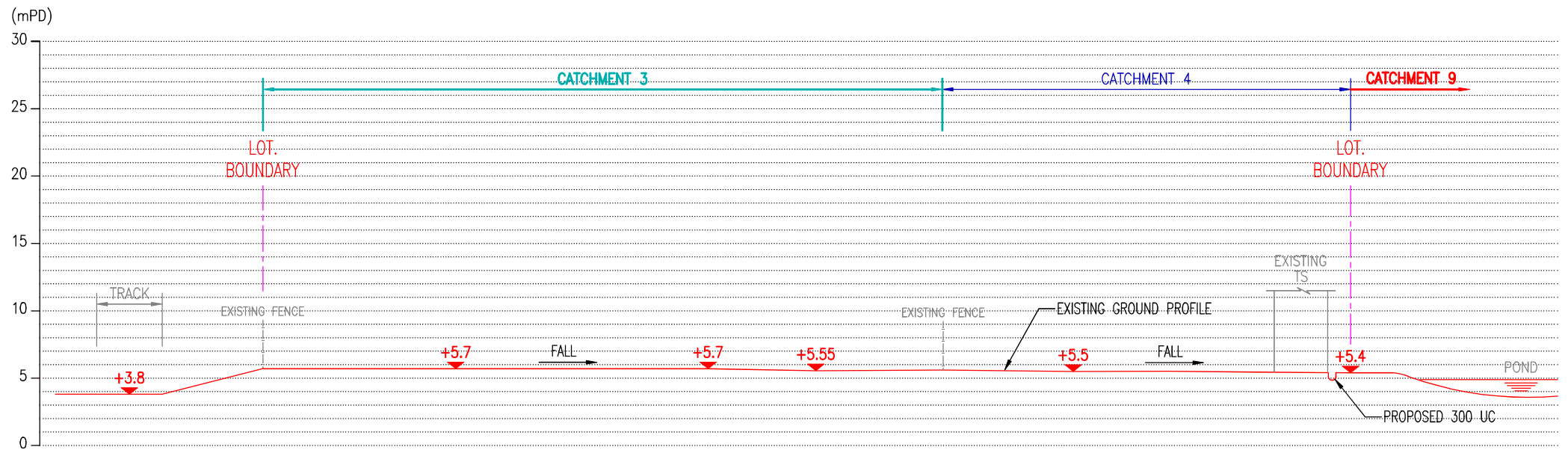


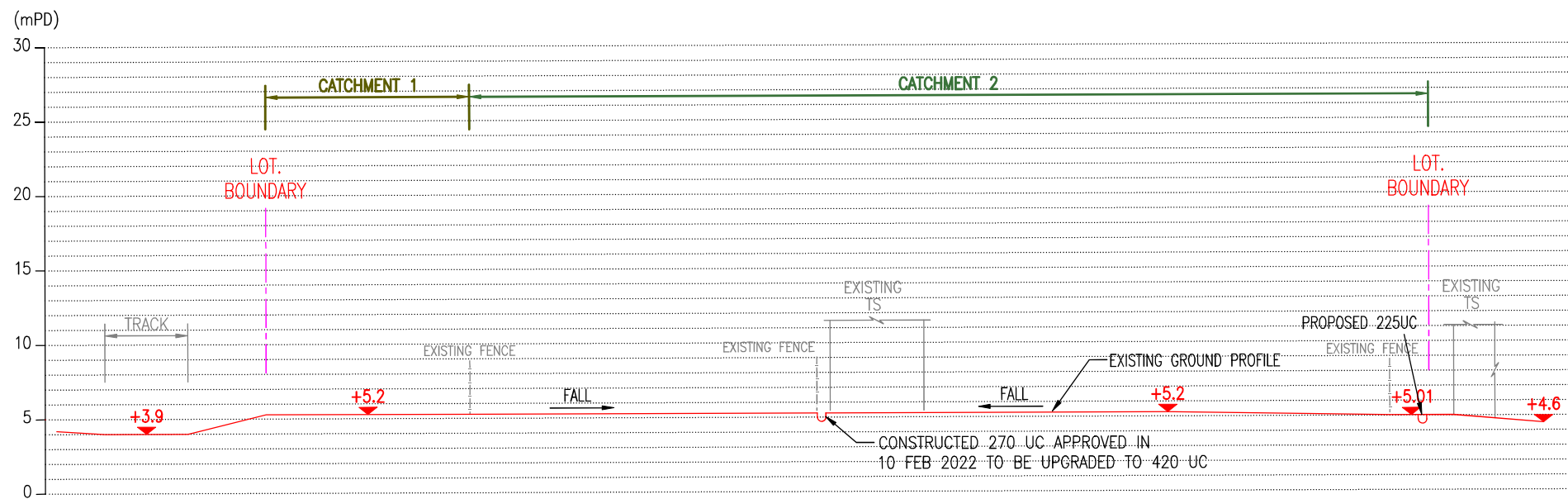
FIGURE 2



SECTION A-A

1 : 300

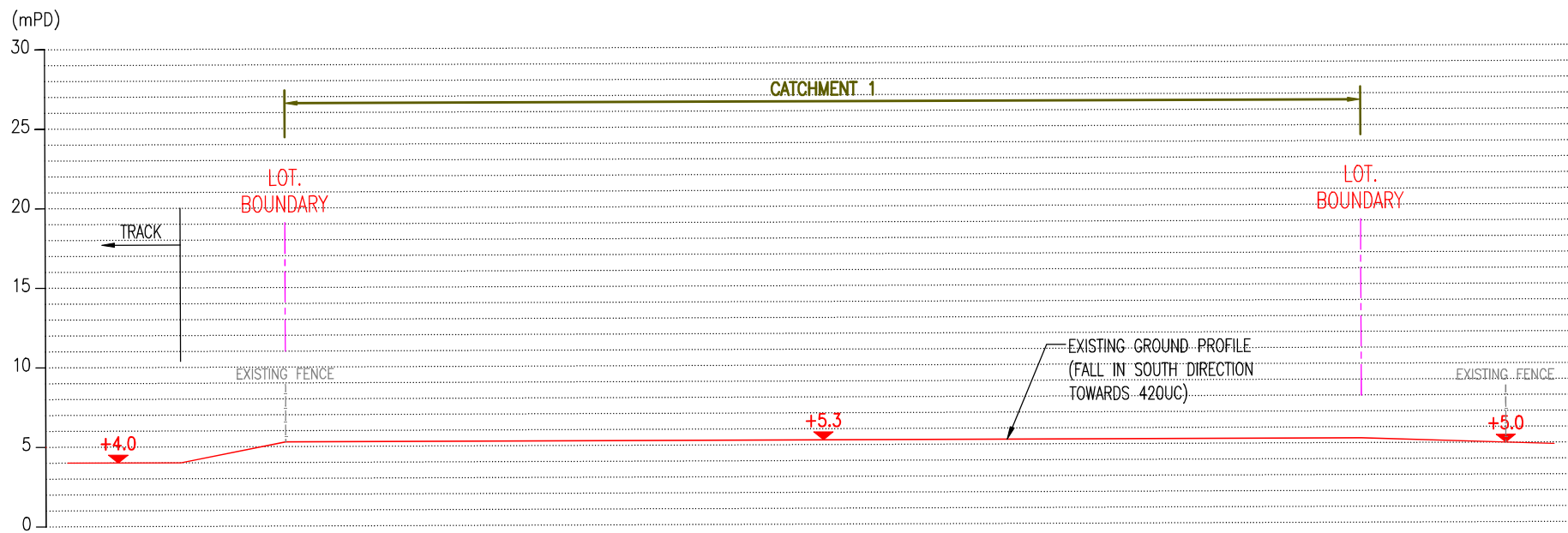
FIGURE 3



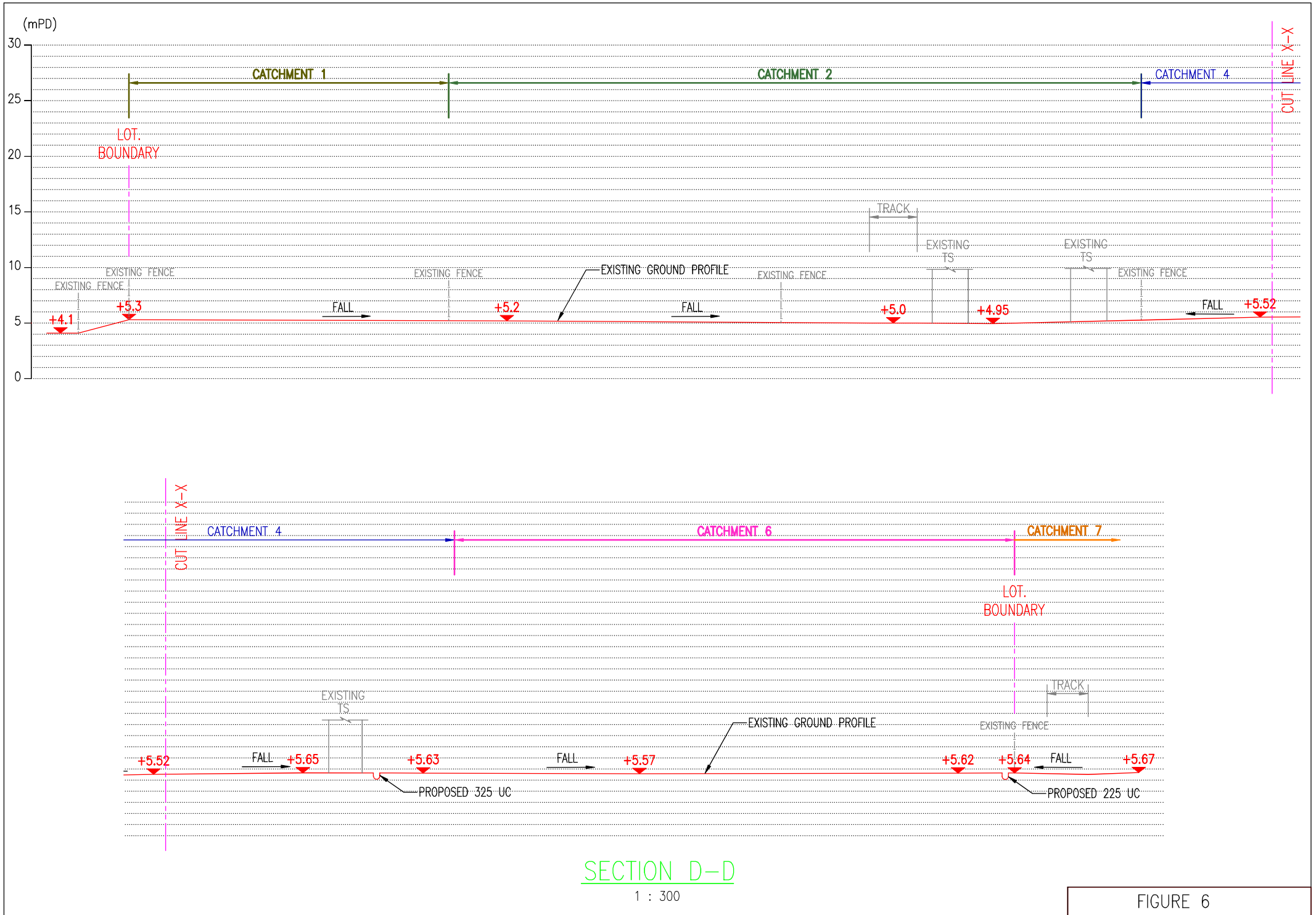
SECTION B-B

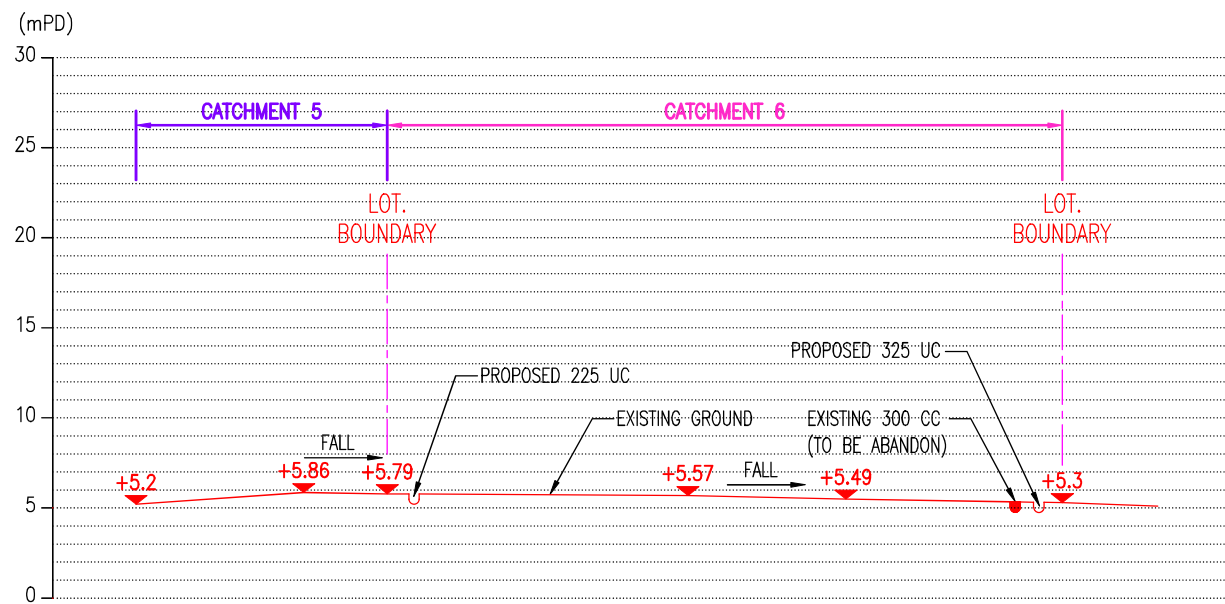
1 : 300

FIGURE 4



SECTION C-C
1 : 300





SECTION E-E
1 : 300

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)
	= 0.014
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	99.00	0.34	8.31	0.25	1.11	235.08	0.033	2000
4	1294.70	47.00	0.37	4.04	0.95	1.11	276.65	0.095	5671
5	731.30	112.00	0.51	9.60	0.25	1.11	226.42	0.011	690
6	1777.60	102.00	0.28	8.99	0.65	1.11	230.32	0.074	4435
7	947.60	107.00	0.27	10.17	0.25	1.11	222.97	0.015	880
8	792.60	110.00	0.27	10.58	0.25	1.11	220.58	0.012	728
								Total:	14405

	Shortest Dis	H1	H2
Catchment 3	89	5.7	5.4
Catchment 4	40	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)

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

$$\text{Average Fall, } H_{\text{avg}} = \frac{H1 - H2}{1 \times 100}$$

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	Qtotal (litre/min)	Gradient	Size	Type	R	Velocity (m/s)	Design Flow	Capacity (litre/min)	
							m ³ /s		
3+4	7671	1 in 100	300	U	0.10	1.58	<4.0 O.K.	0.128	8539 O.K.
5	690	1 in 100	225	U	0.08	1.31	<4.0 O.K.	0.011	3965 O.K.
3+4+5	8361	1 in 100	325	U	0.11	1.67	<4.0 O.K.	0.074	10571 O.K.
7+8	1609	1 in 100	225	U	0.08	1.31	<4.0 O.K.	0.085	3965 O.K.
6+7+8	6044	1 in 100	325	U	0.11	1.67	<4.0 O.K.	0.101	10571 O.K.
3+4+5+6+7+8	14405	1 in 100	375	U	0.13	1.84	<4.0 O.K.	0.240	15483 O.K.
Outlet concrete pipe	14405	1 in 77	375	pipe		2.09		1.35	15891.6 O.K.

Legends:

- n = Manning's coefficient
= 0.014
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 x A x 1000 x 60

Table 14 - Recommended Roughness Values k_s

Source : HR Wallingford et. al. (2006)

Material Classification (see note 1)	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, uPVC, 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
Rusty steel	-	0.15	0.3
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
152mm x 51mm corrugated plate, unpaved circular pipe, running full	50	60	-
76mm x 25mm corrugated plate, unpaved circular pipe, running full	25	30	-
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	<u>0.15</u>	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	-

Table 14 (Cont'd)

Material Classification (see note 1)	Suitable values of k_s (mm)		
	Good	Normal	Poor
Clayware			
Glazed or unglazed pipe:			
With sleeve joints	0.03	0.06	0.15
With spigot and socket joints and 'O' ring seals dia < 150mm	-	0.03	-
With spigot and socket joints and 'O' ring seals dia > 150mm	-	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 joint	0.003	0.006	
Standard, with chemically cemented joints	-	<u>0.03</u>	-
Standard, with spigot and socket joints, 'O' ring seals at 6 m to 9 m intervals	-	0.06	-
New Relining of Sewers			
Factory manufactured GRP	0.03	-	-
Brickworks			
Glazed	0.6	1.5	3.0
Well pointed	1.5	3.0	6.0
Old, in need of pointing	-	15	30
Slimed Sewers (see note 3 & Section 8.3.1)			
Sewers slimed to about half depth; velocity, when flowing half full, approximately 0.75 m/s:			
Concrete, spun or vertically cast	-	3.0	6.0
Asbestos cement	-	3.0	6.0
Clayware	-	1.5	3.0
uPVC	-	0.6	1.5
Sewers slimed to about half depth; velocity, when flowing half full, approximately 1.2 m/s :			
Concrete, spun or vertically cast	-	1.5	3.0
Asbestos cement	-	0.6	1.5
Clayware	-	0.3	0.6
uPVC	-	0.15	0.3

$k_s = 0.030 \text{ mm}$
 $S = 0.02000 \text{ to } 0.10000$

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

A14

(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	1.881	2.262	2.438	2.606	2.768	2.924	3.220	3.361	3.499	3.764	4.018	4.140	4.495	4.631
1/ 50	33.241	71.070	96.946	127.94	164.41	206.66	309.79	371.26	439.72	598.71	788.88	896.30	1270.8	1443.6
0.02200	1.979	2.379	2.564	2.741	2.910	3.074	3.385	3.533	3.678	3.956	4.222	4.351	4.723	4.866
1/ 45.5	34.973	74.750	101.95	134.54	172.87	217.28	325.66	390.26	462.19	629.24	829.04	941.89	1335.3	1516.9
0.02400	2.073	2.491	2.685	2.869	3.047	3.218	3.543	3.698	3.849	4.140	4.418	4.552	4.941	5.091
1/ 41.7	36.631	78.271	106.74	140.85	180.96	227.43	340.83	408.42	483.68	658.44	867.44	985.49	1397.0	1586.9
0.02600	2.163	2.599	2.800	2.993	3.177	3.355	3.694	3.856	4.013	4.316	4.606	4.746	5.150	5.306
1/ 38.5	38.223	81.652	111.34	146.91	188.73	237.18	355.40	425.86	504.31	686.46	904.30	1027.3	1456.2	1654.1
0.02800	2.250	2.703	2.912	3.112	3.303	3.488	3.840	4.008	4.171	4.486	4.786	4.932	5.352	5.514
1/ 35.7	39.756	84.909	115.78	152.74	196.21	246.57	369.43	442.65	524.17	713.44	939.78	1067.6	1513.2	1718.7
0.03000	2.334	2.803	3.019	3.226	3.425	3.616	3.981	4.155	4.324	4.650	4.961	5.111	5.546	5.714
1/ 33.3	41.238	88.054	120.05	158.38	203.43	255.63	382.98	458.86	543.35	739.49	974.04	1106.5	1568.2	1781.2
0.03200	2.415	2.900	3.124	3.337	3.543	3.741	4.117	4.297	4.471	4.808	5.130	5.285	5.735	5.908
1/ 31.3	42.672	91.099	124.20	163.83	210.43	264.41	396.09	474.55	561.90	764.70	1007.2	1144.1	1621.4	1841.6
0.03400	2.494	2.994	3.225	3.445	3.657	3.861	4.249	4.434	4.615	4.962	5.293	5.454	5.917	6.096
1/ 29.4	44.064	94.053	128.21	169.12	217.21	272.91	408.80	489.76	579.90	789.15	1039.3	1180.6	1673.0	1900.2
0.03600	2.570	3.085	3.323	3.550	3.768	3.978	4.377	4.568	4.754	5.111	5.452	5.618	6.094	6.278
1/ 27.8	45.416	96.923	132.12	174.26	223.80	281.18	421.15	504.54	597.38	812.89	1070.6	1216.1	1723.2	1957.1
0.03800	2.645	3.174	3.418	3.652	3.876	4.092	4.502	4.698	4.889	5.256	5.607	5.777	6.267	6.456
1/ 26.3	46.733	99.716	135.92	179.26	230.21	289.22	433.17	518.92	614.39	836.00	1100.9	1250.5	1771.9	2012.4
0.04000	2.717	3.261	3.511	3.751	3.981	4.203	4.624	4.825	5.021	5.398	5.758	5.932	6.435	6.629
1/ 25.0	48.016	102.44	139.62	184.13	236.46	297.06	444.88	532.93	630.96	858.51	1130.5	1284.1	1819.5	2066.4
0.04200	2.788	3.345	3.602	3.848	4.084	4.311	4.743	4.949	5.150	5.536	5.905	6.083	6.599	6.798
1/ 23.8	49.268	105.09	143.23	188.89	242.55	304.71	456.30	546.60	647.13	880.47	1159.4	1316.9	1865.8	2119.0
0.04400	2.857	3.428	3.691	3.943	4.184	4.416	4.859	5.070	5.275	5.671	6.048	6.231	6.759	6.962
1/ 22.7	50.492	107.69	146.76	193.53	248.51	312.18	467.46	559.95	662.92	901.92	1187.6	1348.9	1911.1	2170.3
0.04600	2.925	3.509	3.778	4.035	4.282	4.520	4.972	5.188	5.398	5.803	6.189	6.376	6.916	7.124
1/ 21.7	51.688	110.23	150.21	198.08	254.33	319.49	478.37	573.01	678.37	922.89	1215.2	1380.2	1955.4	2220.6
0.04800	2.991	3.588	3.863	4.126	4.378	4.621	5.083	5.304	5.519	5.932	6.326	6.517	7.069	7.281
1/ 20.8	52.860	112.71	153.59	202.52	260.04	326.64	489.05	585.79	693.48	943.42	1242.2	1410.9	1998.7	2269.8
0.05000	3.056	3.665	3.946	4.215	4.472	4.720	5.192	5.417	5.636	6.058	6.461	6.656	7.219	7.436
1/ 20.0	54.008	115.15	156.90	206.88	265.62	333.64	499.52	598.31	708.29	963.53	1268.6	1440.9	2041.1	2317.9
0.05500	3.213	3.853	4.147	4.429	4.699	4.960	5.455	5.691	5.921	6.364	6.786	6.991	7.582	7.809
1/ 18.2	56.783	121.03	164.90	217.41	279.12	350.58	524.81	628.57	744.07	1012.1	1332.5	1513.4	2143.7	2434.3
0.06000	3.364	4.032	4.340	4.634	4.917	5.189	5.706	5.953	6.193	6.656	7.097	7.311	7.928	8.166
1/ 16.7	59.438	126.66	172.56	227.48	292.03	366.77	548.98	657.50	778.29	1058.6	1393.6	1582.7	2241.7	2545.5
0.06500	3.508	4.204	4.525	4.831	5.125	5.408	5.947	6.204	6.455	6.936	7.396	7.619	8.261	8.508
1/ 15.4	61.987	132.06	179.90	237.15	304.42	382.30	572.18	685.26	811.11	1103.2	1452.2	1649.2	2335.7	2652.3
0.07000	3.647	4.369	4.702	5.021	5.326	5.620	6.179	6.446	6.706	7.206	7.683	7.914	8.581	8.838
1/ 14.3	64.441	137.26	186.97	246.45	316.34	397.26	594.52	711.98	842.71	1146.1	1508.6	1713.3	2426.3	2755.0
0.07500	3.781	4.529	4.874	5.204	5.520	5.824	6.403	6.680	6.949	7.466	7.961	8.200	8.890	9.156
1/ 13.3	66.811	142.29	193.80	255.43	327.85	411.70	616.08	737.77	873.22	1187.5	1563.0	1775.0	2513.6	2854.2
0.08000	3.910	4.684	5.040	5.381	5.707	6.022	6.620	6.906	7.184	7.718	8.229	8.476	9.189	9.464
1/ 12.5	69.104	147.14	200.40	264.12	338.99	425.67	636.93	762.73	902.72	1227.6	1615.7	1834.8	2598.1	2950.1
0.08500	4.036	4.834	5.201	5.552	5.889	6.214	6.830	7.125	7.411	7.963	8.489	8.744	9.479	9.762
1/ 11.8	71.328	151.86	206.81	272.55	349.79	439.21	657.16	786.92	931.33	1266.4	1666.8	1892.8	2680.1	3043.0
0.09000	4.159	4.979	5.358	5.719	6.066	6.400	7.034	7.338	7.632	8.200	8.741	9.004	9.760	10.05
1/ 11.1	73.489	156.43	213.03	280.74	360.28	452.37	676.80	810.41	959.12	1304.1	1716.4	1949.0	2759.6	3133.3
0.09500	4.278	5.121	5.510	5.881	6.238	6.581	7.233	7.545	7.848	8.431	8.987	9.256	10.03	10.33
1/ 10.5	75.592	160.89	219.08	288.70	370.49	465.17	695.90	833.27	986.15	1340.8	1764.6	2003.8	2837.0	3221.2
0.10000	4.394	5.259	5.658	6.039	6.405	6.757	7.427	7.746	8.057	8.655	9.226	9.503	10.30	10.61
1/ 10.0	77.640	165.23	224.98	296.46	380.43	477.63	714.52	855.54	1012.5	1376.6	1811.6	2057.1	2912.4	3306.7
	180	240	280	310	340	370	430	460	490	550	600	650	750	750
θ_{medial} for part-full circular pipes.														

$S = 0.02000 \text{ to } 0.10000$

$k_s = 0.030 \text{ mm}$

A16

(p.3 of 4)

$k_s = 0.150 \text{ mm}$
 $S = 0.00400 \text{ to } 0.02000$

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

ie hydraulic gradient =
 1 in 250 to 1 in 50

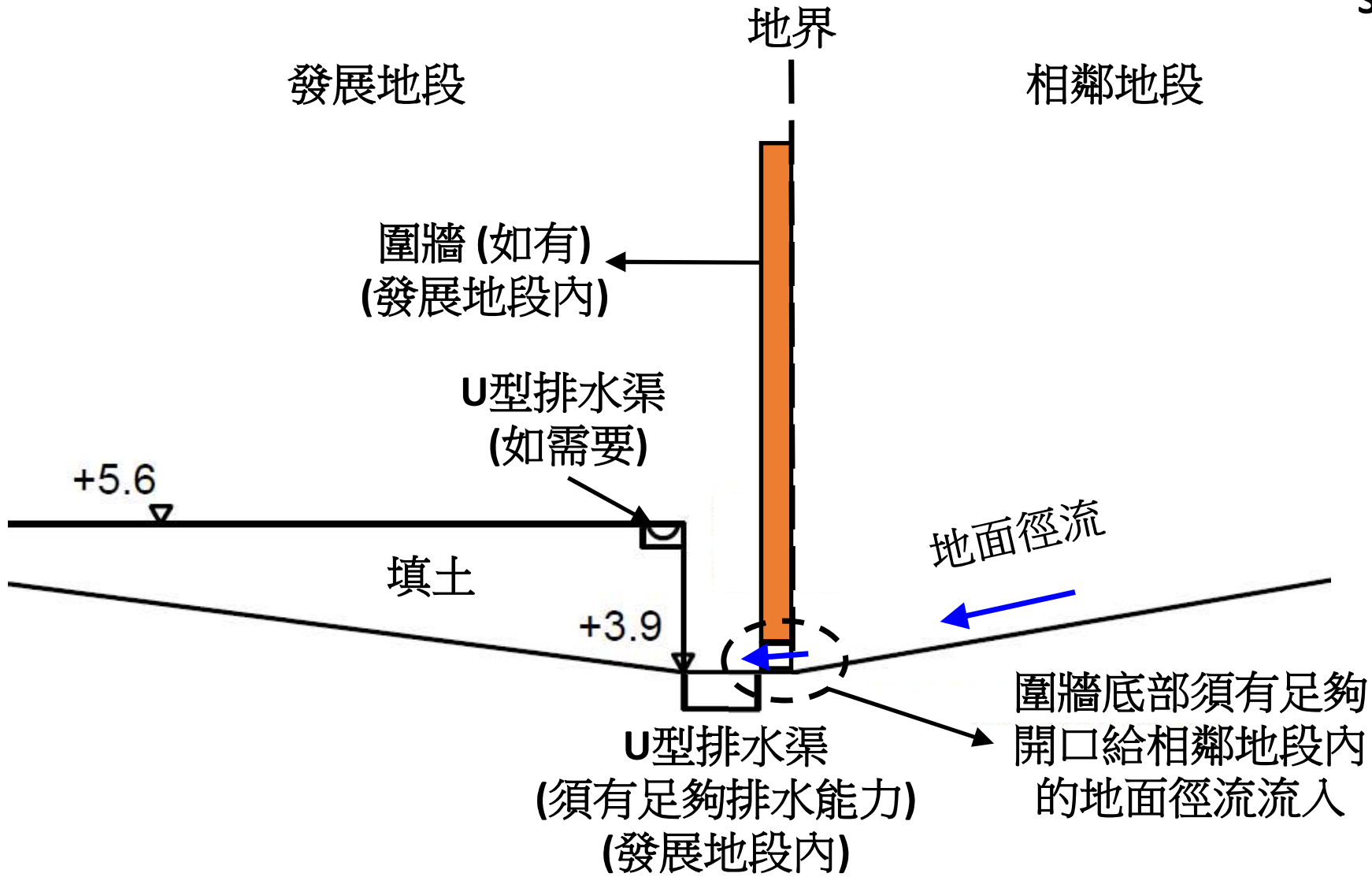
velocities in ms^{-1}
 discharges in litres/sec

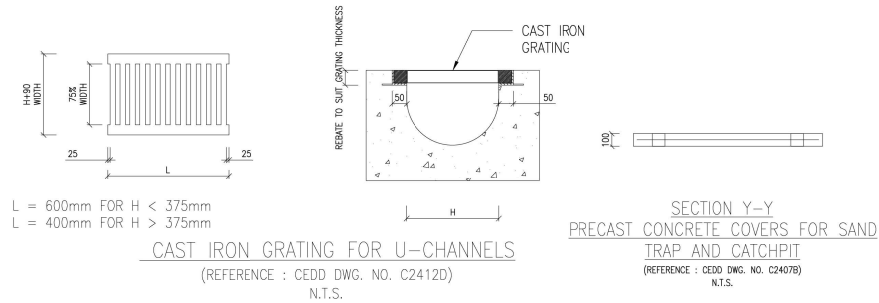
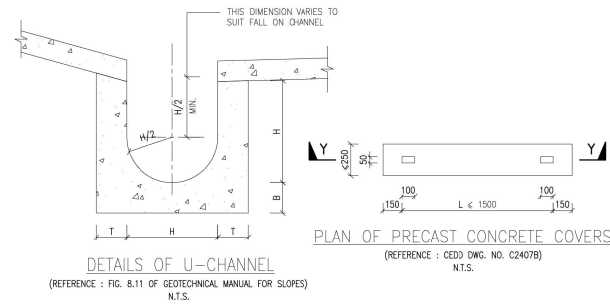
Gradient	(Equivalent) Pipe diameters in mm													
	150	200	225	250	275	300	350	375	400	450	500	525	600	630
0.00400	0.727	0.877	0.946	1.012	1.076	1.137	1.254	1.309	1.364	1.468	1.568	1.617	1.757	1.811
1/ 250	12.848	27.544	37.611	49.682	63.891	80.367	120.62	144.63	171.38	233.54	307.95	350.01	496.73	564.47
0.00420	0.746	0.899	0.970	1.038	1.103	1.166	1.286	1.343	1.399	1.506	1.608	1.658	1.801	1.857
1/ 238	13.182	28.255	38.580	50.959	65.530	82.426	123.70	148.32	175.75	239.48	315.78	358.90	509.32	578.77
0.00440	0.764	0.921	0.994	1.064	1.130	1.195	1.317	1.376	1.432	1.542	1.647	1.698	1.845	1.901
1/ 227	13.508	28.949	39.525	52.206	67.131	84.436	126.71	151.92	180.01	245.29	323.42	367.58	521.62	592.73
0.00460	0.782	0.943	1.017	1.088	1.157	1.222	1.348	1.407	1.466	1.578	1.685	1.737	1.887	1.945
1/ 217	13.826	29.628	40.450	53.425	68.696	86.402	129.65	155.45	184.18	250.96	330.89	376.06	533.64	606.38
0.00480	0.800	0.964	1.040	1.113	1.182	1.250	1.377	1.439	1.498	1.613	1.722	1.776	1.929	1.988
1/ 208	14.138	30.293	41.356	54.618	70.228	88.326	132.53	158.89	188.27	256.52	338.21	384.37	545.41	619.75
0.00500	0.817	0.985	1.062	1.136	1.208	1.276	1.407	1.469	1.530	1.647	1.759	1.813	1.970	2.030
1/ 200	14.444	30.944	42.242	55.787	71.728	90.211	135.35	162.27	192.27	261.96	345.37	392.50	556.93	632.83
0.00550	0.859	1.035	1.116	1.194	1.269	1.341	1.478	1.543	1.607	1.730	1.847	1.904	2.068	2.132
1/ 182	15.183	32.517	44.386	58.612	75.355	94.765	142.17	170.44	201.93	275.10	362.68	412.16	584.78	664.45
0.00600	0.899	1.083	1.168	1.249	1.327	1.402	1.545	1.614	1.680	1.809	1.931	1.991	2.162	2.228
1/ 167	15.889	34.021	46.435	61.313	78.821	99.118	148.68	178.24	211.17	287.67	379.22	430.95	611.39	694.67
0.00650	0.938	1.129	1.217	1.302	1.383	1.461	1.610	1.682	1.751	1.885	2.012	2.074	2.253	2.321
1/ 154	16.567	35.465	48.401	63.904	82.148	103.30	154.93	185.73	220.03	299.72	395.08	448.97	636.91	723.66
0.00700	0.974	1.173	1.265	1.353	1.437	1.518	1.673	1.747	1.819	1.957	2.090	2.154	2.340	2.411
1/ 143	17.220	36.855	50.293	66.399	85.349	107.32	160.95	192.93	228.56	311.32	410.36	466.31	661.48	751.56
0.00750	1.010	1.216	1.311	1.402	1.489	1.573	1.733	1.810	1.884	2.028	2.165	2.231	2.423	2.497
1/ 133	17.850	38.196	52.120	68.806	88.439	111.20	166.76	199.89	236.79	322.52	425.09	483.05	685.19	778.48
0.00800	1.045	1.257	1.355	1.449	1.539	1.626	1.792	1.871	1.948	2.096	2.238	2.306	2.504	2.581
1/ 125	18.460	39.494	53.887	71.135	91.429	114.95	172.38	206.61	244.75	333.34	439.35	499.24	708.12	804.52
0.00850	1.078	1.297	1.398	1.495	1.588	1.678	1.848	1.930	2.009	2.162	2.308	2.379	2.583	2.662
1/ 118	19.051	40.752	55.601	73.393	94.327	118.59	177.82	213.14	252.47	343.84	453.17	514.94	730.35	829.77
0.00900	1.111	1.336	1.440	1.540	1.635	1.728	1.903	1.987	2.069	2.226	2.376	2.449	2.659	2.741
1/ 111	19.625	41.974	57.265	75.586	97.141	122.12	183.11	219.47	259.97	354.04	466.59	530.18	751.94	854.28
0.00950	1.142	1.374	1.481	1.583	1.682	1.776	1.957	2.043	2.127	2.288	2.443	2.518	2.734	2.817
1/ 105	20.184	43.163	58.884	77.720	99.879	125.56	188.25	225.63	267.26	363.95	479.64	545.00	772.94	878.13
0.01000	1.173	1.411	1.521	1.626	1.726	1.824	2.009	2.097	2.183	2.349	2.508	2.584	2.806	2.892
1/ 100	20.728	44.321	60.461	79.798	102.55	128.91	193.26	231.63	274.36	373.61	492.36	559.44	793.39	901.35
0.01100	1.232	1.482	1.597	1.707	1.813	1.915	2.109	2.202	2.292	2.466	2.632	2.713	2.946	3.035
1/ 91	21.777	46.554	63.501	83.805	107.69	135.37	202.93	243.20	288.06	392.24	516.87	587.28	832.82	946.13
0.01200	1.289	1.550	1.670	1.785	1.896	2.002	2.205	2.302	2.396	2.578	2.752	2.836	3.079	3.172
1/ 83	22.781	48.688	66.408	87.635	112.60	141.54	212.16	254.26	301.14	410.03	540.30	613.89	870.50	988.92
0.01300	1.344	1.615	1.740	1.860	1.975	2.086	2.297	2.398	2.496	2.685	2.866	2.954	3.207	3.304
1/ 77	23.743	50.736	69.196	91.309	117.32	147.46	221.02	264.86	313.70	427.11	562.77	639.41	906.65	1030.0
0.01400	1.396	1.678	1.808	1.932	2.052	2.167	2.386	2.491	2.592	2.789	2.976	3.067	3.330	3.431
1/ 71	24.670	52.707	71.880	94.846	121.86	153.16	229.54	275.07	325.78	443.53	584.40	663.97	941.43	1069.5
0.01500	1.447	1.738	1.873	2.002	2.125	2.245	2.471	2.580	2.685	2.888	3.083	3.177	3.448	3.553
1/ 67	25.564	54.609	74.470	98.258	126.24	158.65	237.77	284.92	337.44	459.39	605.27	687.67	974.99	1107.6
0.01600	1.496	1.797	1.936	2.069	2.197	2.320	2.554	2.666	2.775	2.985	3.185	3.283	3.563	3.671
1/ 63	26.429	56.450	76.975	101.56	130.47	163.97	245.73	294.45	348.71	474.72	625.45	710.59	1007.5	1144.4
0.01700	1.543	1.854	1.997	2.134	2.266	2.393	2.634	2.750	2.862	3.078	3.285	3.385	3.674	3.786
1/ 59	27.268	58.234	79.404	104.76	134.58	169.13	253.44	303.69	359.64	489.59	645.02	732.81	1038.9	1180.2
0.01800	1.589	1.909	2.056	2.197	2.333	2.464	2.712	2.831	2.946	3.169	3.382	3.485	3.783	3.897
1/ 56	28.082	59.966	81.762	107.87	138.57	174.14	260.93	312.66	370.26	504.02	664.02	754.39	1069.5	1214.9
0.01900	1.634	1.962	2.114	2.259	2.398	2.532	2.788	2.910	3.029	3.257	3.476	3.582	3.888	4.005
1/ 53	28.875	61.651	84.057	110.89	142.45	179.01	268.21	321.38	380.58	518.06	682.49	775.37	1099.2	1248.6
0.02000	1.678	2.015	2.170	2.319	2.462	2.600	2.862	2.987	3.109	3.343	3.568	3.676	3.990	4.111
1/ 50	29.647	63.293	86.291	113.83	146.22	183.75	275.31	329.88	390.64	531.74	700.49	795.81	1128.2	1281.5

100 130 150 170 180
 θ_{medial} for part-full circular pipes.

$k_s = 0.150 \text{ mm}$ $S = 0.00400 \text{ to } 0.02000$

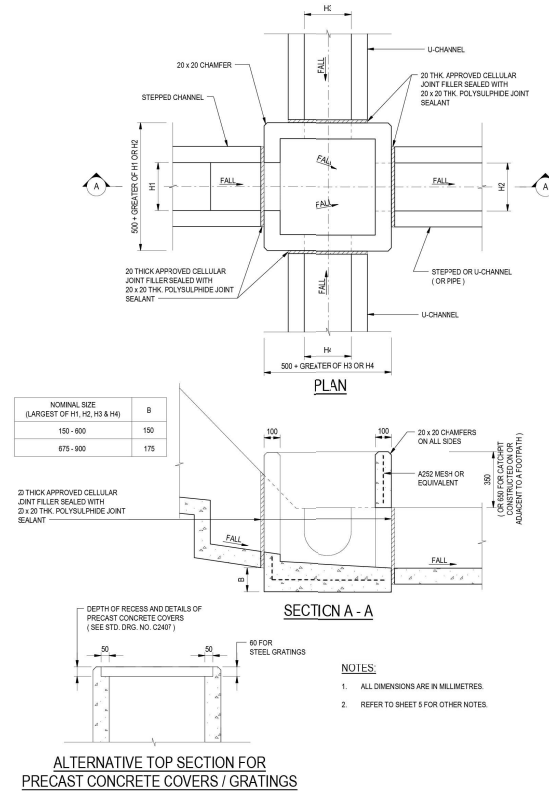
Sketch A



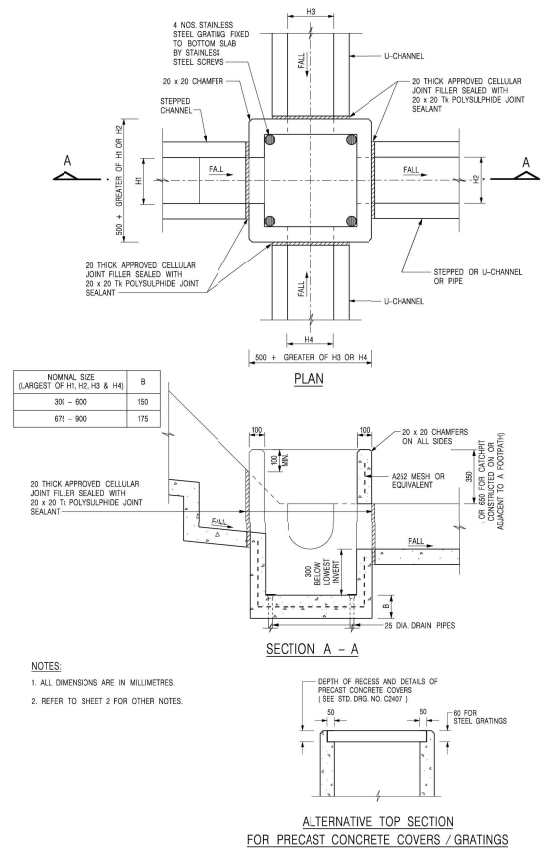
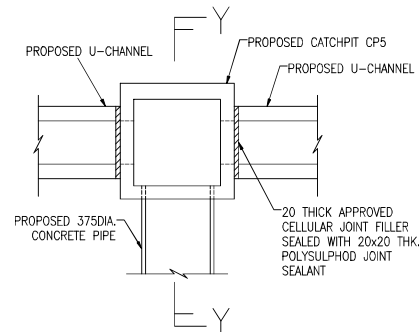
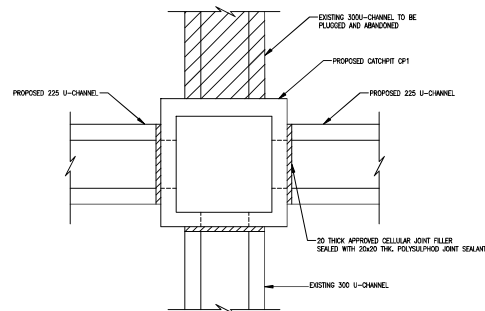


NOTES:

- 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 STD. DRG. NO. D51043) AT 300 mm 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

