

STORMWATER DRAINAGE PROPOSAL

FOR

**LOT NO. 215 RP IN D.D. 78,
TA KWU LING, N.T.**

ISSUE 1

March 2025

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1. INTRODUCTION

This report is submitted for the drainage works on Lot No. 215 RP in D.D.78, Ta Kwu Ling, N.T..

This report presents the stormwater drainage proposal. The lot index plan and the survey plan of the site which endorsed by land surveyor are shown in Figure 1 and 2.

2. SITE DESCRIPTION

The site is a vegetation surface which located at open space area, and the site is divided by 2 portions (northern part and southern part) which separated by access road. The ground level is about +22.0mPD to +23.0mPD dipping from south to north and occupied an area of approximately 2458m². The eastern side of the site is North East New Territories (NENT) Landfill.

An existing channel is located at the northern side of the site (northern part). The surface runoff of the site and adjacent open area is discharged to the existing drainage channel (Plate 4). Location of the site is shown on Figure 1 and 2. Photographs showing general views of the area are shown in Plate 1 to 5.

3. STORMWATER DRAINAGE PROPOSAL

Based on the existing topography, the level of site is +22.0mPD to +23.0mPD dipping from southern to northern direction, the existing surface runoff of the site and adjacent open area is discharge to the existing drainage system.

For the proposed drainage system, as no site formation work is proposed, the collection of surface runoff is remained unchanged, it is evident that no additional stormwater will be imposed to the existing public drainage system.

Peripheral 600mm U-channel will be constructed to collect the stormwater from the sites to the proposed catchpit and the desilting trap will be constructed in the last catchpit before discharge to the existing drainage system. The drainage arrangement is shown on Stormwater Drainage Plan in Appendix B.

The surface channel is designed in accordance with Geotechnical Manual for Slopes (1984). Rational Method is adopted to estimate the quantity of surface runoff based upon a storm of two hundred-year return period. Runoff coefficient of 1.0 is used. The runoff is designed to 4.0m/s permissible flow velocity and 1.0m/s minimum flow velocity for self-cleaning.

Design calculation for the surface channel is presented in Appendix A. Construction details of the proposed drainage works are shown on the plan in Appendix B.

The proposed drainage works, whether within or outside the lot boundary, shall be constructed and maintained by the lot owner at his own expense. **For works to be undertaken outside the lot boundary, prior consent from the DLO and/or relevant private lot owners shall be sought.** It is also the duty of the Lot owner to protect the site from being eroded and flooded.

FIGURES

摘要說明：本地段索引圖在其背景的地形圖上標示了各種永久和短期持有的二地的圖像界線。這些土地包括私人地段、政府撥地、短期租約批地，以及其他作核准用途的二地。請注意：(1)本索引圖上的資料會被不時更新而不作事先通知；(2)索引圖的更新或會延後於有關資料的實際變更；以及(3)本索引圖中顯示的界線僅供識別之用，資料是否準確可靠，應徵詢專業土地測量師的意見。

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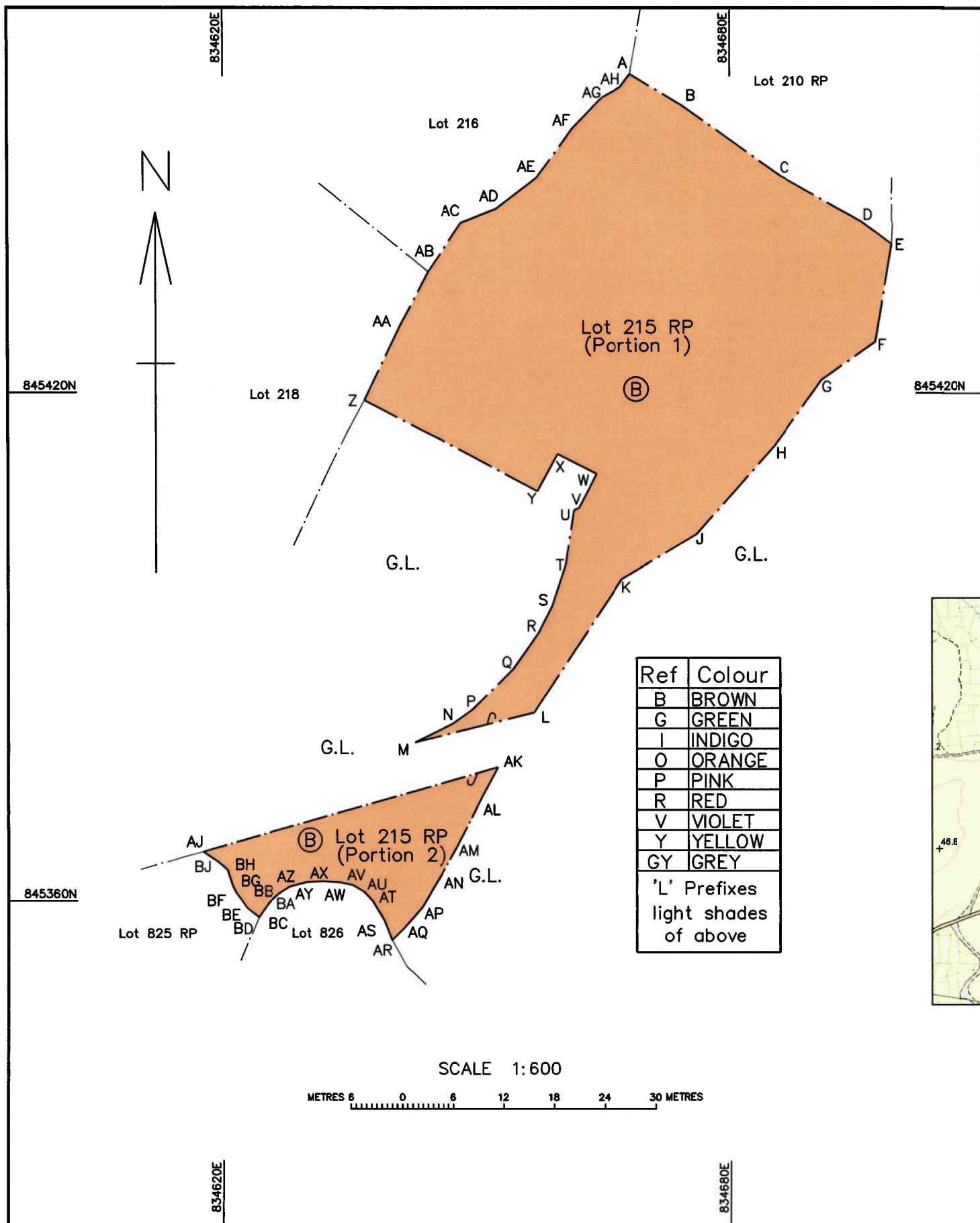


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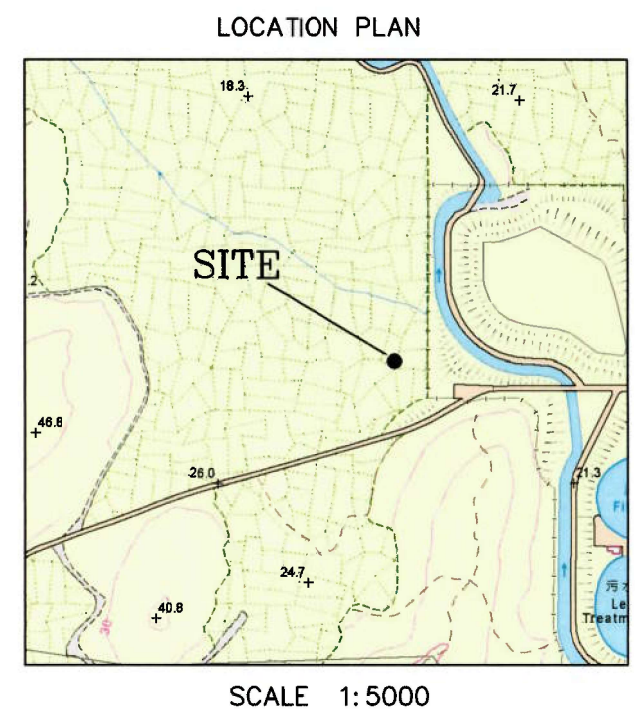
metres 10 0 10 20 30 40 50 metres

Locality :
Lot Index Plan No. : ags_S00000132999_0001
District Survey Office : Lands Information Center
Date :20-Sep-2024
Reference No. : 3-NW-14A

Figure 1



Lot 215 RP in D.D.78 (Portion 2)					
AJ			845365.853	834617.527	
AK	74 02 01	36.365	845375.856	834652.489	
AL	208 18 55	4.038	845372.301	834650.573	
AM	206 47 26	6.593	845366.416	834647.602	
AN	209 51 10	4.573	845362.450	834645.326	
AP	210 26 02	3.553	845359.386	834643.526	
AQ	220 27 20	3.052	845357.064	834641.546	
AR	224 46 16	2.226	845355.484	834639.978	
AS	338 09 56	2.546	845357.847	834639.031	
AT	329 31 13	2.546	845360.041	834637.740	
AU	317 37 14	1.521	845361.164	834636.715	
AV	300 55 37	1.528	845361.949	834635.404	
AW	282 02 08	1.526	845362.267	834633.912	
AX	273 38 42	2.043	845362.397	834631.874	
AY	266 39 04	2.035	845362.278	834629.842	
AZ	254 58 02	2.033	845361.751	834627.879	
BA	237 45 00	1.529	845360.935	834626.586	
BB	227 58 01	1.525	845359.914	834625.452	
BC	215 58 00	1.528	845358.677	834624.555	
BD	215 04 07	0.639	845358.154	834624.188	
BE	306 59 56	1.849	845359.267	834622.711	
BF	323 49 51	2.033	845360.908	834621.512	
BG	331 53 50	1.016	845361.805	834621.033	
BH	341 09 26	2.032	845363.728	834620.377	
BJ	310 52 29	1.526	845364.727	834619.222	
AJ	303 35 46	2.036	845365.853	834617.527	



Notes: SUBJECT LOT COORDINATES & DIMENSIONS:				
Boundary Point	Bearing	Distance in metres	Northing	Easting
Lot 215 RP in D.D.78 (Portion 1)				
A			845457.697	834668.319
B	121 32 15	7.097	845453.985	834674.367
C	125 32 25	14.205	845445.729	834685.926
D	119 22 53	11.068	845440.298	834695.570
E	126 33 16	4.389	845437.684	834699.096
F	189 33 31	11.739	845426.109	834697.146
G	234 24 03	7.802	845421.567	834690.802
H	215 42 11	9.559	845413.805	834685.224
J	221 33 41	14.027	845403.309	834675.918
K	238 58 13	10.176	845398.064	834667.198
L	213 27 24	18.866	845382.324	834656.798
M	255 57 34	14.611	845378.779	834642.624
N	63 36 37	5.057	845381.027	834647.154
P	54 20 37	2.746	845382.628	834649.385
Q	45 32 55	6.849	845387.424	834654.274
R	35 03 58	5.585	845391.995	834657.483
S	26 40 55	3.265	845394.912	834658.949
T	18 31 05	5.055	845399.706	834660.554
U	09 08 33	6.526	845406.149	834661.591
V	67 39 01	0.635	845406.391	834662.179
W	27 18 20	4.546	845410.430	834664.264
X	296 48 19	5.185	845412.768	834659.636
Y	208 40 49	4.993	845408.387	834657.240
Z	297 49 15	23.088	845419.163	834636.820
AA	25 25 15	9.701	845427.925	834640.985
AB	27 27 50	7.240	845434.348	834644.324
AC	33 48 28	6.940	845440.115	834648.185
AD	68 23 24	4.549	845441.790	834652.414
AE	52 40 41	6.129	845445.506	834657.288
AF	36 07 10	7.130	845451.265	834661.491
AG	43 48 11	5.060	845454.917	834664.993
AH	60 40 49	2.465	845456.124	834667.143
A	36 47 16	1.964	845457.697	834668.319

Lot	Area
Lot 215 RP (Portion 1)(Coloured Brown)	2166m ² (About)
Lot 215 RP (Portion 2)(Coloured Brown)	292.1m ² (About)
TOTAL	2458m ² (About)

I, LAU CHI KWONG an Authorized Land Surveyor registered under the Land Survey Ordinance (Cap. 473), hereby certify that this land boundary plan has been prepared from land boundary surveys that were carried out by me. or under my direct supervision, in conformity with the Code of Practice approved by the Land Survey Authority under the above Ordinance, and that this plan correctly represents that survey completed on the . . 4th day of . . Oct. . . 2024 .

Dated this .14th. day of . . Oct. . . 2024.


Authorized Land Surveyor

Survey District : North	DIMENSION PLAN OF LOT 215 RP IN D.D.78	FOR OFFICIAL USE
Date of Survey : October 2024		Figure 2
Survey Sheet No: 3-NW-14A		
Survey Record Plan No. : SRP/DN/058/01448/D1		
		Land Boundary Plan No. : LBP/DN/058/01448/D1

Figure 2

Part of Drainage Record
Plan No. 3NW14A1
Scale 1 : 500

17 SEP 2024

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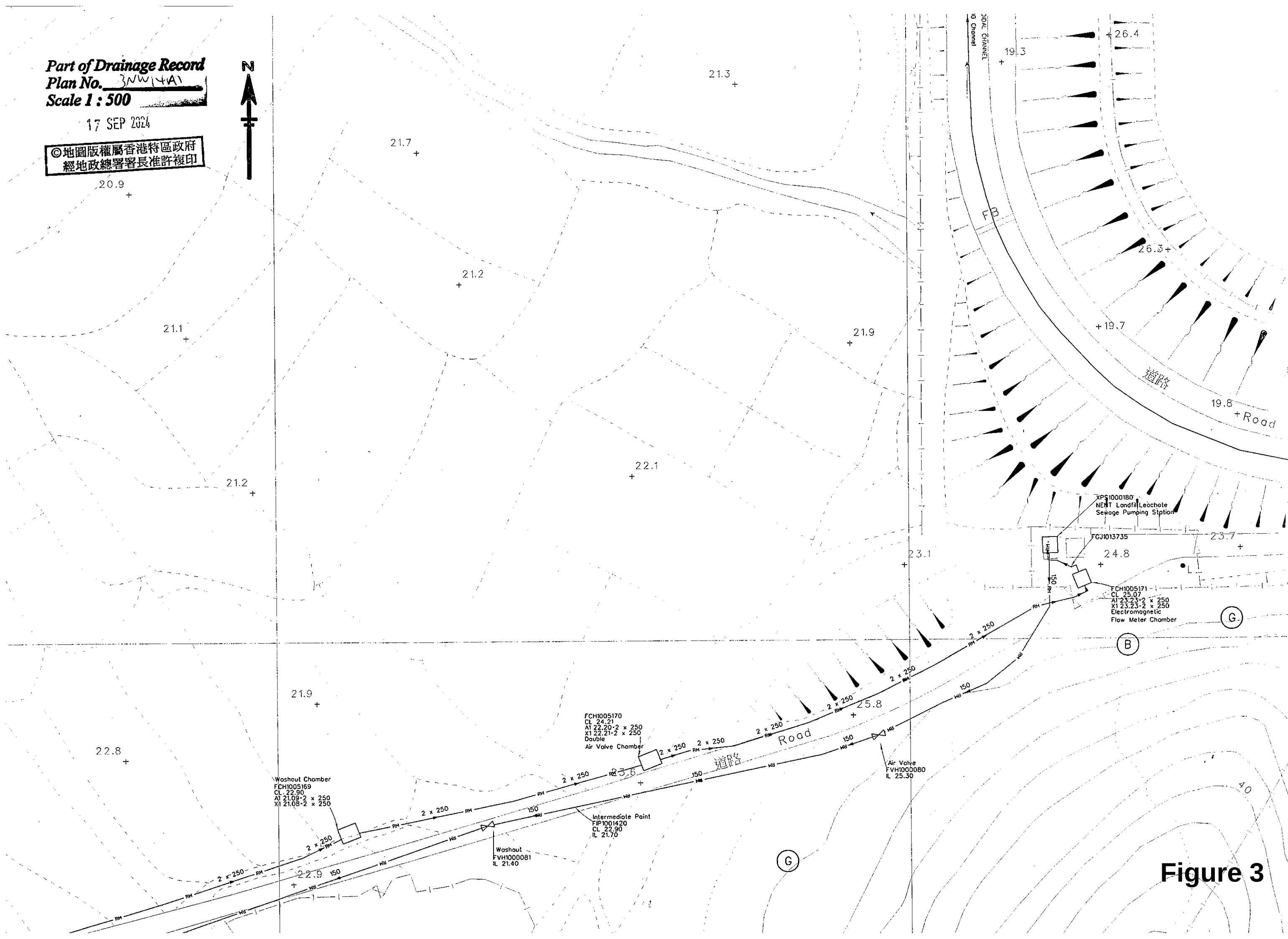
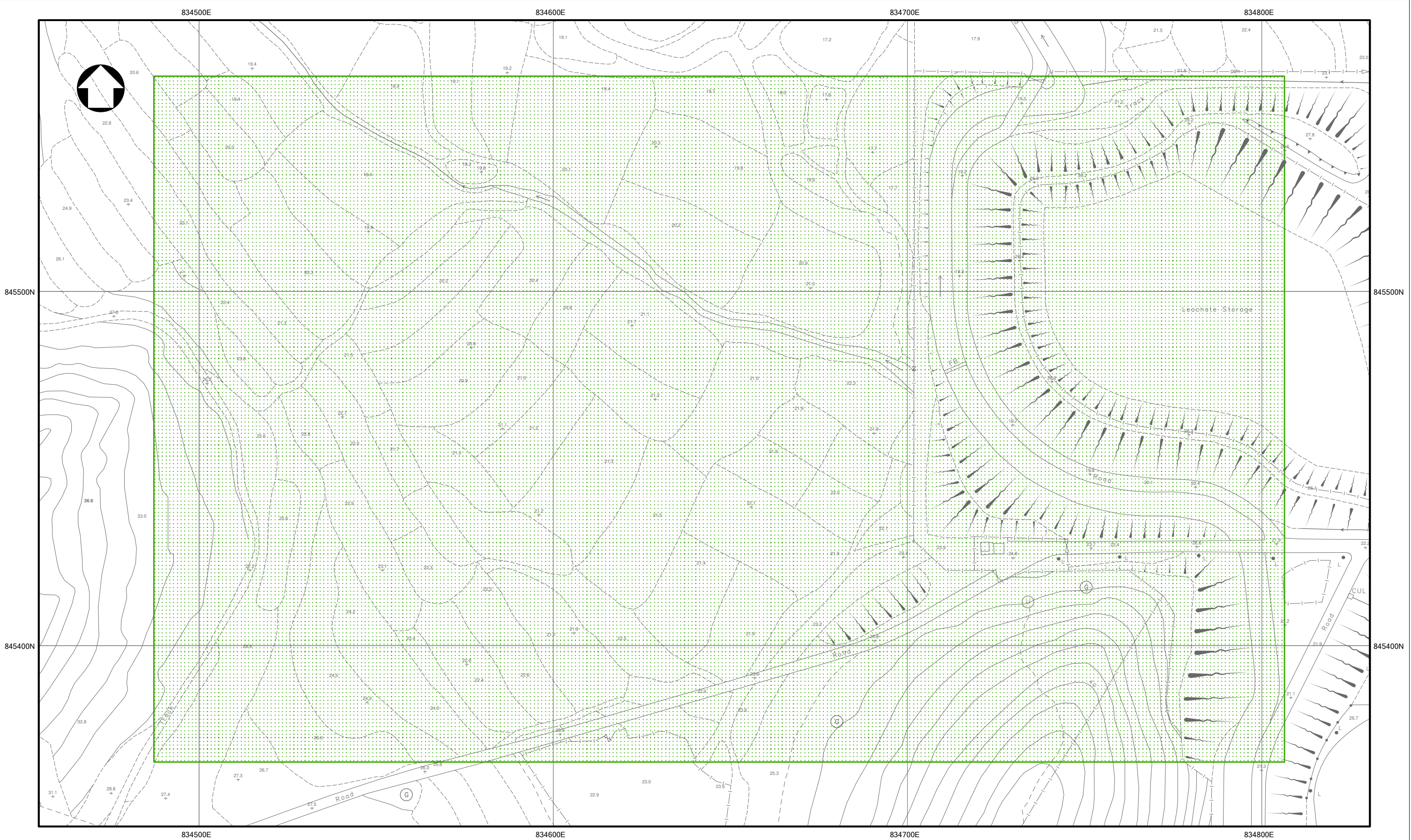


Figure 3



- NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
 2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM.
 3. NO EXISTING WATER MAINS IN THE VICINITY OF THE SITE.
 4. NO PROPOSED WATER MAINS IN THE VICINITY OF THE SITE.
 5. NO EXISTING WSD CABLE IN THE VICINITY OF THE SITE.
 6. NO PROPOSED WSD CABLE IN THE VICINITY OF THE SITE.
 7. THE SITE IS NOT WITHIN WSD GATHERING GROUNDS.
 8. NO WSD LAND ALLOCATION / WWR WITHIN THE SITE AREA.
 9. NO WSD SLOPES ARE AFFECTED IN THE VICINITY OF THE SITE.
 10. NO ASBESTOS CEMENT / UNKNOWN MATERIALS MAINS ON THE VICINITY OF THE SITE.
 11. NO CATHODIC PROTECTION MAINS ON THE VICINITY OF THE SITE.

SUBJECT SITE

PART COPY OF SURVEY SHEET NO(S).		
3-NW-13B & 14A		
FILE REF: Watermains		
	SHEET 1 OF 1	SCALE 1:1000

Figure 4

PLATES

RECORD PHOTOGRAPHS



A1 - General view of the site (looking western) Taken at: 14 February 2025



A2 - General view of the site (looking western) Taken at: 14 February 2025

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RECORD PHOTOGRAPHS



A3 - General view of the site (looking northeastern) Taken at: 14 February 2025



A4 - General view of the site (looking southern) Taken at: 14 February 2025

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RECORD PHOTOGRAPHS



A5 - Existing Drainage Channel

Taken at: 14 February 2025

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APPENDIX A

DESIGN CALCULATION FOR SURFACE CHANNEL

Design Statements

1. The calculation was based on the 'Geotechnical Manual for slopes', 1989 Second Edition.

2. Rational Method was used for calculating Runoff by the following equation

$$Q = \frac{KiA}{3600} \dots\dots\dots (Eq. 1)$$

where Q = maximum runoff (litres/second)
i = design mean intensity of rainfall (mm/hr)
A = area of catchment (m²)
K = runoff coefficient

3. The runoff coefficient K is taken as 1.0.

4. Time of concentration is calculated by Bransby Williams equation

$$t = 0.14465 \frac{L}{H^{0.2} \times A^{0.1}} \dots\dots\dots (Eq. 2)$$

where t = time of entry (min)
L = distacne 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 (m)
A = catchment area (mm²)
H = average fall in m / 100m from summit and point of design (m)

5. The drainage was *checked/designed* for 1 in 100 years return period storm.

6. The correlation between Time of concentration and the mean rainfall intensity is derived from Figure 8.2 of the 'Geotechnical Manual for Slopes'.

7. If time of connection is less than 1 minute, than t is taken as 1 minute.

8. The design of the drainage referred to Figure 8.7 Chart for the Rapid Design of Channel of 'Geotechnical Manual for Slopes'.

9. Maximum permissible velocity is 4m/s for U-channel.

10. Maximum permissible velocity is 5m/s for stepped channel.

Design calculation of proposed drainage

$$\text{Max. Catchment area } A1 = 11374 \text{ m}^2$$

$$\text{Assume runoff coefficient } k = 1.0$$

$$\text{Length of catchment } L = 150 \text{ m}$$

$$\text{Mean gradient} = \frac{24.8}{150}$$

$$= 16.53 / 100 \text{ m}$$

Time of Concentration (from 8.2.3 Geotechnical Manual for slopes)

$$t = 0.14465 \times L \times H^{-0.2} \times A^{-0.1}$$
$$= 4.87 \text{ min.}$$

where

$$L = 150.00 \text{ m}$$
$$H = 16.53 \text{ m}$$
$$A = 11374.00 \text{ m}^2$$

By using Figure 8.2 from Geotechnical Manual for Slopes for a two-hundred year return storm, the mean rainfall intensity,

$$i = 290 \text{ mm/hr}$$

Therefore, the maximum runoff Q (from 8.2.1 Geotechnical Manual for Slopes)

$$Q = k i A / 3600$$
$$= 3298460 \text{ l/s}$$
$$= 54974 \text{ l/min.}$$

For 600mm U-channel with gradient 1: 70 for velocity = 3.4 m/s (< 4m/s)
(From Figure 8.7 Chart for the Rapid Design of Channels, Geotechnical Manual for Slope)

$$\text{Capacity} = 56000 \text{ l/min.} > Q \text{ O.K}$$

Therefore the proposed channel is adequate.

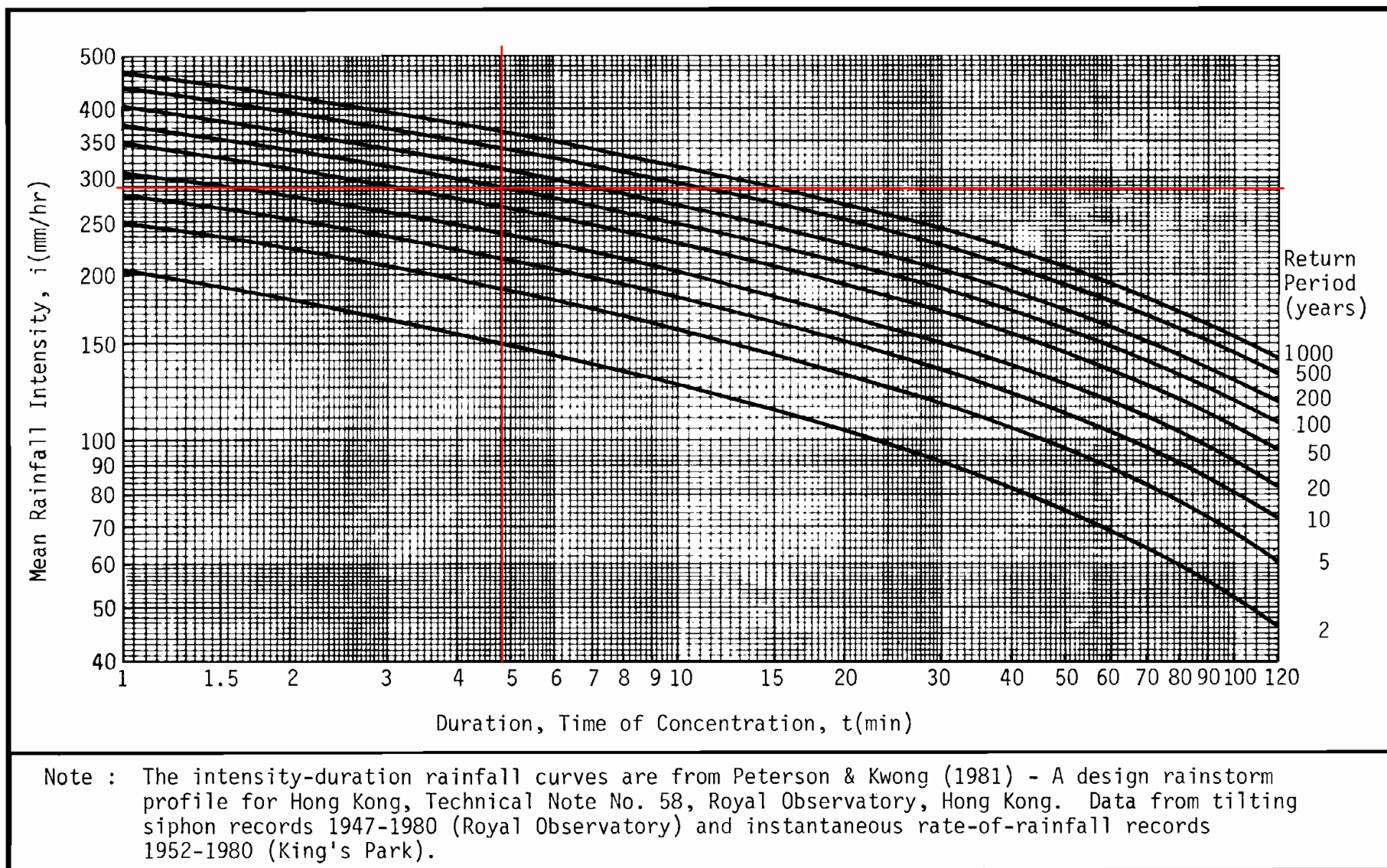
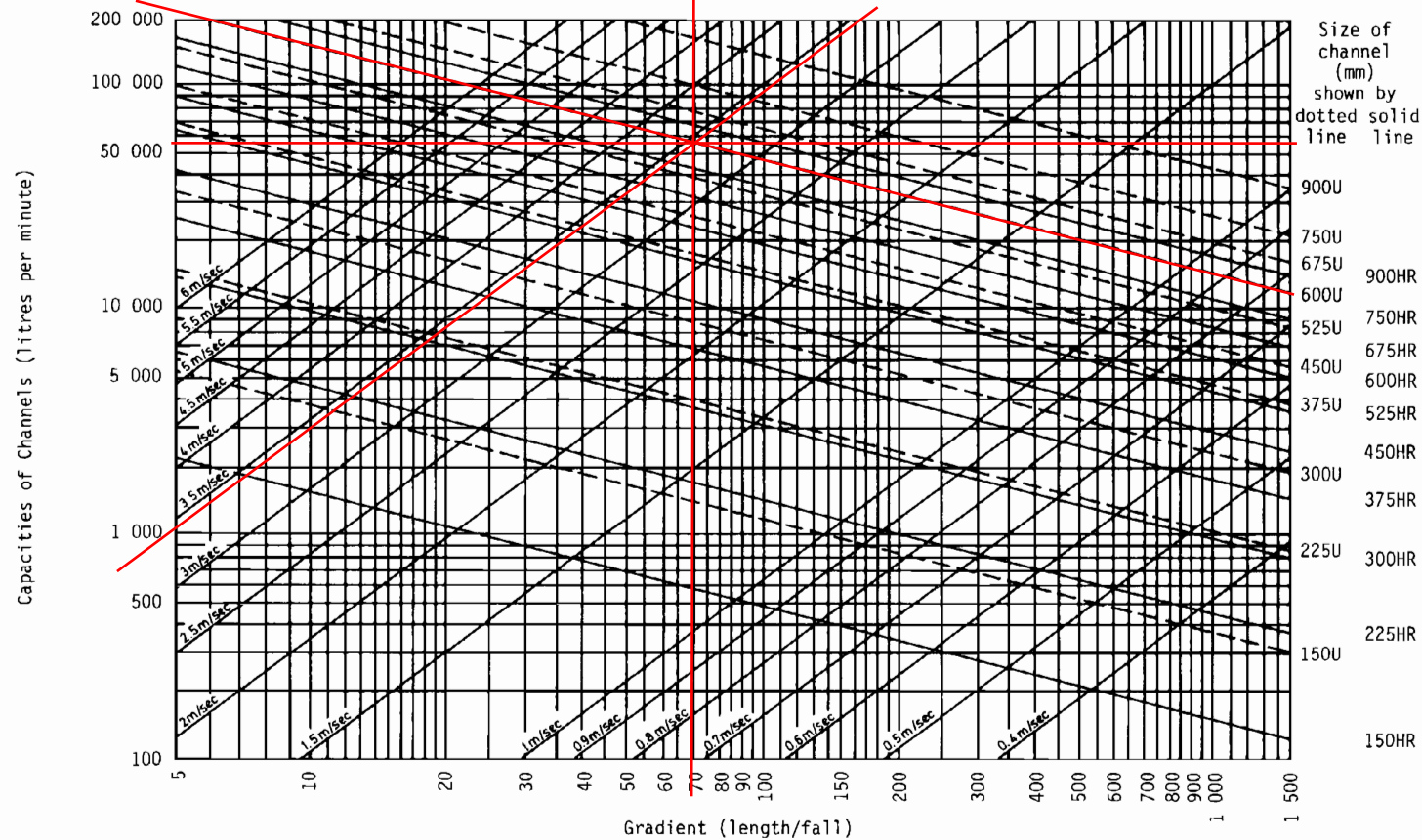
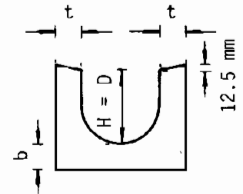


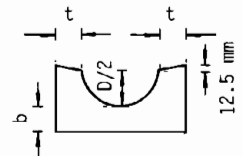
Figure 8.2 - Curves Showing Duration and Intensity of Rainfall in Hong Kong for Various Return Periods



Channel dimensions



U-shaped channel (U)



Half-round channel (HR)

DESIGN METHOD USING CHART

(a) Normal channel Solution

1. Runoff
2. Gradient
3. Channel size
4. Velocity

Example :

1. Enter Runoff = 4 000 litre/min.
2. Enter Gradient = 1 in 40
3. Read channel required = 225 U or 300HR
4. Read velocity = 2.2 m/sec. (<4 m/sec. ∴OK)

(b) Stepped channel Solution

2. Runoff
3. Channel size
4. Gradient
1. Velocity

Example :

1. Enter Velocity = 5 m/sec.
2. Enter Runoff = 20 000 litre/min.
3. Read required channel size = 300U
4. Read required gradient = 1 in 14

Figure 8.7 - Chart for the Rapid Design of Channels

APPENDIX B

STORMWATER DRAINAGE PLAN

