Man Chi Consultants and Construction Limited
敏志顧問及建築工程有限公司

[redacted]

Date : 8th July, 2026

[redacted]

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 Temporary Storage of Kitchenware with Ancillary Site Office for a Period of 3 Years at Lot Nos. 544 S.A (Part), 544 S.B (Part), 544 S.C, 544 RP and 545 S.B RP (Part) in D.D. 111 and adjoining Government Land, Pat Heung, Yuen Long, New Territories (Planning Application No. A/YL-PH/1115)

We refer to the captioned application and would like to submit *a Reponses to Comment Table, a revised Layout Plan, a Swept Path Analysis and a Drainage Proposal* to facilitate further considerations by relevant departments and the Town Planning Board. The revised layout plan serves to provide additional annotations, and there is no change to the development parameters, including site coverage, gross floor area and building height.

According to the Applicant, they do not acknowledge the existence of any pond within the application site, and no filling of pond is involved under the current application.

Furthermore, we would like to clarify that there is a valid general restaurant license for the ground floor of the house (i.e., S6), which expires on 18.4.2027. Please refer to the attachment for details.

Upon approval of the current application, the Applicant will apply to the Lands Department for a Short-Term Waiver and Short-Term Tenancy to permit the structure(s) erected within the private lots and the occupation of Government land within the application site boundary.

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

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

Edward LIT
Planning Consultant

Encl.

[redacted]

<table>
<tr><th>Department</th><th>Date</th><th>Comments</th><th>Responses to Departmental Comments</th></tr>
<tr><td>Transport Department</td><td>9.4.2026</td><td>I. The trip generation and attraction should be provided due to the development and assess the traffic impact to Fan Kam Road and the local access.</td><td>The applied use is intended for the temporary storage of leftover kitchenware awaiting further logistical arrangements at the application site. By its nature, the stored items are intended to remain stagnant for extended periods. Consequently, vehicular movements are limited to occasional stock transfers rather than high-frequency distribution. It is anticipated there would be about 4 trips per week only. The anticipated trip rates are, therefore, considered minimal and negligible in the context of the local road network capacity.

LGVs will be deployed for the transportation of kitchenware to the application site during non-peak hours (i.e. between 10:00 and 17:00). The breakdown of estimated trip generation/attraction of proposed development at AM and PM peak hours are provided below.

Table 5: Traffic Generation/Attraction Rate
<table>
<tr><th>Time Period</th><th>Trip Generation (In)</th><th>Trip Attraction (Out)</th><th>2-Way Total/Total PCUs</th></tr>
<tr><td>Trips at AM peak per hour (09:00 – 10:00)</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Trips at PM eak per hour (18:00-19:00)</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Average trip per hour (10:00 – 17:00)</td><td>1</td><td>1</td><td>2</td></tr>
<tr><td></td><td>1</td><td>1</td><td>2</td></tr>
</table>

The Application Site provides sufficient internal space to allow vehicles to maneuver. No vehicles will be required to reverse onto Fan Kam Road or the local access track.</td></tr>
</table>

			The low-intensity nature of the use ensures no adverse impact on the operational efficiency of the surrounding road network. In view of the above, the applied use is solely for passive storage with minimal logistical requirements. It is anticipated that the applied use will not create any adverse traffic impacts on Fan Kam Road or the immediate vicinity.
		II. Please demonstrate the smooth manoeuvring of vehicles to / from Fan Kam Road, along the local access and within the site.	Please refer to the attached swept path analysis.
		III. Please indicate the clear width of the vehicular ingress / egress on the layout plan.	The width of the ingress/egress point of the Application Site is about 7m wide (Please refer to the layout plan).

持牌普通食肆
LICENSED
GENERAL RESTAURANT

店號及地址：
Shop Sign & Address:

泰潮
THAI CHIU

[redacted]

牌照屆滿日期：
Licence Expiry Date: 18/04/2027

特別批簽 Special Endorsement

食物環境衞生署
Food and Environmental Hygiene Department

編號
Serial No. [redacted]

署
rtment

INANCE (CAP. 132)

牌照／許可證號碼
Licence/Permit No. [redacted]

NCE

牌人姓名列後。
l Hygiene (Director) as a general

19/04/2026 to 18/04/2027.

件，持牌條件及一切限制，持牌人亦須依從。
ance (Cap.132) and Regulations
e by the Director.

ll not transfer his licence to any person.

which this licence relates.

(Fee waived 已豁免收費)
費用收訖:
Fee Received [redacted]

THAI CHIU (GLOBAL) CATERING MANAGEMENT COMPANY LIMITED

[redacted]

食物環境衞生署署長（ Miss Nicole NG 代行）
for Director of Food and Environmental Hygiene
日期：
Date 21/04/2026

[redacted]

DEVELOPMENT PARAMETERS

APPLICATION SITE	:	918 m^2	(ABOUT)
COVERED AREA	:	401 m^2	(ABOUT)
UNCOVERED AREA	:	517 m^2	(ABOUT)
TOTAL FLOOR AREA	:	467 m^2	(ABOUT)

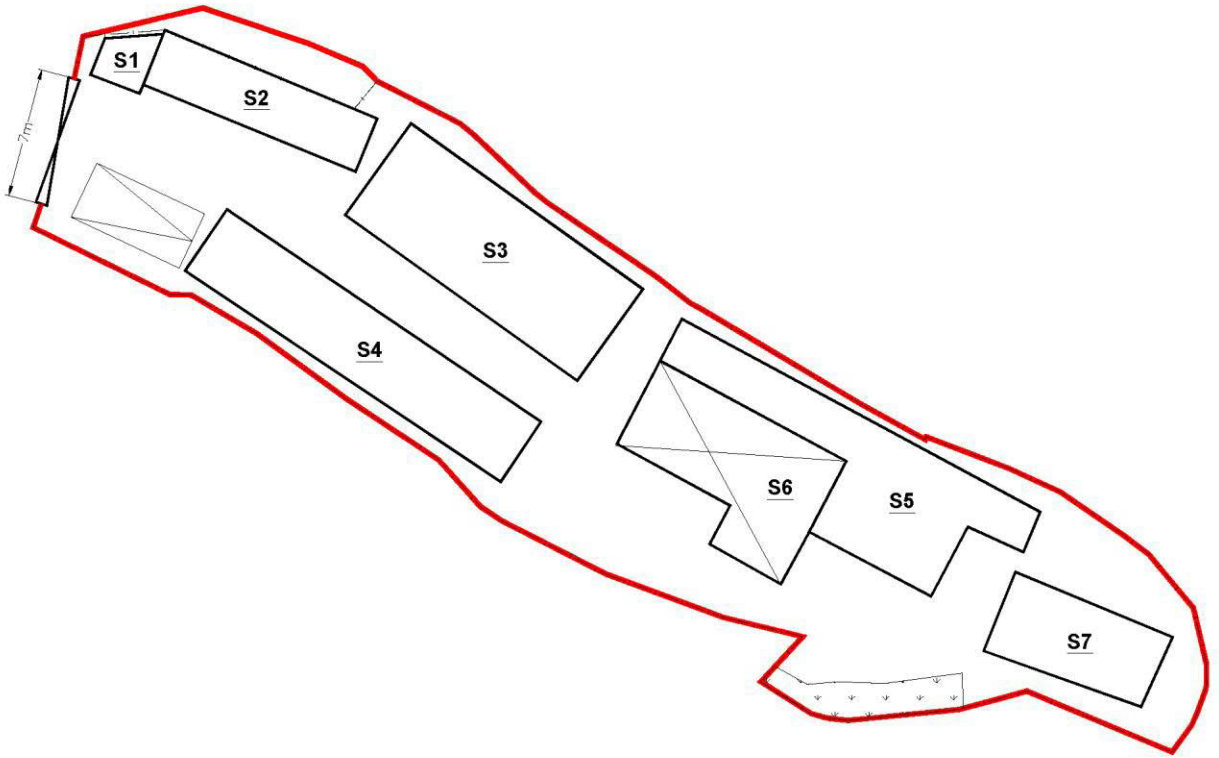
PARKING AND LOADING/UNLOADING PROVISION

L/UL AREA (LGV) : 1 NOS. (7M(L) X 3.5M(W))

NO.	USES	COVERED AREA	FLOOR AREA	BUILDING HEIGHT
S1	STORE ROOM	8 m^2	8 m^2	3m (NOT MORE THAN) (1-STOREY)
S2	STORE ROOM	37 m^2	37 m^2	3m (NOT MORE THAN) (1-STOREY)
S3	STORE ROOM	90 m^2	90 m^2	3m (NOT MORE THAN) (1-STOREY)
S4	STORE ROOM	78 m^2	78 m^2	3m (NOT MORE THAN) (1-STOREY)
S5	STORE ROOM	84 m^2	84 m^2	3m (NOT MORE THAN) (1-STOREY)
S6	STORE ROOM/ANCILLARY OFFICE	66 m^2	132 m^2	7m (NOT MORE THAN) (2-STOREY)
S7	STORAGE AREA	38 m^2	38 m^2	3m (NOT MORE THAN) (1-STOREY)
	TOTAL	401 m^2	467 m^2	

LEGEND

- APPLICATION SITE BOUNDARY
- PROPOSED STRUCTURE (1 STOREY)
- PROPOSED STRUCTURE (2 STOREY)
- PROPOSED FENCING
- PLANTING AREA
- INGRESS/EGRESS (ABOUT 7M-WIDE)
- L/UL BAY (LGV)



Project:
Section 16 Planning Application for Temporary Storage of Kitchenware with Ancillary Site Office for a Period of 3 Years at Various Lots in D.D. 111 and adjoining Government Land, Pat Heung, Yuen Long, New Territories

Title:
Indicative Layout Plan

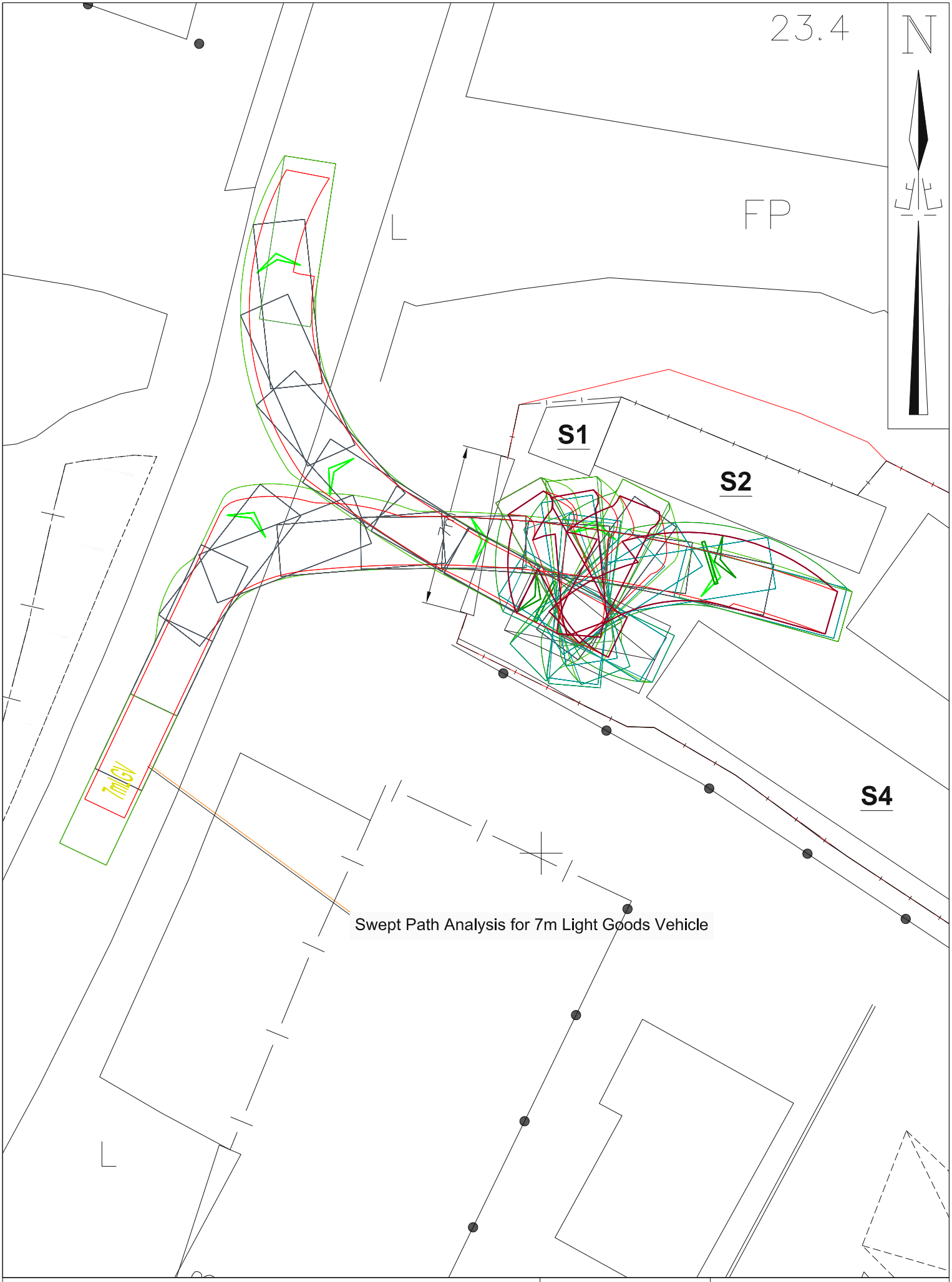
[redacted]

Figure:
4

Scale:
Not to Scale

Date:
Apr 2026

Man Chi
Consultants And Construction Limited



Planning Application No. A/YL-PH/1115
Section 16 Planning Application for Temporary Storage of Kitchenware with Ancillary Site Office for a Period of 3 Years at Various Lots in D.D. 111 and adjoining Government Land, Pat Heung, Yuen Long, New Territories

Figure SP-01

Scale: 1:200@A4

Drawing Date: Apr 2026

8FM CONSULTANCY LIMITED

Drainage Design Report

Proposed Drainage Facilities in Lot 544 S.A, S.B, S.C & RP, And 545 S.B RP in D.D. 111, San Lung Wai, Yuen Long, New Territories

TABLE OF CONTENTS

1. INTRODUCTION

This application is for the Proposed Drainage Facilities in Lot 544 S.A, S.B, S.C & RP, And 545 S.B RP in D.D. 111, San Lung Wai, Yuen Long, New Territories.

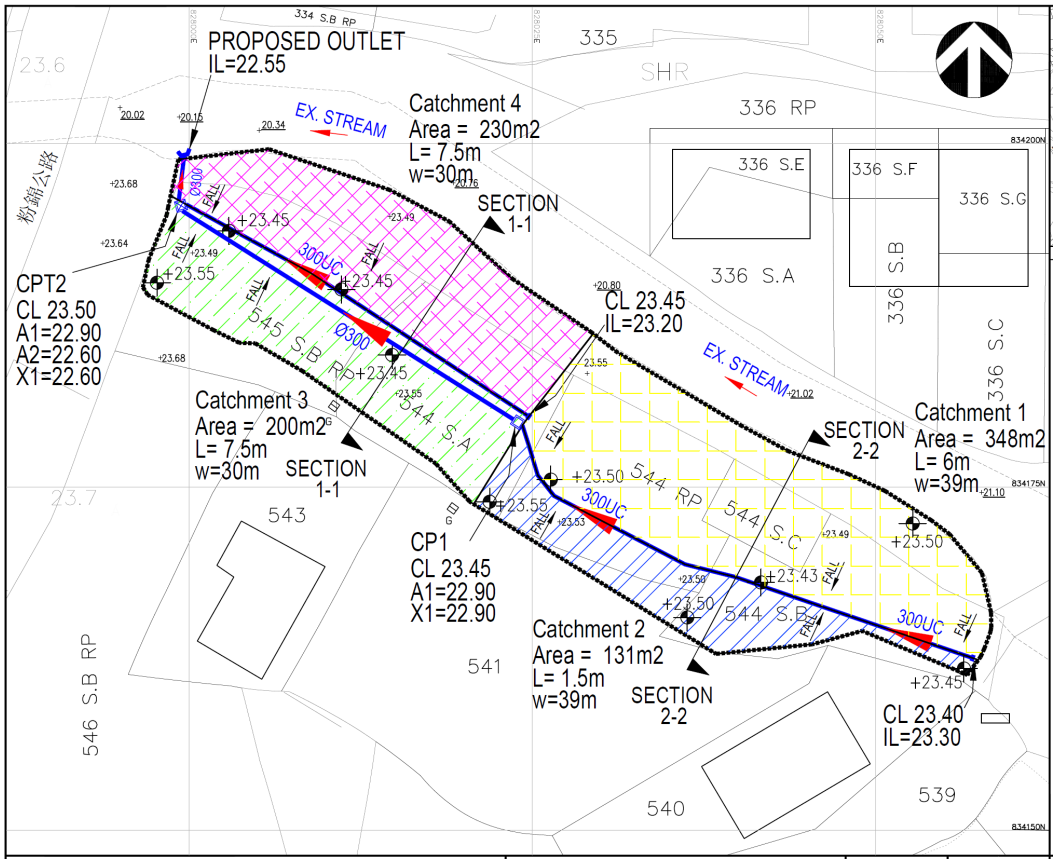
This report has been prepared to support the drainage proposal by:

(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.

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, consisting part of Lot Nos. 544 S.A, 544 S.B, 544 S.C, 544 RP in D.D. 111, 545 S.B RP in D.D. 1 and part government land, is situated on flat terrain. The northern boundary is adjacent to an existing stream at a lower level. The eastern, southern and western boundaries is enclosed by a plinth wall; there is there own drainage facilities outside the eastern, southern and western boundaries. Therefore, the application site is unlikely to collect surface runoff from outside its boundaries.

a. In Catchment 1, denoted by the Yellow area, the surface runoff flows in southwest directions and will be directed to a U-Channel.

b. In Catchment 2, denoted by the Blue area, the surface runoff flows in northeast directions and will be directed to a U-Channel.

c. In Catchment 3, denoted by the Green area, the surface runoff flows in northeast directions and will be directed to a U-Channel.

d. In Catchment D, denoted by the Purple area, the surface runoff flows in southwest directions 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%.

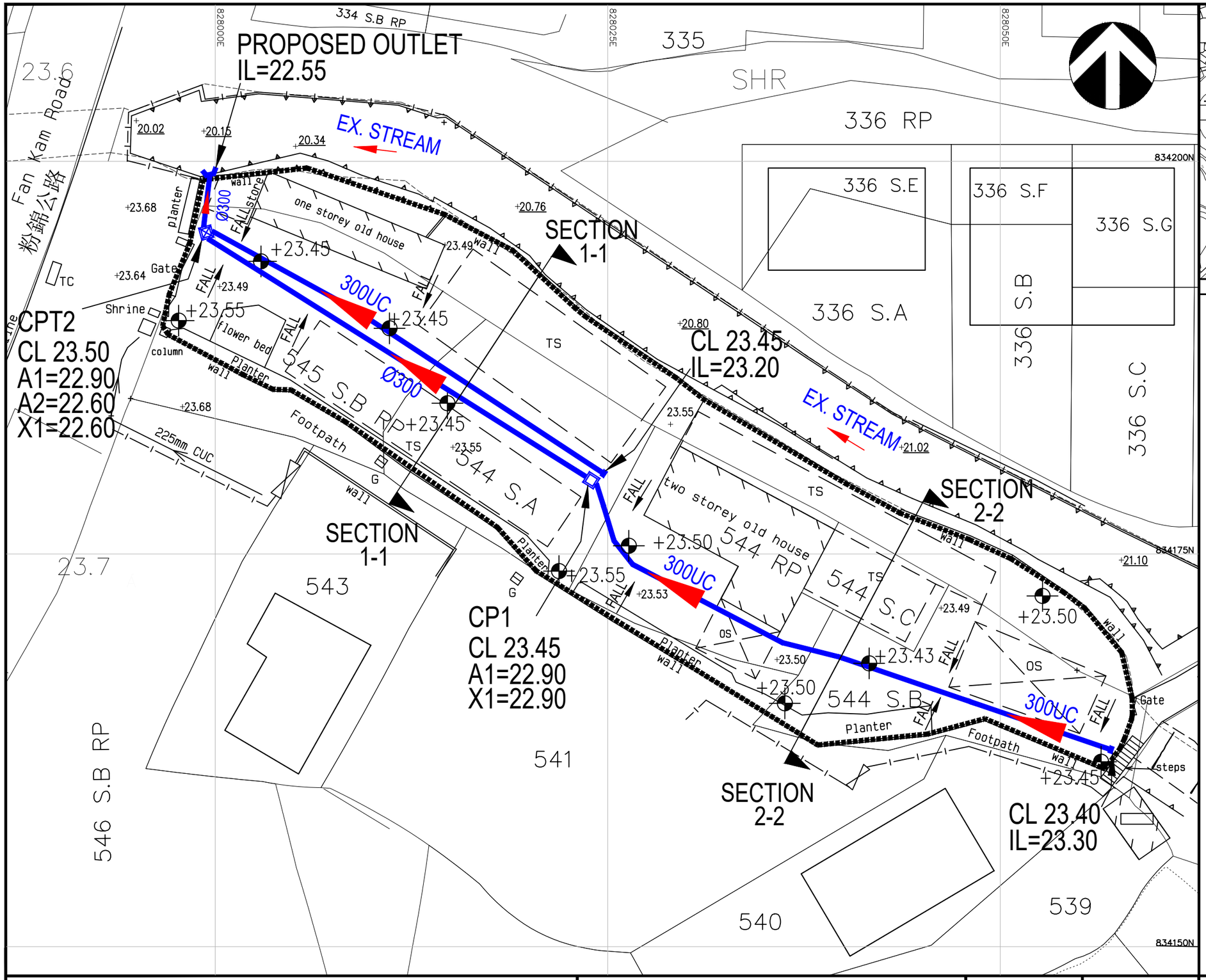
It is concluded that along all the central line of application site, 300mm U-Channels (minimum 1 in 100 fall) are provided, as detailed in Appendix A. The U-channels in Catchments 1 & 2 are connected to a Catchpit (CP1) and then drain into a 300mm underground pipe leading to a proposed Catchpit with Trap (CPT2) located within the subject site boundary. The U-channels in Catchments 3 & 4 are connected to CPT2. The runoff from CPT2 will then drain into a 300mm underground pipe leading to a proposed Outlet (IL at 22.55mPD), that discharges into an existing 4m wide stream. This stream connects to an open channel downstream (Feature no. SCP1013764)

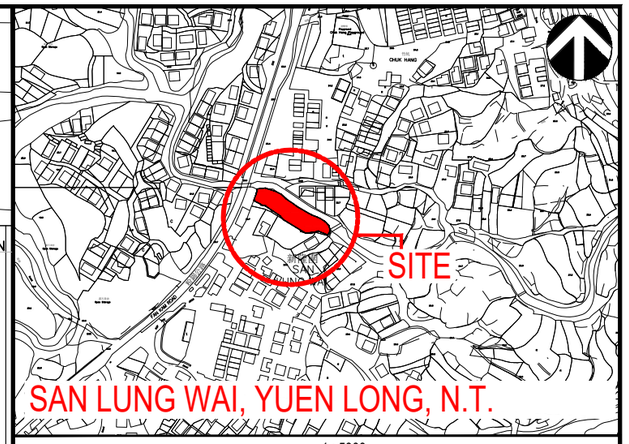
The hydraulic calculations demonstrate that the facilities are sufficient to collect surface runoff from the application site.

The design is considered adequate.

APPENDIX A

Proposed Drainage Details for the Application Site





LEGENDS:

- LOT BOUNDARY LINE
- EXISTING VERTICAL CUTTING
- EXISTING WALL
- INGRESS/EGRESS
- +23.55 - EX. SPOT LEVEL (mPD)
- +23.50 - PROPOSED SITE FORMATION LEVEL (mPD)
- PROPOSED CATCHPIT WITH TRAP
- PROPOSED CATCHPIT WITHOUT TRAP
- (SIZE)UC - PROPOSED U-CHANNEL (SIZE DENOTED ON DRAWING, MIN. FALL 1:100)
- ø(DIA) - PROPOSED DRAINAGE PIPE (UNDERGROUND, SIZE DENOTED ON DRAWING, MIN. FALL 1:100)
- PROPOSED OUTLET

Project: PROPOSED DRAINAGE FACILITIES IN LOT 544 S.A, S.B, S.C & RP, AND 545 S.B RP IN D.D. 111, SAN LUNG WAI, YUEN LONG, N.T.	Title: DRAINAGE DESIGN LAYOUT PLAN	Scale: 1:250 Date: MAY 2026	Figure: 01-A

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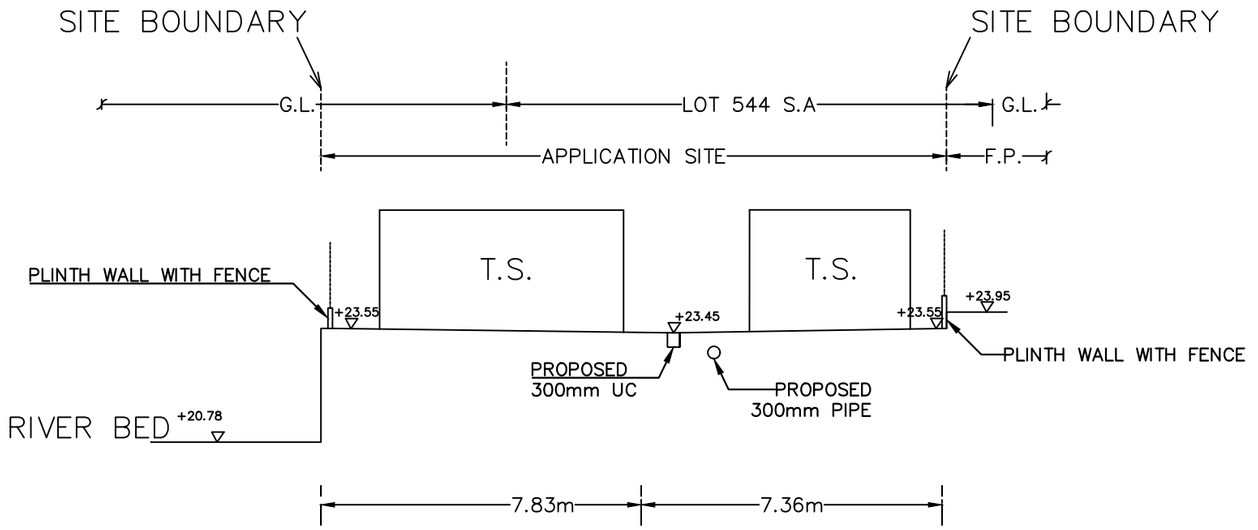
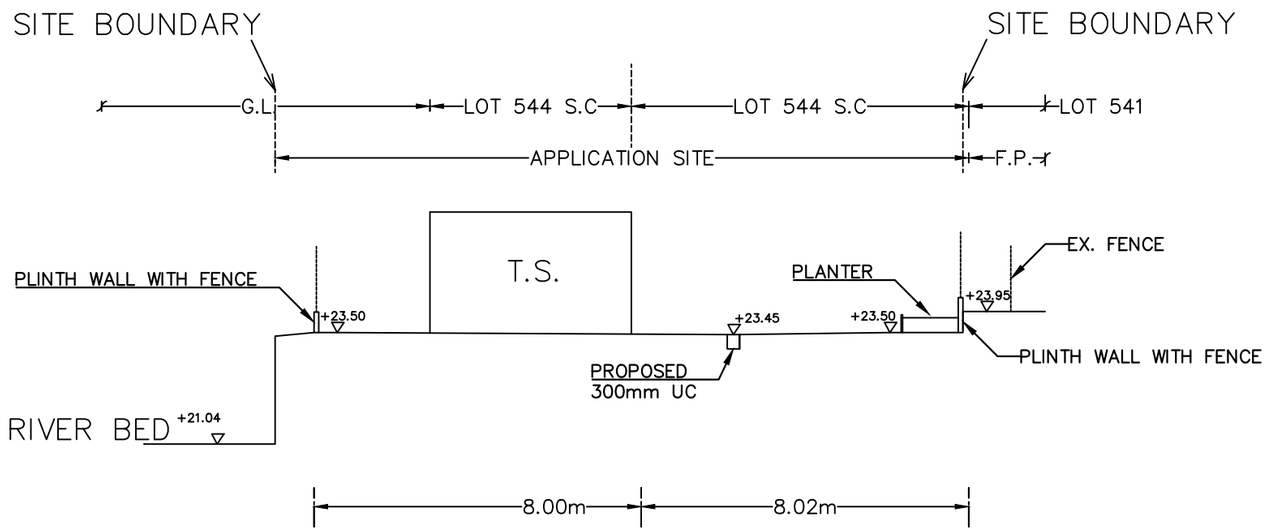


SECTION 1-1 1 : 150



SECTION 2-2 1 : 150

Project: PROPOSED DRAINAGE FACILITIES IN LOT 544 S.A, S.B, S.C & RP, AND 545 S.B RP IN D.D. 111, SAN LUNG WAI, YUEN LONG, N.T.	Title: STORMWATER DRAINAGE WORKS – SECTION 1–1 & SECTION 2–2	Scale: 1:150 Date: MAY 2026	Figure: 02–A	Man Chi Consultants And Construction Limited

2026-29-05 17:51 Calvin

NOTES FOR CATCHPIT

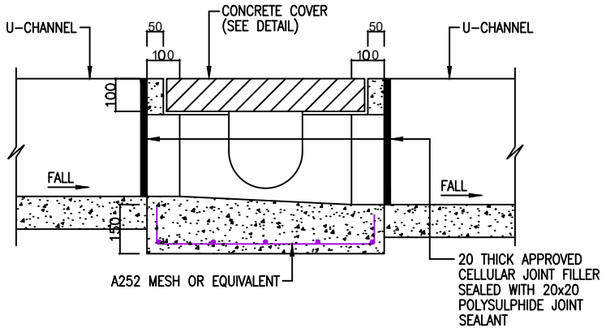
1. ALL CONCRETE SHALL BE GRADE C30 AND COMPLY WITH CS1:2010.
2. MINIMUM CONCRETE COVER SHALL BE 40mm.
3. ALL REINFORCEMENT (GRADE 500B) TO BE HIGH TENSILE DEFORMED BAR.
   ALL REINFORCEMENT SHALL COMPLY WITH CS2:2012.
   ALL WIRE MESH SHALL BE GRADE 500B STEEL COMPLY WITH CS2:2012.
4. RUN OFF FROM THIS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

NOTES FOR U-CHANNEL

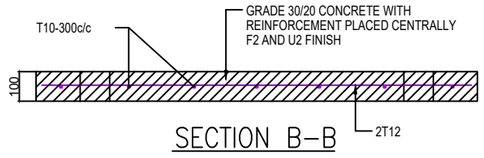
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. H = NOMINAL CHANNEL SIZE
3. FOR DIMENSIONS OF CHANNEL SEE TABLE.

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

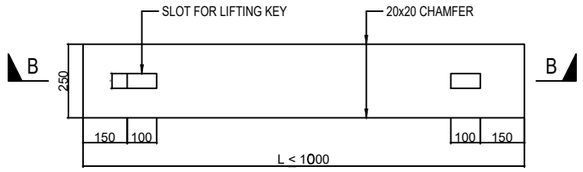
4. CONCRETE SURFACE FINISH SHALL BE CLASS U2 OR F2 AS APPROPRIATE.
5. EXPANSION JOINTS SHALL BE PROVIDED AT A MAXIMUM SPACING OF 10 METRES.
6. ALL CONCRETE SHALL BE GRADE C30.
7. ALL CAST IRON FOR GRATINGS SHALL BE GRADE EN-GJL-150 COMPLYING WITH BS EN 1561.



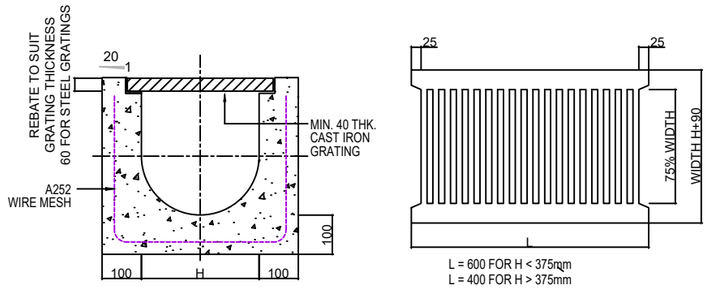
SECTION A-A (WITHOUT TRAP)
(FOR GROUND LEVEL TO I.L.<=1.0M)
(SCALE N.T.S.)



SECTION B-B



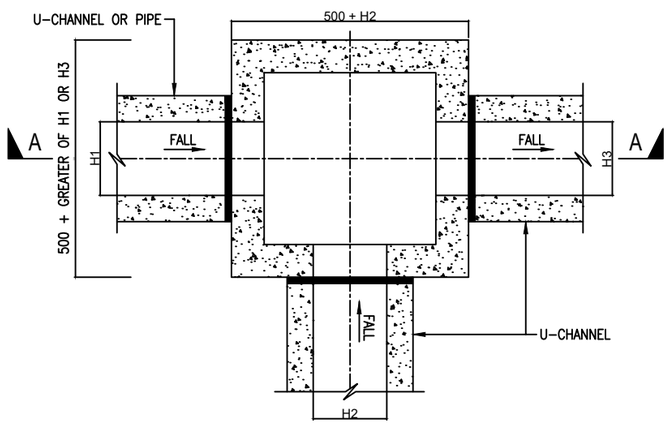
PLAN OF PRECAST CONCRETE COVER FOR CATCHPIT
TYPE 1 – FOR SPAN UP TO 1.0m N.T.S.



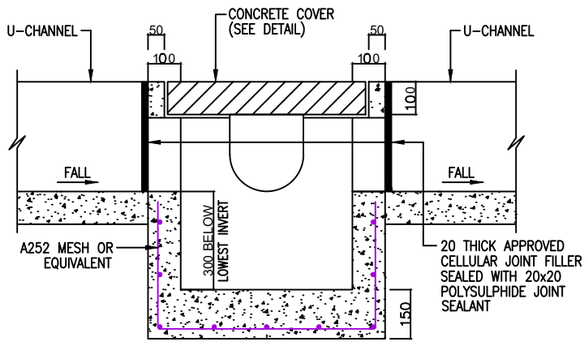
TYPICAL SECTION

CAST IRON GRATING

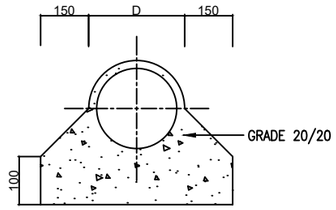
U-CHANNEL WITH CAST IRON GRATING N.T.S.
(UP TO H OF 525)
(DIMENSIONS ARE FOR GUIDANCE ONLY, CONTRACTOR MAY SUBMIT EQUIVALENT TYPE)



PLAN
TYPICAL DETAIL OF CATCHPIT N.T.S.



SECTION A-A (WITH TRAP)
(FOR GROUND LEVEL TO I.L.<=1.0M)
(SCALE N.T.S.)



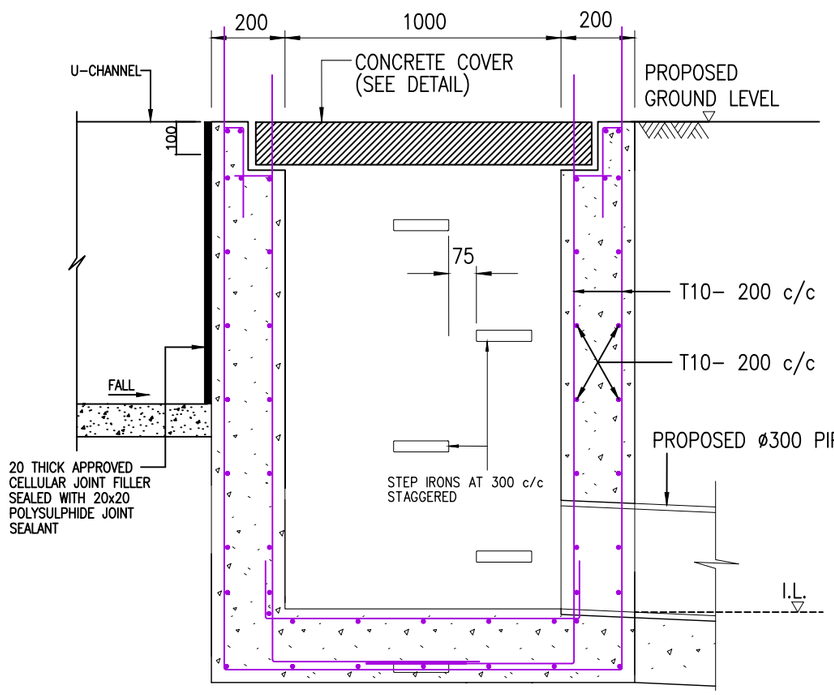
PIPE BEDDING DETAIL
(SCALE N.T.S.)

Project:	Title:	Scale:	Figure:	
PROPOSED DRAINAGE FACILITIES IN LOT 544 S.A, S.B, S.C & RP, AND 545 S.B RP IN D.D. 111, SAN LUNG WAI, YUEN LONG, N.T.	STORMWATER DRAINAGE WORKS – NOTES AND DETAILS 1	AS SHOWN Date: MAY 2026	03-A	Man Chi Consultants And Construction Limited

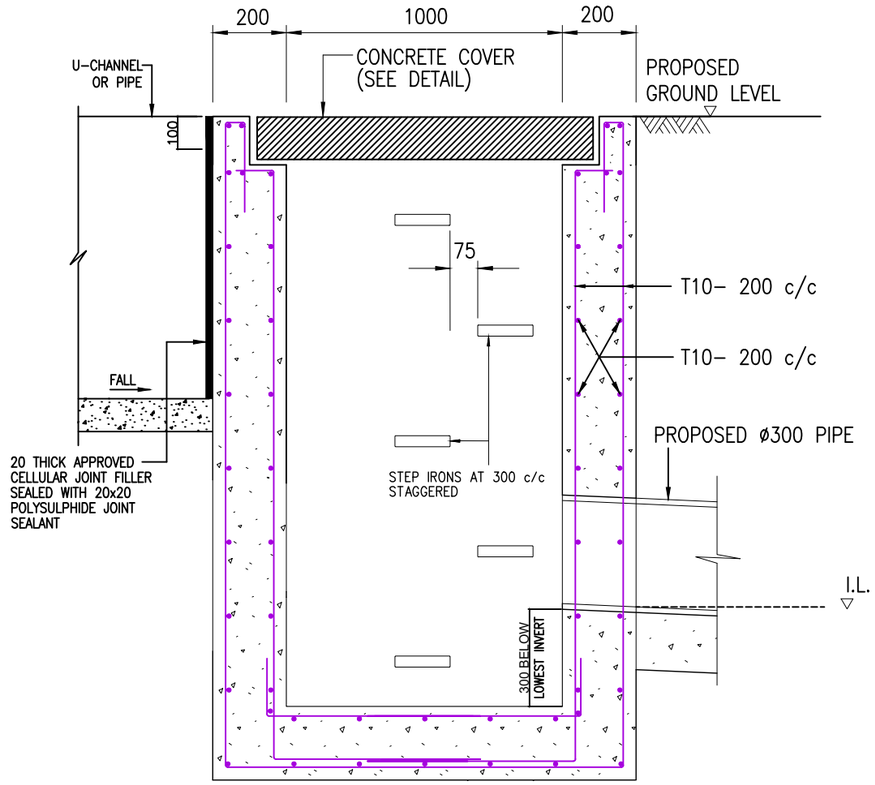
2026-29-05 17:50 Calvin

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.



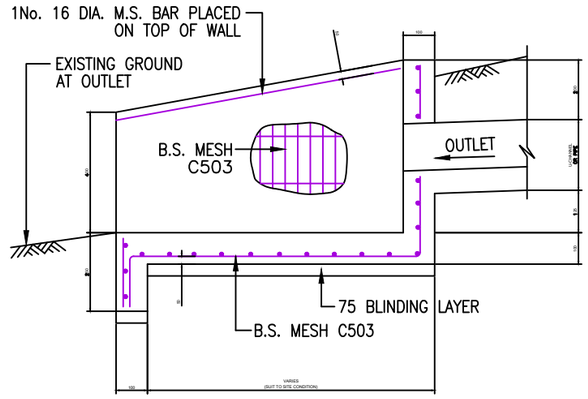
SECTION A–A (WITHOUT TRAP)
(FOR GROUND LEVEL TO I.L.>1.0M)
(SCALE N.T.S.)



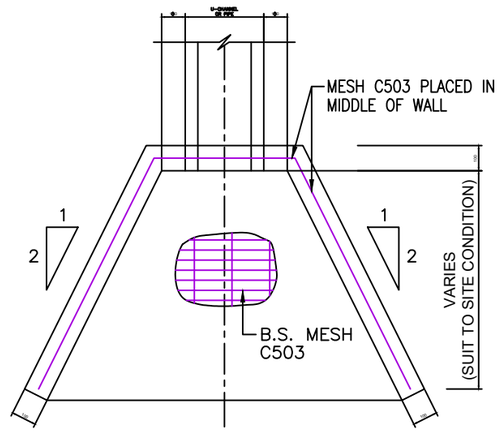
SECTION A–A (WITH TRAP)
(FOR GROUND LEVEL TO I.L.>1.0M)
(SCALE N.T.S.)

NOTES FOR HEAD WALL

1. ALL CONCRETE SHALL BE GRADE C30.
2. MINIMUM LAP LENGTH OF REINFORCEMENT SHOULD BE 40 x DIA. OF BAR.
3. ALL CONCRETE CHAMFERS TO BE 25x25mm.



OUTLET DETAIL N.T.S.



Project: PROPOSED DRAINAGE FACILITIES IN LOT 544 S.A, S.B, S.C & RP, AND 545 S.B RP IN D.D. 111, SAN LUNG WAI, YUEN LONG, N.T.	Title: STORMWATER DRAINAGE WORKS – NOTES AND DETAILS 2	Scale: AS SHOWN Date: MAY 2026	Figure: 04–A	Man Chi Consultants And Construction Limited

2026-29-05 17:52 Calvin

APPENDIX B

Design Calculation

		PROJECT No. **DD111- 544 SA, SB, SC, RP, 545 SB RP**
OFFICE **MC**	PROJECT TITLE **DRAINAGE DESIGN REPORT for Lot 544 SA, SB, SC, RP and 545 SB RP in D.D. 111, San Lung Wai, 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)

Design Parameters and Assumption

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 3a – Storm Constants for Different Return Periods of HKO Headquarters, SDM Corrigendum No. 1/2024"

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 if catchment (m^2)
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 (m^2)
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.

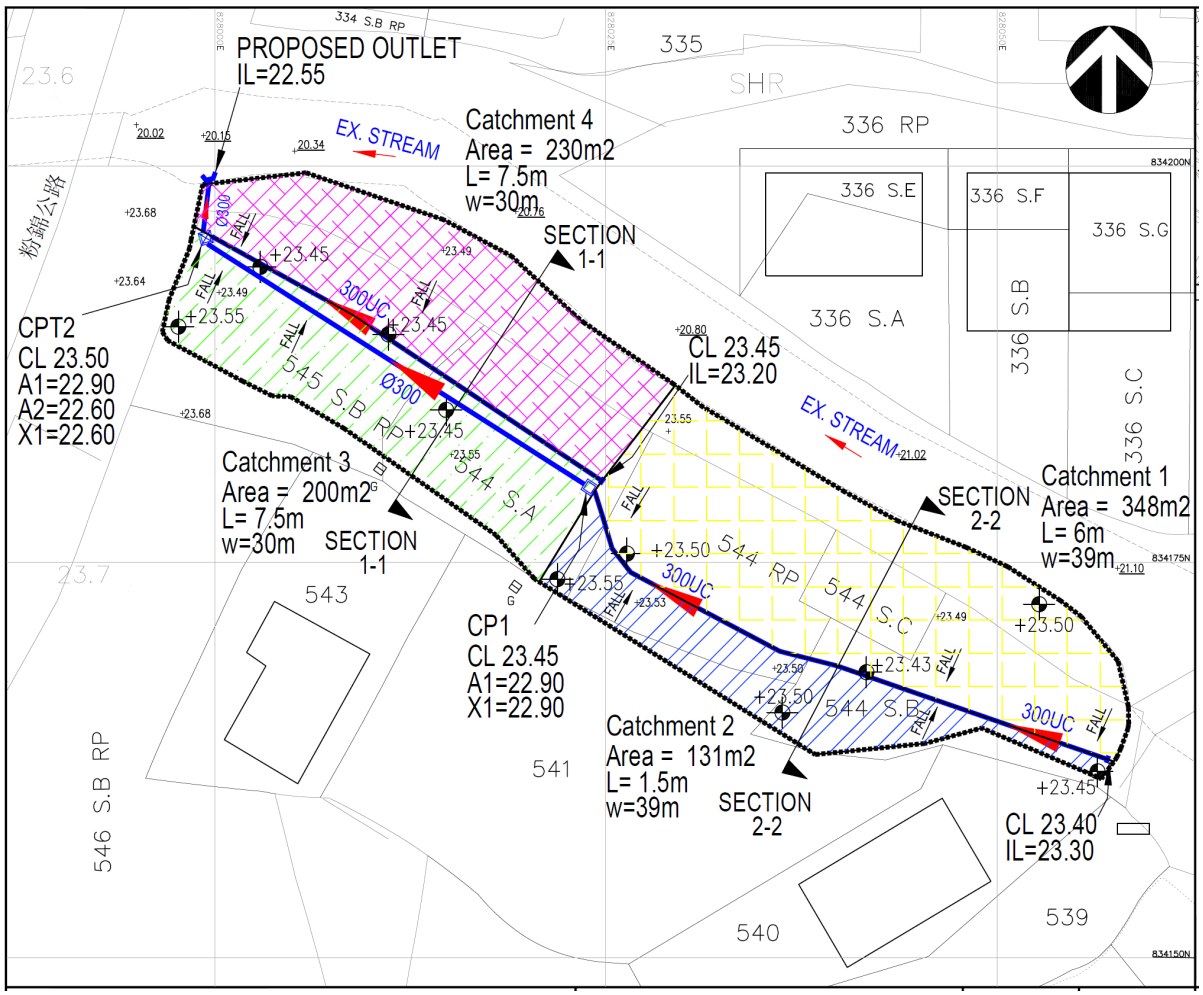
10 Maximum velocity of flow is 4.0 m/s.

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.

Drainage Facilities Arrangement within Application Site

Ref.		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	IL	0.00	23.400	23.30	**0.100**	39	39.00	CP1	23.500	22.90	**0.600**	0.400	100.0	300UC 1 in 100	8184	1.69	ok
CP1	CPT2	CP1	39.00	23.500	22.90	**0.600**	30	69.00	CPT2	23.450	22.60	**0.850**	0.300	100.0	300P 1 in 100	8349	1.97	ok
IL	CPT2	IL	0.00	23.450	23.20	**0.250**	30	30.00	CPT2	23.500	22.90	**0.600**	0.300	100.0	300UC 1 in 100	8148	1.69	ok
CPT	OL	CPT	0.00	23.500	22.60	**0.900**	4	4.00	OL	23.100	22.55	**0.550**	0.050	100.0	300P 1 in 100	8349	1.97	ok



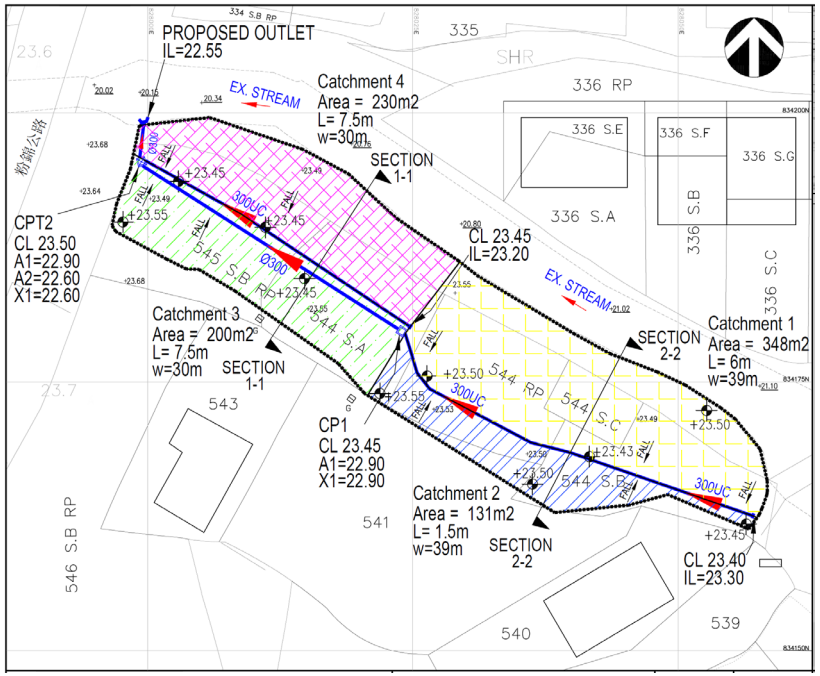
Capacity Calculation for drainage facilities within Application Site

Rainfall intensity is taken from "Table 3a – Storm Constants for Different Return Periods of HKO Headquarters, SDM Corrigendum No. 1/2024" for Return Period 50 years

a	b	c
505.5	3.29	0.355

Catchment ID	Area (m^2)	Run-off Co-efficient	Flow Path L (m)	Highest Catchment Level (mPD)	Collection Pt. Level (mPD) (m)	Delta-h (m)	H - Drop in 100m (m per 100m)	Time of Entry t_o (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)	Velocity at Capacity (m/s) (<=4.0m/s)	Status
Catchment 1	348	1.00	6.0	23.50	23.40	0.10	1.7	0.44	39.0	1.69	0.38	0.82	505.5	3.29	0.355	306.0	16.0%	2,059	300UC 1 in 100	8,184	1.69	ok
Catchment 2	131	1.00	1.5	23.45	23.40	0.05	3.3	0.10	39.0	1.69	0.38	0.49	505.5	3.29	0.355	315.3	16.0%	799	300UC 1 in 100	8,184	1.69	ok
Catchment 3	200	1.00	7.5	23.55	23.45	0.10	1.3	0.60	30.0	1.69	0.30	0.90	505.5	3.29	0.355	304.0	16.0%	1,175	300UC 1 in 100	8,148	1.69	ok
Catchment 4	230	1.00	7.5	23.55	23.45	0.10	1.3	0.59	30.0	1.69	0.30	0.89	505.5	3.29	0.355	304.2	16.0%	1,353	300UC 1 in 100	8,148	1.69	ok
Sum	909																Sum	5,386				

Collect Area	Total Peak Run-off (litre/min)	Required Pipe/Channel	Channel Capacity (litre/min)	Velocity at Capacity (m/s)	Status	(Notes)
Catchment 1	2,059	300UC 1 in 100	8,184	1.69	ok	IL-CP1
Catchment 2	799	300UC 1 in 100	8,184	1.69	ok	IL-CP1
Sub-Total	**2,858**	**300UC 1 in 100**	8,184	1.69	ok	IL-CP1
	2,858	**300P 1 in 100**	8,349	1.97	**ok**	CP1-CPT2
Catchment 3	1,175	300UC 1 in 100	8,148	1.69	ok	IL-CPT2
Catchment 4	1,353	300UC 1 in 100	8,148	1.69	ok	IL-CPT2
Sub-Total	**2,528**	**300UC 1 in 100**	8,148	1.69	ok	IL-CPT2
Catchment 1+2+3+4	**5,386**	**300P 1 in 100**	8,349	1.97	**ok**	CPT2-OL



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 m
h= 0.300 m
r=b/2= 0.150 m half full A= 0.035343

For h <=r, Half-Circle:

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

P=rθ= 0.471239 m

$A=r^2(\theta-\sin\theta)/2=$ 0.035343 m2, (limit at half circle) Hydraculic Radius, R=A/P= 0.075

For h>r, Upper Rectangle:

h'=h-r= 0.15 m

Additional P'=2h= 0.3 m

Additional, A'=bh'= 0.045 m2 Hydraculic Radius, R=A/P= 0.15

Combined:

P= 0.771239 m

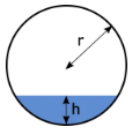
A= 0.080343 m2 Hydraculic Radius, R=A/P= 0.104174 m

Manning's formula,

$V=R^{0.67}*S^{0.5}/n$ 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 × θ`, where the central angle `θ = 2 × 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 = r² × (θ − sin(θ)) / 2`

Combining the two, we find the hydraulic radius equation:

`R = A / P = [r² × (θ − sin(θ)) / 2] / (r × θ)`

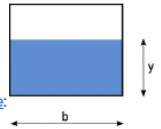
This is quite a formula! Luckily, you can use this handy hydraulic radius calculator instead of meticulously performing all the calculations by hand ;)

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 × y) / (b + y + y) = (b × y) / (b + 2y)`

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

								Lower half-Circle		Upper Rectangle							
	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	35.00	0.029	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	2.86		0.229545	13,773
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	60.00	0.017	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	2.18		0.175318	10,519
Cap/Chart	0.3	0.3000	0.15	3.141593	70.00	0.014	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	2.02		0.162313	9,739
Cap/Chart	0.3	**0.3000**	0.15	3.141593	80.00	0.013	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	**1.89**		0.15183	9,110
Cap/Chart	0.3	**0.3000**	0.15	3.141593	90.00	0.011	0.013	0.035343	0.471239	0.045	0.3	0.080343	0.771239	0.104174	**1.78**		0.143147	8,589
Cap/Chart	0.3	**0.2900**	0.15	3.141593	100.00	0.010	0.013	0.035343	0.471239	0.042	0.28	0.077343	0.751239	0.102954	**1.68**		0.129702	7,782
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

Calculation of Proposed 300mm Pipe (at 1:100) 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

Pipe Diameter=	0.3	m					
A_p=	0.0707	m2					
R =Hydraulic Radius=	0.075	m					
g=	9.81	m/s2					
S_f	0.01	m/m		eqv. (1 in X) =	100.0		
k_s =	0.00006	m	takes k_s=0.06mm for PE Pipe, Table 14, SDM 2018				
v =	0.000001	m2/s					
V= Cross-Sectional Mean Velocity =	-	0.4852	* log (	5.405E-05	+	3.366E-05	)
=	**1.97**	m/s					
Q_p =	A_p	*	V				
=	0.0707	*	1.969				
=	0.139	m^3/s					
=	**8,349**	**L/min**					

Table 12, SDM 2018

Colebrook-White	$\overline{V} = -\sqrt{32gRS_f}\log\left[\frac{k_s}{14.8R} + \frac{1.255\nu}{R\sqrt{32gRS_f}}\right]$	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):

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

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 x 10^{-6} m^2/s)

END

of

Drainage Design Report