

寄件者: Isa Yuen [REDACTED]
寄件日期: 2026年09月23日星期三 10:10
收件者: tpbpd/PLAND
副本: Jason Sek Hei WONG/PLAND; Thomas Luk; YC Lit
主旨: [PLG10340] Planning Application No. A/YL-SK/456 - Further Information
附件: ADCL_PLG_10340_L005.pdf

類別: Internet Email

Dear Sir/Madam,

We refer to our submission and would like to provide further information to facilitate considerations by the relevant departments and the Town Planning Board. Enclosed self-explanatory letter for your processing please.

Thank you for your attention.

Best regards,

Isa Yuen

Man Chi Consultants and Construction Limited

Tel: [REDACTED]

Date : 23rd September, 2026
Our Ref. :

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

By Email

Dear Sir/Madam,

**Re: Section 16 Planning Application for Proposed Temporary Shop and Services (Motor-vehicle Showroom) with Ancillary Office and Facilities and Associated Filling of Land for a Period of 3 Years at Lot Nos. 786 RP (Part) in D.D. 114, Shek Kong, Yuen Long
(Planning Application No. A/YL-SK/456)**

We refer to our submission and the comments received from the Drainage Services Department regarding the subject application. We would like to provide a Response to Comment Table and a Revised Drainage Proposal to facilitate considerations by relevant departments and the Town Planning Board.

Thank you for your kind attention and should you have any queries, please do not hesitate to contact the undersigned at .

Yours faithfully,
For and on behalf of
Man Chi Consultants And Construction Limited



Thomas Luk
Planning Consultant

Encl.

Drainage Design Report

Proposed Drainage Facilities in Lot 786 RP in D.D. 114, Kam Sheung Road, Yuen Long, New Territories

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- C DSD's Comments
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1. INTRODUCTION

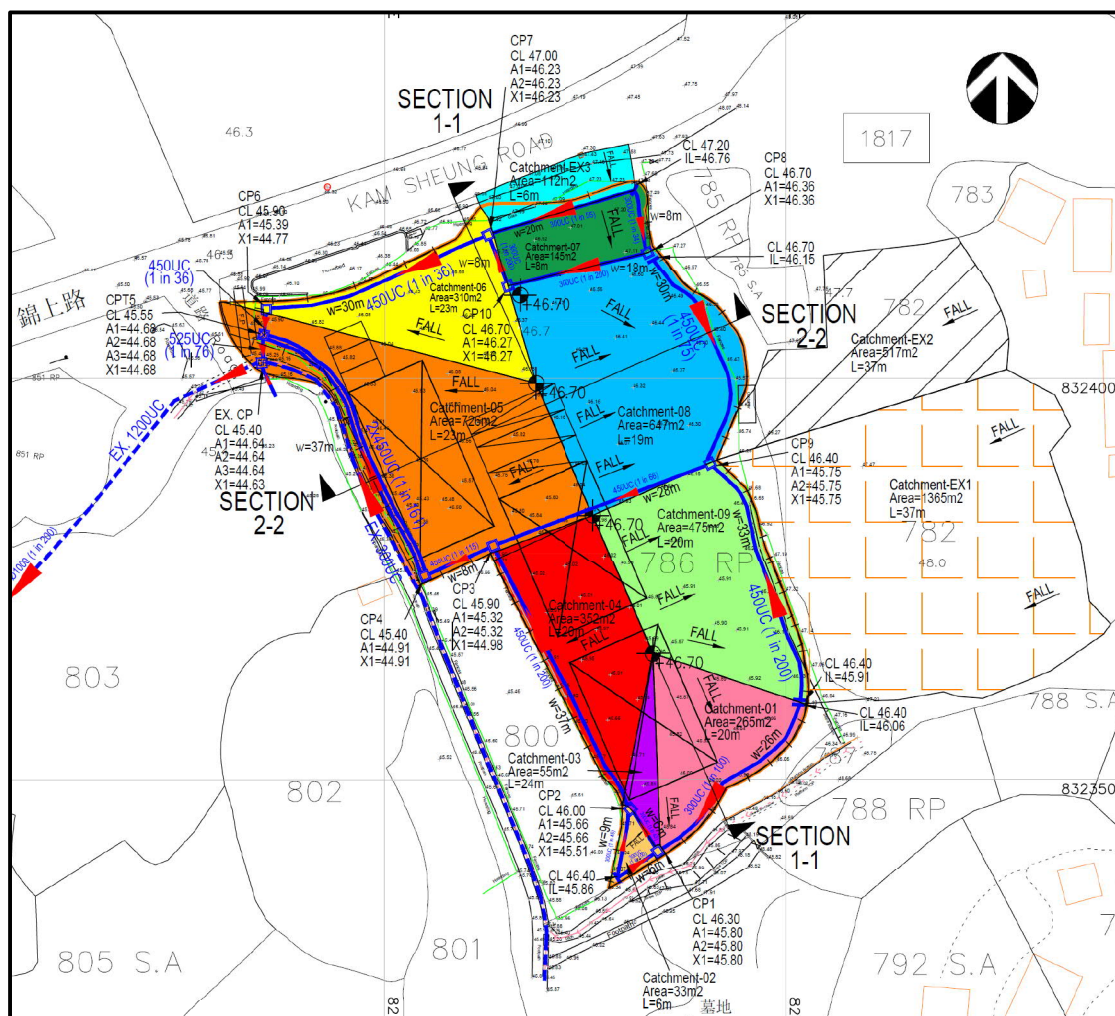
This application is for the Proposed Drainage Facilities in Lot 786 RP in D.D. 114, Kam Sheung Road, Yuen Long, New Territories.

This report has been prepared to support the drainage proposal by:

- (a) Identifying the catchments;
- (b) Demonstrating through hydraulic calculations that the proposed drainage facilities, along with existing downstream facilities, are adequate to collect, convey, and discharge surface runoff, as shown in Appendix B.
- (c) Response to DSD's Comments dated 03.08.2026
- (d) Figures and Photos

2. IDENTIFY CATMENT AREA AND RUNOFF

In the hydraulic calculations, the catchments are located within the application site for the design of the facilities. Below are the key plans for the proposed catchments, as shown in Figure 1.



i) Figure 1

- i) The area within the application site, Lot No. 786 RP in D.D. 114, is situated on flat terrain. The northern boundary is adjacent to the existing Kam Sheung Road with its own drainage system. The northwest boundary along Kam Sheung Road is enclosed by planter (Photo 7 & 8); northern boundary is an ingress gate, runoff from footpath along Kam Sheung Road is flowing over toward the gate (Photo 9). The northeast boundary is enclosed by existing hoarding till CP9 (Photo 10); the existing hoarding with open gap till the southeast corner (Photo 11). Southern and western boundaries is enclosed by an existing fence/hoarding and existing ditch and U-channel (Photo 12 – 16); Therefore, the application site would collect surface runoff from the Catchment Ex1, Ex2 & Ex3 outside its boundaries.

- a. In Catchment 1, denoted by the Pink area, the surface runoff flows in south direction and will be directed to a U-Channel.
- b. In Catchment 2, denoted by the Clay Yellow area, the surface runoff flows in east direction and will be directed to a U-Channel.
- c. In Catchment 3, denoted by the Purple area, the surface runoff flows in south direction and will be directed to a U-Channel.
- d. In Catchment 4, denoted by the Pink & Purple area, the surface runoff flows in southwest direction and will be directed to a U-Channel.
- e. In Catchment 5, denoted by the Orange area, the surface runoff flows in west direction and will be directed to two U-Channels.
- f. In Catchment 6, denoted by the Yellow area, the surface runoff flows in northwest direction and will be directed to a U-Channel.
- g. In Catchment 7, denoted by the Orange-Hatched area, the surface runoff flows in south direction and will be directed to a U-Channel.
- h. In Catchment 8, denoted by the Blue area, the surface runoff flows in east direction and will be directed to a U-Channel.
- i. In Catchment EX1, denoted by the Yellow area, the surface runoff outside the application site, flows in west direction and will be directed to a U-Channel.
- j. In Catchment EX2, denoted by the Black-Slash area, the surface runoff outside the application site, flows in west direction and will be directed to a U-Channel.
- k. In Catchment EX3, denoted by the Cyan area, the surface runoff outside the application site, flows in south direction and will be directed to a U-Channel.

Detailed hydraulic calculations are provided in Appendix B.

3. DESIGN OF DRAINAGE FACILITIES

The proposed facilities are designed according to the following codes and guidelines:

1. Geotechnical Manual for Slopes (GCO, 1984);
2. Stormwater Drainage Manual 2018 (SDM 2018);
3. GEO Technical Guidance Note No. 30 (TGN 30);
4. GEO Technical Guidance Note No. 39 (TGN 39);
5. GEO Technical Guidance Note No. 43 (TGN 43);

The surface runoff for a 1 in 50-year return period rainstorm is calculated using the rational method in accordance with SDM 2018 and SDM Corrigendum No. 1/2024; the calculations are attached in Appendix B.

The increment for climate change is included in the calculations in accordance with SDM Corrigendum No. 1/2022, +16.0%.

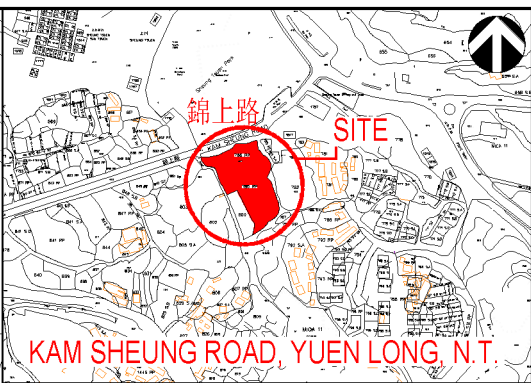
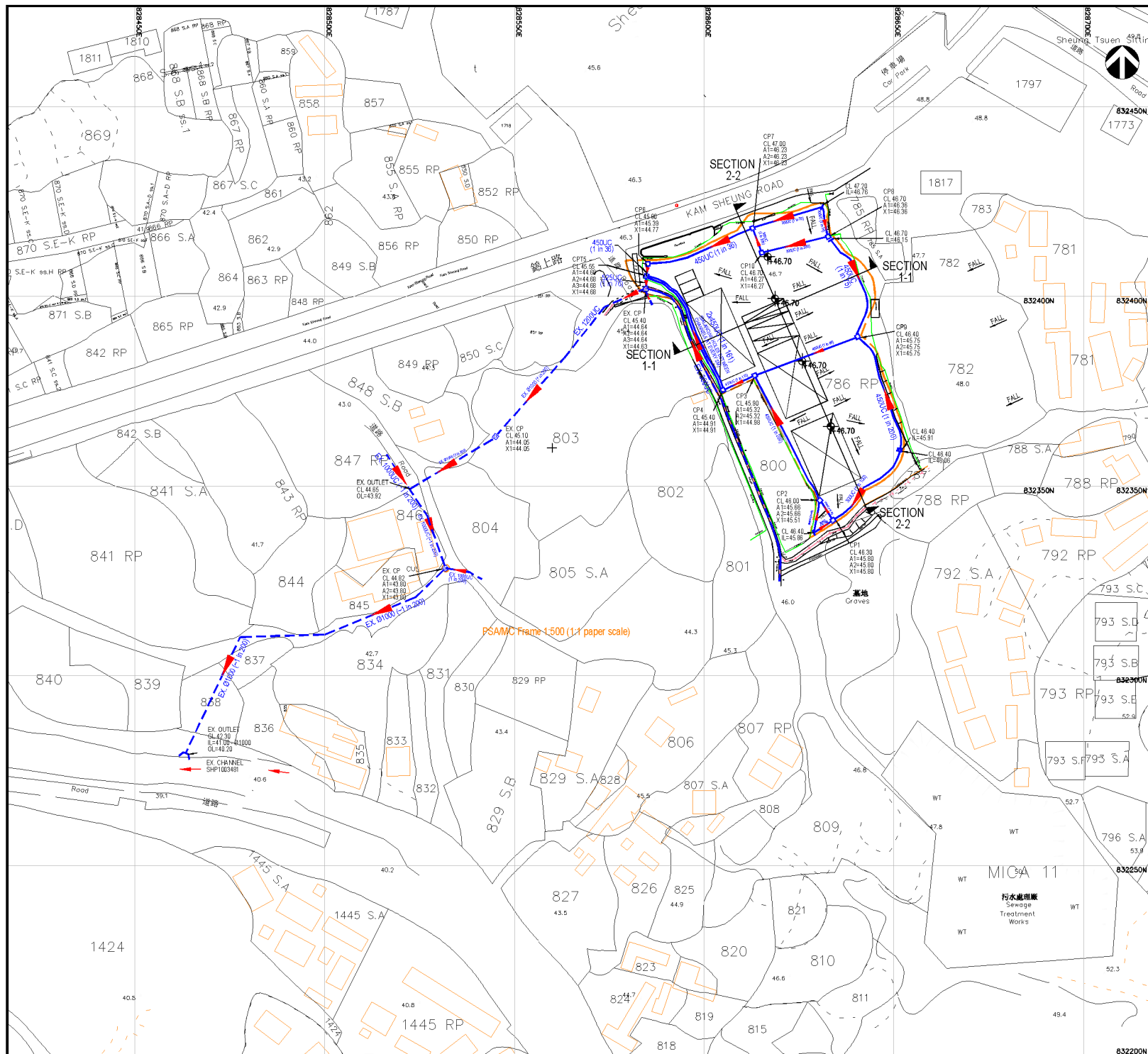
It is concluded that U-Channels will be provided to surround all boundaries of the subjected site, as detailed in Appendix A. All U-channels from the catchments will be connected to a proposed Catchpit with Trap (CPT5) located within the subject site boundary. The runoff from CPT5 will then drain into a 1200mm Existing Channel leading to existing underground pipes and U-channels that finally discharge into an Existing Channel SHP1003481.

The hydraulic calculations demonstrate that the facilities are sufficient to collect surface runoff from the application site.

The design is considered adequate.

APPENDIX A

Proposed Drainage Details for the Application Site



BLOCK PLAN 1:5000

LEGENDS:

- APPLICATION SITE BOUNDARY LINE
- EXISTING FENCES
- INGRESS/EGRESS
- EX. SPOT LEVEL (mPD)
- PROPOSED SITE FORMATION LEVEL (mPD)
- EXISTING STORMWATER CATCHPIT (EX. CP)
- EXISTING U-CHANNEL (SIZE DENOTED)
- EXISTING STORM WATER PIPE (UNDERGROUND) (NOMINAL DIAMETER DENOTED)
- PROPOSED CATCHPIT WITH TRAP
- PROPOSED CATCHPIT WITHOUT TRAP
- PROPOSED U-CHANNEL (SIZE DENOTED, MIN. FALL 1:100)
- PROPOSED STORM WATER PIPE (UNDERGROUND) (NOMINAL DIAMETER DENOTED, MIN. FALL 1:100)

PROJECT:

PROPOSED DRAINAGE FACILITIES AT
LOT 786RP IN D.D. 114,
KAM SHEUNG ROAD, YUEN LONG, N.T.

DRAWING TITLE:

DRAINAGE DESIGN LAYOUT PLAN
(WITH DOWNSTREAM EXISTING
DRAINAGE FACILITIES)

SCALE: 1:1000

DRAWN BY: C.W.

DATE: SEP 2026

CHECKED BY: R.W.

DRAWING NO. DD114-786RP/D-01A

REV. A

GEOTECHNICAL CONSULTANT:

PSA PHILIP SO & ASSOCIATES
CONSULTING CIVIL AND GEOTECHNICAL ENGINEERS LTD.

NOTES FOR CATCHPIT

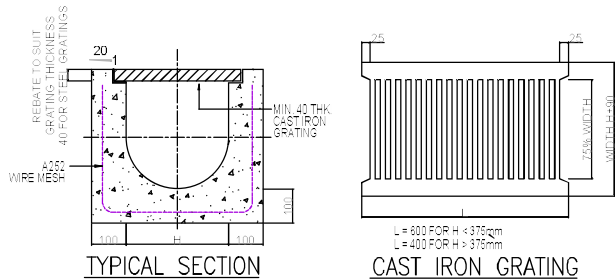
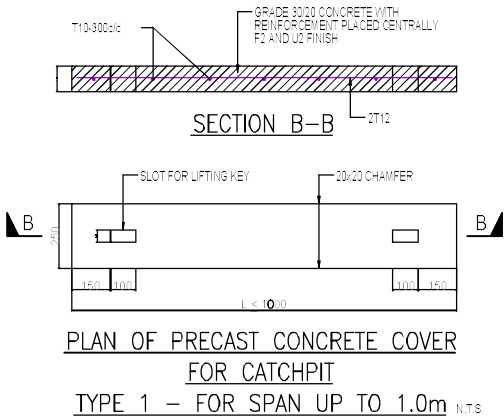
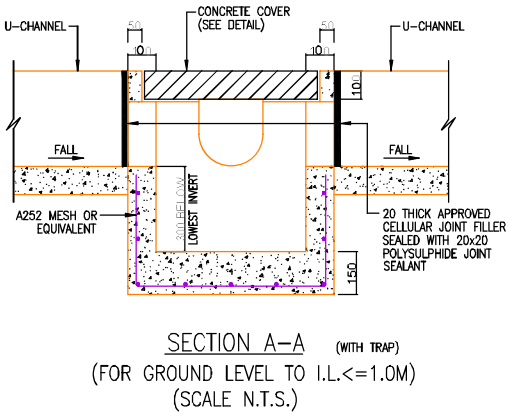
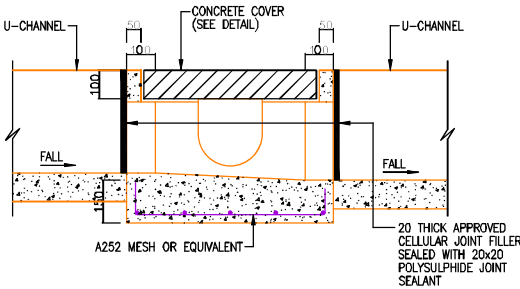
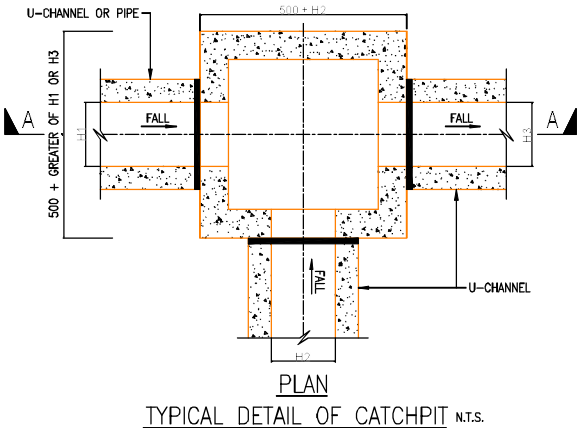
- 1. ALL CONCRETE SHALL BE GRADE C30 AND COMPLY WITH CS1:2010.
- 2. MINIMUM CONCRETE COVER SHALL BE 40mm.
- 3. ALL REINFORCEMENT (GRADE 500B) TO BE HIGH TENSILE DEFORMED BAR.
ALL REINFORCEMENT SHALL COMPLY WITH CS2:2012.
ALL WIRE MESH SHALL BE GRADE 500B STEEL COMPLY WITH CS2:2012.
- 4. RUN OFF FROM THIS SITE SHALL BE PROPERLY TREATED AND CONVEYED TO THE PUBLIC DRAIN VIA SANDTRAP/CATCHPIT DURING THE SITE FORMATION WORKS.

NOTES FOR U-CHANNEL

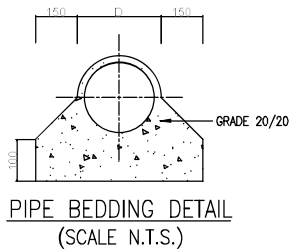
- 1. ALL DIMENSIONS ARE IN MILLIMETRES.
- 2. H = NOMINAL CHANNEL SIZE
- 3. FOR DIMENSIONS OF CHANNEL SEE TABLE.

NOMINAL SIZE H	T	B	REINFORCEMENT
200-300	100	100	A252 MESH PLACED CENTRALLY
375-675	100	150	

- 4. CONCRETE SURFACE FINISH SHALL BE CLASS U2 OR F2 AS APPROPRIATE.
- 5. EXPANSION JOINTS SHALL BE PROVIDED AT A MAXIMUM SPACING OF 10 METRES.
- 6. ALL CONCRETE SHALL BE GRADE C30.
- 7. ALL CAST IRON FOR GRATINGS SHALL BE GRADE EN-GJL-150 COMPLYING WITH BS EN 1561.

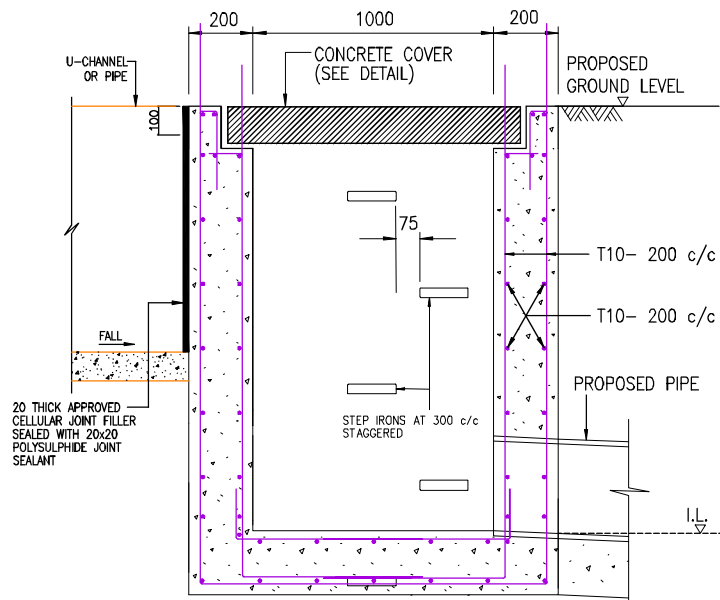


U-CHANNEL WITH CAST IRON GRATING N.T.S.
(UP TO H OF 625)
(DIMENSIONS ARE FOR GUIDANCE ONLY, CONTRACTOR MAY SUBMIT EQUIVALENT TYPE)

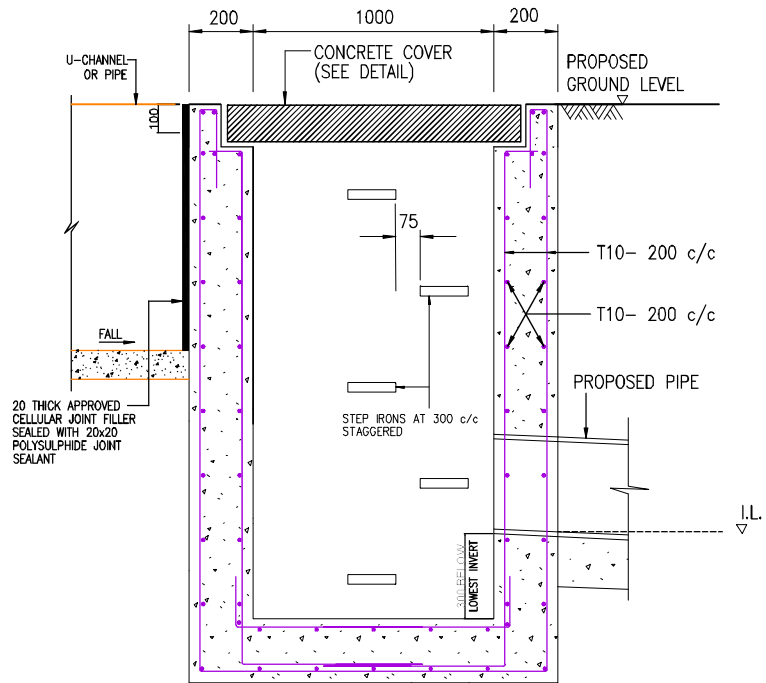


NOTES FOR CATCHPIT

- 1. ALL CONCRETE SHALL BE GRADE C30 AND COMPLY WITH CS1:2010.
- 2. MINIMUM CONCRETE COVER SHALL BE 40mm.
- 3. ALL REINFORCEMENT (GRADE 500B) TO BE HIGH TENSILE DEFORMED BAR.
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- 4. RUN OFF FROM THIS SITE SHALL BE PROPERLY TREATED AND CONVEYED TO THE PUBLIC DRAIN VIA SANDTRAP/CATCHPIT DURING THE SITE FORMATION WORKS.



SECTION A-A (WITHOUT TRAP)
(FOR GROUND LEVEL TO I.L. > 1.0M, MAX. 2.50M)
(SCALE N.T.S.)



SECTION A-A (WITH TRAP)
(FOR GROUND LEVEL TO I.L. > 1.0M, MAX. 2.50M)
(SCALE N.T.S.)

GEOTECHNICAL CONSULTANT :

PHILIP SO & ASSOCIATES
CONSULTING CIVIL AND GEOTECHNICAL ENGINEERS LTD.

PROJECT :

PROPOSED DRAINAGE FACILITIES AT
LOT 786RP IN D.D. 114,
KAM SHEUNG ROAD, YUEN LONG, N.T.

DRAWING TITLE :

STORMWATER DRAINAGE WORKS –
NOTES AND DETAILS – 2

SCALE : AS SHOWN

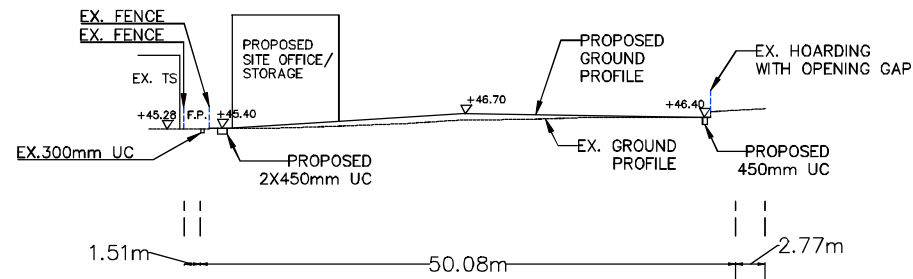
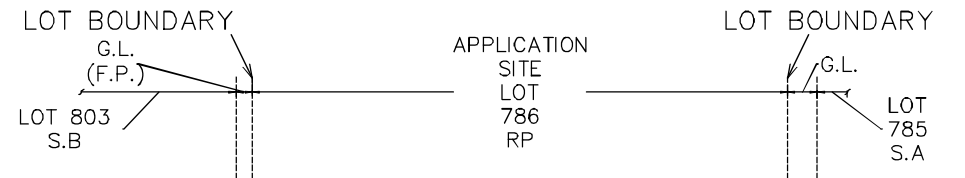
DRAWN BY : C.W.

DATE : JAN 2026

CHECKED BY : R.W.

DRAWING NO. DD114-786RP/D-03

REV. A



SECTION 1-1 1:500

GEOTECHNICAL CONSULTANT :

PSA PHILIP SO & ASSOCIATES
CONSULTING CIVIL AND GEOTECHNICAL ENGINEERS LTD.

PROJECT :

PROPOSED DRAINAGE FACILITIES AT
LOT 786RP IN D.D. 114,
KAM SHEUNG ROAD, YUEN LONG, N.T.

DRAWING TITLE :

SECTION 1-1

SCALE : 1:500

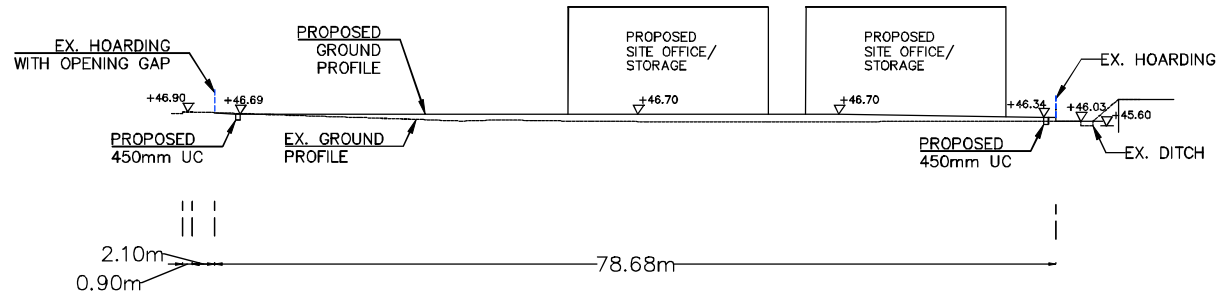
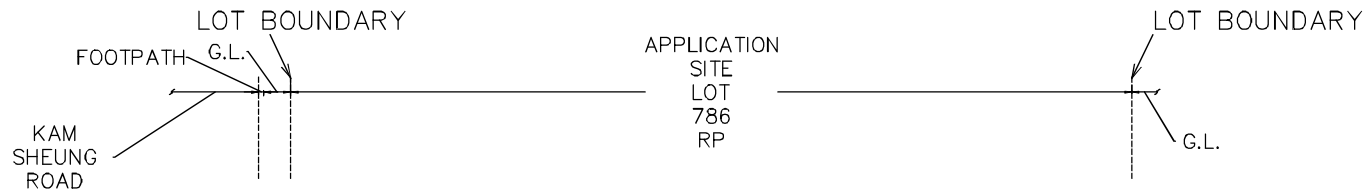
DRAWN BY : C.W.

DATE : JUN 2026

CHECKED BY : R.W.

DRAWING NO. DD114-786RP/D-04

REV. A



GEOTECHNICAL CONSULTANT :

PHILIP SO & ASSOCIATES
CONSULTING CIVIL AND GEOTECHNICAL ENGINEERS LTD.

PROJECT :

PROPOSED DRAINAGE FACILITIES AT
LOT 786RP IN D.D. 114,
KAM SHEUNG ROAD, YUEN LONG, N.T.

DRAWING TITLE :

SECTION 2-2

SCALE : 1:500

DRAWN BY : C.W.

DATE : JUN 2026

CHECKED BY : R.W.

DRAWING NO. DD114-786RP/D-05

REV. A

APPENDIX B

Design Calculation

		PROJECT No. DD114-786RP
OFFICE PSA	PROJECT TITLE DRAINAGE DESIGN REPORT for Lots 786 RP in D.D. 114, Kam Sheung Road, Yuen Long	CATCHMENT No.
NOTES 1. Refer: Geotechnical Manual for Slopes (GCO, 1984)". 2. Refer: Stormwater Drainage Manual 2018 (SDM 2018) 3. Refer: SDM Corrigendum No. 1/2024 4. Refer: SDM Corrigendum No. 1/2022 5. Refer: GEO Technical Guidance Note No. 43 (TGN 44)		
<u>Design Parameters and Assumption</u> 1 The design of surface drainage system is based on the guidelines given in the "Geotechnical Manual for Slopes (GCO, 1984)". 2 The design is in accordance with Stormwater Drainage Manual 2018 (SDM 2018) 3 Rainfall intensity is taken from "Table 3b – Storm Constants for Different Return Periods of Tai Mo Shan Area, SDM 2018" 4 Rainfall Increase due to Climate Change is taken from "Section 6.8 & Table 28 – Rainfall Increase due to Climate Change, SDM, Corrigendum No. 1/2022" 5 All designed drainages are using Concrete U-Channel, in accordance to "Guidelines on Hydraulic Design of U-shaped and Half-round Channels on Slopes, GEO Technical Guidance Note No. 43 (TGN 43)" 6 The required design intensity is based on a 50-years return period storm according to the SDM 2018. (Section 4.3.2-4.3.4, 6.6.1 SDM 2018) 7 The flow in the catchment area is calculated using the "Rational Method", The formula is $Q = k \times I \times A / 3600$ (Ref. Eq. 8.1, Ch. 8.2.1, GCO, 1984) where Q = Maximum Runoff (litres/sec) I = Design mean intensity of rainfall (mm/hr) A = Area of catchment (m²) k = Runoff coefficient (Ref. Section 7.5.2 (b), to P37, SDM 2018) 8 The Time of Concentration is calculated using the modified form of original Bransby--Williams equation, $t = 0.14465 \times L / (H^{0.2} \times A^{0.1})$ (Ref. Eq. 8.2, Ch. 8.2.3, GCO 1984) where t = Time of Concentration (min) H = Average fall (m/100m) from the summit of catchment to the pt. of design. A = Area of catchment (m²) L = Distance in (m) measured on the line of natural flow between the design section and that pt. of the catchment from which water would take the longest time to reach the design section. 9 All design pipe are using concrete pipe/DI pipe. 10 Maximum velocity of flow is 4.0 m/s. 11 Area is divided into sub-catchment areas for the calculation of surface runoff if necessary. Runoff is collected by U-channels, 12 The stormwater collected by the surface drainage system is connected to the existing stream.		

Capacity Calculation for drainage facilities within Application Site

Rainfall intensity is taken from "Table 3b - Storm Constants for Different Return Periods of Tai Mo Shan Area, SDM 2018"
for Return Period 50 years

a b c
1740.1 19.78 0.57

Catchment ID	Area (m ²)	Run-off Co-efficient	Flow Path L (m)	Highest Catchment Level (mPD)	Collection Pt. Level (mPD)	Delta-h (m)	H - Drop in 100m (m per 100m)	Time of Entry t _e (min)	U-Channel Length w (m)	Assumed Velocity v (m/s)	Time of Flow t _f (min)	Time of Concentration T _c (min)	Rainfall Intensity - a	Rainfall Intensity - b	Rainfall Intensity - c	Rainfall Intensity (mm/hr)	Increment for Climate Change (%)	Peak Runoff Q (litre/min)	Required Pipe/Channel	Channel Capacity (litre/min)	Utilization Rate (%)	Velocity at Capacity (m/s) (<=4.0m/s)	Status
Catchment 01	265	1.00	20.0	46.70	46.40	0.30	1.5	1.53	26.0	1.69	0.26	1.78	1740.1	19.78	0.57	302.2	16.0%	1,548	300UC 1 in 100	8,148	19.0%	1.69	ok
Catchment 02	33	1.00	6.0	46.40	46.30	0.10	1.7	0.55	6.0	2.58	0.04	0.59	1740.1	19.78	0.57	312.2	16.0%	199	300UC 1 in 43	12,426	1.6%	2.58	ok
Catchment 03	55	1.00	24.0	46.70	46.30	0.40	1.7	2.10	6.0	2.58	0.04	2.14	1740.1	19.78	0.57	299.4	16.0%	318	300UC 1 in 43	12,426	2.6%	2.58	ok
Catchment 04	352	1.00	20.0	46.70	46.00	0.70	3.5	1.25	37.0	1.57	0.39	1.65	1740.1	19.78	0.57	303.3	16.0%	2,064	450UC 1 in 200	17,010	12.1%	1.57	ok
Catchment 09	475	1.00	20.0	46.70	46.40	0.30	1.5	1.44	33.0	1.57	0.35	1.79	1740.1	19.78	0.57	302.2	16.0%	2,775	450UC 1 in 200	17,010	16.3%	1.57	ok
Catchment EX1	726	0.80	23.0	48.00	46.84	1.16	5.0	1.25	33.0	1.57	0.35	1.60	1740.1	19.78	0.57	303.7	16.0%	3,411	450UC 1 in 200	17,010	20.1%	1.57	ok
																		6,186	450UC 1 in 200	17,010	36.4%	1.57	ok
Catchment 08	647	1.00	19.0	46.70	46.40	0.30	1.6	1.31	30.0	2.56	0.20	1.51	1740.1	19.78	0.57	304.5	16.0%	3,808	450UC 1 in 75	27,777	13.7%	2.56	ok
Catchment EX2	517	0.80	23.0	48.00	46.25	1.75	7.6	1.19	30.0	2.56	0.20	1.38	1740.1	19.78	0.57	305.5	16.0%	2,443	450UC 1 in 75	27,777	8.8%	2.56	ok
																		6,251	450UC 1 in 75	27,777	22.5%	2.56	ok
Catchment 05	726	1.00	23.0	46.70	45.90	0.80	3.5	1.34	37.0	1.75	0.35	1.69	1740.1	19.78	0.57	303.0	16.0%	4,252	450UC 1 in 161	18,959	22.4%	1.75	ok
Catchment 07	145	1.00	8.0	47.20	46.70	0.50	6.3	0.49	18.0	1.20	0.25	0.74	1740.1	19.78	0.57	310.9	16.0%	872	300UC 1 in 200	5,762	15.1%	1.20	ok
Catchment EX3	112	1.00	6.0	47.58	47.00	0.58	9.7	0.34	20.0	2.28	0.15	0.49	1740.1	19.78	0.57	313.1	16.0%	678	300UC 1 in 55	10,987	6.2%	2.28	ok
Catchment 06	210	1.00	23.0	46.70	45.90	0.80	3.5	1.52	30.0	3.70	0.14	1.65	1740.1	19.78	0.57	303.3	16.0%	1,231	450UC 1 in 36	40,093	3.1%	3.70	ok
Sum	3,558																	23,601					

Collect Area	Total Peak Run-off (litre/min)	Required Pipe/Channel	Channel Capacity (litre/min)	Utilization Rate (%)	Velocity at Capacity (m/s)	Status
Catchment 1	1,548	300UC 1 in 100	8,148	19.0%	1.69	ok
Catchment 1+2+3	2,066	300UC 1 in 43	12,426	16.6%	2.58	ok
Catchment 1+2+3+4	4,130	450UC 1 in 200	17,010	24.3%	1.57	ok
Catchment 9+EX1	6,186	450UC 1 in 200	12,146	50.9%	1.57	ok
Catchment 8+EX2	6,251	450UC 1 in 75	27,777	22.5%	2.56	ok
Catchment 8+EX2+9+EX1	12,437	450UC 1 in 66	29,610	42.0%	2.73	ok
Catchment 1+2+3+4+8+EX2+9+EX1+5	20,820	2x 450UC 1 in 161	37,918	54.9%	1.75	ok
Catchment 07	872	300UC 1 in 200	5,762	15.1%	1.20	ok
Catchment EX03	678	300UC 1 in 55	10,987	6.2%	2.28	ok
Catchment 07-EX3-06	2,781	450UC 1 in 36	40,093	6.9%	3.70	ok
	2,781	450UC 1 in 34	42,155	6.6%	3.80	ok
All Catchments	23,601	525UC 1 in 76	41,645	56.7%	2.82	ok
	23,601	EX. 1200UC 1 in 200	233,367	10.1%	3.03	ok
	23,601	EX. 1000UC 1 in 200	143,425	16.5%	2.68	ok
	23,601	EX. 1000P 1 in 200	111,276	21.2%	2.36	ok

Direction (Clockwise?) (Notes)

CW IL-CP1

CW IL-CP1-CP2

CW IL-CP1-CP2-CP3

ACW IL-CP9

CW IL-CP9

ACW CP9-CP3

CW IL-CP1-CP2-CP3-CP4-CPT5

ACW IL-CP8-CP10

ACW IL-CP7

ACW IL-CP8-CP10-CP7-CP6

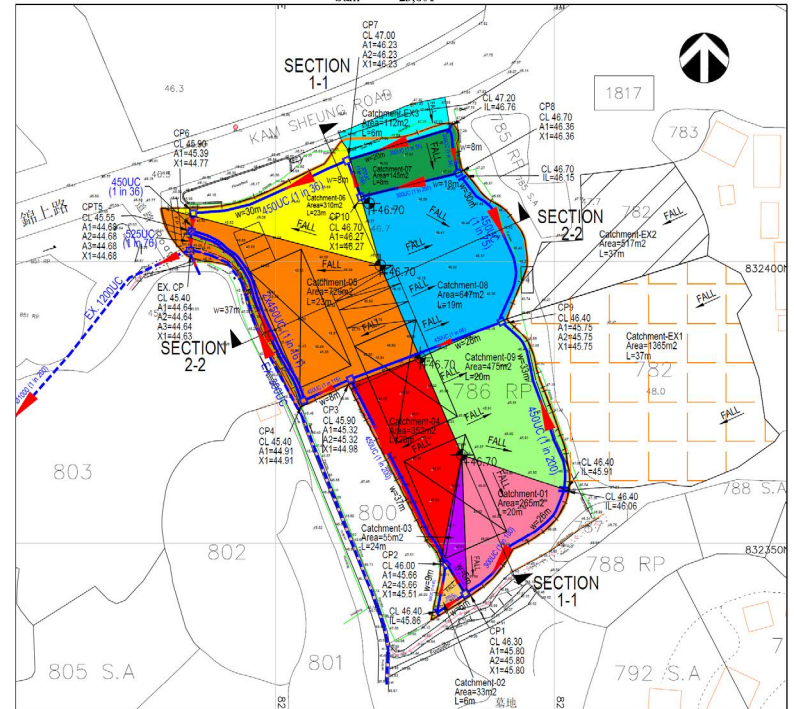
ACW IL-CP8-CP10-CP7-CP6-CPT5

ACW CPT5-EX, CP

EX. 1200UC

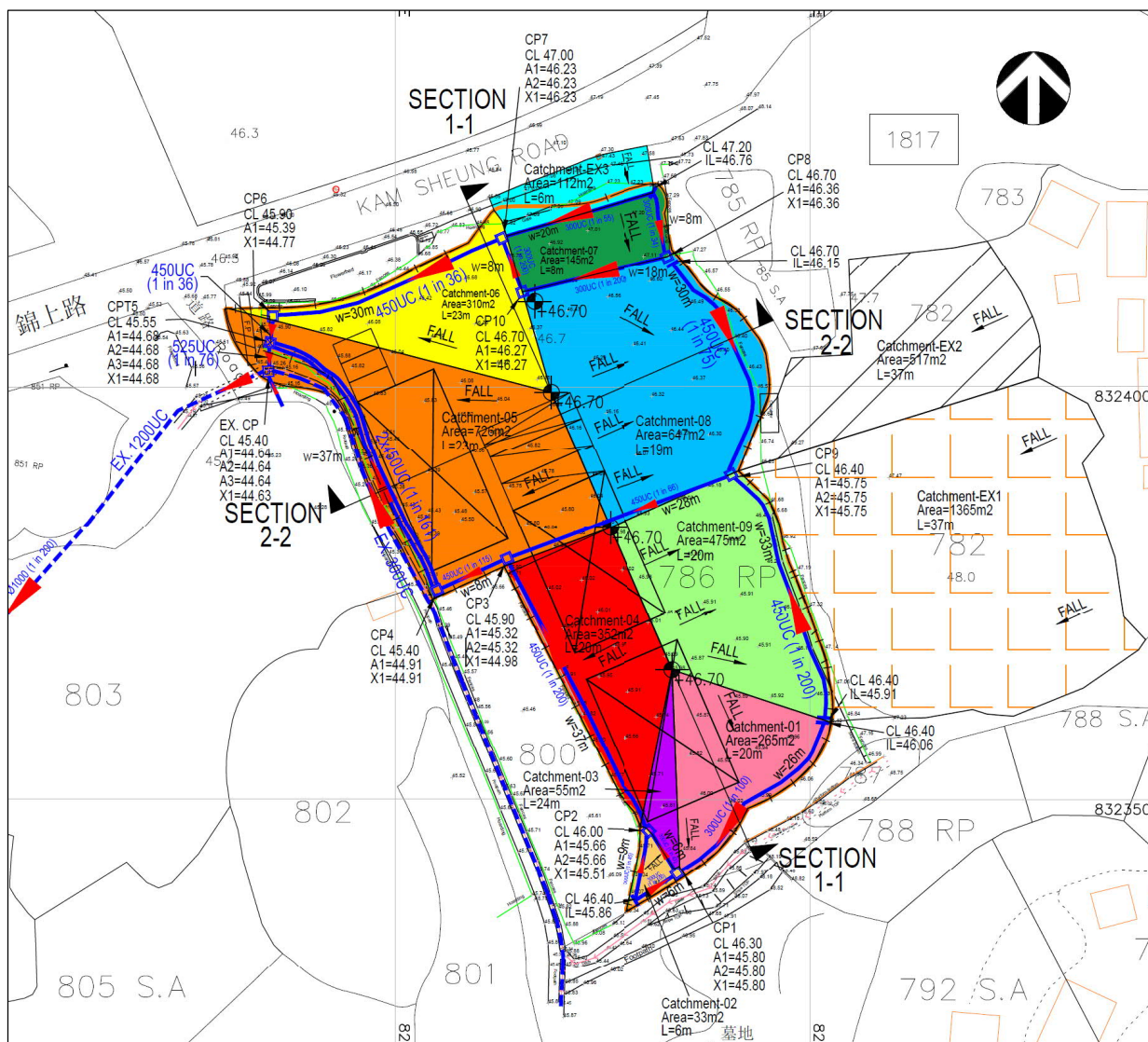
EX. 1000UC

EX. 1000P



Drainage Facilities Arrangement within Application Site

Ref.	Direction (Clockwise?)	Beginning	L-increment (Chainage)	CL	IL	Depth of Catchpit	DS Channel Length	DWG. Chainage	END	C.L	I.L	Depth of Catchpit	Delta IL (Height Diff)	Gradient X in 100	Required Pipe/Channel	Channel Capacity (litre/min)	Velocity at Capacity (m/s)
IL CP1	CW	IL	0.00	46.400	46.060	0.340	26	26.00	CP1	46.300	45.800	0.500	0.260	100.0	300UC 1 in 100	8,148	1.69
CP1 CP2	CW	CP1	26.00	46.300	45.800	0.500	6	32.00	CP2	46.000	45.660	0.340	0.140	42.9	300UC 1 in 43	12,426	2.58
CP2 CP3	CW	CP2	32.00	46.000	45.510	0.490	37	69.00	CP3	45.900	45.320	0.580	0.190	200.0	450UC 1 in 200	17,010	1.57
CP3 CP4	CW	CP3	69.00	45.900	44.980	0.920	8	77.00	CP4	45.400	44.910	0.490	0.070	114.3	450UC 1 in 115	22,432	2.07
CP4 CPT5	CW	CP4	77.00	45.400	44.910	0.490	37	114.00	CPT5	45.550	44.680	0.870	0.230	160.9	450UC 1 in 161	18,959	1.75
IL CP1	ACW	IL	0.00	46.400	45.860	0.540	6	6.00	CP1	46.300	45.800	0.500	0.060	100.0	300UC 1 in 100	8,148	1.69
IL CP2	ACW	IL	0.00	46.400	45.860	0.540	9	9.00	CP2	46.000	45.660	0.340	0.200	45.0	300UC 1 in 45	12,146	2.52
IL CP9	CW	IL	0.00	46.700	46.150	0.550	30	30.00	CP9	46.400	45.750	0.650	0.400	75.0	450UC 1 in 75	27,777	2.56
IL CP9	ACW	IL	0.00	46.400	45.910	0.490	32	32.00	CP9	46.400	45.750	0.650	0.160	200.0	450UC 1 in 200	17,010	1.57
CP9 CP3	ACW	CP9	32.00	46.400	45.750	0.650	28	60.00	CP3	45.900	45.320	0.580	0.430	65.1	450UC 1 in 66	29,610	2.73
IL CP8	ACW	IL	0.00	47.200	46.600	0.600	8	8.00	CP8	46.700	46.360	0.340	0.240	33.3	300UC 1 in 34	13,974	2.90
CP8 CP10	ACW	CP8	8.00	46.700	46.360	0.340	18	26.00	CP10	46.700	46.270	0.430	0.090	200.0	300UC 1 in 200	5,762	1.20
CP10 CP7	ACW	CP10	26.00	46.700	46.270	0.430	8	34.00	CP7	47.000	46.230	0.770	0.040	200.0	300UC 1 in 200	5,762	1.20
CP7 CP6	ACW	CP7	34.00	47.000	46.230	0.770	30	64.00	CP6	45.900	45.390	0.510	0.840	35.7	450UC 1 in 36	40,093	3.70
CP6 CPT5	ACW	CP6	64.00	45.900	44.770	1.130	3	67.00	CPT5	45.550	44.680	0.870	0.090	33.3	450UC 1 in 34	42,155	3.80
IL CP7	ACW	IL	0.00	47.200	46.600	0.600	20	20.00	CP7	47.000	46.230	0.770	0.370	54.1	300UC 1 in 55	10,987	2.28
CPT5 EX. CP	ACW	CPT5	0.00	45.550	44.680	0.870	3	3.00	EX. CP	45.400	44.640	0.760	0.040	75.0	525UC 1 in 76	41,645	2.82



Calculation of 300mm U-Channal Capacity by using Manning's Formula

Refer to Section 8.3.4 of Geotechnical Manual for Slopes (GCO, 1984) & 5.1 of GEO Technical Guidance Note No. 43 (TGN 44)

For U-Channel

$$R=Dh=A/P$$

$$b=0.300 \text{ m}$$

$$h=0.300 \text{ m}$$

$$r=b/2=0.150 \text{ m}$$

$$\text{half full } A=0.035343$$

For $h \leq r$, Half-Circle:

$$\theta=2 \times \cos^{-1}((r-h)/r)=3.141593$$

$$P=r\theta=0.471239 \text{ m}$$

$$A=r^2(\theta-\sin\theta)/2=0.035343 \text{ m}^2, (\text{limit at half circle})$$

$$\text{Hydraulic Radius, } R=A/P=0.075$$

For $h > r$, Upper Rectangle:

$$h'=h-r=0.15 \text{ m}$$

$$\text{Additional } P'=2h'=0.3 \text{ m}$$

$$\text{Additional, } A'=bh'=0.045 \text{ m}^2$$

$$\text{Hydraulic Radius, } R=A/P=0.15$$

Combined:

$$P=0.771239 \text{ m}$$

$$A=0.080343 \text{ m}^2$$

$$\text{Hydraulic Radius, } R=A/P=0.104174 \text{ m}$$

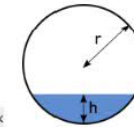
Manning's formula,

$$V=R^{0.67} \times S^{0.5}/n \quad \text{8.3.4 of GCO 1984 \& 5.1 of TGN43}$$

2. Pipe (less than full)

The problem gets a bit more complicated when the pipe is only partially filled. We already calculated this wetted perimeter in the [wetted perimeter of a pipe](#) section:

$$P=r \times \theta, \text{ where the central angle } \theta=2 \times \arccos[(r-h)/r]$$



What about the area, then? You can use the [segment area calculator](#) or directly the formula for the circle segment area:

$$A=r^2 \times (\theta - \sin(\theta)) / 2$$

Combining the two, we find the hydraulic radius equation:

$$R=A/P=[r^2 \times (\theta - \sin(\theta)) / 2] / (r \times \theta)$$

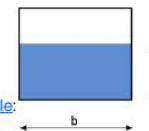
This is quite a formula! Luckily, you can use this handy hydraulic radius calculator instead of meticulously performing all the calculations by hand ;)

Hydraulic radius equation for rectangular, trapezoidal, and triangular channel

This hydraulic radius calculator can be used for channels of various shapes, including rectangles, trapezoids, and triangles. Let's analyze them in more detail to find out which hydraulic radius equations can be used in each case.

1. Rectangular channel

In the case of a rectangular channel, the formulas are very straightforward. The hydraulic radius is simply equal to the rectangle's area divided by the wetted perimeter, as explained in [the first example](#):



$$R=A/P=(b \times y) / (b + y + y) = (b \times y) / (b + 2y)$$

That's it — you can use this formula to find the hydraulic radius of a rectangular open channel.

	b	h	r=b/2	θ	1 in	S=	n=	A	P	A'	P'	A+A'	P+P'	R=Dh=A/P	V m/s	Q, m³/s	Q, L/min
Cap/Chart	0.3	0.3000	0.15	3.141593	34.00	0.029	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	2.90	0.232897	13.974
Cap/Chart	0.3	0.3000	0.15	3.141593	43.00	0.023	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	2.58	0.207094	12.426
Cap/Chart	0.3	0.3000	0.15	3.141593	45.00	0.022	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	2.52	0.20244	12.146
Cap/Chart	0.3	0.3000	0.15	3.141593	50.00	0.020	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	2.39	0.192051	11.523
Cap/Chart	0.3	0.3000	0.15	3.141593	55.00	0.018	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	2.28	0.183114	10.987
Cap/Chart	0.3	0.3000	0.15	3.141593	100.00	0.010	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	1.69	0.135801	8.148
Cap/Chart	0.3	0.3000	0.15	3.141593	115.00	0.009	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	1.58	0.126635	7.598
Cap/Chart	0.3	0.3000	0.15	3.141593	200.00	0.005	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	1.20	0.096026	5.762

Calculation of 450mm U-Channal Capacity by using Manning's Formula

Refer to Section 8.3.4 of Geotechnical Manual for Slopes (GCO, 1984) & 5.1 of GEO Technical Guidance Note No. 43 (TGN 44)

For U-Channel

$$R=Dh=A/P$$

$$b= 0.450 \text{ m}$$

$$h= 0.450 \text{ m}$$

$$r=b/2= 0.225 \text{ m}$$

$$\text{half full } A= 0.079522$$

For $h \leq r$, Half-Circle:

$$\theta = 2 \times \cos^{-1}((r-h)/r) = 3.141593$$

$$P=r\theta = 0.706858 \text{ m}$$

$$A=r^2(\theta - \sin\theta)/2 = 0.079522 \text{ m}^2, (\text{limit at half circle})$$

$$\text{Hydraulic Radius, } R=A/P = 0.1125$$

For $h > r$, Upper Rectangle:

$$h'=h-r = 0.225 \text{ m}$$

$$\text{Additional } P'=2h' = 0.45 \text{ m}$$

$$\text{Additional, } A'=bh' = 0.10125 \text{ m}^2$$

$$\text{Hydraulic Radius, } R=A/P = 0.225$$

Combined:

$$P= 1.156858 \text{ m}$$

$$A= 0.180772 \text{ m}^2$$

$$\text{Hydraulic Radius, } R=A/P = 0.156261 \text{ m}$$

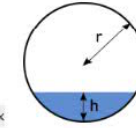
Manning's formula,

$$V=R^{0.67} \times S^{0.5}/n \quad \text{8.3.4 of GCO 1984 \& 5.1 of TGN43}$$

2. Pipe (less than full)

The problem gets a bit more complicated when the pipe is only partially filled. We already calculated this wetted perimeter in the [wetted perimeter of a pipe](#) section:

$$P = r \times \theta, \text{ where the central angle } \theta = 2 \times \arccos [(r - h) / r]$$



What about the area, then? You can use the [segment area calculator](#) or directly the formula for the circle segment area:

$$A = r^2 \times (\theta - \sin(\theta)) / 2$$

Combining the two, we find the hydraulic radius equation:

$$R = A / P = [r^2 \times (\theta - \sin(\theta)) / 2] / (r \times \theta)$$

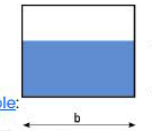
This is quite a formula! Luckily, you can use this handy hydraulic radius calculator instead of meticulously performing all the calculations by hand ;)

Hydraulic radius equation for rectangular, trapezoidal, and triangular channel

This hydraulic radius calculator can be used for channels of various shapes, including rectangles, trapezoids, and triangles. Let's analyze them in more detail to find out which hydraulic radius equations can be used in each case.

1. Rectangular channel

In the case of a rectangular channel, the formulas are very straightforward. The hydraulic radius is simply equal to the rectangle's area divided by the wetted perimeter, as explained in [the first example](#):



$$R = A / P = (b \times y) / (b + y + y) = (b \times y) / (b + 2y)$$

That's it – you can use this formula to find the hydraulic radius of a rectangular open channel.

	b	h	r=b/2	θ	1 in	S=	n=	A	P	A'	P'	A+A'	P+P'	R=Dh=A/P	V m/s	Q, m3/s	Q, L/min
Cap/Chart	0.45	0.4500	0.225	3.141593	34.00	0.029	0.013	0.079522	0.706858	0.10125	0.45	0.180772	1.156858	0.156261	3.80	0.687586	41.255
Cap/Chart	0.45	0.4500	0.225	3.141593	36.00	0.028	0.013	0.079522	0.706858	0.10125	0.45	0.180772	1.156858	0.156261	3.70	0.668213	40.093
Cap/Chart	0.45	0.4500	0.225	3.141593	66.00	0.015	0.013	0.079522	0.706858	0.10125	0.45	0.180772	1.156858	0.156261	2.73	0.493508	29.610
Cap/Chart	0.45	0.4500	0.225	3.141593	75.00	0.013	0.013	0.079522	0.706858	0.10125	0.45	0.180772	1.156858	0.156261	2.56	0.462952	27.777
Cap/Chart	0.45	0.4500	0.225	3.141593	100.00	0.010	0.013	0.079522	0.706858	0.10125	0.45	0.180772	1.156858	0.156261	2.22	0.400928	24.056
Cap/Chart	0.45	0.4500	0.225	3.141593	115.00	0.009	0.013	0.079522	0.706858	0.10125	0.45	0.180772	1.156858	0.156261	2.07	0.373867	22.432
Cap/Chart	0.45	0.4500	0.225	3.141593	161.00	0.006	0.013	0.079522	0.706858	0.10125	0.45	0.180772	1.156858	0.156261	1.75	0.315975	18.959
Cap/Chart	0.45	0.4500	0.225	3.141593	200.00	0.005	0.013	0.079522	0.706858	0.10125	0.45	0.180772	1.156858	0.156261	1.57	0.283499	17.010

Calculation of 525mm U-Channal Capacity by using Manning's Formula

Refer to Section 8.3.4 of Geotechnical Manual for Slopes (GCO, 1984) & 5.1 of GEO Technical Guidance Note No. 43 (TGN 44)

For U-Channel

$$R=Dh=A/P$$

$$b= 0.525 \text{ m}$$

$$h= 0.525 \text{ m}$$

$$r=b/2= 0.263 \text{ m}$$

$$\text{half full } A= 0.108238$$

For $h \leq r$, Half-Circle:

$$\theta = 2 \times \cos^{-1}((r-h)/r) = 3.141593$$

$$P=r\theta = 0.824668 \text{ m}$$

$$A=r^2(\theta - \sin\theta)/2 = 0.108238 \text{ m}^2, (\text{limit at half circle})$$

$$\text{Hydraulic Radius, } R=A/P = 0.13125$$

For $h > r$, Upper Rectangle:

$$h'=h-r = 0.2625 \text{ m}$$

$$\text{Additional } P'=2h' = 0.525 \text{ m}$$

$$\text{Additional, } A'=bh' = 0.137813 \text{ m}^2$$

$$\text{Hydraulic Radius, } R=A/P = 0.2625$$

Combined:

$$P= 1.349668 \text{ m}$$

$$A= 0.24605 \text{ m}^2$$

$$\text{Hydraulic Radius, } R=A/P = 0.182304 \text{ m}$$

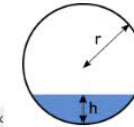
Manning's formula,

$$V=R^{0.67} \times S^{0.5}/n \quad 8.3.4 \text{ of GCO 1984 \& 5.1 of TGN43}$$

2. Pipe (less than full)

The problem gets a bit more complicated when the pipe is only partially filled. We already calculated this wetted perimeter in the [wetted perimeter of a pipe](#) section:

$$P = r \times \theta, \text{ where the central angle } \theta = 2 \times \arccos [(r - h) / r]$$



What about the area, then? You can use the [segment area calculator](#) or directly the formula for the circle segment area:

$$A = r^2 \times (\theta - \sin(\theta)) / 2$$

Combining the two, we find the hydraulic radius equation:

$$R = A / P = [r^2 \times (\theta - \sin(\theta)) / 2] / (r \times \theta)$$

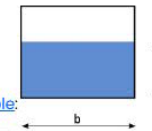
This is quite a formula! Luckily, you can use this handy hydraulic radius calculator instead of meticulously performing all the calculations by hand ;)

Hydraulic radius equation for rectangular, trapezoidal, and triangular channel

This hydraulic radius calculator can be used for channels of various shapes, including rectangles, trapezoids, and triangles. Let's analyze them in more detail to find out which hydraulic radius equations can be used in each case.

1. Rectangular channel

In the case of a rectangular channel, the formulas are very straightforward. The hydraulic radius is simply equal to the rectangle's area divided by the wetted perimeter, as explained in [the first example](#):



$$R = A / P = (b \times y) / (b + y + y) = (b \times y) / (b + 2y)$$

That's it — you can use this formula to find the hydraulic radius of a rectangular open channel.

	b	h	r=b/2	θ	1 in	S=	n=	A	P	A'	P'	A+A'	P+P'	R=Dh=A/P	V m/s	Q, m3/s	Q, L/min
Cap/Chart	0.525	0.5250	0.2625	3.141593	40.00	0.025	0.013	0.108238	0.824668	0.137813	0.525	0.24605	1.349668	0.182304	3.89	0.956718	57.403
Cap/Chart	0.525	0.5250	0.2625	3.141593	50.00	0.020	0.013	0.108238	0.824668	0.137813	0.525	0.24605	1.349668	0.182304	3.48	0.855715	51.343
Cap/Chart	0.525	0.5250	0.2625	3.141593	76.00	0.013	0.013	0.108238	0.824668	0.137813	0.525	0.24605	1.349668	0.182304	2.82	0.694077	41.645
Cap/Chart	0.525	0.5250	0.2625	3.141593	100.00	0.010	0.013	0.108238	0.824668	0.137813	0.525	0.24605	1.349668	0.182304	2.46	0.605082	36.305
Cap/Chart	0.525	0.5250	0.2625	3.141593	150.00	0.007	0.013	0.108238	0.824668	0.137813	0.525	0.24605	1.349668	0.182304	2.01	0.494047	29.643
Cap/Chart	0.525	0.5250	0.2625	3.141593	175.00	0.006	0.013	0.108238	0.824668	0.137813	0.525	0.24605	1.349668	0.182304	1.86	0.457399	27.444
Cap/Chart	0.525	0.5250	0.2625	3.141593	200.00	0.005	0.013	0.108238	0.824668	0.137813	0.525	0.24605	1.349668	0.182304	1.74	0.427857	25.671
Cap/Chart	0.525	0.5250	0.2625	3.141593	225.00	0.004	0.013	0.108238	0.824668	0.137813	0.525	0.24605	1.349668	0.182304	1.64	0.403388	24.203

Calculation of 1000mm U-Channal Capacity by using Manning's Formula

Refer to Section 8.3.4 of Geotechnical Manual for Slopes (GCO, 1984) & 5.1 of GEO Technical Guidance Note No. 43 (TGN 44)

For U-Channel

$$R=Dh=A/P$$

$$b=1.000 \text{ m}$$

$$h=1.000 \text{ m}$$

$$r=b/2=0.500 \text{ m}$$

$$\text{half full } A=0.392699$$

For $h \leq r$, Half-Circle:

$$\theta = 2 \times \cos^{-1}((r-h)/r) = 3.141593$$

$$P=r\theta = 1.570796 \text{ m}$$

$$A=r^2(\theta - \sin\theta)/2 = 0.392699 \text{ m}^2, (\text{limit at half circle})$$

$$\text{Hydraulic Radius, } R=A/P=0.25$$

For $h > r$, Upper Rectangle:

$$h'=h-r=0.5 \text{ m}$$

$$\text{Additional } P'=2h'=1 \text{ m}$$

$$\text{Additional, } A'=bh'=0.5 \text{ m}^2$$

$$\text{Hydraulic Radius, } R=A/P=0.5$$

Combined:

$$P=2.570796 \text{ m}$$

$$A=0.892699 \text{ m}^2$$

$$\text{Hydraulic Radius, } R=A/P=0.347246 \text{ m}$$

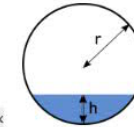
Manning's formula:

$$V=R^{0.67} \times S^{0.5}/n \quad \text{8.3.4 of GCO 1984 \& 5.1 of TGN43}$$

2. Pipe (less than full)

The problem gets a bit more complicated when the pipe is only partially filled. We already calculated this wetted perimeter in the [wetted perimeter of a pipe](#) section:

$$P = r \times \theta, \text{ where the central angle } \theta = 2 \times \arccos[(r-h)/r]$$



What about the area, then? You can use the [segment area calculator](#) or directly the formula for the circle segment area:

$$A = r^2 \times (\theta - \sin(\theta)) / 2$$

Combining the two, we find the hydraulic radius equation:

$$R = A / P = [r^2 \times (\theta - \sin(\theta)) / 2] / (r \times \theta)$$

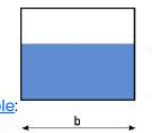
This is quite a formula! Luckily, you can use this handy hydraulic radius calculator instead of meticulously performing all the calculations by hand ;)

Hydraulic radius equation for rectangular, trapezoidal, and triangular channel

This hydraulic radius calculator can be used for channels of various shapes, including rectangles, trapezoids, and triangles. Let's analyze them in more detail to find out which hydraulic radius equations can be used in each case.

1. Rectangular channel

In the case of a rectangular channel, the formulas are very straightforward. The hydraulic radius is simply equal to the rectangle's area divided by the wetted perimeter, as explained in [the first example](#):



$$R = A / P = (b \times y) / (b + y + y) = (b \times y) / (b + 2y)$$

That's it — you can use this formula to find the hydraulic radius of a rectangular open channel.

	b	h	r=b/2	θ	1 in	S=	n=	A	P	A'	P'	A+A'	P+P'	R=Dh=A/P	V m/s	Q, m3/s	Q, L/min
Cap/Chart	1	1.0000	0.5	3.141593	40.00	0.025	0.013	0.392699	1.570796	0.5	1	0.892699	2.570796	0.347246	5.99	5.345137	320.708
Cap/Chart	1	1.0000	0.5	3.141593	50.00	0.020	0.013	0.392699	1.570796	0.5	1	0.892699	2.570796	0.347246	5.36	4.780836	286.850
Cap/Chart	1	1.0000	0.5	3.141593	76.00	0.013	0.013	0.392699	1.570796	0.5	1	0.892699	2.570796	0.347246	4.34	3.877777	232.666
Cap/Chart	1	1.0000	0.5	3.141593	100.00	0.010	0.013	0.392699	1.570796	0.5	1	0.892699	2.570796	0.347246	3.79	3.380561	202.834
Cap/Chart	1	1.0000	0.5	3.141593	150.00	0.007	0.013	0.392699	1.570796	0.5	1	0.892699	2.570796	0.347246	3.09	2.760217	165.613
Cap/Chart	1	1.0000	0.5	3.141593	175.00	0.006	0.013	0.392699	1.570796	0.5	1	0.892699	2.570796	0.347246	2.86	2.555464	153.328
Cap/Chart	1	1.0000	0.5	3.141593	200.00	0.005	0.013	0.392699	1.570796	0.5	1	0.892699	2.570796	0.347246	2.68	2.390418	143.425
Cap/Chart	1	1.0000	0.5	3.141593	225.00	0.004	0.013	0.392699	1.570796	0.5	1	0.892699	2.570796	0.347246	2.52	2.253707	135.222

Calculation of 1200mm U-Channal Capacity by using Manning's Formula

Refer to Section 8.3.4 of Geotechnical Manual for Slopes (GCO, 1984) & 5.1 of GEO Technical Guidance Note No. 43 (TGN 44)

For U-Channel

$$R=Dh=A/P$$

$$b=1.200 \text{ m}$$

$$h=1.200 \text{ m}$$

$$r=b/2=0.600 \text{ m}$$

$$\text{half full } A=0.565487$$

For $h \leq r$, Half-Circle:

$$\theta = 2 \times \cos^{-1}((r-h)/r) = 3.141593$$

$$P=r\theta = 1.884956 \text{ m}$$

$$A=r^2(\theta - \sin\theta)/2 = 0.565487 \text{ m}^2, (\text{limit at half circle})$$

$$\text{Hydraulic Radius, } R=A/P=0.3$$

For $h > r$, Upper Rectangle:

$$h'=h-r=0.6 \text{ m}$$

$$\text{Additional } P'=2h'=1.2 \text{ m}$$

$$\text{Additional, } A'=bh'=0.72 \text{ m}^2$$

$$\text{Hydraulic Radius, } R=A/P=0.6$$

Combined:

$$P=3.084956 \text{ m}$$

$$A=1.285487 \text{ m}^2$$

$$\text{Hydraulic Radius, } R=A/P=0.416695 \text{ m}$$

Manning's formula.

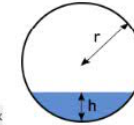
$$V=R^{0.67} \times S^{0.5}/n$$

8.3.4 of GCO 1984 & 5.1 of TGN43

2. Pipe (less than full)

The problem gets a bit more complicated when the pipe is only partially filled. We already calculated this wetted perimeter in the [wetted perimeter of a pipe](#) section:

$$P = r \times \theta, \text{ where the central angle } \theta = 2 \times \arccos[(r-h)/r]$$



What about the area, then? You can use the [segment area calculator](#) or directly the formula for the circle segment area:

$$A = r^2 \times (\theta - \sin(\theta)) / 2$$

Combining the two, we find the hydraulic radius equation:

$$R = A / P = [r^2 \times (\theta - \sin(\theta)) / 2] / (r \times \theta)$$

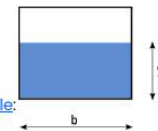
This is quite a formula! Luckily, you can use this handy hydraulic radius calculator instead of meticulously performing all the calculations by hand ;)

Hydraulic radius equation for rectangular, trapezoidal, and triangular channel

This hydraulic radius calculator can be used for channels of various shapes, including rectangles, trapezoids, and triangles. Let's analyze them in more detail to find out which hydraulic radius equations can be used in each case.

1. Rectangular channel

In the case of a rectangular channel, the formulas are very straightforward. The hydraulic radius is simply equal to the rectangle's area divided by the wetted perimeter, as explained in [the first example](#):



$$R = A / P = (b \times y) / (b + y + y) = (b \times y) / (b + 2y)$$

That's it — you can use this formula to find the hydraulic radius of a rectangular open channel.

	b	h	r=b/2	θ	1 in	S=	n=	A	P	A'	P'	A+A'	P+P'	R=Dh=A/P	V m/s	Q, m³/s	Q, L/min
Cap/Chart	1.2	1.2000	0.6	3.141593	40.00	0.025	0.013	0.565487	1.884956	0.72	1.2	1.285487	3.084956	0.416695	6.77	8.697065	521.824
Cap/Chart	1.2	1.2000	0.6	3.141593	50.00	0.020	0.013	0.565487	1.884956	0.72	1.2	1.285487	3.084956	0.416695	6.05	7.778892	466.734
Cap/Chart	1.2	1.2000	0.6	3.141593	76.00	0.013	0.013	0.565487	1.884956	0.72	1.2	1.285487	3.084956	0.416695	4.91	6.309514	378.571
Cap/Chart	1.2	1.2000	0.6	3.141593	100.00	0.010	0.013	0.565487	1.884956	0.72	1.2	1.285487	3.084956	0.416695	4.28	5.500507	330.030
Cap/Chart	1.2	1.2000	0.6	3.141593	150.00	0.007	0.013	0.565487	1.884956	0.72	1.2	1.285487	3.084956	0.416695	3.49	4.491145	269.469
Cap/Chart	1.2	1.2000	0.6	3.141593	175.00	0.006	0.013	0.565487	1.884956	0.72	1.2	1.285487	3.084956	0.416695	3.23	4.157993	249.480
Cap/Chart	1.2	1.2000	0.6	3.141593	200.00	0.005	0.013	0.565487	1.884956	0.72	1.2	1.285487	3.084956	0.416695	3.03	3.889446	233.367
Cap/Chart	1.2	1.2000	0.6	3.141593	225.00	0.004	0.013	0.565487	1.884956	0.72	1.2	1.285487	3.084956	0.416695	2.85	3.667005	220.020

Calculation of Proposed 1000mm Pipe (at 1:200) Capacity by using Colebrook-White's Formula

Refer to Section 8.3.1, Table 12 & Table 14 SDM 2018

Refer to Section 3.12.2 of Guidance Notes On Road Pavement Drainage Design
RD/GN/035A, February 2020

For Pipe

$$\begin{aligned}
 &\text{Pipe Diameter} = 1 \text{ m} \\
 &A_p = 0.7854 \text{ m}^2 \\
 &R = \text{Hydraulic Radius} = 0.25 \text{ m} \\
 &g = 9.81 \text{ m/s}^2 \\
 &S_f = 0.005 \text{ m/m} \quad \text{eqv. (1 in X)} = 200.0 \\
 &k_s = 0.0006 \text{ m} \quad \text{takes } k_s = 0.6 \text{ mm for Concrete Pipe, Table 14, SDM 2018} \\
 &v = 0.000001 \text{ m}^2/\text{s} \\
 &V = \text{Cross-Sectional Mean Velocity} = \frac{-0.6264}{2.36} \text{ m/s} \quad * \log (1.622\text{E-}04 + 7.822\text{E-}06) \\
 &Q_p = A_p * V \\
 &= 0.7854 * 2.361 \\
 &= 1.855 \text{ m}^3/\text{s} \\
 &= 111,276 \text{ L/min}
 \end{aligned}$$

Table 12, SDM 2018

Colebrook-White	$\bar{V} = -\sqrt{32gRS_f} \log \left[\frac{k_s}{14.8R} + \frac{1.255\nu}{R\sqrt{32gRS_f}} \right]$	transition between rough and smooth turbulent flow
-----------------	--	--

RD/GN/035A

3.12.2 The capacity of an outlet pipe can be computed by using the Colebrook-White equation as shown in Equation (6):

$$Q_p = -A_p \sqrt{32gRS_f} \log \left[\frac{k_s}{14.8R} + \frac{1.255\nu}{R\sqrt{32gRS_f}} \right] \quad (6)$$

where Q_p = pipe capacity (m^3/s)
 A_p = cross-sectional area of the pipe (m^2)
 g = gravitational acceleration (m/s^2) (the typical value is of 9.81 m/s^2)
 R = hydraulic radius (m) (= pipe diameter/4)
 S_f = slope of the pipe
 k_s = roughness value of the pipe (m) (the typical values for concrete pipe and PVC pipe are 0.0006 m (i.e. 0.6 mm) and 0.00006 m (i.e. 0.06 mm) respectively)
 ν = viscosity of stormwater (m^2/s) (the typical value is of $1 \times 10^{-6} \text{ m}^2/\text{s}$)

APPENDIX C

Response to DSD's Comments

Email from PlanD, dated 03 August 2026, regarding DSD's comment about the Application No. A/YL-SK/456 (the Application Site), Subject: s.16 Planning Application No. A/YL-SK/456 - Departmental Comments (DSD) Refer to the captioned planning application and your FI submission dated 26.6.2026 in the preceding email. Please find below DSD's comments on the submitted drainage proposal for your follow-up action: Comments from Chief Engineer/Mainland North, Drainage Services Department (Contact Person:- Mr. Jeff TSE C.W., Tel: 3965 8921)	Our Response to DSD's Comments
i) For Drawing No. DD114-786RP/D-01_B, please provide a clear and zoom-in plan showing the proposed drainage arrangement with the size and gradient of the proposed drainage facilities from CP1 to the existing catchpit via CP7 and CPT6 for review. ii) Please advise if any site formation/levelling works to be carried out under this application. Please provide more cross sections at different locations for review. Cross sections showing the existing and proposed ground levels of the captioned site with respect to the adjacent areas should be given.	Revised and simplified. Please see the revised drawing for details. Minor levelling works will be carried out. Please see revised plan and section drawings for details.

iii)	Please confirm if any walls or hoarding are/to be erected or laid along the site boundary. If affirmative, adequate opening should be provided to intercept the existing overland flow passing through the site and please provide its details for comments.	Please see revised plan and section drawings for details.
iv)	The gradient of the proposed U-channels/pipes should be shown on the drainage plan.	Noted. Please see revised plan and section drawings for details.
v)	Catchpit should be provided at the turning point of the proposed u-channel.	Noted. Please see revised plan and section drawings for details.
vi)	Please indicate the utilization rate of the proposed drainage facilities in Appendix B for reference.	Noted. Please see revised calculation in Appendix B for details.
vii)	Please indicate the size of the existing drain on the drainage plan for review. Please indicate clearly 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).	Noted. Please see revised drawings for details.
viii)	The applicant should check and ensure the hydraulic capacity of the existing drainage facilities would not be adversely affected by the captioned development.	Noted. Please see revised calculations in Appendix B for details.
ix)	The existing drain, to which the applicant proposed to discharge the stormwater from the subject site was not maintained by this office. The applicant(s) shall resolve any conflict/disagreement arisen for discharging the runoff from the application	Noted and Agree.

site(s) to the proposed discharge point(s). In the case that it is a local village drains, DO/YL should be consulted. Moreover, the applicant(s) should ensure that this drainage system and the existing downstream drains/channels/streams have adequate capacity to convey the additional runoff from the application site(s). Regular maintenance should be carried out by the applicant(s) to avoid blockage of the system.	
x) Further to (ix) above, since there is no record of the said discharge path, please provide site photos at different locations and views to demonstrate its presence and existing condition.	Please see Photo in Appendix D for existing facilities.
xi) The development should neither obstruct overland flow and nor adversely affect existing natural streams, village drains, ditches and the adjacent areas, etc.	Noted and Agree.
xii) The applicant should resolve any conflict/disagreement with relevant lot owner(s) and seek permission from DLO/YL for laying new drains/channels and/or modifying/upgrading existing ones in other private lots or on Government Land, where required, outside the application site(s).	Noted and Agree.

APPENDIX D

Figures and Photos

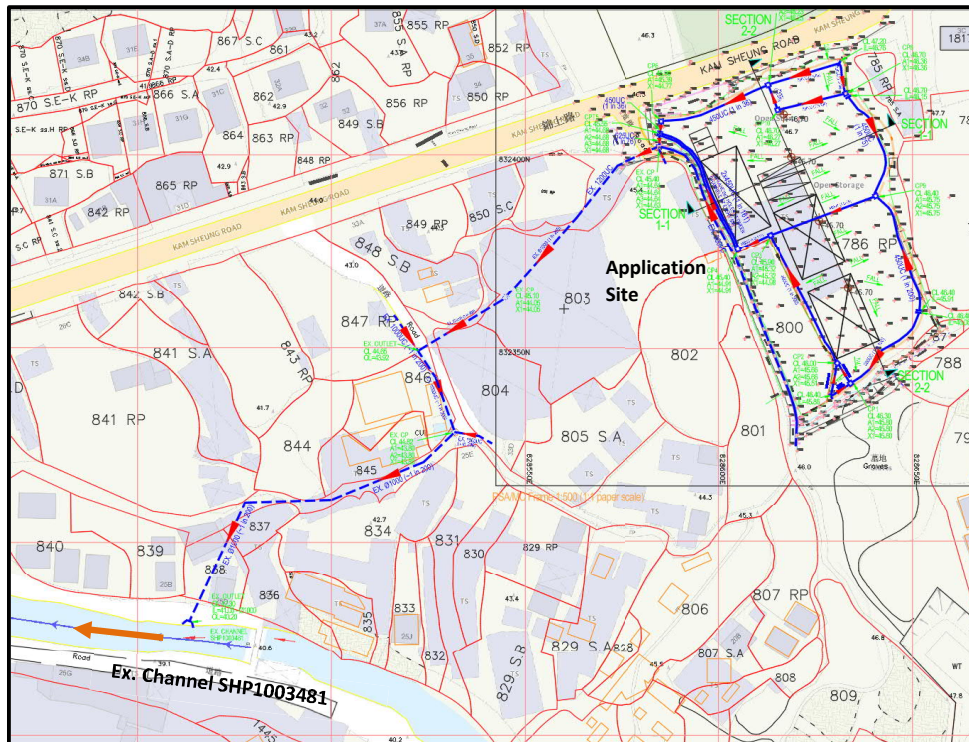


Figure A - Location of Application Site and Ex. Streamcourse.

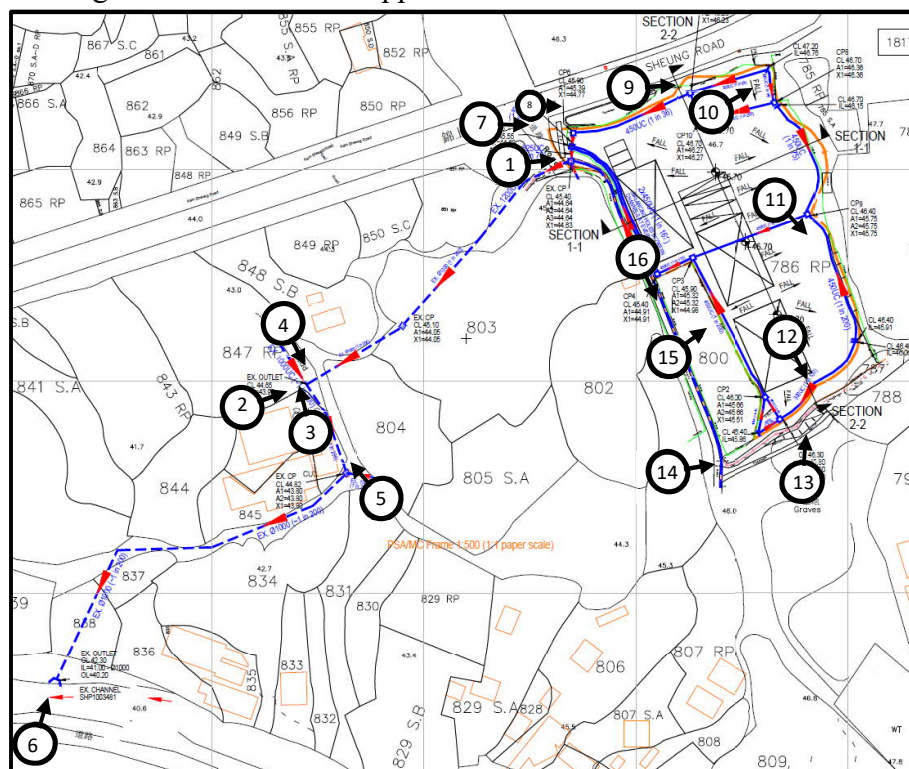


Figure B – POV of Photos



Photo 1 – Existing Catchpit



Photo 2 – Downstream Facility
(1m Pipe)

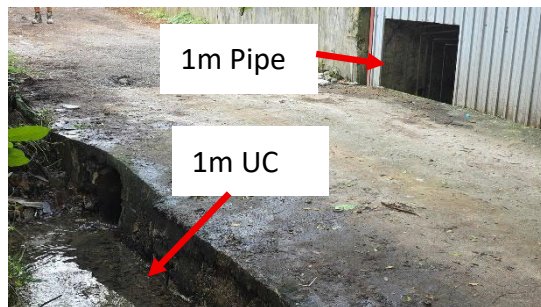


Photo 3 - Downstream Facilities
(1m Pipe & 1m UC)



Photo 4 - Downstream Facilities
(1m Pipe & 1m UC)

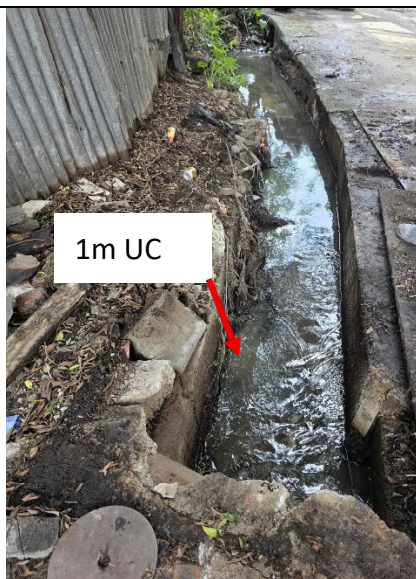


Photo 5 - Downstream Facility
(1m UC)



Photo 6 - Downstream Facility
(Outlet 1m Pipe)



Photo 7 – Existing Planter & Catchpit



Photo 8 – Existing Planter



Photo 9 – Gate along Kam Sheung Road



Photo 10 - Downstream Facilities
 (1m Pipe & 1m UC)



Photo 11 – Ex. Hoarding with gap along
 eastern boundary



Photo 12 – Ex. Hoarding with gap
 along southern boundary



Photo 13 – Ex. Hoarding with gap along southern boundary



Photo 14 – Ex. Ditch outside southern boundary

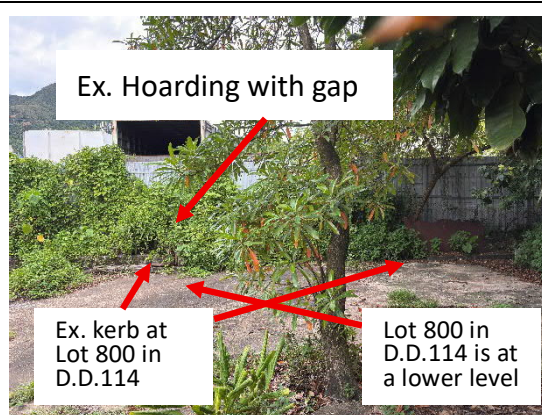


Photo 15 – Ex. Hoarding with gap along western boundary



Photo 16 – Ex. Ditch outside southern boundary

END

of

Drainage Design Report