Our Ref: 32226

Proposed Temporary Warehouse (excl. D.G.G.) with Ancillary Facilities and Associated Filling of Land for a Period of 3 Years in "Agriculture" Zone Various Lots in D.D. 90, Man Kam To, New Territories (Planning Application No. A/NE-MKT/69)

DRAINAGE IMPACT ASSESSMENT

OCTOBER 2026

RESPONSE TO COMMENTS for DSD dated October 2026

DSD Comment	Response to DSD/LD Comments
(a) Appendix A: No enclosure is found.	(a) Noted. The related documents are enclosed in **Appendix A**.
(b) Section 3.3: Appendix C is site photos. Please review.	(b) Noted. Revised.
(c) Section 3.3 & 4.1: Please review the unit of "L/mm".	(c) Noted. Revised.
(d) Appendix D: The factor of "1.281" was not included in the estimation of runoff. Please review.	(d) Referring to the Example of catchment area calculation, the factor of "1.281" is included in the estimation of runoff.
(e) Section 2.2 of Appendix D: According to Section 9.3 of SDM, deposition of sediment in stormwater channels and pipes should be considered in the design. Please review.	(e) Noted. The calculation is revised with 10% reduction in channel capacity in the surface channel calculations.
(f) According to the record, there is existing watercourse within your application site as shown below. The proposed drainage system crosses over the existing watercourse. Please review.	(f) Noted. The site is heavily overgrown with vegetation, and the top-view photo (P9) indicates that the existing watercourse is abandoned. This watercourse will remain abandoned after development, as the proposed drainage system is fully capable of discharging surface runoff from the associated catchment area. Therefore, the proposed drainage system should be adopted
(g) Please show clearly on the layout plan relevant information such as starting points level, catchpits level as well as their invert level etc.	(g) Noted. The layout plan is revised.
(h) Please also provide a series of photos within the application site.	(h) Noted. The site is heavily overgrown with vegetation, making it inaccessible. A top view photo (P9) showing the existing site conditions is enclosed in **Appendix C** for your reference.
(i) Please note that the applicant shall be required to place all the proposed works at least 3m away from the top of the bank of the streamcourse. All the proposed works in the vicinity of the streamcourse should not create any adverse drainage impacts, both during and after construction. Proposed flooding mitigation measures, if necessary, shall be provided at the resources of the applicant to the satisfaction of DSD.	(i) Noted

CONTENTS

Response to Comments for DSD dated October 2026

1. **Introduction**
2. **Existing Drainage and Flooding Condition**
3. **Drainage Impacts of the (PTW)**
4. **Proposed Drainage Impact Mitigation Measures**
5. **Maintenance Consideration**
6. **Conclusion**

APPENDICES

Appendix A Email from Planning Department on 28-July-2026

Appendix B Application Site Layout Plan

Appendix C Site Photos for the PTW and Existing Open Stream Course

Appendix D Hydrological calculation for Surface Runoff (Before and After PTW) & Hydraulic Calculations for Channel & Pipe

FIGURES

1. **Lot Boundary of the Site**
2. **Aerial Photo of Catchments under this Study**
3. **Catchment of the Site**
4. **Conceptual drainage Layout Plan**
5. **Section A-A**
6. **Section B-B**
7. **Details**

1. Introduction

1.1 On 28 July 2026, the applicant Wah Cheong Hon Building Materials Limited received an email from the Planning Department (Planning Application No. A/NE-MKT/69) stating that the Drainage Services Department (DSD) had requested the Applicant to submit a Drainage Impact Assessment (DIA) Report for the Proposed Temporary Warehouse (Excluding Dangerous Goods Godown) (PTW) with Ancillary Facilities and Associated Filling of Land for a period of 3 years in "Agriculture Zone", in various Lots in DD90, Man Kam To, N.T. (the Site). DSD's email is attached in A**ppendix A** for reference.

1.2 Henry Chan & Partners Consultant Engineering Ltd. was commissioned by the Applicant to carry out the DIA for the PTW. This Assessment Report forms part of the planning application document to demonstrate that the PTW is viable in terms of drainage.

1.3 Figure 1 shows the lot boundary of the Site. It lies at Muk Wu near Muk Wu Tsuen and is south-east of the Muk Wu B and C Raw Water Pumping Stations. The Site is accessible from Lin Ma Hang Road via a local access. The site area is about 2756m^2 on plan. The Site will be totally hard paved to provide for the proposed enclosed structures, vehicle parking spaces and a circulation area(Appendix B refers). The Site is bounded by private properties and has only one entrance at the southwest corner.

1.4 This DIA report outlines the existing drainage arrangements within and in the vicinity of the Site. The Report also identifies and quantifies of the potential drainage impacts of the proposed PTW on this Site and proposes appropriate mitigation measures before and after completion. These include the provision of adequate surrounding drainage and maintenance of the existing and proposed drainage systems.

2. Existing Drainage and Flooding Condition

Existing Site Condition

The Site is located in Muk Wu, the south-east of the Muk Wu B and C Raw Water Pumping Station about +7.1mPD. It comprises abandoned farmland overgrown with vegetation. The temporary structure on the western side of the Site is also abandoned and covered with grass. The southern boundary of the Site is surrounded by existing structures with an existing solid fence wall erected along the lot boundary. The existing site conditions are shown in photographs attached in **Appendix C**.

Existing Site Drainage and its Surrounding Area

The Site and its adjacent area have no proper surface discharge drainage system provided. Surface run-off flows towards the southwest of the Site via natural gradients and is collected by an existing 600 mm U-channel. This U-channel continues southwest and connects to an existing open stream course, which ultimately discharges the run-off onto adjacent farmland and to soak away into the soil.

Flood Risk

There has been no flooding reported in this Area. It seems that even without any proper drainages, this area is not prone to flooding, which proves that the existing open stream course has adequate capacity to serve the whole area during rainstorms.

3. Drainage Impacts of the (PTW)

3.1 The Site understudy is a flat piece of land, and its surrounding areas are also flat. There is no proper discharge provided within the Site and its surrounding areas. Based on Aerial Photographs and HK government 1:1000 survey map sheet, the Site and its surrounding areas can be subdivided into 5 Catchments, where all stormwater run-off naturally find its way towards an existing 600mm u-channel and discharge to existing farmland through open stream course (Figure 2 & 3 refers).

3.2 Drainage Impact Assessment

A comparison was made between the Site before and after it was converted to a PTW.

(i) Before

The Site area is approximately 2756m^2 in total, which is abandoned farmland. The whole Site area was covered with grasses (General View attached in **Appendix B**).

(ii) After

It is now converted into PTW, the area will hard paved. It should be noted that a majority of the Site will be occupied by enclosed building structures as shown in **Appendix B**. As the exact layout of the structures are unknown at this stage. These areas have been included as hard pave catchments in this DIA Report i.e Catchment 4 & 5.

3.3 The amount of runoff generated from infiltration before and after the PTW establishment is estimated in **Appendix D**. The estimated total runoff is from all catchments area is 9,755 L/min. and 17,802 L/min. under the return-period of design rainfall intensity is 1 in 50 years for North District Area respectively, due to 2822m^2 lawn area is changed into hard paved area after development. Therefore, the total runoff is increased 8,047 L/mm.

4. Proposed Drainage Impact Mitigation Measures

4.1 As discussed in the previous sections, the potential impacts of the development include an increase in surface runoff. The discharge routing of the surface runoff will remain unchanged; the runoff will continue to discharge into a farmland area of over 2 hectares. Hence, even with an additional runoff of 8,047 L/min, this should not cause any adverse impact on the farmland and adjacent environment. The capacity of the 600mm the existing u-channel was also checked and found to be sufficient to absorb the additional runoff.

Although there is no potential drainage impact on the existing 600mm U-channel and open stream course, a proper drainage discharge system

(comprising peripheral channels and underground cast iron pipes) is proposed for the site. This system will be built along the site boundary to collect, convey, and discharge any flow generated within the site, as well as overland flow intercepted from adjacent lands at equal or higher elevations, as shown in Figures 3 to 5.

Moreover, adequate openings in the hoarding on the eastern and northern sides (facing Catchments 1 and 2) are provided to allow existing overland flow from higher-level adjoining lots to pass through. The design of the peripheral channels and underground cast iron pipes, along with capacity checks for the existing 600mm U-channel, are included in **Appendix C**.

4.2 In addition, peripheral channels in Figure 3 collect surface runoff form Catchment Areas 1, 2, 3, 4, and 5 into the nearest 600mm u-channel via 375mm Dia. cast iron pipe.

4.3 As the cast iron pipe is located outside the Site, the applicant should seek consent from the relevant owner(s) or government department for any drainage work outside the Site before the commencement of the drainage work for underground cast iron pipe.

5. Maintenance Consideration

5.1 The drainage facilities are provided as part of the proposed development inside the PTW and will be maintained by the Applicant after completion.

5.2 Regular maintenance should be undertaken for these new drainage works in accordance with standard practice. It is considered desirable that the drains should be inspected annually before commencement of the wet season (April to October) to ensure these drains can still function properly.

6. Conclusion

6.1 The potential drainage impacts arising from the PTW include an increase in runoff volume due to lawn areas within the site becoming hard-paved. The PTW has neither obstructed overland flow nor adversely affected the existing open stream course and adjacent areas. Since there is no proper existing

drainage system to handle surface runoff from the site and the surrounding catchment area, peripheral channels are proposed to collect and convey this runoff to the nearby open stream course. The proposed works in the vicinity of the watercourses will not create any adverse drainage impacts during or after construction.

6.2 The proposed peripheral channels will enhance the serviceability of the PTW itself. As the Site do not affect the existing catchments, and the existing stream has been servicing the surrounding area well during rainstorm periods, the drainage impact of the PTW on its surroundings is insignificant.

6.3 The Application will be fully responsible for the maintenance of the future peripheral channels and constructed drainage system under this Application.

6.4 As the underground cast iron pipe is located outside the Site, the Applicant should seek consent from the relevant owner(s) or government department for any drainage work outside the Site before the commencement of the drainage work for underground cast iron pipe.

Appendix A

Email from Planning Department on 28-July-2026

Danny Ng

寄件者:	Cheryl Tsz Man TSANG/PLAND <ctmtsang@pland.gov.hk>
寄件日期:	2026年7月28日星期二 15:40
收件者:	Matthew Ng; Louis Tse
副本:	Christian Chim; Danny Ng; Esther Hiu Laam LI/PLAND; Shing Fung CHAIR/PLAND
主旨:	Planning Application No. A/NE-MKT/69 - Departmental Comment from the Drainage Services Department
附件:	Annex I_Layout plan_MKT69.pdf

Dear Matthew/Louis,

I refer to the captioned planning application.

Please find below the comments from the Chief Engineer/Mainland North of Drainage Services Department (DSD) (Contact Person: Mr. Renol TAN, Tel: 3965 8925) for your information.

(i) There is existing watercourse within the application site (the Site). The applicant should submit a Drainage Impact Assessment (DIA) referring to DSD Advice Note No. 1 'Application of the Drainage Impact Assessment Process to Private Sector Projects';

(ii) The DIA shall demonstrate that there would be adequate measures provided at the resources of the applicant to ensure capacity of streamcourse/drainage facilities and flooding susceptibility of the adjoining areas would not be adversely affected by the proposed use and to avoid the Site from being eroded and flooded. The applicant is required to assess whether the downstream for drainage connection would have sufficient capacity to receive the stormwater runoff. Flood mitigation measures proposed in the DIA and any other storm-water drainage facilities should be provided and maintained by the applicant to the satisfaction of her office;

(iii) As the existing streamcourse traversing the Site is crucial to the drainage condition of the area, it should be maintained at all times. The applicant shall be required to place all the proposed works including landfilling works at least 3m away from the top of the banks of existing streamcourse. All the proposed works should not disturb, interfere with or cause damage to existing streamcourse, and all the proposed works in the vicinity of existing streamcourse should not create any adverse drainage impacts, both during and after construction;

(iv) The existing streamcourse will be narrowed by the filling materials if landfilling is carried out for the entire site, rectification and improvement works should be planned to resume the hydraulic performance of the streamcourse. No land filling on site shall be allowed until the flood mitigation measures have been implemented to the satisfaction of DSD;

(v) Photos should be submitted clearly showing the current conditions of the area around the Site, the existing drainage/flowpaths around the Site, the proposed drainage from the Site to the downstream existing watercourse and the existing watercourse at about 20m intervals. The locations of the camera and the direction of each photo should also be indicated on a plan;

(vi) The applicant shall take all precautionary measures to prevent any disturbance, damage and pollution from the development to any parts of the existing drainage facilities and existing watercourse within the Site. In the event of any damage to the existing drainage facilities and watercourse, the applicant shall be held responsible for the cost of all necessary repair works, compensation and any other consequences arising there from;

(vii) The applicant should be reminded to minimise the possible adverse environmental impacts on the existing watercourse in his design and during construction;

(viii) The proposed drainage works, whether within or outside the site boundary, should be constructed and maintained properly by the applicant and rectify the system if it is found to be inadequate or ineffective during operation at his/her own expense;

(ix) For works to be undertaken outside the lot boundary, the applicant should obtain prior consent and agreement from the District Lands Officer/North of Lands Department and/or relevant private lot owners;

(x) The applicant shall allow all time free access for the Government and its agent to conduct site inspection on his/her completed drainage works;

(xi) The applicant and the successive lot owners shall allow connections from the adjacent lots to the completed drainage works on Government Land when so required; and

(xii) The Site is within an area where connection to existing public sewerage networks are available in the vicinity. A copy of the drainage record is at **Annex I**, and the legend of drainage record plans can be referred to https://www.dsd.gov.hk/EN/Files/Legend_BW.pdf. Please note that the information shown on the record drawings are subject to verification on site and no guarantee can be given that this is a complete record. The lot owner should be asked to verify the actual site conditions by sub-surface explorations. Should the applicant choose to connect his proposed drainage systems to DSD's networks, he/she shall furnish her with his/her connection proposals for agreement. After obtaining her agreement, the applicant shall submit a duly completed Form HBP1 ''Application for Technical Audit of Drainage/Water Supply Connection Works carried out by a Member of the Public' with a crossed cheque covering the technical audit fee and a plan showing the details of the proposed drainage connection works to her office for formal application for the required connections. Upon my acceptance of the connection application, the applicant shall carry out the proposed connection works in accordance with DSD Standard Drawings at the resources of the applicant. The connection pipe located downstream of the terminal manhole and outside the lot boundaries shall be handed over to DSD for maintenance after satisfactory technical audit by DSD. The location of the terminal manhole shall be designed and constructed close to the lot boundary as far as practicable.

[See attachment "Annex I_Layout plan_MKT69.pdf"]

If you intend to make response to the comments or provide further information (FI) in support of your application, you are advised to submit the FI **on or before 14.8.2026 (Friday)** to allow sufficient time for the concerned department to comment on your FI.

Best regards,
Cheryl TSANG
Town Planner/North 2,
Sha Tin, Tai Po and North District Planning Office,
Planning Department
Tel: 2158 6229

VG3867
FTH1032372
FMH1069913
CL 8.94
A1 7.85-200
X1 7.77-200
138
ST
TS
FTH1032380
VG3868
FMH1069909
CL 8.98
X1 8.29-200
E
FTH1032378
200
FWD1104994
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FWD1104993
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FWD1104991
N2
FMH1069910
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FTH1032379
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CL 9.18
A1 8.08-200
X1 7.96-200
FMH1069912
CL 9.03
A1 7.92-200
X1 7.86-200
8.1
7.2
PO
7.3
7.0
N2
TS
E
FMH1069914
CL 7.38
X1 6.05-200
V8701
7.2
7.4
7.2
7.4
7.2
泥路 Track
N2
N2
6.7
E
E
N

Legend refers to Legend Sheet - "Legend for Drainage Record Plan"

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Part print of sheet
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Scale 1:500
Print date 28/07/2026

Mainland North Division

Drainage Services Department
Government of the Hong Kong Special Administrative Region

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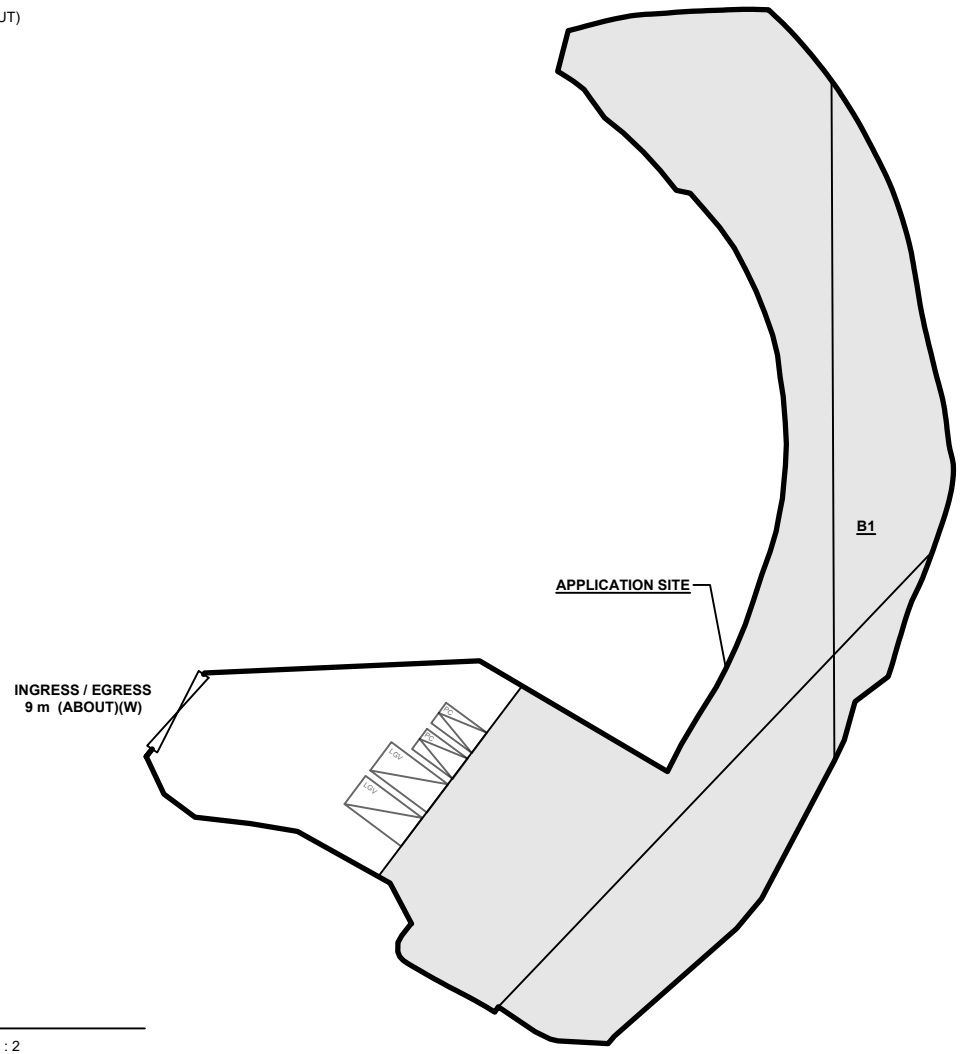
Appendix B

Application Site Layout Plan

DEVELOPMENT PARAMETERS

APPLICATION SITE AREA	: 2,756 m^2	(ABOUT)
COVERED AREA	: 2,258 m^2	(ABOUT)
UNCOVERED AREA	: 498 m^2	(ABOUT)
PLOT RATIO	: 0.82	(ABOUT)
SITE COVERAGE	: 82 %	(ABOUT)
NO. OF STRUCTURE	: 1	
DOMESTIC GFA	: N/A	
NON-DOMESTIC GFA	: 2,258 m^2	(ABOUT)
TOTAL GFA	: 2,258 m^2	(ABOUT)
BUILDING HEIGHT	: 8 m	(ABOUT)
NO. OF STOREY	: 1	

STRUCTURE	USE	COVERED AREA	GROSS FLOOR AREA	BUILDING HEIGHT
B1	WAREHOUSE (EXCL. D.G.G.), OFFICE AND METER ROOM	2,258 m^2 (ABOUT)	2,258 m^2 (ABOUT)	8 m (ABOUT)(1-STOREY)
	TOTAL	**2,258 m^2 (ABOUT)**	**2,258 m^2 (ABOUT)**	



PARKING PROVISIONS

NO. OF PRIVATE CAR PARKING SPACE	: 2
DIMENSION OF PARKING SPACE	: 5 m (L) x 2.5 m (W)

LOADING / UNLOADING PROVISIONS

NO. OF L/UL SPACE FOR LIGHT GOODS VEHICLE	: 2
DIMENSION OF L/UL SPACE	: 7 m (L) x 3.5 m (W)

**SITE BOUNDARY FOR IDENTIFICATION PURPOSE ONLY.*

LEGEND

- APPLICATION SITE
- STRUCTURE (ENCLOSED)
- PARKING SPACE (PRIVATE CAR)
- L/UL SPACE (LIGHT GOODS VEHICLE)
- INGRESS / EGRESS

NORTH
W E
S

PLANNING CONSULTANT
R-RICHES PLANNING LIMITED

PROJECT
PROPOSED TEMPORARY WAREHOUSE (EXCLUDING DANGEROUS GOODS GODOWN) AND ASSOCIATED FILLING OF LAND FOR A PERIOD OF 3 YEARS

SITE LOCATION
VARIOUS LOTS IN D.D. 90, MAN KAM TO, NEW TERRITORIES

SCALE
1 : 750 @ A4

DRAWN BY	DATE
MN	19.5.2026
CHECKED BY	DATE
APPROVED BY	DATE

DWG. TITLE
LAYOUT PLAN

DWG NO.	VER.
PLAN 8	001

Appendix C

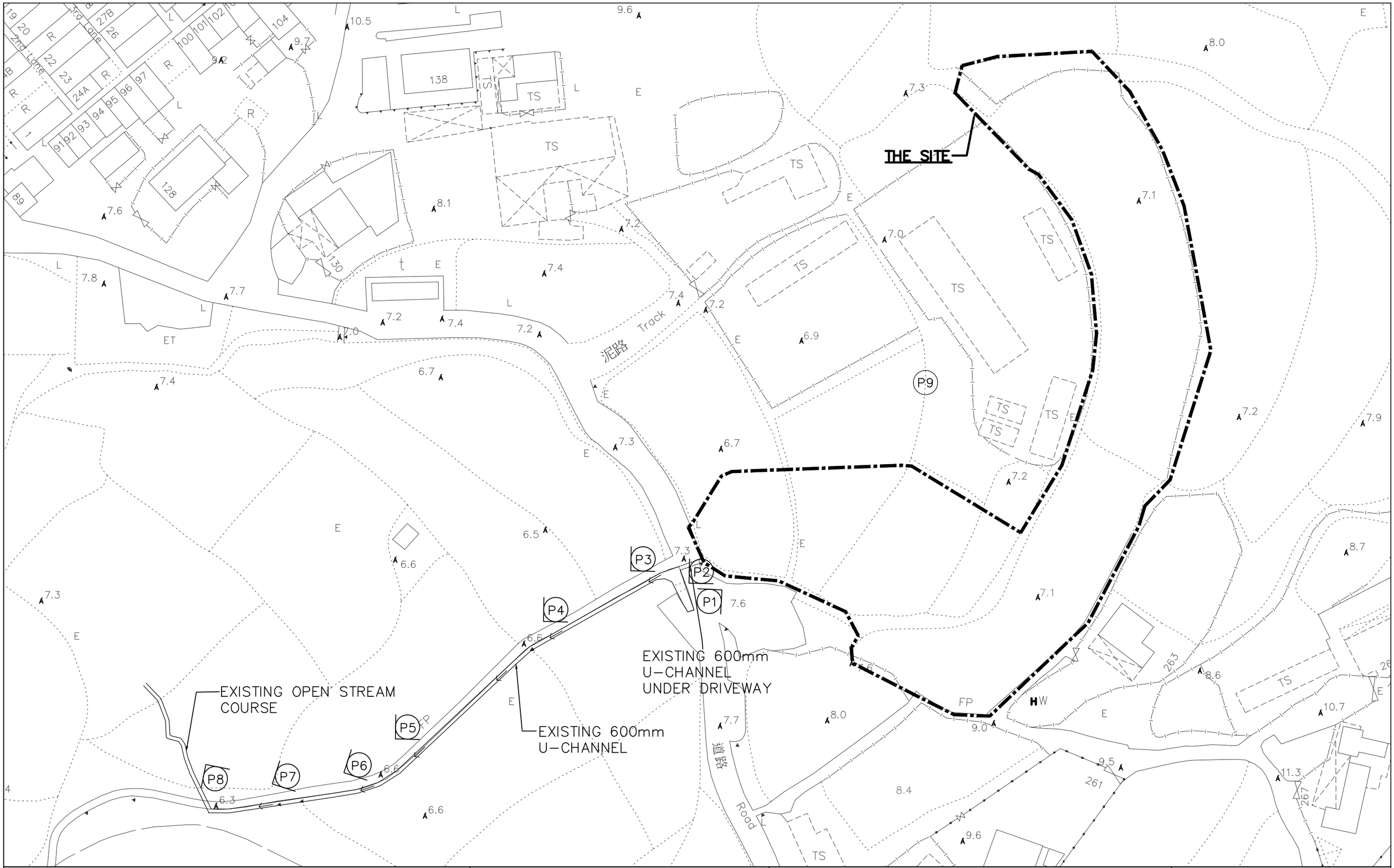
Site Photos for the PTW, Existing 600mm u-channel and Existing Open Stream Course



LEGEND:

- THE SITE
- CATCHMENT AREA BOUNDARY
- 1 CATCHMENT AREA MARK

GENERAL TOP VIEW



LEGEND:

- SITE BOUNDARY
- 6.6 EXISTING LEVEL
- (P1) PHOTOGRAPHIC VIEW

VARIOUS LOTS IN D.D. 90,
MAN KAM TO,
NEW TERRITORIES

TITLE

PHOTO INDEX PLAN

FIGURE NO

SCALE 1 : 600



P1



P2



P3



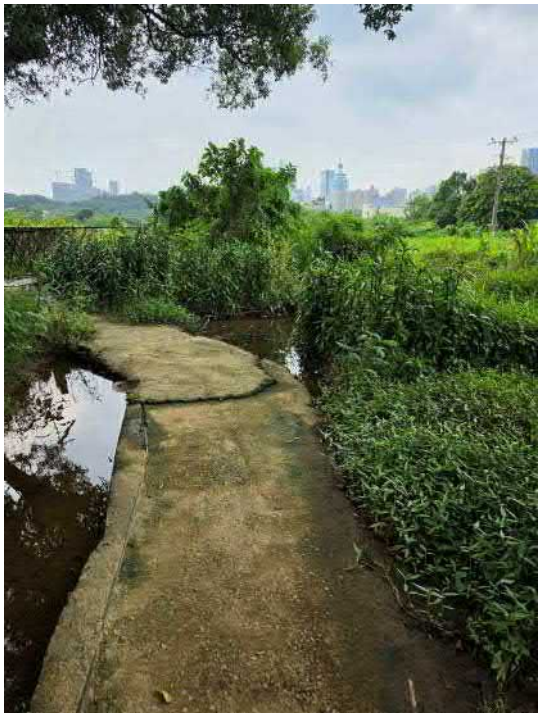
P4



P5



P6



P7



P8



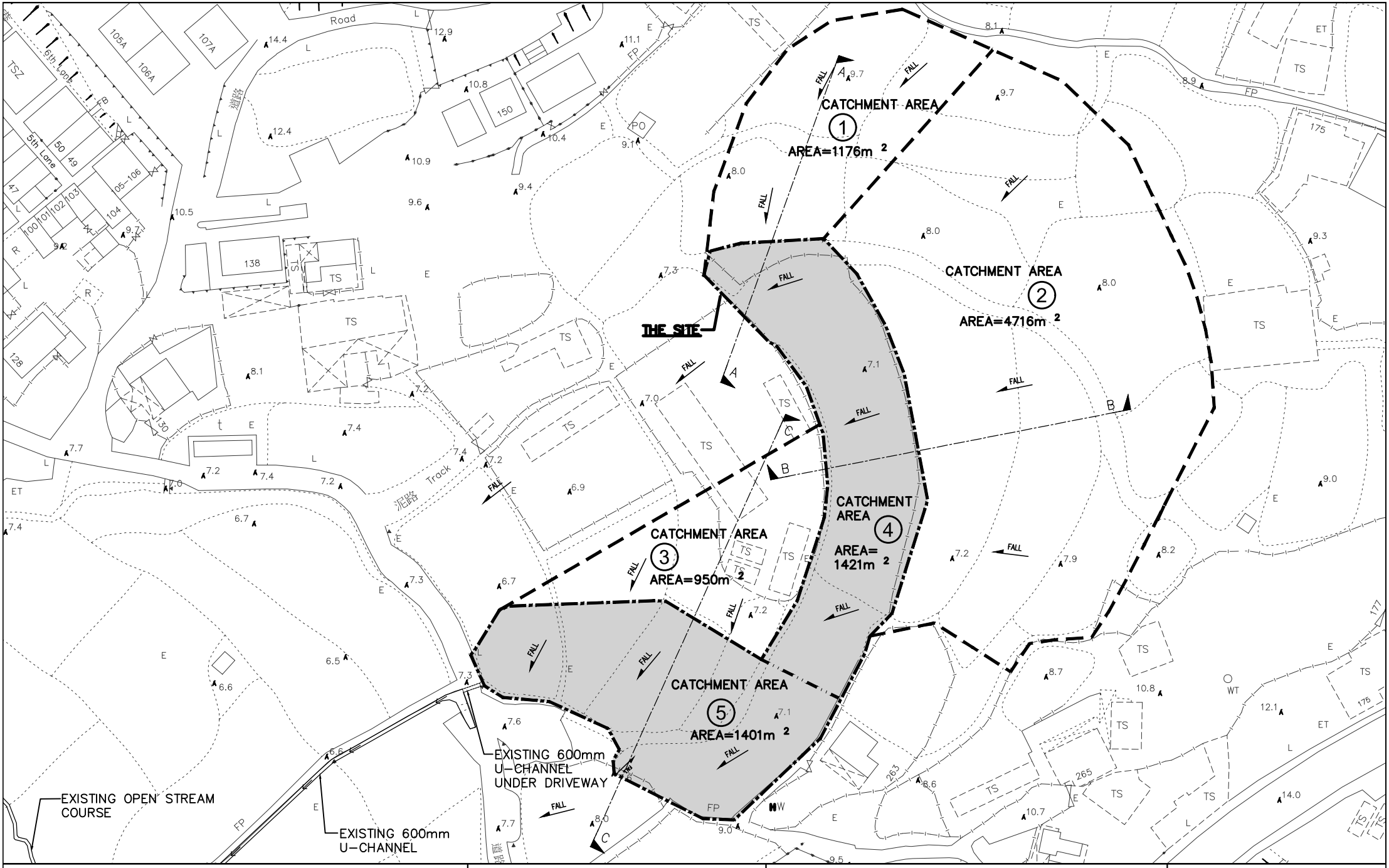
P9

Appendix D

Hydrological calculation for Surface Runoff

(Before and After PTW) &

Hydraulic Calculations for Channel & Pipe



LEGEND:

- CATCHMENT AREA BOUNDARY
- FALL — FLOW DIRECTION
- THE SITE
- (1) CATCHMENT AREA MARK

VARIOUS LOTS IN D.D. 90,
MAN KAM TO,
NEW TERRITORIES

TITLE

CATCHMENT OF THE SITE

FIGURE NO 3

SCALE 1 : 600

Estimation of Runoff: (With Proposed Drainage for the Application Site)

Catchment Location	Catchment Area, A m^2	Longest Distance, L (m)	Average Fall, H_{avg} (m per 100)	Time of Concentration, t (min)	Runoff Coefficient, K	Rainfall Increase due to Climate Change	Rainfall Intensity, i (mm/hr)	Maximum runoff, Q (litre/min)
1	1176	68.7	4.19	3.68	0.25	1.281	302.24	1481
2	4176	134.4	2.21	7.21	0.25	1.281	257.73	4485
3	950	100.5	0.15	10.64	0.25	1.281	231.24	915
4	1421	89.6	0.13	9.40	0.95	1.281	239.63	5391
5	1401	80.6	0.16	8.16	0.95	1.281	249.30	5530
								17802

	Shortest Distance (I)	H1	H2
Catchment 1	62	9.7	7.1
Catchment 2	117.7	9.7	7.1
Catchment 3	64.7	7.2	7.1
Catchment 4	75.6	7.1	7.0
Catchment 5	62.7	7.1	7.0

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

Legend:

A = area of catchment (m^2)

L = distance in metres measured on the line of natural flow between the design section and that point of the catchment from which water would take the longest time to reach the design section

H_{avg} = average fall (m per 100m) from the summit of catchment to the point of design

t_d = time of concentration (min)

$= 0.14465 \times \frac{L}{H^{0.2} \times A^{0.1}}$

i = design mean intensity of rainfall (mm/hr) which is dependent upon the time of concentration
The return-period of design rainfall intensity is 1 in 50 years using algebraic equation in Section 4.3.3

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

Return Period, 50 Years

Storm Constants(North District Area): a = 474.6 b = 2.90 c = 0.371

K = runoff coefficient
= 0.25 for lawn area & 0.95 for hard paved area

Q = maximum runoff (litre/min)

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

Example : Catchment Area A,

t

0.14465 x (68.7 / 4.19^0.2 x 1176^0.1) = 3.68 min.

i

474.6 / (3.68 + 2.90)^0.371 = 235.92 min/hr

235.92 x **1.281** = 302.24 min/hr

Q

302.24 x 1176 x 0.25 x 60 / 3600 = 1481 L/min.

2.2 Estimation of Surface Channel Capacity:

Catchments Considered	Qtotal (litre/min)	Gradient	Size	Type	Velocity (m/s)		Capacity (litre/min)			
1	1481	1 in 200	225	U	1.05	<4.0 O.K.	3183	######	2864.7	O.K.
1+4	6872	1 in 200	375	U	1.47	<4.0 O.K.	12429	######	11186.1	O.K.
2+5	10015	1 in 200	375	U	1.47	<4.0 O.K.	12429	######	11186.1	O.K.
1+4+3	7788	1 in 200	375	U	1.47	<4.0 O.K.	12429	######	11186.1	O.K.
1+2+3+4+5	17802	1 in 77	400	pipe	2.81		21176	######	19058.4	O.K.
Check of existing 600mm u-channel	17802	1 in 100	600	U	2.85	<4.0 O.K.	61559	######	55403.1	O.K.

Legends:

n = Manning's coefficien (Table 13)
= 0.012

R = Hydraulic Radius

$= \frac{A}{P}$

V = Manning 's flow velocity equatio (m/sec)

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

Q = Manning 's flow capacity equatio (litre/min)
= V x A x 1000 x 60 x 0.9 (Deposition of sediment)

Capacity of pipe = velocity x area of pipe x 60 x1000 (litre/min)

ColebrookWhite equation (Table 12) $\bar{V} = -\sqrt{32gRS_f}\log\left[\frac{k_s}{14.8R} + \frac{1.255\nu}{R\sqrt{32gRS_f}}\right]$

g = 9.81 m/s^2
R = 400 / 4 = 100 mm
S_f = 1 / 77 = 0.013 mm
k_s = 0.03 mm
ν = 1.0 x 10^{-6} m2/s

Estimation of Runoff: (Existing Condition)

Catchment Location	Catchment Area, A m^2	Longest Distance, L (m)	Average Fall, H_{avg} (m per 100)	Time of Concentration, t (min)	Runoff Coefficient, K	Rainfall Increase due to Climate Change	Rainfall Intensity, i (mm/hr)	Maximum runoff, Q (litre/min)
1	1176	68.7	4.19	3.68	0.25	1.281	302.24	1481
2	4176	134.4	2.21	7.21	0.25	1.281	257.73	4485
3	950	100.5	0.15	10.64	0.25	1.281	231.24	915
4	1421	89.6	0.13	9.40	0.25	1.281	239.63	1419
5	1401	80.6	0.16	8.16	0.25	1.281	249.30	1455
								9755

	ortest Distance	H1	H2
Catchment 1	62	9.7	7.1
Catchment 2	117.7	9.7	7.1
Catchment 3	64.7	7.2	7.1
Catchment 4	75.6	7.1	7.0
Catchment 5	62.7	7.1	7.0

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

Legend:

A = area of catchment (m^2)

L = distance in metres measured on the line of natural flow between the design section and that point of the catchment from which water would take the longest time to reach the design section

H_{avg} = average fall (m per 100m) from the summit of catchment to the point of design

t_d = time of concentration (min)

$$= 0.14465 \times \frac{L}{H^{0.2} \times A^{0.1}}$$

i = design mean intensity of rainfall (mm/hr) which is dependent upon the time of concentration

The return-period of design rainfall intensity is 1 in 50 years using algebraic equation in Section 4.3.3

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

Return Period, 50 Years

Storm Constants(North District Area): a = 474.6 b = 2.90 c = 0.371

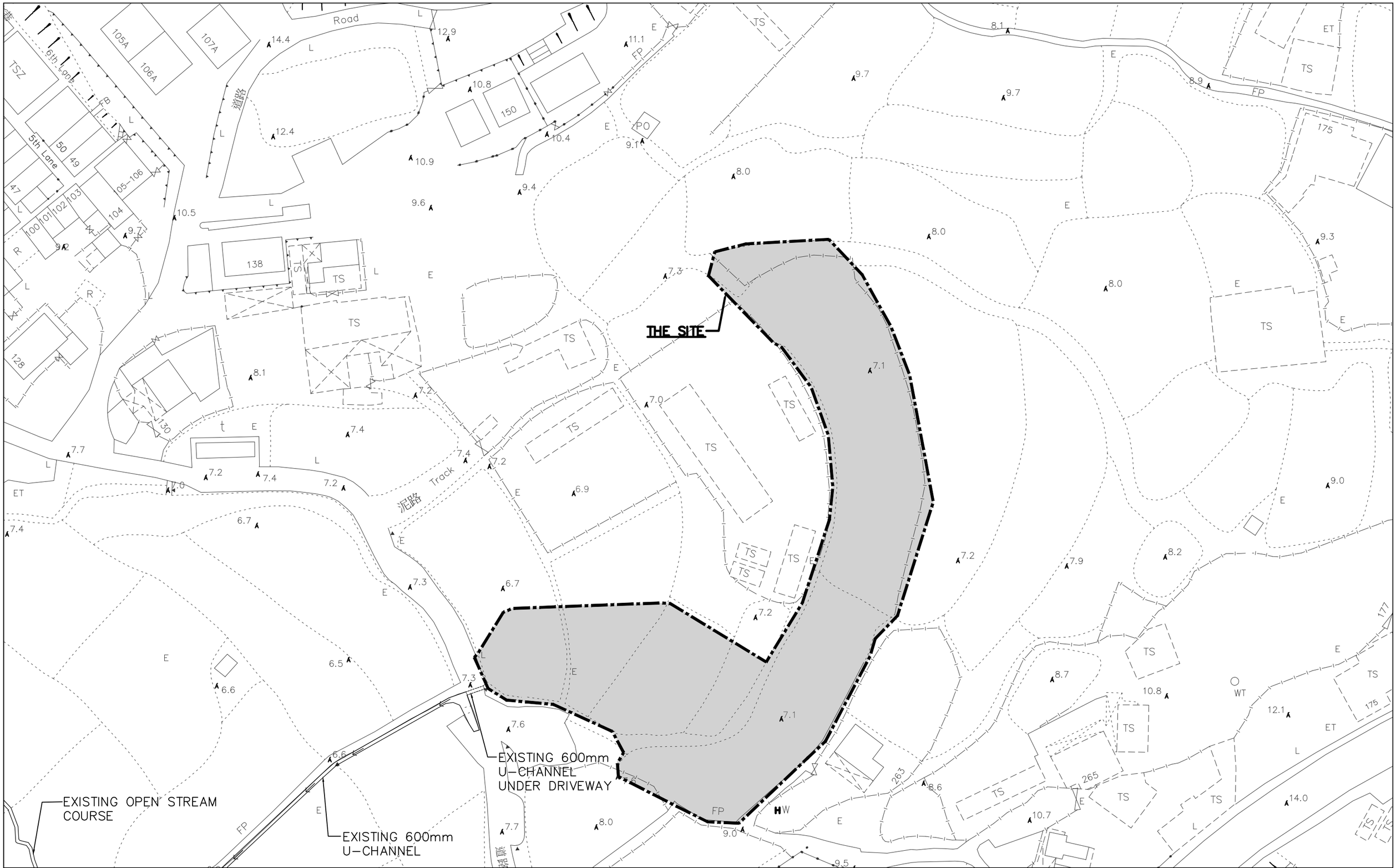
K = runoff coefficient

= 0.25 for lawn area

Q = maximum runoff (litre/min)

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

Figure



LEGEND:

SITE BOUNDARY

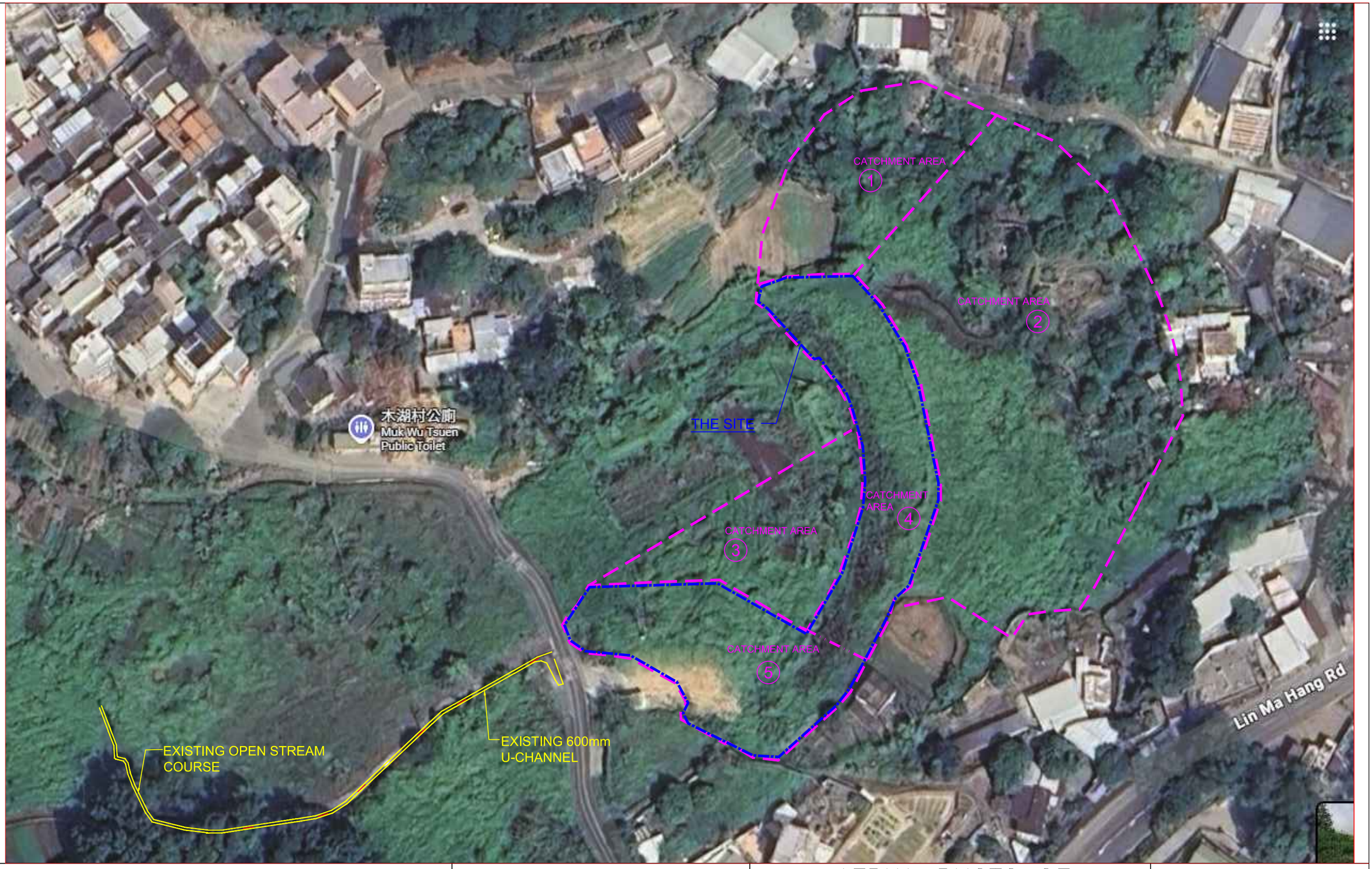
VARIOUS LOTS IN D.D. 90,
MAN KAM TO,
NEW TERRITORIES

TITLE

SITE LOCATION PLAN

FIGURE NO 1

SCALE 1 : 600



LEGEND:

CATCHMENT AREA BOUNDARY

THE SITE

1 CATCHMENT AREA MARK

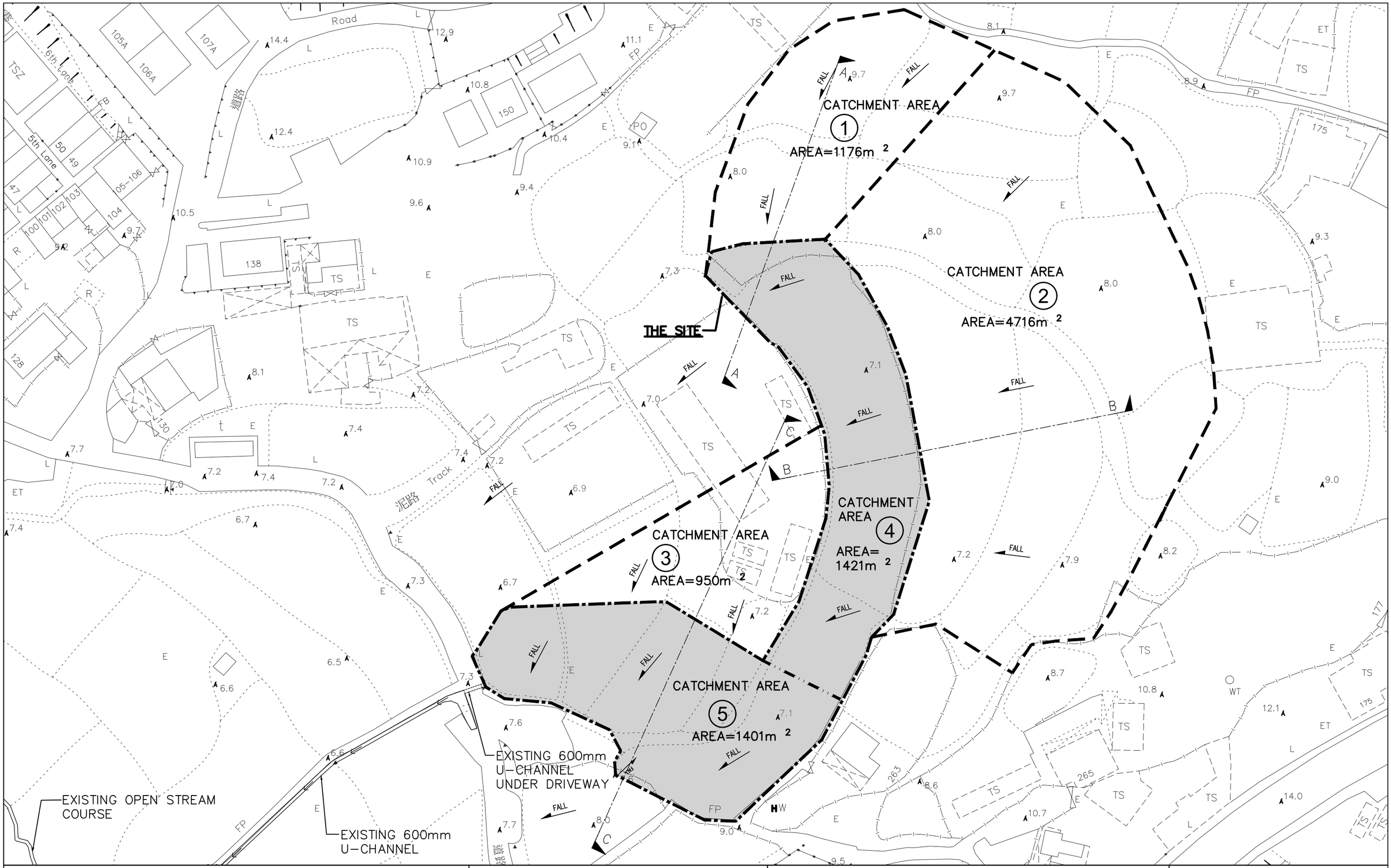
VARIOUS LOTS IN D.D. 90,
MAN KAM TO,
NEW TERRITORIES

TITLE

AERIAL PHOTO OF CATCHMENTS UNDER THIS STUDY

FIGURE NO 2

SCALE 1 : 500



LEGEND:

- CATCHMENT AREA BOUNDARY
- (1) CATCHMENT AREA MARK
- FALL — FLOW DIRECTION
- THE SITE

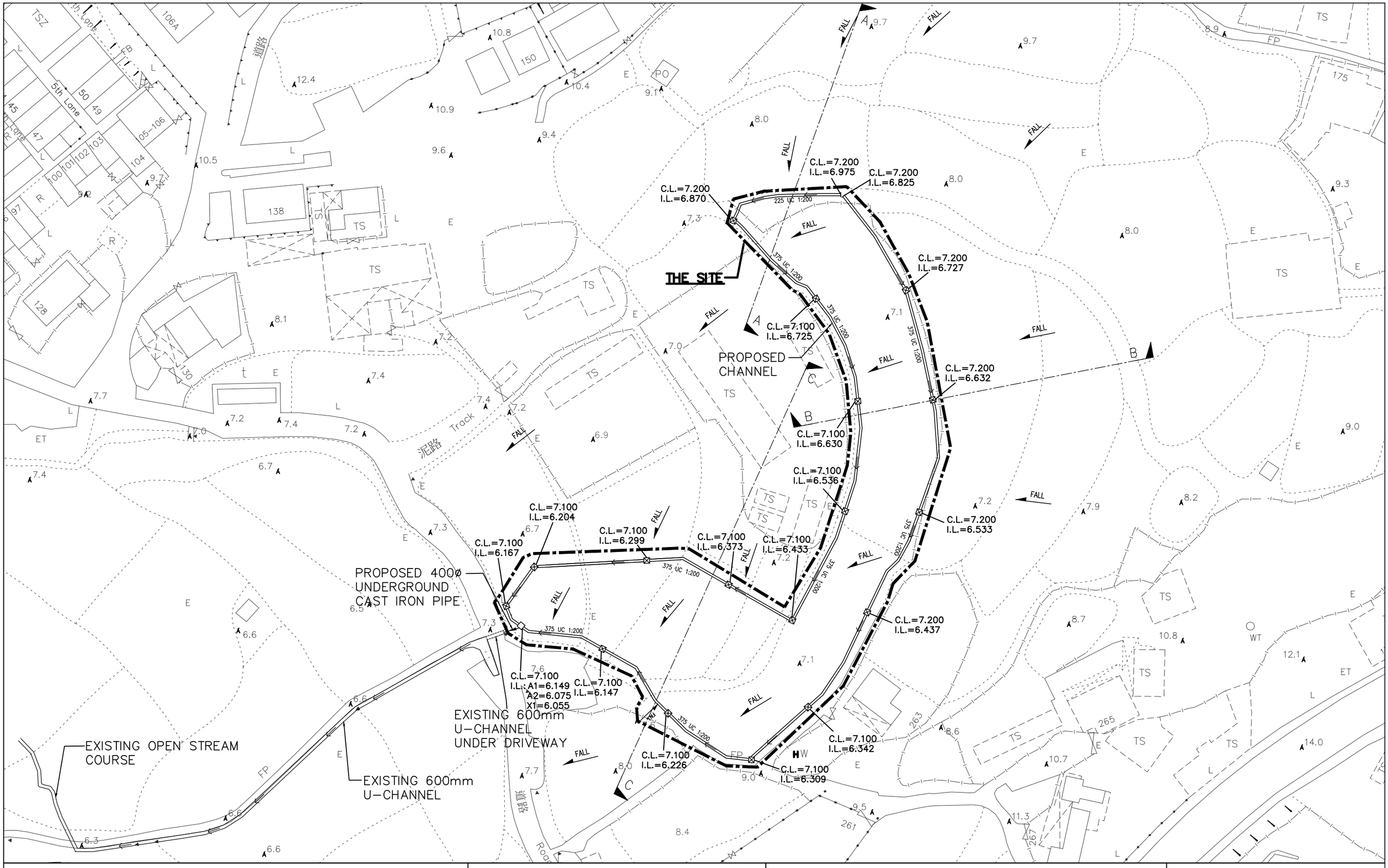
VARIOUS LOTS IN D.D. 90,
MAN KAM TO,
NEW TERRITORIES

TITLE

CATCHMENT OF THE SITE

FIGURE NO 3

SCALE 1 : 600



LEGEND:

- SITE BOUNDARY
- PROPOSED 325 UC
- PROPOSED 350ø PIPE
- PROPOSED CATCHPIT
- PROPOSED MANHOLE
- FALL — FLOW DIRECTION
- 6.6 EXISTING LEVEL

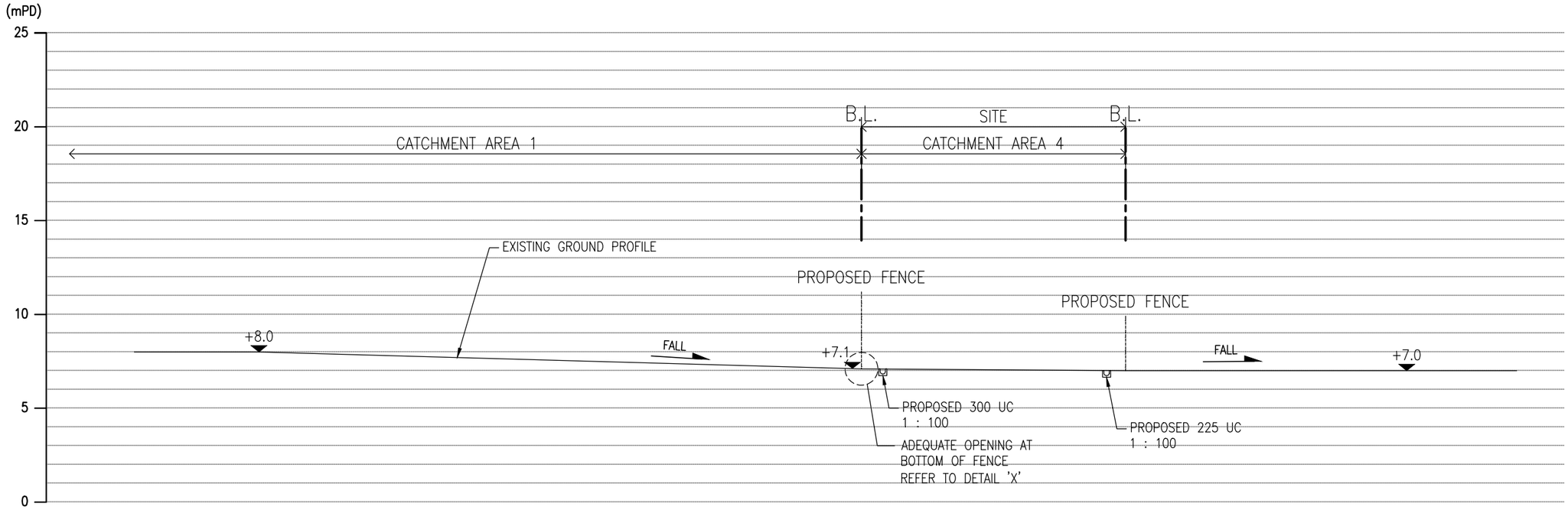
VARIOUS LOTS IN D.D. 90,
MAN KAM TO,
NEW TERRITORIES

TITLE

CONCEPTUAL DRAINAGE PLAN

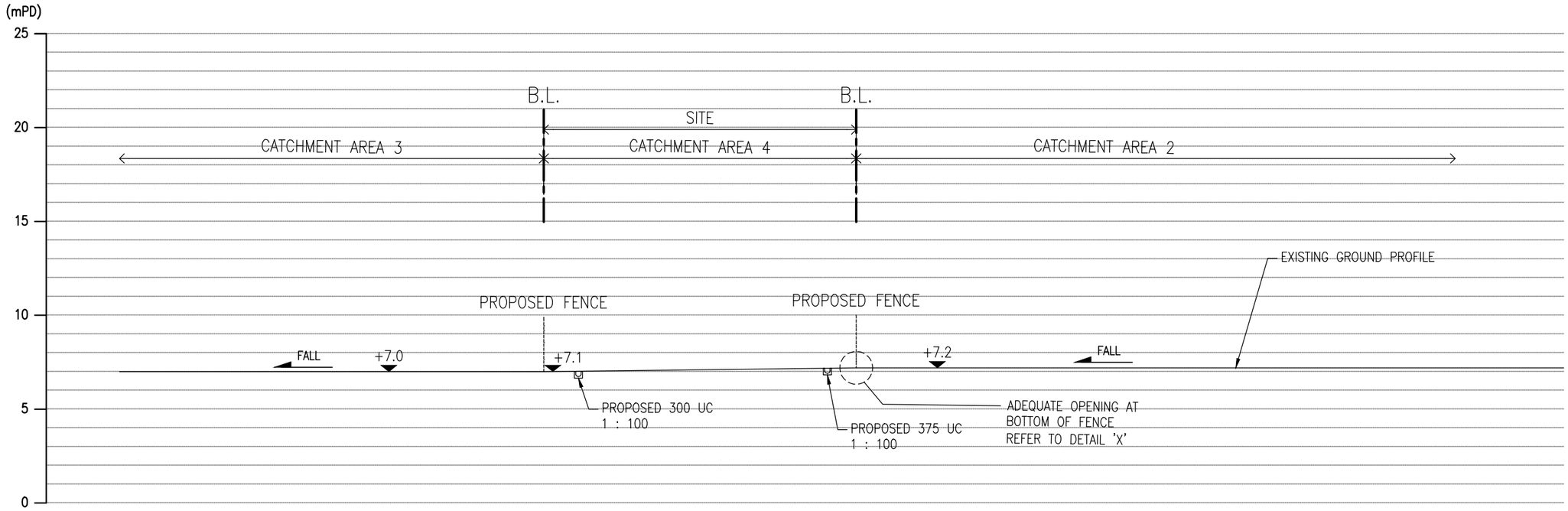
FIGURE NO 4

SCALE 1 : 600



SECTION A–A

1 : 250



SECTION B–B

1 : 250

LEGEND:

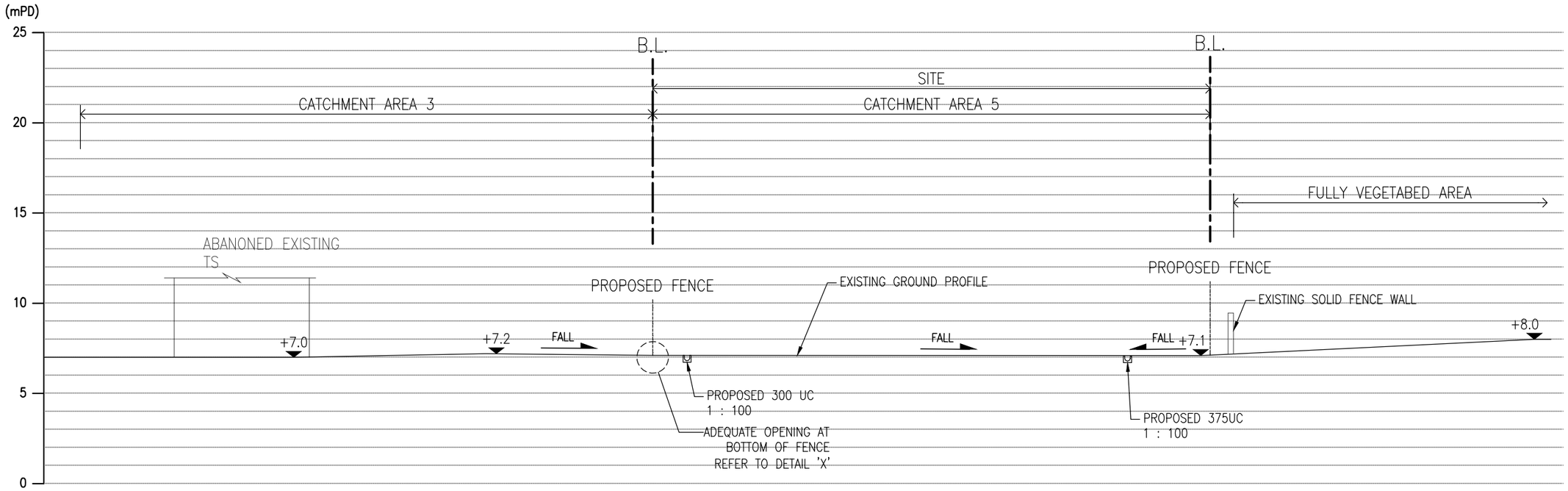
VARIOUS LOTS IN D.D. 90,
MAN KAM TO,
NEW TERRITORIES

TITLE

SECTION A–A
SECTION B–B

FIGURE NO 5

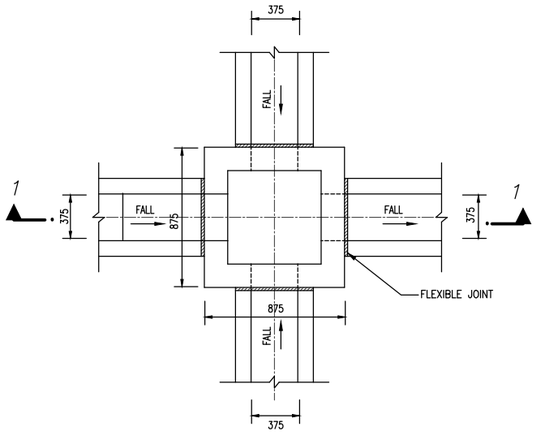
SCALE 1 : 250

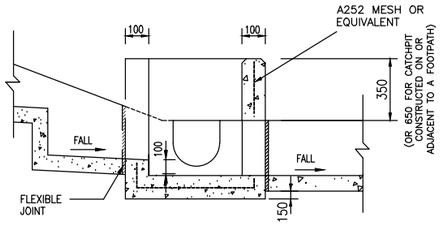


SECTION C–C

1 : 250

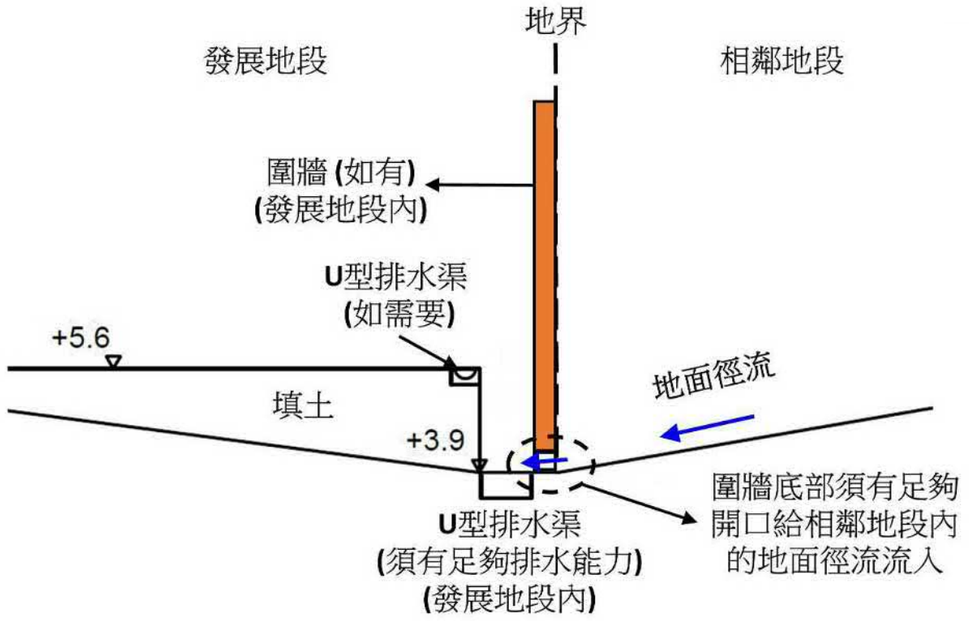
LEGEND:	VARIOUS LOTS IN D.D. 90, MAN KAM TO, NEW TERRITORIES	TITLE SECTION C–C	FIGURE NO 6 SCALE 1 : 250



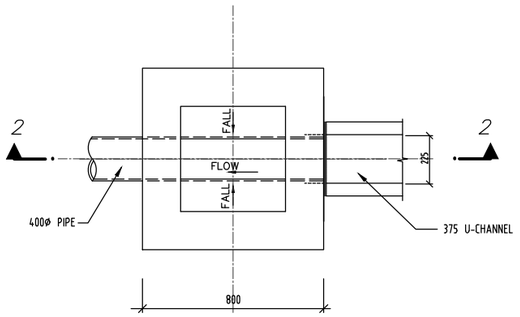


SECTION 1–1

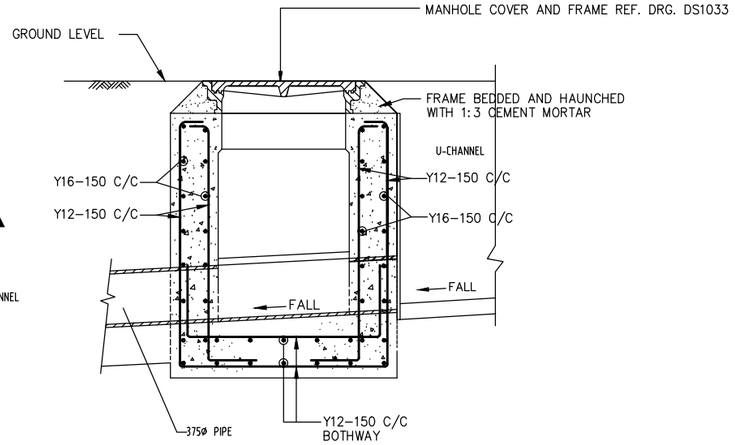
TYPICAL DETAILS OF CATCHPIT CP1 TO CP6



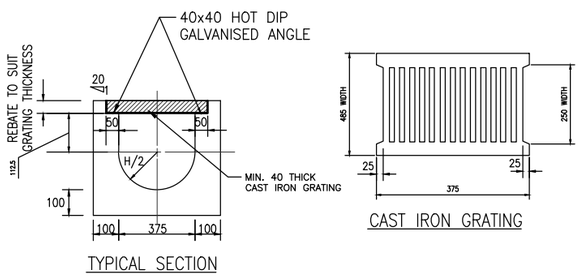
DETAILS FOR HOARDING OPENINGS AT BOTTOM
(DETAILS 'X')



PLAN FOR MANHOLE "MH1"



SECTION 2 – 2



TYPICAL SECTION

CAST IRON GRATING

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

U CHANNELS WITH CAST IRON GRATING
UP TO H OF 525 U CHANNEL

VARIOUS LOTS IN D.D. 90,
MAN KAM TO,
NEW TERRITORIES

TITLE
DETAILS

FIGURE NO 7

SCALE N.T.S.