Appendix VII – Drainage Impact Assessment

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REDEVELOPMENT OF NOS. 20-24 TAI YAU STREET, SAN PO KONG, KOWLOON, N.K.I.L.S 4735, 4736, 4737, 4738, 4739 RP, 4739 S.A & 4739 S.B

DRAINAGE IMPACT ASSESSMENT

28 July 2025

Report No: RT24152_02-DIA-01r2

Prepared By:

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Project:	REDEVELOPMENT OF NOS. 20-24 TAI YAU STREET, SAN PO KONG, KOWLOON, N.K.I.L.S 4735, 4736, 4737, 4738, 4739 RP, 4739 S.A & 4739 S.B DRAINAGE IMPACT ASSESSMENT
Report No.:	RT24152_02-DIA-01r2

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01	10/07/2025	Issued for Comment	Various	TL	HM
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01r2	28/07/2025	Issued for Comment	Various	TL	HM

Prepared By:

Various

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Theo Lai

Senior Consultant

Approved by:

Henry Mak

Director

Disclaimer:

- This report is prepared and submitted by Beexergy Consulting Limited with all reasonable skill to the best of our knowledge, incorporating our Terms and Conditions and taking account of the resources devoted to it by agreement with the client.
- We disclaim any responsibility to the client and others in respect of any matters outside the project scope.
- This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.

TABLE OF CONTENTS

1 INTRODUCTION

1.1 PROJECT BACKGROUND

BeeXergy Consulting Limited (the Consultant) was commissioned by the Project Proponent to conduct a Drainage Impact Assessment for the planning application under Section 16 of the Town Planning Ordinance (Cap. 131) for the Proposed Development. Latest architectural drawings and technical information on the Project Site were provided by the Project Architect.

1.2 PROJECT LOCATION

The Project Site is located at 20 - 24 Tai Yau Street, San Po Kong, Kowloon. It is bounded by Cheong Tai Industrial Building to the north, Tai Yau Street to the west and Tin Hung Industrial Building to the south. **Figure 1.1** shows the location of Project Site and its environs.

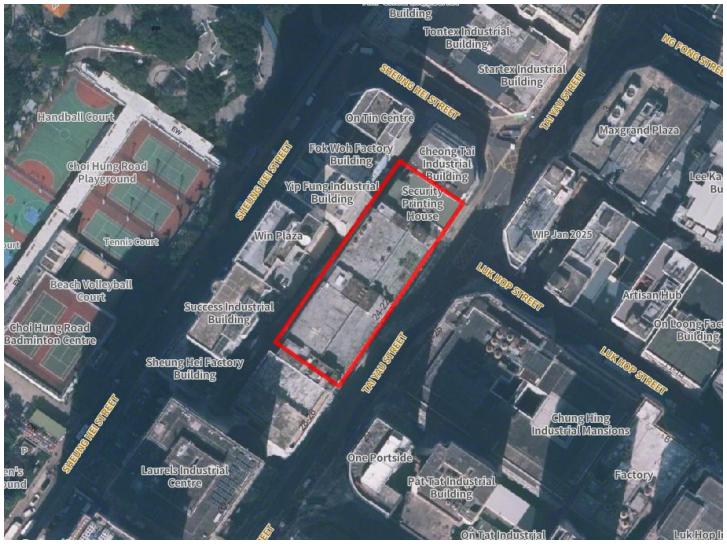


Figure 1.1 Location of the Project Site (Source: Geoinfo map)

1.3 DESCRIPTION OF THE SUBJECT SITE AND PROPOSED DEVELOPMENT

The Project Site covers an area of approximately 2,426.05m^2, and comprises a 34-storey hotel, including 1-storey of refuge floor, and 1-storey of basement carpark. The master layout plan provided by Project Architect is enclosed in **Appendix A**.

2 DRAINAGE IMPACT ASSESSMENT

2.1 SCOPE OF WORKS

The objectives of this DIA are to assess whether the Proposed Development may cause adverse impacts on drainage and flooding or not and to recommend appropriate mitigation measures to alleviate unacceptable drainage impact, if any.

2.2 EXISTING SITE CONDITION AND DRAINAGE FACILITIES

The existing drainage record from the GeoInfo Map of the Lands Department (LandsD) and Drainage Service Department (DSD) are obtained and attached in **Appendix B**. stormwater from SMH4041619 will be diverted to SMH4041638 via a 450mm diameter drainage pipe.

The Project Proponent would like to construct a stormwater terminal manhole (STMH-01) connecting the Project Site (S) to SMH4041619 via a 225mm diameter drainage pipe. The location of terminal manhole, proposed drainage connection and catchments are shown in **Appendix C**.

2.3 DRAINAGE ANALYSIS

Peak instantaneous runoff before and after the Proposed Development is calculated based on the Rational Method. The recommended physical parameters, including runoff coefficient (C) and storm constants (a, b, c) for different return periods, are referred to the Drainage Services Department (DSD)'s Stormwater Drainage Manual Fifth Edition, January 2018 and its Corrigendum No. 1/2022 and 1/2024.

The Rational Method (Equation 1) has been adopted for hydraulic analysis and the peak runoff is given by the following expression:

$$Q_p = 0.278CiA \qquad \text{(Equation 1)}$$

Where:

Q_p = peak runoff in m^3/s

C = runoff coefficient

i = rainfall intensity in mm/hr

A = catchment area in km^2

Rainfall intensity is calculated using the following expression (Equation 2):

$$i = \frac{a}{(t_d+b)^c} \qquad \text{(Equation 2)}$$

Where:

i = rainfall intensity in mm/hr

t_d = duration in minutes ($t_d \leq 240$)

a, b, c = storm constants given in Table 3a and Figure 3 of the SDM with return period of 50 years of the HKO Headquarters

For a single catchment, duration (t_d) can be assumed to be the time of concentration (t_c) which is calculated as follows (Equation 3):

$$t_c = t_0 + t_f \qquad \text{(Equation 3)}$$

Where:

t_c = time of concentration (time needed for water to flow overland from the most remote point in a catchment to its outlet)

t_0 = inlet time

t_f = flow time

Generally, t_0 is much smaller than t_f. As shown in Equation 2 above, t_d is the divisor. Therefore, the larger t_d will result in the smaller rain intensity (i) as well as a smaller Q_p. For the worst-case scenario (Equation 4 and Equation 5), t_0 is assumed to be negligible and so:

$$t_d = t_c = t_0 \qquad \text{(Equation 4)}$$

$$t_c = \frac{0.14465L}{H^{0.2}A^{0.1}} \qquad \text{(Equation 5)}$$

Where:

A = catchment area (m^2)

H = average slope (m per 100m), measured along the line of natural flow, from the summit of the catchment to the point under consideration

L = distance (on plan) measured on the line of natural flow between the summit and the point under consideration (m)

The capacities of the drainage pipes have been calculated using the Colebrook-White Equation (Equation 6), assuming full bore flow with no surcharge, as follows, incorporate 10% sedimentation in the calculation of drainage flow capacity in accordance with the SDM:

$$V = -\sqrt{32gRs} \times \log\left(\frac{k_s}{14.8R} + \frac{1.25v}{R\sqrt{32gRs}}\right) \qquad \text{(Equation 6)}$$

Where:

V = mean velocity (m/s)

g = gravitation acceleration (m/s^2)

R = hydraulic radius (m)

k_s = hydraulic pipeline roughness (m)

V = kinematic viscosity of fluid (m^2/s)

S = hydraulic gradient (energy loss per unit length due to friction)

2.4 CHANGES IN SURFACE CHARACTERISTICS

Although greenery will be provided in the Proposed Development, the Project Site is assumed to be fully paved in a conservative approach. No change in surface characteristics of the Project Site is expected as shown in **Table 2.1.**

Table 2.1 Changes in Surface Characteristics of the Project Site

Scenario of Project	Surface Characteristics (Paved)	Surface Characteristics (Unpaved)
Before Development	100%	0%
After Development	100%	0%

2.5 CUMULATIVE RUNOFF

As the existing drainage system collects runoff from the Site and the surrounding catchments, runoff from the surrounding catchments shall be considered. Catchments that contributed to the cumulative runoff have been identified as shown in **Appendix D.** The changes in cumulative runoff at SMH4041638 are summarized in **Table 2.2.**

Table 2.2 Changes of Cumulative Runoff

Catchment	Before Development		After Development	
	Unpaved Area	Paved Area	Unpaved Area	Paved Area
Catchment S	0m^2	2,426.05m^2	0m^2	2,426.05m^2

2.6 ESTIMATED EXISTING AND FUTURE RUNOFF

Peak Runoff

Based on the cumulative runoff shown in Table 2.2, the runoff at SMH4041619 before and after the development was estimated based on the return periods of 50 years.

The estimated peak runoff discharged to SMH4041619 before and after Development (Catchment S) will be 0.16m^3/s. The detailed calculations of runoff discharge to SMH4041638 under the assessed return periods of 50 years are provided in **Appendix E**.

Assessment of Drainage Capacity

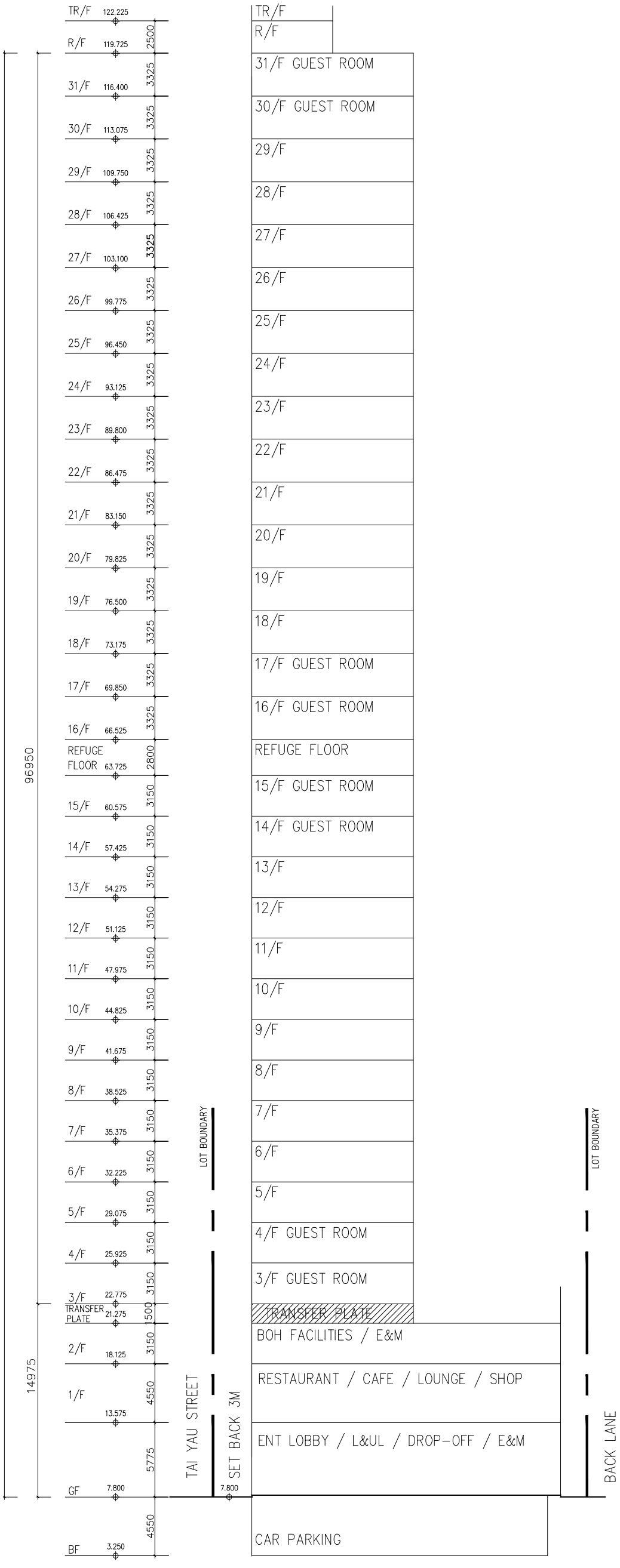
The results suggested that the estimated peak runoff will not be higher than 68% capacity of the drainage systems, and it is anticipated that the proposed drainage system will have sufficient capacity to cater to the surface runoff from the Proposed Development. Given the surface characteristics of the Project Site and surrounding catchments remain unchanged before and after the Proposed Development, no additional runoff or hydraulic capacity will be inducted due to the Proposed Development and no adverse drainage impact is anticipated.

3 CONCLUSION

A hotel development comprised of a 34-storey hotel, including 1-storey of refuge floor, and 1-storey of basement carpark is proposed at 20 - 24 Tai Yau Street, San Po Kong, Kowloon. This is the DIA to assess whether the capacity of the drainage networking is sufficient to cope with the peak drainage flow arising from the Proposed Development during its operation stage or not and to recommend appropriate mitigation measures to alleviate unacceptable drainage impact, if any.

Based on the DIA results, it is found that the proposed and existing drainage system serving the area has sufficient capacity to cater for the drainage generation from the Proposed Development and the surrounding catchment areas. Adverse drainage impact is not anticipated, and thus no upgrading or improvement works for existing drainage system are required.

APPENDIX A
MASTER LAYOUT PLAN



DIAGRAMMATIC SECTION (N.T.S.)

Schedule of Accommodation, 20-24 Tai Yau Street, San Po Kong, Kowloon

Site Area:	2,426.050 sq.m.
Lots:	N.K.I.L.s 4735, 4736, 4737, 4738, 4739 RP, 4739 s.A & 4739 s.B
Class of Site:	A
Permissible Plot Ratio:	12 (Under OZP)
Permissible GFA:	29,112.600 sq.m.
Bonus GFA for Setting Back 3m:	237.975 sq.m. x 5 = 1,189.875 sq.m.
Total Permissible GFA:	30,302.475 sq.m.
Total Permissible Plot Ratio:	12.490
Permissible Building Height:	120mPD 120mPD - 7.8mPD (mean street level) = 112.200m
Permissible Site Coverage:	Not exceeding 100% below 15m Not exceeding 60% above 15m
Proposed Use of Floor:	
Basement	Car Parking / E&M
G/F	Entrance Lobby / Loading & Unloading / Drop-off / E&M
1/F	Restaurant / Cafe / Lounge / Shop
2/F	Back of House Facility / E&M
2/F- 3/F Slab	Transfer Plate
3/F-15/F & 16/F-31/F	Guest Rooms
R/F	E&M
Proposed Site Coverage:	Below 15m : 76.665% (1,859.921 sq.m) Above 15m : 44.151% (1,071.121 sq.m)
Proposed Height of Building:	111.925m (119.725 mPD)
Proposed GFA per floor:	
G/F	466.094 sq.m
1/F	1,437.307 sq.m.
2/F	677.332 sq.m.
3/F	942.662 sq.m.
4/F-30/F	940.742 sq.m. (per floor) x 27 floors = 25,400.034 sq.m.
31/F	628.603 sq.m.
Staircase (NKILs. 4739s.A & s.B)	750.00 sq.m
Proposed Total GFA:	30,302.032 sq.m.
Proposed Plot Ratio:	12.490
Proposed no. of Storeys:	34 storeys (inlcude 1 storey basement & 1 storey refuge floor)
Proposed no. of Guest Rooms:	1286

REV. - DESIGN PROPOSAL JUL'25
DESCRIPTION DATE

PROJECT :
REDEVELOPMENT OF NOS. 20-24 TAI YAU STREET SAN PO KONG, KOWLOON, N.K.I.L.s 4735, 4736, 4737, 4738, 4739 RP, 4739 S.A & 4739 S.B

DRAWING TITLE :
SCHEDULE OF ACCOMMODATION

AUTHORIZED PERSON :

C&L architects & surveyors ltd 宋倫建築師測量師有限公司

JOB No. : AA598

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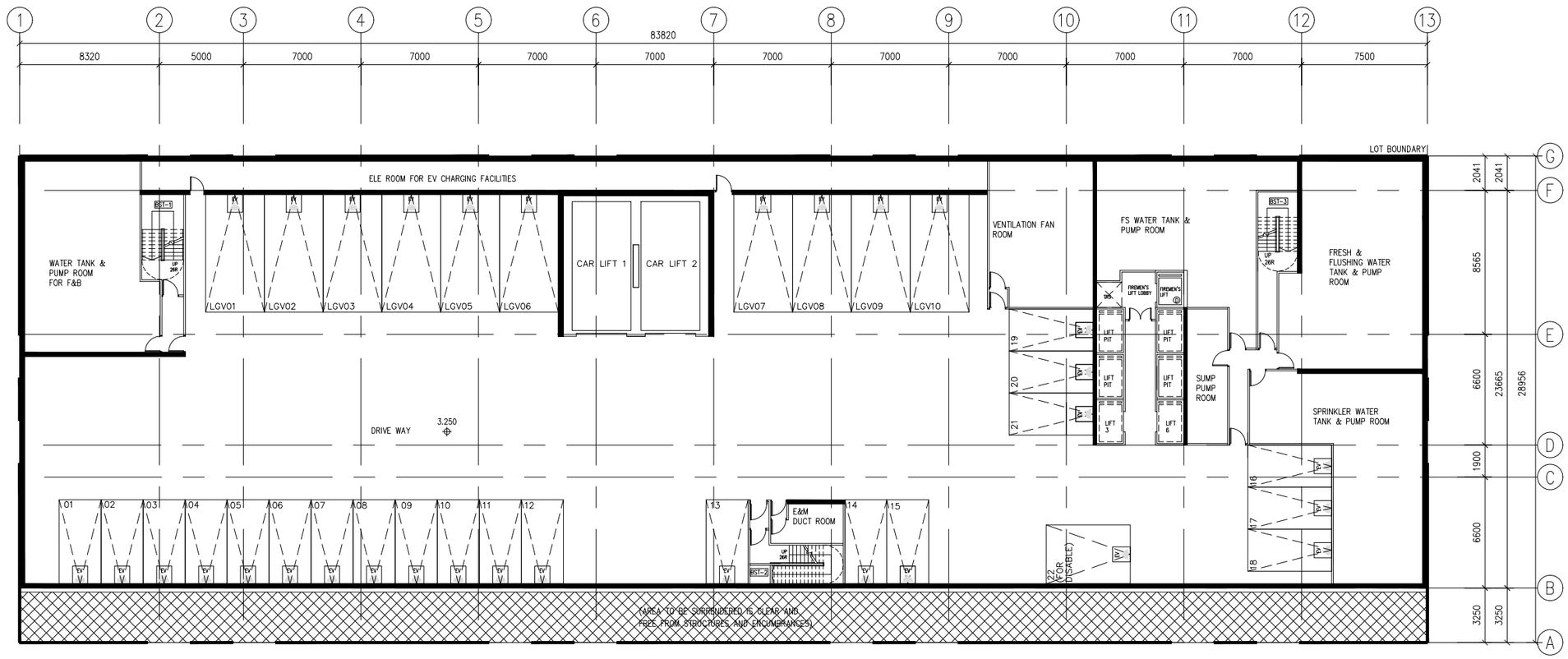

LEGEND:

AREA TO BE SURRENDED TO THE GOVERNMENT FOR ROAD WIDENING PURPOSES

BASEMENT FLOOR PLAN

REV.	DESCRIPTION	DATE
-	DESIGN PROPOSAL	JUL'25

PROJECT :

REDEVELOPMENT OF NOS. 20-24 TAI YAU STREET
SAN PO KONG, KOWLOON, N.K.I.L.s
4735, 4736, 4737, 4738, 4739 RP, 4739 S.A & 4739 S.B

DRAWING TITLE :

BASEMENT FLOOR PLAN

AUTHORIZED PERSON :

C&L architects & surveyors ltd
朱倫建築師測量師有限公司

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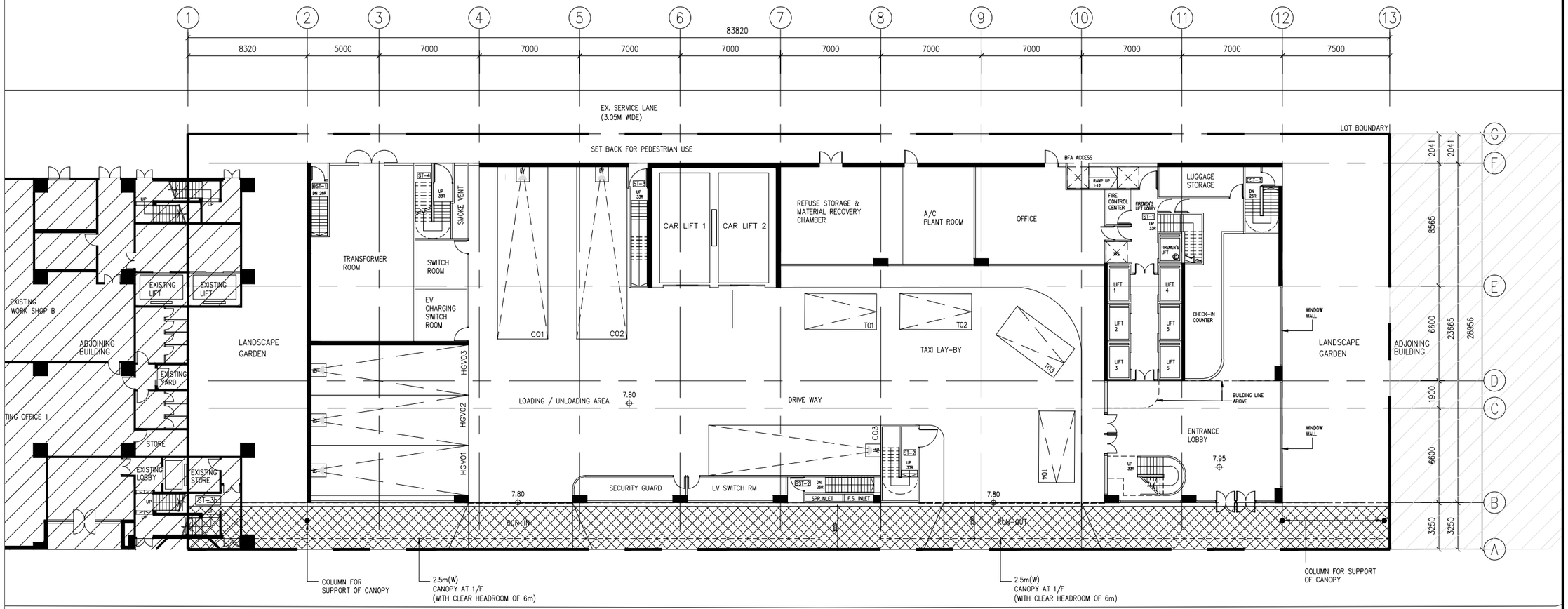

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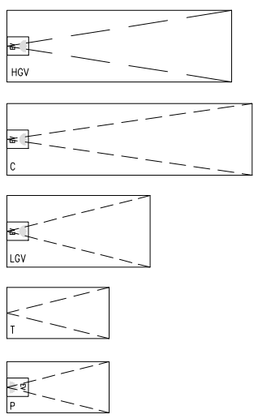
GROUND FLOOR PLAN

TAI YAU STREET (18.30M WIDE)



HEAVY GOODS VEHICLES 3.5m x 11m

TOUR BUS LAY-BY 3.5m x 12m

LIGHT GOODS VEHICLE 3.5m x 7m

TAXI LAY-BY 2.5m x 5m

PRIVATE CAR 2.5m x 5m

CARPARK PROVISION CALCULATION

APPROX. NO. OF ROOMS = 1286

TYPE	ROOM/GFA	RATE	NO. REQUIRED	NO. PROVIDED
PRIVATE CAR	1286 ROOMS RESTUATANT/CAFE /800 SEAT	1/100 ROOMS 1/100 SEATS	13 8	22
TAXI LAY-BY	1286 ROOMS	>600 ROOMS MIN. 4 NOS.	4	4
TOUR BUS LAY-BY	1286 ROOMS	>900 ROOMS MIN. 3 NOS.	3	3
LGV HGV	1286 ROOMS	0.5-1/100 ROOMS	7-13	10 3

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4735, 4736, 4737, 4738, 4739 RP, 4739 S.A & 4739 S.B

DRAWING TITLE :

GROUND FLOOR PLAN

AUTHORIZED PERSON :

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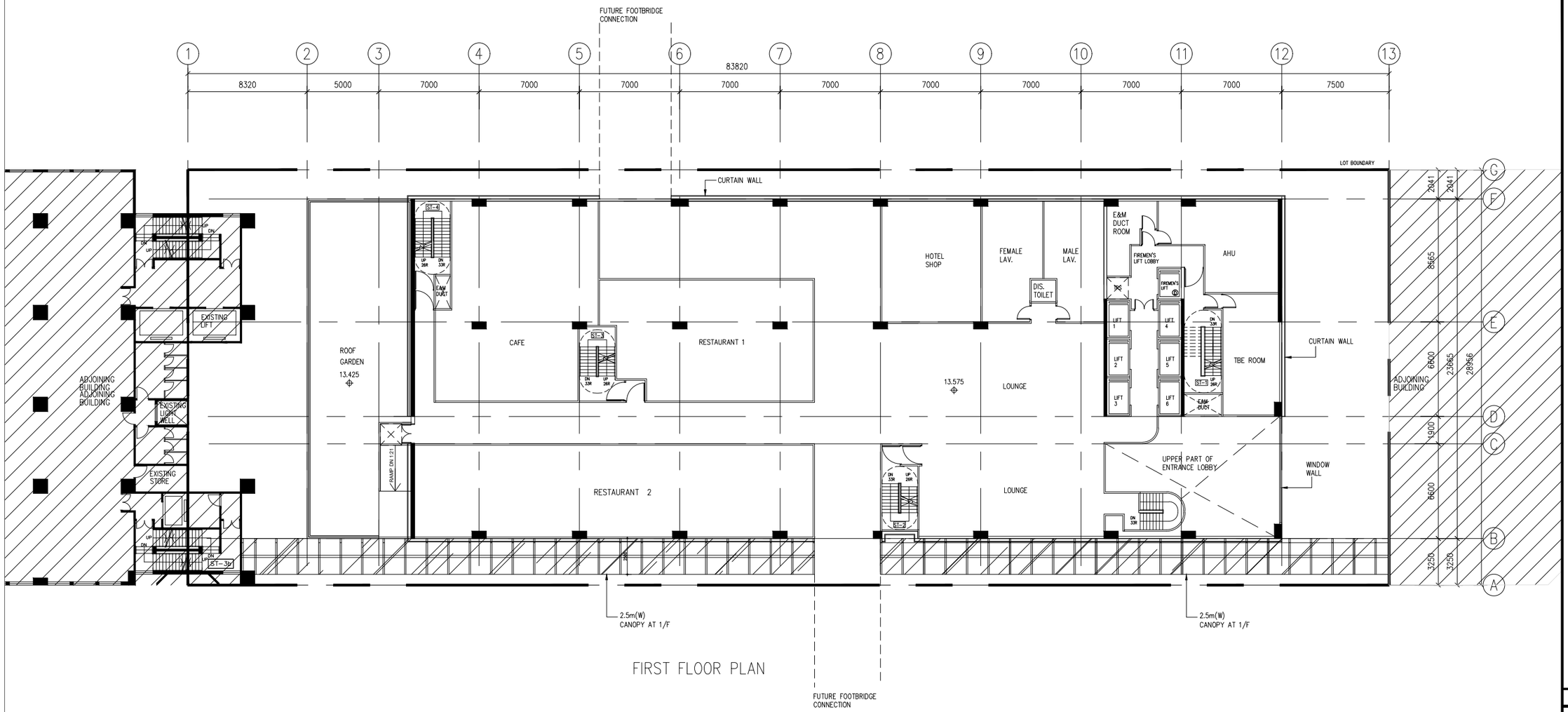

FIRST FLOOR PLAN

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-	DESIGN PROPOSAL	JUL'25

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REDEVELOPMENT OF NOS. 20-24 TAI YAU STREET
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4735, 4736, 4737, 4738, 4739 RP, 4739 S.A & 4739 S.B

DRAWING TITLE :

FIRST FLOOR PLAN

AUTHORIZED PERSON :

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朱倫建築師測量師有限公司

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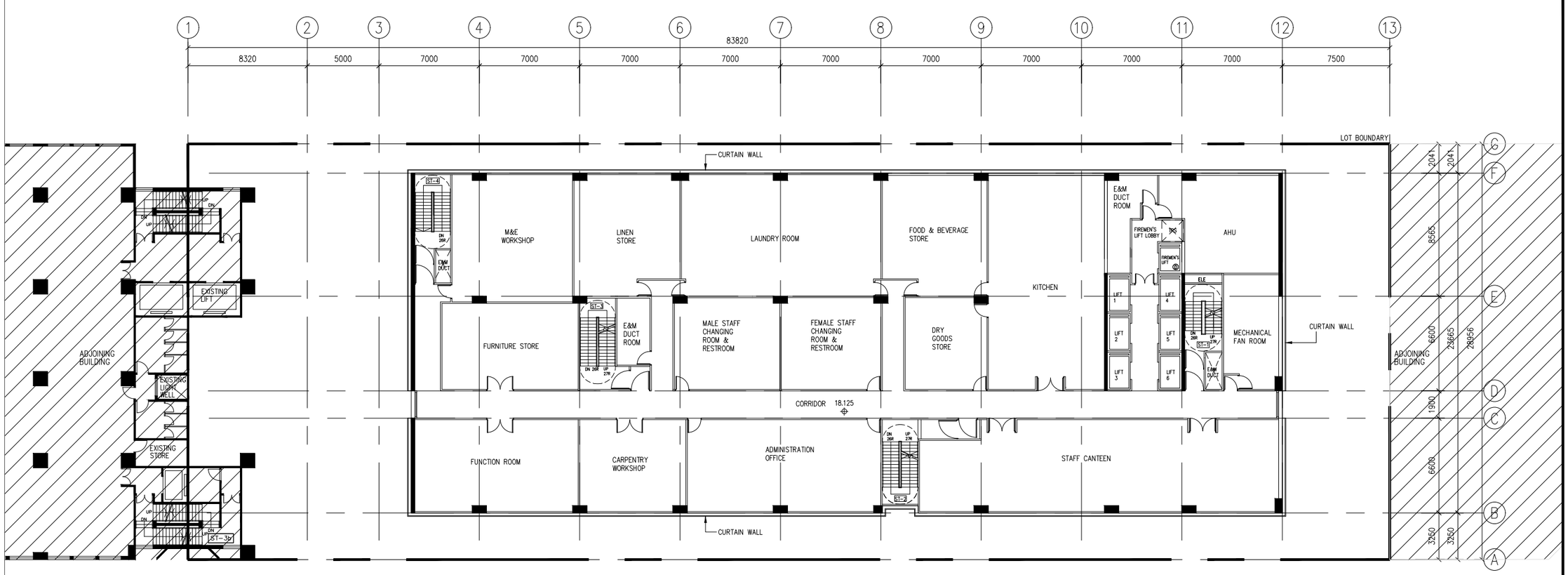

SECOND FLOOR PLAN

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4735, 4736, 4737, 4738, 4739 RP, 4739 S.A & 4739 S.B

DRAWING TITLE :

SECOND FLOOR PLAN

AUTHORIZED PERSON :

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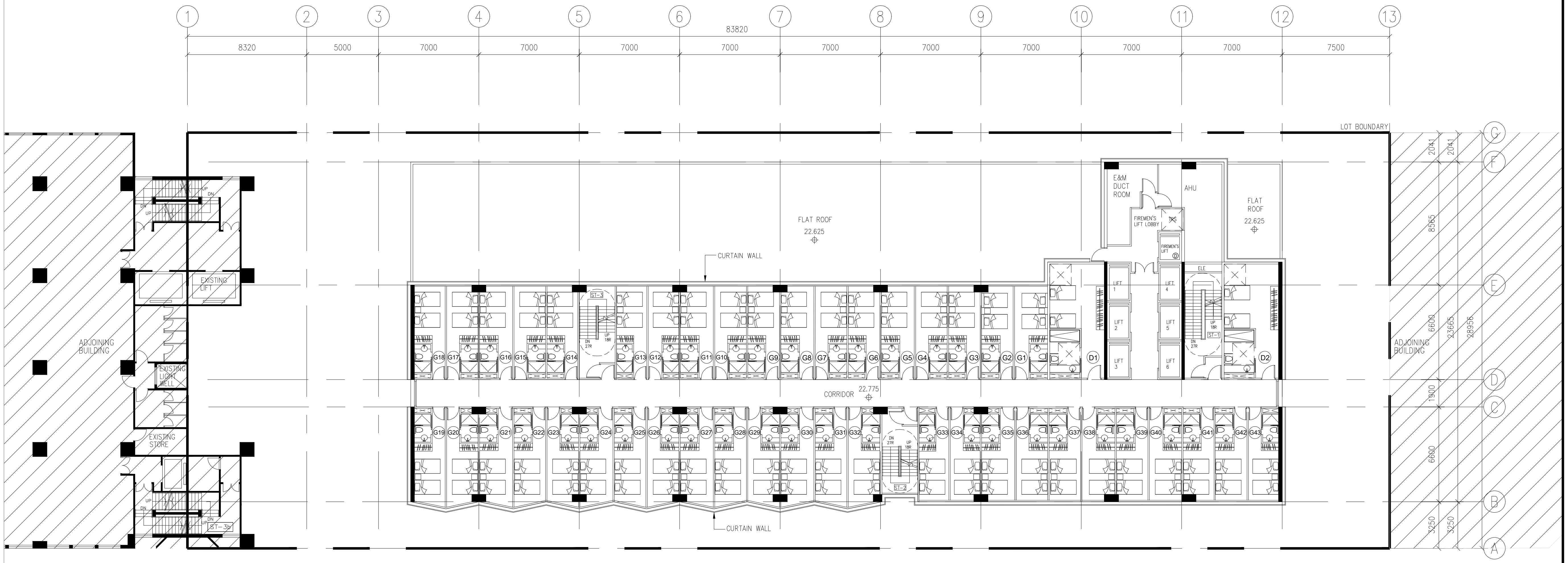
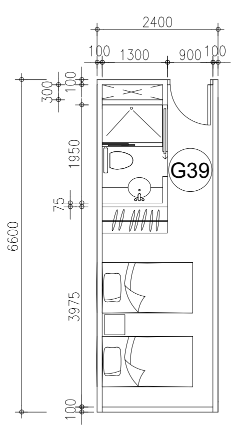


THIRD FLOOR PLAN (GUEST ROOM)



TYPICAL LAYOUT 1 FOR SINGLE BED GUEST ROOM
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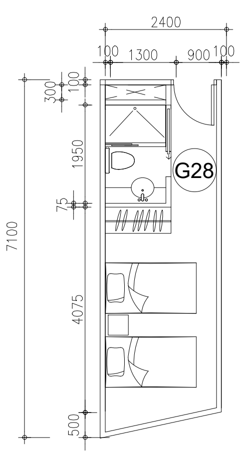

TYPICAL LAYOUT 2 FOR SINGLE BED GUEST ROOM
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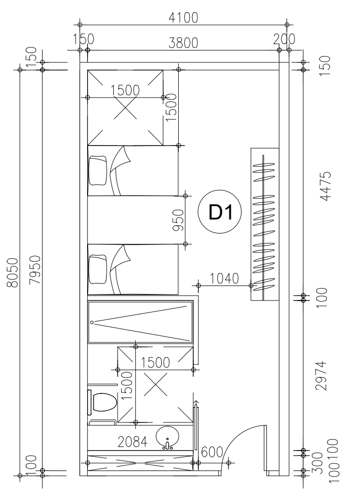

TYPICAL LAYOUT FOR GUEST ROOM FOR DISABILITY (D1 & D2)
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THIRD FLOOR PLAN

AUTHORIZED PERSON :

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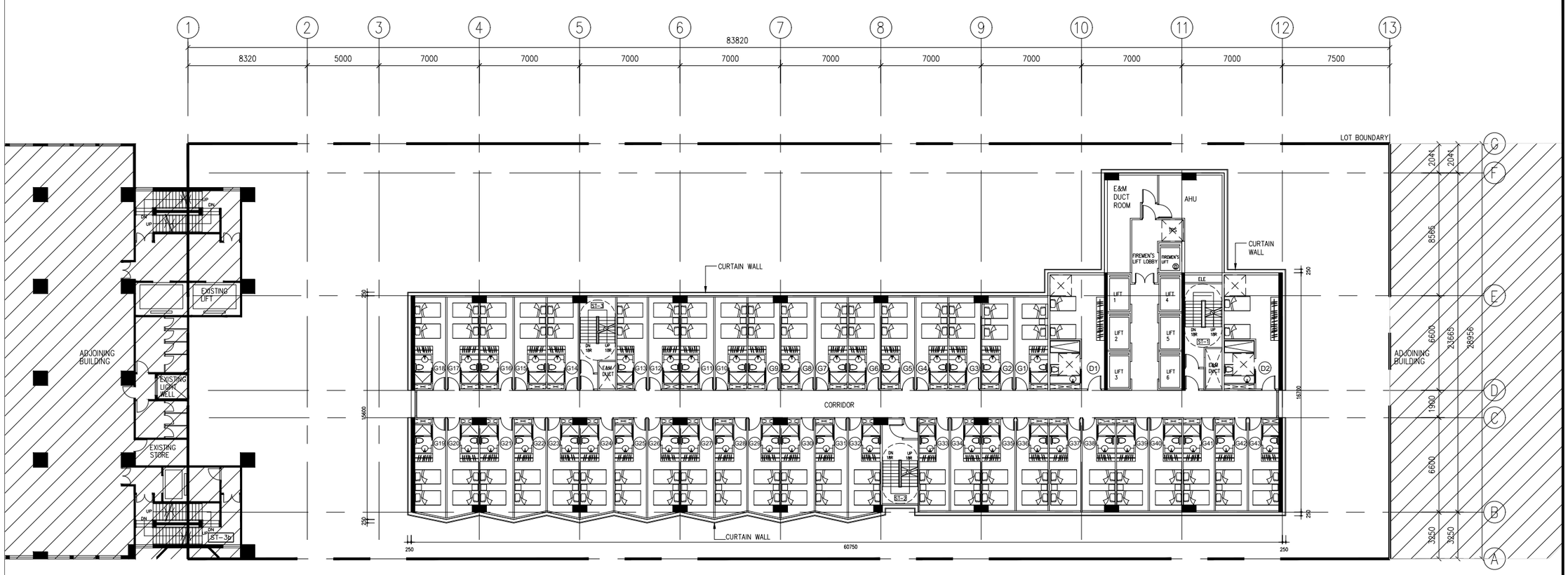
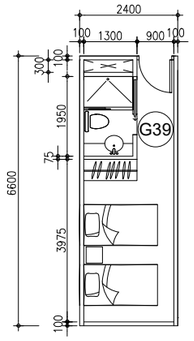


4/F TO 15/F FLOOR PLAN (GUEST ROOM)



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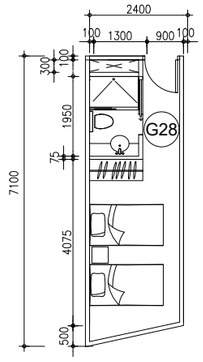

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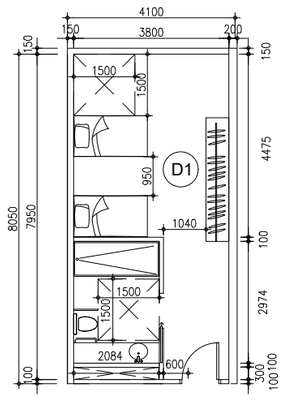

TYPICAL LAYOUT FOR GUEST ROOM FOR DISABILITY (D1 & D2)
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4735, 4736, 4737, 4738, 4739 RP, 4739 S.A & 4739 S.B

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4TH TO 15TH FLOOR PLAN

AUTHORIZED PERSON :

C&L architects & surveyors ltd
朱倫建築師測量師有限公司

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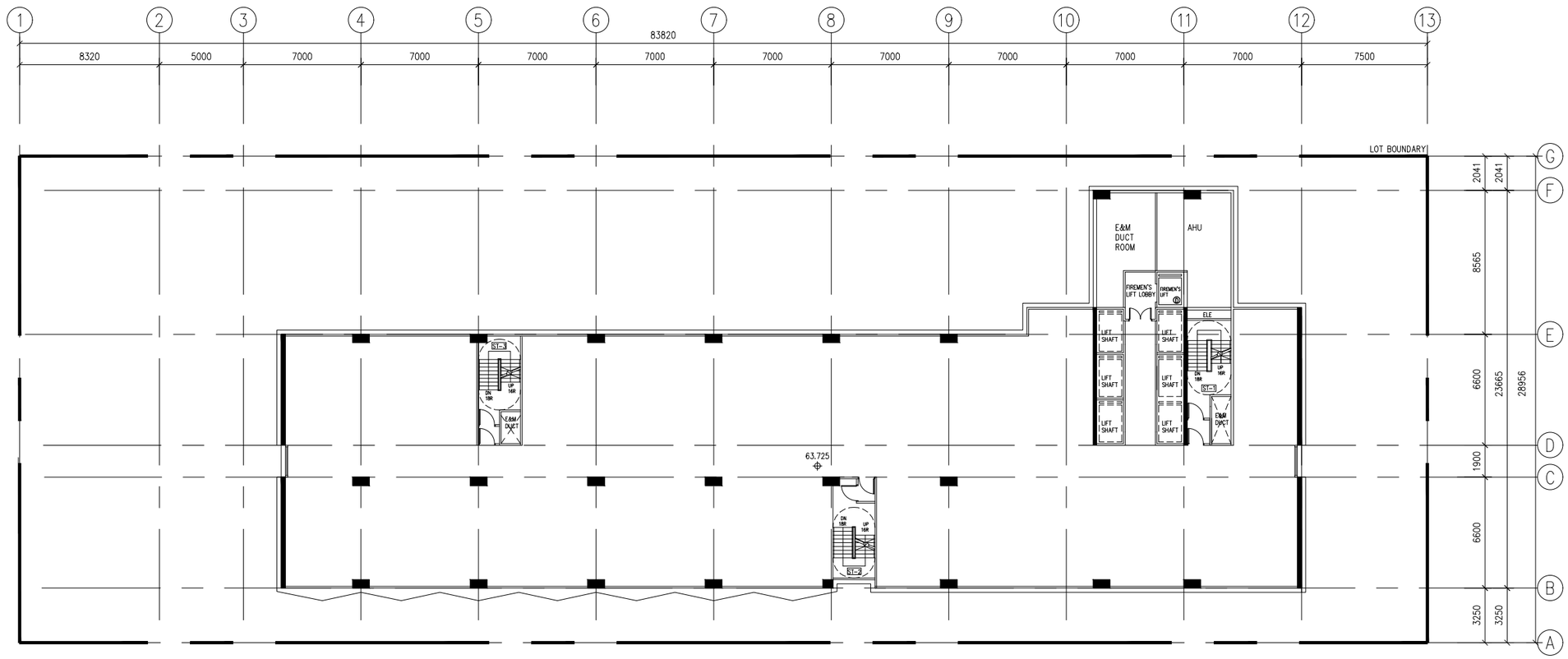

REFUGE FLOOR PLAN

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REFUGE FLOOR PLAN

AUTHORIZED PERSON :

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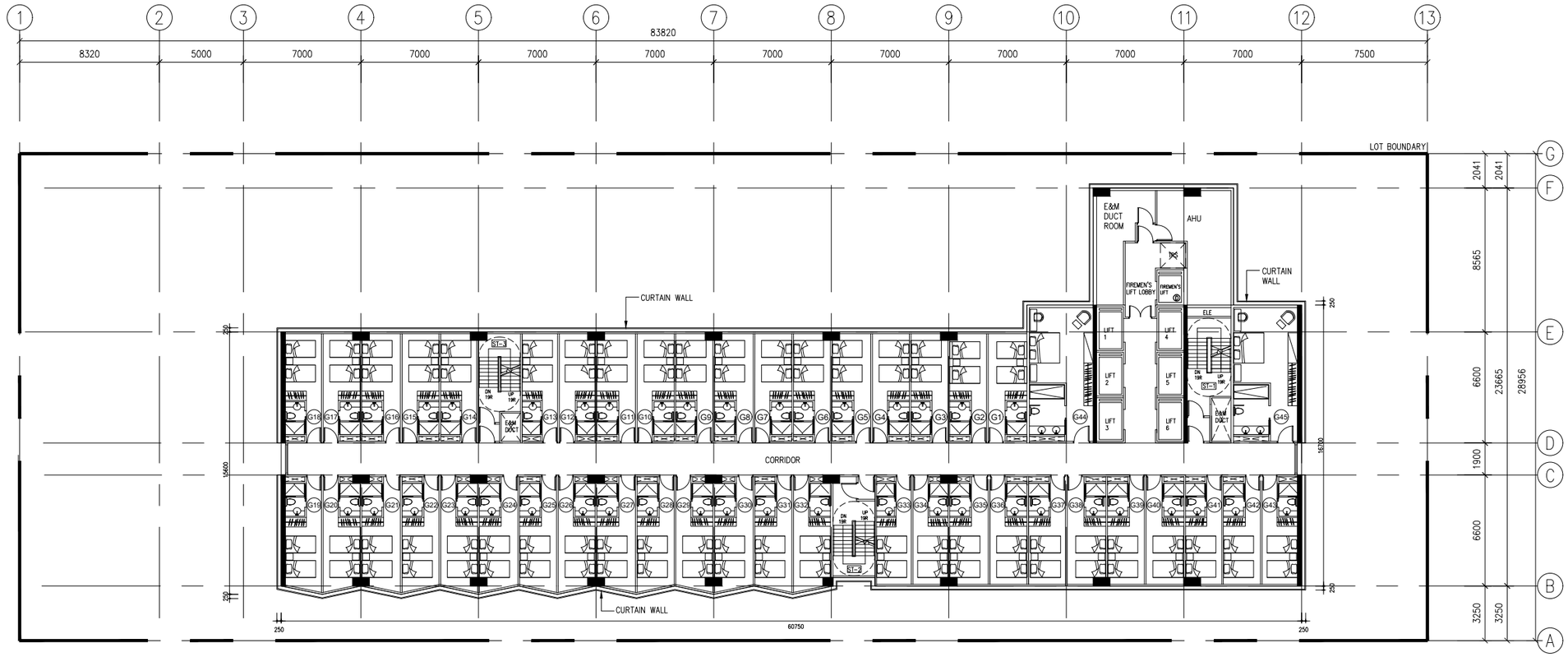
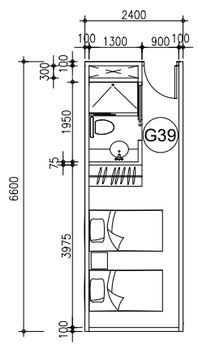


16/F TO 30/F FLOOR PLAN (GUEST ROOM)



TYPICAL LAYOUT 1 FOR SINGLE BED GUEST ROOM
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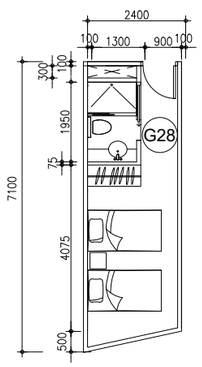

TYPICAL LAYOUT 2 FOR SINGLE BED GUEST ROOM
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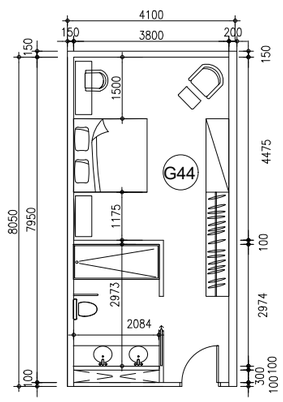

TYPICAL LAYOUT FOR DOUBLE BED GUEST ROOM (G44 & G45)
UFA=20.955 m2
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-	DESIGN PROPOSAL	JUL'25
REV.	DESCRIPTION	DATE

PROJECT :

REDEVELOPMENT OF NOS. 20-24 TAI YAU STREET
SAN PO KONG, KOWLOON, N.K.I.L.s
4735, 4736, 4737, 4738, 4739 RP, 4739 S.A & 4739 S.B

DRAWING TITLE :

16TH TO 30TH FLOOR PLAN

AUTHORIZED PERSON :

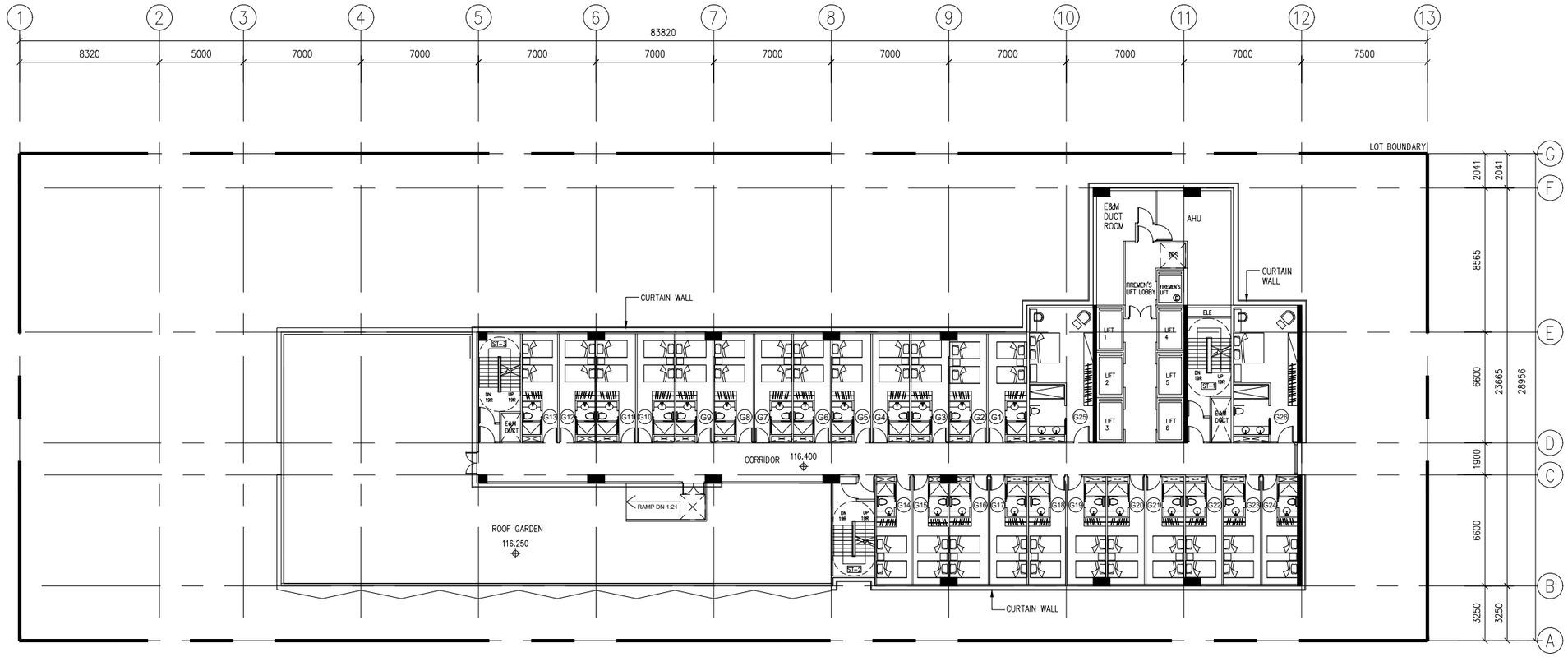
C&L architects & surveyors ltd
朱倫建築師測量師有限公司

JOB No. : AA598

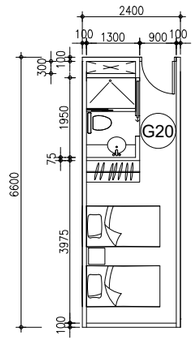
DESIGNED :	DRAWN :	CHECKED :	APPROVED :
RL	NC	RL	JC

PRINTED DATE :	DATE :

SCALE AT A3	DRAWING No. :	REV:
1:300	GBP-08	-



31ST FLOOR PLAN (GUEST ROOM)



TYPICAL LAYOUT 1 FOR SINGLE BED GUEST ROOM
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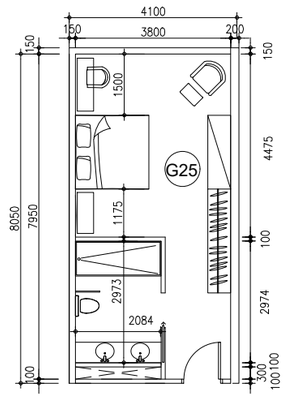

TYPICAL LAYOUT FOR DOUBLE BED GUEST ROOM (G25 & G26)
UFA=20.955 m2
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-	DESIGN PROPOSAL	JUL'25
REV.	DESCRIPTION	DATE

PROJECT :

REDEVELOPMENT OF NOS. 20-24 TAI YAU STREET
SAN PO KONG, KOWLOON, N.K.I.L.s
4735, 4736, 4737, 4738, 4739 RP, 4739 S.A & 4739 S.B

DRAWING TITLE :

31ST FLOOR PLAN

AUTHORIZED PERSON :

C&L architects & surveyors ltd
朱倫建築師測量師有限公司

JOB No. : AA598

DESIGNED :	DRAWN :	CHECKED :	APPROVED :
RL	NC	RL	JC

PRINTED DATE : | DATE :

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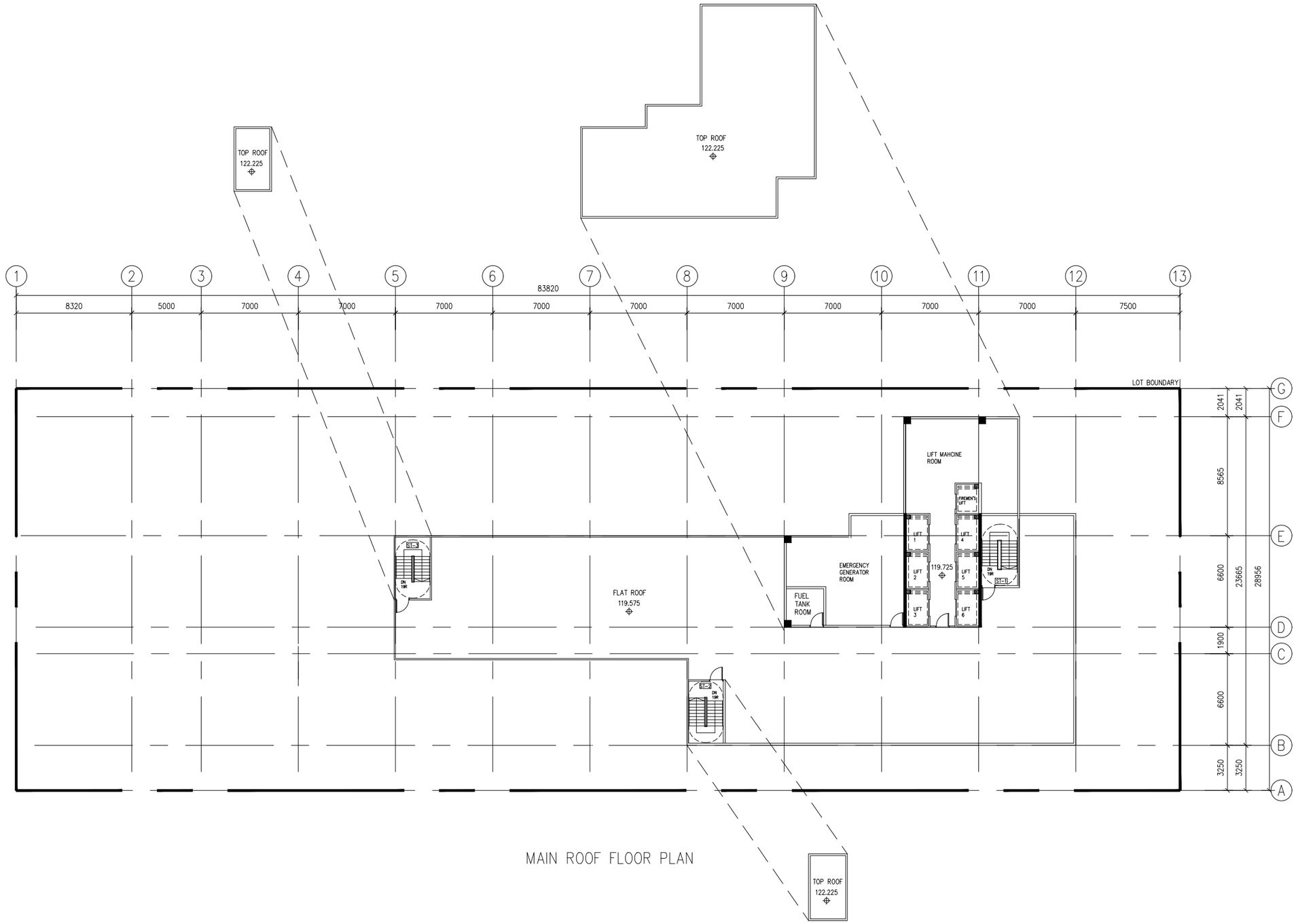

MAIN ROOF FLOOR PLAN

-	DESIGN PROPOSAL	JUL'25
REV.	DESCRIPTION	DATE

PROJECT :

REDEVELOPMENT OF NOS. 20-24 TAI YAU STREET
SAN PO KONG, KOWLOON, N.K.I.L.s
4735, 4736, 4737, 4738, 4739 RP, 4739 S.A & 4739 S.B

DRAWING TITLE :

ROOF FLOOR PLAN

AUTHORIZED PERSON :

C&L architects & surveyors ltd
朱倫建築師測量師有限公司

JOB No. : AA598

DESIGNED :	DRAWN :	CHECKED :	APPROVED :
RL	NC	RL	JC

PRINTED DATE : | DATE :

SCALE AT A3	DRAWING No. :	REV:
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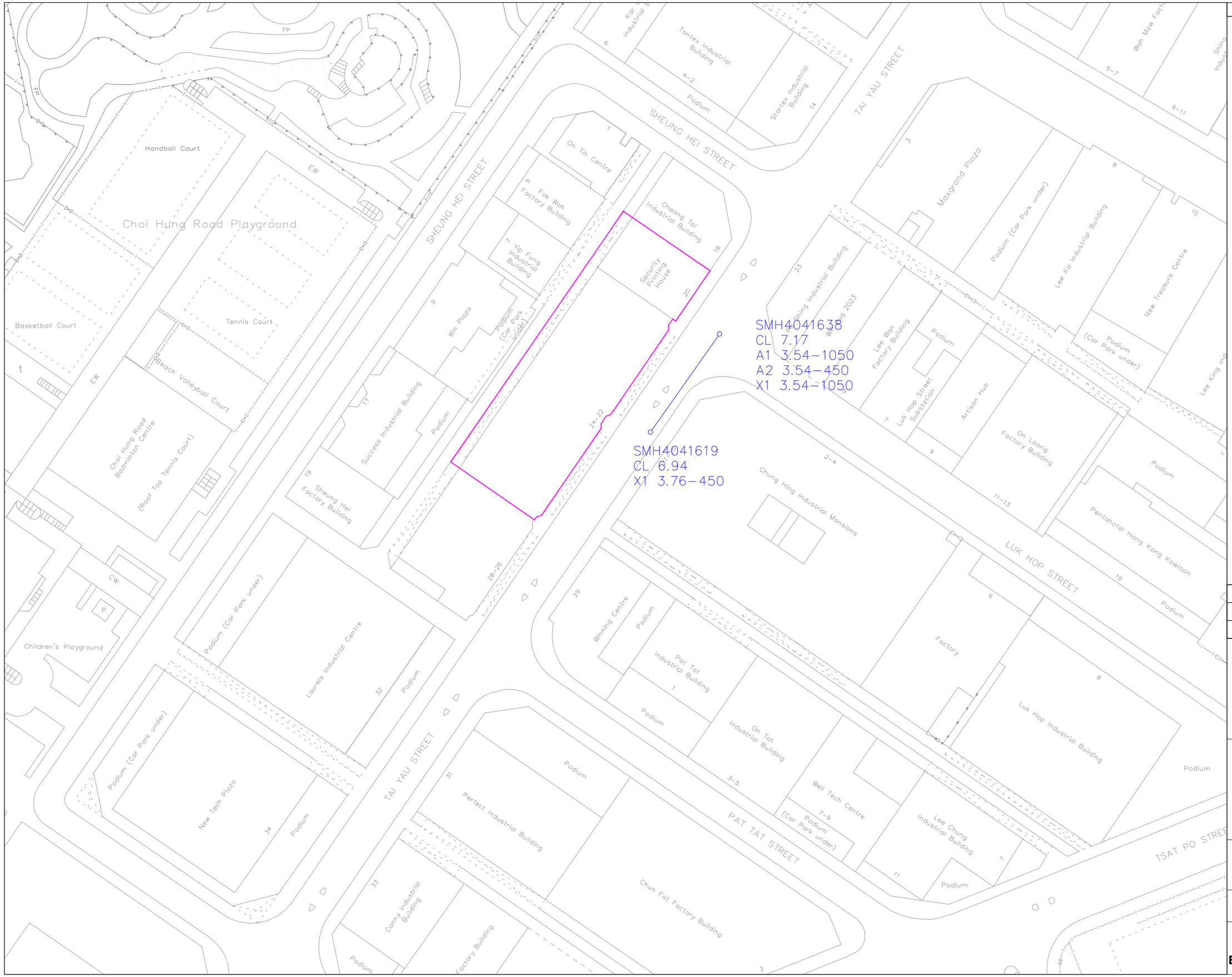
APPENDIX B
EXISTING DRAINAGE SYSTEM



Project Site

Existing Drainage Connection

	Prepared	Checked	Approved
Initial	Various	TL	HM
Date	20250708	20250708	20250708

Project Title

Redevelopment of Nos 20- 24 Tai Yau Street, San Po Kong, Kowloon

Drawing Title

Existing Drainage Connection

Drawing No.	Rev.
Appendix B	0

Scale: A3

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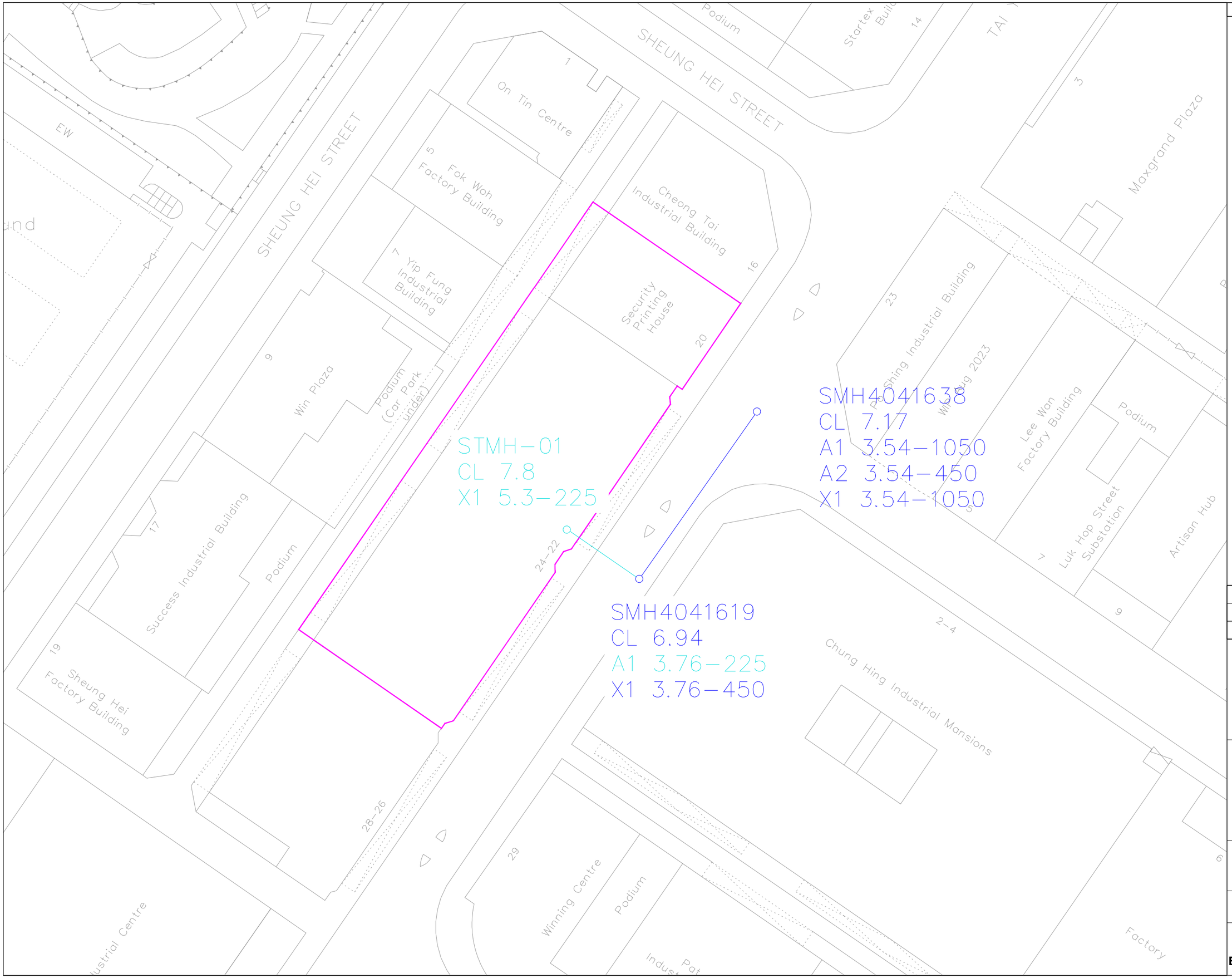
APPENDIX C
PROPOSED DRAINAGE CONNECTION AND CATCHMENT AREA



Project Site

Existing Drainage Connection

Proposed Drainage Connection

	Prepared	Checked	Approved
Initial	Various	TL	HM
Date	20250708	20250708	20250708

Project Title

Redevelopment of Nos 20- 24 Tai Yau Street, San Po Kong, Kowloon

Drawing Title

Proposed Drainage Connection

Drawing No.	Rev.
Appendix C	0

Scale: A3

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APPENDIX D
CALCULATION OF RUNOFF FOR RETURN PERIOD OF 50 YEARS

Appendix D

Calculation of Runoff for the Return Period of 50 Years

Catchment ID	Unpaved Catchment Area (km^2)	Paved Catchment Area (km^2)	Catchment Area (A), km^2	Average slope (H), m/100m	Flow path length (L), m	Inlet time (t_0), min	Duration (t_d), min	Storm Constants*			Runoff intensity (i) with climate change factor, mm/hr*	Runoff coefficient for unpaved area (C_{up})	Runoff coefficient for paved area (C_p)	C x A	Peak runoff (Q_p) m^3/s
								a	b	c					
After the Proposed Development															
Catchment S	0.000000	0.002426	0.002426	0.56	53	3.98	3.98	505.5	3.29	0.355	250.01	0.25	0.95	0.00230	0.160

APPENDIX E

CALCULATION OF DRAINAGE CAPACITY OF ALL RUNOFF FROM THE PROJECT SITE (CATCHMENT S)

Appendix E

Calculation of drainage capacity of the runoff from the Project Site (Catchment S)

SECTION		Pipe	Catchment	Length	Upstream Invert Level	Downstream Invert Level	d	r	A_w	P_w	R	s	k_s	V	Q_c	Total Runoff in 50 Years	% of capacity	Remark
From	To			m	mPD	mPD	m	m	m^2	m	m	-	mm	m/s	m^3/s	m^3/s	%	
STMH-01	SMH4041619	1 x 225mm circular pipe	S	12.9	+5.30	+3.76	0.225	0.11	0.040	0.707	0.06	0.119	0.06	5.8927	0.234	0.160	68%	OK
SMH4041619	SMH4041638	1 x 450mm circular pipe	S	32.3	+3.76	+3.54	0.45	0.23	0.159	1.414	0.11	0.007	0.06	2.0763	0.330	0.160	49%	OK

Legend

d = pipe diameter, m

r = pipe radius (m) = 0.5d

A_w = wetted area (m^2) = πr^2 (circular) ; $\pi r^2/2$ (U-channel) ; WH (Box Culvert)

P_w = wetted perimeter (m) = $2\pi r$ (circular) ; πr (U-channel) ; 2W+2H (Box Culvert)

R = Hydraulic radius (m) = A_w / P_w

s = Slope of the total energy line

k_s = equivalent sand roughness, mm

V = Velocity of flow calculated based on Colebrook White Equation, m/s

Q_c = Flow Capacity (10% sedimentation incorporated), m^3/s

Q_p = Estimated total peak flow from the Site during peak season, m^3/s