
Appendix II

Drainage Proposal

**Application at Lots 267 (Part) and
268 (Part) in D.D. 84, Lots 481 S.A
(Part) and 481 RP (Part) in D.D. 87,
and adjoining Government Land,
Ping Che, Ta Kwu Ling, New
Territories**

Drainage Proposal

First Submission

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22 Hung To Road,
Kwun Tong, Kowloon
Hong Kong**

May 2024

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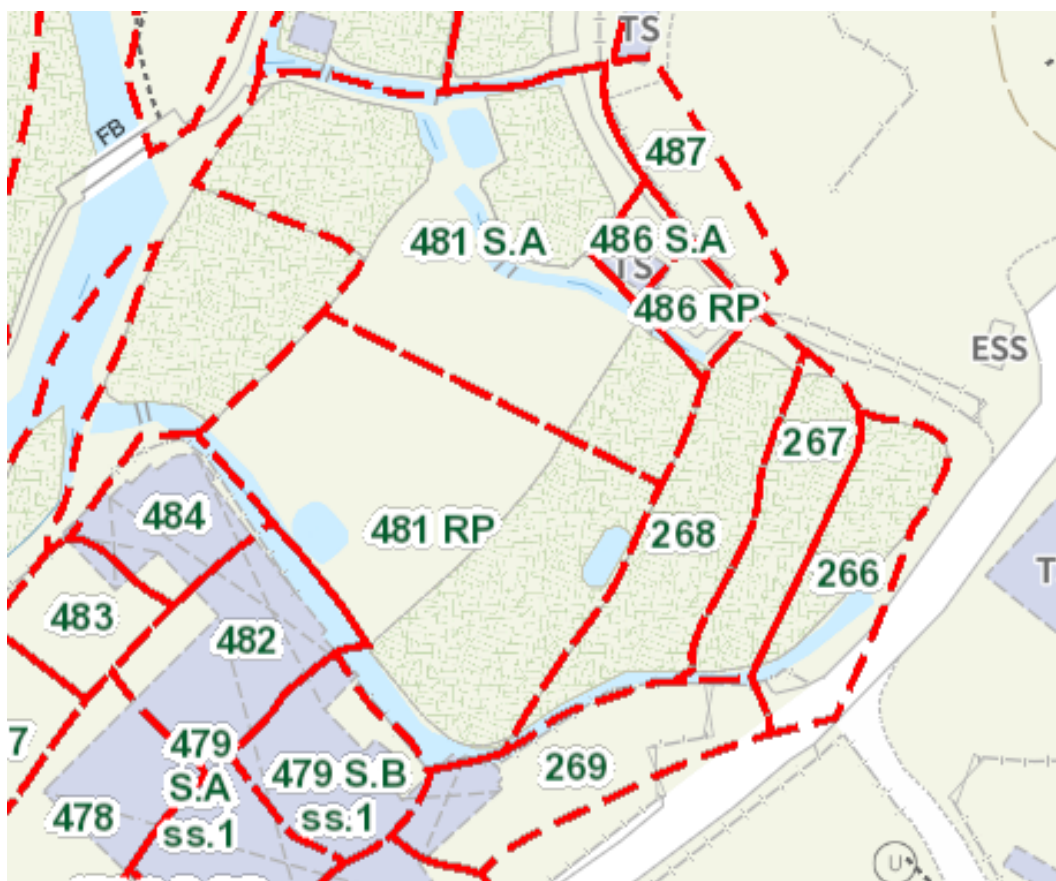
1. INTRODUCTION

The drainage proposal is under the application of Section 16 Planning Application. The proposed uses of the subject lots are a temporary logistic center for a period of 3 years and filling of land and pond at Lots 267 (Part) and 268 (Part) in D.D. 84, Lots 481 S.A (Part) and 481 RP (Part) in D.D. 87, and adjoining Government Land, Ping Che, Ta Kwu Ling, New Territories.

Wings & Associates Consulting Engineers Limited is appointed to be the consultant to prepare for the Drainage Proposal in support of the construction works for the proposed application and address the Drainage Services Department's general comments.

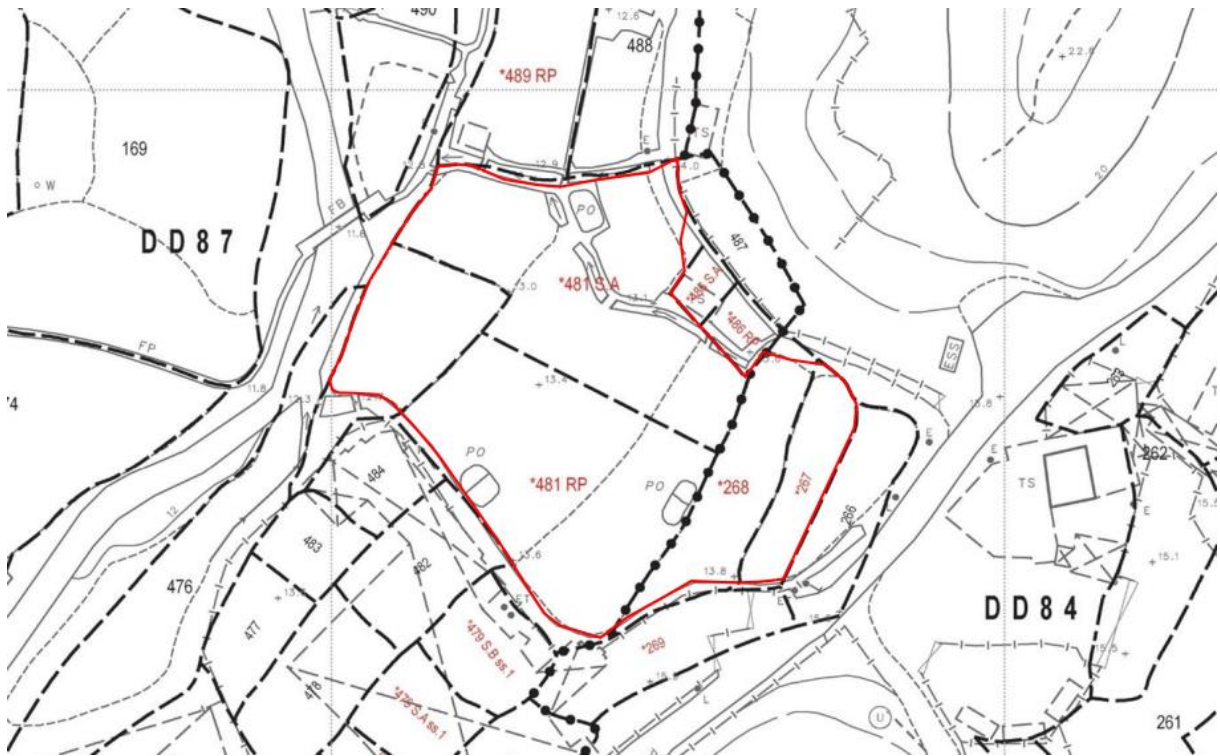
2. SITE DESCRIPTION

- 2.1 The general views of the application area can be referred to the figures below. The combined parts of the lot cover an area of about 6500m².

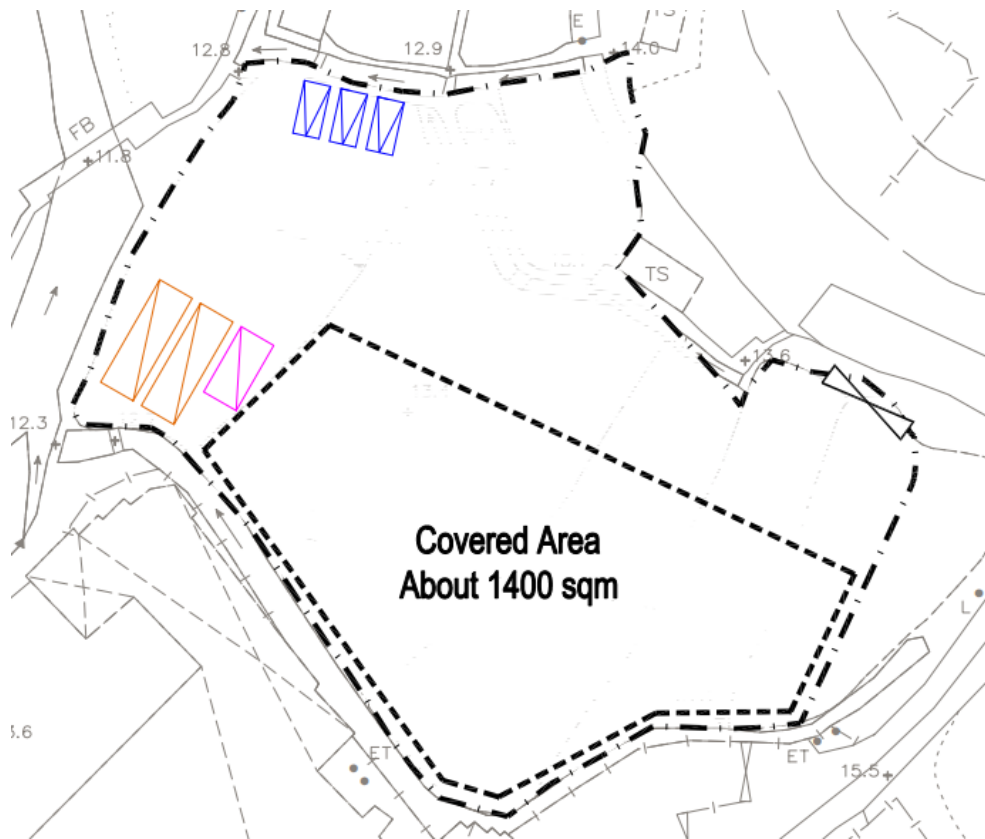


Lot information of the Subject Site

Lots 267 (Part) and 268 (Part) in D.D. 84, Lots 481 S.A (Part) and 481 RP (Part) in D.D. 87, and adjoining Government Land, Ping Che, Ta Kwu Ling, New Territories *Drainage Proposal*



Boundary of the Subject Site



Layout Plan with different Parking Provisions of the Subject Site



Location and Condition of the Existing Discharge Point (River) at West Side



Location and Condition of the Existing U-Channels at West Side (outside the site boundary)

Lots 267 (Part) and 268 (Part) in D.D. 84, Lots 481 S.A (Part) and 481 RP (Part) in D.D. 87, and adjoining Government Land, Ping Che, Ta Kwu Ling, New Territories *Drainage Proposal*



Photo Record for the Existing Fencing with openings at bottom surrounding the site



Photo Record of the Existing Drainage System inside the Subject Lots

2.2 The existing ground level of the subject site ranges between +12.17mPD to +14.47 mPD.

With reference to the Stormwater Drainage Manual, the mean higher high-water level for Tai Po Kau is +2.02mPD.

Water level information from Hong Kong Observatory shows the existing highest water level is recorded as +5.03mCD (+5.176mPD) with tide gauge established in Tai Po Kau.

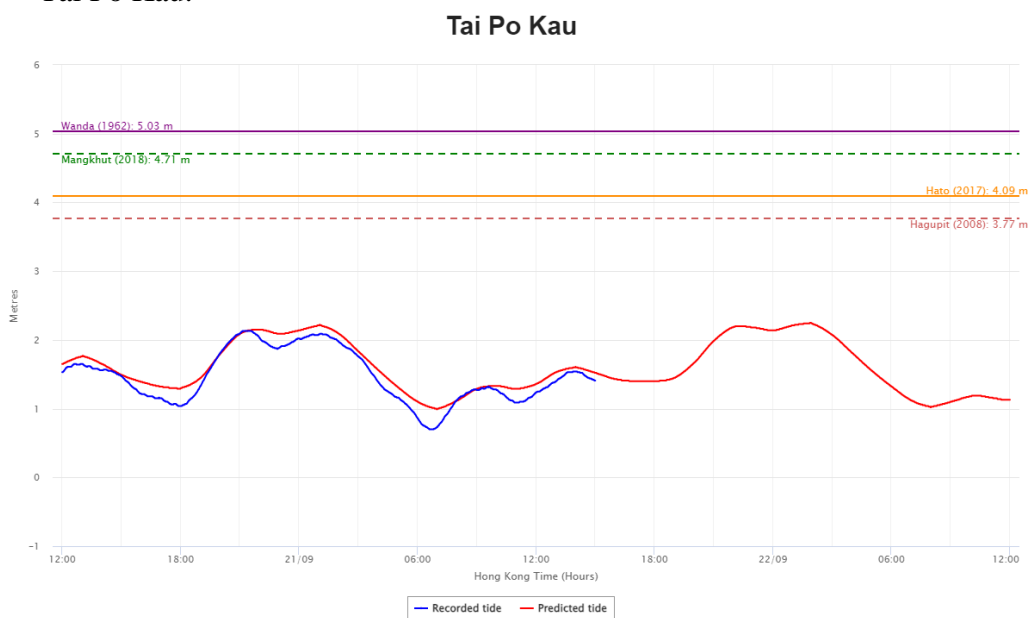


Table 8 – Design Extreme Sea Levels (in mPD)

Return Period (Years)	North Point/ Quarry Bay (1954-2017)	Tai Po Kau (1962-2017)	Tsim Bei Tsui (1974-2017)	Tai O (1985-2017)
2	2.73	2.91	3.07	2.87
5	2.94	3.20	3.31	3.16
10	3.09	3.45	3.51	3.36
20	3.24	3.73	3.74	3.57
50	3.45	4.19	4.09	3.84
100	3.63	4.60	4.40	4.06
200	3.81	5.10	4.77	4.28

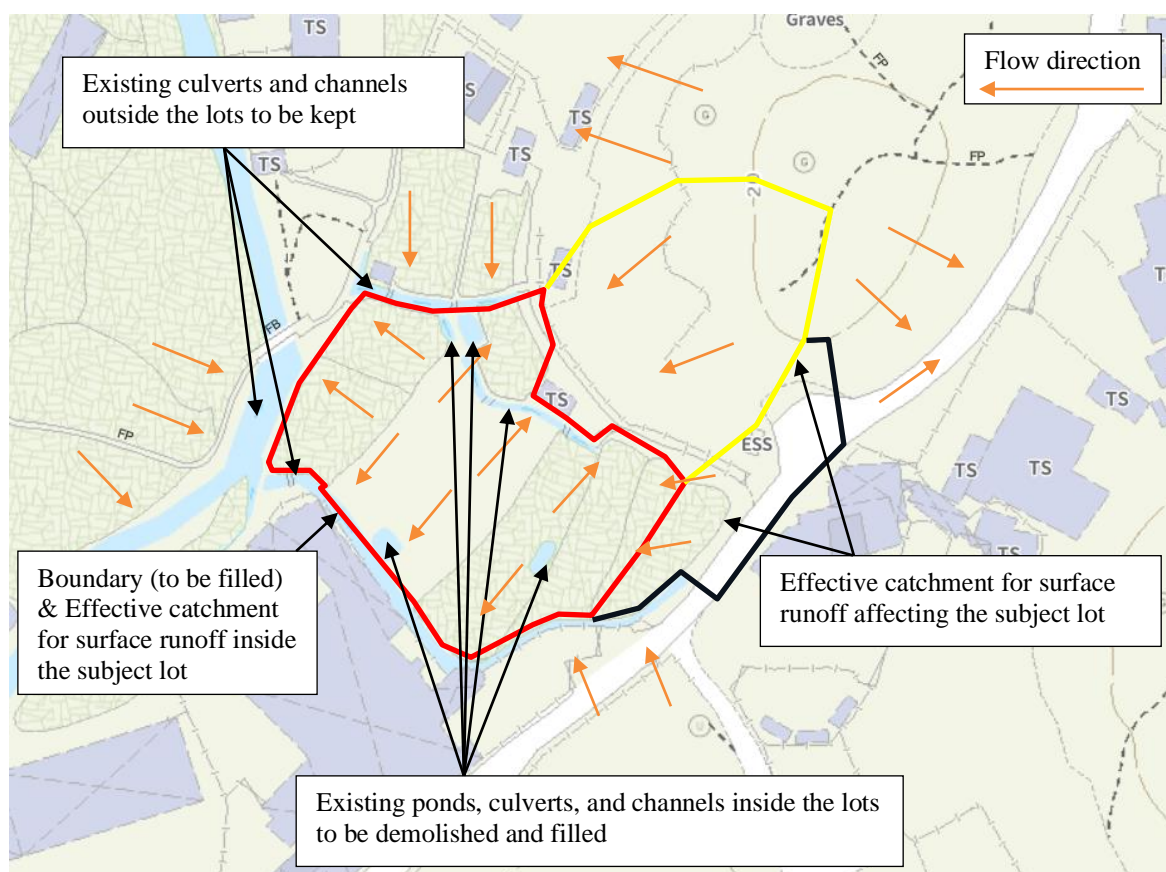
Table 9 – Mean Higher High Water (MHHW) Levels (in mPD)

North Point/ Quarry Bay (1962-2017)	Tai Po Kau (1981-2017)	Tsim Bei Tsui (1983-2017)	Tai O (1985-2017)
2.01	2.02	2.32	2.13

3. DRAINAGE SYSTEM OF THE SITE FOR STORWATER DISCHARGE

3.1 Referring to the location plan and the existing ground level, the considered effective catchment area of surface runoff includes: the area of the subject lots and the adjacent area with higher cover level (including uphill and carriageway).

The other adjacent area will be determined as the anticipated catchment areas of runoff which are not affecting the subject site, in case, those area separate with the subject lots by existing drainage utilities (culvert and channels), carriageway, fencing, and level difference.

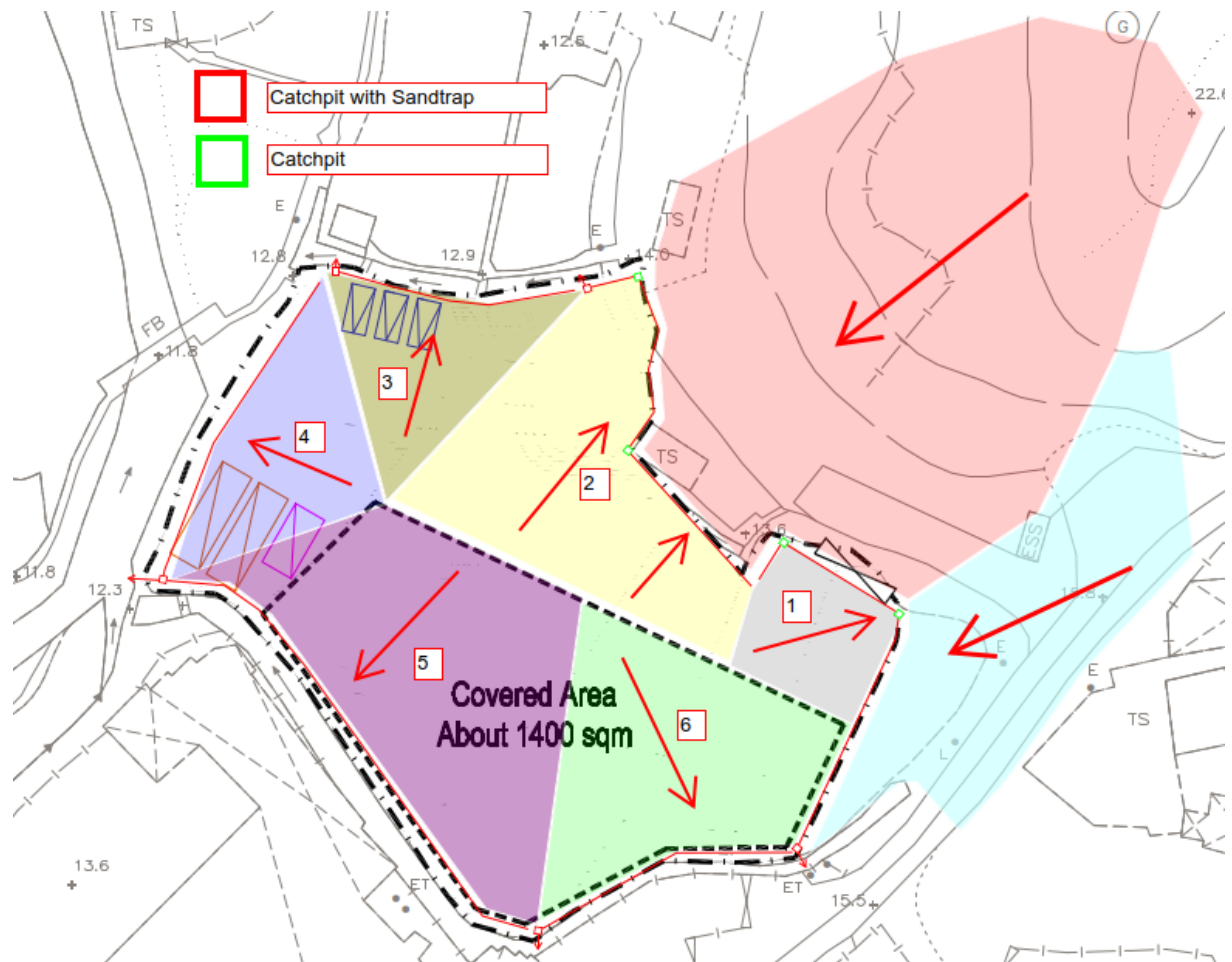


Flow Direction of the Catchment Area on this site

3.2 The area inside the lots will be completely filled up to create a flat surface to match the existing road surface outside the lot boundary. The ground level is proposed to be raised to +14.5mPD for feasible traffic flow and heavy vehicle access. Thus, the existing culvert within the subject lots will be filled and dismantled. The new drainage system will replace the original one.

3.3 The captured catchment areas have been identified for collecting stormwater for the application area. The drainage system has been proposed to discharge stormwater with surface channel and catchpits, the design of the dimension and size have been

referred to the guidance from Stormwater Drainage Manual. Calculation has been provided for checking the capacity of the drainage system.



Effective Catchment Area and Flow Direction within the Subject Lots

- 3.4 The proposed drainage system has been checked to be sufficient to handle stormwater surface runoff within the subject site area and not affecting the adjacent footpath and carriageway to minimize the potential risks of overland flows and flooding by rainfall event. The related calculation and drawing can be related in Appendix.
- 3.5 For the surface channel have to change direction, a bend with radius three times the width of the channel will be provided according to the guidance from the design manual. For the turning in sharp angle, catchpits will be provided.
- 3.6 The collected stormwater will be diverted and discharged to the adjacent river.

4. CONCLUSIONS

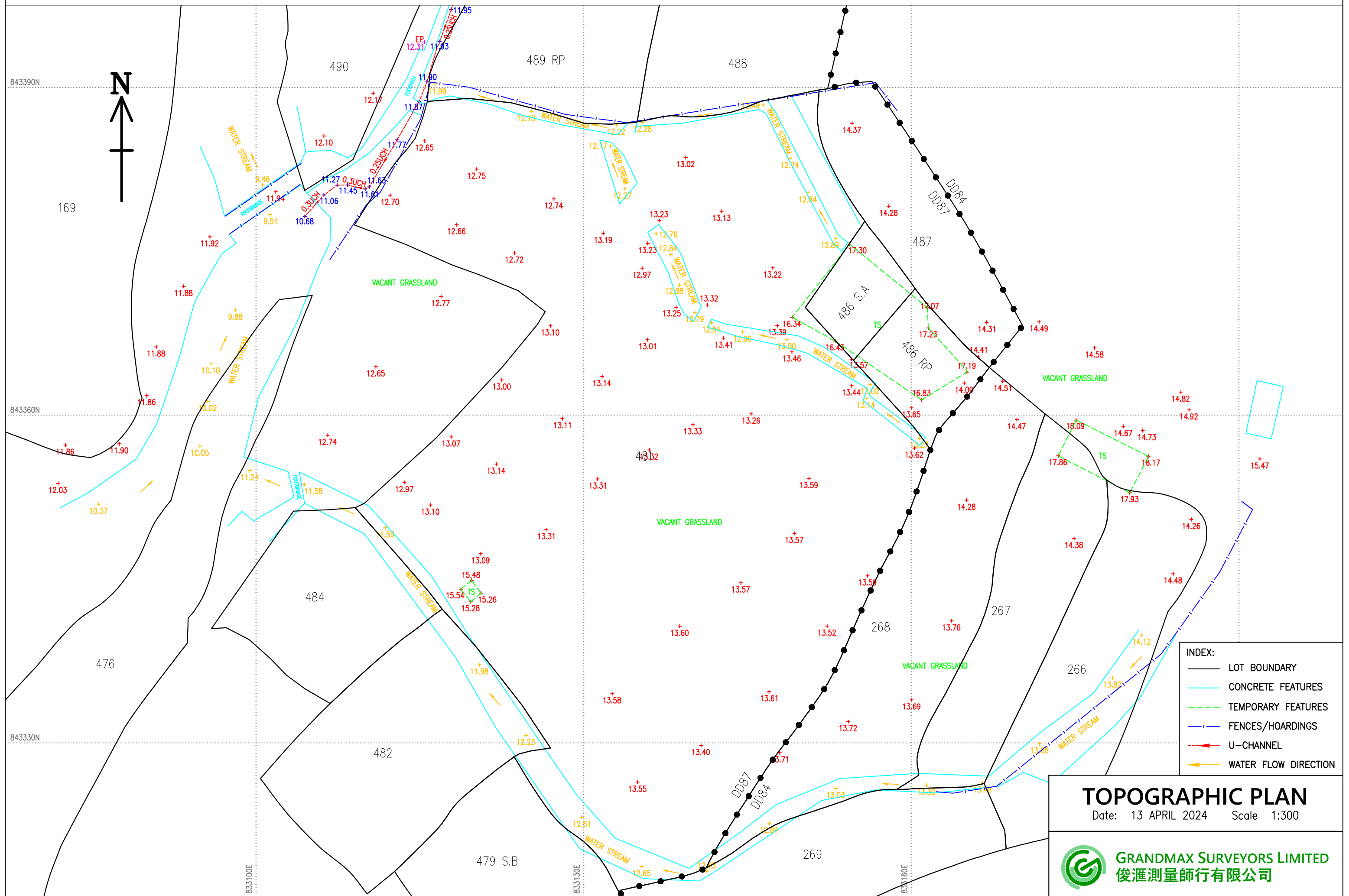
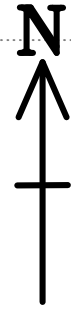
- 4.1 A new drainage system within the subject lots is proposed after the site formation works to raise the ground level to be uniform.
- 4.2 The stormwater and surface runoff in the effective catchment area will be discharged to the existing drainage system outside the subject lot area (existing river, culverts, and surface channels).
- 4.3 Having considered each branch of the proposed surface channel to handle the surface runoff from both catchment areas from uphill and the subject lots concurrently in the design checking (design calculation in Appendix refers), the proposed surface channels and catchpits are capable of receiving potential surface runoff in calculating the rainfall intensity storm effect in approximate 50 years of return period.
- 4.4 Regular maintenance such as routine desilting will be carried out by the development owner for the drainage system (i.e. surface channel and catchpit) surrounding the site to avoid blockage and deterioration.
- 4.5 For the surface channels pass through vehicle access, steel gratings referring to the typical details from standard drawings will be provided.
- 4.6 Openings on the bottom of fencing and walls will be provided surrounding the subject lots to avoid blockage and changing the flow path of the surface runoff.

END OF TEXT

APPENDIX A

Topography Survey Record

TOPOGRAPHIC SURVEY FOR VARIOUS LOTS IN D.D.87



- INDEX:**
- LOT BOUNDARY
 - CONCRETE FEATURES
 - TEMPORARY FEATURES
 - FENCES/HOARDINGS
 - U-CHANNEL
 - WATER FLOW DIRECTION

TOPOGRAPHIC PLAN
 Date: 13 APRIL 2024 Scale: 1:300



APPENDIX B

Drainage Design Calculation

Project : S.16 Planning Application at Lot 268 (Part) in D.D. 84 and Lot 481 (Part) in D.D. 87)

Catchment Area : 1 (inside Lot)

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A = area of catchment (m²) = 3340.0 m²
 H = average fall (per 100m) from the summit of catchment to the point of design = 0.1 m
 L = length which water takes the longest time to reach the design section = 75.0 m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1})) = 7.63 \text{ min}$ say 7.63 min

From Figure 8.2 of GMS, assuming storm return period is 1 in 50 years,

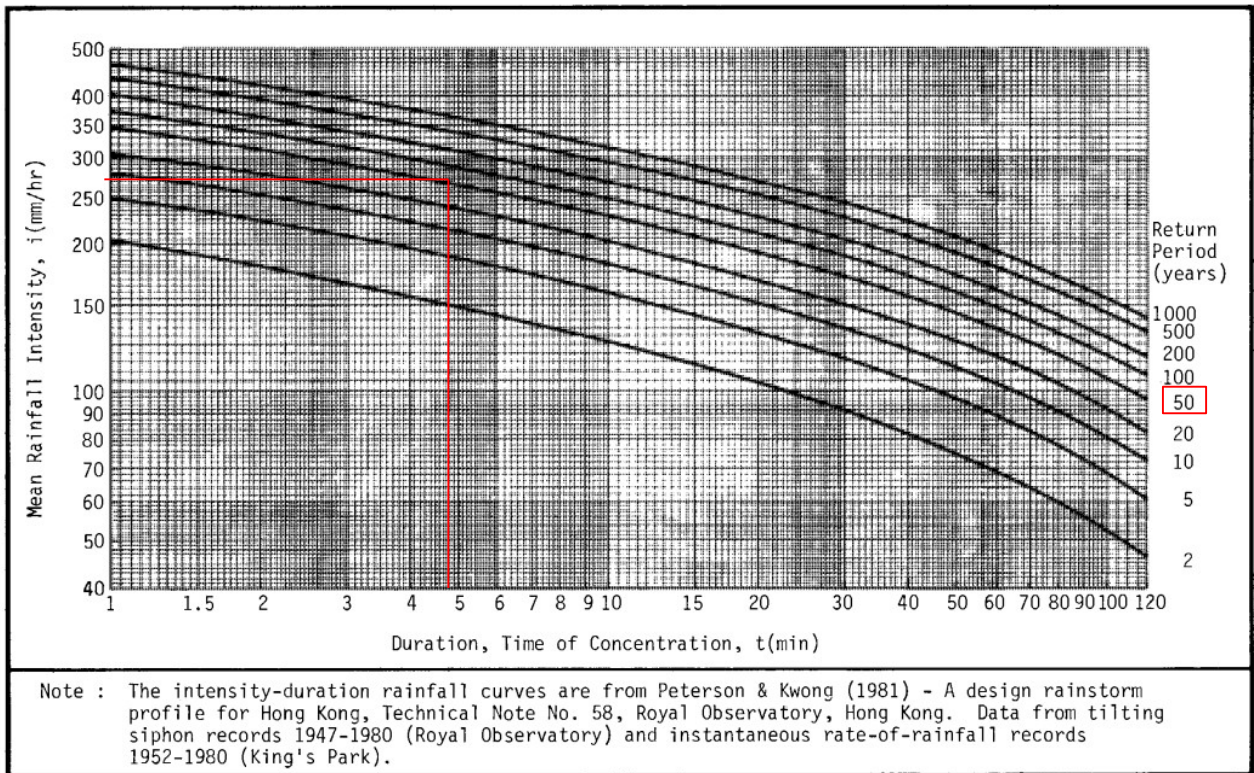


Figure 8.2 - Curves Showing Duration and Intensity of Rainfall in Hong Kong for Various Return Periods

$i =$ designed mean intensity of rainfall (mm/hr) = 243.4 mm/hr

Project : S.16 Planning Application at Lot 268 (Part) in D.D. 84 and Lot 481 (Part) in D.D. 87)

Catchment Area : 2 (Uphill)

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A = area of catchment (m²) = 1900.0 m²
 H = average fall (per 100m) from the summit of catchment to the point of design = 15.0 m
 L = length which water takes the longest time to reach the design section = 65.0 m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1})) = 2.57 \text{ min}$ say 2.57 min

From Figure 8.2 of GMS, assuming storm return period is 1 in 50 years,

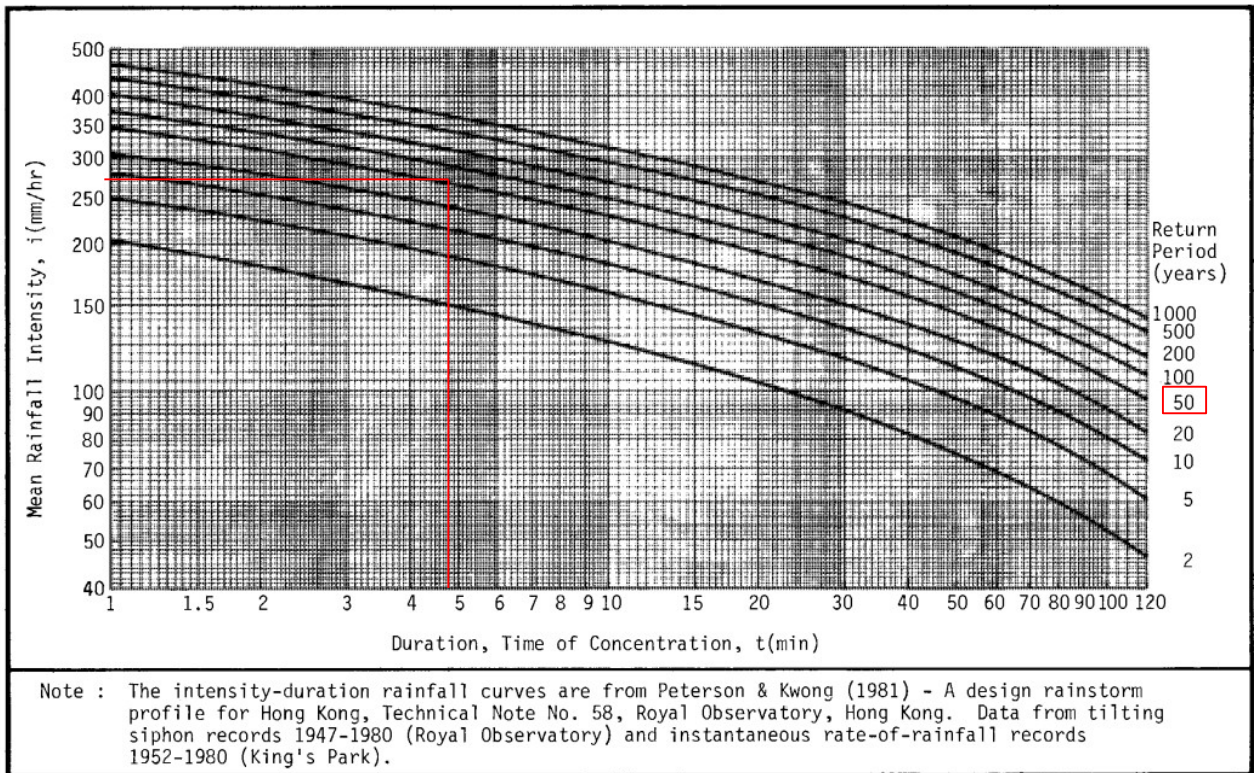


Figure 8.2 - Curves Showing Duration and Intensity of Rainfall in Hong Kong for Various Return Periods

$i = \text{designed mean intensity of rainfall (mm/hr)} = 307.7 \text{ mm/hr}$

Project : S.16 Planning Application at Lot 268 (Part) in D.D. 84 and Lot 481 (Part) in D.D. 87)

Catchment Area : 3 (Carriageway)

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A = area of catchment (m²) = 1200.0 m²
 H = average fall (per 100m) from the summit of catchment to the point of design = 6.0 m
 L = length which water takes the longest time to reach the design section = 75.0 m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1})) = 3.73 \text{ min}$ say 3.73 min

From Figure 8.2 of GMS, assuming storm return period is 1 in 50 years,

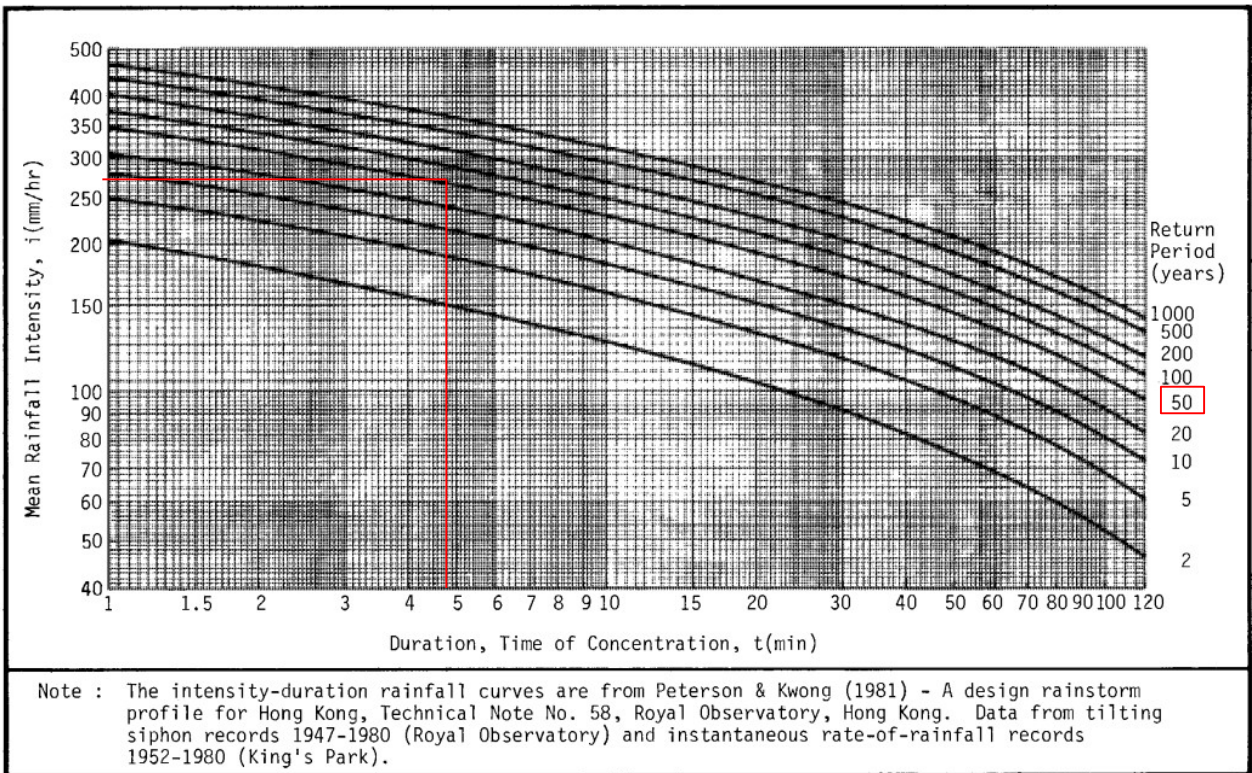


Figure 8.2 - Curves Showing Duration and Intensity of Rainfall in Hong Kong for Various Return Periods

$i = \text{designed mean intensity of rainfall (mm/hr)} = 287.9 \text{ mm/hr}$

Design Calculation of U-Channel

Project : S.16 Planning Application at Lot 268 (Part) in D.D. 84 and Lot 481 (Part) in D.D. 87)

Reference code: Stormwater Drainage Manual 2018 & Geotechnical Manual for Slope
 Assumption: Runoff Coefficient for grass **0.2** (Steep and sandy grassland)
 Runoff Coefficient for concrete **1**

Catchment 1 **3340** m² (Effective catchment inside subject lot) Rainfall Intensity = **243.4** mm/hr
 Catchment 2 **1900** m² (Effective catchment from uphill) Rainfall Intensity = **307.7** mm/hr
 Catchment 3 **1200** m² (Effective catchment from carriageway) Rainfall Intensity = **287.9** mm/hr
 Allowance **10** % reduction in flow area due to permissible degradation between desilting cycles

Abbreviation and Terms:	USCP	Upstream Catchpit	RAINFALL INTENSITY	Rainfall Intensity, mm/hr
	DSCP	Downstream Catchpit	RUNOFF COEF.	Runoff Coefficient
	USGL	Upstream Ground Level, mPD	CATCHMENT	Catchment Area, m ²
	USIL	Upstream Invert Level, mPD	EFF. AREA	Effective Area, m ²
	DSIL	Downstream Invert Level, mPD	CUM. AREA	Cumulative Effective Area, m ²
	INVERT DIFF.	INVERT DIFFERENCE, m	DESIGN FLOW	Design Flow m ³ /s
	LENGTH	Channel Length, m	SIZE	Channel Size, mm
	SLOPE	Channel Gradient, 1 in	UC TYPE	Channel Type
			VEL.	Velocity of Channel by Manning's Equation where n = 0.013
			FLOW CAP.	Fullbore Capacity m ³ /s
		SPARE CAP.	Spare Capacity m ³ /s	

Catchment	USGL	DSGL	USIL	DSIL	AVG. DEPTH	INVERT DIFF.	LENGTH	GRADIENT	RAINFALL INTENSITY	RUNOFF COEF.	CATCHMENT	Affecte d Area	EFF. AREA	DESIGN FLOW	CUM. DESIGN	SIZE	TYPE	VEL	ALLOWANCE (REDUCTION %)	FLOW CAP.	SPARE CAP.	UTILISA TION	RESULT	A	P	R
	mPD	mPD	mPD	mPD	m	m	m	1 in	mm/hr		m ²	%	m ²	m ³ /s	m ³ /s	mm		m/s		m ³ /s	m ³ /s	%	OK	(m ²)	(m)	(m)
1	14.50	14.45	14.23	13.76	0.69	0.47	46.7	100	243.4	1	3340	20	668	0.04519	0.04519	225	UC	1.5	10	0.208	0.163	22	OK	0.135	1.512	0.089
2	22.60	14.45	14.23	13.76	0.69	0.47	46.7	100	307.7	0.2	1900	100	380	0.03250	0.03250	225	UC	1.5	10	0.208	0.176	16	OK	0.135	1.512	0.089
3	15.80	14.45	14.23	13.76	0.69	0.47	46.7	100	287.9	1	1200	100	1200	0.09605	0.09605	225	UC	1.5	10	0.208	0.112	46	OK	0.135	1.512	0.089
Resultant & Discharge														0.17375	0.17375	225	UC	1.5	10	0.208	0.034	84	OK	0.135	1.512	0.089
1	14.50	14.45	14.30	13.92	0.53	0.38	38.0	100	243.4	1	3340	20	668	0.04519	0.04519	150	UC	1.2	10	0.082	0.037	55	OK	0.069	1.146	0.061
2	22.60	14.45	14.30	13.92	0.53	0.38	38.0	100	307.7	0.2	1900	100	380	0.03250	0.03250	150	UC	1.2	10	0.082	0.050	39	OK	0.069	1.146	0.061
Resultant & Discharge														0.07770	0.07770	150	UC	1.2	10	0.082	0.005	94	OK	0.069	1.146	0.061
1	14.50	14.45	14.30	13.97	0.48	0.33	33.0	100	243.4	1	3340	30	1002	0.06779	0.06779	150	UC	1.2	10	0.074	0.006	92	OK	0.063	1.046	0.060
Discharge														0.06779	0.06779	150	UC	1.2	10	0.074	0.006	92	OK	0.063	1.046	0.060
1	14.50	14.45	14.30	14.05	0.40	0.25	25.0	100	243.4	1	3340	20	668	0.04519	0.04519	150	UC	1.2	10	0.060	0.015	75	OK	0.052	0.886	0.059
Discharge														0.04519	0.04519	150	UC	1.2	10	0.060	0.015	75	OK	0.052	0.886	0.059
1	14.50	14.45	14.30	13.76	0.69	0.54	53.6	100	243.4	1	3340	40	1336	0.09039	0.09039	150	UC	1.2	10	0.109	0.019	83	OK	0.090	1.457	0.062
Discharge														0.09039	0.09039	150	UC	1.2	10	0.109	0.019	83	OK	0.090	1.457	0.062
1	14.50	14.45	14.30	14.01	0.44	0.29	29.0	100	243.4	1	3340	20	668	0.04519	0.04519	150	UC	1.2	10	0.067	0.022	68	OK	0.057	0.966	0.059
Discharge														0.04519	0.04519	150	UC	1.2	10	0.067	0.022	68	OK	0.057	0.966	0.059
Total Catchment for Site = 6440 m ²																										

APPENDIX C

Construction Drawing

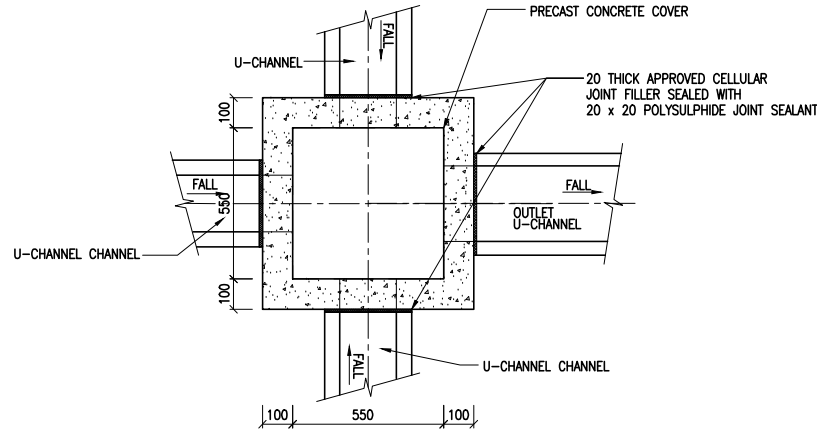
ISO A1 594mm x 841mm

GENERAL NOTES:

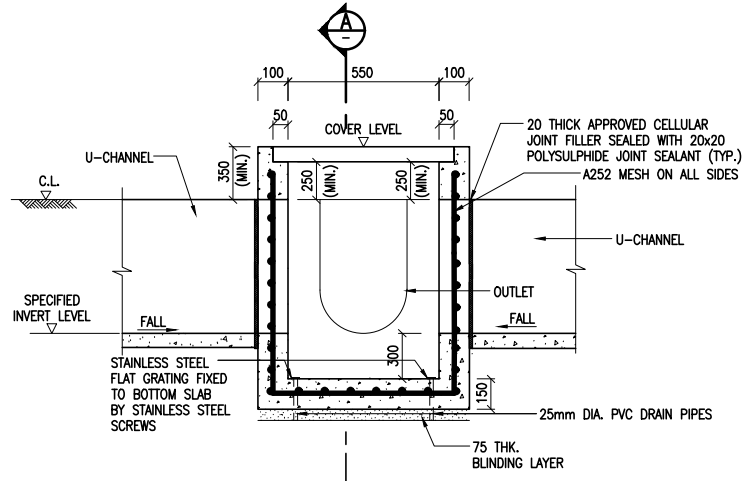
- GRADE 40 CONCRETE SHALL BE USED UNLESS OTHERWISE STATED.
- THE PROPOSED DRAINAGE WORKS, WHETHER WITHIN OR OUTSIDE THE LOT BOUNDARY, SHALL BE CONSTRUCTED AND MAINTAINED BY THE OWNER AT HIS OWN EXPENSE. FOR WORKS TO BE UNDERTAKEN OUTSIDE THE LOT BOUNDARY, PRIOR CONSENT FROM DLO AND/OR RELEVANT PRIVATE LOT OWNERS SHALL BE SOUGHT.
- ALL U-CHANNEL SHALL BE GRADIENT 1:100 UNLESS OTHERWISE STATED.
- GRATE COVERS SHALL BE PROVIDED FOR THE SECTION THAT VEHICLE MAY CROSS THE CHANNELS.

SCHEDULE OF CATCHPIT

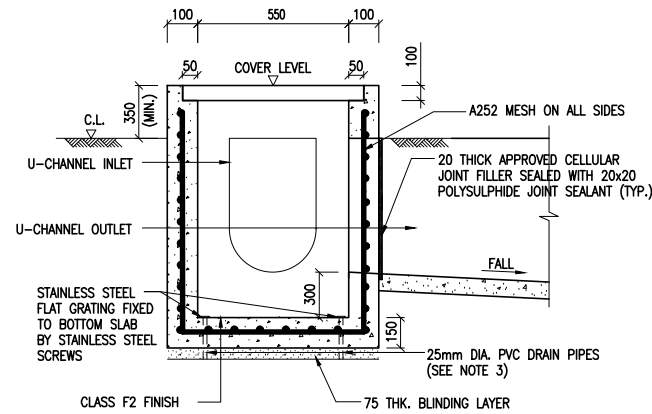
CATCHPIT NO.	CATCHPIT TYPE	COVER LEVEL (mPD)	BTM. LEVEL (mPD)	INLET LEVEL (mPD)	OUTLET LEVEL (mPD)
CP1A	1	+14.45	+14.08	+14.23	+14.23
CP1B	1	+14.45	+13.94	+14.09	+14.09
CP1C	2	+14.45	+13.36	+13.81	+13.81
CP2A	1	+14.45	+13.96	+14.11	+14.11
CP2B	2	+14.45	+13.47	+13.92	+13.92
CP3	2	+14.45	+13.52	+13.97	+13.97
CP4	2	+14.45	+13.58	+14.03	+14.03
CP5	2	+14.45	+13.31	+13.76	+13.76
CP6	2	+14.45	+13.56	+14.01	+14.01



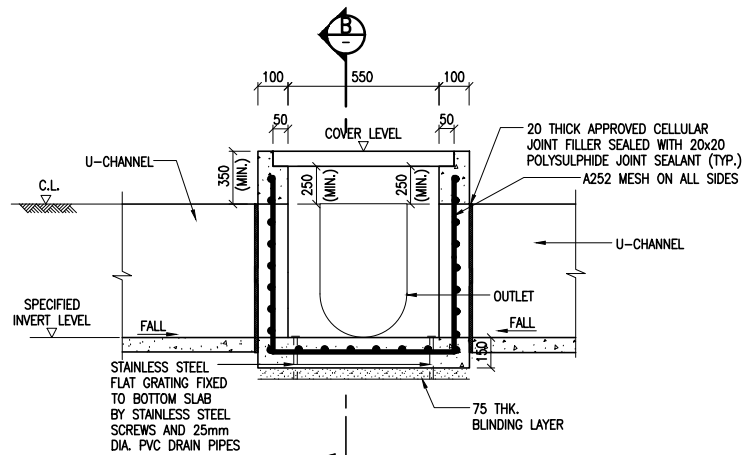
PLAN OF CATCHPIT (TYPE 1&2)
(REFERENCE: CEDD STANDARD DRAWING NO. IC2406_1&2)
N.T.S.



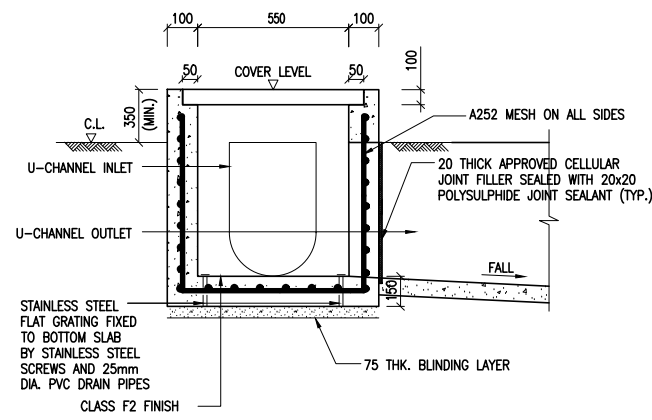
SECTION OF TYPE 2 CATCHPIT
SCALE 1:100



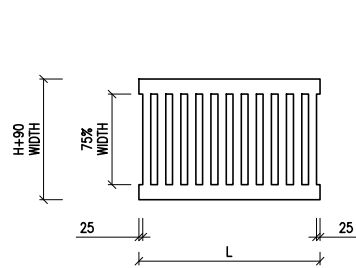
SECTION
SCALE: 1:100



SECTION OF TYPE 1 CATCHPIT
SCALE 1:100



SECTION
SCALE: 1:100

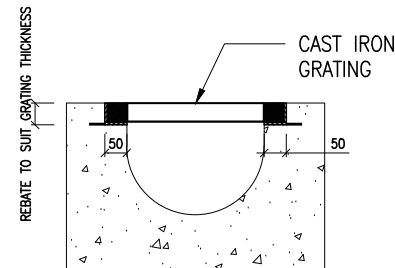


L = 600mm FOR H < 375mm
L = 400mm FOR H > 375mm

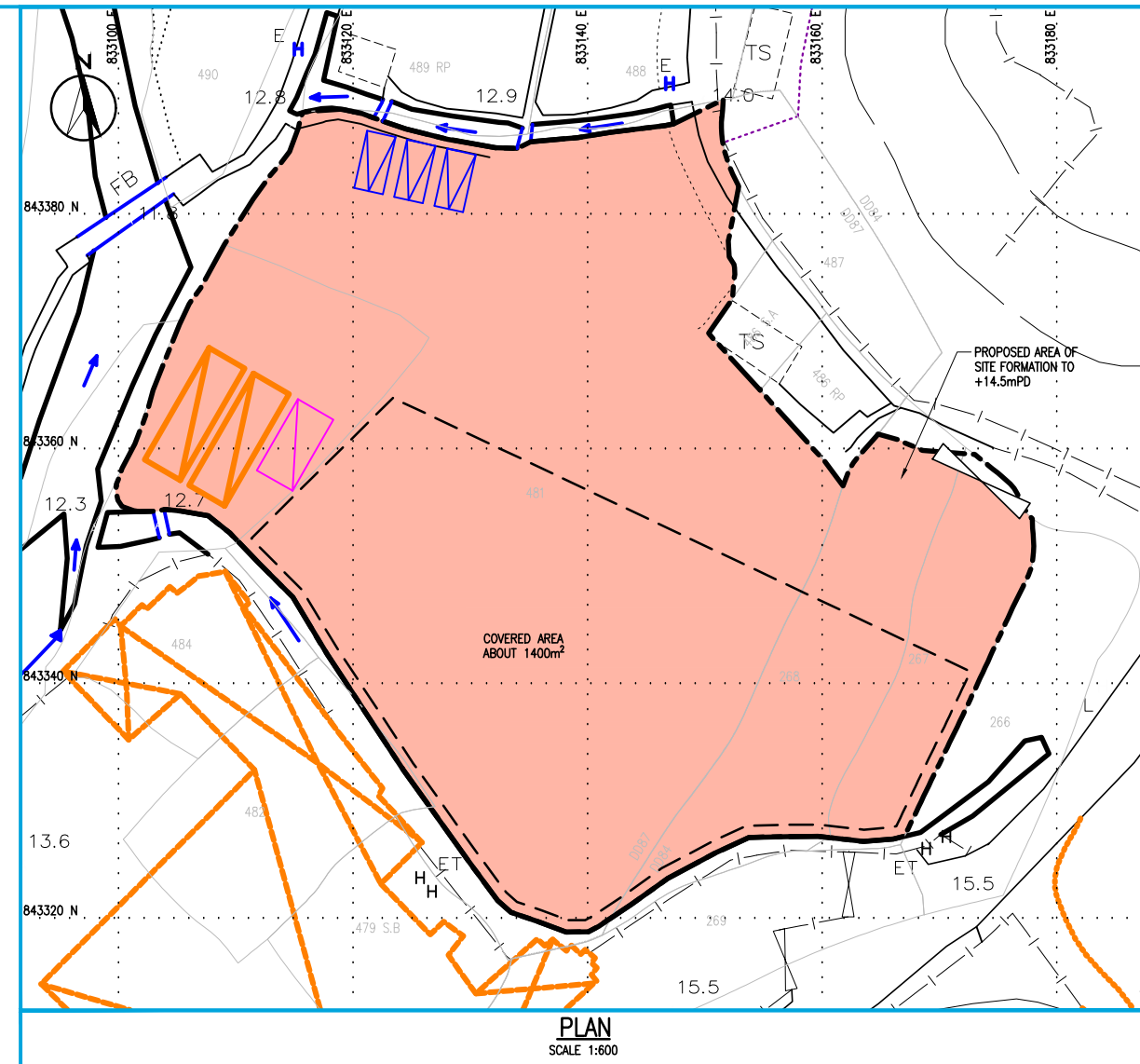
CAST IRON GRATING FOR U-CHANNELS

(REFERENCE : CEDD DWG. NO. C2412D)

N.T.S.

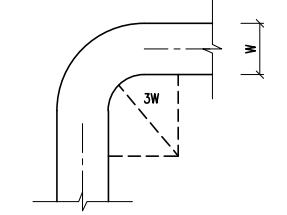


H



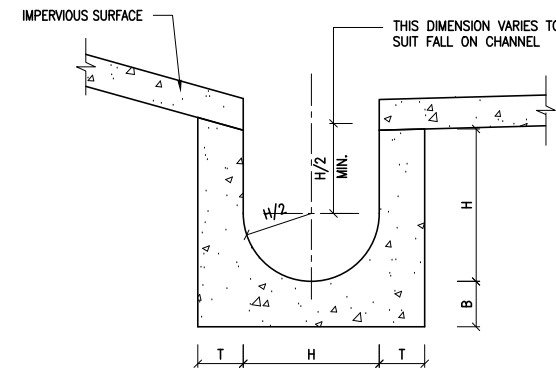
PLAN
SCALE 1:600

NOMINAL SIZE	THICKNESS T	THICKNESS B
H		
150	100	100
225-600	175	225
675-1200	175	225



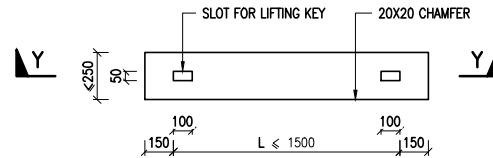
CHANNEL CHANGING DIRECTION THROUGH BENDS

(REFERENCE : PAGE 100 GEOTECHNICAL MANUAL FOR SLOPES)
N.T.S.



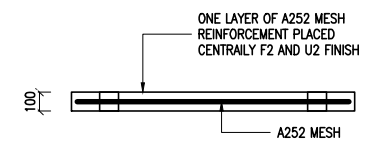
DETAILS OF U-CHANNEL

(REFERENCE : FIG. 8.11 OF GEOTECHNICAL MANUAL FOR SLOPES)
N.T.S.



PLAN OF PRECAST CONCRETE COVERS

(REFERENCE : CEDD DWG. NO. C2407B)
N.T.S.



SECTION Y-Y PRECAST CONCRETE COVERS FOR SAND TRAP AND CATCHPIT

(REFERENCE : CEDD DWG. NO. C2407B)
N.T.S.

B.D. REF. _____
F.S.D. REF. _____

LEGEND:

- APPLICATION BOUNDARY
- PROPOSED HG V L/UL BAY (16mx 3.5mx4.7m)
- PROPOSED HG V L/UL BAY (11mx3.5mx4.7m)
- PROPOSED ACCESSIBLE PARKING SPACE (5m x 3.5mx 2.4m)
- PROPOSED 9m WIDE VEHICULAR ACCESS

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

ALL MEASUREMENTS MUST BE CHECKED AT THE SITE - DO NOT SCALE DRAWING - ALL DRAWING SPECIFICATIONS AND THEIR COPY RIGHT ARE THE PROPERTY OF ENGINEERS, ARCHITECTS, DESIGNERS AND SHALL BE RETURNED AT THE COMPLETION OF THE WORK - THIS DRAWING IS NOT VALID FOR CONSTRUCTION PURPOSES UNLESS EXPRESSLY CERTIFIED.

SIGNATURE FOR SUBMISSION/ CONSTRUCTION

PROJECT NO:	24050		
DRAWN BY:	QYD		04/24
DESIGNED BY:	HT		04/24
CHECKED BY:	MC		04/24
APPROVED BY:	VT		04/24
SCALE:	AS SHOWN (A3)		
CAD FILE:	WNG_24050_C_DRA_001		

PROJECT:
SDO 01/2024 PEDESTRIAN WALKWAY LINKING WEST KOWLOON CULTURAL DISTRICT AND TAI KOK TSUI DESIGN AND CONSTRUCTION SUPERVISION

DRAWING TITLE:
GENERAL NOTES AND LAYOUT PLAN

DRAWING NO:	WNG/24050/C/DRA/001	REV:	-
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B.D. REF. _____
 F.S.D. REF. _____

LEGEND:
 [Solid Line] BOUNDARY OF LOTS FOR THIS APPLICATION
 [Hatched Area] EXISTING DRAINAGE FEATURES
 [Arrow] FLOW DIRECTION

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

ALL MEASUREMENTS MUST BE CHECKED AT THE SITE - DO NOT SCALE DRAWING
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 ENGINEERS, ARCHITECTS, DESIGNERS AND SHALL BE RETURNED AT THE
 COMPLETION OF THE WORK - THIS DRAWING IS NOT VALID FOR FOR CONSTRUCTION
 PURPOSES UNLESS EXPRESSLY CERTIFIED.

SIGNATURE FOR SUBMISSION/ CONSTRUCTION

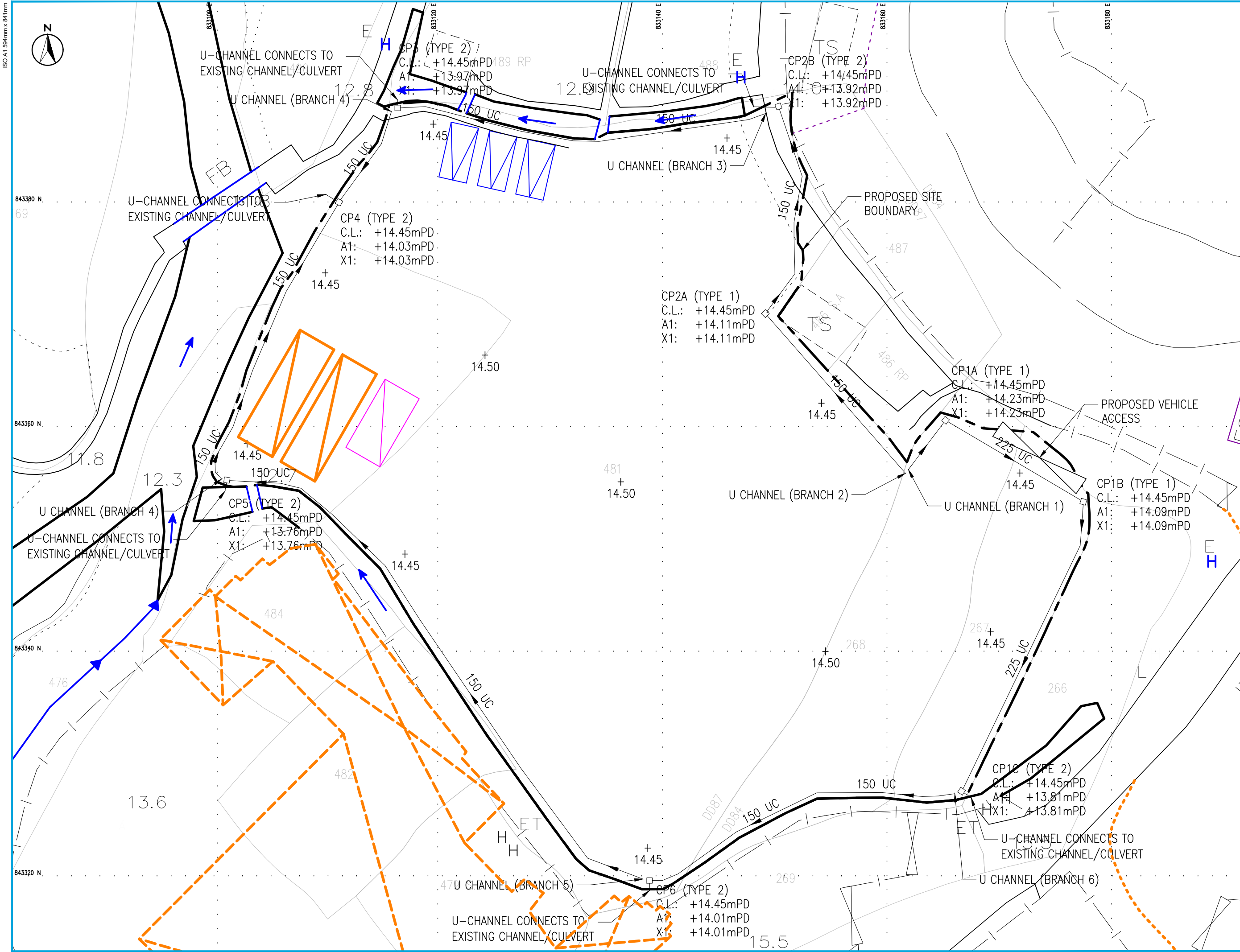
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DRAWN BY:	QYD 04/24
DESIGNED BY:	HT 04/24
CHECKED BY:	MC 04/24
APPROVED BY:	VT 04/24
SCALE:	1:500 (A3)
CAD FILE:	WNG_24050_C_DRA_002

PROJECT:
 SDO 01/2024 PEDESTRIAN WALKWAY
 LINKING WEST KOWLOON CULTURAL
 DISTRICT AND TAI KOK TSUI DESIGN AND
 CONSTRUCTION SUPERVISION

DRAWING TITLE:
 PROPOSED EFFECTIVE CATCHMENT
 AREA FOR SURFACE RUNOFF
 AFFECTING SUBJECT LOTS

DRAWING NO:	WNG/24050/C/DRA/002	REV:	-
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W 耀南工程咨询有限公司
 WONG & ASSOCIATES
 CONSULTING ENGINEERS LTD.



B.D. REF.
F.S.D. REF.

LEGEND:
 PROPOSED 9m WIDE VEHICULAR ACCESS

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

ALL MEASUREMENTS MUST BE CHECKED AT THE SITE - DO NOT SCALE DRAWING
 ALL DRAWING SPECIFICATIONS AND THEIR COPY RIGHT ARE THE PROPERTY OF ENGINEERS, ARCHITECTS, DESIGNERS AND SHALL BE RETURNED AT THE COMPLETION OF THE WORK - THIS DRAWING IS NOT VALID FOR CONSTRUCTION PURPOSES UNLESS EXPRESSLY CERTIFIED.

SIGNATURE FOR SUBMISSION/ CONSTRUCTION

PROJECT NO:	24050
DRAWN BY:	QYD 04/24
DESIGNED BY:	HT 04/24
CHECKED BY:	MC 04/24
APPROVED BY:	VT 04/24

SCALE: 1:300 (A3)
 CAD FILE: WNG_24050_C_DRA_003

PROJECT:
 SDO 01/2024 PEDESTRIAN WALKWAY LINKING WEST KOWLOON CULTURAL DISTRICT AND TAI KOK TSUI DESIGN AND CONSTRUCTION SUPERVISION

DRAWING TITLE:
 PROPOSED DRAINAGE SYSTEM

DRAWING NO:	WNG/24050/C/DRA/003	REV:	-
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