TEMPORARY DRAINAGE PROPOSAL

Application for the Proposed Temporary Shop and Services for a Period of 3 Years at Lot 618 (Part) in D.D. 122, Ping Shan, Yuen Long, New Territories

s16 No. : A/YL-PS/785

From: PD/TM&YLW/DPO (DSD/MN) **Date: 4 March 2026** **Ref: () in TPB/A/YL-PS/728**	
Comments	**Responses**
(i) Specific comments	
1. The ground to the south of the application site is generally higher. Please justify and update the external catchment area according to topography, external catchment area shall be greater than the one adopted in the submitted hydraulic calculation. The applicant should update hydraulic calculation to demonstrate 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.	Noted. The external catchment areas are reviewed and increased from 640 m^2 to 1700 m^2 to cover the adjacent external catchment area. The total catchment area is 3400m^2
2. Appendix EI - Practically, the drain utilization rate is referred not higher than 85%. Please review the drains design.	The hydraulic designs were updated. Please refer to Appendix E1 and E2.

Content Page

Appendix

1. Introduction

This report presents the temporary drainage proposal for proposed temporary shop and services for a period of 3 years at Lot 618 (Part) in D.D. 122, Ping Shan, Yuen Long, New Territories. For site location, please refer to **Appendix A**.

1.1. Objectives of the Report

This report shall be prepared to include the following:

- Identify the potential drainage impact assessment from the proposed application site
- Recommend and implement all necessary measures to mitigate adverse drainage impacts arising from the application site

1.2. Report Structure

The report contains the following sections:

- Section 1 on Introduction;
- Section 2 on Development Proposal;
- Section 3 on Assessment Methodology;
- Section 4 on Potential Drainage Impact; and /
- Section 5 on Conclusion

1.3. References

This report has been prepared with reference to the following documents:

- Stormwater Drainage Manual: Planning, Design and Management (Fifth Edition, January 2018)
- Technical Mote No.1 Technical Note to Prepare a Drainage Submission (December 2024)
- Stormwater Drainage Manual – Corrigendum No. 1/2022
- Stormwater Drainage Manual – Corrigendum No. 1/2024

2. Development Proposal

2.1. Existing Site Conditions

The application site is located in Ping Shan, Yuen Long, New Territories, with a total area of approximately 1440 m^2. (1700 m^2 included the access road). The existing ground level varying between + 7.75 mPD and + 8.71 mPD. The site layout plan is provided in **Appendix B**.

The applied development is for temporary shop and service. The type of application is the temporary use/development in rural areas for a period of 3 years. The application site is located at Lot 618 (Part) in D.D. 122, Ping Shan, Yuen Long, New Territories. For a conservative approach, both two sides of development areas and the access road between them are counted as catchment area for the design calculation. The total catchment area including the adjacent area will be 3400m^2.

The application site is less than 1 ha in size and neither fall within flood prone areas such as lowlying areas and flooding blackspots nor involve pond filling and substantial earth filling, so it is regarded as simple site. There is an existing village drain in vicinity of the site that can be discharged to, the location and photos of the existing village drain is shown in **Appendix C.**

3. Assessment Methodology

3.1. Calculation Methodology for Runoff

According to **Section 6.6.2 of the Storm Drainage Manual (SDM)**, an "Urban Drainage Branch System" refers to a network of interconnected drains that collect rainwater runoff from an urban area and transport it to a trunk drain, river, or sea. In simpler terms, the largest pipe size or the equivalent diameter in case of a box culvert in a branch system will normally be less than 1.8m.

Referring to SDM, since the proposed U-channels have dimensions smaller than 1.8m, the drainage system would be classified as an urban drainage branch. It is recommended to design the system with a return period of 50 years to ensure its adequacy in managing stormwater drainage.

To calculate the peak instantaneous runoff values before and after the development, the Rational Method with recommended physical parameters including runoff coefficient (C) and storm constants for different return periods are adopted referred to the SDM.

The Rational Method is adopted for hydraulic analysis and the peak runoff is calculated based on the following equation:

$$Q_p = 0.278\ Ci\ A$$

where Qp = Peak Runoff, m^3/s
C = Runoff Coefficient
i = Rainfall Intensity, mm/hr
A = Catchment Area, km^2

The runoff coefficient of 0.85 is assumed.

Based on the storm constants for the 50-year return period recommended in Stormwater Drainage Manual – Corrigendum No. 1/2024. A 16% of rainfall increases is considered in the design due to climate change. The appropriate rainfall intensities (i) are calculated as detailed in **Appendix E1** and **Appendix E2**.

3.2. Calculation Methodology for Capacity Checking

Since the catchment areas are less than 1ha, surface U-channels are recommended to be constructed to collect the stormwater runoff within the site. The collected

stormwater should finally be diverted to the existing village drain in vicinity of the site via the proposed U-channel and pipe system.

For the worst-case scenario, bad condition of concrete u channel is assumed for the Manning's roughness coefficient i.e coefficient value is 0.016 for calculating capacities of concrete U-channel using Manning's Equation. The recommended roughness values k_s for concrete channels is 0.6mm.

Manning's Equation for calculating the channel and pipe capacities is adopted for this analysis:

$$\frac{V = R^{2/3}S^{1/2}}{n}$$

where V = mean velocity, m/s
S = slope of the total energy line
n = Manning's roughness coefficient
R = hydraulic radius, m

Deposition of sediment in stormwater drainage system is considered in the hydraulic calculation as required by the SDM. 10% reduction in flow area is adapted to consider the effects to flow capacity due to materials deposited on the bed.

3.3. Summary of Assessment Assumptions

The assumptions of the Drainage Proposal are summarized below for ease of reference:

- Runoff coefficient of 0.85 for the paved area (brick) is assumed;
- Storm constants for 50 years return periods of HKO Headquarter
- Manning's roughness coefficient of 0.016 for the proposed concrete U-channels and concrete pipe are adopted;
- Roughness values k_s of 0.6 mm for concrete is adopted;
- 10% reduction in flow area;
- 16 rainfalls intensityincrease due to climate change

4. Potential Drainage Impact

4.1. Change in Drainage Characteristics

There is no existing drainage provision inside the current site, the collected stormwater was discharged as surface runoff and infiltration leading to the natural stream or river before the development.

The adjacent sites have no record of flooding. Peripheral surface channels are proposed to collect the surface runoff accrued on the site and to intercept the overland flow from the adjacent lands. For conservative approach, the total area of the site for 1700 m² will be accounted for one catchment area.

Since the ground to the south and east of the site is generally higher in elevation, overland flow from adjacent areas is also considered and external catchment are added in the calculation. An external catchment area of 1700 m² from the south and side is considered in this design. The details of catchment areas can be referred to **Appendix D**. Below are the size of the catchment areas:

1. Site Catchment Area 1 (CA1): 1700 m²
2. External Catchment Area 2 (CA2): 1700 m²

To manage the stormwater flows after developing the site, this drainage proposal detailed the proposed drainage system consisting of a set of U-channels for diverting stormwater flows to avoid causing flooding to the site.

4.2. Potential Drainage Impact

The runoff from the application site is proposed to be collected by peripheral surface U-channels and discharged to the terminate catchpit with sand trap and eventually lead to the existing village drain by drainage pipe in vicinity of the site. The detail of the proposed drainage works with sections are illustrated in **Appendix D**.

For conservative approach, the critical scenario is considered for collecting all the flow in the catchment area leading to the 350 mm U-channel. The design calculations of the proposed U- channel and pipe connected to the existing village drain are calculated as detailed in **Appendix E1** and **Appendix E2.** Typical designs of the U-channels and Catchpits are shown in **Appendix F**.

The design runoff arising from the proposed application site is to be discharged into the proposed 350 mm U-channel and connect with the existing village drain with a 350mm diameter pipe. The summary of estimated runoffs and proposed u-channel size in shown in **Table 1** and the proposed pipe size connected with the existing village drain in shown in **Table 2.**

U Channel	U/S G.L. (mPD)	D/S G.L. (mPD)	U/S I.L. (mPD)	D/S I.L. (mPD)	Width (mm)	Vel. V at Full Bore (m/s)	Capacity (Q/Qo) (For Site Area)	Capacity (Q/Qo) (Included External Area)
UC1	8.71	8.05	8.36	7.10	350	2.392	38%	77%
UC2	8.05	7.97	7.10	6.78	350	2.671	42%	84%
UC3	8.71	8.62	8.36	7.97	350	2.912	39%	69%
UC4	8.65	7.95	8.30	7.10	350	2.547	37%	75%
UC5	7.97	7.9	7.10	6.77	350	2.961	39%	78%
UC6	8.6	7.9	8.25	6.75	350	2.889	33%	59%
UC7	7.9	7.7	7.55	6.95	350	2.978	37%	74%
UC8	8.62	8.41	8.27	7.56	350	2.500	41%	82%
UC9	8.41	7.78	7.91	6.93	350	2.392	38%	77%

Table 1 Summary of Estimated Runoffs and Proposed U-channel Size

Pipe	Catchment Area (m^2)	Proposed Pipe Size (mm)	Length (m)	Gradient (1 in)	Estimated Peak Runoff (m^3/s)	Capacity (%)
DP1	3400	350	8	20	0.225	79%

Table 2 Proposed Pipe Size Connected with the Existing Village Drain

Since there are no changes to the drainage characteristics, it is considered that the discharge from the application site will not have an adverse impact on the overall downstream drainage system. For conservative reasons, a separate design check has been undertaken for the 450 mm surface channel as demonstrated in **Appendix E3.** The potential impact from the application site will occupy 6% capacity of the 450mm existing village drain.

5. Conclusion

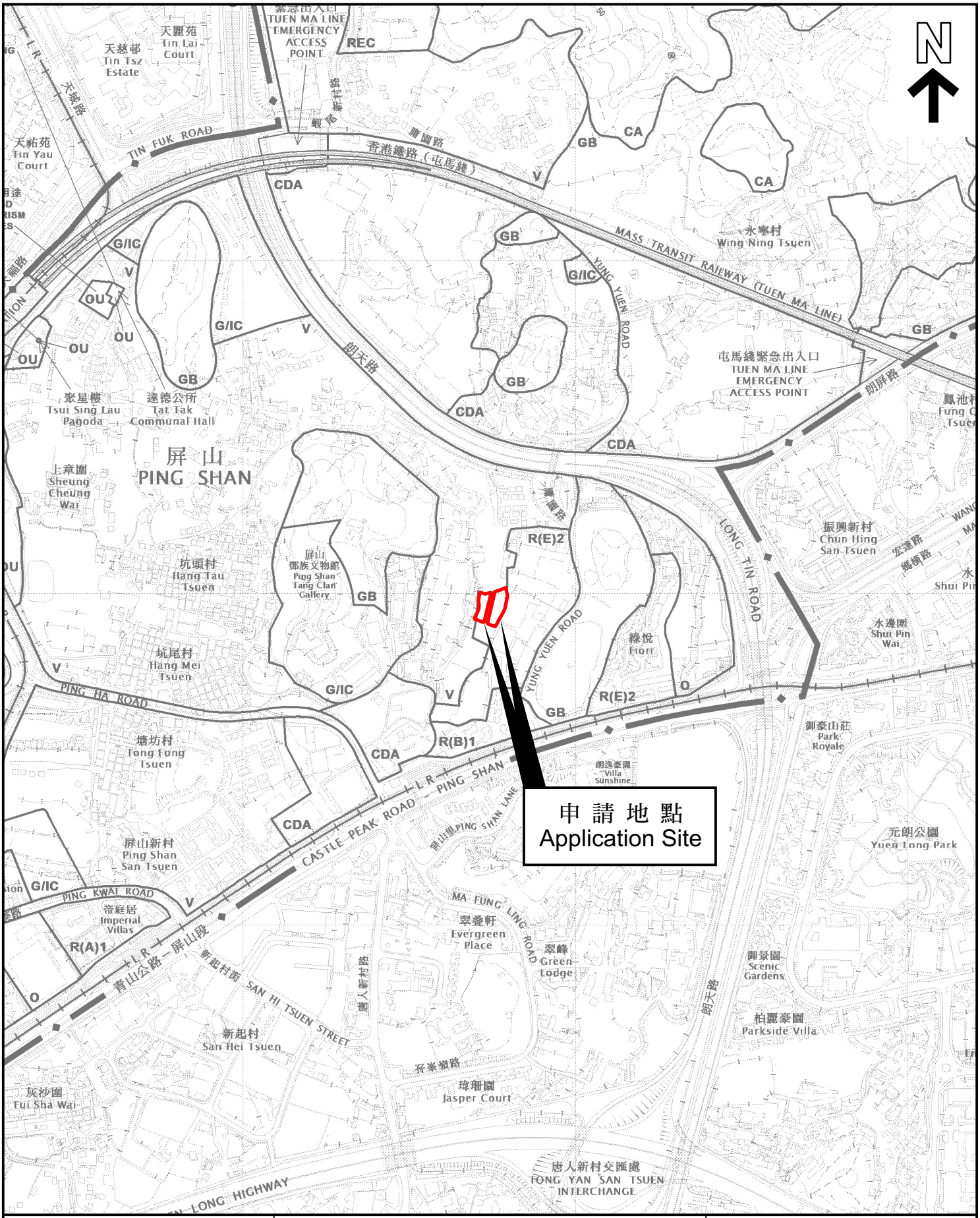
A temporary drainage proposal has been designed for proposed temporary shop and services for a period of 3 years at Lot 618 (Part) in D.D. 122, Ping Shan, Yuen Long, New Territories.

In the design calculation, 350 mm U-channel and 350 mm diameter pipe found adequate and proposed to convey at the peak runoff under the 50 years return period from the application site.

Since the ground to the south of the site is generally higher in elevation, overland flow from adjacent areas is also considered, and external catchment areas have been included in the design calculation. The stormwater collected from this application site will be discharged to the existing village drainage in vicinity of the site without overloading the existing drainage system.

To manage the stormwater flows after developing the site, this drainage proposal detailed the proposed drainage system consisting of a set of U-channels and pipes diverting stormwater flows to avoid causing flooding to the site.

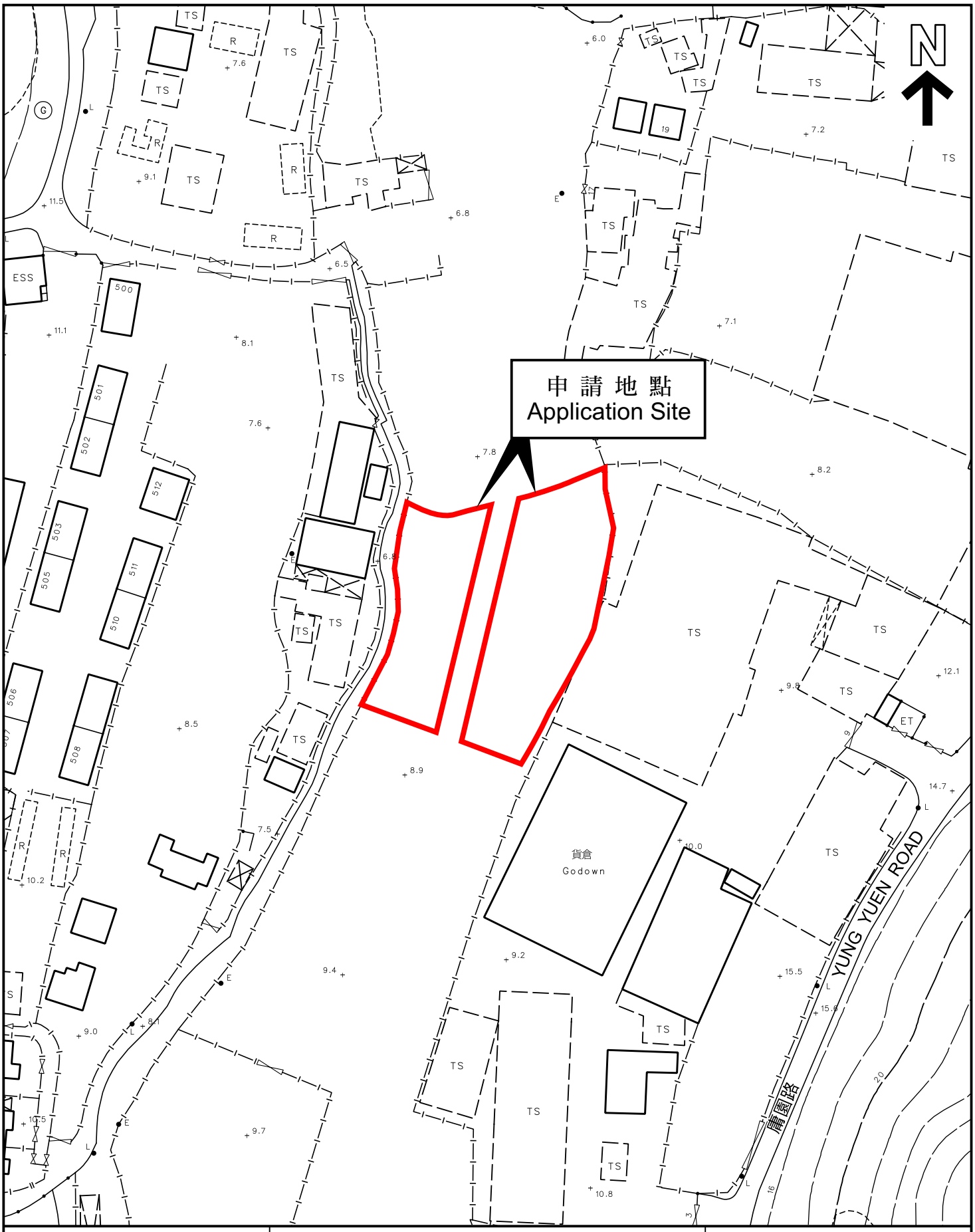
Appendix A



位置圖 LOCATION PLAN

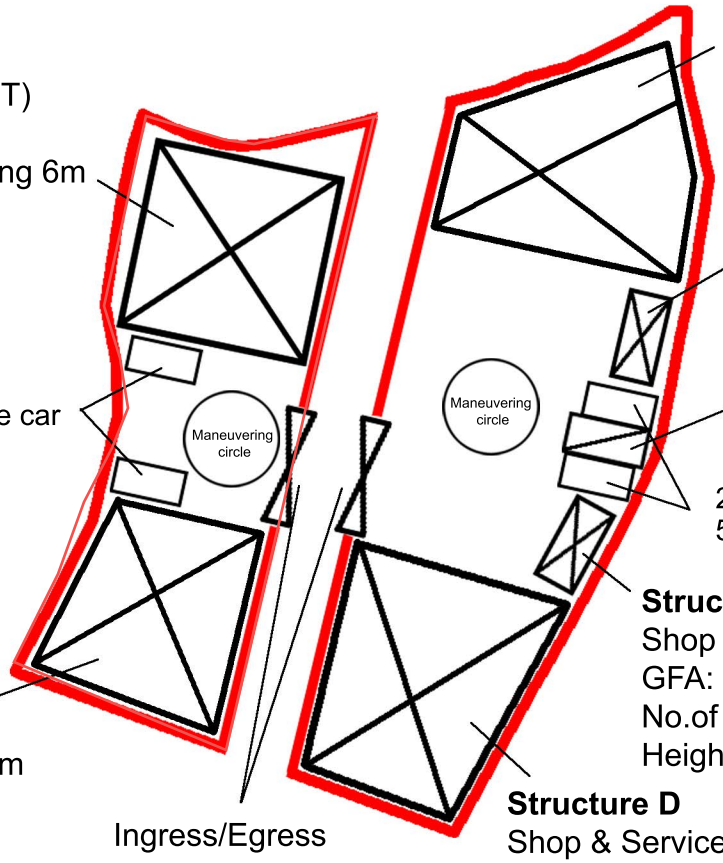
SCALE 1 : 7 500 比例尺

米 METRES 100 0 100 200 300 米 METRES



平面圖 SITE PLAN

Appendix B



Structure A
Shop & Services
GFA: 220m² (ABOUT)
No.of storey: 1
Height: Not exceeding 6m

Structure B
Shop & Services
GFA: 40m² (ABOUT)
No.of storey: 2
Height: Not exceeding 6m

1 Loading/unloading bay
of 7m x 3.5m for
light goods vehicle

2 parking spaces of
5m x 2.5m for private car

Structure C
Shop & Services
GFA: 40m² (ABOUT)
No.of storey: 2
Height: Not exceeding 6m

Structure D
Shop & Services
GFA: 220m² (ABOUT)
No.of storey: 1
Height: Not exceeding 6m

Ingress/Egress

Structure E
Shop & Services
GFA: 200m² (ABOUT)
No.of storey: 1
Height: Not exceeding 6m

Structure F
Shop & Services
GFA: 200m² (ABOUT)
No.of storey: 1
Height: Not exceeding 6m

2 parking spaces of
5m x 2.5m for private car

Allgain Land Planning
全堅土地規劃

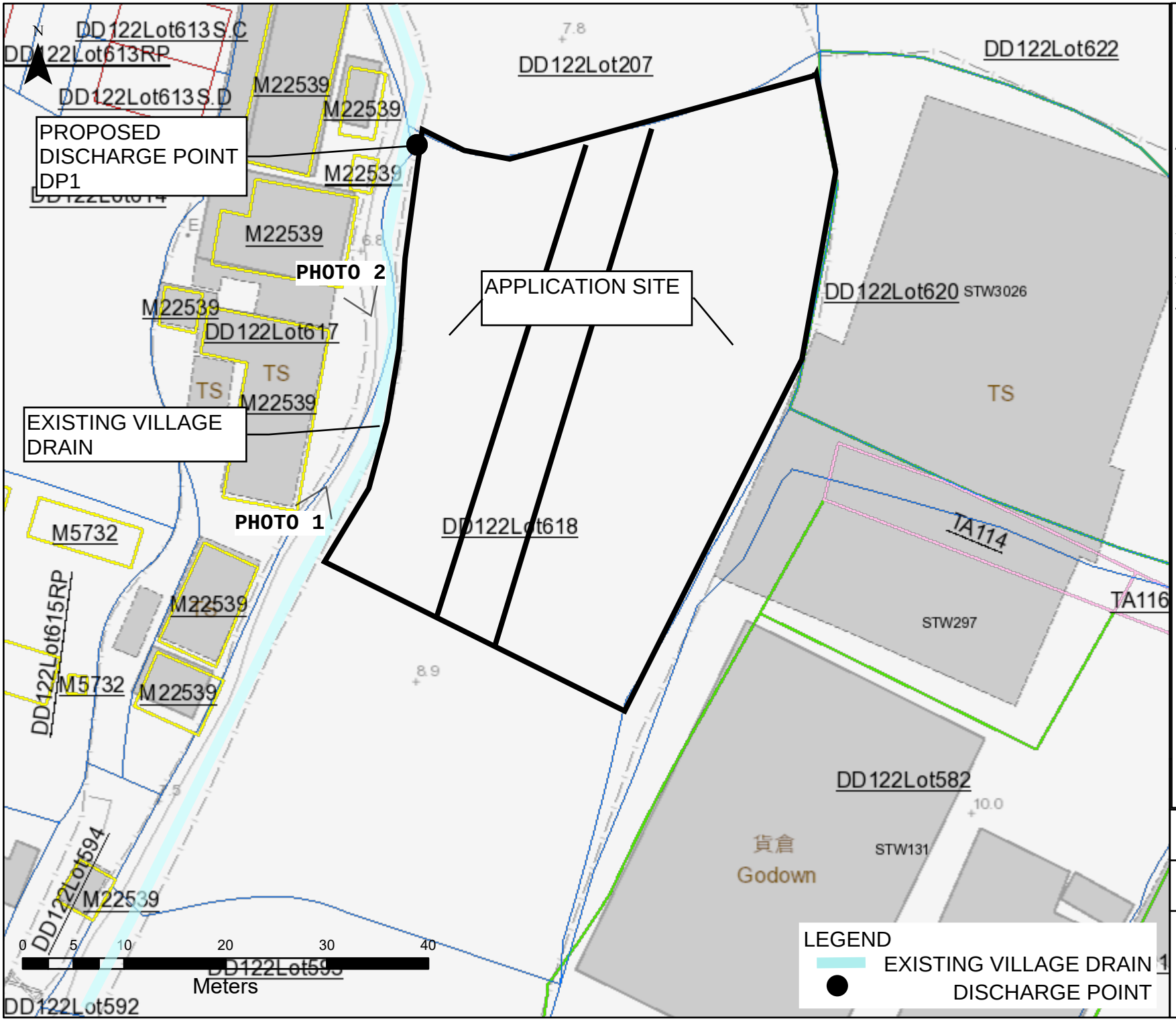
Project 項目名稱:
Proposed Temporary Shop and Services for a Period of 3 Years at Lot 618 (Part) in D.D. 122, Ping Shan, Yuen Long, N.T.

Drawing Title 圖紙標題:
Site Plan

Drawing No. 圖號:
20240713

Remarks 備註:
- Structure
- Light goods vehicle
- Private car

Appendix C



SITE PLAN

PROJECT :

APPLICATION FOR PROPOSED TEMPORARY SHOP AND SERVICES FOR A PERIOD OF 3 YEARS AT LOT 618 (PART) IN D.D. 122, PING SHAN, YUEN LONG, NEW TERRITORIES

DRAWING TITLE:

EXISTING VILLAGE DRAING

ISSUE 1

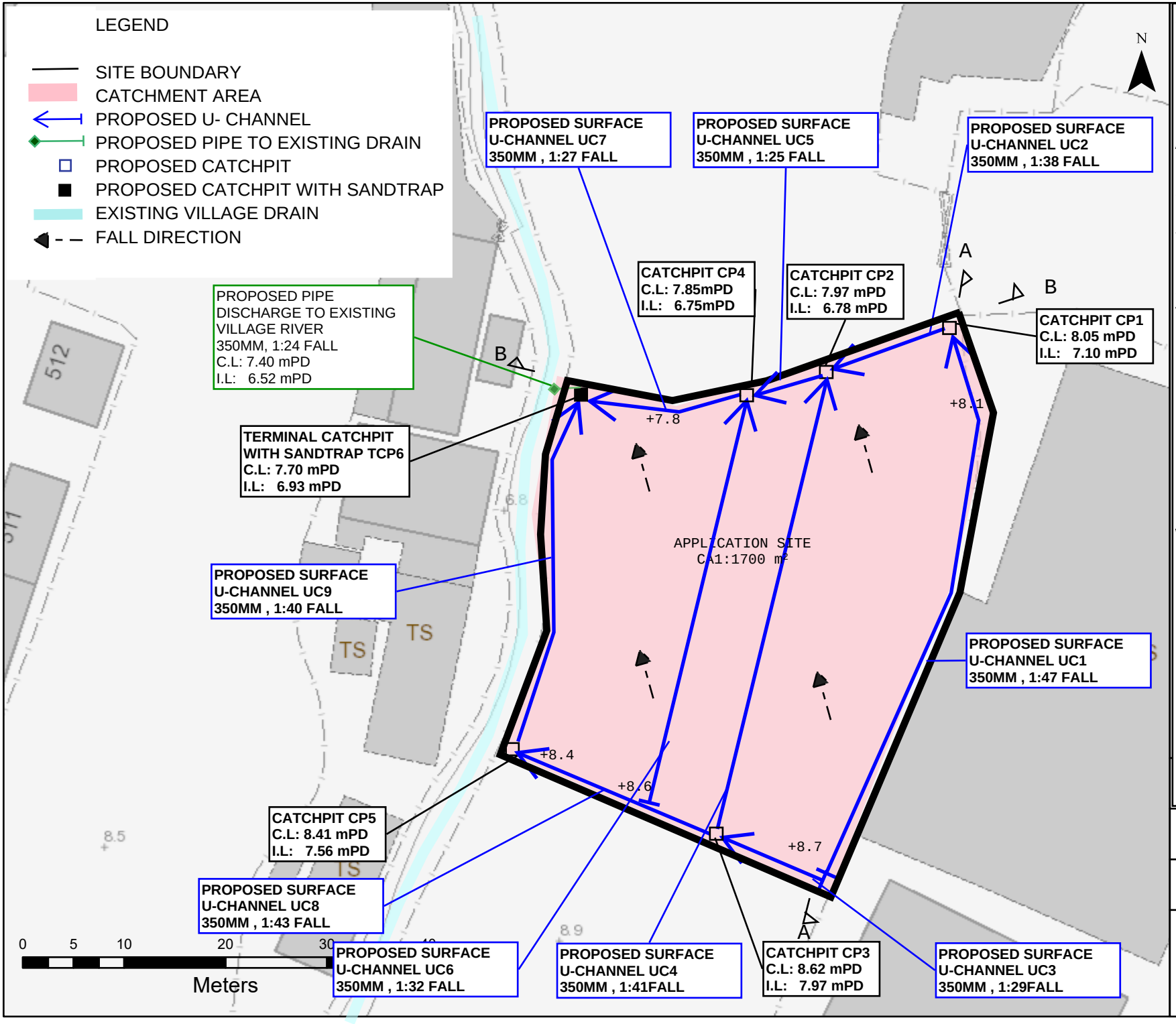
Scale	1:500
Date	3/9/2024

APPENDIX C


450mm
62.28 m
PHOTO 1


PHOTO 2

Appendix D



SITE PLAN

PROJECT :

APPLICATION FOR PROPOSED TEMPORARY SHOP AND SERVICES FOR A PERIOD OF 3 YEARS AT LOT 618 (PART) IN D.D. 122, PING SHAN, YUEN LONG, NEW TERRITORIES

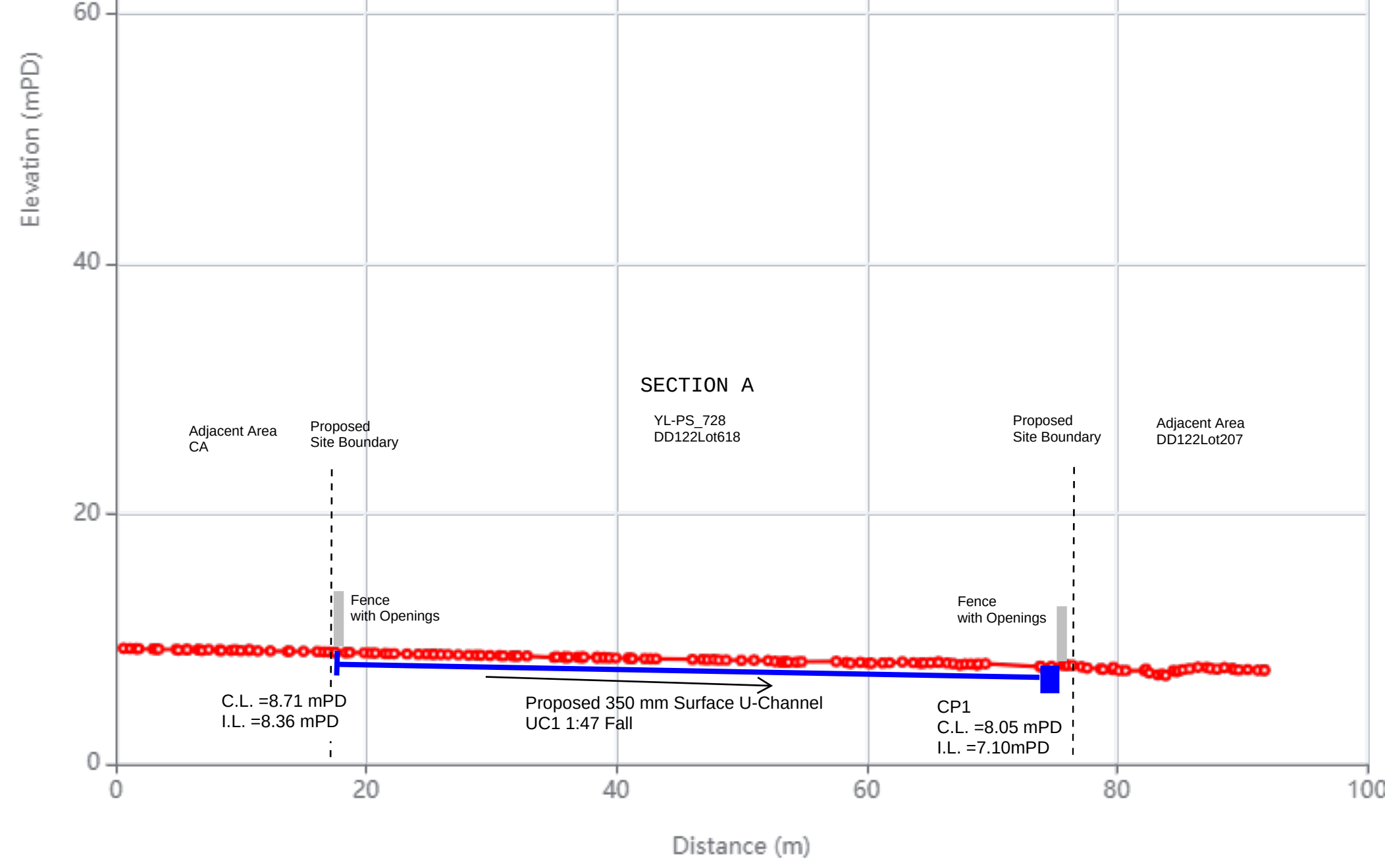
DRAWING TITLE:

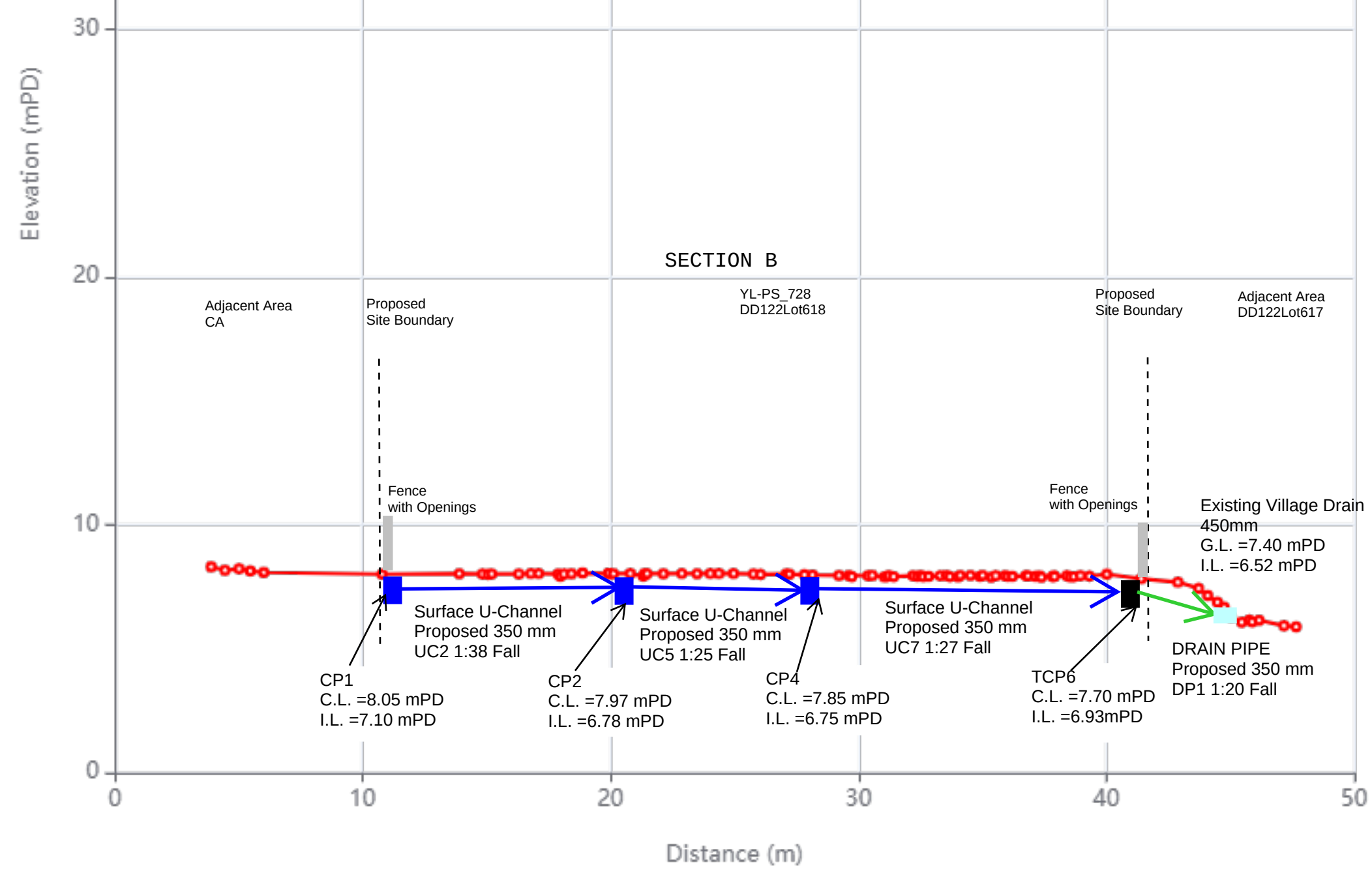
PROPOSED DRAINAGE WORKS

ISSUE 4

Scale 1:500

Date 20/05/2026


SECTION A
YL-PS_728
DD122Lot618
Adjacent Area
CA
Proposed
Site Boundary
Proposed
Site Boundary
Adjacent Area
DD122Lot207
Fence
with Openings
Fence
with Openings
C.L. =8.71 mPD
I.L. =8.36 mPD
Proposed 350 mm Surface U-Channel
UC1 1:47 Fall
CP1
C.L. =8.05 mPD
I.L. =7.10mPD
Elevation (mPD)
Distance (m)
0
20
40
60
0
20
40
60
80
100


SECTION B
Elevation (mPD)
Distance (m)
0
10
20
30
40
50
Adjacent Area
CA
Proposed
Site Boundary
YL-PS_728
DD122Lot618
Proposed
Site Boundary
Adjacent Area
DD122Lot617
Fence
with Openings
Fence
with Openings
Existing Village Drain
450mm
G.L. =7.40 mPD
I.L. =6.52 mPD
Surface U-Channel
Proposed 350 mm
UC2 1:38 Fall
Surface U-Channel
Proposed 350 mm
UC5 1:25 Fall
Surface U-Channel
Proposed 350 mm
UC7 1:27 Fall
DRAIN PIPE
Proposed 350 mm
DP1 1:20 Fall
CP1
C.L. =8.05 mPD
I.L. =7.10 mPD
CP2
C.L. =7.97 mPD
I.L. =6.78 mPD
CP4
C.L. =7.85 mPD
I.L. =6.75 mPD
TCP6
C.L. =7.70 mPD
I.L. =6.93mPD

Appendix E1

Calculation Sheet		
Project Title:	**Date:**	**2026-06-06**
	Project No.:	**YL-SK-728**
Temporary Drainage Proposal for Proposed Temporary Shop and Services for a Period of 3 Years at Lot 618 (Part) in D.D. 122, Ping Shan, Yuen Long, New Territories	**Designed by:**	**RF**
	Appendix :	**E1**
	Sheet No.:	**1**

Design for Proposed U Channel for Development Area

Catchpit No.			Catchment				Level				U Channel									Manning's Equation				
From (U/S)	To (D/S)	U Channel	Incre. Area (m^2)	Accum. Area (m^2)	Runoff Coef. C	Ave. Slope / 100m	U/S G.L. (mPD)	D/S G.L. (mPD)	U/S I.L. (mPD)	D/S I.L. (mPD)	Mat-erial	Width (mm)	Depth (mm)	Lgth (m)	Grad. (1 in)	Restricted U Channel Area Ar (m2)	Vel. V at Full Bore (m/s)	Cap. Q_o (m^3/s)	Velocity Check	Time of Conc. t_c (min)	Rainfall Intensity i (mm/hr)	Runoff Q (m^3/s)	Capacity % (Q/Q_o)	Capacity Check
-	CP1	UC1	1700	1700	0.85	2	8.71	8.05	8.36	7.10	CO	350	350	58.9	47	0.11	2.392	0.262	OK	4.089	248.64	0.100	38%	OK
CP1	CP2	UC2	1700	1700	0.85	2	8.05	7.97	7.10	6.78	CO	350	350	12	38	0.11	2.671	0.292	OK	0.833	305.71	0.123	42%	OK
-	CP3	UC3	1700	1700	0.85	2	8.71	8.62	8.36	7.97	CO	350	350	11.5	29	0.11	2.912	0.318	OK	0.798	306.63	0.123	39%	OK
CP3	CP2	UC4	1700	1700	0.85	2	8.65	7.95	8.30	7.10	CO	350	350	49.5	41	0.11	2.547	0.279	OK	3.437	256.95	0.103	37%	OK
CP2	CP4	UC5	1700	1700	0.85	2	7.97	7.9	7.10	6.77	CO	350	350	8.2	25	0.11	2.961	0.324	OK	0.569	312.98	0.126	39%	OK
-	CP4	UC6	1700	1700	0.85	2	8.6	7.9	8.25	6.75	CO	350	350	48.1	32	0.11	2.889	0.316	OK	3.339	258.28	0.104	33%	OK
CP4	TCP6	UC7	1700	1700	0.85	2	7.9	7.7	7.55	6.95	CO	350	350	15.9	27	0.11	2.978	0.326	OK	1.104	298.89	0.120	37%	OK
CP3	CP5	UC8	1700	1700	0.85	2	8.62	8.41	8.27	7.56	CO	350	350	30.4	43	0.11	2.500	0.273	OK	2.111	277.78	0.112	41%	OK
CP5	TCP6	UC9	1700	1700	0.85	2	8.41	7.70	7.91	6.93	CO	350	350	39.3	40	0.11	2.583	0.282	OK	2.728	267.30	0.107	38%	OK

Formulae:

t_c = Time of Concentration = $t_o + t_f$

where t_o = Inlet Time = 4.09 min

t_f = Flow Time = â (Pipe Length / Flow Velocity)

V = Pipe Flow Velocity

= $(R)^{2/3}s^{1/2}/n$ for Manning's Equation

where g = Gravitational Acceleartion = 9.81 m/s^2

R = Hydraulic Radius

s = Frictional Slope

k_s = Surface Roughness

=	0.6 mm for	concrete	CO
=	0.06 mm for	cast iron	CI
=	0.6 mm for	ductile iron	DI

Ref. DSD SDM Table 14

n = Kine. Viscosity = 1.141E-06 m^2/s

n = Manning's Coef.

=	0.015 for	concrete	CO
=	0.015 for	cast iron	CI
=	0.015 for	ductile iron	DI

Ref. DSD SDM Table 13

Q_o = Pipe Flow Capacity = $(\pi D^2/4)V$

i = Rainfall Intensity for **HKO** District Area

= $a / (t_c + b)^c$ where a = 505.5 for a return period of 50 years

b = 3.29

c = 0.355

Ref. DSD Corrigendum No. 1/2024 SDM Table 3a

Rainfall Increase (Climate Change) = 16 %

Ref. DSD Corrigendum No. 1/2022 SDM Table 28

Q = Runoff = 0.278*CiA

where C = Runoff Coefficient

Calculation Sheet		
Project Title:	**Date:**	**2026-06-06**
	Project No.:	**YL-SK-728**
Temporary Drainage Proposal for Proposed Temporary Shop and Services for a Period of 3 Years at Lot 618 (Part) in D.D. 122, Ping Shan, Yuen Long, New Territories	**Designed by:**	**RF**
	Appendix :	**E1**
	Sheet No.:	**2**

Design for Proposed U Channel for Development Area

Catchpit No.			Catchment				Level				U Channel									Manning's Equation				
From (U/S)	To (D/S)	U Channel	Incre. Area (m^2)	Accum. Area (m^2)	Runoff Coef. C	Ave. Slope / 100m	U/S G.L. (mPD)	D/S G.L. (mPD)	U/S I.L. (mPD)	D/S I.L. (mPD)	Mat-erial	Width (mm)	Depth (mm)	Lgth (m)	Grad. (1 in)	Restricted U Channel Area Ar (m2)	Vel. V at Full Bore (m/s)	Cap. Q_o (m^3/s)	Velocity Check	Time of Conc. t_c (min)	Rainfall Intensity i (mm/hr)	Runoff Q (m^3/s)	Capacity % (Q/Q_o)	Capacity Check
-	CP1	UC1	3400	3400	0.85	2	8.71	8.05	8.36	7.10	CO	350	350	58.9	47	0.11	2.392	0.262	OK	3.815	252.00	0.202	77%	OK
CP1	CP2	UC2	3400	3400	0.85	2	8.05	7.97	7.10	6.78	CO	350	350	12	38	0.11	2.671	0.292	OK	0.777	307.20	0.247	84%	OK
-	CP3	UC3	3000	3000	0.85	2	8.71	8.62	8.36	7.97	CO	350	350	11.5	29	0.11	2.912	0.318	OK	0.754	307.82	0.218	69%	OK
CP3	CP2	UC4	3400	3400	0.85	2	8.65	7.95	8.30	7.10	CO	350	350	49.5	41	0.11	2.547	0.279	OK	3.206	260.15	0.209	75%	OK
CP2	CP4	UC5	3400	3400	0.85	2	7.97	7.9	7.10	6.77	CO	350	350	8.2	25	0.11	2.961	0.324	OK	0.531	314.08	0.252	78%	OK
-	CP4	UC6	3000	3000	0.85	2	8.6	7.9	8.25	6.75	CO	350	350	48.1	32	0.11	2.889	0.316	OK	3.155	260.88	0.185	59%	OK
CP4	TCP6	UC7	3400	3400	0.85	2	7.9	7.7	7.55	6.95	CO	350	350	15.9	27	0.11	2.978	0.326	OK	1.030	300.69	0.242	74%	OK
CP3	CP5	UC8	3400	3400	0.85	2	8.62	8.41	8.27	7.56	CO	350	350	30.4	43	0.11	2.500	0.273	OK	1.969	280.41	0.225	82%	OK
CP5	TCP6	UC9	3400	3400	0.85	2	8.41	7.70	7.91	6.93	CO	350	350	39.3	40	0.11	2.583	0.282	OK	2.546	270.24	0.217	77%	OK

Formulae:

t_c = Time of Concentration = $t_o + t_f$

where t_o = Inlet Time = 3.82 min

t_f = Flow Time = â (Pipe Length / Flow Velocity)

V = Pipe Flow Velocity

= $(R)^{2/3}s^{1/2}/n$ for Manning's Equation

where g = Gravitational Acceleartion = 9.81 m/s^2

R = Hydraulic Radius

s = Frictional Slope

k_s = Surface Roughness

=	0.6	mm for	concrete	CO
=	0.06	mm for	cast iron	CI
=	0.6	mm for	ductile iron	DI

Ref. DSD SDM Table 14

n = Kine. Viscosity = 1.141E-06 m^2/s

n = Manning's Coef.

=	0.015	for	concrete CO
=	0.015	for	cast iron CI
=	0.015	for	ductile iron DI

Ref. DSD SDM Table 13

Q_o = Pipe Flow Capacity = $(\pi D^2/4)V$

i = Rainfall Intensity for **HKO** District Area

= $a / (t_c + b)^c$ where a = 505.5 for a return period of 50 years

b = 3.29

c = 0.355

Ref. DSD Corrigendum No. 1/2024 SDM Table 3a

Rainfall Increase (Climate Change) = 16 %

Ref. DSD Corrigendum No. 1/2022 SDM Table 28

Q = Runoff = 0.278*CiA

where C = Runoff Coefficient

Appendix E2

Calculation Sheet		
Project Title:	**Date:**	**2026-06-06**
Temporary Drainage Proposal for Proposed Temporary Shop and Services for a Period of 3 Years at Lot 618 (Part) in D.D. 122, Ping Shan, Yuen Long, New Territories	**Project No.:**	**YL-SK-728**
	Designed by:	**RF**
	Appendix :	**E2**
	Sheet No.:	**1**

Design for Proposed U Channel for Development Area

Design for Proposed Pipe from Development Area

Manhole			Catchment					Pipe				Colebrook-White Equation					Manning's Equation						
													Pipe Flow				Pipe Flow						
From (U/S)		To (D/S)	Incre. Area (m^2)	Accum. Area (m^2)	Runoff Coef. C	U/S I.L. (mPD)	D/S I.L. (mPD)	Mat-erial	Dia. (mm)	Lgth (m)	Grad. (1 in)	Rough-ness k_s (mm)	Vel. V (m/s)	Cap. Q_o (m^3/s)	Time of Conc. t_c (min)	Rainfall Inten-sity i (mm/hr)	Vel. V (m/s)	Cap. Q_o (m^3/s)	Velocity Check	Time of Conc. t_c (min)	Rainfall Inten-sity i (mm/hr)	Runoff Q (m^3/s)	Runoff / Cap. (Q/Q_o)	Capacity Check
TCP6		Village Drain	3400	3400	1	6.930	6.520	CO	350	8	20	0.60	3.9	0.379	3.849	252	3.0	0.286	OK	5.045	238	0.225	79%	OK

Formulae:

t_c = Time of Concentration = $t_o + t_f$

where t_o = Inlet Time = 3.82 min

t_f = Flow Time = å (Pipe Length / Flow Velocity)

V = Pipe Flow Velocity

= $(R)^{2/3}s^{1/2}/n$ for Manning's Equation

where g = Gravitational Acceleartion = 9.81 m/s^2

R = Hydraulic Radius

s = Frictional Slope

k_s = Surface Roughness = 0.6 mm for concrete CO — Ref. DSD SDM Table 14

= 0.06 mm for cast iron CI

= 0.6 mm for ductile iron DI

n = Kine. Viscosity = 1.141E-06 m^2/s

n = Manning's Coef. = 0.015 for concrete CO — Ref. DSD SDM Table 13

0.015 for cast iron CI

0.015 for ductile iron DI

Q_o = Pipe Flow Capacity = $(\pi D^2/4)V$

i = Rainfall Intensity for **HKO** District Area

= $a / (t_c + b)^c$ where a = 505.5 for a return period of 50 years — Ref. DSD Corrigendum No. 1/2024 SDM Table 3a

b = 3.29

c = 0.355

Rainfall Increase (Climate Change) = 16 %

Ref. DSD Corrigendum No. 1/2022 SDM Table 28

Q = Runoff = 0.278*CiA

where C = Runoff Coefficient

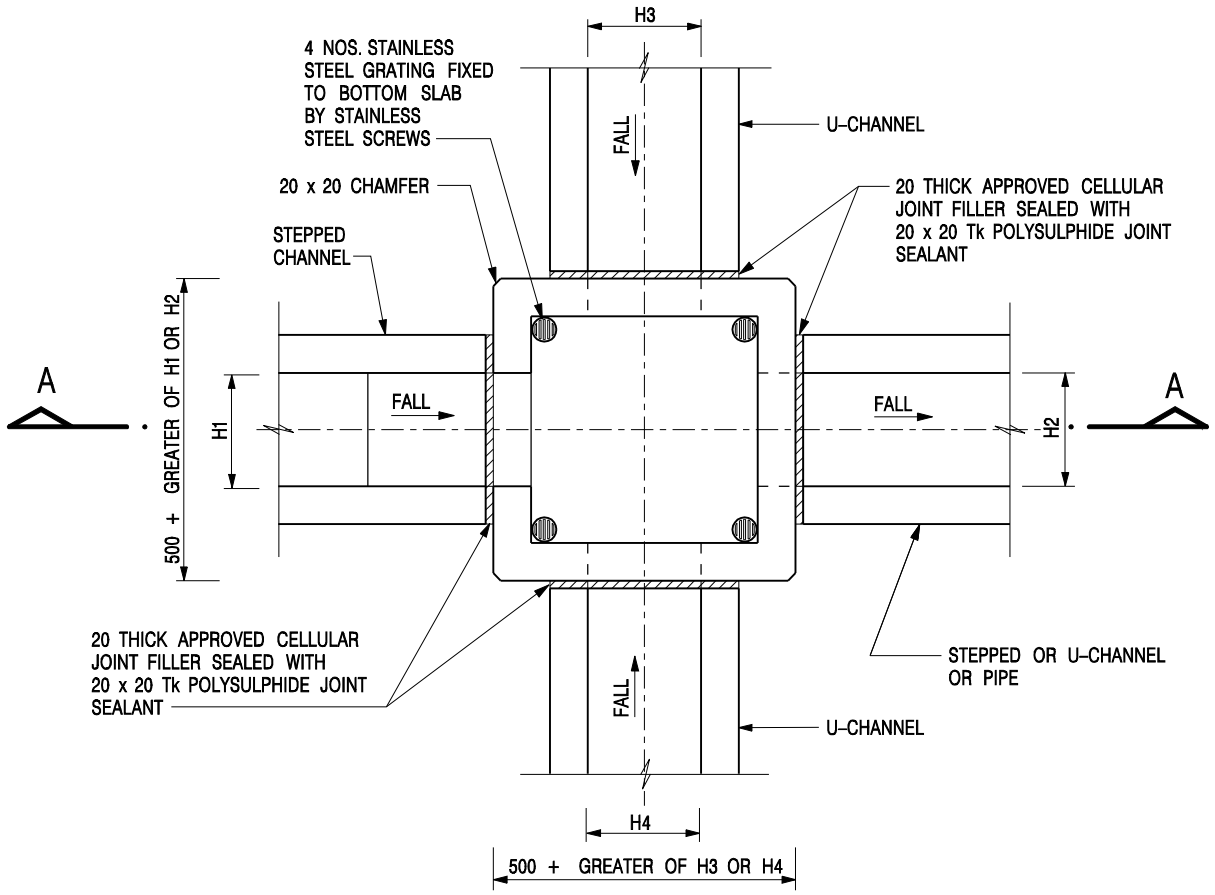
Appendix E3

Calculation Sheet	Date:	2026-06-06
Project Title:	Project No.:	YL-SK-728
	Designed by:	RF
Temporary Drainage Proposal for Proposed Temporary Shop and Services for a Period of 3 Years at Lot 618 (Part) in D.D. 122, Ping Shan, Yuen Long, New Territories	Appendix :	E3
	Sheet No.:	1

Checking the Capacity Existing Village Drain

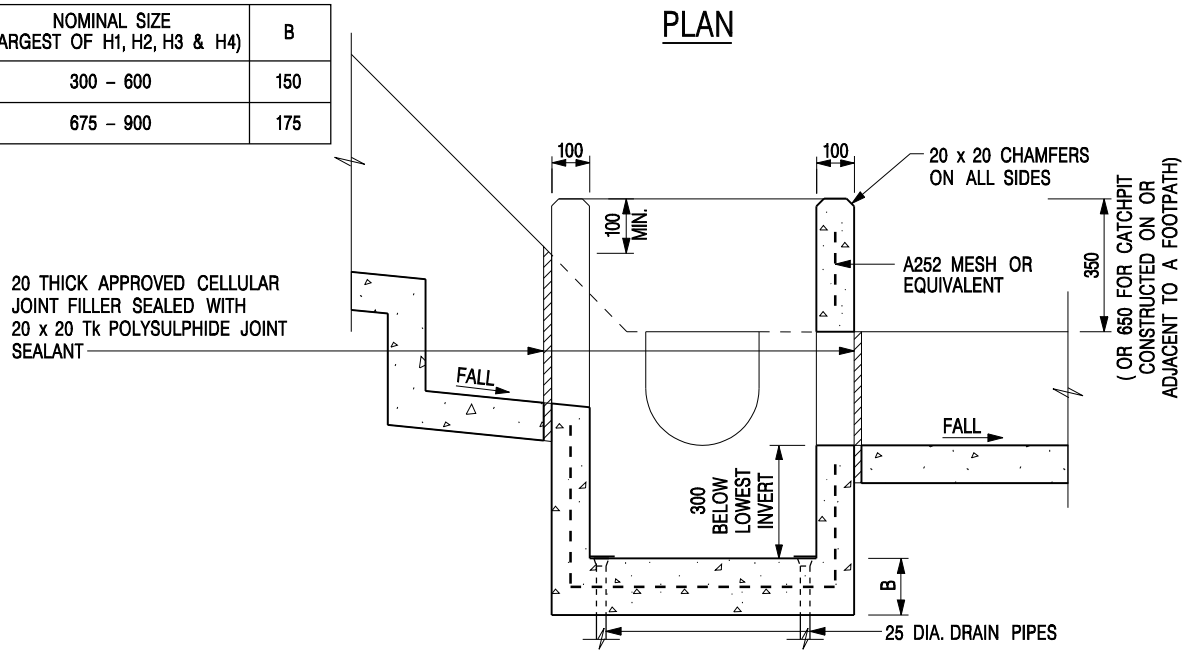
Catchpit		Catchment					Pipe		Manning's Equation							
										Pipe Flow						
From (U/S)	To (D/S)	Incre. Area (m^2)	Accum. Area (m^2)	Runoff Coef. C	U/S I.L. (mPD)	D/S I.L. (mPD)	Mat-erial	Dia. (mm)	Mng's Coef. n	Vel. V (m/s)	Cap. Q_o (m^3/s)	Time of Conc. t_c (min)	Rainfall Inten-sity i (mm/hr)	Runoff Q (m^3/s)	Runoff / Cap. (Q/Q_o)	Capacity Check
CP4	Existing Village Drain	3400	3400	1	7.700	6.000	CO	450	0.016	18.991	3.020	5.001	207	0.196	6%	OK

Appendix F



PLAN

NOMINAL SIZE (LARGEST OF H1, H2, H3 & H4)	B
300 – 600	150
675 – 900	175



SECTION A – A

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFER TO SHEET 2 FOR OTHER NOTES.

REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2406J.	Original Signed	03.2015

CATCHPIT WITH TRAP

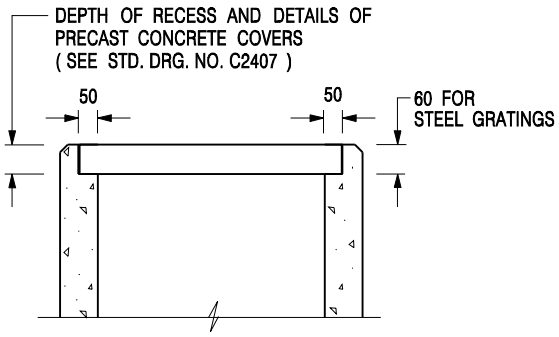
(SHEET 1 OF 2)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 20

DATE JAN 1991

DRAWING NO. C2406 /1



ALTERNATIVE TOP SECTION
FOR PRECAST CONCRETE COVERS / GRATINGS

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL CONCRETE SHALL BE GRADE 20 /20.
3. CONCRETE SURFACE FINISH SHALL BE CLASS U2 OR F2 AS APPROPRIATE.
4. FOR DETAILS OF JOINT, REFER TO STD. DRG. NO. C2413.
5. CONCRETE TO BE COLOURED AS SPECIFIED.
6. UNLESS REQUESTED BY THE MAINTENANCE PARTY AND AS DIRECTED BY THE ENGINEER, CATCHPIT WITH TRAP IS NORMALLY NOT PREFERRED DUE TO PONDING PROBLEM.
7. 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.
8. 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.
9. 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.
10. MINIMUM INTERNAL CATCHPIT WIDTH SHALL BE 1 000 mm FOR CATCHPITS WITH A HEIGHT EXCEEDING 1 000 mm MEASURED FROM THE INVERT LEVEL TO THE ADJACENT GROUND LEVEL. AND, STEP IRONS (SEE DSD STD. DRG. NO. DS1043) AT 300 c/c STAGGERED SHALL BE PROVIDED. THICKNESS OF CATCHPIT WALL FOR INSTALLATION OF STEP IRONS SHALL BE INCREASED TO 150 mm.
11. FOR RETROFITTING AN EXISTING CATCHPIT WITH STEEL GRATING, SEE DETAIL 'G' ON STD. DRG. NO. C2405 /4.
12. SUBJECT TO THE APPROVAL OF THE ENGINEER, OTHER MATERIALS CAN ALSO BE USED AS COVERS / GRATINGS.

REF.	REVISION	SIGNATURE	DATE
A	MINOR AMENDMENT.	Original Signed	04.2016
–	FORMER DRG. NO. C2406J.	Original Signed	03.2015

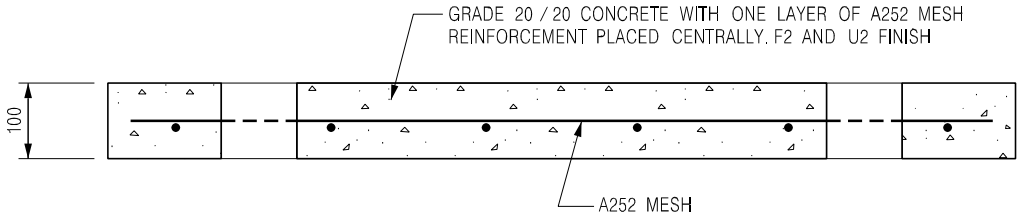
CATCHPIT WITH TRAP
(SHEET 2 OF 2)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

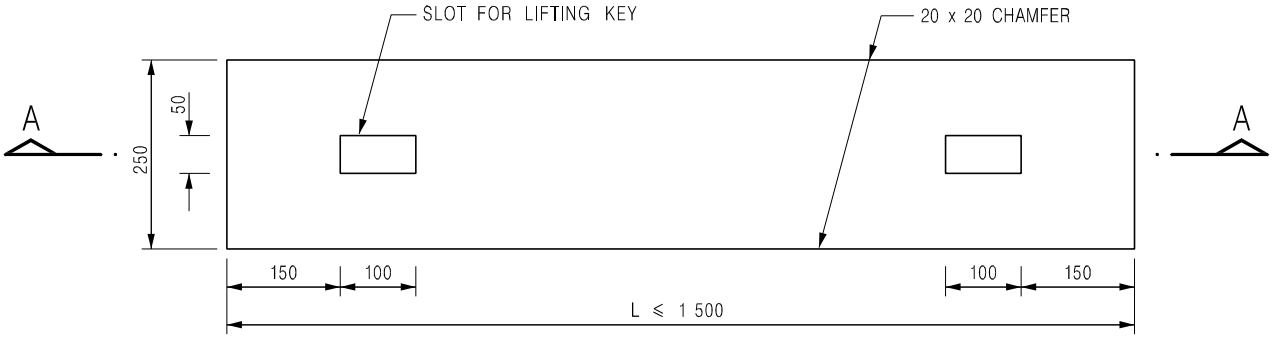
SCALE 1 : 20

DATE JAN 1991

DRAWING NO. C2406 /2A

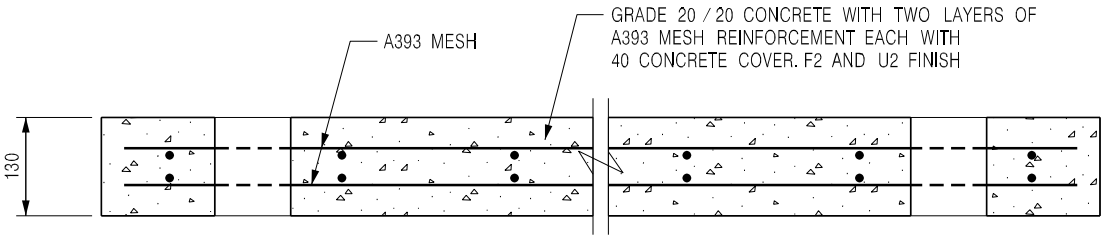


SECTION A – A

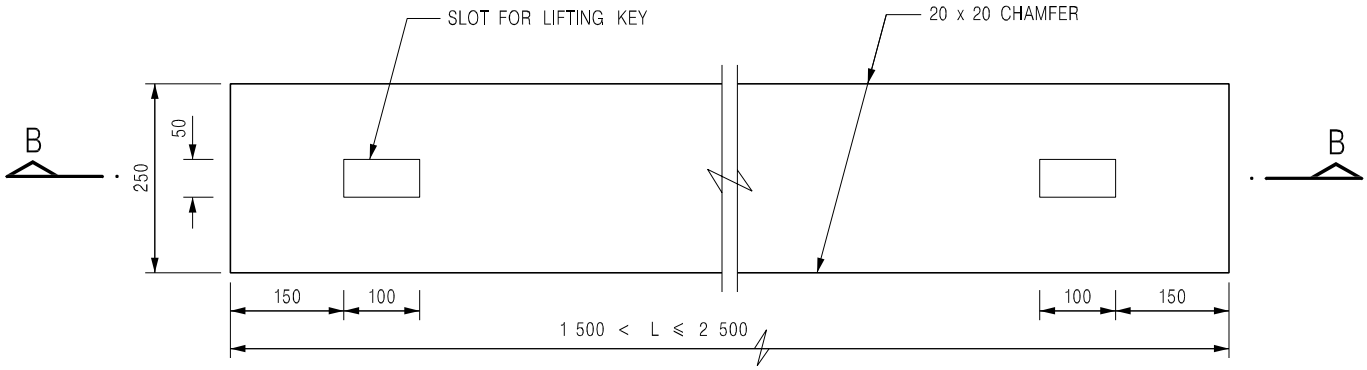


PLAN

TYPE 1 – FOR SPAN UP TO 1.5 m



SECTION B – B



PLAN

TYPE 2 – FOR SPANS 1.5 m TO 2.5 m

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL EXTERNAL EDGES OF THE COVERS SHALL BE 20mm CHAMFERED.

REF.	REVISION	SIGNATURE	DATE
B	NAME OF DEPARTMENT AMENDED.	Original Signed	01.2005
A	GENERAL REVISION	Original Signed	12.2002

PRECAST CONCRETE COVERS FOR CATCHPIT AND SAND TRAP

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 10

DATE JAN 1991

DRAWING NO. C2407B

興土木 利民生 齊拓展 創明天

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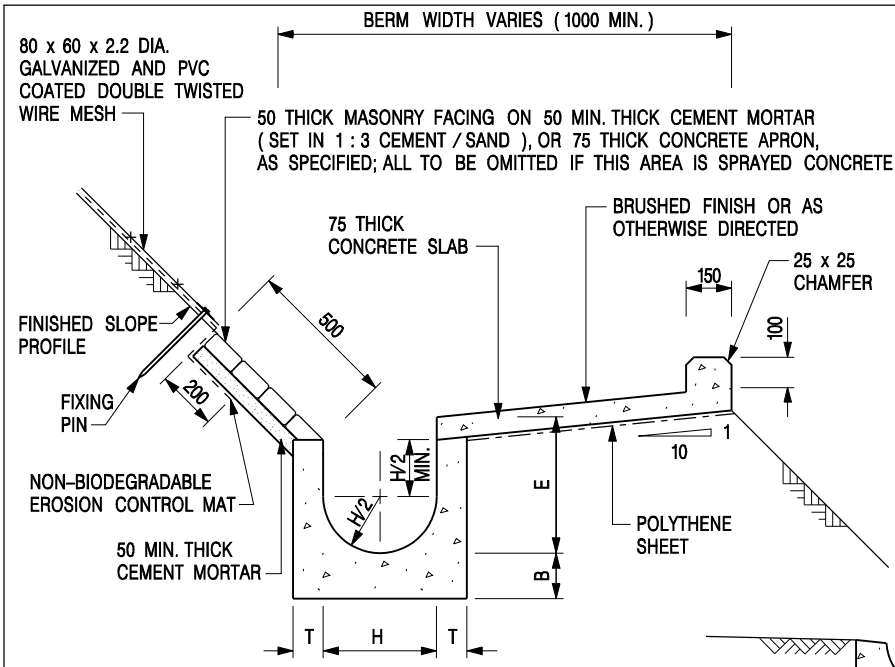
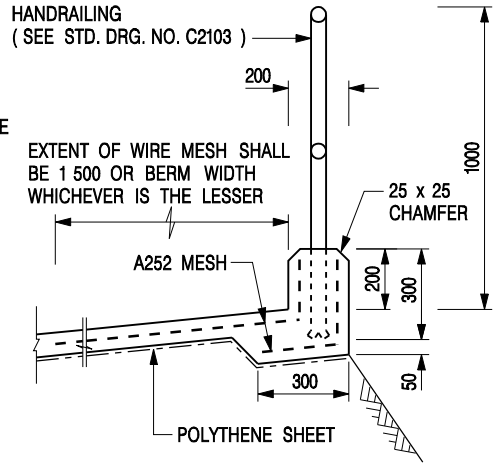
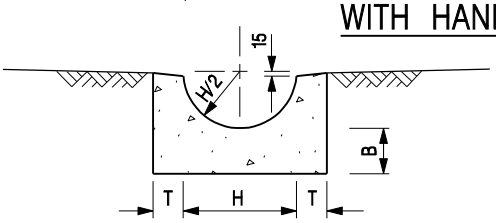


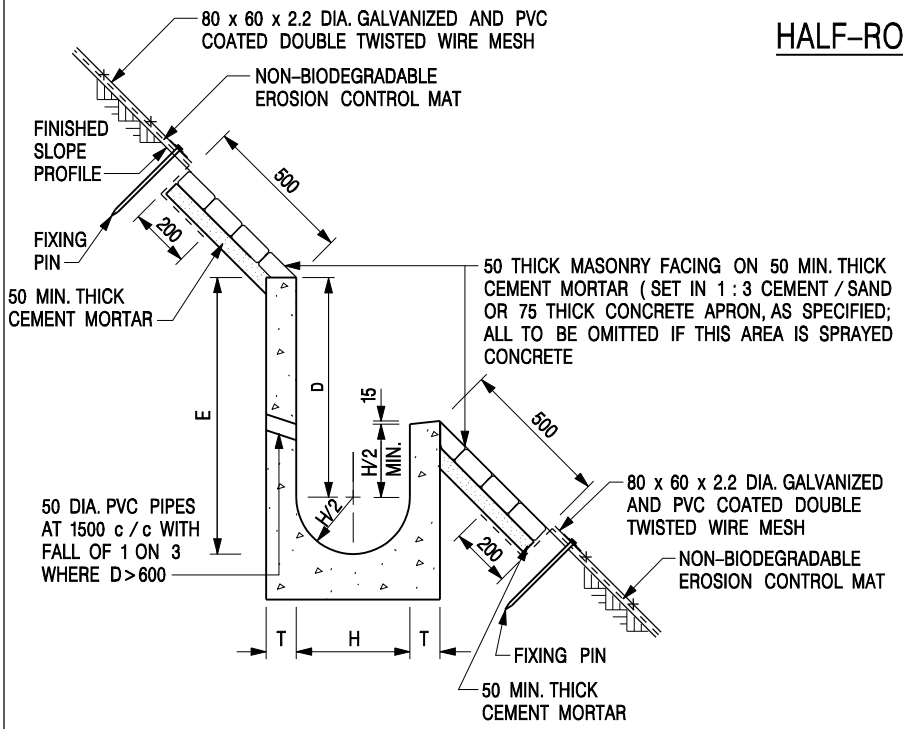
U-CHANNELS CONSTRUCTED ON BERM



DETAILS OF BERM WITH HANDRAILING



HALF-ROUND CHANNEL



U-CHANNELS NOT CONSTRUCTED ON BERM

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL CONCRETE TO BE GRADE 20 / 20.
3. CONCRETE SURFACE FINISH SHALL BE CLASS U2, F2 OR BRUSHED FINISH AS DIRECTED.
4. SPACING OF EXPANSION JOINT IN CHANNELS, BERM SLABS AND APRONS TO BE 10 METRES MAXIMUM, SEE STD. DRG. NO. C2413 FOR DETAILS.
5. JOINTS FOR CHANNELS, BERM SLABS, APRONS AND WALLS, ETC. TO BE ON THE SAME ALIGNMENT.
6. FOR DIMENSIONS T, H, & B, SEE TABLE BELOW.
7. BIODEGRADABLE EROSION CONTROL MAT IF REQUIRED, SEE STD. DRG. NO. C2511/1E.
8. CONCRETE TO BE COLOURED AS SPECIFIED.
9. CONCRETE U-CHANNEL CAN BE CAST IN-SITU OR PRECAST CONCRETE SUBJECT TO THE ENGINEER'S AGREEMENT ON THE DETAILS.
10. DETAILS OF EROSION CONTROL MAT AND WESH MESH ON BERM. (SEE STD DRG. NO. C2511/1E)

NOMINAL SIZE H	T	B	REINFORCEMENT
300	80	100	A252 MESH PLACED CENTRALLY AND T=100 WHEN E>650
375 – 600	100	150	
675 – 900	125	175	A252 MESH PLACED CENTRALLY

REF.	REVISION	SIGNATURE	DATE
I	MINOR AMENDMENT.	Original Signed	07.2018
H	THICKNESS OF MASONRY FACING AMENDED.	Original Signed	01.2005
G	MINOR AMENDMENT.	Original Signed	01.2004
F	GENERAL REVISION.	Original Signed	12.2002
E	DRAWING TITLE AMENDED.	Original Signed	11.2001
D	MINOR AMENDMENT.	Original Signed	08.2001
C	150 x 100 UPSTAND ADDED AT BERM.	Original Signed	6.99
B	MINOR AMENDMENTS.	Original Signed	3.94

DETAILS OF HALF-ROUND AND U-CHANNELS (TYPE A – WITH MASONRY APRON)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 25

DATE JAN 1991

DRAWING NO. C2409I

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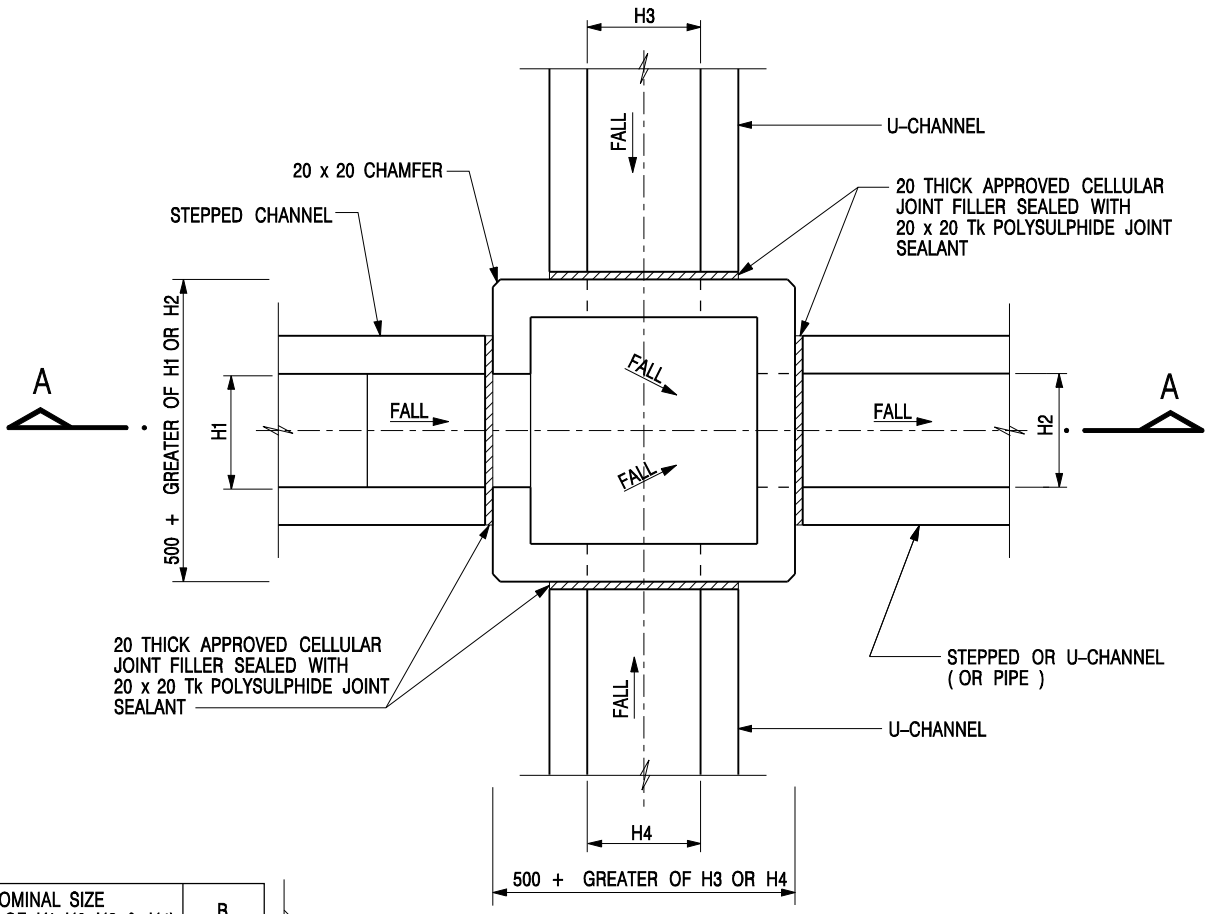
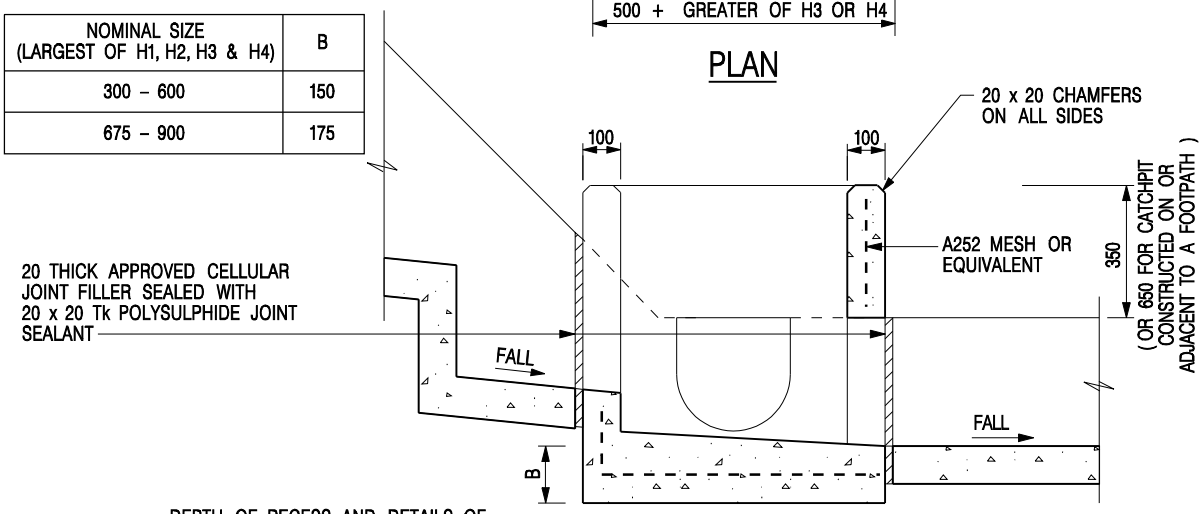
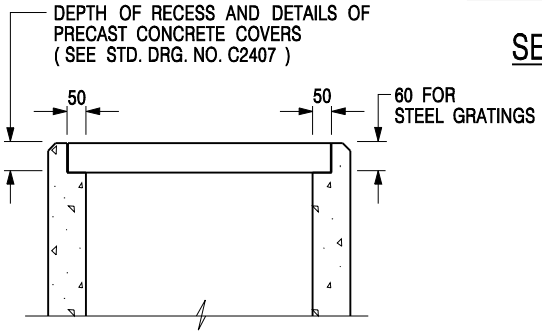


PLAN

NOMINAL SIZE (LARGEST OF H1, H2, H3 & H4)	B
300 – 600	150
675 – 900	175



SECTION A – A



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFER TO SHEET 5 FOR OTHER NOTES.

ALTERNATIVE TOP SECTION FOR PRECAST CONCRETE COVERS / GRATINGS

REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2405J.	Original Signed	03.2015

STANDARD CATCHPIT DETAILS

(SHEET 1 OF 5)

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE	1 : 20	DRAWING NO.
DATE	JAN 1991	C2405 /1

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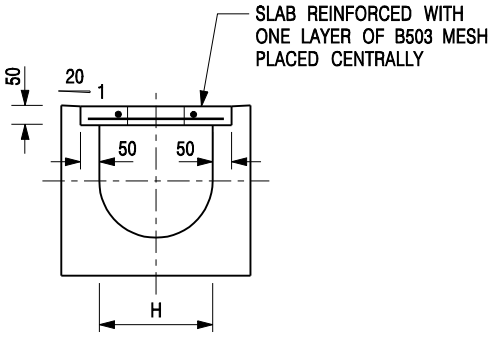
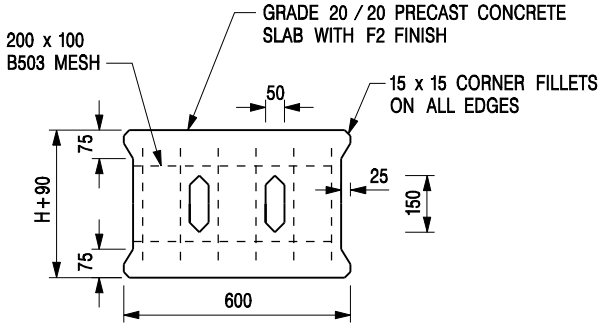


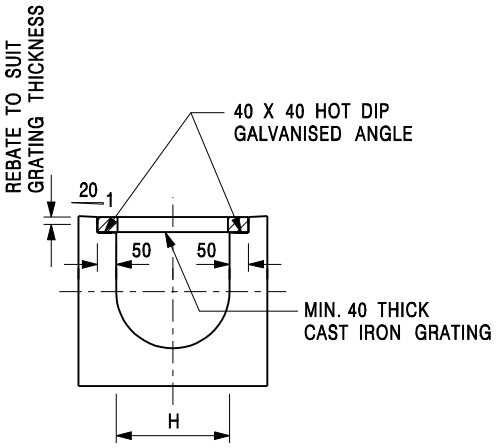
TYPICAL SECTION



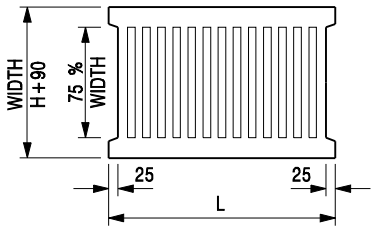
PLAN OF SLAB

U-CHANNELS WITH PRECAST CONCRETE SLABS

(UP TO H OF 525)



TYPICAL SECTION



L = 600mm FOR H ≤ 375mm
L = 400mm FOR H > 375mm

CAST IRON GRATING

(DIMENSIONS ARE FOR GUIDANCE ONLY, CONTRACTOR MAY SUBMIT EQUIVALENT TYPE)

U-CHANNEL WITH CAST IRON GRATING

(UP TO H OF 525)

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. H = NOMINAL CHANNEL SIZE.
3. ALL CAST IRON FOR GRATINGS SHALL BE GRADE EN-GJL-150 COMPLYING WITH BS EN 1561.
4. FOR COVERED CHANNELS TO BE HANDED OVER TO HIGHWAYS DEPARTMENT FOR MAINTENANCE, THE GRATING DETAILS SHALL FOLLOW THOSE AS SHOWN ON HyD STD. DRG. NO. H3156.

REF.	REVISION	SIGNATURE	DATE
E	NOTES 3 & 4 AMENDED.	Original Signed	12.2014
D	NOTE 4 ADDED.	Original Signed	06.2008
C	MINOR AMENDMENT. NOTE 3 ADDED.	Original Signed	12.2005
B	NAME OF DEPARTMENT AMENDED.	Original Signed	01.2005
A	CAST IRON GRATING AMENDED.	Original Signed	12.2002

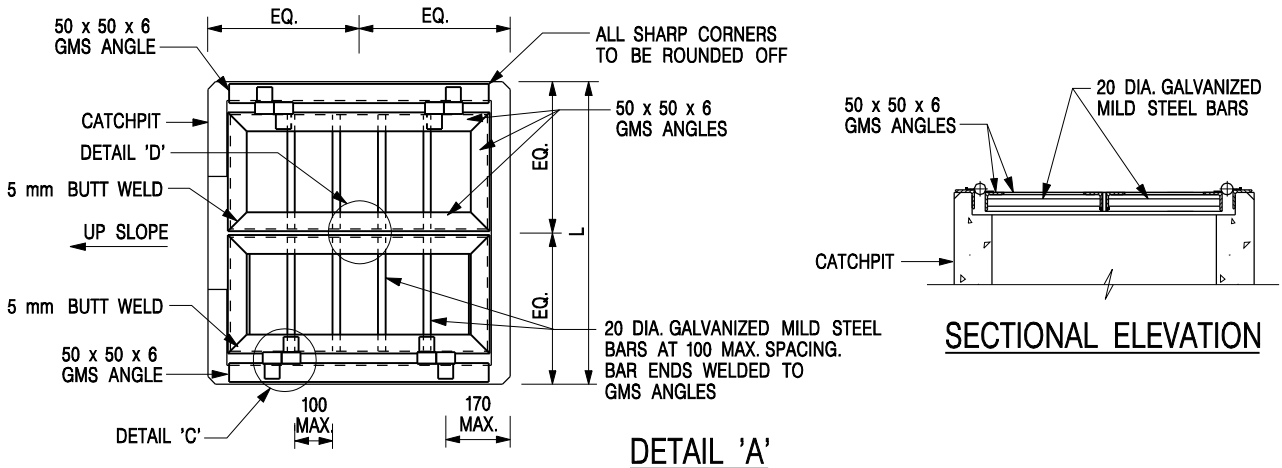
COVER SLAB AND CAST IRON GRATING FOR CHANNELS

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 20

DATE JAN 1991

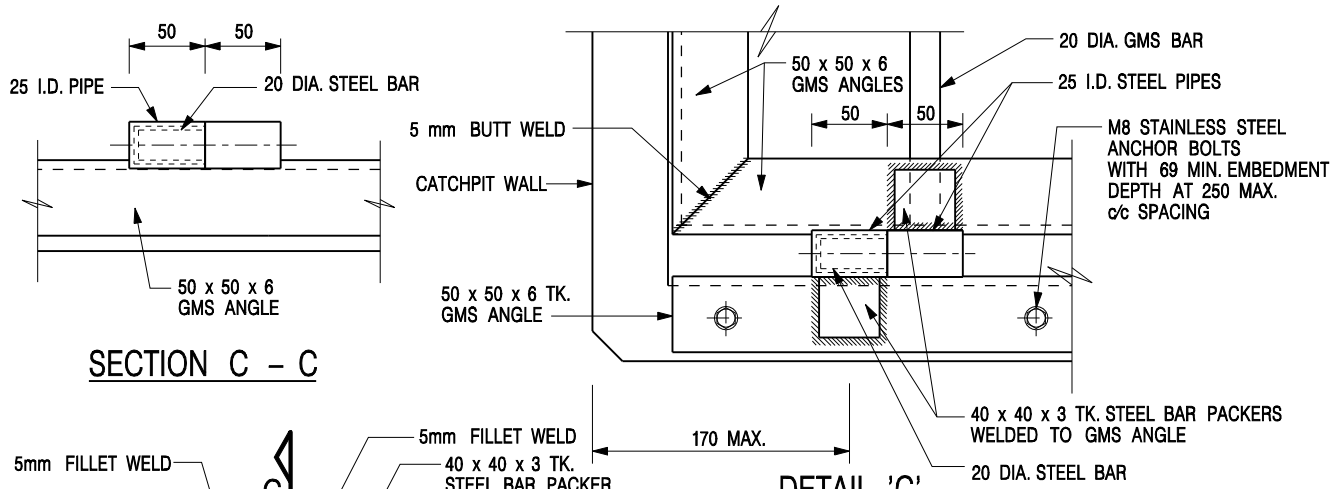
DRAWING NO. C2412E



DETAIL 'A'

(DETAILS OF DOUBLE SIDE OPENING STEEL GRATING FOR L>900mm)

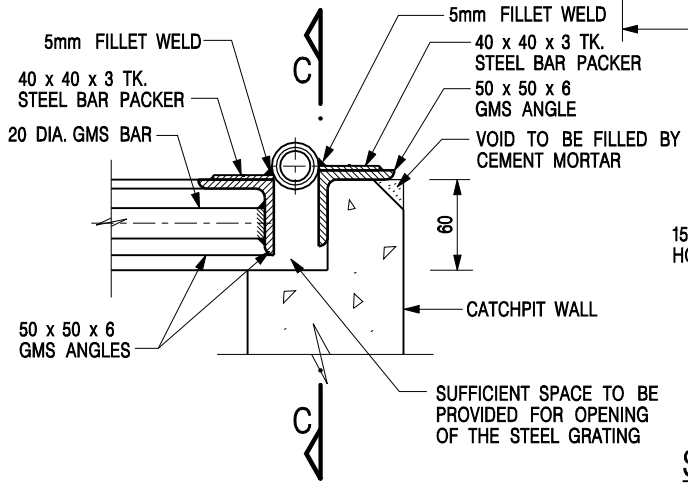
SCALE 1 : 20



DETAIL 'C'

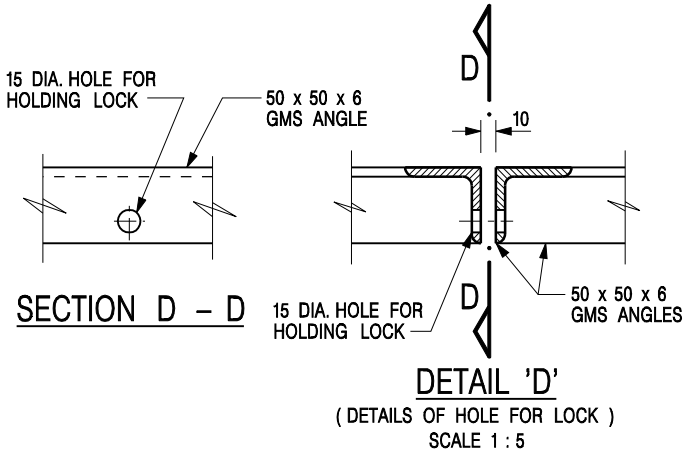
(DETAILS OF HINGE)

SCALE 1 : 5



SECTIONAL ELEVATION

(DETAIL 'C')



DETAIL 'D'

(DETAILS OF HOLE FOR LOCK)

SCALE 1 : 5

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFER TO SHEET 5 FOR OTHER NOTES.

REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2405J.	Original Signed	03.2015

STANDARD CATCHPIT DETAILS

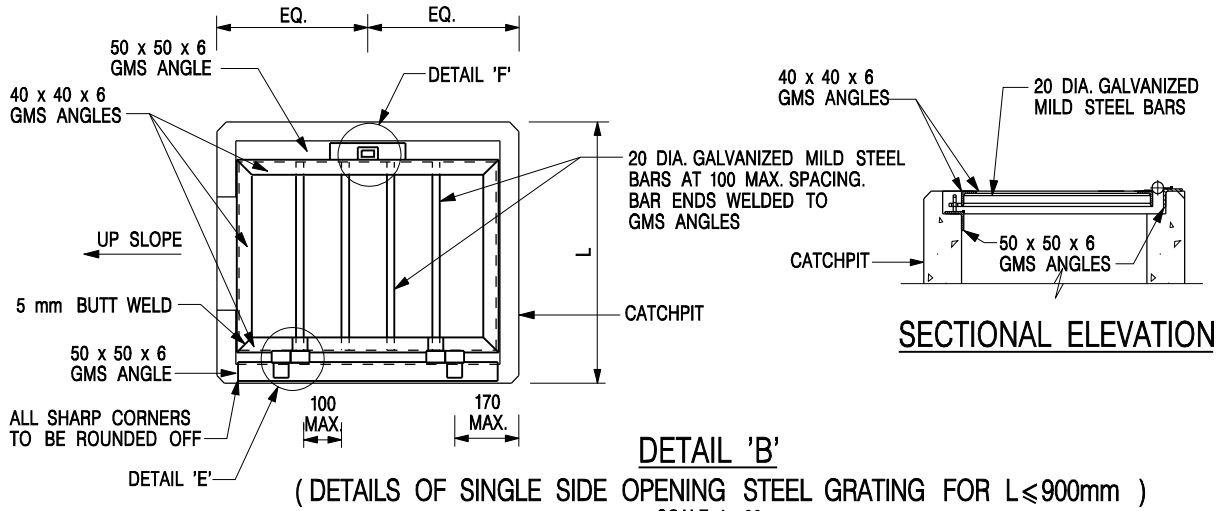
(SHEET 2 OF 5)

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE AS SHOWN

DATE JAN 1991

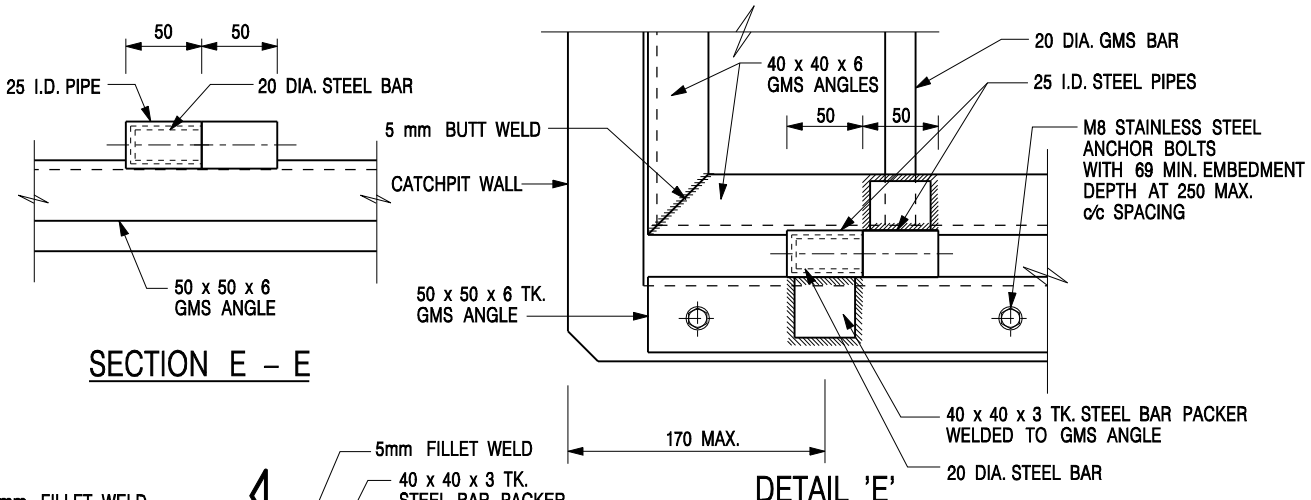
DRAWING NO. C2405 /2



DETAIL 'B'

(DETAILS OF SINGLE SIDE OPENING STEEL GRATING FOR L≤900mm)

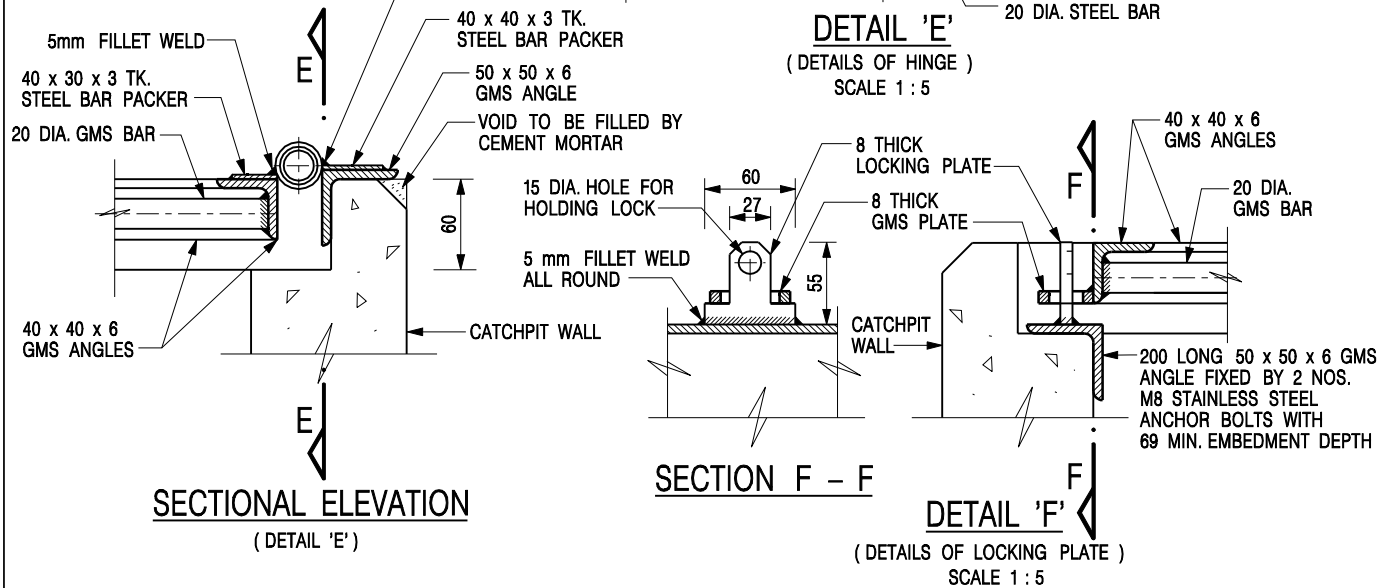
SCALE 1 : 20



DETAIL 'E'

(DETAILS OF HINGE)

SCALE 1 : 5



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFER TO SHEET 5 FOR OTHER NOTES.

REF.	REVISION	SIGNATURE	DATE
-	FORMER DRG. NO. C2405J.	Original Signed	03.2015

STANDARD CATCHPIT DETAILS

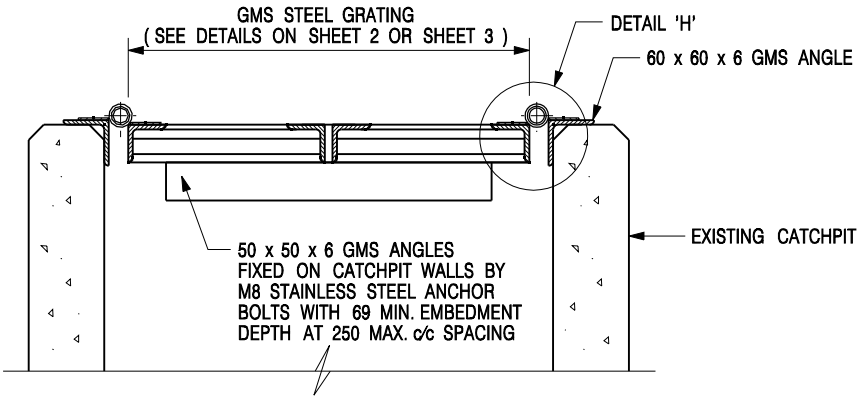
(SHEET 3 OF 5)

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE AS SHOWN

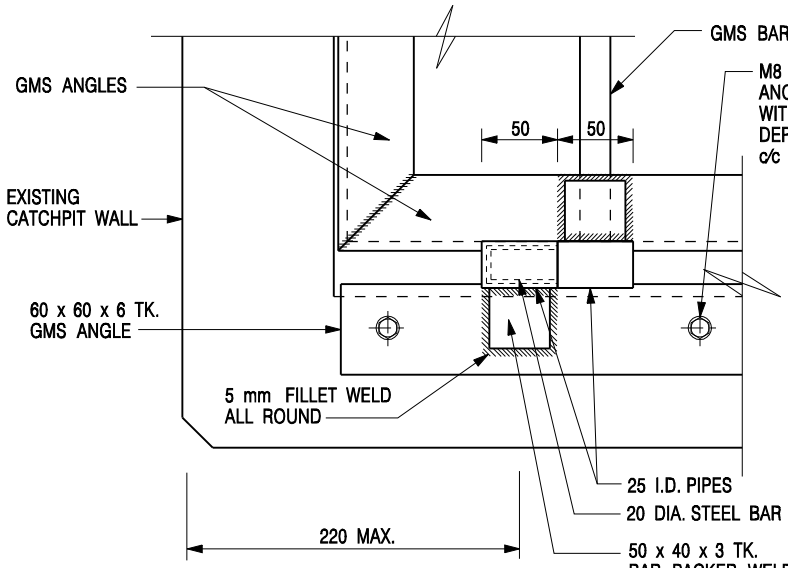
DATE JAN 1991

DRAWING NO. C2405 /3



DETAIL 'G' – DETAILS OF STEEL GRATING CONSTRUCTED ON EXISTING CATCHPIT

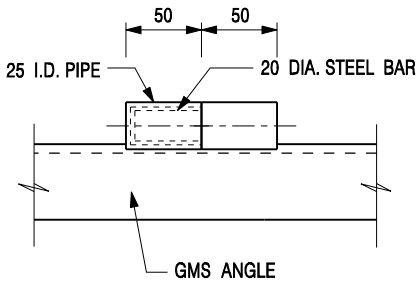
SCALE 1 : 10



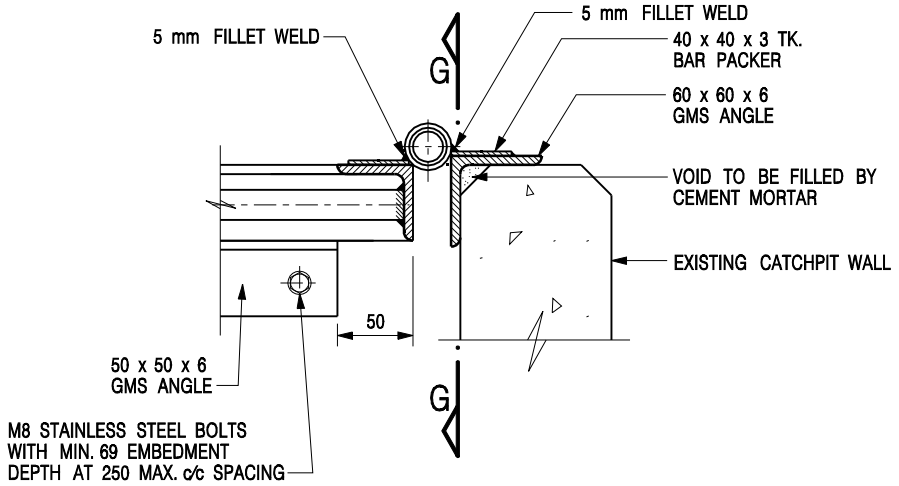
DETAIL 'H'

(DETAILS OF HINGE)

SCALE 1 : 5



SECTION G – G



SECTIONAL ELEVATION

(DETAIL 'H')

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFER TO SHEET 5 FOR OTHER NOTES.

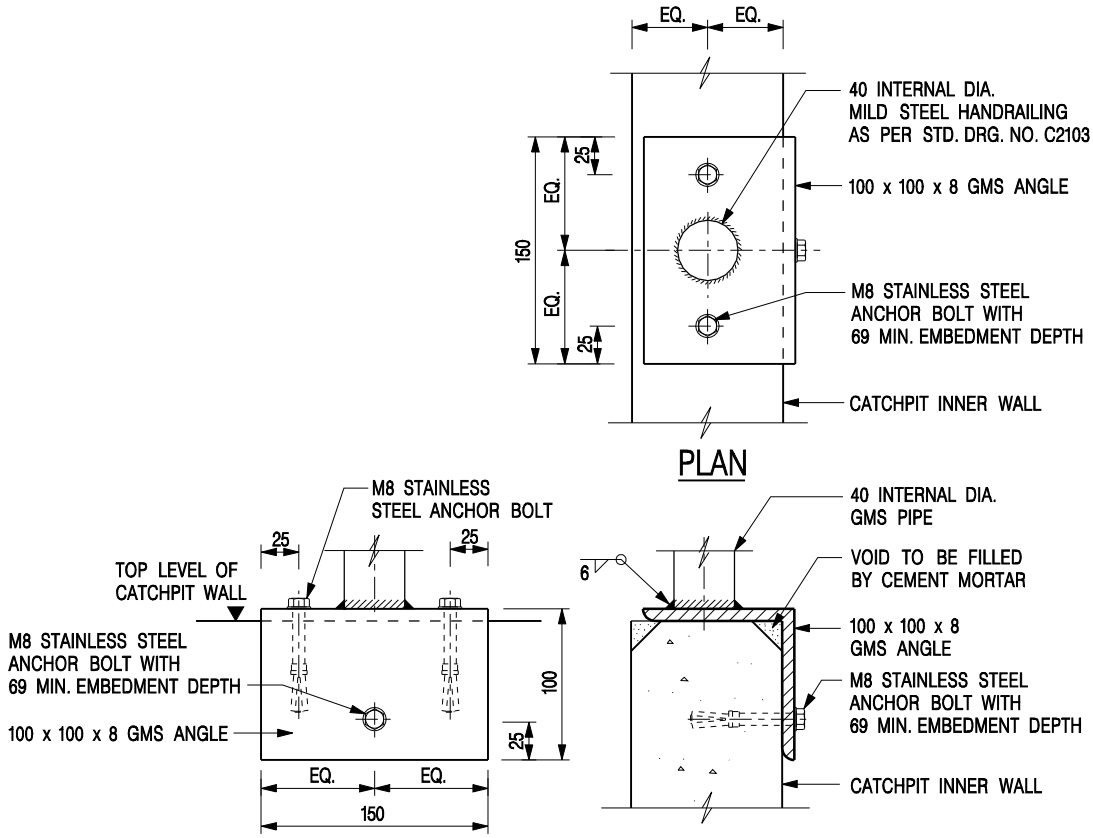
REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2405J.	Original Signed	03.2015

STANDARD CATCHPIT DETAILS

(SHEET 4 OF 5)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE	AS SHOWN	DRAWING NO.
DATE	JAN 1991	C2405 /4



DETAIL 'J' – FIXING DETAILS FOR HANDRAILING ON TOP OF CATCHPIT WALL

SCALE 1 : 5

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL CONCRETE SHALL BE GRADE 20 /20.
3. CONCRETE SURFACE FINISH SHALL BE CLASS U2 OR F2 AS APPROPRIATE.
4. FOR DETAILS OF JOINT, REFER TO STD. DRG. NO. C2413.
5. CONCRETE TO BE COLOURED AS SPECIFIED.
6. FOR CATCHPITS CONSTRUCTED ON OR ADJACENT TO A FOOTPATH, STEEL GRATINGS (SEE DETAILS ON SHEET 2 OR SHEET 3) OR CONCRETE COVERS (SEE STD. DRG. NO. C2407) SHALL BE PROVIDED AS DIRECTED BY THE ENGINEER.
7. IF INSTRUCTED BY THE ENGINEER, HANDRAILING (SEE DETAIL 'J' ON SHEET 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.
8. MINIMUM INTERNAL CATCHPIT WIDTH SHALL BE 1 000 mm FOR CATCHPITS WITH A HEIGHT EXCEEDING 1 000 mm MEASURED FROM THE INVERT LEVEL TO THE ADJACENT GROUND LEVEL. AND, STEP IRONS (SEE DSD STD. DRG. NO. DS1043) AT 300 mm c/c STAGGERED SHALL BE PROVIDED. THICKNESS OF CATCHPIT WALL FOR INSTALLATION OF STEP IRONS SHALL BE INCREASED TO 150 mm.
9. FOR RETROFITTING AN EXISTING CATCHPIT WITH STEEL GRATING, SEE DETAIL 'G' ON SHEET 4.
10. ALL STEEL ANGLES SHALL COMPLY WITH BS EN 10025 AND BS EN 10056.
11. UNLESS OTHERWISE SPECIFIED, ALL WELDS SHALL BE 5 mm CONTINUOUS FILLET WELDS.
12. ALL WELDS SHALL BE CHIPPED, GROUND SMOOTH, BRUSHED TO REMOVE SLAG PRIOR TO HOT-DIP GALVANIZATION.
13. ALL STEELWORK SHALL BE HOT-DIP GALVANIZED TO BS EN ISO 1461. ALL EXPOSED STEELWORK SURFACES SHALL BE TREATED AND PAINTED IN ACCORDANCE WITH THE GENERAL SPECIFICATION.
14. SUBJECT TO THE APPROVAL OF THE ENGINEER, OTHER MATERIALS CAN ALSO BE USED AS COVERS / GRATINGS.

REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2405J.	Original Signed	03.2015

STANDARD CATCHPIT DETAILS

(SHEET 5 OF 5)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE AS SHOWN

DATE JAN 1991

DRAWING NO. C2405 /5