Appendix III

Drainage Proposal

Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 RP in D.D. 87, and Adjoining Government Land, Kong Nga Po, Sheung Shui, New Territories

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Drainage Proposal

1st Submission

Prepared by: Matthew Poon
Date: 02/06/2025

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22 Hung To Road,
Kwun Tong, Kowloon
Hong Kong

CONTENTS

APPENDICE

1. INTRODUCTION

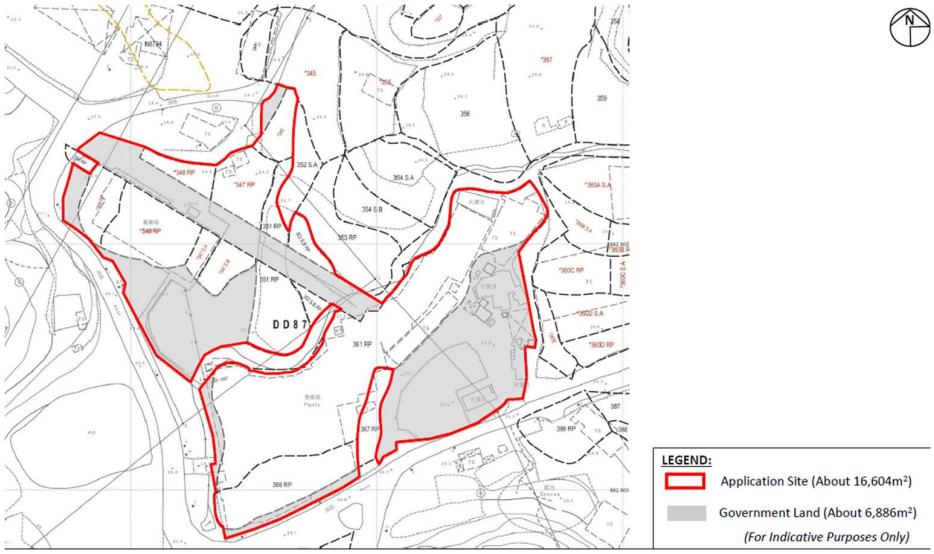
The drainage proposal is under the application of Section 16 Planning Application. The proposed uses of the subject lots are temporary warehouse (excluding dangerous goods godown) and open storage of construction material and machineries with ancillary facilities for a period of 3 years at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 RP in D.D. 87 and Adjoining Government Land, Kong Nga Po, Sheung Shui, 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

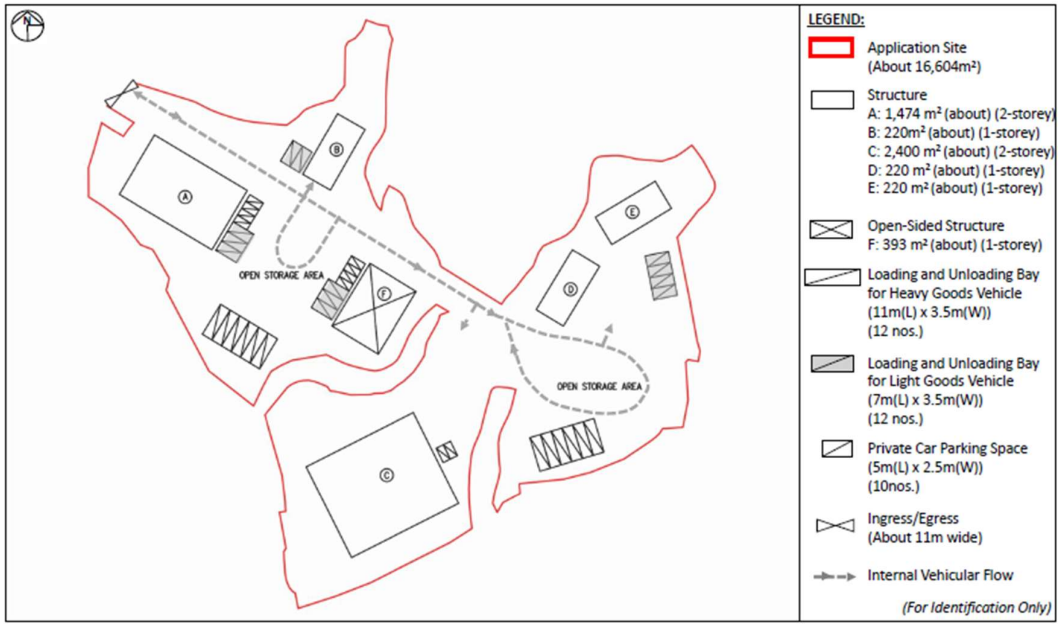
2.1 The general views of the application area can be referred to in the figures below. The combined parts of the lot cover an area of about 16,604m^2.

Lot information of the Subject Site



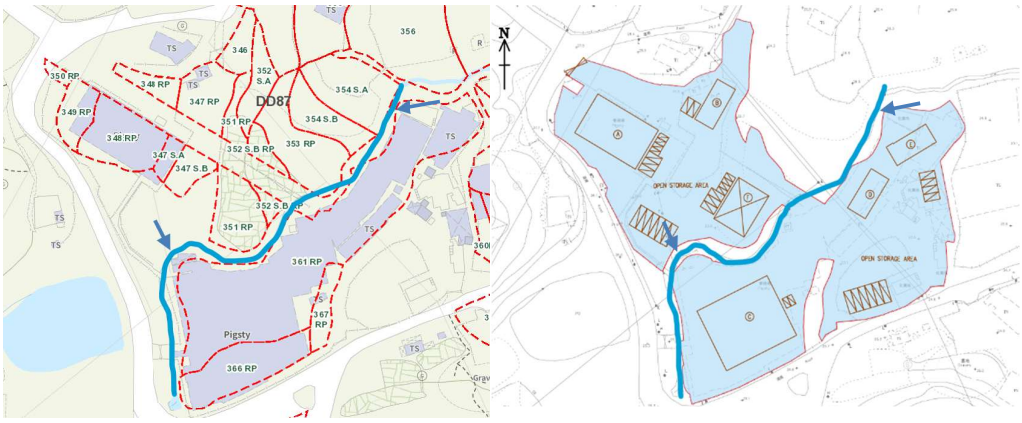
Boundary of the Subject Site surrounded by fencing

2.3 The figure below shows the proposed layout of the structures and parking provision within the boundary of the fencing. The subject site consists of six single-storey temporary structures, including 5 nos. of enclosed structures and 1 open-sided structure. No permanent structures and buildings will be placed within the subject site, the flow direction will not be affected by any blockage. All proposed structures will be placed 3m away from the existing stream course.



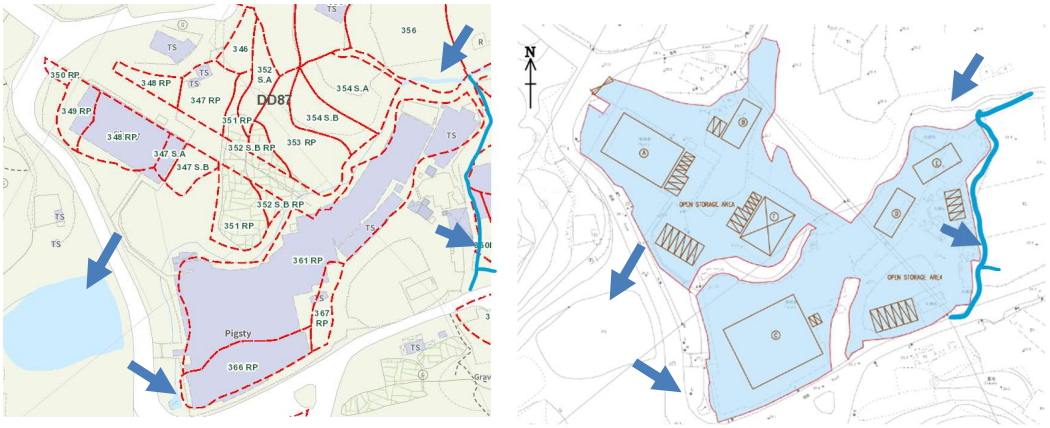
Location of the structures and parking areas inside the Subject Site

2.4 The figures below show the location of an existing stream course within the subject lot. Photos showing the current conditions can be referred to **Appendix A**.



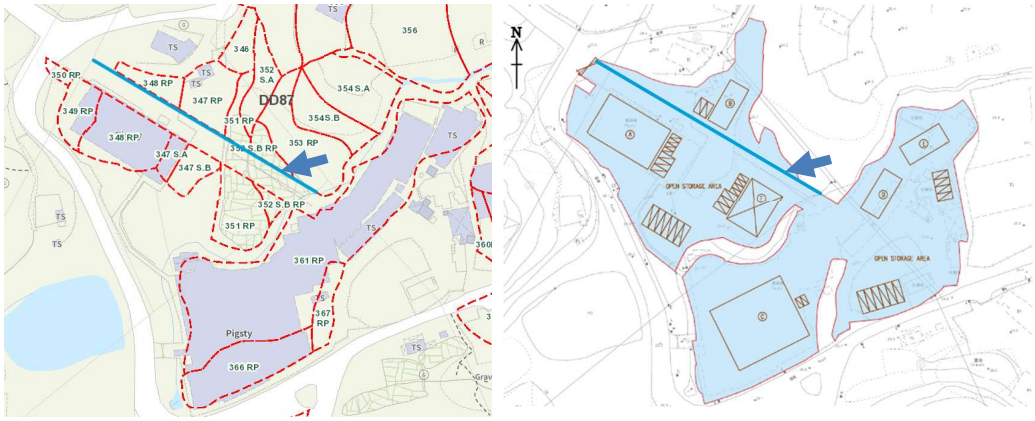
Existing drainage features inside the Subject Site

2.5 The figure below shows the location of the existing stream course outside of the subject lot. Photos showing the current conditions can be referred to **Appendix A**.



Existing drainage features outside the Subject Site

2.6 Referring to the actual site condition, there are existing channels inside the boundary. The figure below shows the location of the existing channels inside the subject lots. Photos showing the current conditions can be referred to **Appendix A**.



Existing U-Channels inside the Subject Site

2.7 The existing ground level of the subject site ranges between +22.1mPD to +27.8mPD. 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.

The Information can be referred to the record from the Observatory and the tables from the Stormwater Drainage Manual, which have shown below.

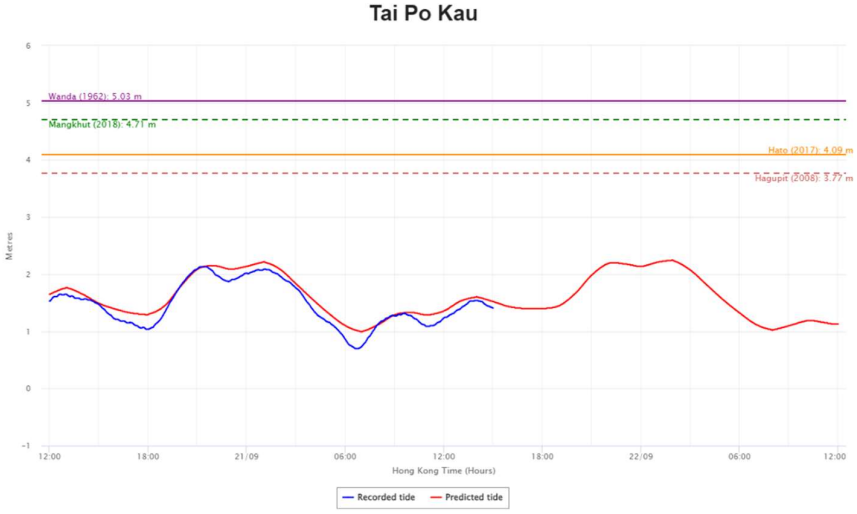


Table 8 – Design Extreme Sea Levels (in mPD)

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

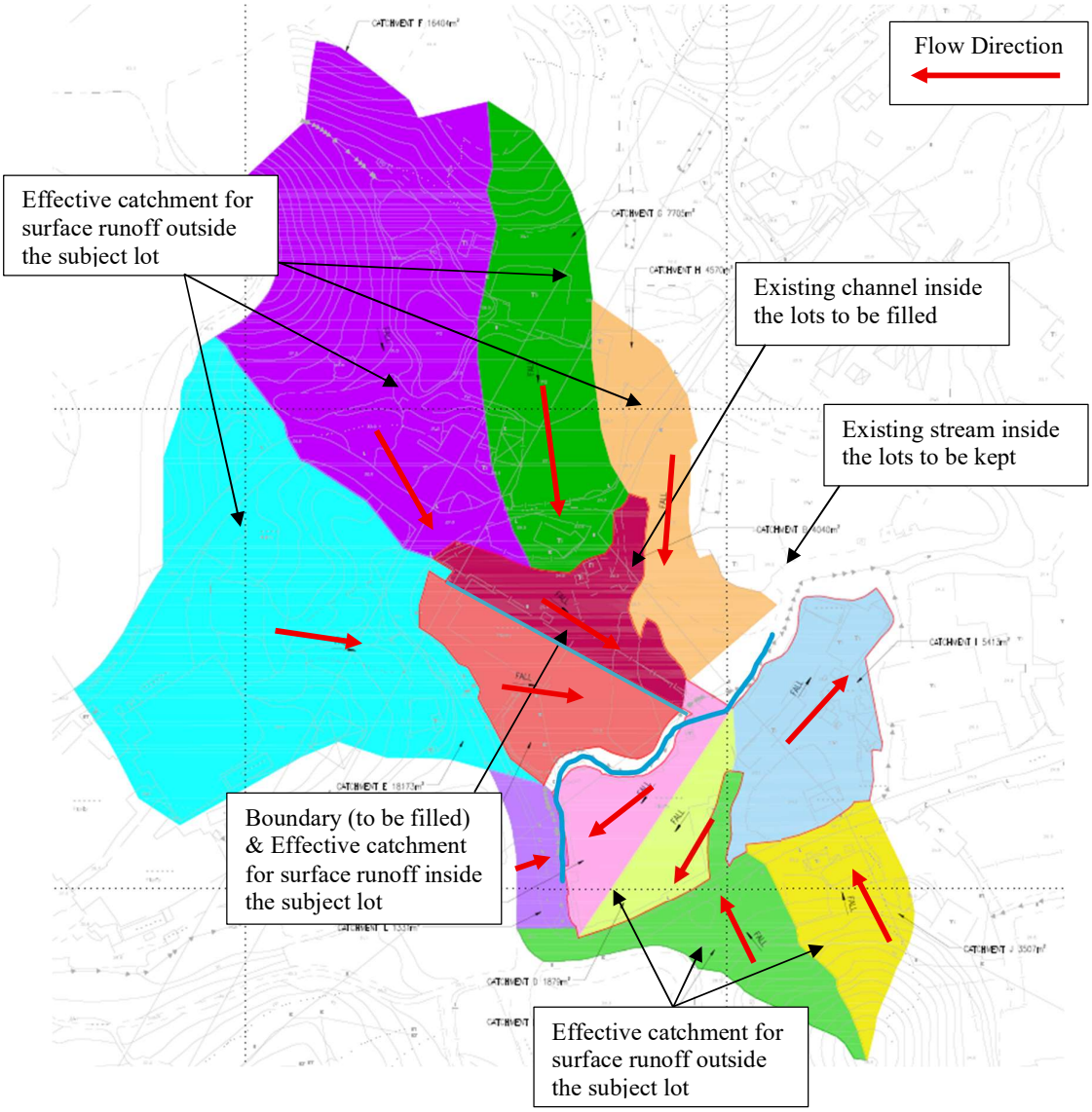
3.1 General Planning

At the very first, the planning of the provision of drainage system to handle stormwater surface runoff within the subject site will cover the following items:

- Maintain the existing stream course, and channels (outside the boundary)
- Backfill and remove the existing channels (inside the boundary)
- Raise the ground surface level inside the subject site by filling works
- Construction of new channels and catchpits

3.2 Identification of the Effective Catchment Area

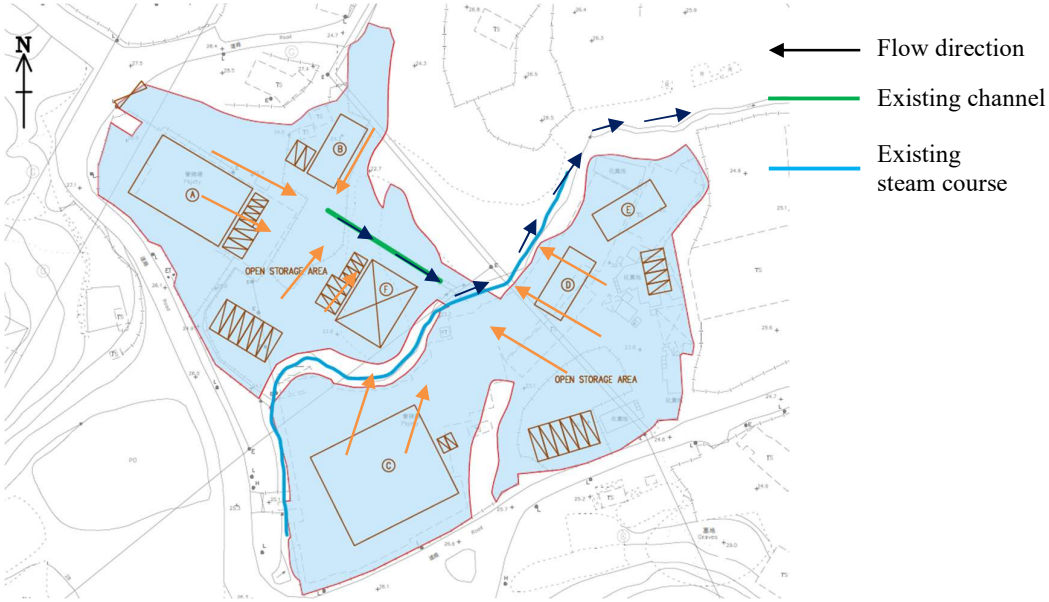
Referring to the location plan and the existing ground level, the considered effective catchment area of surface runoff includes: the area of the subject lots and the adjacent area with higher cover level (including uphill and carriageway).
The other adjacent area will be determined as the anticipated catchment areas of runoff which are not affecting the subject site, in case, those areas separate with the subject lots by existing drainage utilities (culvert and channels), carriageway, fencing, and level difference.



Flow Direction of the Effective Catchment Area inside the Subject Site

3.3 Studying on the Existing Drainage System

According to the existing ground level, upstream profile, and the flow direction and the location of the existing stream course and surface channels, the original drainage system can be determined as the figure below:



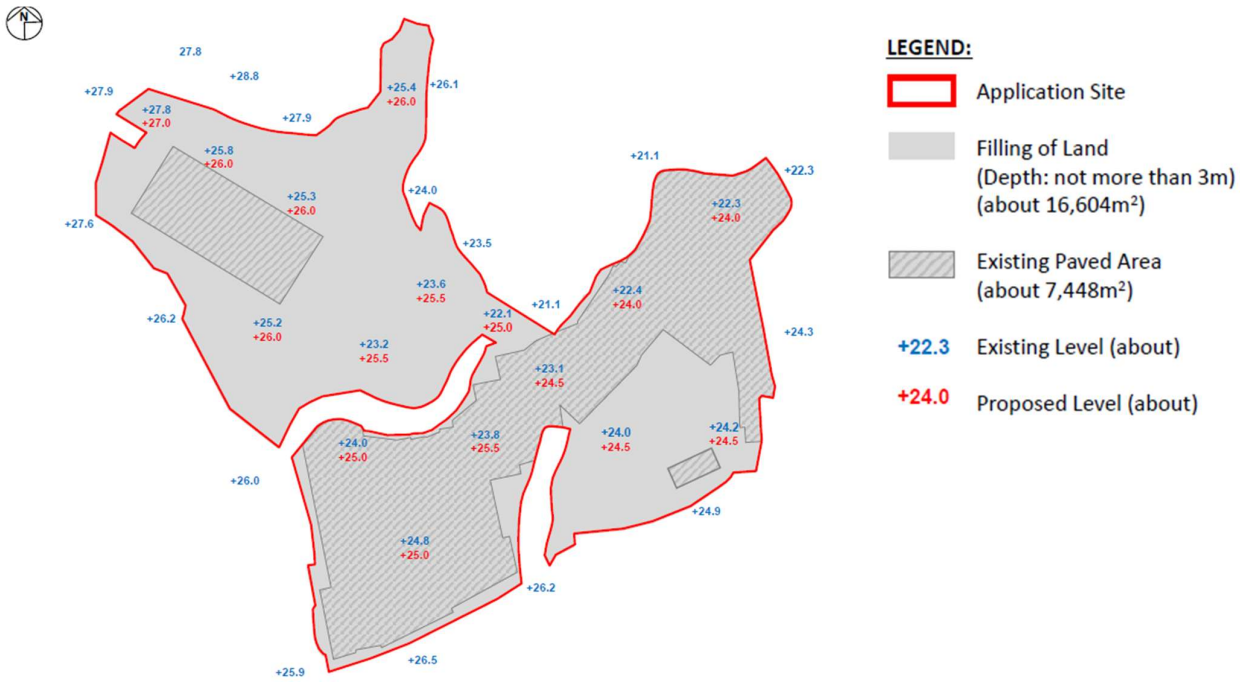
Original drainage network inside the Subject Site

3.4 Filling the subject site to rearrange cover level

The area inside the lots will be completely filled up to create a flat surface with slight gradient to provide falls to drainage features and match the existing road surface outside the lot boundary. The existing channel inside the lot boundary will be removed.

The existing concrete pipe at the connection point between the northwest and southeast sections of the lot are proposed to be replaced with a new 800mm diameter concrete pipe. Connecting the upstream and downstream sections. The design checking for the concrete pipe can be found in **Appendix C**.

The ground level is proposed to be raised to a level between +24.0mPD and +27.0mPD for feasible traffic flow and heavy vehicle access. The cover level at the boundary will be between +24.0mPD and +27.0mPD. The details of the cover levels and the flow direction of the surface runoff can be referred to the drawings and the figure below.



Filling plan of the Subject Site

3.5 Proposed Flow Direction and Drainage System

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.

3.6 Design of Channels and Catchpits

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 found in **Appendix C** and **Appendix D**.

For the surface channel 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.

3.7 Discharge Point

The collected stormwater will be diverted and discharged to the existing stream course and river adjacent to the captioned site. Before discharging to the public drainage network, a catchpit with sand trap will be provided. The dimensions and depth are according to the standard drawings from CEDD (drawing no. C2405 & C2406). The proposed connection handles the same effective catchment area from upstream and the subject site which will not induce additional loading to the existing drainage downstream.

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). The discharge has been incorporated into the checking of drainage capacity of the existing drainage system (design calculation refers to **Appendix C**)

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 refers to **Appendix C**), 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.

4.7 The development will not have any adverse impact on the drainage in the surrounding area. The construction and development within the subject lot will not alter the flow direction of surface runoff. There will be no increased risk of flooding, and the capacity of existing drainage utilities will not be exceeded.

END OF TEXT

APPENDIX A

Photo Record

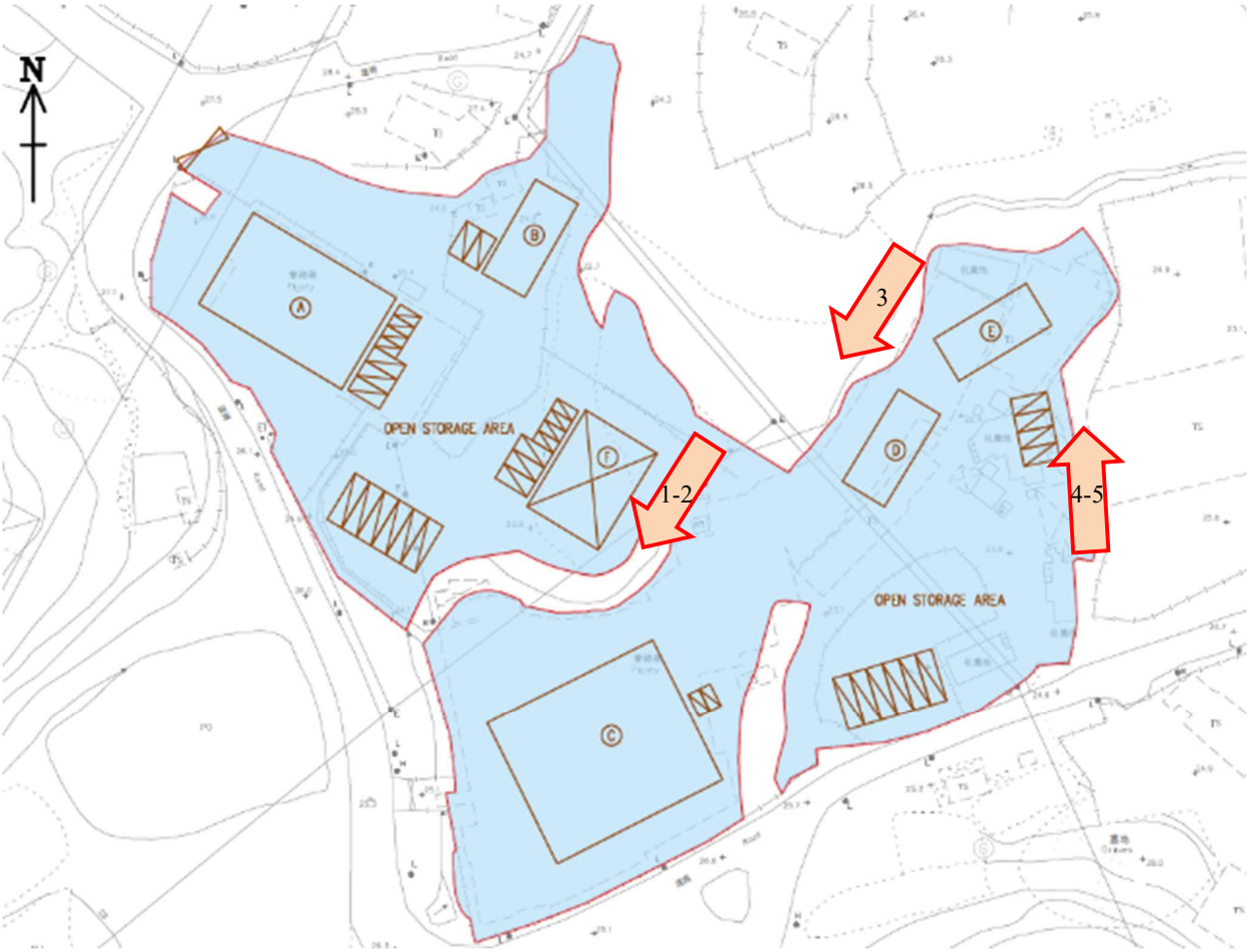

N
A
B
C
D
E
F
OPEN STORAGE AREA
OPEN STORAGE AREA
1-2
3
4-5

Photo No. 1

Photo No. 2

Photo No. 3

Photo No. 4

Photo No. 5

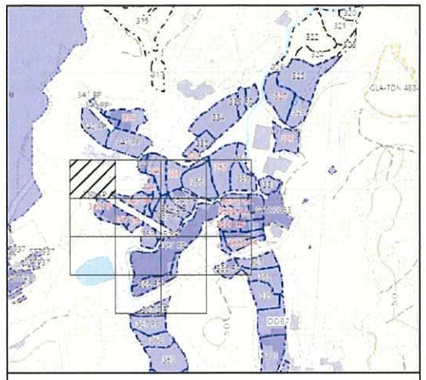
APPENDIX B

Topography Survey Record

N

832060E 832080E 832100E

842980N 842960N 842940N



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SP LP WS

KONG NGA PO ROAD

G.L. G.L. G.L.

Lot 350 RP

832060E 832080E 832100E

842980N 842960N 842940N

Notes :

1. All levels are in meters referenced to Hong Kong principal datum (HKPD).
2. All levels are in meters referenced to Hong Kong metric grid (HK1980).
3. All spot levels position are indicated by the decimal point or a cross.
4. Lot boundary is showed approximalty for reference only.

Legend :

- SUBJECT LOT BOUNDARY LINE
- ADJACENT LOT BOUNDARY LINE
- FENCE,RAILING
- PIPE
- ARTIFICIAL SLOPE
- UC — CONCRETE DRAIN & CATCHPIT
- COL — COLUMN
- CUL — CULVERT
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- 20 — CONTOURS INTERPOLATED AT ONE METRE INTERVAL

Title :
Topographic Survey of Various Lots in DD87

Locality :
Sheung Shui, North

Survey Sheet No : 3-NW-22A/22B

Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO
(SHEET 1 OF 14)

Scale: 1:200 (A3)

Our Ref: 25019

Approved by:
Date : 15 May 2025

Tang Chi Ho
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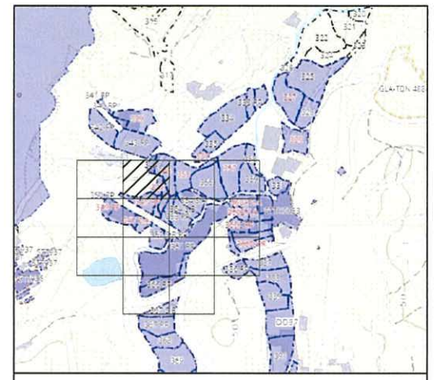
Tel.: 2652 2351 Fax: 2652 2322



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Topographic Survey of Various Lots in DD87

Locality :
Sheung Shui, North

Survey Sheet No : 3-NW-22A/22B

Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO
(SHEET 2 OF 14)

Scale: 1:200 (A3)

Our Ref: 25019

Approved by:
Date : 15 May 2025

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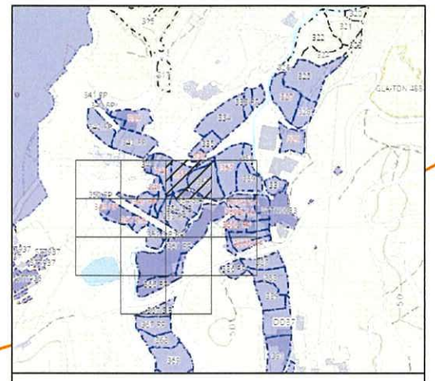
Tel.: 2652 2351 Fax: 2652 2322

832180E 832200E 832220E 832240E

842980N 842960N 842940N

N



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Lot 356

5.50 25.00 25.50 26.00 26.50 26.75 26.07 23.80 26.10 25.90 23.06

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Survey Sheet No : 3-NW-22A/22B

Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO
(SHEET 3 OF 14)

Scale: 1:200 (A3)

Our Ref: 25019

Approved by:
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Tel.: 2652 2351 Fax: 2652 2322

832260E

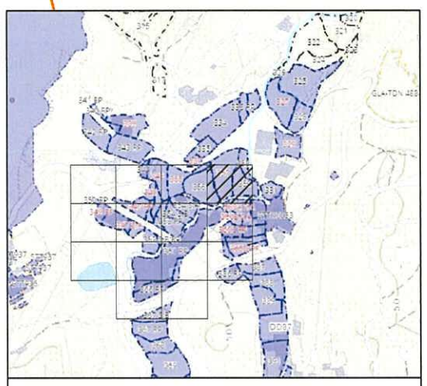
832280E

832300E

842980N

842960N

842940N



Scale 1: 20000

Lot 357

Lot 358

Lot 359

G.L.

N

platform 25.67 25.80 21.16 20.63 21.28 21.41 platform 20.43 20.41 20.71 20.48 20.70 21.57 21.65 21.30 21.43 20.32 21.00 20.36 stream 20.38 20.44 20.73 21.98 22.11 25.61 24.55 25.63 25.80 26.28 26.30 22.44 25.74 slope top 22.14 slope bottom platform 21.51 20.80 20.34 21.41 20.83 20.66 20.23 20.35 21.53 22.01 22.30 25.67 platform 22.14 22.48 25.60 25.55 23.08 25.50 25.48 22.11

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Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO (SHEET 4 OF 14)

Scale: 1:200 (A3)

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N

832060E

832080E

832100E

842920N

842900N

842880N

G.L.

Lot 349 RP

Lot 348 RP

TS

WT

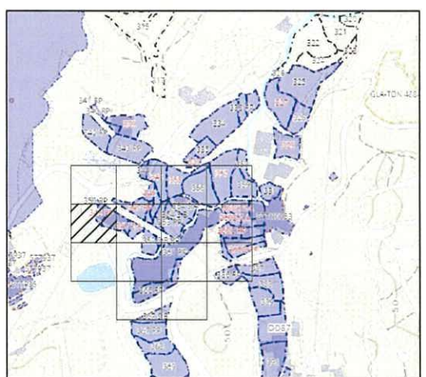
OS

LP

EP

UC

27.52 27.08 28.00 26.86 26.51 26.17 25.91 25.14 25.93 25.81 25.62 25.61 25.43 25.66 27.46 26.86 27.38 26.74 26.58 27.60 26.18 26.16 27.86 26.54 27.43 27.33 26.70 26.39 26.78 27.35 27.28 26.31 27.49 27.66 26.79 26.87 27.20 26.97 27.05 26.78 27.40 26.95 26.53 25.90 25.79 25.82 25.74 27.17 26.95 26.67 26.34 26.87 25.80 25.59 26.64 26.54 26.55 25.94 25.71 25.56 26.44 25.81 25.76 26.44 25.71 25.77 26.08 26.43 25.56 26.29 25.96 25.42 26.21 26.23 26.21 25.24 26.16 25.84 25.81 25.70 25.93



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Survey Sheet No : 3-NW-22A/22B

Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO (SHEET 5 OF 14)

Scale: 1:200 (A3)

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Tel.: 2652 2351 Fax: 2652 2322

Lot 348 RP

Lot 347 RP

Lot 351 RP

Lot 352 S.B RP

Lot 347 S.A

Lot 347 S.B

G.L.

WELL

stream

TS

EP

900UC

280UC

septic tank

slope top

slope bottom

footpath

842920N

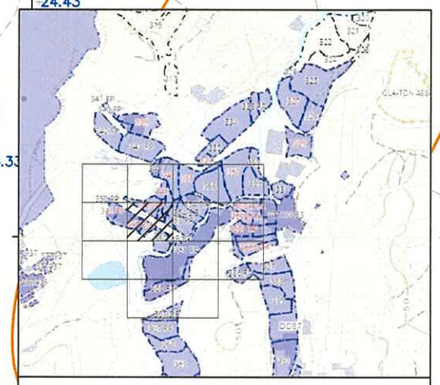
842900N

842880N

832120E

832140E

832160E



Scale 1: 20000

Notes :

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Legend :

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- ADJACENT LOT BOUNDARY LINE
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- PIPE
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- UC — CONCRETE DRAIN & CATCHPIT
- COL — COLUMN
- CUL — CULVERT
- TS — TEMPORARY STRUCTURE
- OS — OPEN-SIDED STRUCTURE
- VERTICAL MASONRY (RETAINING WALL)
- PARAPET OR WALL
- STEPS
- GULLY
- GATE
- TC — HONG KONG TELECOM
- MH — MANHOLE FOUL WATER
- WS — WATER SERVICE
- IC — INSPECTION COVER
- LP — LAMP POLE
- SP — SIDE POLE
- TP — TELEPHONE POLE
- EP — ELECTRIC POLE
- 1.23 — SPOT LEVEL
- 20 — CONTOURS INTERPOLATED AT ONE METRE INTERVAL

Title :
Topographic Survey of Various Lots in DD87

Locality :
Sheung Shui, North

Survey Sheet No : 3-NW-22A/22B

Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO (SHEET 6 OF 14)

Scale: 1:200 (A3)

Our Ref: 25019

Approved by:
Date : 15 May 2025

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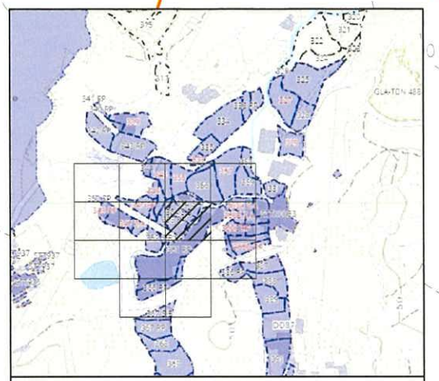

Scale 1:20000

N

Lot 354 S.A

Lot 354 S.B

Lot 353 RP

Lot 361 RP

G.L.

RP

832180E 832200E 832220E 832240E 832260E

842920N 842900N 842880N

slope top

slope bottom

stream

septic tank

track

EP

TS

OS

platform

overhang

conc bldg

footpath

wall width=0.1
wall height=0.4

pipe width=0.06m

240UC 250UC 200UC

UC

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Locality :
Sheung Shui, North

Survey Sheet No : 3-NW-22A/22B

Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO (SHEET 7 OF 14)

Scale: 1:200 (A3)

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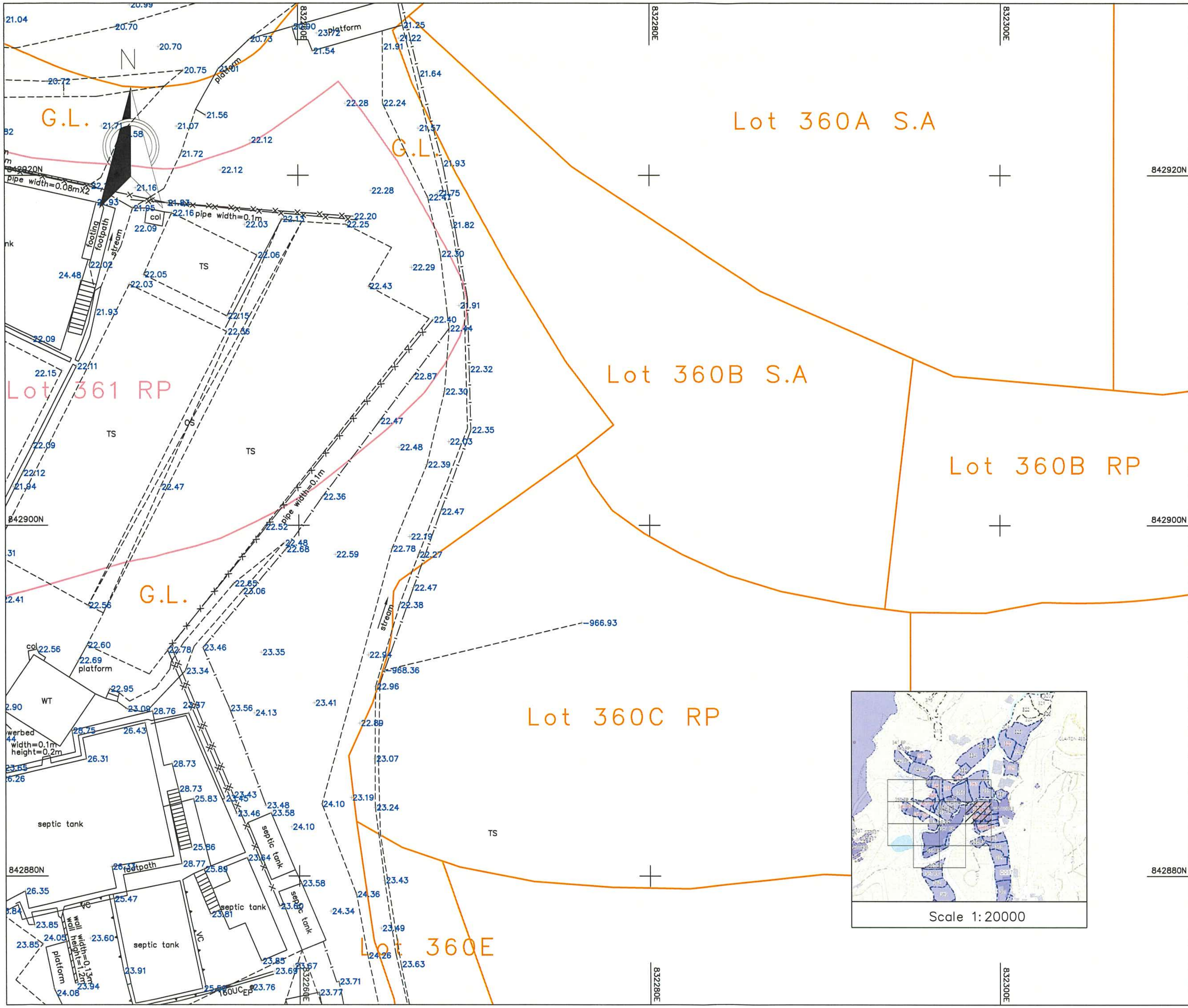

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Title :
Topographic Survey of Various Lots in DD87

Locality :
Sheung Shui, North

Survey Sheet No : 3-NW-22A/22B

Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO (SHEET 8 OF 14)

Scale: 1:200 (A3)

Our Ref: 25019

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N

832060E

832080E

832100E

842860N

842840N

842820N

25.19 25.19 25.00

26.03

26.10

25.64 25.08 24.99

25.02

25.73 25.76

26.03

25.99

26.07 25.73

25.49

26.04

26.07

25.79

25.99

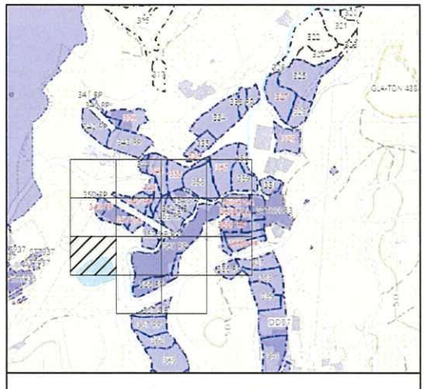
26.02

25.98

26.05

25.34

25.40



Scale 1: 20000

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Title :
Topographic Survey of Various Lots in DD87

Locality :
Sheung Shui, North

Survey Sheet No : 3-NW-22A/22B

Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO
(SHEET 9 OF 14)

Scale: 1:200 (A3)

Our Ref: 25019

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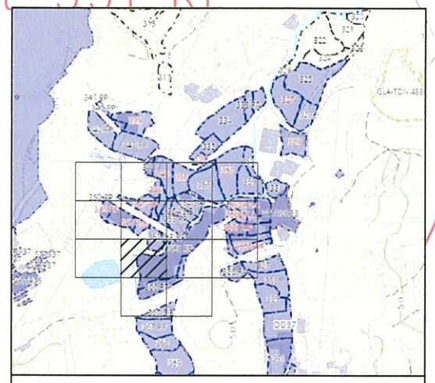
Lot 351 RP

Lot 361 RP

G.L.

G.L.

N



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Title :
Topographic Survey of Various Lots in DD87

Locality :
Sheung Shui, North

Survey Sheet No : 3-NW-22A/22B

Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO (SHEET 10 OF 14)

Scale: 1:200 (A3)

Our Ref: 25019

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Lot 361 RP

Lot 367 RP

G.L.

conc bldg

container

septic tank

bamboo

stream

footpath

wall width=0.1m
wall height=0.3m

Scale 1: 20000

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Locality :
Sheung Shui, North

Survey Sheet No : 3-NW-22A/22B

Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO
(SHEET 11 OF 14)

Scale: 1:200 (A3)

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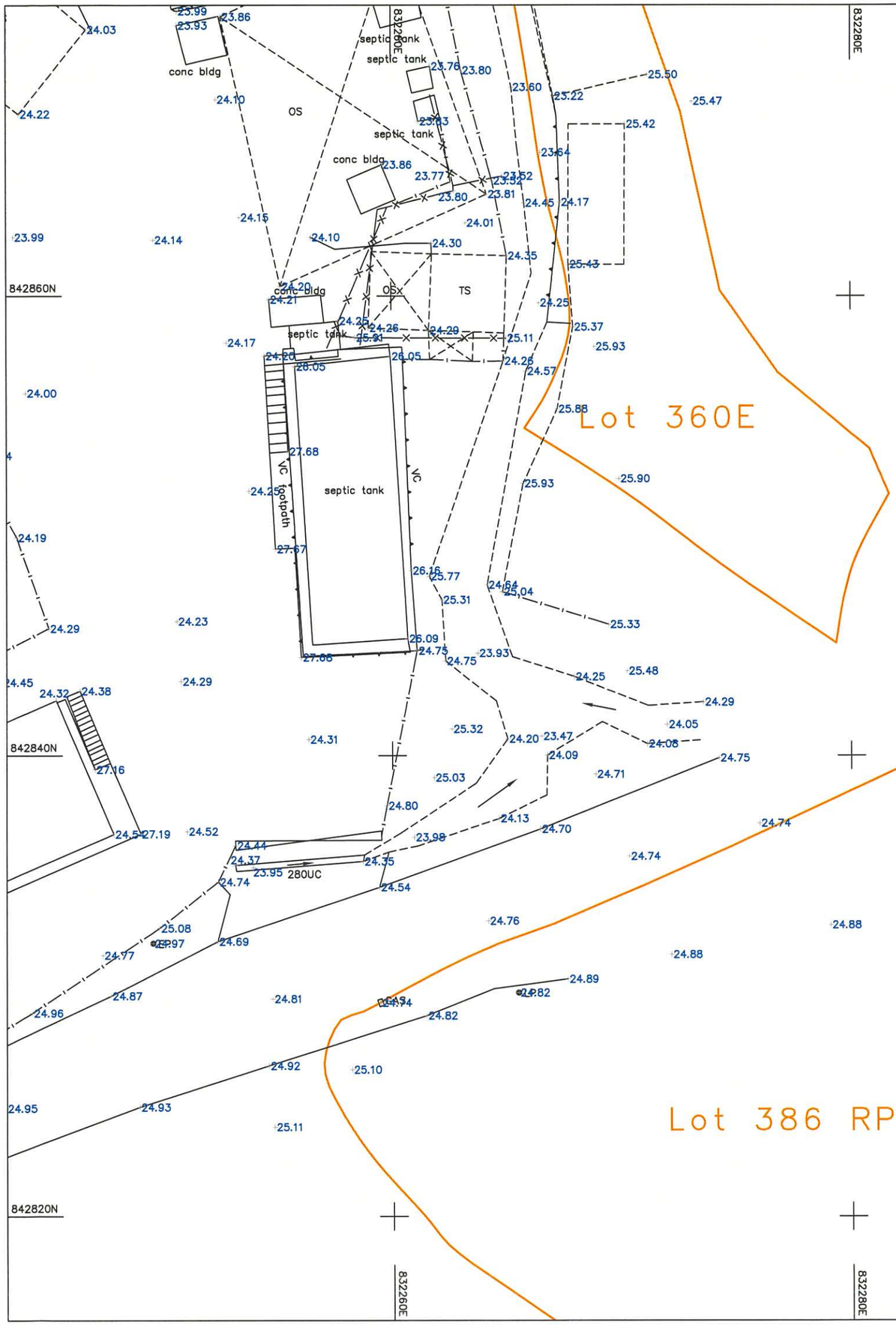

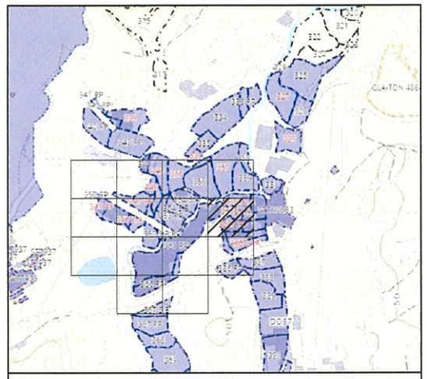

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Topographic Survey of Various Lots in DD87

Locality :
Sheung Shui, North

Survey Sheet No : 3-NW-22A/22B

Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO
(SHEET 12 OF 14)

Scale: 1:200 (A3)

Our Ref: 25019

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Scale 1:20000

Lot 366 RP

TS

KONG NGA PO ROAD

832180E | 832200E | 832220E | 832240E

842800N | 842780N | 842760N

25.17 | 25.21 | 25.14 | 25.50 | 25.80 | 25.51 | 25.44 | 25.53 | 25.60 | 25.73 | 25.84 | 26.19 | 26.05 | 26.19 | 26.23 | 26.38 | 26.69 | 28.39 | 26.86 | 28.28 | 28.18 | 27.52 | 28.18 | 28.10 | 28.39 | 28.00 | 28.15 | 28.04 | 28.48 | 28.28 | 27.31 | 27.45 | 26.99

25.63 | 25.66 | 25.37 | 25.70 | 25.79 | 25.28

25.13 | 25.99 | 26.36 | 25.94 | 26.14 | 25.97 | 26.22 | 25.12 | 26.65 | 25.99 | 26.70 | 26.93 | 25.97 | 27.01 | 26.99 | 26.88 | 26.71 | 26.88 | 26.97 | 26.83 | 26.84 | 27.63 | 27.44 | 27.89 | 27.49 | 27.94 | 27.92 | 26.91 | 27.39 | 27.94 | 27.05 | 6.78

250UC

LP TP

WS | WSD | 25.90 | 26.91 | 26.88 | 26.90

platform | platform | SP

ttrack

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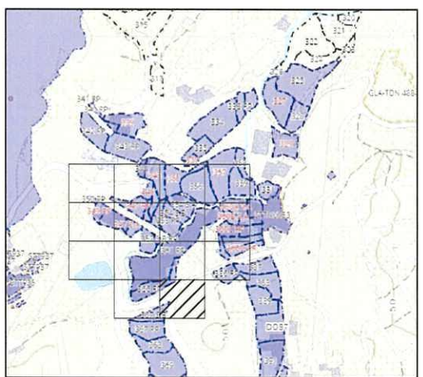

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Title :
Topographic Survey of Various Lots in DD87

Locality :
Sheung Shui, North

Survey Sheet No : 3-NW-22A/22B

Date of Survey : 14 April 2025

Plan No: DN/2212/87/351RP-TOPO
(SHEET 14 OF 14)

Scale: 1:200 (A3)

Our Ref: 25019

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APPENDIX C

Drainage Design Calculation

Design Calculation of U-Channel

Project : **S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 RP 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	1.0					
Catchment A	3250	m^2	(Effective catchment inside subject lots)	Rainfall Intensity =	229.4	mm/hr
Catchment B	4040	m^2	(Effective catchment inside subject lots)	Rainfall Intensity =	228.8	mm/hr
Catchment C	2480	m^2	(Effective catchment inside subject lots)	Rainfall Intensity =	206.2	mm/hr
Catchment D	1879.0	m^2	(Effective catchment outside subject lots)	Rainfall Intensity =	210.8	mm/hr
Catchment E	18173.0	m^2	(Effective catchment outside subject lots)	Rainfall Intensity =	224.7	mm/hr
Catchment F	16464.0	m^2	(Effective catchment outside subject lots)	Rainfall Intensity =	212.6	mm/hr
Catchment G	7705.0	m^2	(Effective catchment outside subject lots)	Rainfall Intensity =	221.2	mm/hr
Catchment H	4570.0	m^2	(Effective catchment outside subject lots)	Rainfall Intensity =	215.3	mm/hr
Catchment I	5413.0	m^2	(Effective catchment outside subject lots)	Rainfall Intensity =	206.0	mm/hr
Catchment J	3507.0	m^2	(Effective catchment outside subject lots)	Rainfall Intensity =	267.7	mm/hr
Catchment K	4257.0	m^2	(Effective catchment outside subject lots)	Rainfall Intensity =	252.1	mm/hr
Catchment L	1497.0	m^2	(Effective catchment outside subject lots)	Rainfall Intensity =	231.8	mm/hr
Allowance	10.0	%	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

Cathcment		USGL mPD	DSGL mPD	USIL mPD	DSIL mPD	AVG. DEPTH m	INVERT DIFF. m	LENGTH m	GRADIENT 1 in	RAINFALL INTENSITY mm/hr	RUNOFF COEF.	CATCH MENT m^2	Affected Area (catchment	EFF. AREA m^2	DESIGN FLOW m^3/s	CUM. DESIGN FLOW m^3/s	SIZE mm	TYPE	VEL m/s	ALLOWANCE (REDUCTION %)	FLOW CAP. m^3/s	SPARE CAP. m^3/s	UTILISATION %	RESULT	A (m^2)	P (m)	R (m)
E	Branch 1	27.00	26.00	26.50	25.51	0.49	0.99	99.0	100	224.7	0.2	18173	E	3634.6	0.22702	0.22702	375	UC	1.9	10	0.295	0.068	77	OK	0.152	1.194	0.127
Resultant & Discharge															0.22702	0.22702	375	UC	1.9	10	0.295	0.068	77	OK	0.152	1.194	0.127
A	Branch 2	26.00	25.00	25.30	24.58	0.42	0.71	71.0	100	229.4	1	3250	A	3250	0.20725	0.20725	375	UC	1.9	10	0.239	0.032	87	OK	0.127	1.046	0.121
Resultant & Discharge															0.20725	0.20725	375	UC	1.9	10	0.239	0.032	87	OK	0.127	1.046	0.121
C	Branch 3	25.00	24.50	24.50	23.25	1.25	1.25	124.0	100	206.2	1	2480	C	2480	0.14214	0.14214	350	UC	2.1	10	0.796	0.654	18	OK	0.381	2.691	0.141
L		25.00	25.00	24.50	23.25	1.75	1.25	124.0	100	231.8	0.2	1497	L	299.4	0.01929	0.01929	350	UC	2.1	10	1.149	1.130	2	OK	0.538	3.691	0.146
Resultant & Discharge															0.16143	0.16143	350	UC	2.1	10	0.796	0.635	20	OK	0.381	2.691	0.141
D	Branch 4	25.50	25.00	25.10	24.14	0.86	0.96	96.0	100	210.8	1	1879	D	1879	0.11013	0.11013	350	UC	2.0	10	0.524	0.414	21	OK	0.259	1.920	0.135
K		25.50	25.00	25.10	24.14	0.86	0.96	96.0	100	252.1	0.2	4257	K	851.4	0.05966	0.05966	350	UC	2.0	10	0.524	0.465	11	OK	0.259	1.920	0.135
Resultant & Discharge															0.16979	0.16979	350	UC	2.0	10	0.524	0.355	32	OK	0.259	1.920	0.135
I	Branch 5	24.50	24.50	24.10	22.98	1.52	1.12	113.0	101	206.0	1	5413	I	5413	0.31001	0.31001	350	UC	2.1	10	0.983	0.673	32	OK	0.467	3.240	0.144
J		24.50	24.50	24.10	22.98	1.52	1.12	113.0	101	267.7	0.2	3507	J	701.4	0.05220	0.05220	350	UC	2.1	10	0.983	0.931	5	OK	0.467	3.240	0.144
Resultant & Discharge															0.36221	0.36221	350	UC	2.1	10	0.983	0.621	37	OK	0.467	3.240	0.144
I	Branch 6	24.50	24.00	24.10	23.24	0.76	0.86	85.0	99	206.0	1	5413	I	5413	0.31001	0.31001	350	UC	2.0	10	0.457	0.147	68	OK	0.228	1.720	0.132
Resultant & Discharge															0.31001	0.31001	350	UC	2.0	10	0.457	0.147	68	OK	0.228	1.720	0.132

I	Branch 7	24.50	24.00	24.10	23.27	0.73	0.83	83.1	100	206.0	1	5413	I	5413	0.31001	0.31001	350	UC	2.0	10	0.433	0.123	72	OK	0.218	1.660	0.131
Resultant & Discharge															0.31001	0.31001	350	UC	2.0	10	0.433	0.123	72	OK	0.218	1.660	0.131
B	Branch 8	26.00	25.00	25.30	24.43	0.57	0.87	87.0	100	228.8	1	4040	B	4040	0.25694	0.25694	375	UC	2.0	10	0.356	0.099	72	OK	0.179	1.354	0.132
H		26.00	25.00	25.30	24.43	0.57	0.87	87.0	100	215.3	0.2	4570	H	914	0.05471	0.05471	375	UC	2.0	10	0.356	0.301	15	OK	0.179	1.354	0.132
Resultant & Discharge															0.31165	0.31165	375	UC	2.0	10	0.356	0.044	88	OK	0.179	1.354	0.132
F	Branch 9	26.00	26.00	25.50	24.90	1.10	0.60	60.2	100	221.2	1	7705	G	7705	0.47384	0.47384	375	UC	2.2	10	0.769	0.295	62	OK	0.358	2.414	0.148
Resultant & Discharge															0.47384	0.47384	375	UC	2.2	10	0.769	0.295	62	OK	0.358	2.414	0.148
F	Branch 10	27.00	26.00	25.97	25.61	0.39	0.36	35.5	100	212.6	0.2	16464	F	3292.8	0.19464	0.19464	375	UC	1.9	10	0.220	0.025	89	OK	0.118	0.994	0.119
Resultant & Discharge															0.19464	0.19464	375	UC	1.9	10	0.220	0.025	89	OK	0.118	0.994	0.119

Project : S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 I

Catchment Area : A

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A =	area of catchment (m^2)	=	3250.0	m^2
H =	average fall (per 100m) from the summit of catchment to the point of design	=	2.1	m
L =	length which water takes the longest time to reach the design section	=	117.8	m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1}))$ = 6.53 min say 6.53 min

From Figure 4d of Corrigendum No.1 2024 Stormwater Drainage Manual, assuming storm return period is 1 in 50 years,

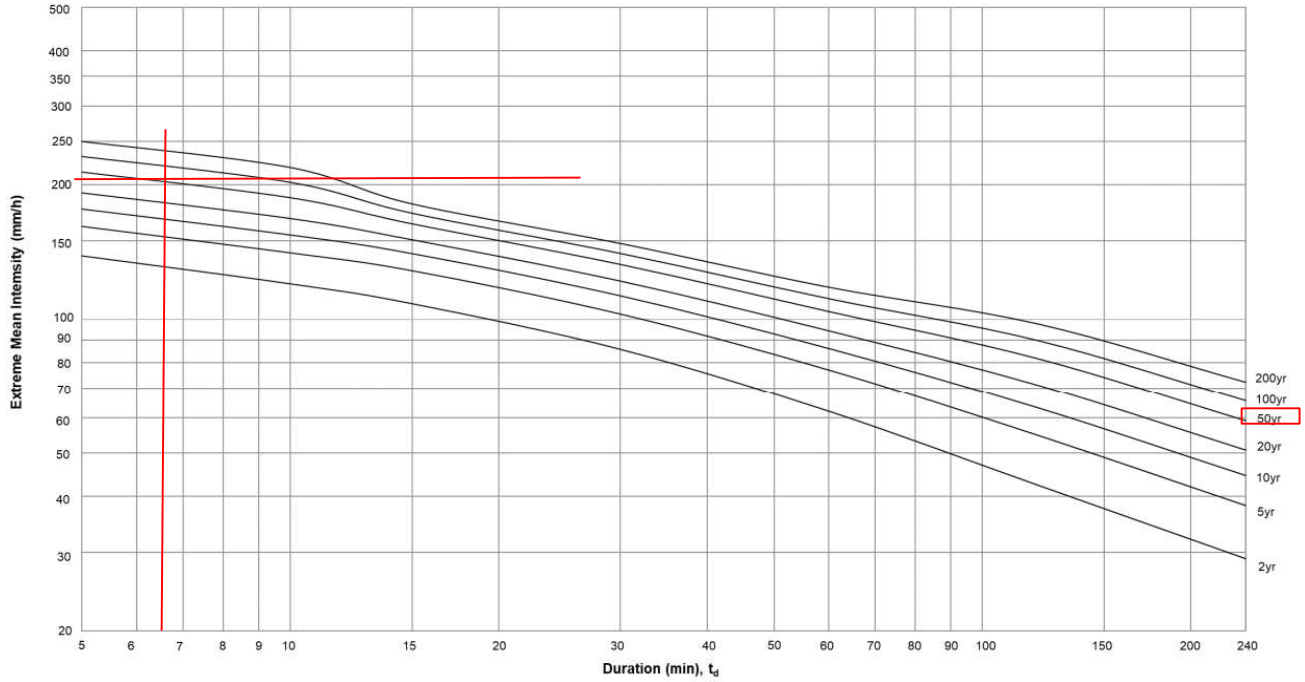


Figure 4d – Intensity-Duration-Frequency Curves of North District Area
(for durations not exceeding 4 hours)

i =	designed mean intensity of rainfall (mm/hr)	=	206.5	mm/hr
	Rainfall increased due to Climate Change (11.1%)	i x 1.111 =	229.4	mm/hr
	(With reference to Corrigendum-No.-1_2022-of-Stormwater-Drainage-Manual)			

Project : S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 I

Catchment Area : B

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A =	area of catchment (m^2)	=	4040.0	m^2
H =	average fall (per 100m) from the summit of catchment to the point of design	=	2.07	m
L =	length which water takes the longest time to reach the design section	=	121.0	m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1}))$ = 6.59 min say 6.59 min

From Figure 4d of Corrigendum No.1 2024 Stormwater Drainage Manual, assuming storm return period is 1 in 50 years,

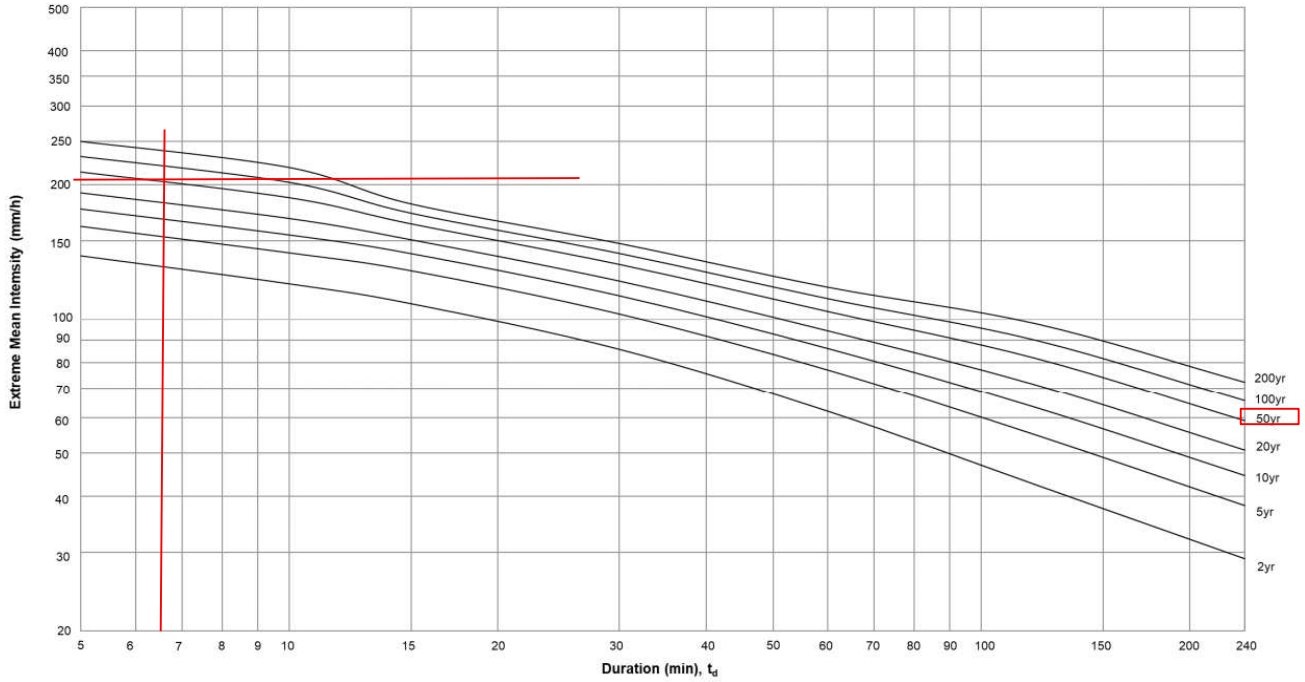


Figure 4d – Intensity-Duration-Frequency Curves of North District Area
(for durations not exceeding 4 hours)

i =	designed mean intensity of rainfall (mm/hr)	=	205.9	mm/hr
	Rainfall increased due to Climate Change (11.1%)	i x 1.111 =	228.8	mm/hr
	(With reference to Corrigendum-No.-1_2022-of-Stormwater-Drainage-Manual)			

Project : S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 I

Catchment Area : C

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A =	area of catchment (m^2)	=	2480.0	m^2
H =	average fall (per 100m) from the summit of catchment to the point of design	=	0.41	m
L =	length which water takes the longest time to reach the design section	=	122.2	m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1}))$ = 9.67 min say 9.67 min

From Figure 4d of Corrigendum No.1 2024 Stormwater Drainage Manual, assuming storm return period is 1 in 50 years,

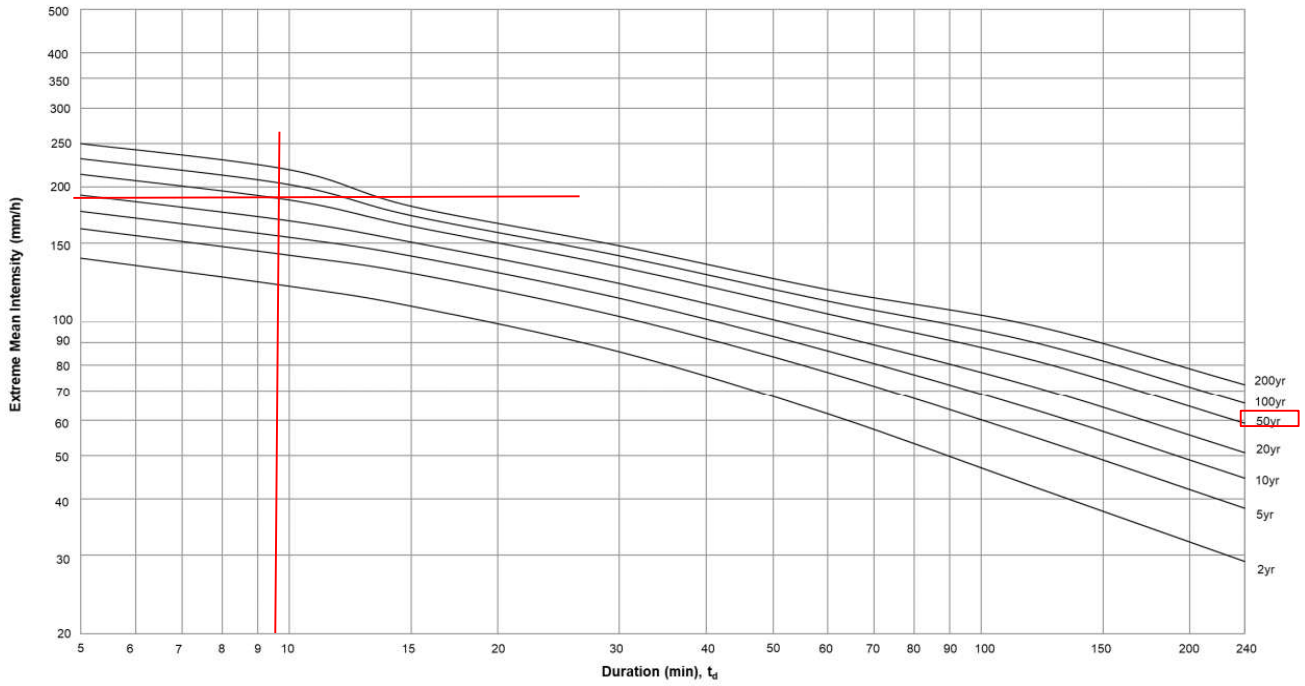


Figure 4d – Intensity-Duration-Frequency Curves of North District Area
(for durations not exceeding 4 hours)

i =	designed mean intensity of rainfall (mm/hr)	=	185.6	mm/hr
	Rainfall increased due to Climate Change (11.1%)	i x 1.111 =	206.2	mm/hr
	(With reference to Corrigendum-No.-1_2022-of-Stormwater-Drainage-Manual)			

Project : S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 I

Catchment Area : D

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A =	area of catchment (m^2)	=	1879.0	m^2
H =	average fall (per 100m) from the summit of catchment to the point of design	=	0.45	m
L =	length which water takes the longest time to reach the design section	=	111.8	m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1}))$ = 8.93 min say 8.93 min

From Figure 4d of Corrigendum No.1 2024 Stormwater Drainage Manual, assuming storm return period is 1 in 50 years,

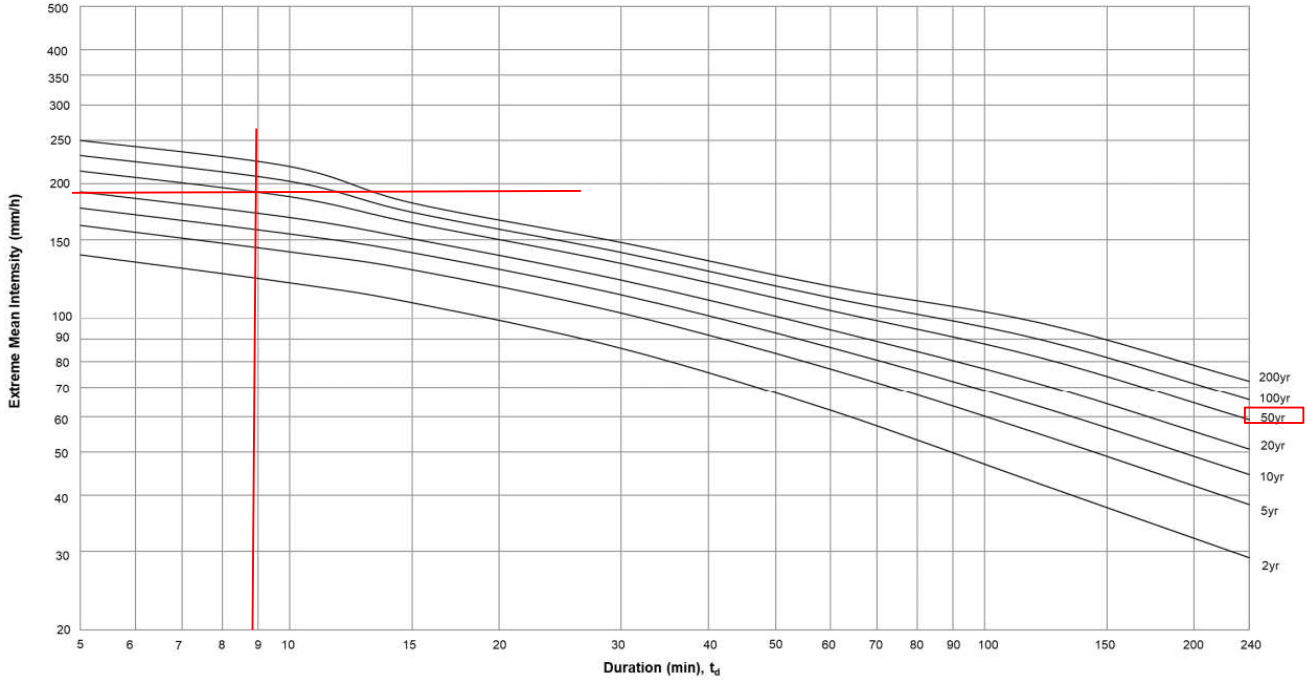


Figure 4d – Intensity-Duration-Frequency Curves of North District Area
(for durations not exceeding 4 hours)

i =	designed mean intensity of rainfall (mm/hr)	=	189.8	mm/hr
	Rainfall increased due to Climate Change (11.1%)	i x 1.111 =	210.8	mm/hr
	(With reference to Corrigendum-No.-1_2022-of-Stormwater-Drainage-Manual)			

Project : S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 I

Catchment Area : E

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A =	area of catchment (m^2)	=	18173.0	m^2
H =	average fall (per 100m) from the summit of catchment to the point of design	=	8.50	m
L =	length which water takes the longest time to reach the design section	=	200.0	m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1}))$ = 7.07 min say 7.07 min

From Figure 4d of Corrigendum No.1 2024 Stormwater Drainage Manual, assuming storm return period is 1 in 50 years,

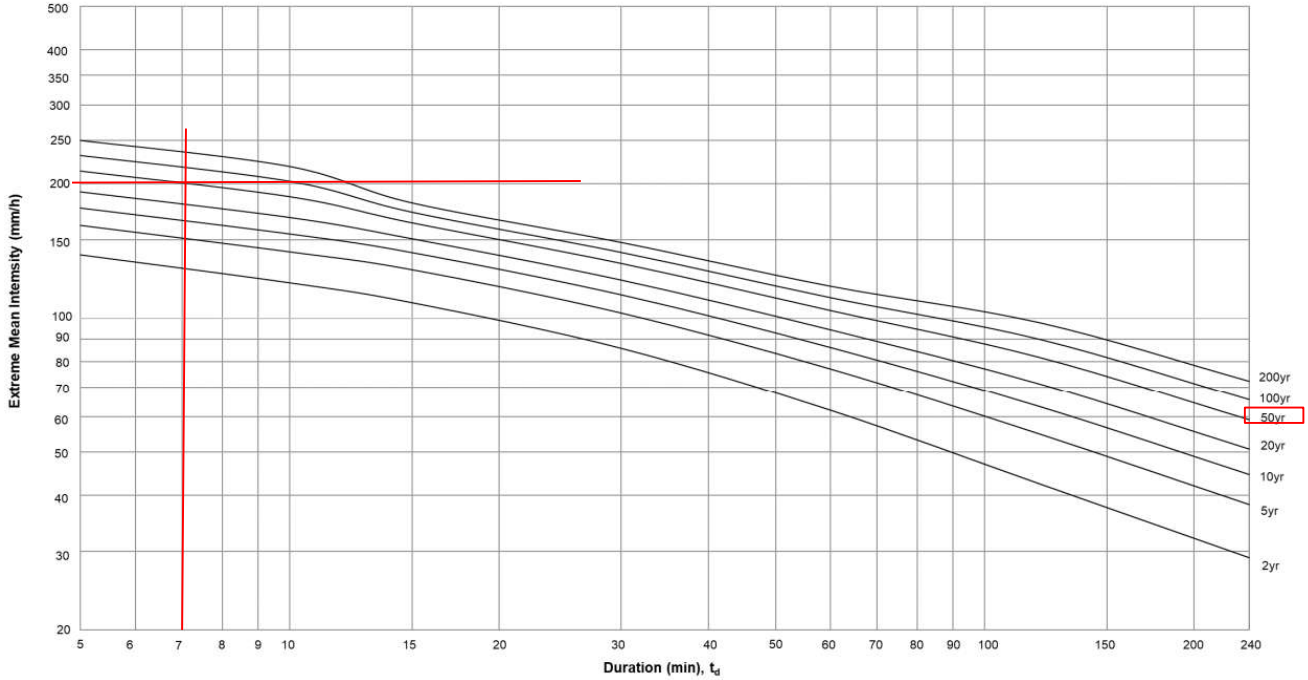


Figure 4d – Intensity-Duration-Frequency Curves of North District Area
(for durations not exceeding 4 hours)

i =	designed mean intensity of rainfall (mm/hr)	=	202.2	mm/hr
	Rainfall increased due to Climate Change (11.1%)	i x 1.111 =	224.7	mm/hr
	(With reference to Corrigendum-No.-1_2022-of-Stormwater-Drainage-Manual)			

Project : S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 I

Catchment Area : F

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A =	area of catchment (m^2)	=	16464.0	m^2
H =	average fall (per 100m) from the summit of catchment to the point of design	=	7.37	m
L =	length which water takes the longest time to reach the design section	=	236.0	m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1}))$ = 8.67 min say 8.67 min

From Figure 4d of Corrigendum No.1 2024 Stormwater Drainage Manual, assuming storm return period is 1 in 50 years,

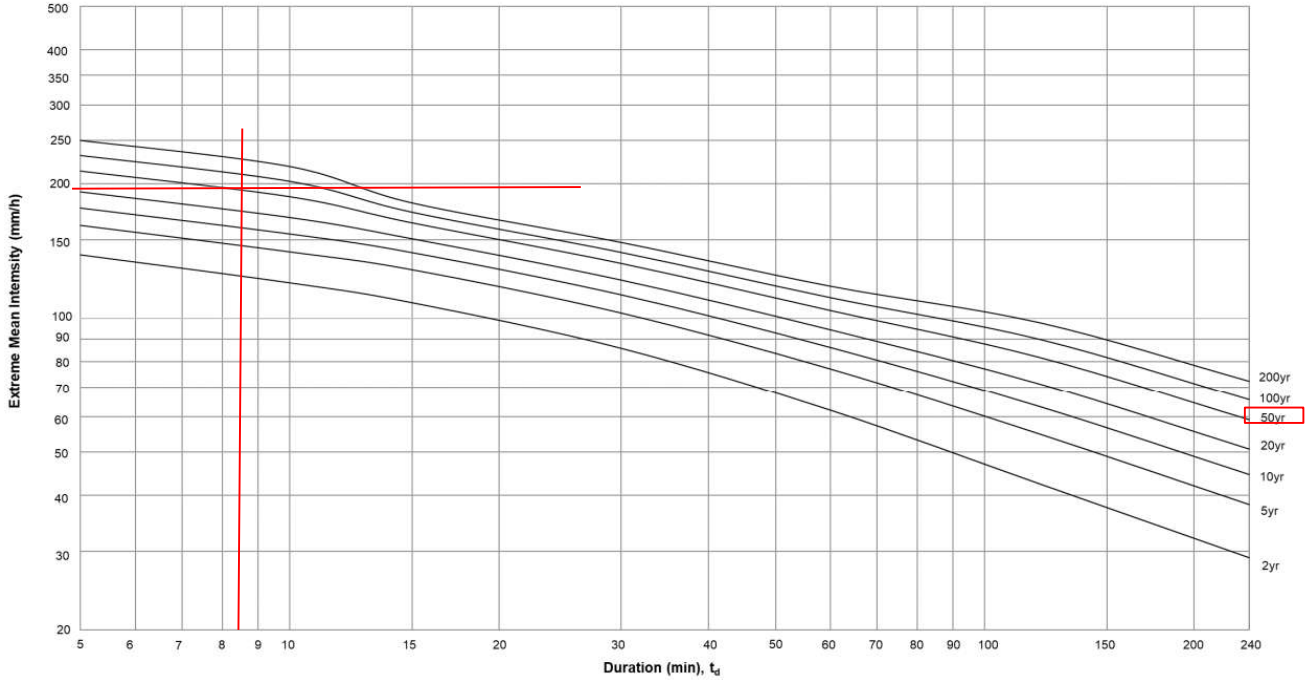


Figure 4d – Intensity-Duration-Frequency Curves of North District Area
(for durations not exceeding 4 hours)

i =	designed mean intensity of rainfall (mm/hr)	=	191.4	mm/hr
	Rainfall increased due to Climate Change (11.1%)	i x 1.111 =	212.6	mm/hr
	(With reference to Corrigendum-No.-1_2022-of-Stormwater-Drainage-Manual)			

Project : S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 I

Catchment Area : G

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A =	area of catchment (m^2)	=	7705.0	m^2
H =	average fall (per 100m) from the summit of catchment to the point of design	=	9.50	m
L =	length which water takes the longest time to reach the design section	=	199.0	m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1}))$ = 7.49 min say 7.49 min

From Figure 4d of Corrigendum No.1 2024 Stormwater Drainage Manual, assuming storm return period is 1 in 50 years,

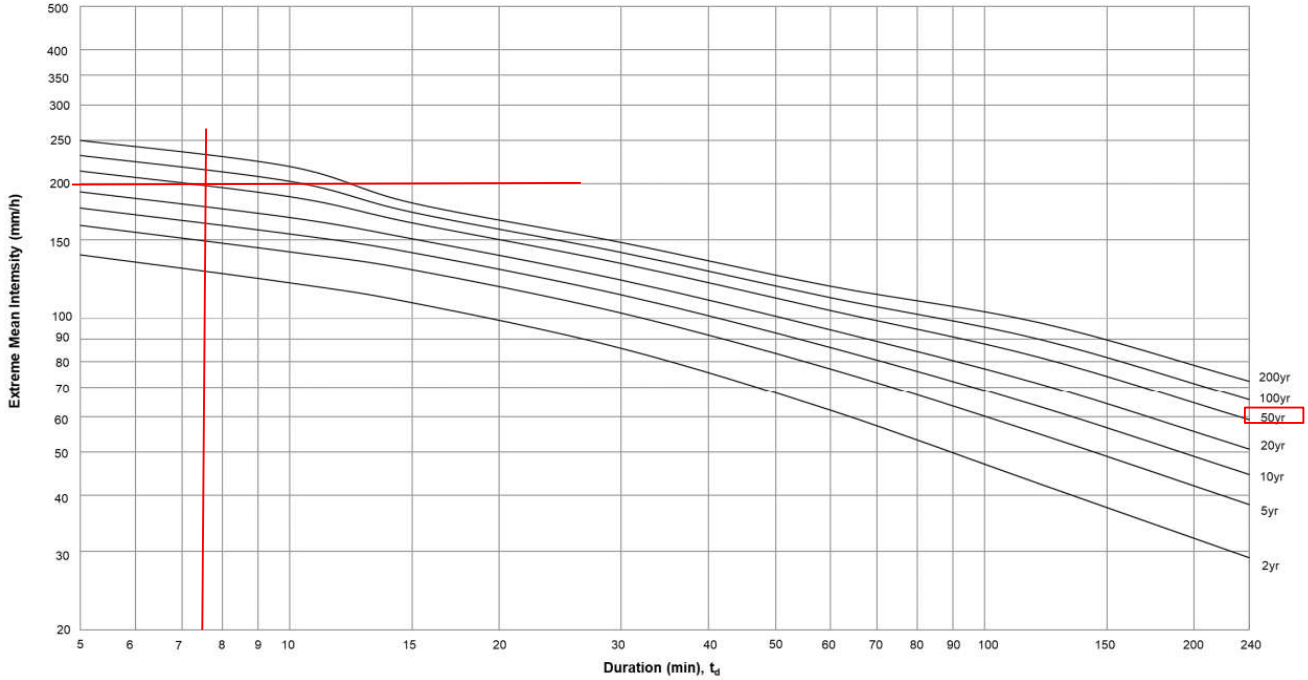


Figure 4d – Intensity-Duration-Frequency Curves of North District Area
(for durations not exceeding 4 hours)

i =	designed mean intensity of rainfall (mm/hr)	=	199.1	mm/hr
	Rainfall increased due to Climate Change (11.1%)	i x 1.111 =	221.2	mm/hr
	(With reference to Corrigendum-No.-1_2022-of-Stormwater-Drainage-Manual)			

Project : S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 I

Catchment Area : H

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A =	area of catchment (m^2)	=	4570.0	m^2
H =	average fall (per 100m) from the summit of catchment to the point of design	=	2.76	m
L =	length which water takes the longest time to reach the design section	=	163.0	m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1}))$ = 8.28 min say 8.28 min

From Figure 4d of Corrigendum No.1 2024 Stormwater Drainage Manual, assuming storm return period is 1 in 50 years,

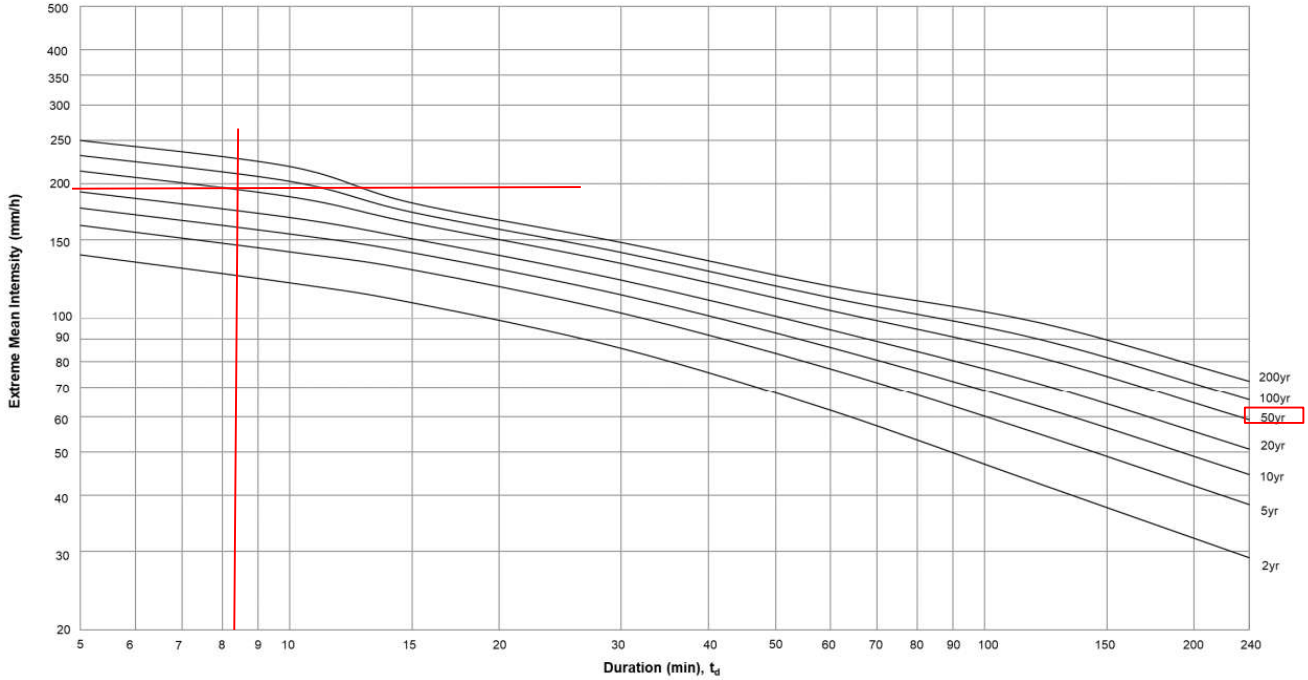


Figure 4d – Intensity-Duration-Frequency Curves of North District Area
(for durations not exceeding 4 hours)

i =	designed mean intensity of rainfall (mm/hr)	=	193.8	mm/hr
	Rainfall increased due to Climate Change (11.1%)	i x 1.111 =	215.3	mm/hr
	(With reference to Corrigendum-No.-1_2022-of-Stormwater-Drainage-Manual)			

Project : S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 I

Catchment Area : I

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A =	area of catchment (m^2)	=	5413.0	m^2
H =	average fall (per 100m) from the summit of catchment to the point of design	=	0.38	m
L =	length which water takes the longest time to reach the design section	=	130.7	m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1}))$ = 9.69 min say 9.69 min

From Figure 4d of Corrigendum No.1 2024 Stormwater Drainage Manual, assuming storm return period is 1 in 50 years,

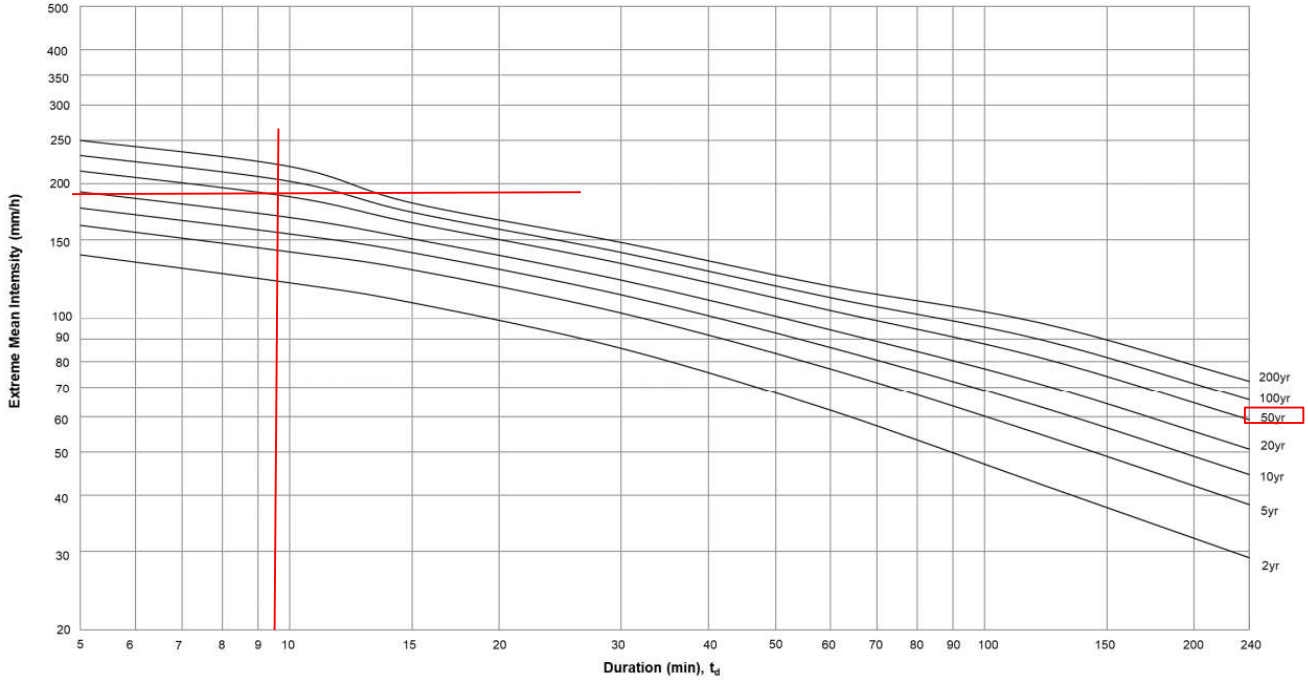


Figure 4d – Intensity-Duration-Frequency Curves of North District Area
(for durations not exceeding 4 hours)

i =	designed mean intensity of rainfall (mm/hr)	=	185.4	mm/hr
	Rainfall increased due to Climate Change (11.1%)	i x 1.111 =	206.0	mm/hr
	(With reference to Corrigendum-No.-1_2022-of-Stormwater-Drainage-Manual)			

Project : S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 I

Catchment Area : J

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A =	area of catchment (m^2)	=	3507.0	m^2
H =	average fall (per 100m) from the summit of catchment to the point of design	=	31.10	m
L =	length which water takes the longest time to reach the design section	=	103.2	m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1}))$ = 3.32 min say 3.32 min

From Figure 4d of Corrigendum No.1 2024 Stormwater Drainage Manual, assuming storm return period is 1 in 50 years,

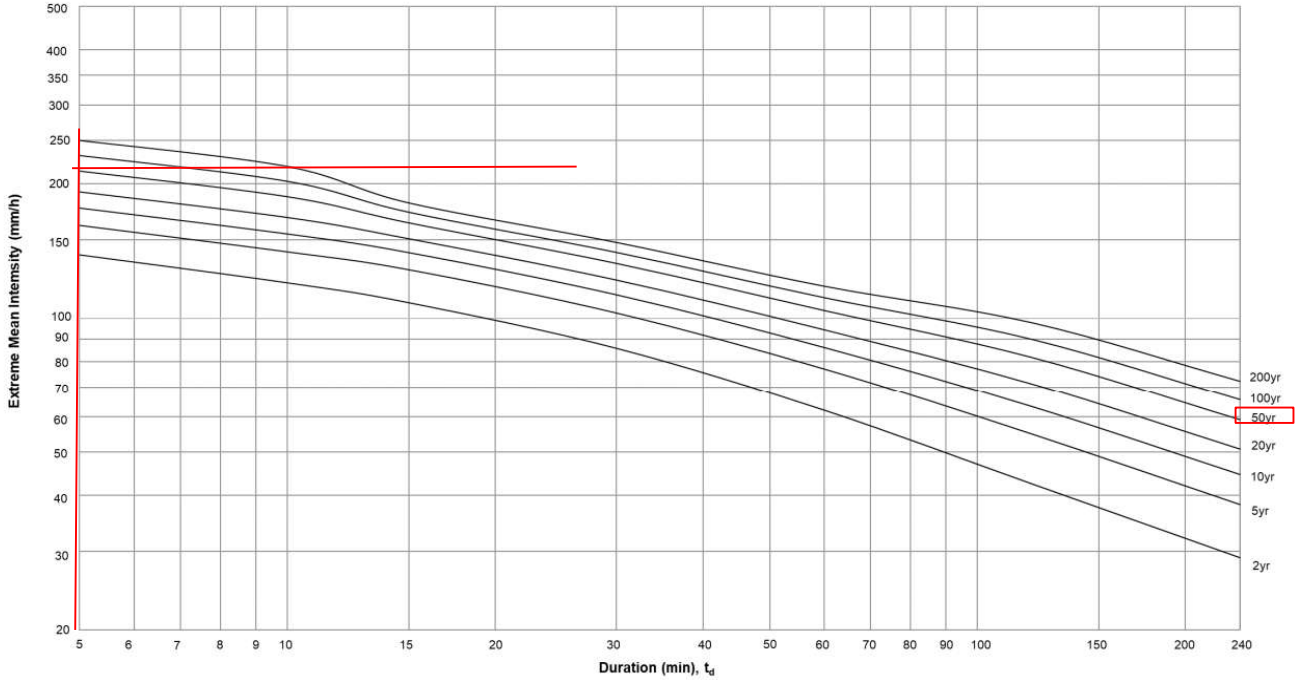


Figure 4d – Intensity-Duration-Frequency Curves of North District Area
(for durations not exceeding 4 hours)

i =	designed mean intensity of rainfall (mm/hr)	=	240.9	mm/hr
	Rainfall increased due to Climate Change (11.1%)	i x 1.111 =	267.7	mm/hr
	(With reference to Corrigendum-No.-1_2022-of-Stormwater-Drainage-Manual)			

Project : S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 I

Catchment Area : K

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A =	area of catchment (m^2)	=	4257.0	m^2
H =	average fall (per 100m) from the summit of catchment to the point of design	=	23.51	m
L =	length which water takes the longest time to reach the design section	=	132.3	m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1}))$ = 4.41 min say 4.41 min

From Figure 4d of Corrigendum No.1 2024 Stormwater Drainage Manual, assuming storm return period is 1 in 50 years,

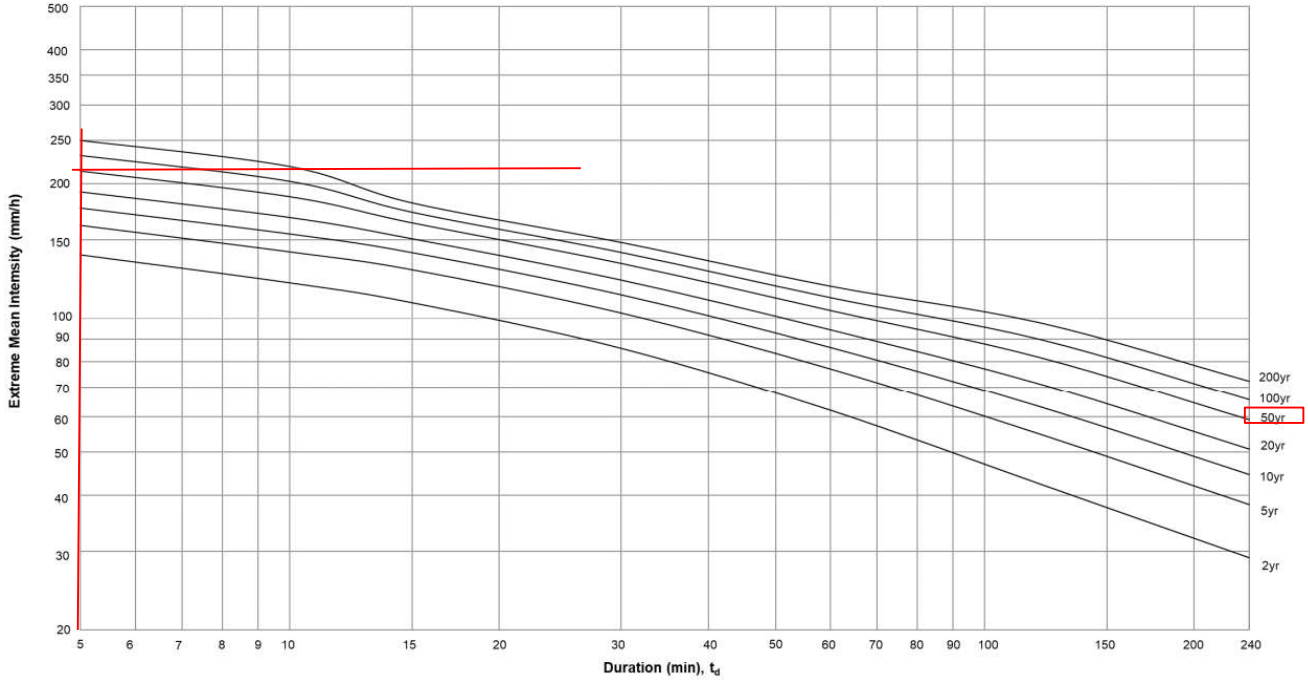


Figure 4d – Intensity-Duration-Frequency Curves of North District Area
(for durations not exceeding 4 hours)

i =	designed mean intensity of rainfall (mm/hr)	=	226.9	mm/hr
	Rainfall increased due to Climate Change (11.1%)	i x 1.111 =	252.1	mm/hr
	(With reference to Corrigendum-No.-1_2022-of-Stormwater-Drainage-Manual)			

Project : S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP (Part), 366 I

Catchment Area : L

Determination of Time of Concentration and Designed Mean Rainfall Intensity

A =	area of catchment (m^2)	=	1497.0	m^2
H =	average fall (per 100m) from the summit of catchment to the point of design	=	0.40	m
L =	length which water takes the longest time to reach the design section	=	75.0	m

Time of concentration, $t = 0.14456 \times (L / (H^{0.2} \times A^{0.1}))$ = 6.27 min say 6.27 min

From Figure 4d of Corrigendum No.1 2024 Stormwater Drainage Manual, assuming storm return period is 1 in 50 years,

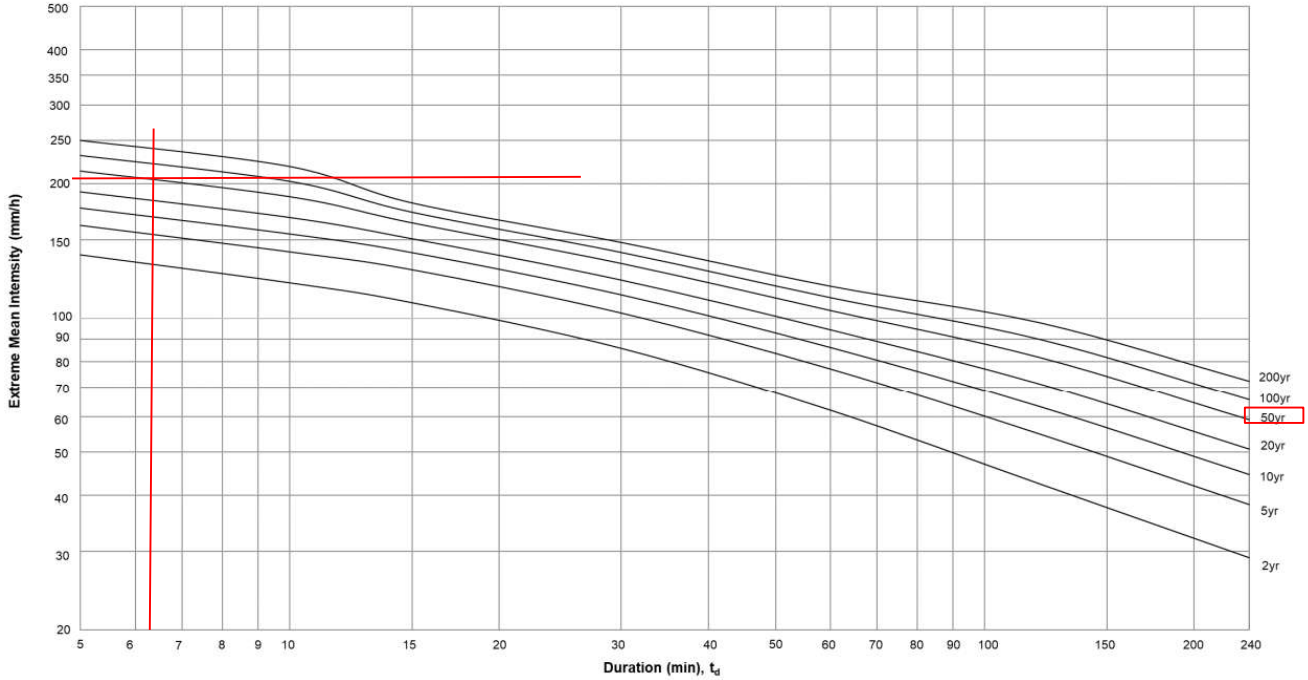


Figure 4d – Intensity-Duration-Frequency Curves of North District Area
(for durations not exceeding 4 hours)

i =	designed mean intensity of rainfall (mm/hr)	=	208.6	mm/hr
	Rainfall increased due to Climate Change (11.1%)	i x 1.111 =	231.8	mm/hr
	(With reference to Corrigendum-No.-1_2022-of-Stormwater-Drainage-Manual)			

Downstream Capacity Check

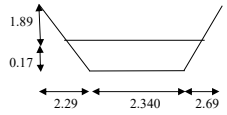
Project : **S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP, 366 RP in D.D. 87**

Total Discharge from Channels (data from U-channel calculation)

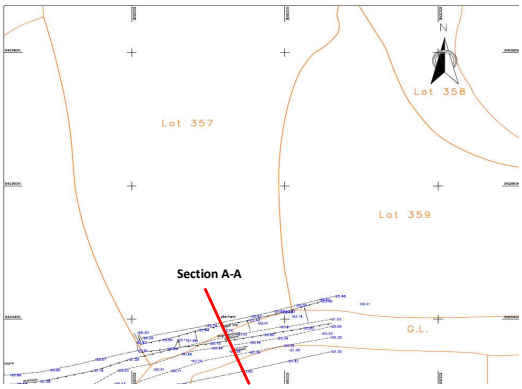
Branch 1	=	0.22702	m^3/s
Branch 2	=	0.20725	m^3/s
Branch 3	=	0.16143	m^3/s
Branch 4	=	0.16979	m^3/s
Branch 5	=	0.36221	m^3/s
Branch 6	=	0.31001	m^3/s
Branch 8	=	0.31165	m^3/s
Additional flow from channels		**1.74936**	m^3/s

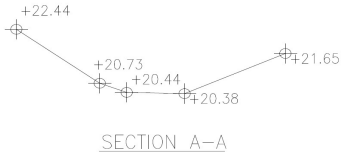
Calculation of Capacity of Existing Stream Course at Section A-A

Water level (from Ginfo)	=	20.55	mPD	
b = stream bottom width	=	5.856	m	Say 0.8t
t = stream top width	=	7.320	m	
z = stream side slope gradient	=	0.900		
y = remaining depth	=	1.89	m	Reference from Geotechnical Information Infrastructure (Ginfo) and topographic survey
P = stream wetted perimeter	=	8.70	m	
A = cross sectional flow area	=	12.45	m^2	
R = hydraulic radius (A/P)	=	1.431	m	
S = stream gradient	=	0.003		
n = Manning coefficient of roughness	=	0.03		
V = mean velocity = $R^{(2/3)}S^{(1/2)}/n$	=	2.33	m/s	
Q = remaining capacity of stream (VA)	=	29.01	m^3/s	
Additional flow from channels	>	**1.7494**	m^3/s	OK



S = 0.010538
(measure from Topo)
y = 1.89



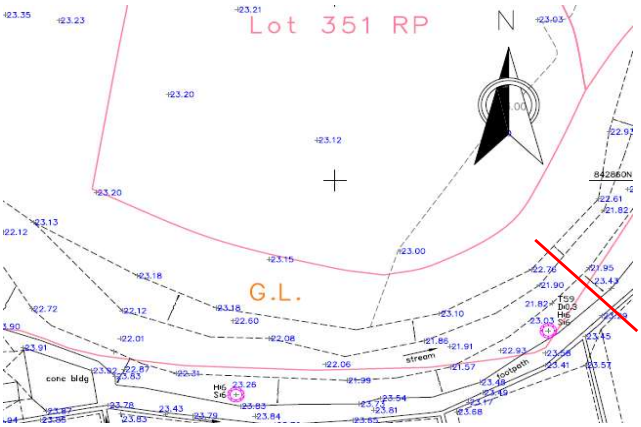


Plan view of Section A

Water level reference from Geotechnical Information Infrastructure (Ginfo)

Concrete Pipe Capacity Check

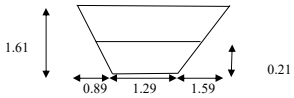
Project : **S.16 Planning Application at Lots 346, 347 S.A, 347 S.B, 348 RP, 349 RP, 351 RP, 352 S.B RP, 361 RP, 366 RP in D.D. 87**



Section B-B

Plan view of Section B

Water level reference from Geotechnical Information Infrastructure (Ginfo)



Calculation of Flow of Existing Stream Course at Section A-A

	Water level (from Ginfo)	=	22.03 mPD	
b =	stream bottom width	=	1.290 m	
t =	stream top width	=	3.770 m	
z =	stream side slope gradient	=	1.81 m	
y =	water depth	=	0.21 m	Reference from Geotechnical Information Infrastructure (Ginfo) and topographic survey
P =	stream wetted perimeter	=	1.77 m	
A =	cross sectional flow area	=	0.19 m^2	
R =	hydraulic radius (A/P)	=	0.106 m	
S =	stream gradient	=	0.020	
n =	Manning coefficient of roughness	=	0.03	
V =	mean velocity = $R^{(2/3)}S^{(1/2)}/n$	=	1.06 m/s	
Q =	Flow of Existing Stream (VA)	=	0.20 m^3/s	

Discharge form Channels

	Branch 1	=	0.22702 m^3/s
	Branch 2	=	0.20725 m^3/s
	Branch 3	=	0.16143 m^3/s
	Branch 4	=	0.16979 m^3/s
	Branch 5	=	0.36221 m^3/s
			1.12770 m^3/s

Total Upstrean Flow = 1.32633 m^3/s

Calculation of Capacity of Concrete Pipe

D =	pipe diameter	=	0.8 m	
	number of pipe	=	1	
P =	pipe wetted perimeter	=	2.51 m	
A =	cross sectional flow area	=	0.50 m^2	
R =	hydraulic radius (A/P)	=	0.200 m	
S =	pipe gradient	=	0.023	
n =	Manning coefficient of roughness	=	0.015	
V =	mean velocity = $R^{(2/3)}S^{(1/2)}/n$	=	3.42 m/s	
Q =	capacity of concrete pipe (VA)	=	1.72 m^3/s	
		>	**1.32633**	OK
				77.06 %

APPENDIX D

Design Drawings

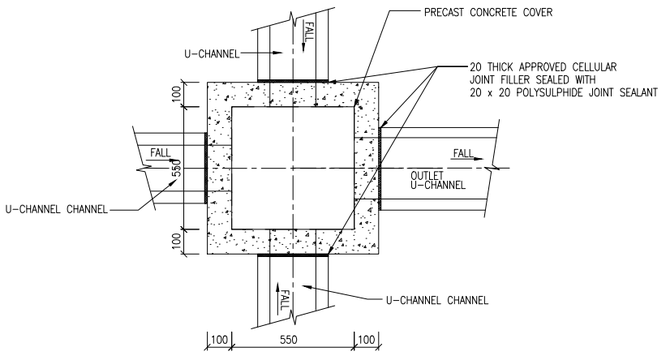
ISO A1 594mm x 841mm

GENERAL NOTES:

1. GRADE 40D CONCRETE SHALL BE USED UNLESS OTHERWISE STATED.
2. 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.
3. ALL U-CHANNEL SHALL BE GRADIENT 1:100 UNLESS OTHERWISE STATED.
4. GRATE COVERS SHALL BE PROVIDED FOR THE SECTION THAT VEHICLE MAY CROSS THE CHANNELS.

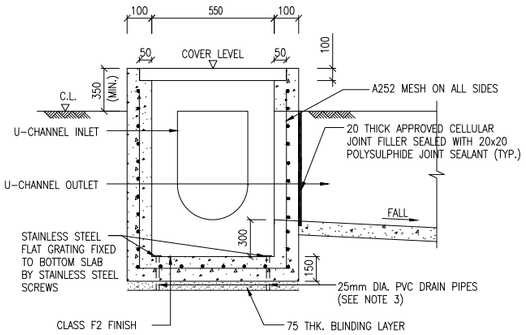
SCHEDULE OF CATCHPIT WITH SAND TRAP

CATCHPIT NO.	CATCHPIT TYPE	COVER LEVEL (mPD)	BTM. LEVEL (mPD)	INLET LEVEL (mPD)	OUTLET LEVEL (mPD)
CP1	2	+26.00	+25.35	+25.51	+25.50
CP2	2	+25.00	+24.39	+24.55	+24.54
CP3	2	+24.50	+22.82	A: +22.98	+22.97
				B: +23.30	
CP4	2	+25.00	+23.73	+23.89	A: +23.88
					B: +23.88
CP5	1	+25.00	+23.98	+24.14	+24.13
CP6	1	+25.00	+24.51	+24.67	+24.66
CP7	1	+24.50	+23.12	+23.28	+23.27
CP8	1	+24.50	+23.40	+23.56	+23.55
CP9	2	+24.00	+23.08	A: +23.24	+23.23
				B: +23.27	
CP10	1	+24.00	+23.38	+23.54	+23.53
CP11	2	+25.00	+24.27	+24.43	+24.42
CP12	1	+26.00	+25.28	+25.44	+25.43
CP13	1	+26.00	+24.65	A: +24.90	+24.89
				B: +25.61	



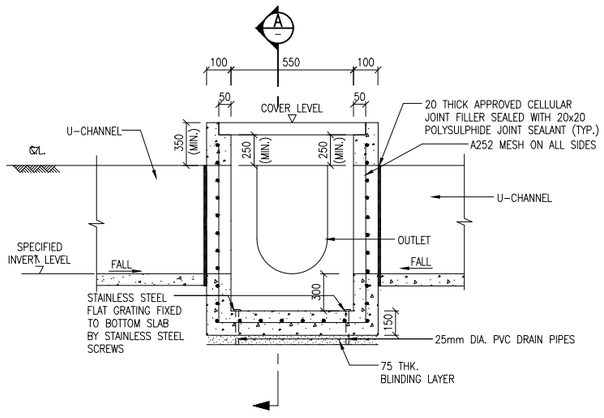
PLAN OF CATCHPIT (TYPE 1&2)

(REFERENCE: CEDD STANDARD DRAWING NO. IC2406_1&2)
N.T.S.



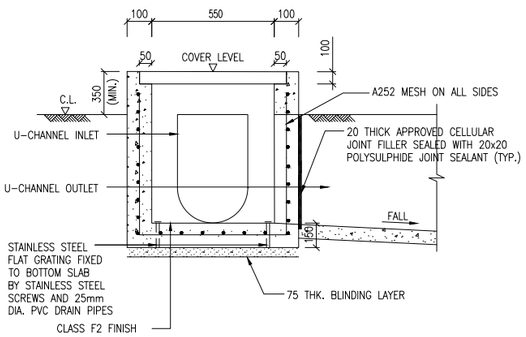
SECTION A

SCALE: 1:100



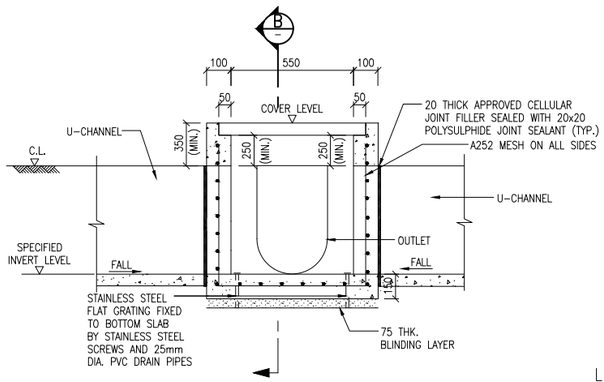
SECTION OF TYPE 2 CATCHPIT

SCALE 1:100



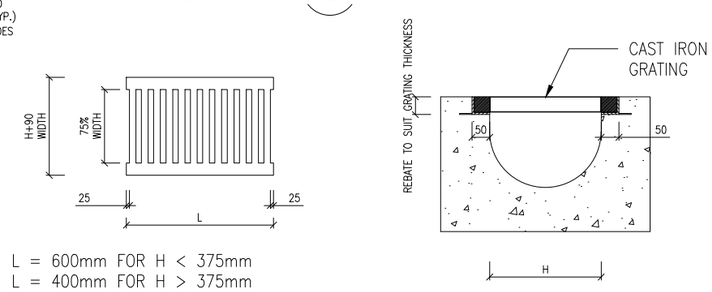
SECTION B

SCALE: 1:100



SECTION OF TYPE 1 CATCHPIT

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.

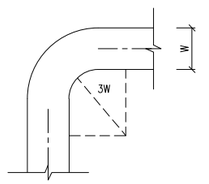
PLAN

SCALE 1:600

LEGEND:

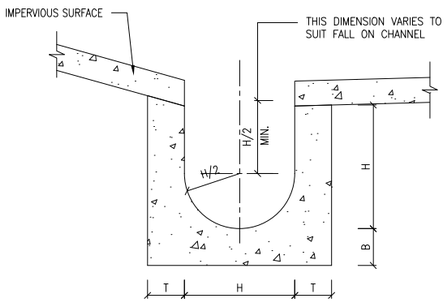
- PROPOSED APPLICATION SITE
- STRUCTURE
  - A: 737 sq.m (about)
  - B: 220 sq.m (about)
  - C: 1200 sq.m (about)
  - D: 220 sq.m (about)
  - E: 220 sq.m (about)
- OPEN-SIDED STRUCTURE
  - F: 393 sq.m (about)
- PRIVATE CARPARKING SPACE 5m(L) X 2.5m(W) (10 nos.)
- L/UL BAY FOR LGVS 7m(L) X 3.5m(W) (12 nos.)
- L/UL BAY FOR HGVS 11m(L) X 3.5m(W) (12 nos.)
- PROPOSED 11m WIDE VEHICULAR ACCESS

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



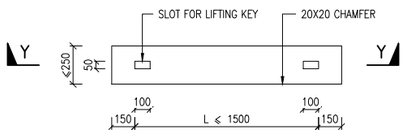
CHANNEL CHANGING DIRECTION THROUGH BENDS

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



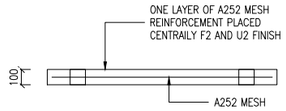
DETAILS OF U-CHANNEL

(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.

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

SIGNATURE FOR SUBMISSION/ CONSTRUCTION

PROJECT NO:	25086		
DRAWN BY:	MP		05/25
DESIGNED BY:	MP		05/25
CHECKED BY:	RM		05/25
APPROVED BY:	VT		05/25
SCALE:	AS SHOWN (A3)		
CAD FILE:	WNG_25086_C_DRA_001		

PROJECT:
DRAINAGE CONSULTANCY SERVICES FOR S.16 PLANNING APPLICATION FOR PROPOSED TEMPORARY OPEN STORAGE AND ANCILLARY OFFICE AT LOT NOS 346 IN DD87 AT PING CHE

DRAWING TITLE:
GENERAL NOTES AND LAYOUT PLAN

DRAWING NO: WNG/25086/C/DRA/001

REV: –

WINGS & ASSOCIATES CONSULTING ENGINEERS LTD.
和昇顧問工程師有限公司

Plot File by: USER31 6/4/2025 2:43:33 PM
PATH \\192.168.1.26\eng4-r\2025\P25086 (Drainage Consultancy Services For S.16 Planning Application For Proposed Temporary Open Storage And Ancillary Office At Lot Nos 346 In DD87 At Ping Che)\05-Drawing\20250602\WNG_25086_C_DRA_001.dwg

ISO A3 297mm x 420mm

N

832000 E

832200 E

832400 E

843200 N

843000 N

842800 N

CATCHMENT F 16404m²

CATCHMENT G 7705m²

CATCHMENT H 4570m²

CATCHMENT B 4040m²

CATCHMENT I 5413m²

CATCHMENT E 18173m²

CATCHMENT A 3250m²

CATCHMENT C 2480m²

CATCHMENT L 1331m²

CATCHMENT D 1879m²

CATCHMENT K 4024m²

CATCHMENT J 3507m²

FALL

Hong Nga Po

Rifle Range

Open Storage

Track

Road

Pigsty

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

LEGEND:

FLOW DIRECTION

BOUNDARY OF LOTS FOR THIS APPLICATION

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

SIGNATURE FOR SUBMISSION/ CONSTRUCTION

PROJECT NO:	25086		
DRAWN BY:	MYZ		05/25
DESIGNED BY:	NL		05/25
CHECKED BY:	RM		05/25
APPROVED BY:	VT		05/25
SCALE:	1:2000 (A3)		
CAD FILE:	WNG_25086_C_DRA_002-3		

PROJECT:

DRAINAGE CONSULTANCY SERVICES FOR S.16 PLANNING APPLICATION FOR PROPOSED TEMPORARY OPEN STORAGE AND ANCILLARY OFFICE AT LOT NOS 346 IN DD87 AT PING CHE

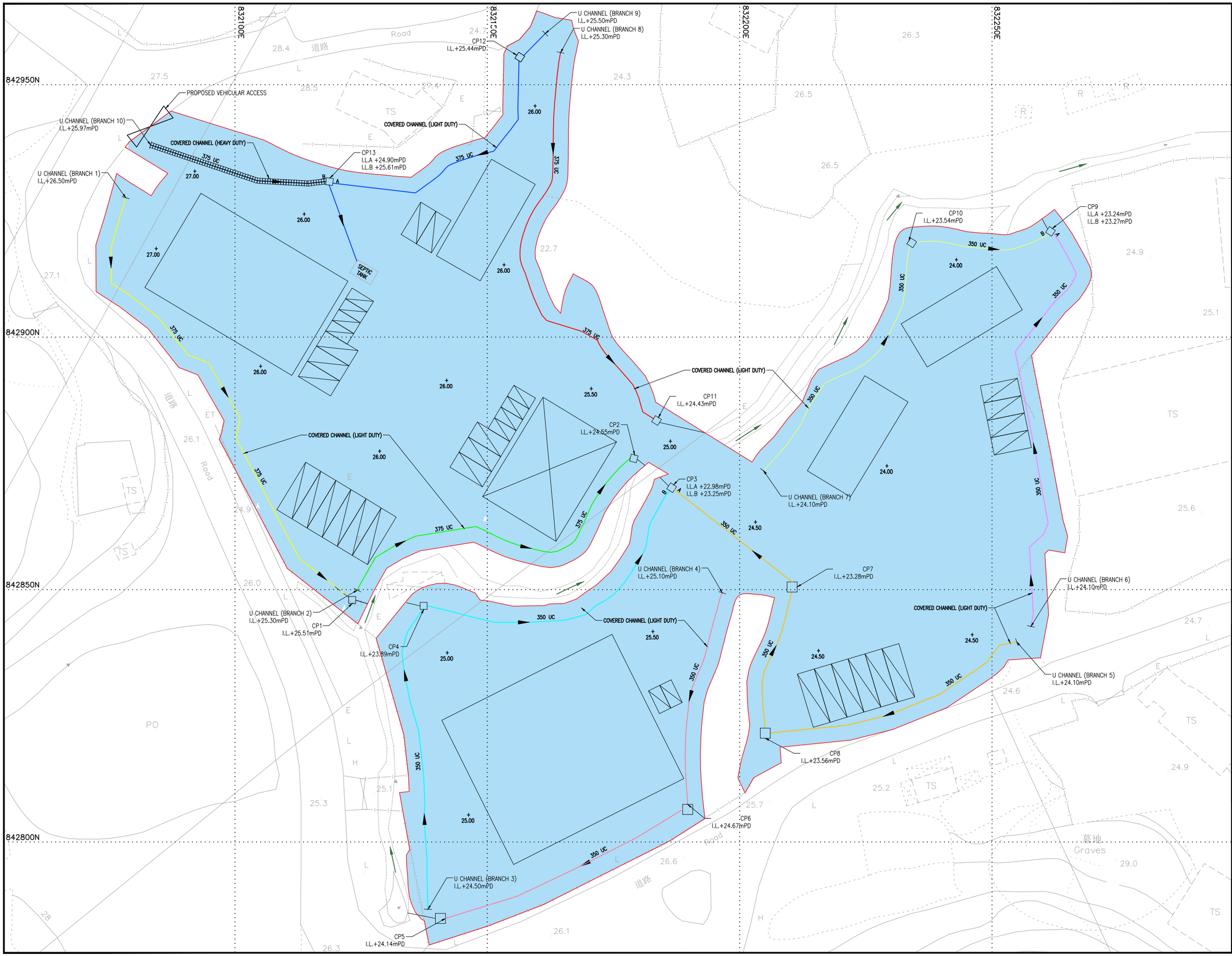
DRAWING TITLE:

PROPOSED EFFECTVE CATCHMENT AREA FOR SURFACE RUNOFF AFFECTING SUBJECT LOTS

DRAWING NO:	REV:
WNG/25086/C/DRA/002	–

WINGS & ASSOCIATES CONSULTING ENGINEERS LTD.
和源顧問工程師有限公司

ISO A3 297mm x 420mm



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

LEGEND:

- FLOW DIRECTION OF STREAM
- BOUNDARY OF LOTS FOR THIS APPLICATION
- PROPOSED 11m WIDE VEHICULAR ACCESS

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

SIGNATURE FOR SUBMISSION/ CONSTRUCTION

PROJECT NO:	25086		
DRAWN BY:	MYZ		05/25
DESIGNED BY:	NL		05/25
CHECKED BY:	RM		05/25
APPROVED BY:	VT		05/25
SCALE:	1:2000 (A3)		
CAD FILE:	WNG_25086_C_DRA_002-3		

PROJECT:
DRAINAGE CONSULTANCY SERVICES FOR S.16 PLANNING APPLICATION FOR PROPOSED TEMPORARY OPEN STORAGE AND ANCILLARY OFFICE AT LOT NOS 346 IN DD87 AT PING CHE

DRAWING TITLE:
PROPOSED DRAINAGE SYSTEM

DRAWING NO:	REV:
WNG/25086/C/DRA/003	–

華輝顧問工程師有限公司
WINGS & ASSOCIATES
CONSULTING ENGINEERS LTD.