Annex I

Proposed Temporary Open Storage of Construction Materials for a Period of 3 Years and Associated Filling of Land in "Agriculture" Zone, Lots 1290 RP (Part) and 1291 (Part) in D.D. 107, Fung Kat Heung, Kam Tin, Yuen Long, New Territories

Drainage Appraisal

Proposed Temporary Open Storage of Construction Materials for a Period of 3 Years and Associated Filling of Land in "Agriculture" Zone, Lots 1290 RP (Part) and 1291 (Part) in D.D. 107, Fung Kat Heung, Kam Tin, Yuen Long, New Territories

Drainage Appraisal

April 2024

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Proposed Temporary Open Storage of Construction Materials for a Period of 3 Years and Associated Filling of Land in
"Agriculture" Zone, Lots 1290 RP (Part) and 1291 (Part) in D.D. 107, Fung Kat Heung, Kam Tin, Yuen Long, New Territories

Drainage Appraisal

1. Introduction

1.1 Background

1.1.1 The applicant seeks planning permission from the Town Planning Board (the Board) to use Lots 1290 RP (Part) and 1291 (Part), Fung Kat Heung, Kam Tin, Yuen Long, New Territories (the Site) for 'Proposed Temporary Open Storage of Construction Materials for a Period of 3 Years and Associated Filling of Land' (proposed development).

1.1.2 This Drainage Proposal is to support the planning application for the proposed use.

1.2 The Site

1.2.1 The Application Site area is about 3,796m^2, and it is at rural area of Kam Tin North. The site is currently an open area with existing temporary structures. The site location plan is shown in **Figure 1**.

1.2.2 The Application Site is surrounded by temporary structures and local track. The existing ground level various from approx. +10.3 mPD to +11.7 mPD. The site is intended to be filled and paved to ground level from +11.2 mPD to +11.9 mPD.

1.2.3 There is an existing channel adjacent to the site at the west and south. Existing Drainage Plan is shown in **Figure 2** for reference.

1.2.4 The site at the east is slightly higher than the Application Site. The eastern area is mostly grassland. It is assumed that the unpaved area is <mark>75%</mark> for assessment purposes. Catchment Plan is shown in **Figure 4**.

1.2.5 Proposed Development Layout plan is shown in **Appendix B** for reference.

Proposed Temporary Open Storage of Construction Materials for a Period of 3 Years and Associated Filling of Land in "Agriculture" Zone, Lots 1290 RP (Part) and 1291 (Part) in D.D. 107, Fung Kat Heung, Kam Tin, Yuen Long, New Territories

Drainage Appraisal

2.   Development Proposal

2.1   The Proposed Development

2.1.1   The total site area is approximately 3,796m². The indicative development schedule is summarized in Table 1 below for technical assessment purpose. The proposed catchment plan is shown in **Figure 4**.

Proposed Development	
Total Site Area (m²) Assume all proposed site area as paved area after development for assessment purpose	3,796
Zone A (m²)	1,700
Zone B (m²)	2,096
External Catchment	
Eastern External Catchment (m²) The Area is mostly grassland It is assumed that paved to unpaved ratio is 20:80 for assessment purposes.	4,246

Table 1 - Key Development Parameters

3.   Assessment Criteria

3.1.1   The Recommended Design Return Period based on Flood Level from SDM (Table 10) is adopted for this DIA. The recommendation is summarized in **Table 2** below.

Description	Design Return Periods
Intensively Used Agricultural Land	2 – 5 Years
Village Drainage Including Internal Drainage System under a polder Scheme	10 Years
Main Rural Catchment Drainage Channels	50 Years
Urban Drainage Trunk System	200 Years
Urban Drainage Branch System	50 Years

Table 2– Design Return Periods under SDM

3.1.2   The proposed village drainage system intended to collect runoff from the internal site and discharge to existing nearby existing stream. 1 in 10 years return period is adopted for the drainage design.

Proposed Temporary Open Storage of Construction Materials for a Period of 3 Years and Associated Filling of Land in "Agriculture" Zone, Lots 1290 RP (Part) and 1291 (Part) in D.D. 107, Fung Kat Heung, Kam Tin, Yuen Long, New Territories

Drainage Appraisal

3.1.3 Stormwater drainage design will be carried out in accordance with the criteria set out in the Stormwater Drainage Manual published by DSD. The proposed design criteria to be adopted for design of this stormwater drainage system and factors which have been considered are summarised below.

1. Intensity-Duration-Frequency Relationship – The Recommended Intensity-Duration-Frequency relationship is used to estimate the intensity of rainfall. It can be expressed by the following algebraic equation.

$$i = \frac{a}{(t_d + b)^c}$$

The site is located within the HKO Headquarters Rainfall Zone. Therefore, for 10 years return period, the following values are adopted.

a	=	471.9
b	=	3.02
c	=	0.397

2. The peak runoff is calculated by the Rational Method
i.e. $Q_p = 0.278CiA$

where Q_p = peak runoff in m^3/s
C = runoff coefficient (dimensionless)
i = rainfall intensity in mm/hr
A = catchment area in km^2

3. The run-off coefficient (C) of surface runoff are taken as follows:

- Paved Area: C = 0.95
- Unpaved Area: C = 0.35

Proposed Temporary Open Storage of Construction Materials for a Period of 3 Years and Associated Filling of Land in
"Agriculture" Zone, Lots 1290 RP (Part) and 1291 (Part) in D.D. 107, Fung Kat Heung, Kam Tin, Yuen Long, New Territories
Drainage Appraisal

4.   Manning's Equation is used for calculation of velocity of flow inside the channels:

$$\text{Manning's Equation:} \quad v = \frac{R^{\frac{1}{6}}}{n} \, R^{\frac{1}{2}} S_f^{\frac{1}{2}}$$

Where,

V = velocity of the pipe flow (m/s)
S_f = hydraulic gradient
n = manning's coefficient
R = hydraulic radius (m)

5.   Colebrook-White Equation is used for calculation of velocity of flow inside the pipes:

$$\text{Colebrook-White Equation:} \quad \underline{v} = -\sqrt{32gRS} \, log \, log \, \left(\frac{k_s}{14.8R} + \frac{1.255v}{R\sqrt{32gRS_f}} \right)$$

where,

V	=	velocity of the pipe flow (m/s)
S_f	=	hydraulic gradient
k_f	=	roughness value (m)
v	=	kinematics viscosity of fluid
D	=	pipe diameter (m)
R	=	hydraulic radius (m)

Proposed Temporary Open Storage of Construction Materials for a Period of 3 Years and Associated Filling of Land in "Agriculture" Zone, Lots 1290 RP (Part) and 1291 (Part) in D.D. 107, Fung Kat Heung, Kam Tin, Yuen Long, New Territories

Drainage Appraisal

4. Proposed Drainage System

4.1.1 The Application Site and the surrounding areas are generally flat with gentle gradient toward the west. Drainage system is proposed to collect the runoff from the application site and external catchment at the east. It is proposed to discharge to ==existing 3m (W) x 2m (D) channel at the west.== The alignment, size and gradient of the proposed drains are shown in **Figure 3**.

4.1.2 The design calculations of proposed channels are shown in **Appendix A**.

4.1.3 ==The design checking of existing 3m (W) x 2m (D) channel at the west for drainage discharge is shown in **Appendix F**.==

4.1.4 The reference drawings of proposed drains are shown in **Appendix C**.

5. Conclusion

5.1.1 A drainage appraisal has been conducted for the Proposed Development. The surface runoff from the Application Site will be collected by the proposed perimeter Uchannel/drains and discharged to the existing stream at the west.

5.1.2 With the proposed drainage system, it is anticipated that there will be no significant drainage impact to the area after the implementation of the development.

- End of Text -

FIGURES
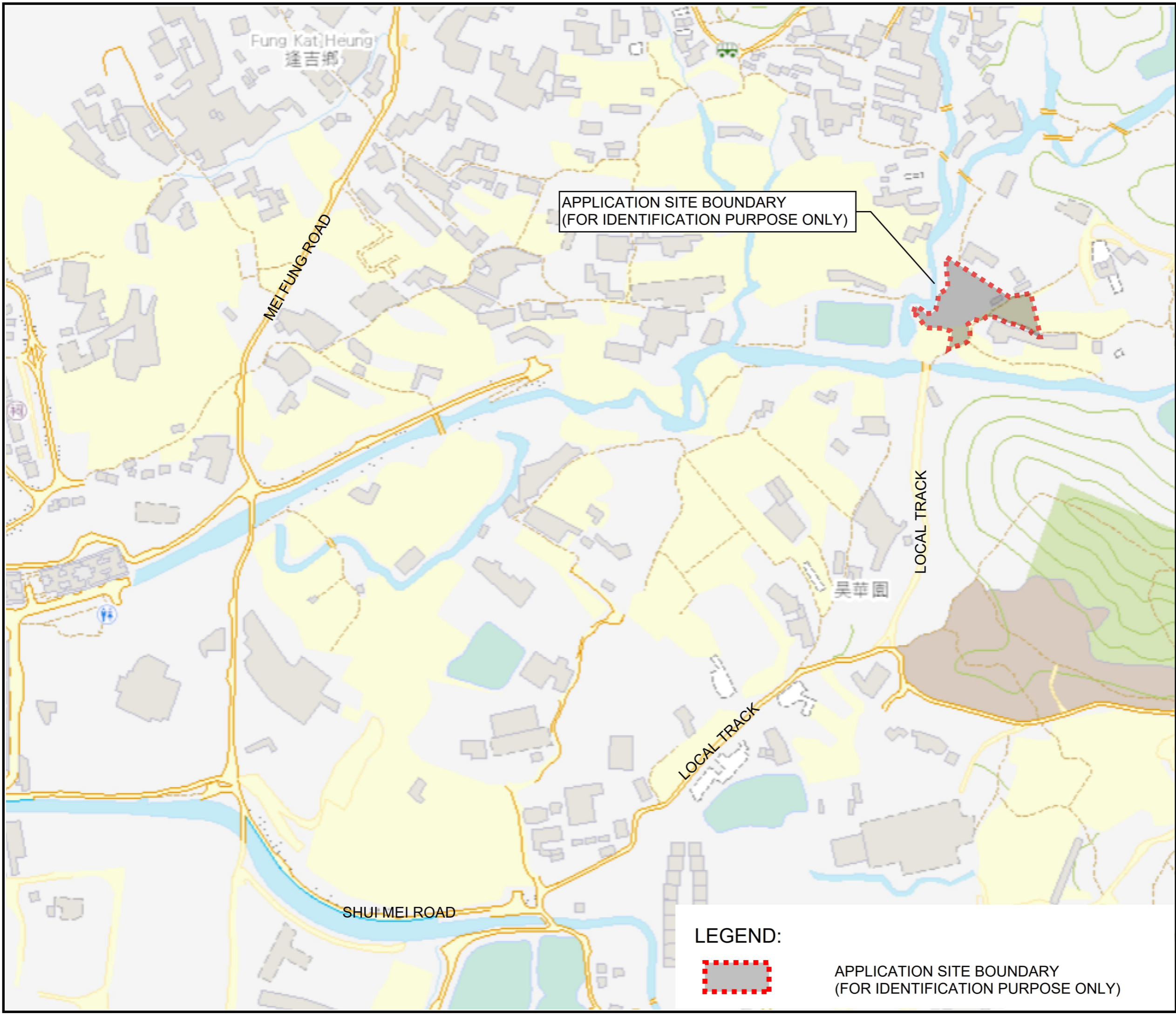
APPLICATION SITE BOUNDARY
(FOR IDENTIFICATION PURPOSE ONLY)

Fung Kat Heung
逢吉鄉

MEI FUNG ROAD

LOCAL TRACK

LOCAL TRACK

昊華園

SHUI MEI ROAD

PROJECT:
Proposed Temporary Open Storage of Construction Materials for a Period of 3 Years and Associated Filling of Land in "Agriculture" Zone, Lots 1290 RP (Part) and 1291 (Part) in D.D. 107, Fung Kat Heung, Kam Tin, Yuen Long, New Territories
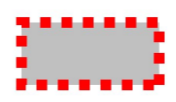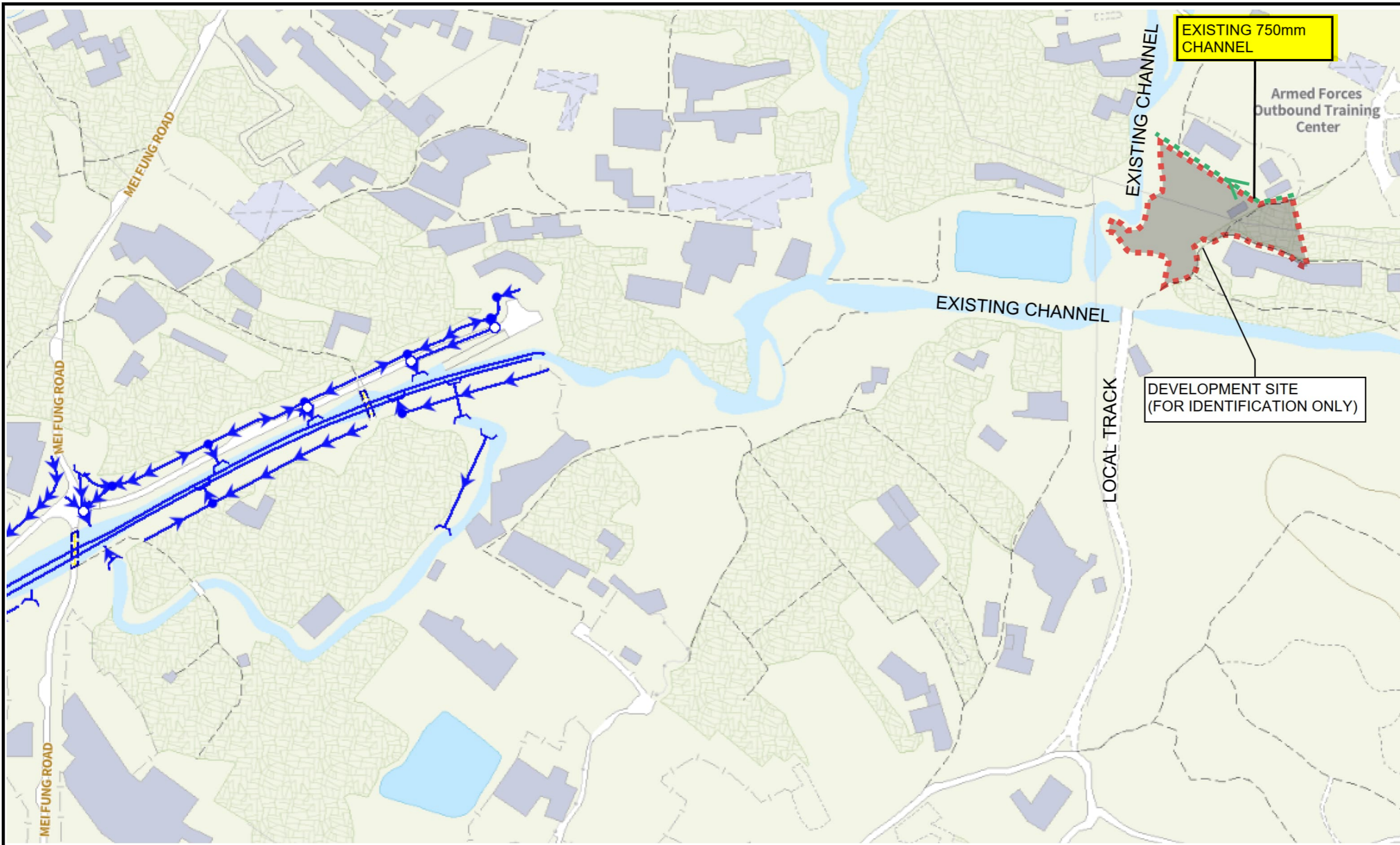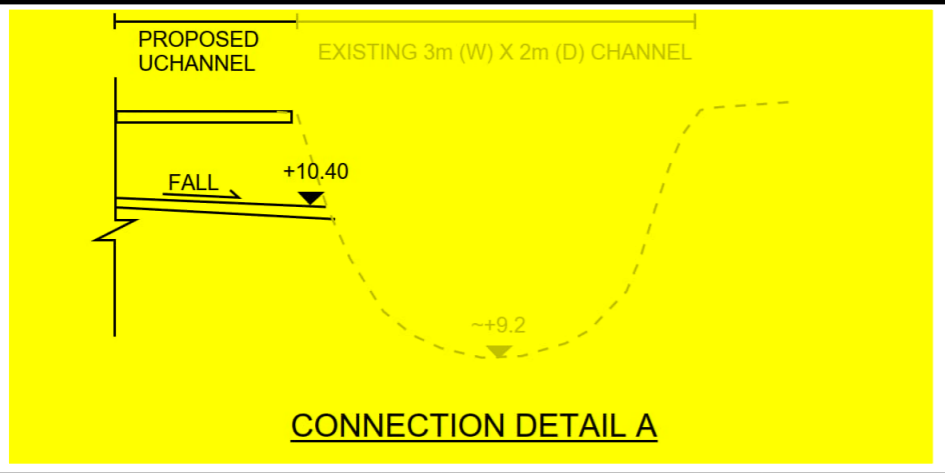
REV	DESCRIPTION	DATE

DRAWING TITLE
SITE LOCATION PLAN

DRAWING NUMBER
FIGURE 1

LEGEND:

APPLICATION SITE BOUNDARY
(FOR IDENTIFICATION PURPOSE ONLY)

EXISTING 750mm CHANNEL

Armed Forces Outbound Training Center

EXISTING CHANNEL

EXISTING CHANNEL

LOCAL TRACK

MEI FUNG ROAD

DEVELOPMENT SITE
(FOR IDENTIFICATION ONLY)

REV	DESCRIPTION	DATE

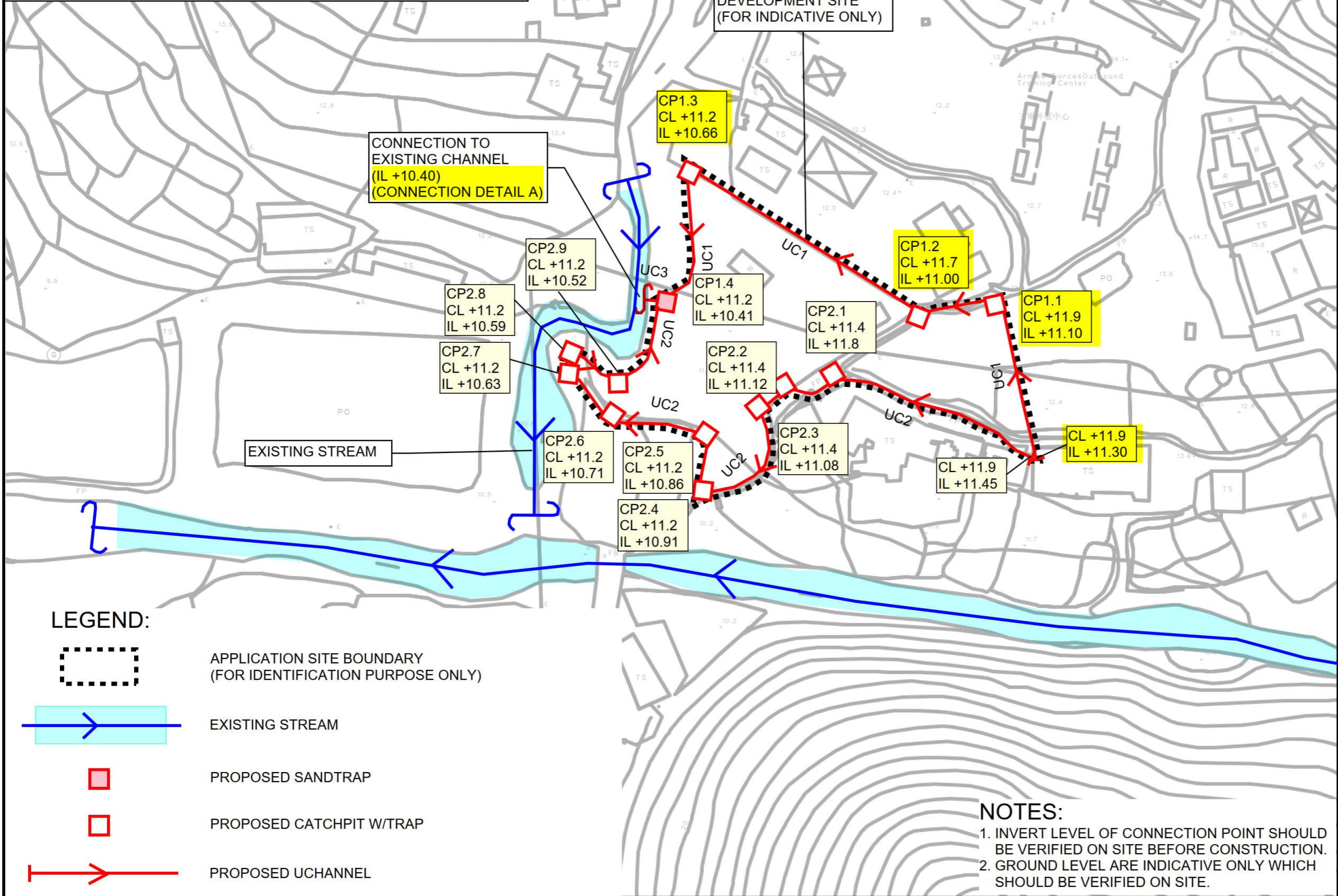DRAWING TITLE
EXISTING DRAINAGE PLAN

DRAWING NUMBER
FIGURE 2A

LEGEND:

◩	Combined Manhole	⊢	Tapping Point (Sewer)	⊢	Tapping Point (Storm)
◖	Overflow (Combined)	⊡	Sewer Terminal Manhole	⊙	Storm Water Terminal Manhole
▬	Pipe (Combined)	●	Catchpit	▨	Tunnel Protection Zone (100m / 200m)
⊠	Interface Valve Chamber	⊁	Inlet	▨	Tunnel Protection Zone (General Range)
▯	Sewer Manhole	○	Storm Water Manhole	▦	Tunnel / Box Culvert (Sewer)
▭	Oil / Petrol Interceptor	⊁	Outlet	▦	Tunnel / Box Culvert (Storm)
◖	Overflow (Sewer)	▬	Pipe (Storm)		
▬	Pipe (Sewer)	▱	Sand Trap		

EXTRACT FROM GEOINFO MAP ON MAR 2024

CONNECTION DETAIL A

PROPOSED UCHANNEL

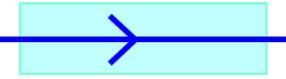EXISTING 3m (W) X 2m (D) CHANNEL

FALL

+10.40

~+9.2

UCHANNEL TYPE
UCHANNEL 1 (UC1) - 525mm, 1 IN 200
UCHANNEL 2 (UC2) - 375mm, 1 IN 200
UCHANNEL 3 (UC3) - 600mm, 1 IN 200

PROJECT:
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DEVELOPMENT SITE
(FOR INDICATIVE ONLY)

CONNECTION TO
EXISTING CHANNEL
(IL +10.40)
(CONNECTION DETAIL A)

CP1.3
CL +11.2
IL +10.66

CP2.9
CL +11.2
IL +10.52

CP1.2
CL +11.7
IL +11.00

UC3

UC1

CP2.8
CL +11.2
IL +10.59

CP1.4
CL +11.2
IL +10.41

CP2.1
CL +11.4
IL +11.8

CP1.1
CL +11.9
IL +11.10

UC2

CP2.7
CL +11.2
IL +10.63

CP2.2
CL +11.4
IL +11.12

UC1

CP2.6
CL +11.2
IL +10.71

UC2

CP2.5
CL +11.2
IL +10.86

CP2.3
CL +11.4
IL +11.08

UC2

CL +11.9
IL +11.30

EXISTING STREAM

UC2

CL +11.9
IL +11.45

CP2.4
CL +11.2
IL +10.91

LEGEND:

APPLICATION SITE BOUNDARY
(FOR IDENTIFICATION PURPOSE ONLY)

EXISTING STREAM

PROPOSED SANDTRAP
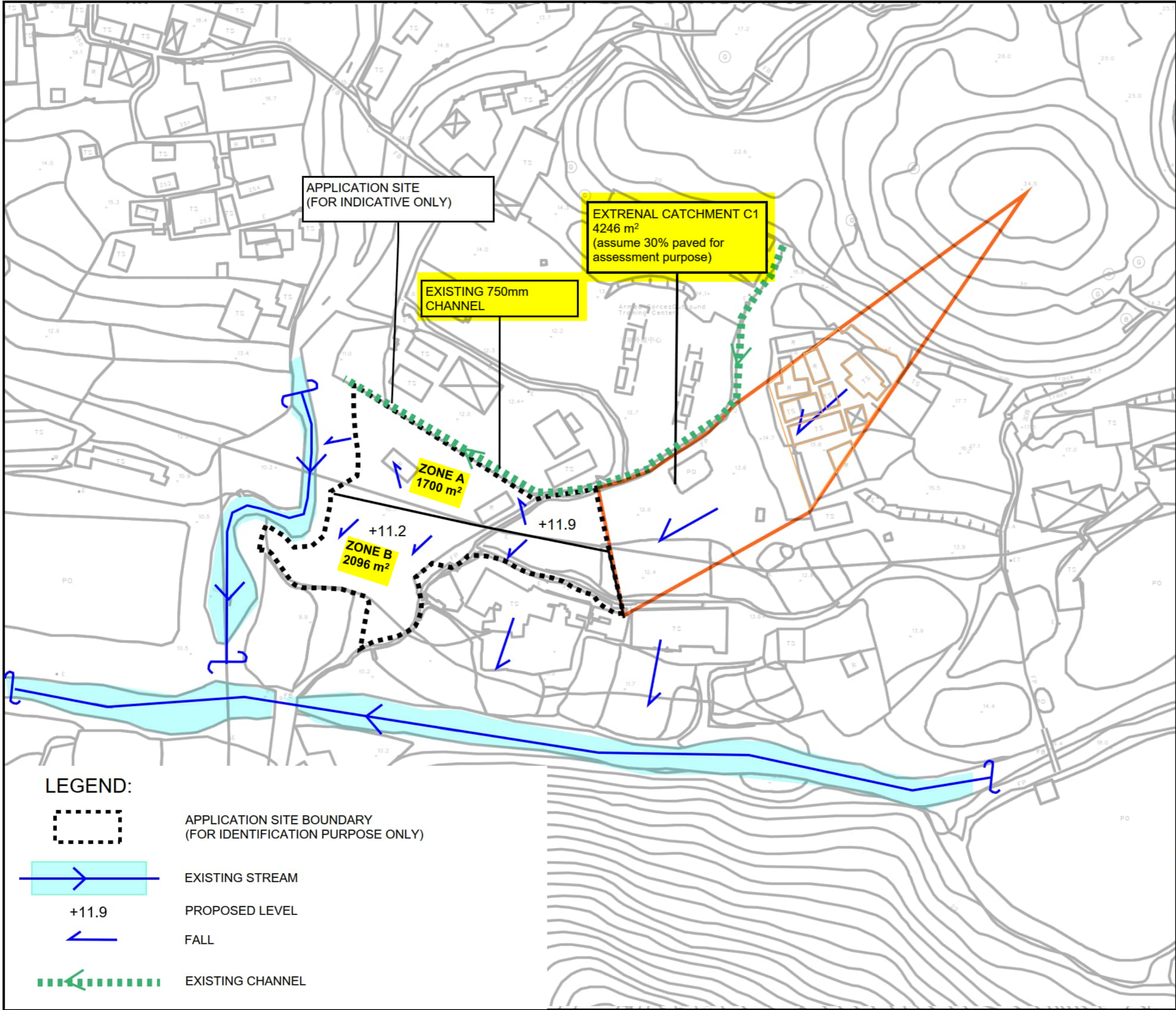
PROPOSED CATCHPIT W/TRAP

PROPOSED UCHANNEL

NOTES:
1. INVERT LEVEL OF CONNECTION POINT SHOULD BE VERIFIED ON SITE BEFORE CONSTRUCTION.
2. GROUND LEVEL ARE INDICATIVE ONLY WHICH SHOULD BE VERIFIED ON SITE.

REV | DESCRIPTION | DATE

DRAWING TITLE
PROPOSED DRAINAGE SYSTEM

DRAWING NUMBER
FIGURE 3A

APPLICATION SITE
(FOR INDICATIVE ONLY)

EXTRENAL CATCHMENT C1
4246 m²
(assume 30% paved for
assessment purpose)

EXISTING 750mm
CHANNEL

ZONE A
1700 m²

+11.2

ZONE B
2096 m²

+11.9

PROJECT:
Proposed Temporary Open
Storage of Construction
Materials for a Period of 3
Years and Associated Filling
of Land in "Agriculture" Zone,
Lots 1290 RP (Part) and 1291
(Part) in D.D. 107, Fung Kat
Heung, Kam Tin, Yuen Long,
New Territories

LEGEND:

APPLICATION SITE BOUNDARY
(FOR IDENTIFICATION PURPOSE ONLY)

EXISTING STREAM

+11.9   PROPOSED LEVEL

FALL

EXISTING CHANNEL

REV	DESCRIPTION	DATE

DRAWING TITLE
CATCHMENT PLAN

DRAWING NUMBER
FIGURE 4A

Appendix

Appendix A - Design Calculation

U Channel 1 - Zone A with External Catchment C1

Runoff Estimation

Design Return Period		1 in	10	years
Paved Area	1700 + 4246 x 0.3 =		2974	(m2)
Unpaved Area	4246 x 0.7 =		2972	(m2)
Total Equivalent Area	2974 x 0.95 + 2972 x 0.35 =		3865	(m2)
Time of Concentration *			6.20	min
Rainfall Intensity, I **			195	mm/hr
Design Discharge Rate, Q	0.278 x 3865 x 195 / 1000000 =		0.210	m3/s

$$* \quad i = \frac{a}{(t_d + b)^c}$$

U Channel

Channel Size			525	(mm)
Gradient		1 in	200	
Velocity			1.62	m/s
Capacity			0.400	m3/s

Utilization	0.21 / 0.4	=	**52.54**	%	OK	(Allowed 10% for siltation)

U Channel 2 - Zone B

Runoff Estimation

Design Return Period		1 in	10	years
Paved Area	2096		2096	(m2)
Unpaved Area			0	(m2)
Total Equivalent Area	2096 x 0.95 + 0 x 0.35 =		1991	(m2)
Time of Concentration *			6.20	min
Rainfall Intensity, I **			195	mm/hr
Design Discharge Rate, Q	0.278 x 0 x 195 / 1000000 =		0.108	m3/s

$$** \quad i = \frac{a}{(t_d + b)^c}$$

U Channel

Channel Size			375	(mm)
Gradient		1 in	200	
Velocity			1.30	m/s
Capacity			0.163	m3/s

Utilization	0.108 / 0.163	=	**66.39**	%	OK	(Allowed 10% for siltation)

U Channel 3 - Combined (Zone A + B +C1)

Runoff Estimation

Design Return Period		1 in	10	years
Paved Area	2974 + 2096 =		5070	(m2)
Unpaved Area	2972 + 0 =		2972	(m2)
Total Equivalent Area	5070 x 0.95 + 2972 x 0.35 =		5857	(m2)
Time of Concentration *			6.20	min
Rainfall Intensity, I **			195	mm/hr
Design Discharge Rate, Q	0.278 x 5857 x 195 / 1000000 =		0.318	m3/s

$$** \quad i = \frac{a}{(t_d + b)^c}$$

U Channel

Channel Size			600	(mm)
Gradient		1 in	200	
Velocity			1.78	m/s
Capacity			0.570	m3/s

Utilization	0.318 / 0.57	=	**55.76**	%	OK	(Allowed 10% for siltation)

Time of Concentration for External Catchment C1
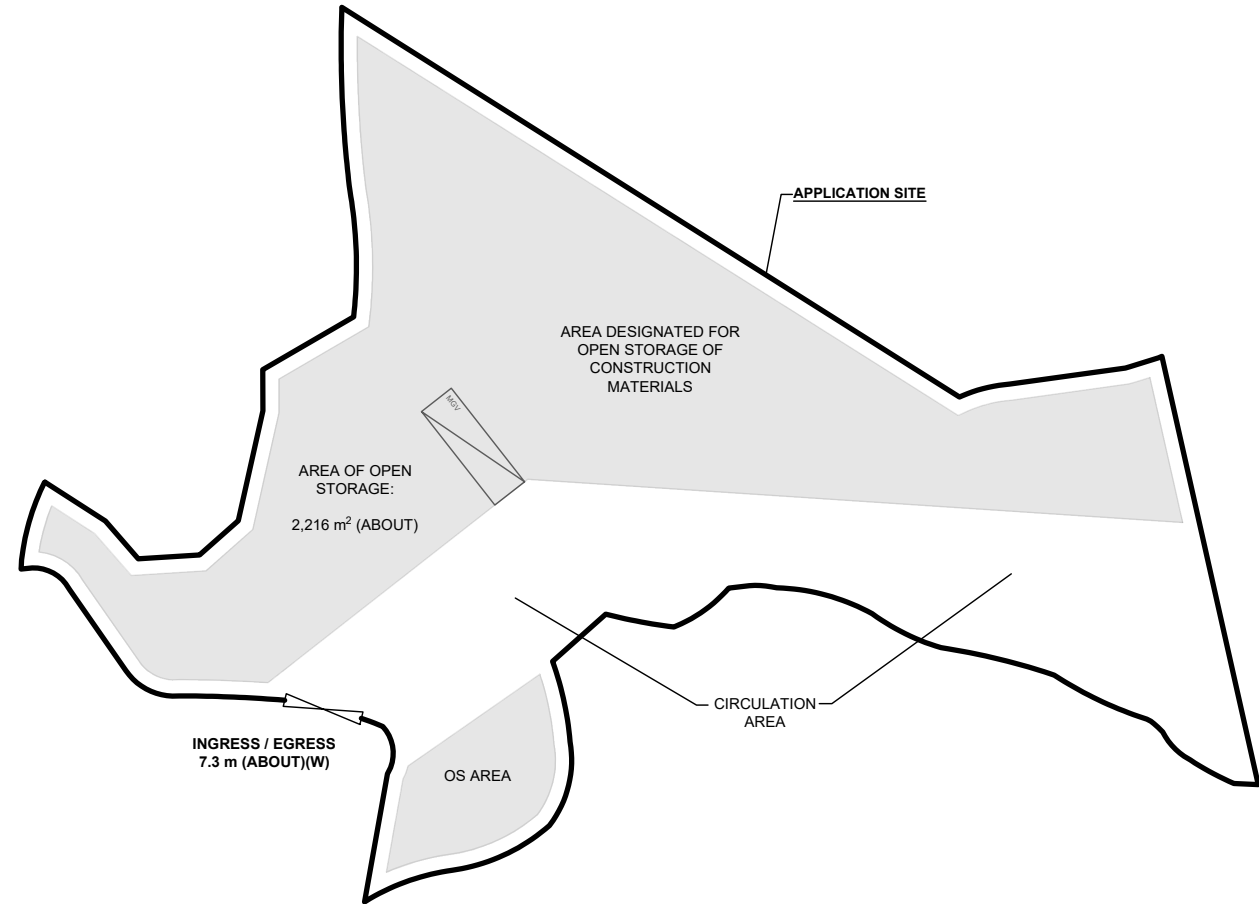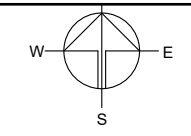
Catchment	Flow Distance	Highest Level	Lowest Level	Gradient (per 100m) = (H1-H2)/L x 100	to (min) = $0.14465L/(H^{0.2}A^{0.1})$	tc = to + tf
A	L			H		
(m2)	(m)	(mPD)	(mPD)		(min)	(min)
4246	166	34.5	12.5	13.253	6.211	6.211

tc	=	6.211	(min)			

DEVELOPMENT PARAMETERS

APPLICATION SITE AREA	: 3,796 m^2	(ABOUT)
COVERED AREA	: NOT APPLICABE	
UNCOVERED AREA	: 3,796 m^2	(ABOUT)

APPLICATION SITE

AREA DESIGNATED FOR
OPEN STORAGE OF
CONSTRUCTION
MATERIALS

MGV

AREA OF OPEN
STORAGE:

2,216 m^2 (ABOUT)

CIRCULATION
AREA

**INGRESS / EGRESS
7.3 m (ABOUT)(W)**

OS AREA

W — N — E
S

PLANNING CONSULTANT

R-Riches
Property Consultants Ltd.

PROJECT

PROPOSED TEMPORARY OPEN
STORAGE OF CONSTRUCTION
MATERIALS FOR A PERIOD OF 3
YEARS AND ASSOCIATED
FILLING OF LAND

SITE LOCATION

LOTS 1290 RP (PART) AND 1291
(PART) IN D.D. 107, FUNG KAT
HEUNG, KAM TIN, YUEN LONG,
NEW TERRITORIES

SCALE

1 : 700 @ A4

DRAWN BY	DATE
MN	11.1.2024
REVISED BY	DATE
APPROVED BY	DATE

DWG. TITLE

LAYOUT PLAN

DWG NO.	VER.
PLAN 5	001

LEGEND

▭	APPLICATION SITE
⊠	STRUCTURE
▢	OPEN STORAGE AREA
MGV ⬚	LOADING / UNLOADING SPACE FOR MGV
▷◁	INGRESS / EGRESS

PARKING AND LOADING / UNLOADING PROVISIONS

NO. OF L/UL SPACE FOR MEDIUM GOODS VEHICLE	: 1
DIMENSION OF L/UL SPACE	: 11 m (L) x 3.5 m (W)

4 NOS. STAINLESS STEEL GRATING FIXED TO BOTTOM SLAB BY STAINLESS STEEL SCREWS

20 x 20 CHAMFER

STEPPED CHANNEL

U-CHANNEL

20 THICK APPROVED CELLULAR JOINT FILLER SEALED WITH 20 x 20 Tk POLYSULPHIDE JOINT SEALANT

FALL

FALL

STEPPED OR U-CHANNEL OR PIPE

20 THICK APPROVED CELLULAR JOINT FILLER SEALED WITH 20 x 20 Tk POLYSULPHIDE JOINT SEALANT

U-CHANNEL

$500 + $ GREATER OF H1 OR H2

$500 + $ GREATER OF H3 OR H4

PLAN

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

100

100

100 MIN.

20 x 20 CHAMFERS ON ALL SIDES

A252 MESH OR EQUIVALENT

350 (OR 650 FOR CATCHPIT CONSTRUCTED ON OR ADJACENT TO A FOOTPATH)

20 THICK APPROVED CELLULAR JOINT FILLER SEALED WITH 20 x 20 Tk POLYSULPHIDE JOINT SEALANT

FALL

FALL

300 BELOW LOWEST INVERT

B

25 DIA. DRAIN PIPES

SECTION A - A
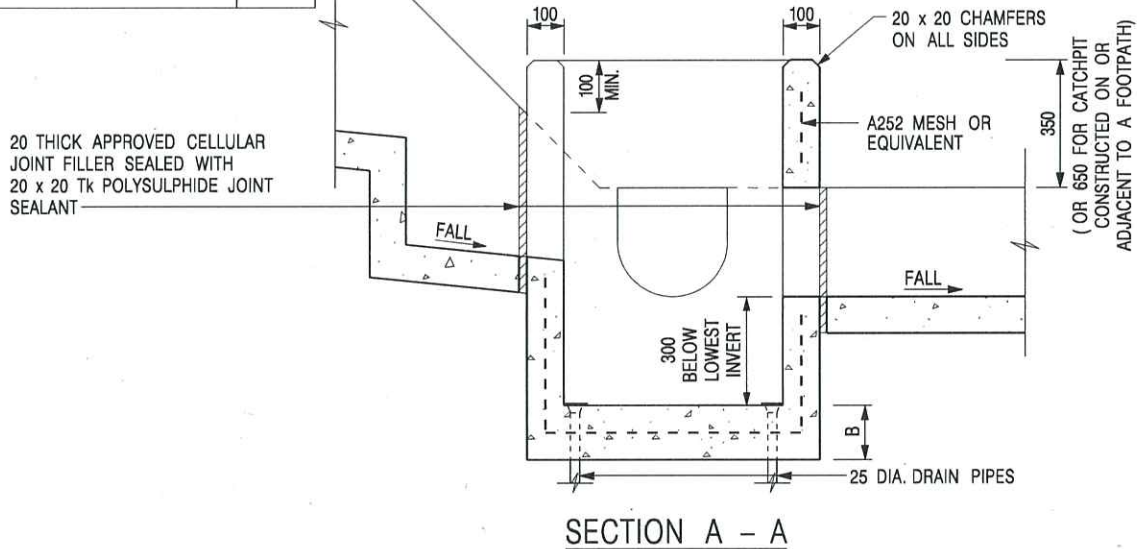
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.

2. REFER TO SHEET 2 FOR OTHER NOTES.

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

CATCHPIT WITH TRAP

(SHEET 1 OF 2)

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

CEDD

SCALE	1 : 20	DRAWING NO.
DATE	JAN 1991	C2406 /1

卓越工程 建設香港

We Engineer Hong Kong's Development

DEPTH OF RECESS AND DETAILS OF
PRECAST CONCRETE COVERS
(SEE STD. DRG. NO. C2407)

50   50   60 FOR
                        STEEL GRATINGS
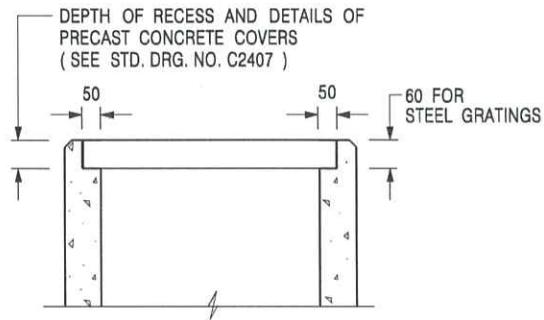
ALTERNATIVE TOP SECTION
FOR PRECAST CONCRETE COVERS / GRATINGS

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	DRAWING NO.
DATE JAN 1991	C2406 /2A

卓越工程 建設香港   We Engineer Hong Kong's Development

BERM WIDTH VARIES (1000 MIN.)

80 x 60 x 2.2 DIA.
GALVANIZED AND PVC
COATED DOUBLE TWISTED
WIRE MESH

50 THICK MASONRY FACING ON 50 MIN. THICK CEMENT MORTAR
(SET IN 1 : 3 CEMENT / SAND), OR 75 THICK CONCRETE APRON,
AS SPECIFIED; ALL TO BE OMITTED IF THIS AREA IS SPRAYED CONCRETE

75 THICK
CONCRETE SLAB

BRUSHED FINISH OR AS
OTHERWISE DIRECTED

150

25 x 25
CHAMFER

FINISHED SLOPE
PROFILE

FIXING
PIN

NON-BIODEGRADABLE
EROSION CONTROL MAT

50 MIN. THICK
CEMENT MORTAR

POLYTHENE
SHEET

500

200

H/2
H/2 MIN.

E

B

10
1

100

T   H   T

U-CHANNELS CONSTRUCTED
ON BERM

HANDRAILING
(SEE STD. DRG. NO. C2103)

200

EXTENT OF WIRE MESH SHALL
BE 1 500 OR BERM WIDTH
WHICHEVER IS THE LESSER

A252 MESH

POLYTHENE SHEET

25 x 25
CHAMFER

1000

200

300

300

50

DETAILS OF BERM
WITH HANDRAILING

80 x 60 x 2.2 DIA. GALVANIZED AND PVC
COATED DOUBLE TWISTED WIRE MESH

NON-BIODEGRADABLE
EROSION CONTROL MAT

FINISHED
SLOPE
PROFILE

FIXING
PIN

50 MIN. THICK
CEMENT MORTAR

50 DIA. PVC PIPES
AT 1500 c / c WITH
FALL OF 1 ON 3
WHERE D > 600

500

200

D

E

15

H/2
H/2 MIN.

50 THICK MASONRY FACING ON 50 MIN. THICK
CEMENT MORTAR (SET IN 1 : 3 CEMENT / SAND),
OR 75 THICK CONCRETE APRON, AS SPECIFIED;
ALL TO BE OMITTED IF THIS AREA IS SPRAYED
CONCRETE

500

200

80 x 60 x 2.2 DIA. GALVANIZED
AND PVC COATED DOUBLE
TWISTED WIRE MESH

NON-BIODEGRADABLE
EROSION CONTROL MAT

FIXING PIN

50 MIN. THICK
CEMENT MORTAR

T   H   T

U-CHANNELS NOT CONSTRUCTED
ON BERM

H/2

15

B

T   H   T

HALF-ROUND CHANNEL

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

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
REF.	REVISION	SIGNATURE	DATE

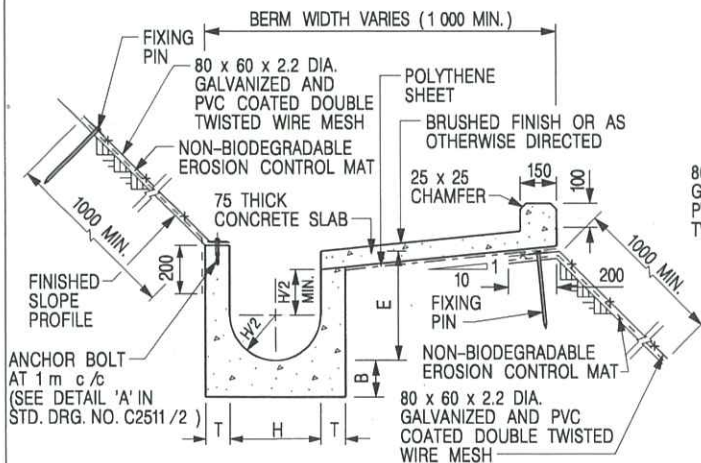# DETAILS OF HALF-ROUND
AND U-CHANNELS (TYPE A -
WITH MASONRY APRON)

CEDD

CIVIL ENGINEERING AND
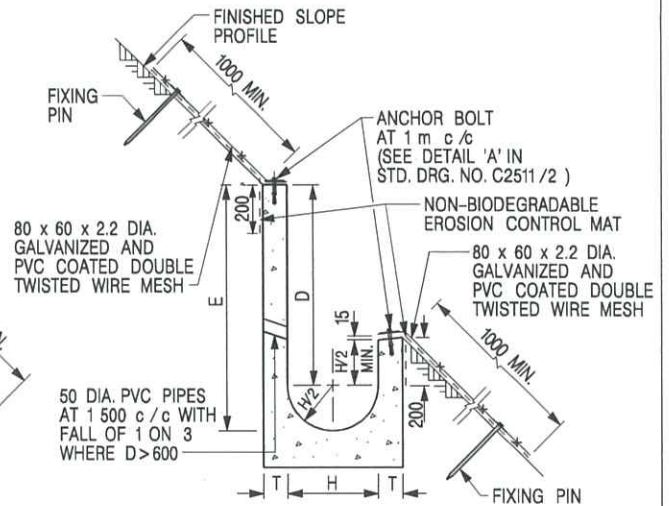DEVELOPMENT DEPARTMENT

SCALE 1 : 25

DATE JAN 1991

DRAWING NO.
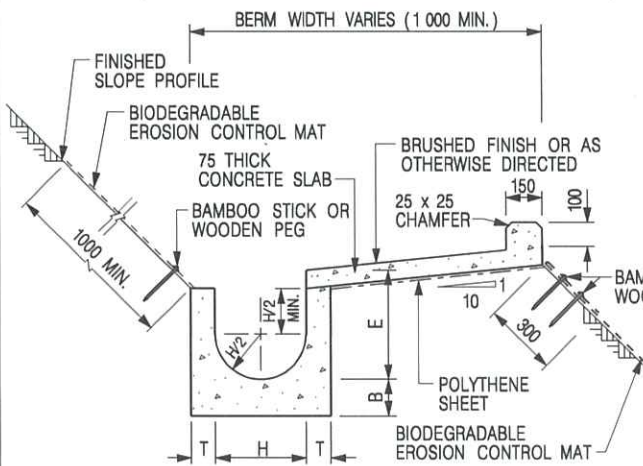C2409I

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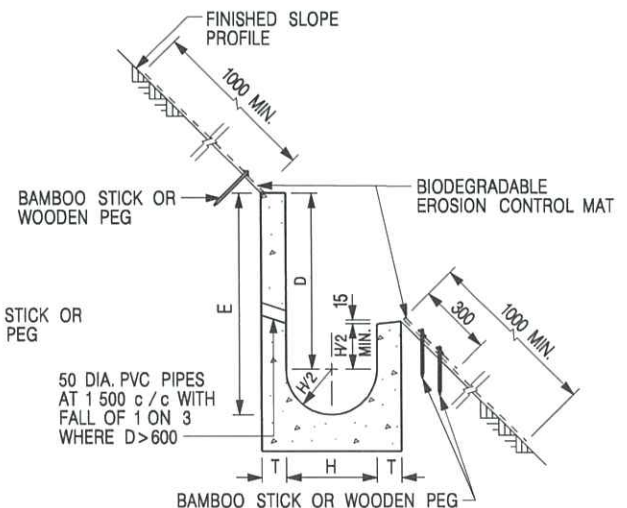
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U-CHANNELS CONSTRUCTED ON BERM WITH NON-BIODEGRADABLE EROSION CONTROL MAT

U-CHANNELS NOT CONSTRUCTED ON BERM WITH NON-BIODEGRADABLE EROSION CONTROL MAT

U-CHANNELS CONSTRUCTED ON BERM WITH BIODEGRADABLE EROSION CONTROL MAT

U-CHANNELS NOT CONSTRUCTED ON BERM WITH BIODEGRADABLE EROSION CONTROL MAT

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. FOR TYPICAL FIXING PIN DETAILS, SEE STD. DRG. NO. C2511/2.

8. MINIMUM SIZE OF 25 x 50 x 300mm SHALL BE PROVIDED FOR WOODEN PEG.

9. MINIMUM SIZE OF 10mm DIAMETER WITH 200mm LONG SHALL BE PROVIDED FOR BAMBOO STICK.

10. THE FIXING DETAILS OF NON-BIODEGRADABLE AND BIODEGRADABLE EROSION CONTROL MATS ON EXISTING BERM SHALL REFER TO STD. DRG. NO. C2511/1.

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

I	MINOR AMENDMENT.	Original Signed	07.2018
H	FIXING DETAILS OF BIODEGRADABLE EROSION CONTROL MAT ADDED.	Original Signed	12.2017
G	DIMENSION TABLE AMENDED.	Original Signed	01.2005
F	MINOR AMENDMENT.	Original Signed	01.2004
E	GENERAL REVISION.	Original Signed	12.2002
D	MINOR AMENDMENT.	Original Signed	08.2001
C	150 x 100 UPSTAND ADDED AT BERM.	Original Signed	6.99
B	MINOR AMENDMENT.	Original Signed	3.94
A	MINOR AMENDMENT.	Original Signed	10.92
REF.	REVISION	SIGNATURE	DATE

DETAILS OF HALF-ROUND AND U-CHANNELS (TYPE B – WITH EROSION CONTROL MAT APRON)

CEDD

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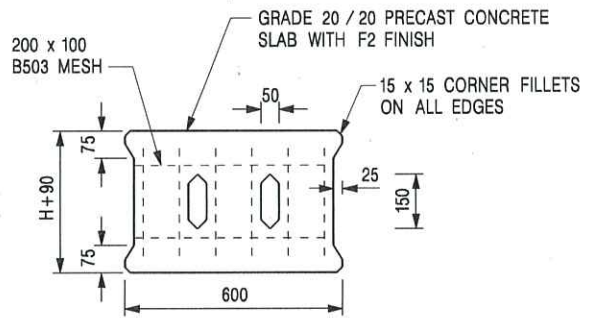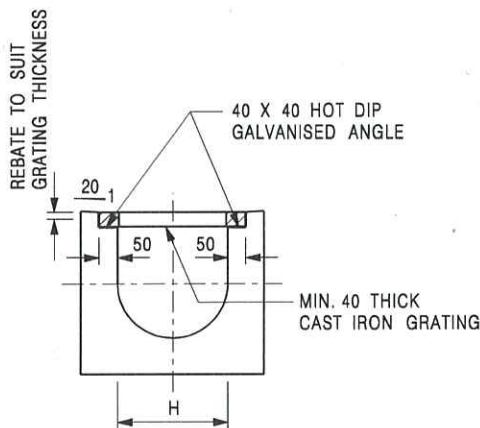
SCALE	DIAGRAMMATIC	DRAWING NO.
DATE	JAN 1991	C2410I

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50
20
1
SLAB REINFORCED WITH
ONE LAYER OF B503 MESH
PLACED CENTRALLY

50 50

H

TYPICAL SECTION

200 x 100
B503 MESH

GRADE 20 / 20 PRECAST CONCRETE
SLAB WITH F2 FINISH

50

15 x 15 CORNER FILLETS
ON ALL EDGES

H + 90

75

75

25

150

600
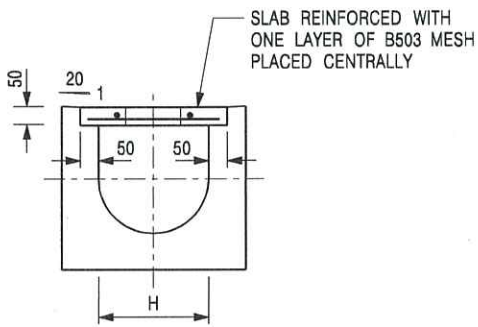
PLAN OF SLAB

U–CHANNELS WITH PRECAST CONCRETE SLABS
(UP TO H OF 525)

REBATE TO SUIT
GRATING THICKNESS

40 X 40 HOT DIP
GALVANISED ANGLE

20
1

50 50

MIN. 40 THICK
CAST IRON GRATING

H

TYPICAL SECTION

WIDTH
H + 90

75 % WIDTH

25

25

L
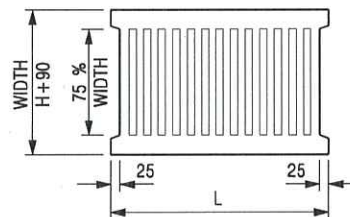
CAST IRON GRATING

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

(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.

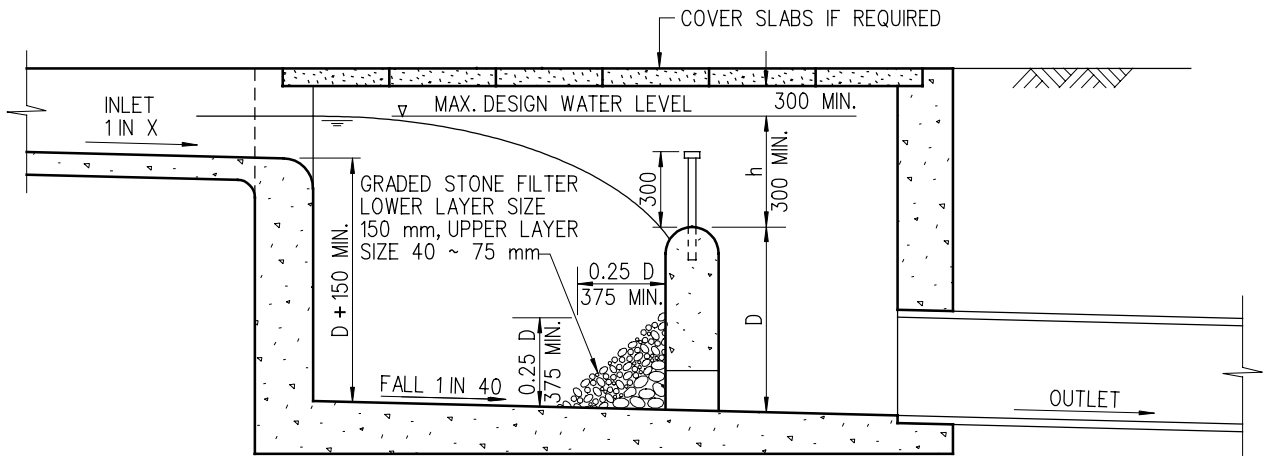| REF.	REVISION	SIGNATURE	DATE
E	NOTES 3 & 4 AMENDED.	Original Signed	12.2014
D	NOTE 4 ADDED.	Original Signed	06.2008
C	MINOR AMENDMENT. NOTE 3 ADDED.	Original Signed	12.2005
B	NAME OF DEPARTMENT AMENDED.	Original Signed	01.2005
A	CAST IRON GRATING AMENDED.	Original Signed	12.2002

COVER SLAB AND CAST IRON GRATING FOR CHANNELS

CEDD

**CIVIL ENGINEERING AND
DEVELOPMENT DEPARTMENT**

SCALE	1 : 20	DRAWING NO.
DATE	JAN 1991	C2412E

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LONGITUDINAL SECTION

- COVER SLABS IF REQUIRED
- MAX. DESIGN WATER LEVEL
- 300 MIN.
- INLET 1 IN X
- GRADED STONE FILTER LOWER LAYER SIZE 150 mm, UPPER LAYER SIZE 40 ~ 75 mm
- $0.25\ D$ / 375 MIN.
- $0.25\ D$ / 375 MIN.
- D + 150 MIN.
- FALL 1 IN 40
- 300
- h
- 300 MIN.
- D
- OUTLET

PLAN

- L
- 750 MIN.
- A
- B
- W
- A

SECTION A-A

- M.S. FLAT BAR 25 x 16
- M.S. BARS DIA. 16 AT 100 c/c
- HOLES DIA. 150
- 1 IN 40
- W
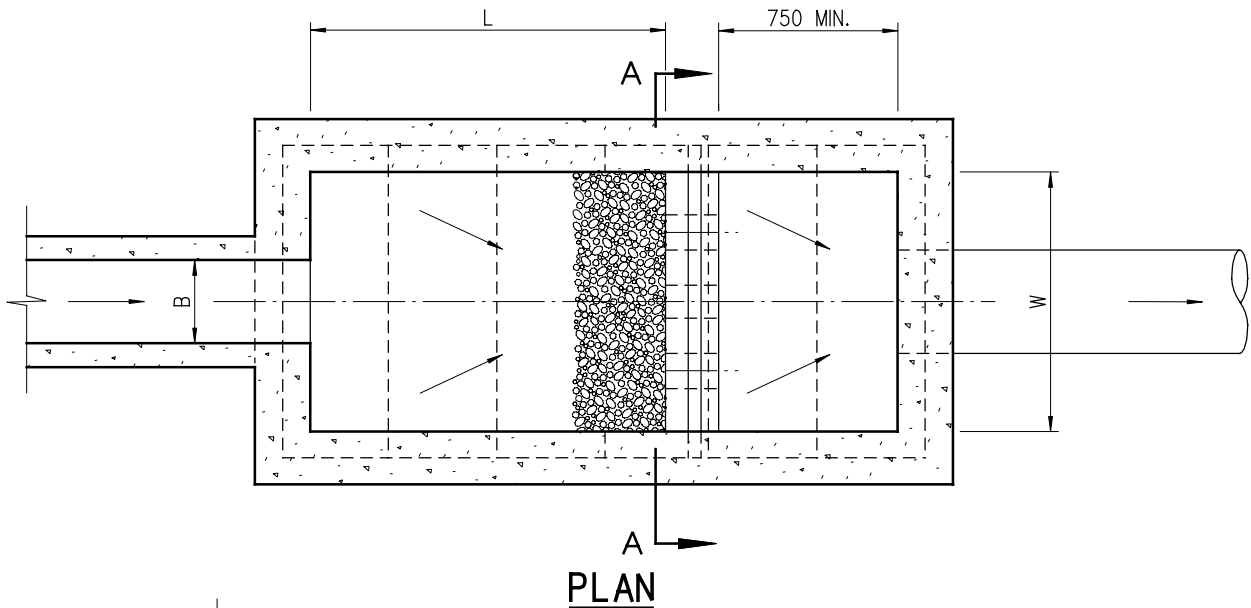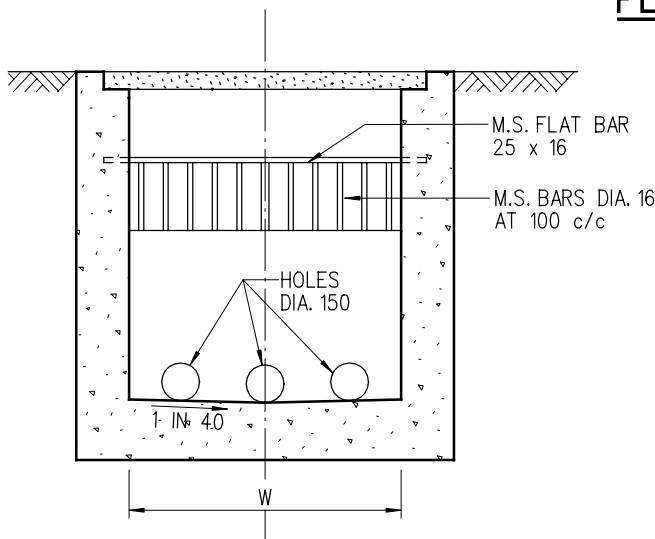
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.

2. NORMALLY FOR DRAINS OF 900 mm DIA. AND BELOW. FOR BIGGER DRAINS AND STEEP TERRAIN, SAND TRAP SHOULD BE SPECIALLY DESIGNED.

3. SIZE
   DEPTH : $D \not< 750$
   WIDTH : $W \geqslant 3B$
   LENGTH : $4.8 D^{0.67}\ h^{0.5}\ X^{-0.5} \geqslant 4B$

4. GRADED STONE FILTER SHALL BE CRUSHER RUN GRANITE AGGREGATE.

5. CAPACITY D W L TO BE ACCORDING TO SIZE AND NATURE OF CATCHMENT, PROVIDING DETENTION TIME NOT LESS THAN 5 MINUTES FOR MAX. DESIGN FLOW OF INLET.

B	REDRAWN BY CAD	ORIGINAL SIGNED	8.8.2001
A	GENERAL REVIEW	ORIGINAL SIGNED	2.2.2001
REV.	DESCRIPTION	SIGNATURE	DATE

DRAINAGE SERVICES DEPARTMENT

SAND TRAP

REFERENCE	DRAWING No.
SCALE DIAGRAMMATIC	DS 1025B
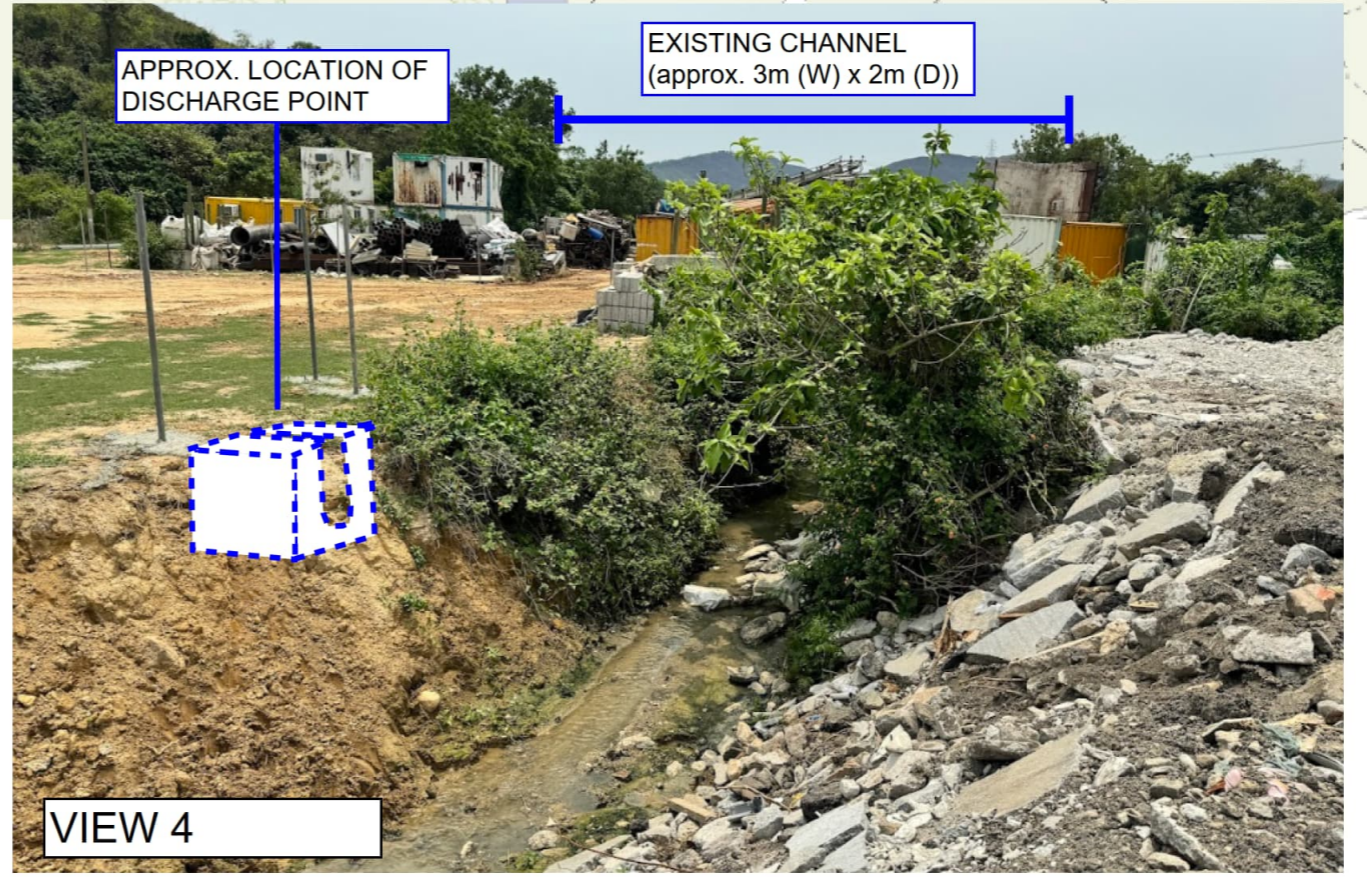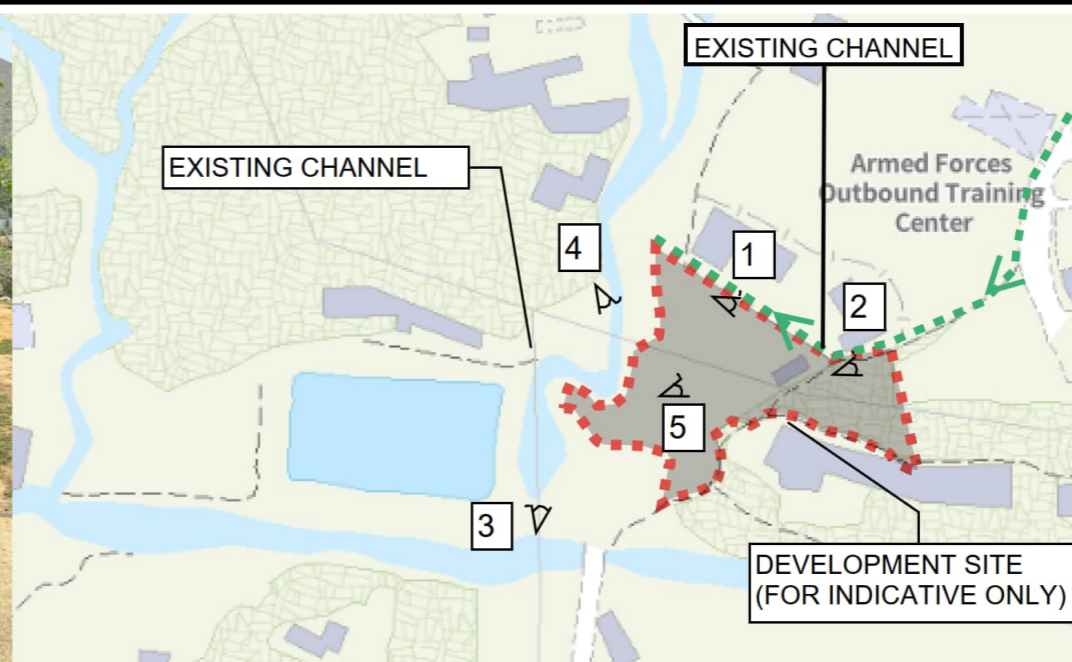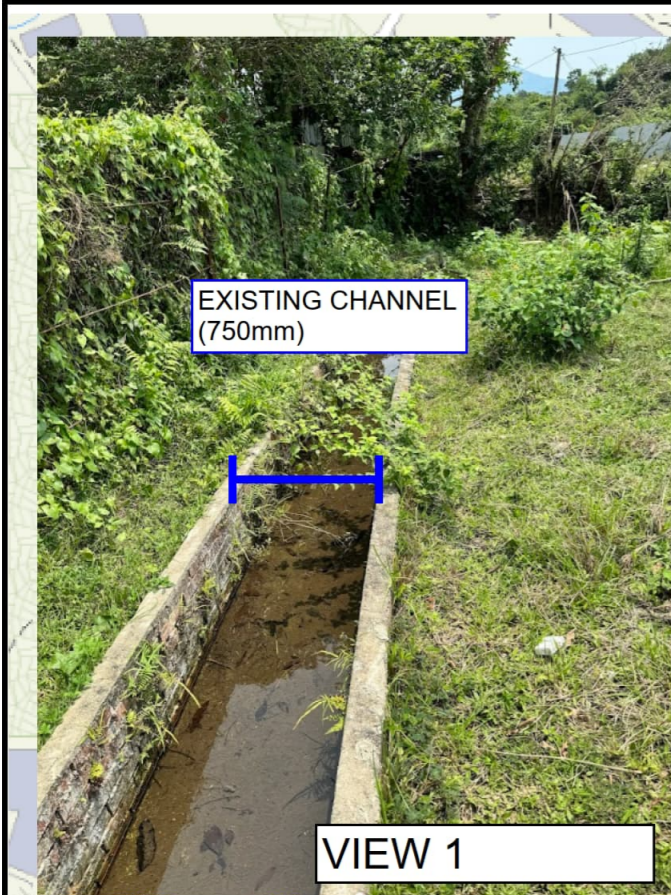
EXISTING CHANNEL (750mm)

VIEW 1

EXISTING CHANNEL

VIEW 2

EXISTING CHANNEL

EXISTING CHANNEL

Armed Forces Outbound Training Center

4

1

2

5

3

DEVELOPMENT SITE (FOR INDICATIVE ONLY)

VIEW 5

EXISTING CHANNEL (approx. 3m (W) x 2m (D))

VIEW 3

APPROX. LOCATION OF DISCHARGE POINT

EXISTING CHANNEL (approx. 3m (W) x 2m (D))

VIEW 4

PROJECT:
Proposed Temporary Warehouse (Excluding Dangerous Goods Godown) with Ancillary Facilities for a Period of 3 Years and Associated Filling of Land and Pond in "Agriculture" Zone, Lot 1434 (part) in D.D. 107, Kam Tin, Yuen Long, New Territories

Photos Record of Surroundings

Appendix D

PROJECT:
Proposed Temporary Warehouse (Excluding Dangerous Goods Godown) with Ancillary Facilities for a Period of 3 Years and Associated Filling of Land and Pond in "Agriculture" Zone, Lot 1434 (part) in D.D. 107, Kam Tin, Yuen Long, New Territories
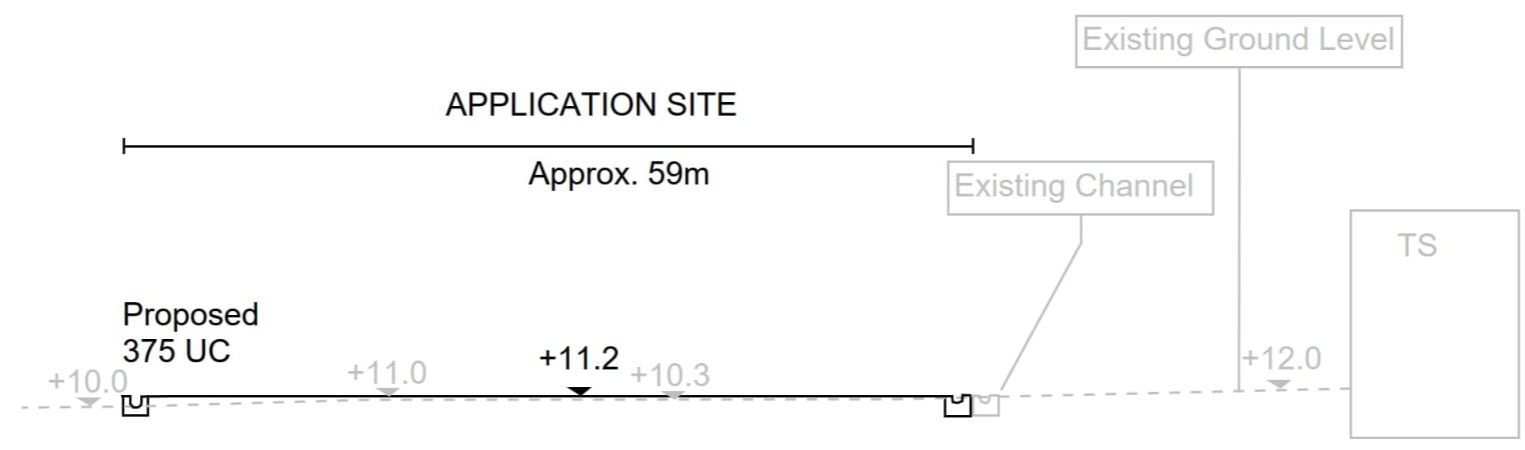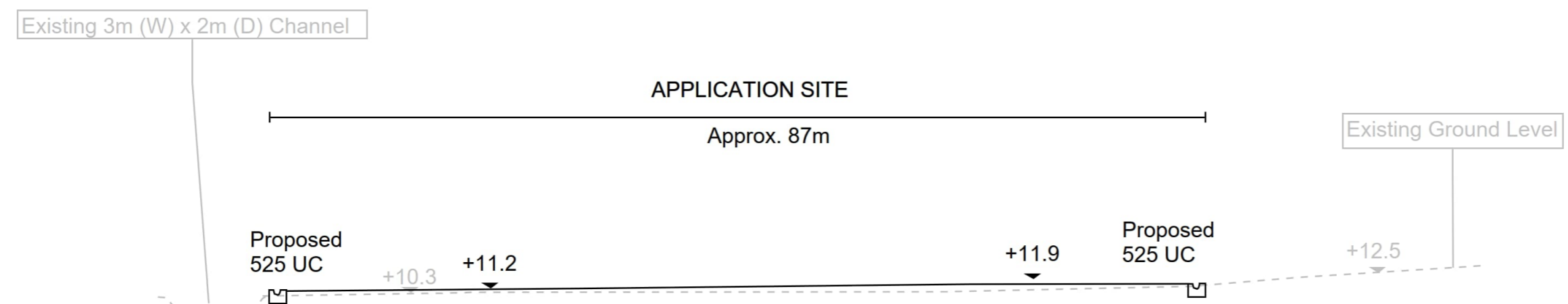
PLAN

APPLICATION SITE

Approx. 59m

Existing Ground Level

Existing Channel

TS

Proposed 375 UC

+10.0   +11.0   +11.2 +10.3   +12.0

SECTION 1
NTS

Existing 3m (W) x 2m (D) Channel

APPLICATION SITE

Approx. 87m

Existing Ground Level

Proposed 525 UC

+10.3   +11.2   +11.9   Proposed 525 UC   +12.5

SECTION 2
NTS

SECTIONS

Appendix E

Appendix F — Checking of Existing 3m (W) x 2m (D) Channel
[Assume width of channel is 2m for Assessment Purpose]

Runoff Estimation

Runoff Estimation		1 in	10	years
Design Return Period		1 in	10	years
Paved Area	5070 + 530101 x 0.25 =		137,595	(m2)
Unpaved Area	2972 + 530101 x 0.75 =		400,548	(m2)
Total Equivalent Area	137595 x 0.95 + 400548 x 0.35 =		270,907	(m2)
Time of Concentration *			29.30	min
Rainfall Intensity, I **			141	mm/hr
Design Discharge Rate, Q	0.278 x 270907 x 141 / 1000000 =		10.597	m3/s

$$** \quad i = \frac{a}{(t_d + b)^c}$$

U Channel

U Channel				
Channel Size			2000	(mm)
Gradient		1 in	130	
Velocity			4.91	m/s
Capacity			17.543	m3/s

Utilization   10.597 / 17.543   =   **60.41**   %   OK   (Allowed 10% for siltation)

Time of Concentration for Existing 3m (W) x 2m (D) Channel

Catchment	Flow Distance	Highest Level	Lowest Level	Gradient (per 100m) = (H1-H2)/L x 100	to (min) = $0.14465L/(H^{0.2}A^{0.1})$	tc = to + tf
A	L			H		
(m2)	(m)	(mPD)	(mPD)		(min)	(min)
530101	1446	374	10.2	25.159	29.371	29.371

tc   =   29.371 (min)

+374
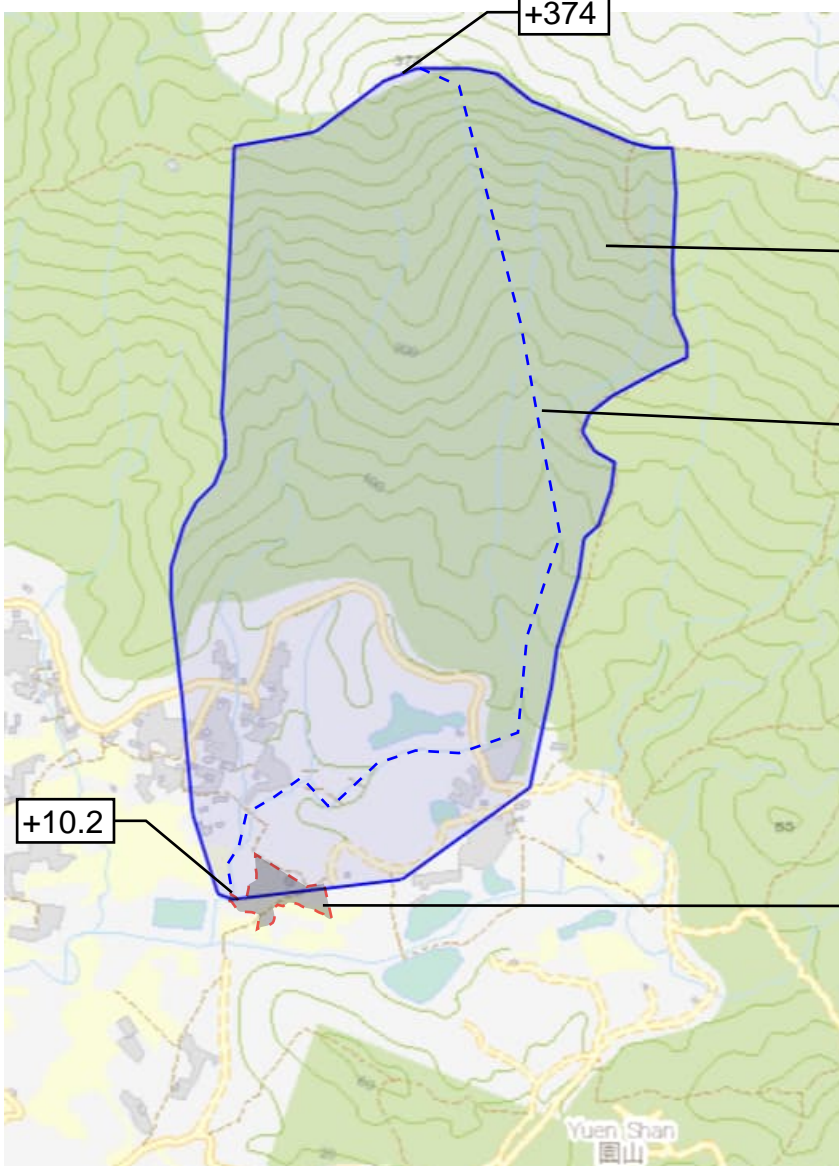
Catchment Area
530,101 m²

Flow Distance
1446 m
(base on stream shown on basemap)

+10.2

DEVELOPMENT SITE
(FOR INDICATIVE ONLY)

Yuen Shan
園山