Attachment 3

Revised Drainage and
Sewerage Impact Assessment

Prepared by

Ramboll Hong Kong Limited

PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AT 201 AND 203 WAI YIP STREET, KWUN TONG

DRAINAGE AND SEWERAGE IMPACT ASSESSMENT

Date	**November 2024**
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Signed	
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Signed	
Project Reference	**HHPWYSDCSI00**
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CHAPTERS

TABLES

FIGURES

APPENDIX

1. INTRODUCTION

1.1 Background and Objectives

1.1.1 The Application Site is located at 201 and 203 Wai Yip Street, Kwun Tong, which falls within an area zoned "Other Specified Uses (Business)" under the Approved Kwun Tong (South) Outline Zoning Plan No. S/K14S/26.

1.1.2 Ramboll Hong Kong Limited is commissioned to conduct the sewerage impact assessment based on the information regarding the proposed scheme.

1.2 Application Site and its Environs

1.2.1 The Application Site is bounded by Hung To Road to the north-east, Hoi Yuen Road to the south-east, Wai Yip Street to the south-west and Tsun Yip Street to the north-west.

1.2.2 **Figure 1** shows the location and the environs of the Proposed Development.

1.3 Proposed Development

1.3.1 Under the current application, the Application Site is proposed for a hotel development. Details of the proposed development schedule are summarised in **Table 1.1** below and the layout plan is shown in **Appendix 1.1**.

Table 1.1 Development Schedule of the Proposed Development

Total Site Area	About 1872 m^2
Plot Ratio	14.4
Total GFA	About 26,957 m^2 [1]
No. of Blocks	1
Building Height	120mPD
No. of Storeys	33 [2]

Remarks:

[1] Excluding an approvable bonus GFA of about 793m^2 (i.e. equivalent to a PR of about 0.424) in accordance with the Building (Planning) Regulations to be claimed from the Building Department during GBP stage that comprises of:

- 2.5m SBL from the lot boundary abutting Wai Yip Street
- 1.5m SBL along the back alley

[2] Including one level of refuge floor on 17/F but excluding one level of basement car park floor.

2. SEWERAGE IMPACT ASSESSMENT

2.1 Scope of Work

2.1.1 The aim of this study is to compare the sewage flow generated from the proposed development with the sewage flow generated from the existing usage, and to determine whether adverse sewage impact is anticipated.

2.2 Assessment Criteria and Methodology

2.2.1 The Commercial and Industrial Floor Space Utilization Survey (CIFSUS) conducted by the Planning Department has been used to determine the worker density for various economic activities and planned usage types.

2.2.2 Environmental Protection Department's (EPD's) Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning, Version 1 (GESF) has been referred to for the purposes of estimating the quantity of the sewage generated from the Proposed Development and the existing catchment area. Sewage flow parameters and global peaking factors in this document have been adopted for this SIA.

2.2.3 According to the GESF, the overall unit flow is composed of flows due to employees and the associated activities. The following unit flow factors have been adopted in the SIA calculation in accordance with Tables T-1, T-2 and T-3 of the GESF:

- J10 Restaurants & Hotels: 1.58 m^3/day

2.3 Existing and Future Sewerage System

2.3.1 With reference to the sewerage system shown in Geoinfo Map, the sewage generated from the proposed development will be discharged to the existing manhole FMH4043092 from the proposed terminal manhole.

2.3.2 The existing and proposed sewerage system are shown in **Figure 2.1**

2.4 Wastewater Generated by the Proposed Development

2.4.1 The sewage generated by the proposed development is given in **Table 2.1** shown below.

Table 2.1 Estimated Peak Flow

Calculation for Sewage Generation Rate of the Proposed Development at the Application Site			
1. Hotel			
Assumer Area	=	25378	m^2 [1]
Assumed floor area per employee	=	31.3	m^2 per employee – (refer to Table 8 of CIFSUS – Hotels and Boarding Houses)
Total number of employees	=	813	employees
Design flow for commercial employees	=	1.58	m^3/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**1283.1**	m^3/day
2. Restaurant & Café			
Assumer Area	=	861	m^2 [1]
Assumed floor area per employee	=	19.6	m^2 per employee – (refer to Table 8 of CIFSUS – Restaurants)
Total number of employees	=	44	employees
Design flow for commercial employees	=	1.58	Litre/employee/day – (refer to Table T-2 of GESF – Job T10 Restaurants & Hotels)
Sewage generation rate	=	**69.4**	m^3/day
3. Shop			
Assumer Area	=	107	m^2 [1]
Assumed floor area per employee	=	28.6	m^2 per employee – (refer to Table 8 of CIFSUS – Retail Trade)
Total number of employees	=	4	employees
Design flow for commercial employees	=	0.28	Litre/employee/day – (refer to Table T-2 of GESF – Job T10 Wholesale & Retail)
Sewage generation rate	=	**1.0**	m^3/day
3. Swimming Pool			
Assumed area	=	120	m^2
Assumed depth of water	=	1.5	m
Volume of water	=	180.0	m^3
Turnover Rate	=	4.0	hr CAP132, Section 42 Swimming Pools Regulation (covered))
Surface loading rate of filter	=	50.0	$m^3/m^2/hr$
Filter areas required	=	0.9	m^2
Backwashing flow rate	=	30.0	$m^3/m^2/hr$
Design flow for backwashing	=	27.0	m^3/hr
Backwash duration	=	7.0	min/day
Backwash generation rate	=	1.35	m^3/day
Backwash generation rate	=	**7.5**	litre/sec
Total Flow from the Proposed Development			
Flow rate	=	1353.6	m^3/day
Flow rate with P_{CIF}	=	1488.9	m^3/day (refer to Table T-4 of GESF – East Kowloon - 1.1)
Contributing population	=	5515	people
Peaking factor	=	5	(refer to Table T-5 of GESF for a population between 5,000 – 10,000 incl. stormwater allowance)

Peak Flow (without swimming pool)	=	7444.6	m^3/day
	=	86.2	litre/sec
Peak flow (with swimming pool)	=	**93.7**	litre/sec

Remark:
[1] Excluding GFA of about 1403m^2 from landscape garden, lounge, hotel lobby, back of house, plant room, TX. room and filtration plant room.

2.5 Assessment of Sewerage Impact

2.5.1 As shown in **Figure 2.1**, sewerage generated from the proposed development will be discharged from the terminal manhole located within the Application Site to Manhole S1 FMH4043092 which is located at the back alley of the proposed development.

2.5.2 Catchments in the vicinity of the Application Site are shown in **Figure 2.2**.

2.5.3 Detailed calculation of sewage generation, peak flow estimation and the capacity of the public sewer can be referred to **Appendix 2.1**. Based on the assessment results, the capacity of sewers FWD4048770, FWD4048771, FWD4048772, FWD4048554, FWD4048555, FWD4048556, FWD4048557 and FWD4049140 are not sufficient for the sewerage generated from the proposed development and the surrounding catchment. Therefore, sewers FWD4048770, FWD4048771 and FWD4048772 are proposed to upgrade to 375mm with total length of 21.4m while FWD4048554 will be upgraded to 1250mm with the length of 23.6m. For sewers FWD4048555, FWD4048556, FWD4048557 and FWD4049140 are proposed to upgrade to 1800mm with the total length of 164.8m.

2.5.4 Hence, upgrading works on the public sewers FWD4048770, FWD4048771, FWD4048772, FWD4048554, FWD4048555, FWD4048556, FWD4048557 and FWD4049140 by the project proponent are required.

2.5.5 Beside upgrading works on the above-mentioned pipes, a new 375mm sewer is proposed to connect manhole FMH4043095 and FMH4042874.

2.5.6 The proposed development is expected to be completed by the year of 2028/2029 and hence the proposed upgrading works and new pipe will be completed before 2028/2029 or prior to the commissioning of the proposed development.

3. DRAINAGE IMPACT ASSESSMENT

3.1 Discussion

3.1.1 Surface runoff is mainly from rainfall and it will be directed to existing public storm drains. As the existing site is currently on hard-paved ground, it is anticipated that the proposed development will not affect the drainage path or lead to any changes in the runoff behaviour.

3.1.2 There is no change or abandonment of existing drains and hence no extra stormwater discharge is imposed. Therefore, adverse impact on the existing drainage system is not anticipated and a detailed drainage impact assessment is therefore unnecessary.

4. OVERALL CONCLUSION

4.1.1 The Application Site is located at 201 and 203 Wai Yip Street, which falls within an area zoned "Other Specified Uses (Business)" under the Approved Kwun Tong (South) Outline Zoning Plan No. S/K14S/26.

4.1.2 The Proposed development is to develop a hotel building. The development consists of a 27-storey hotel guest rooms with a swimming pool, 3-storey restaurant and café and 1-storey shop.

4.1.3 The estimated sewage generation rate of the Proposed Development has been quantitatively addressed. The estimated peak sewage generation from the Proposed Development is about 93.7 litre/sec.

4.1.4 Based on the calculations, as shown in **Appendix 2.1**, the capacity of existing sewers are not sufficient to cater for the sewage generated from the Proposed Development. Upgrading works on the public sewers FWD4048770, FWD4048771, FWD4048772, FWD4048554, FWD4048555, FWD4048556, FWD4048557 and FWD4049140 are required. Beside upgrading works on the above-mentioned pipes, a new 375mm sewer is proposed to connect manhole FMH4043095 and FMH4042874. After the proposed upgrading and new pipe works, there would not have any adverse impact on the public sewerage system.

Figures

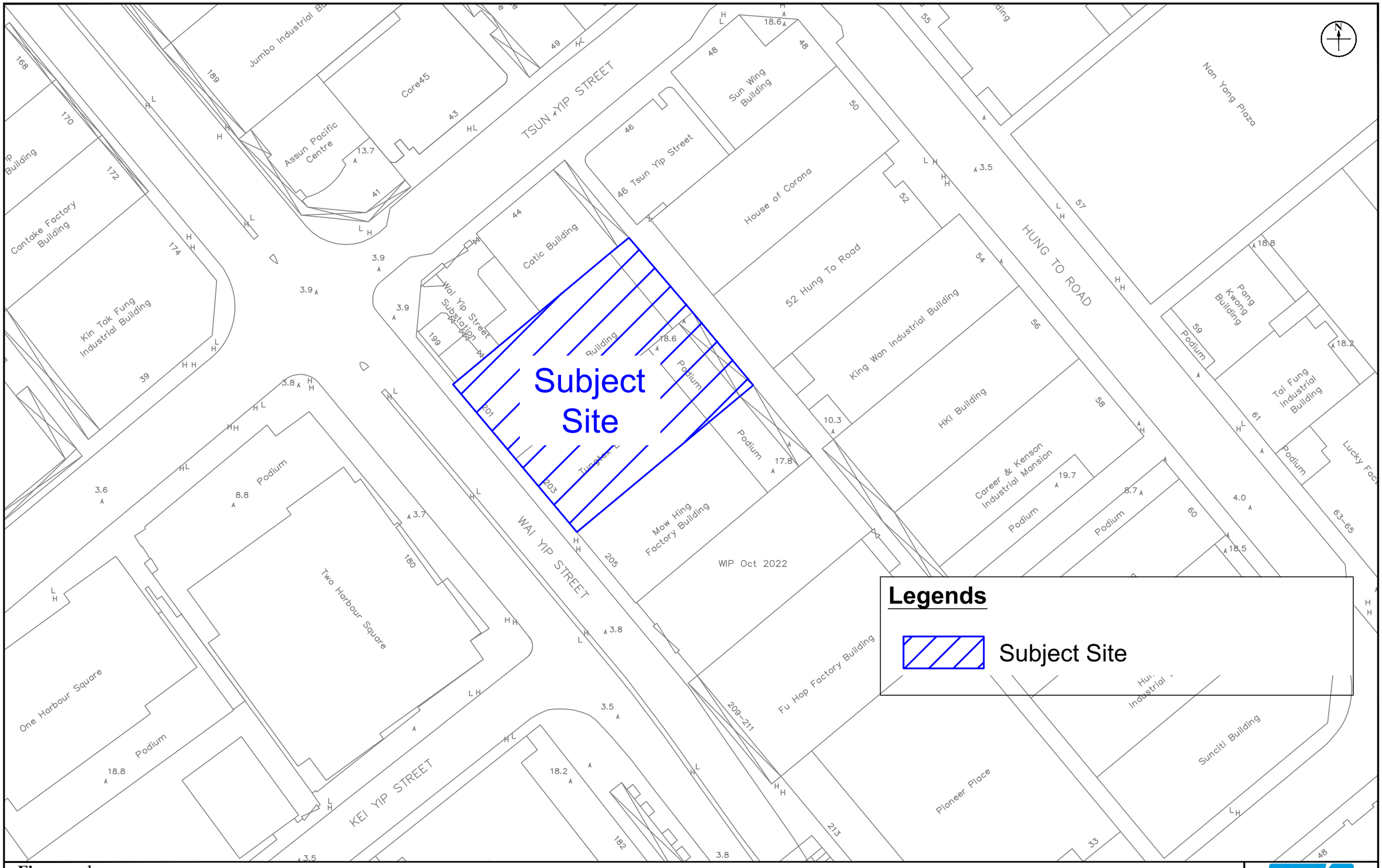

Figure: 1	RAMBOLL
Title: Location of the Application Site	Drawn by: SC
	Checked by: TC
Project: Proposed Re-development at 201 and 203 Wai Yip Street	Rev.: 1.0
	Date: Oct 2023

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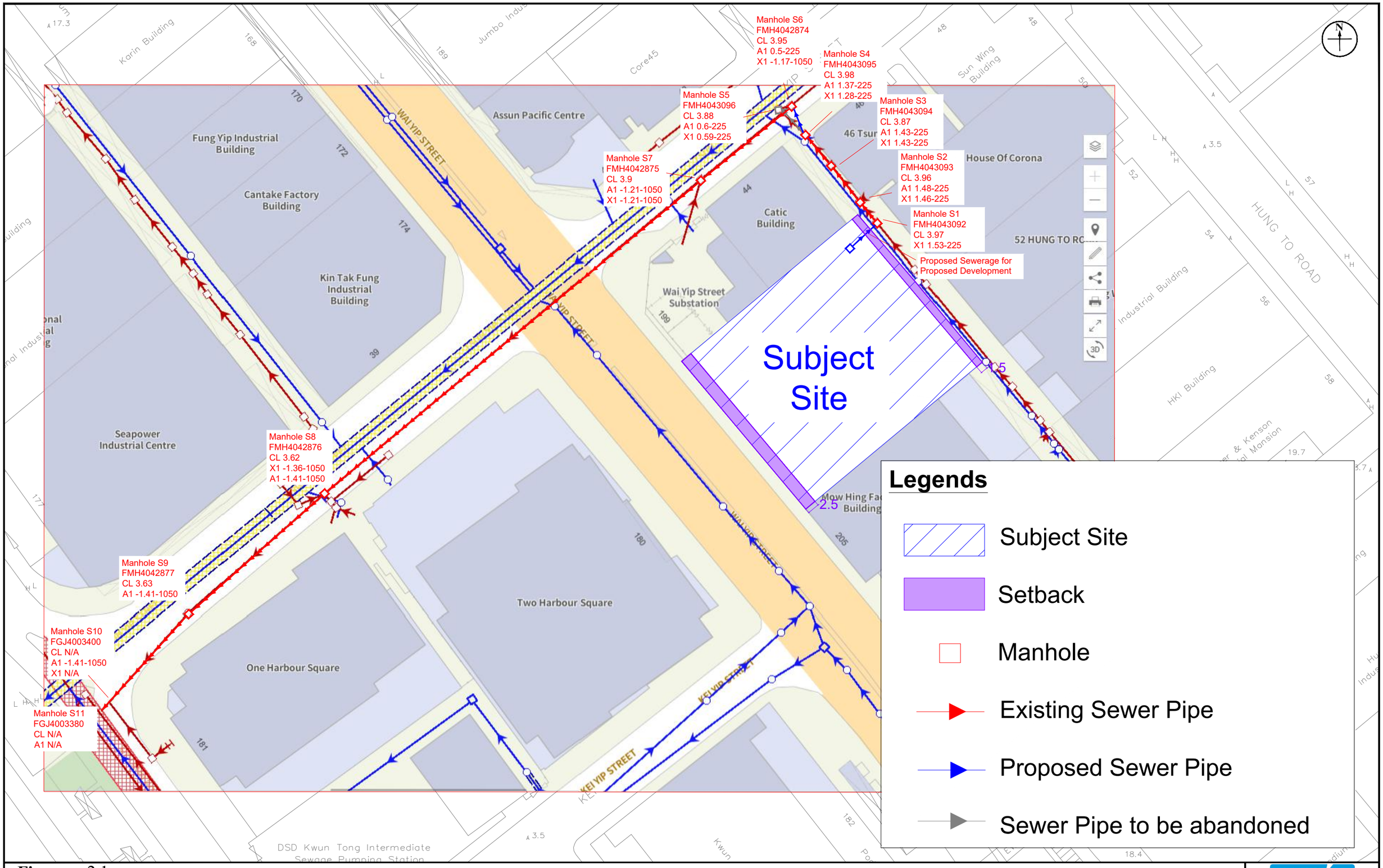


Figure: 2.1	RAMBOLL
Title: Existing and Proposed Sewerage System	Drawn by: SC Checked by: TC
Project: Proposed Re-development at 201 and 203 Wai Yip Street	Rev.: 1.0 Date: Oct 2023

Q:\Projects\HHPWYSDCSI00\05 Assessments\04 SIA\Hotel Scheme\Fig 2.1_Existing Sewerage System_241120.dwg

Manhole S6 (Include sewage from Subject Site + Catchment A, B, C)
FMH4042874
CL 3.95
A1 0.5-375
X1 -1.17-1250

Catchment C: Assume full pipe capacity of FWD4048553

Manhole S4 (Include sewage from Subject Site + Catchment A & B)
FMH4043095
CL 3.98
A1 1.28-375
X1 1.28-375

Manhole S3 (Include sewage from Subject Site + Catchment A & B)
FMH4043094
CL 3.87
A1 1.37-375
X1 1.37-375

Manhole S7 (Include sewage from Subject Site + Catchment A, B, C, D)
FMH4042875
CL 3.9
A1 -1.21-1250
X1 -1.21-1800

Manhole S2 (Include sewage from Subject Site + Catchment A & B)
FMH4043093
CL 3.96
A1 1.48-375
X1 1.48-375

Manhole S1 (Include sewage from Subject Site + Catchment A)
FMH4043092
CL 3.97
A1 1.53-300
X1 1.53-375

Proposed Terminal Manhole
X1 1.57-300

Subject Site

Manhole S8 (Include sewage from Subject Site + Catchment A, B, C, D, E & F)
FMH4042876
CL 3.62
X1 -1.36-1800
A1 -1.41-1800

Catchment E:
Assume full pipe capacity for all the buildings discharged to FMH4042830
Manhole: FMH4042830
CL: 3.96
X1: 1.83-225

Manhole S9 (Include sewage from Subject Site + Catchment A, B, C, D, E & F)
FMH4042877
CL 3.63
A1 -1.41-1800
X1 -1.41-1800

Manhole S10 (Include sewage from Subject Site + Catchment A, B, C, D, E & F)
FGJ4003400
CL N/A
A1 -1.41-1800
X1 N/A

Manhole S11 (Include sewage from Subject Site + Catchment A, B, C, D, E & F)
FGJ4003380
CL N/A
A1 N/A

TSUN YIP STREET
WAI YIP STREET
KEI YIP STREET
HUNG TO ROAD
Wai Yip Street Substation
Catic Building
King Won Industrial Building
HKI Building
Career & Kenson Industrial Mansion
Mow Hing Factory Building
WIP Oct 2022
Fu Hop Factory Building
Pioneer Place
Kwun Tong Harbour Plaza
DSD Kwun Tong Intermediate Sewage Pumping Station
Two Harbour Square
One Harbour Square
Nan Yang Plaza
High Win Factory Building
Jumbo Industrial Building
Assun Pacific Centre
Free Trade Centre
Winner Factory Building
Wah Hong Industrial Building
Sifoy Tower
Karin Building
Fung Yip Industrial Building
Contake Factory Building
Kin Tak Fung Industrial Building
International Industrial Building
D. J. Building

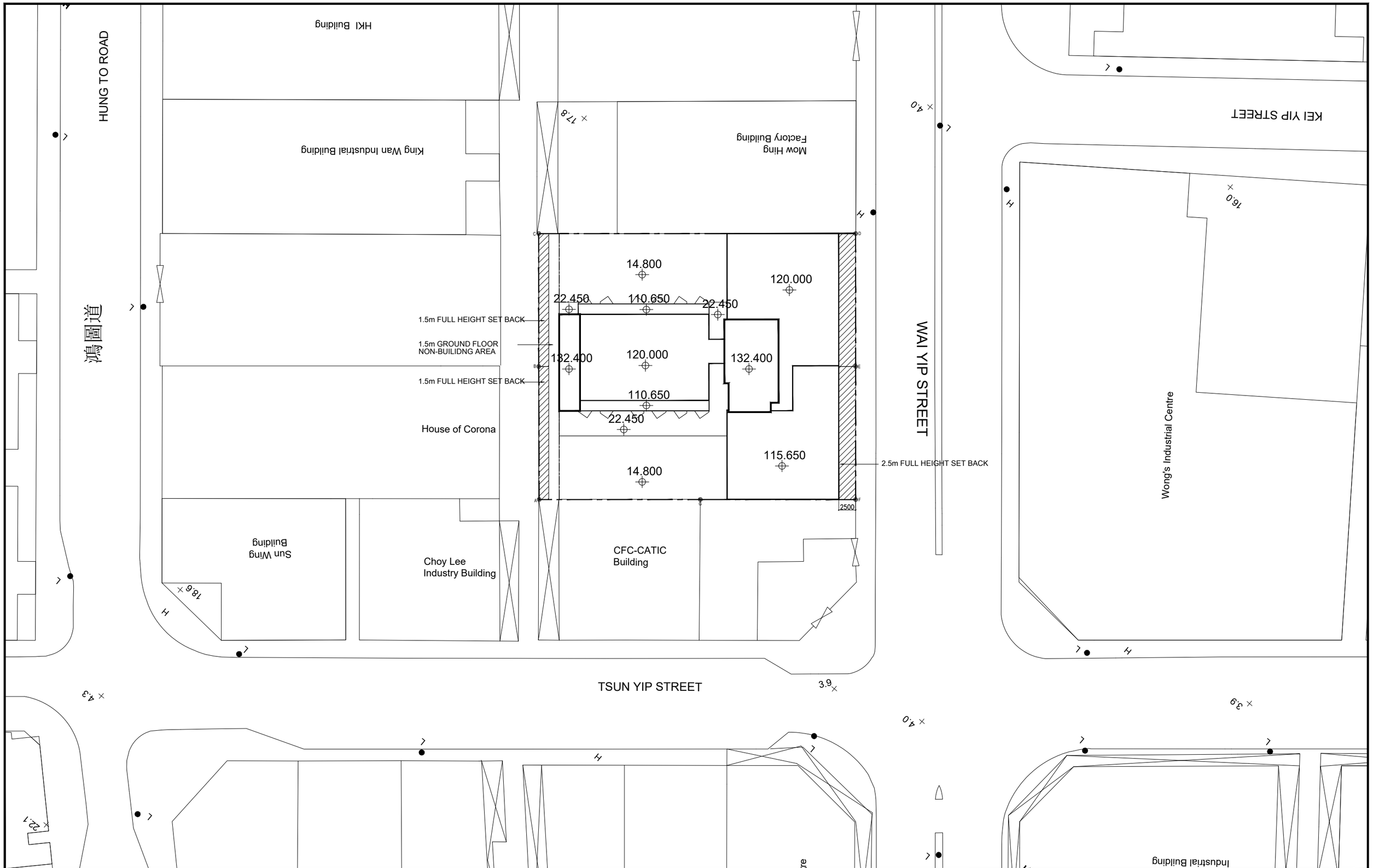
Legends

- Subject Site
- Setback
- Catchment A
- Catchment B
- Catchment C
- Catchment D
- Catchment E
- Catchment F
- Existing Manhole
- Proposed Manhole
- Existing Sewer Pipe
- Sewer Pipe to be upgraded
- Proposed Sewer Pipe

Figure: 2.2	RAMBOLL
Title: Existing/Proposed/ Upgrading Sewerage System and Catchments Area	Drawn by: SC Checked by: TC
Project: Proposed Re-development at 201 and 203 Wai Yip Street	Rev.: 1.0 Date: Oct 2023

Q:\Projects\HHPWYSDCSI00\05 Assessments\04 SIA\Hotel Scheme\Fig 2.2_Catchment_241111.dwg

Appendix 1.1 Master Layout Plan of the Application Site



Drawing Title BLOCK PLAN	Scale 1:500 Date 15/11/2024	Project SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 201 AND 203 WAI YIP STREET, KWUN TONG, KOWLOON	Job No. A-2302

ANDREW LEE KING FUN & ASSOCIATES ARCHITECTS LTD

PLOT RATIO & SITE COVERAGE CALCULATION

(UNDER O.Z.P.)

SITE AREA		=	1871.980 S.M. (20150.000 S.F.)
CLASS OF SITE		=	`A'
HEIGHT RESTRICTION		=	120.000 mPD
MEAN LEVEL		=	4.000 M.
HEIGHT OF NEW BUILDING			
120.000 mPD - 4.000 mPD(MEAN LEVEL)		=	116.000 M
PERMITTED NON-DOMESTIC SITE COVERAGE (BELOW 15M)		=	100.000%
ACTUAL NON-DOMESTIC SITE COVERAGE (BELOW 15M)		=	1639.440 S.M. (87.577%)
PERMITTED NON-DOMESTIC SITE COVERAGE (OVER 61M)		=	60.000%
PERMITTED NON-DOMESTIC PLOT RATIO	= 12 x (1 + 20%)	=	14.4
ROAD WIDENING AREA (SURRENDERED):		=	99.067 S.M.
SET BACK AREA (SURENDERED):		=	59.444 S.M.
	TOTAL	=	158.511 S.M.

BONUS: ROAD WIDENING x 1500 / SITE AREA x HEIGHT OF BUILDING

$$\frac{158.511 \text{ S.M.} \times 1500}{1871.980 \text{ S.M.} \times 116.000 \text{ M}} \%$$ = 1.095 %

TOTAL PERMITTED NON-DOMESTIC SITE COVERAGE		=	61.095%
TOTAL PERMITTED NON-DOMESTIC SITE COVERAGE AREA			
1871.980 S.M. x 61.095 %		=	1143.686 S.M.
ACTUAL NON-DOMESTIC SITE COVERAGE AREA (OVER 61M)		=	1142.646 S.M. < 1143.686 S.M.
			(61.039 %) (61.095 %)
PERMITTED NON-DOMESTIC G.F.A.			
1871.980 S.M. x 14.4		=	26956.512 S.M.
BONUS :			
99.067 S.M. x 5		=	495.335 S.M.
WAI YIP STREET - ROAD WIDENING (SURRENDERED)			
59.444 S.M. x 5		=	297.220 S.M.
BACK ALLEY - SET BACK AREA (SURRENDERED)			
	TOTAL	=	27749.067 S.M.

ACTUAL GROSS FLOOR AREA FOR NON-DOMESTIC (AFTER BONUS):

GROUND FLOOR			=	495.427 S.M.
1ST FLOOR			=	589.722 S.M.
2ND FLOOR			=	642.515 S.M.
3/F - 4/F	948.885	X 2	=	1897.770 S.M.
5/F - 6/F	950.924	X 2	=	1901.848 S.M.
7/F - 11/F	943.348	X 5	=	4716.740 S.M.
12/F - 16/F, 18/F - 28/F	935.772	X 16	=	14972.352 S.M.
29/F - 30/F	944.479	X 2	=	1888.958 S.M.
31/F			=	461.692 S.M.
32/F			=	661.618 S.M.
			=	28228.642 S.M.
DEDUCT				
EXEMPTED G.F.A. OF LIFT SHAFT			=	479.605 S.M.
	TOTAL		=	27749.037 S.M. < 27749.067S.M.

NO. OF CARPARK CALCULATION

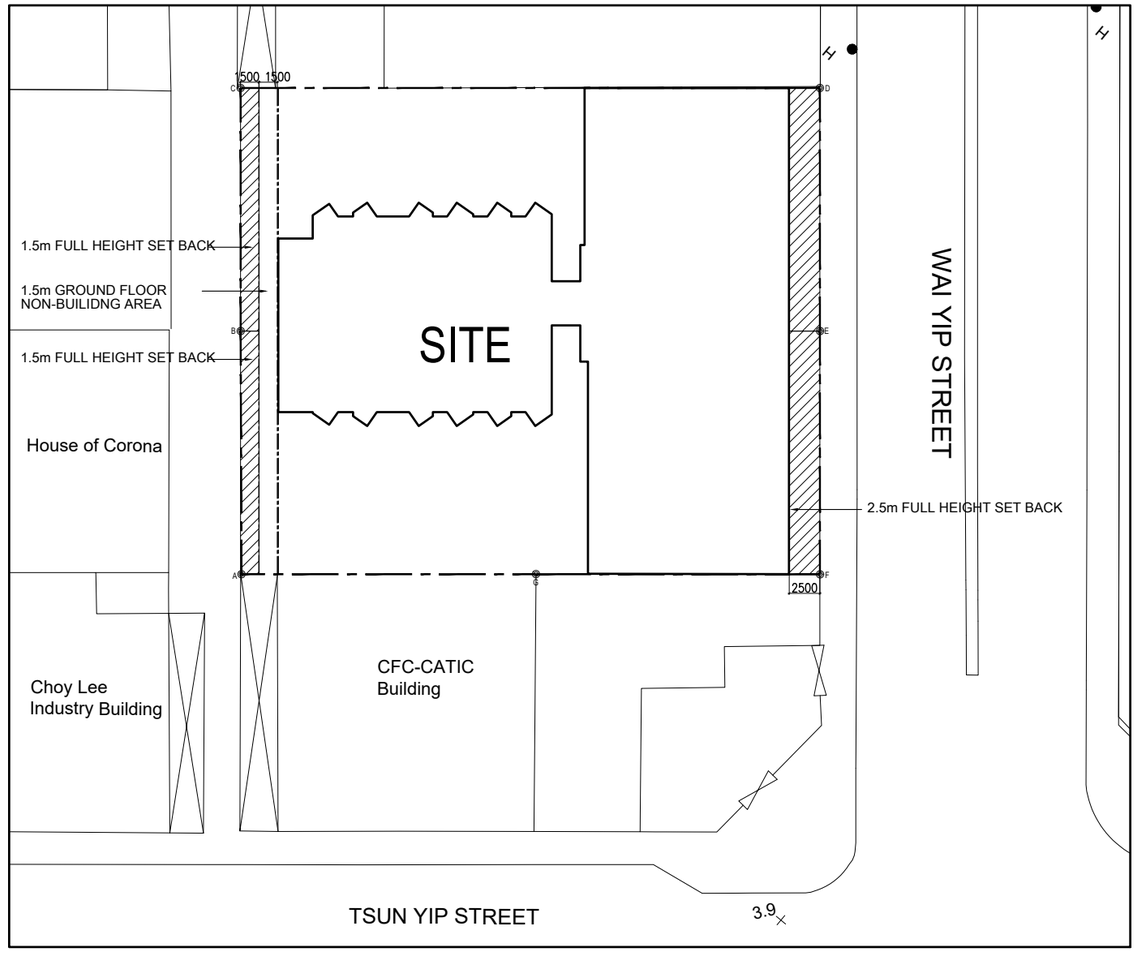
(ACCORDING TO H.K.P.S.G.)

NO. OF GUEST ROOM

3/F - 4/F			
31 x 2 STOREYS		=	62 NOS.
5/F - 16/F, 18/F - 28/F			
16 x 23 STOREYS		=	368 NOS.
29/F - 30/F			
9 x 2 STOREYS		=	18 NOS.
	TOTAL	=	448 NOS.

CAR PARK NOS REQUIRED

MOTOR VEHICLES (2.5 x 5.0 x 2.4H)				
HOTEL ROOMS :	448 / 100		=	5 NOS.
ANCILLARY FACILITIES :	589.722 (1/F)	+642.515 (3/F) / 400	=	4 NOS.
		TOTAL	=	9 NOS.
GOODS VEHICLES (LOADING & UNLOADING BAY)				
448 HOTEL ROOMS	(3.5 x 11.0 x 4.7H)		=	1 NOS.
	(3.5 x 7.0 x 3.6H)		=	2 NOS.
LAY-BYS FOR TAXI				
300 - 599 HOTEL ROOMS			=	3 NOS.
LAY-BYS FOR COACH / TOUR BUS				
300 - 899 HOTEL ROOMS	(3.5 x 12.0 x 3.8H)		=	3 NOS.



BLOCK PLAN

LIFT SHAFT AREA EXEMPTED IN G.F.A. CALCULATION :

G.F.A. OF NON-DOMESTIC		=	28228.642 S.M.
TOTAL G.F.A. OF LIFT SHAFT			
39.618 x 32 STOREYS		=	1467.744 S.M.
EXEMPTED G.F.A. OF LIFT SHAFT			
(1467.744 / 28228.642) x 100% - 3.5%		=	1.699 %
28228.642 x 1.699%		=	479.605 S.M.

TOTAL AREA OF BACK OF HOUSE

TOTAL NON-DOMESTIC G.F.A.		=	27749.037 S.M.
27749.067 x 5%		=	1387.452 S.M.
BACK OF HOUSE PROVIDED			
GROUND FLOOR		=	125.809 S.M.
1ST FLOOR		=	955.222 S.M.
3/F - 30/F	11.340 x 27	=	306.180 S.M.
	TOTAL	=	1387.211 S.M. < 1387.452 S.M.

GREENERY AREA REQ. (PLANTER AREA)

SITE AREA = 1871.980 S.M. (1000 S.M. - 20000 S.M.)

SITE COVERAGE OF GREENERY REQ. :
PRIMARY ZONE 10% & OVERALL 20%

GREENERY AREA REQ. (PLANTER AREA) PRO. (OVERALL)

p1	PLANTER AREA (2/F)		=	274.305 S.M.
p2	VERTICAL GREEN (1/F - 2/F)		=	94.163 S.M.
p3	PLANTER AREA (R/F)		=	175.705 S.M.
		TOTAL	=	544.173 S.M.

TOTAL SITE COVERAGE OF GREENERY

SITE COVERAGE OF GREENERY

$$= \frac{\text{TOTAL GREENERY AREA}}{\text{SITE AREA}} \times 100\%$$

$$= \frac{544.173}{1871.980} \times 100\% = 29.033\% > 20\% \text{ (REQUIRED) i.e. OK}$$

Drawing Title: CALCULATION	Scale: 1:500	Project: SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 201 AND 203 WAI YIP STREET, KWUN TONG, KOWLOON	Job No.: A-2302
	Date: 15/11/2024		

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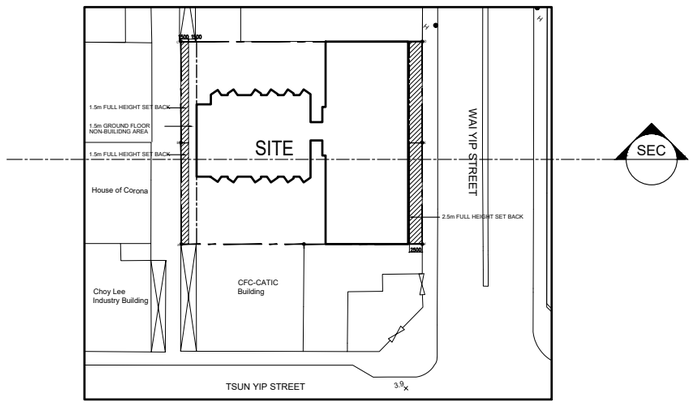
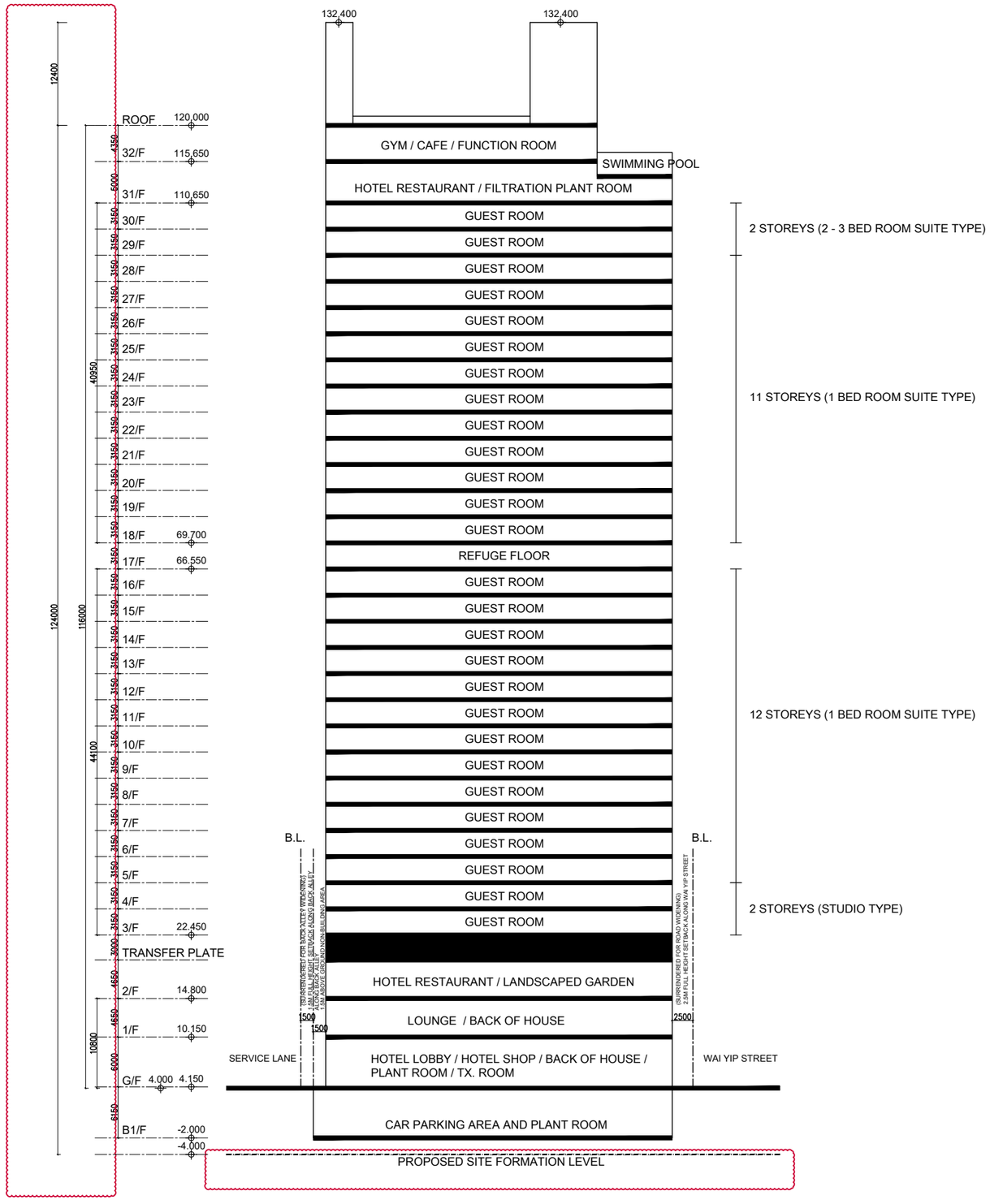


KEY PLAN



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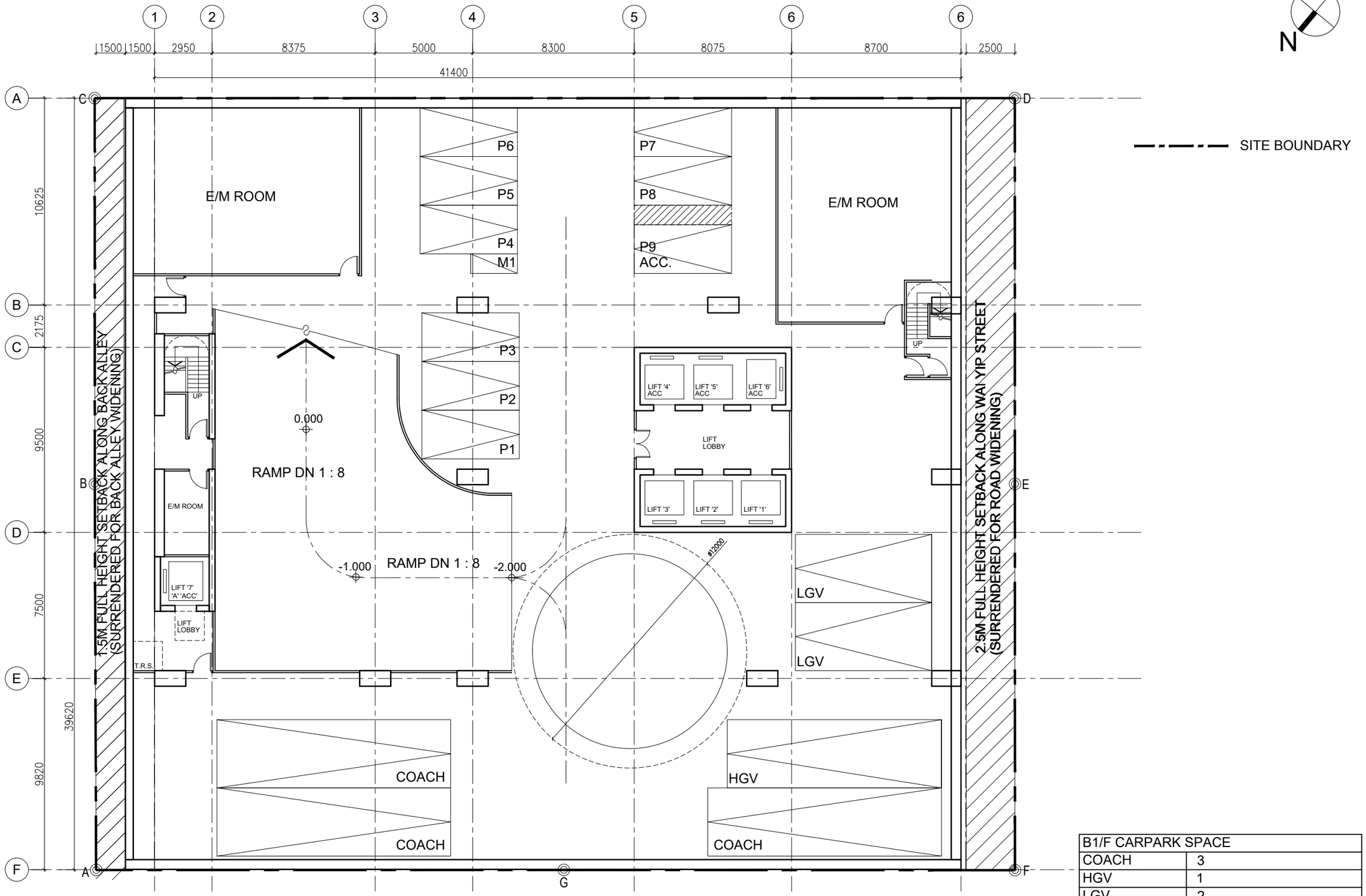

SCALE BAR

0m 2m 4m 6m 8m 10m

B1/F CARPARK SPACE	
COACH	3
HGV	1
LGV	2
PRIVATE CAR	9
MOTOR CYCLE	1

Drawing Title

BASEMENT FLOOR PLAN

Scale
1:200

Date
15/11/2024

Project
SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 201 AND 203 WAI YIP STREET, KWUN TONG, KOWLOON

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A-2302

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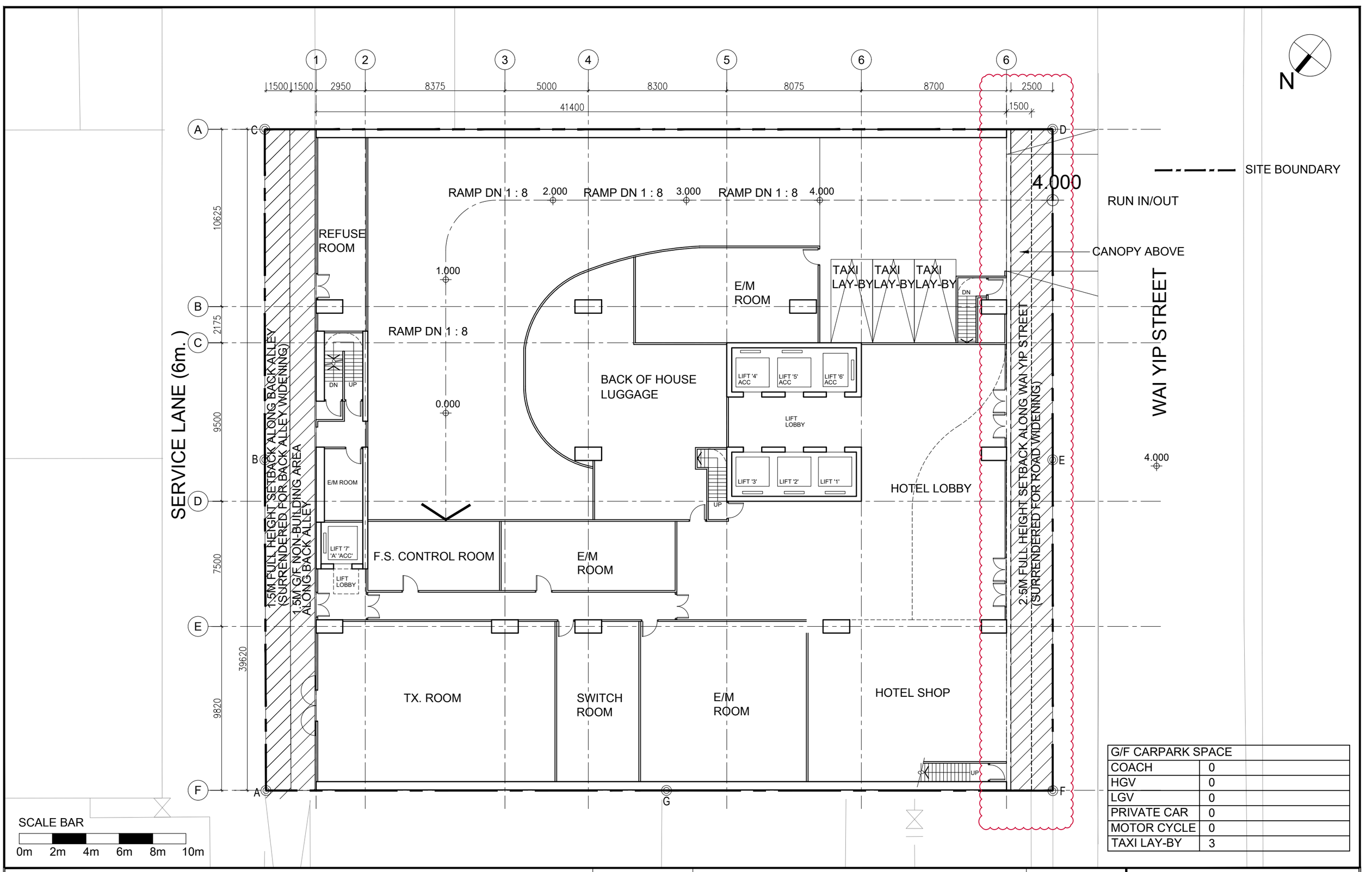

G/F CARPARK SPACE	
COACH	0
HGV	0
LGV	0
PRIVATE CAR	0
MOTOR CYCLE	0
TAXI LAY-BY	3

Drawing Title

GROUND FLOOR PLAN

Scale
1:200

Date
15/11/2024

Project
SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 201 AND 203 WAI YIP STREET, KWUN TONG, KOWLOON

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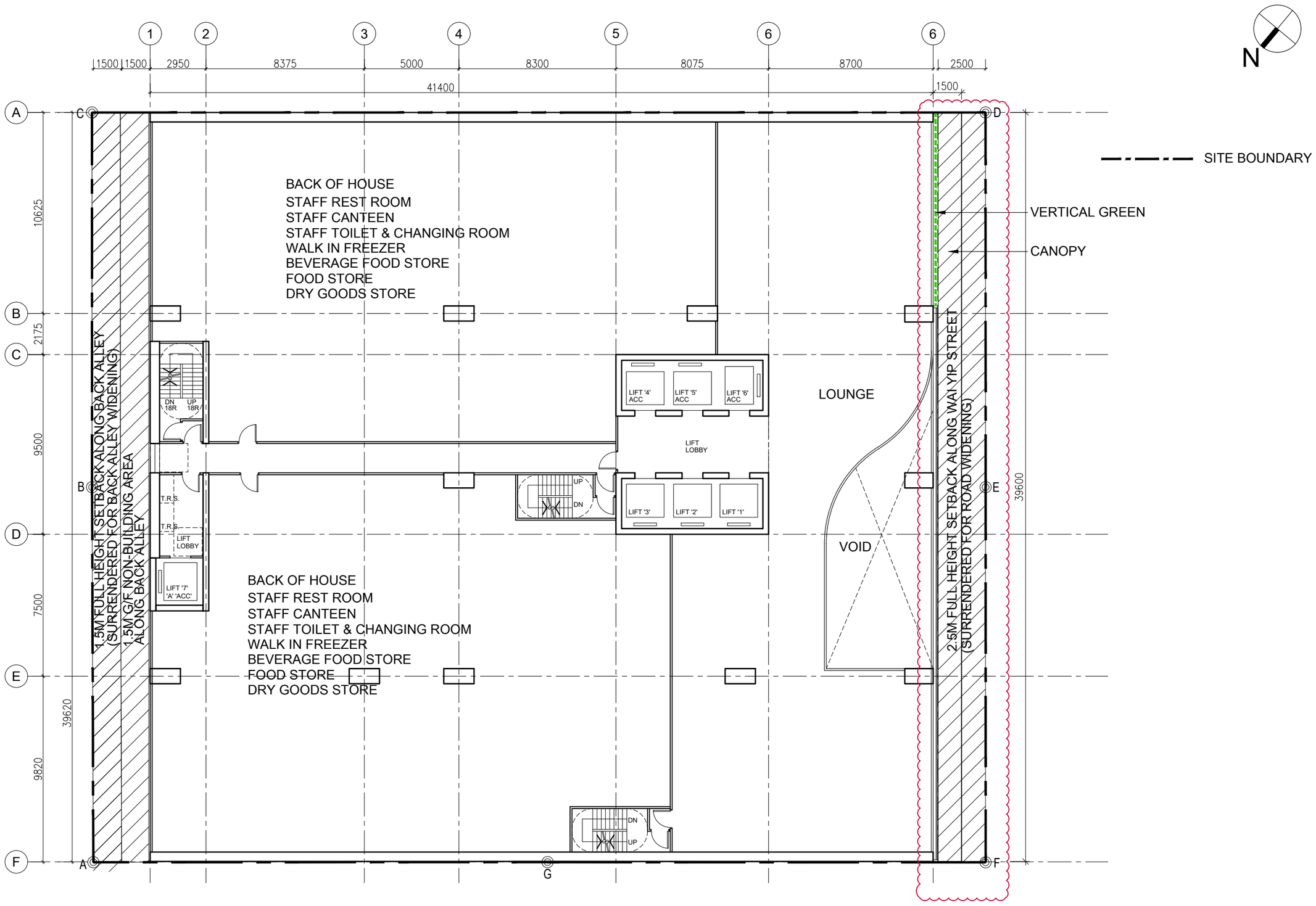

SCALE BAR

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Drawing Title 1/F PLAN	Scale 1:200 Date 15/11/2024	Project SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 201 AND 203 WAI YIP STREET, KWUN TONG, KOWLOON	Job No. A-2302

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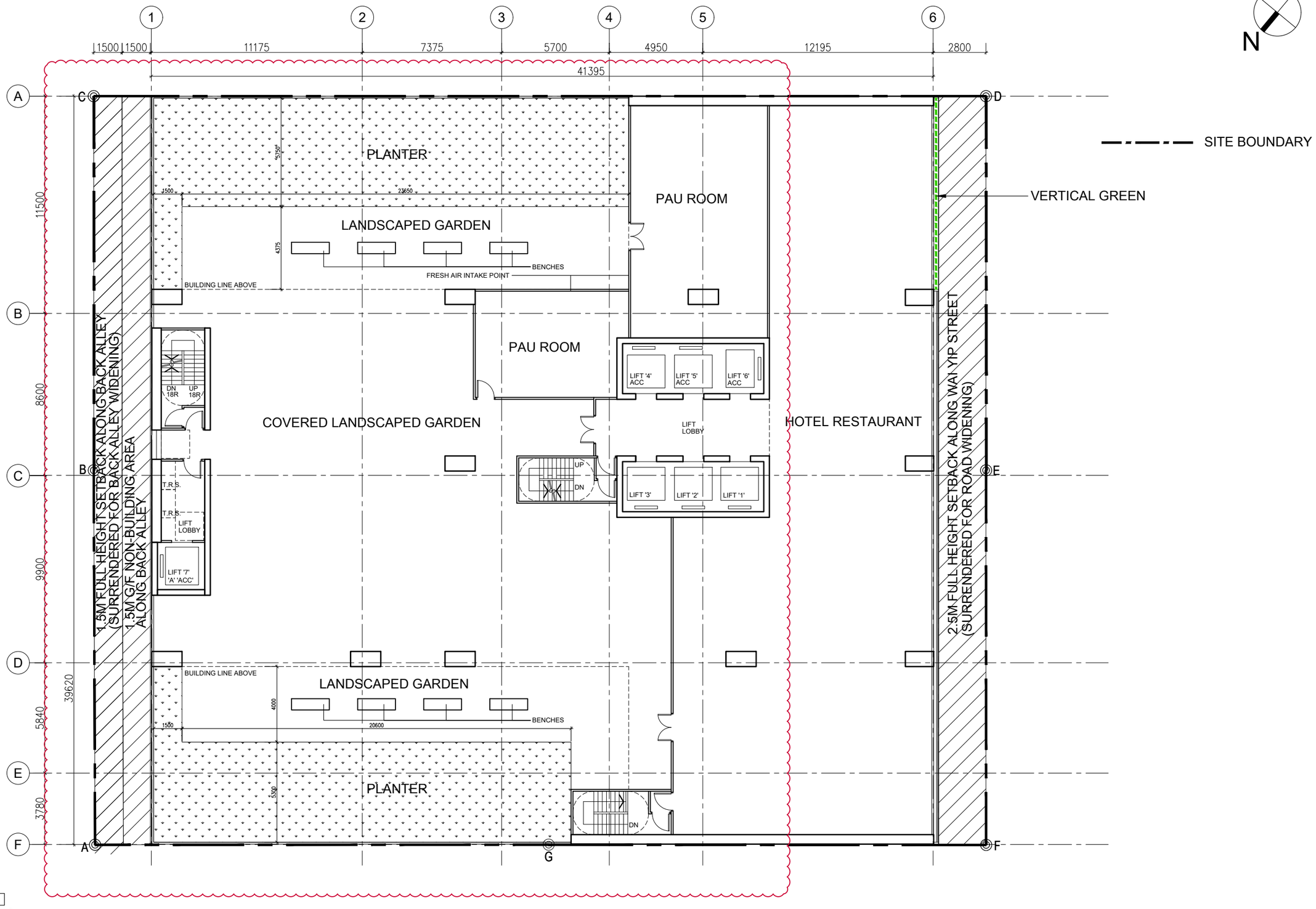

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2/F PLAN	1:200 Date 15/11/2024	SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 201 AND 203 WAI YIP STREET, KWUN TONG, KOWLOON	A-2302

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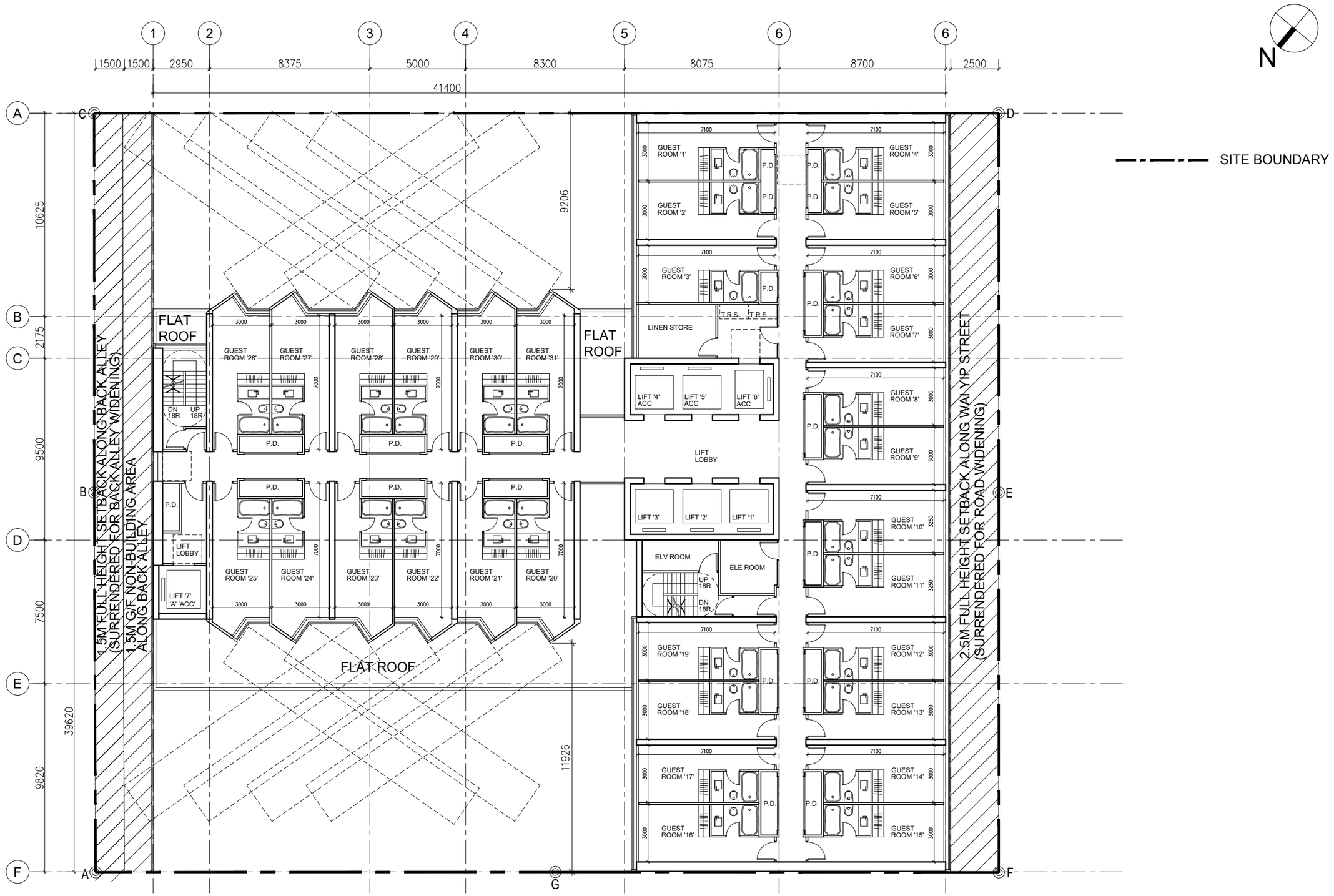

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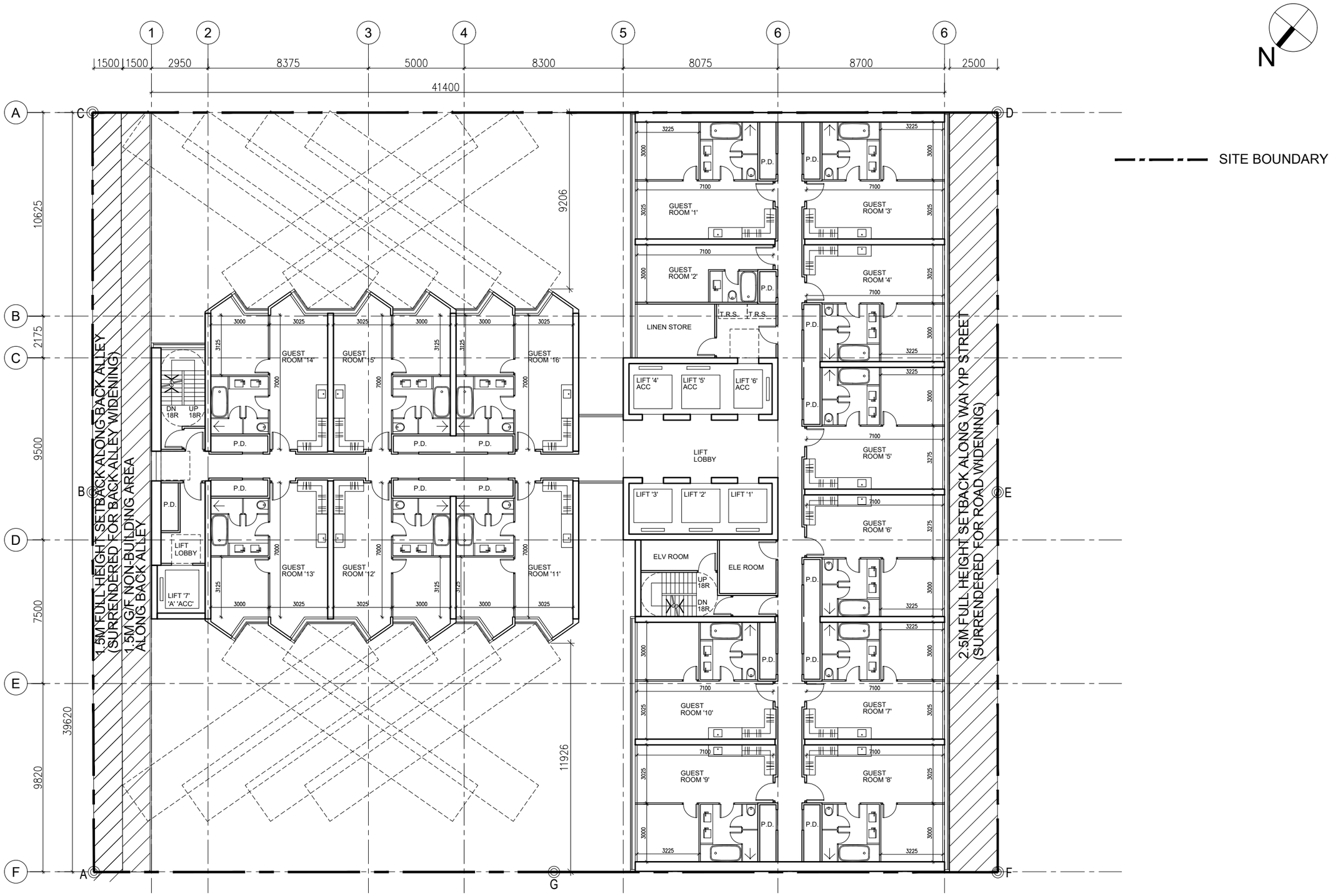

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Drawing Title	Scale	Project	Job No.
5/F - 6/F PLAN	1:200 Date 15/11/2024	SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 201 AND 203 WAI YIP STREET, KWUN TONG, KOWLOON	A-2302

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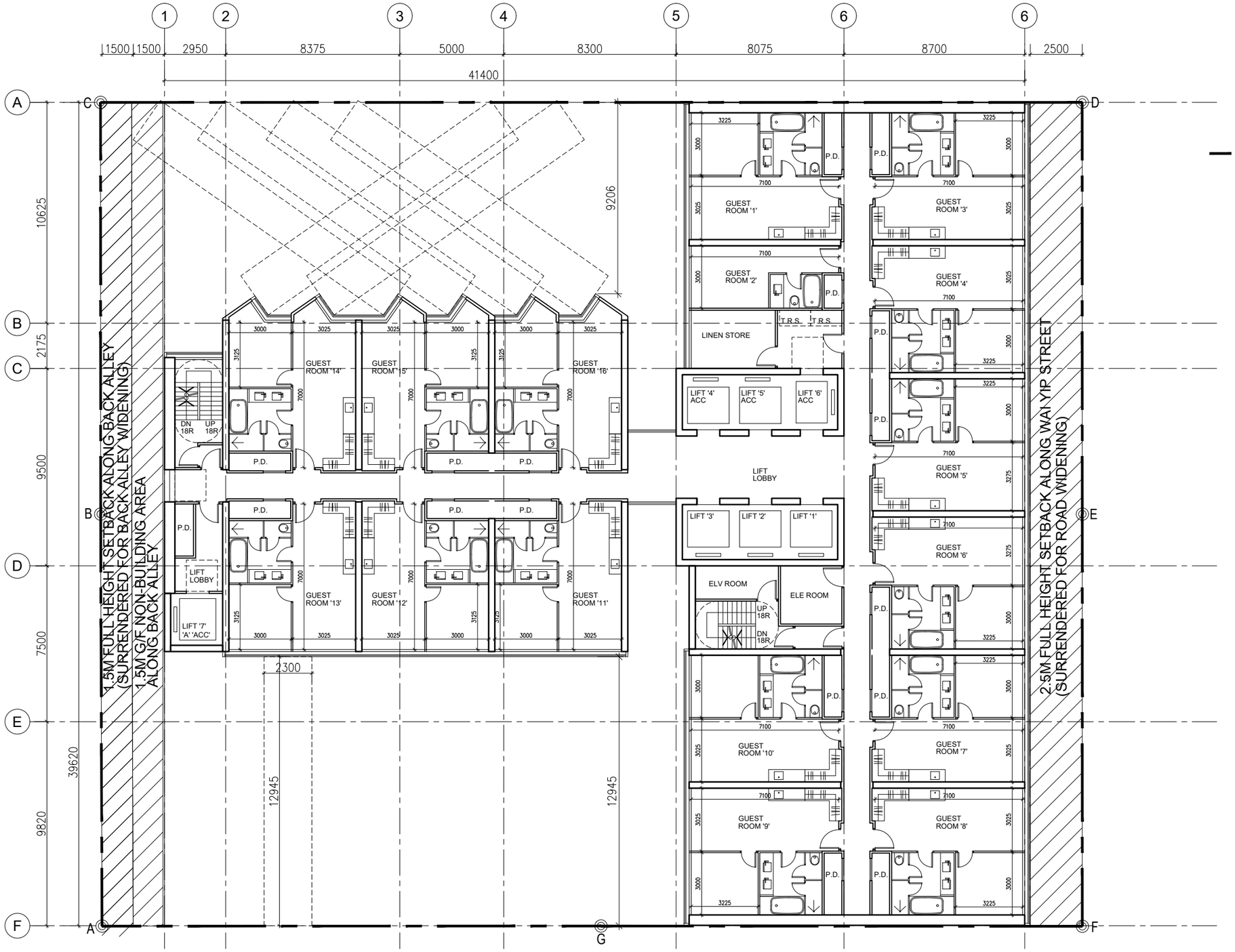

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Drawing Title	Scale	Project	Job No.
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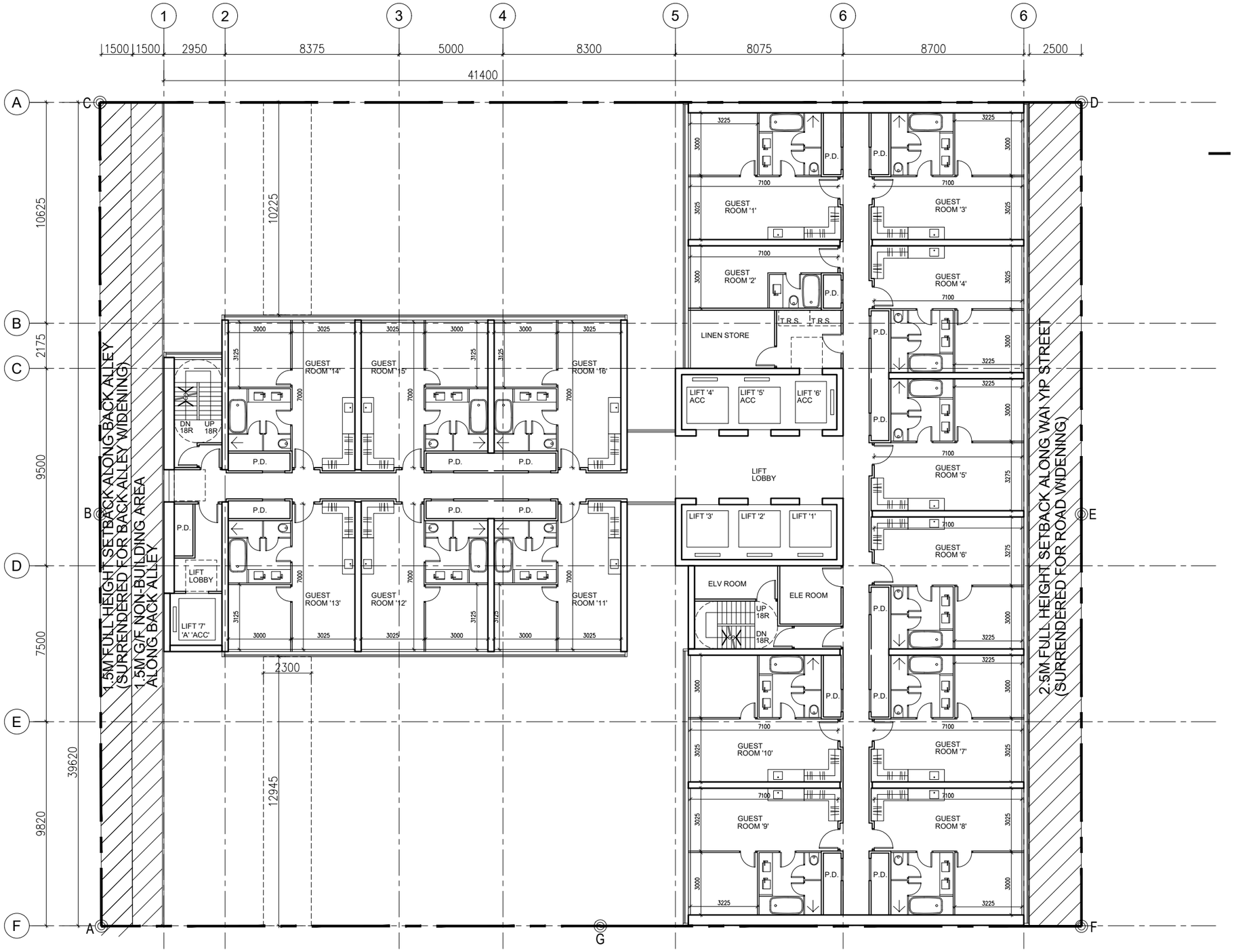

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Drawing Title	Scale	Project	Job No.
12/F - 16/F, 18/F - 28/F PLAN	1:200	SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 201 AND 203 WAI YIP STREET, KWUN TONG, KOWLOON	A-2302
	Date 15/11/2024		

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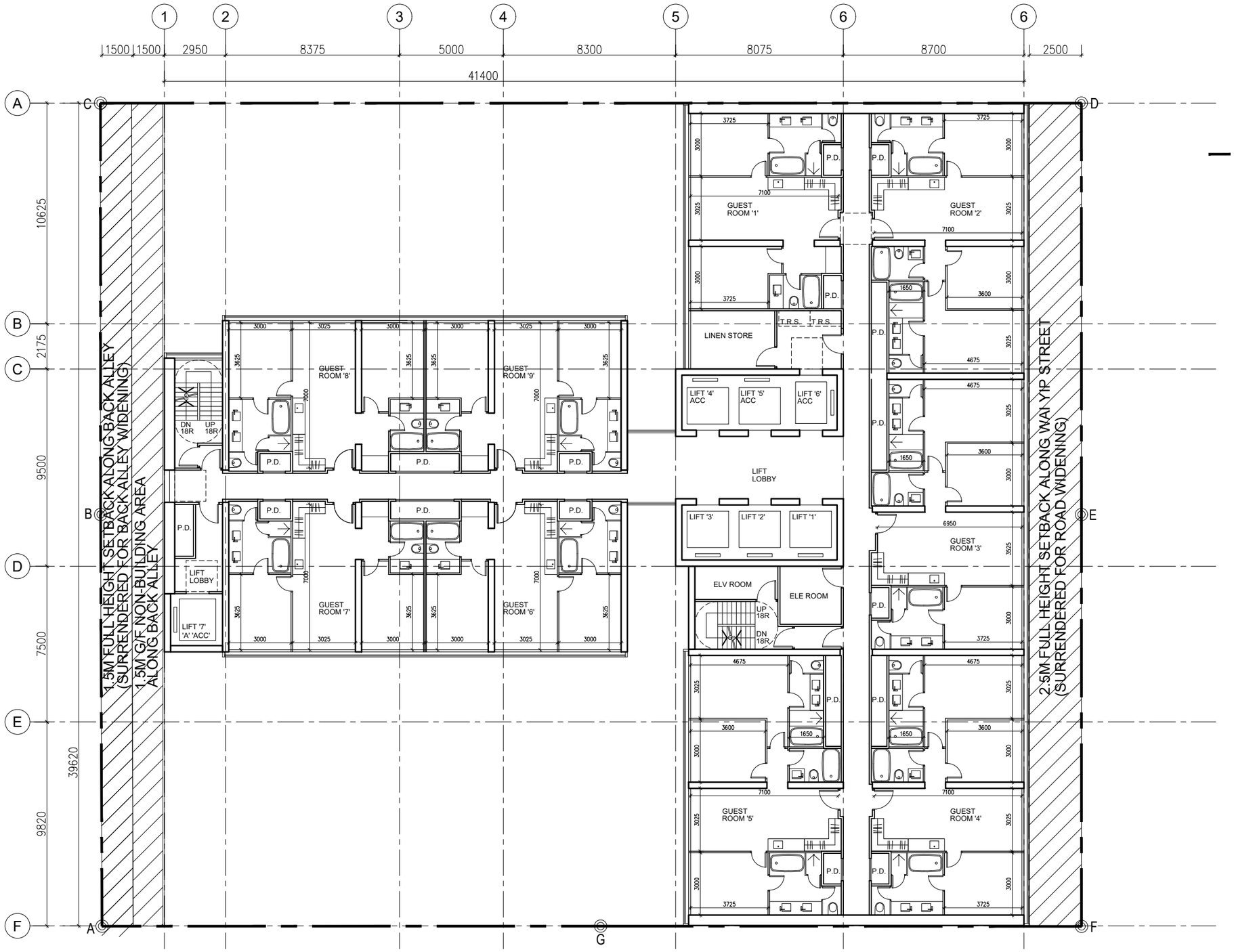

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Drawing Title	Scale	Project	Job No.
29/F - 30/F PLAN	1:200 Date 15/11/2024	SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 201 AND 203 WAI YIP STREET, KWUN TONG, KOWLOON	A-2302

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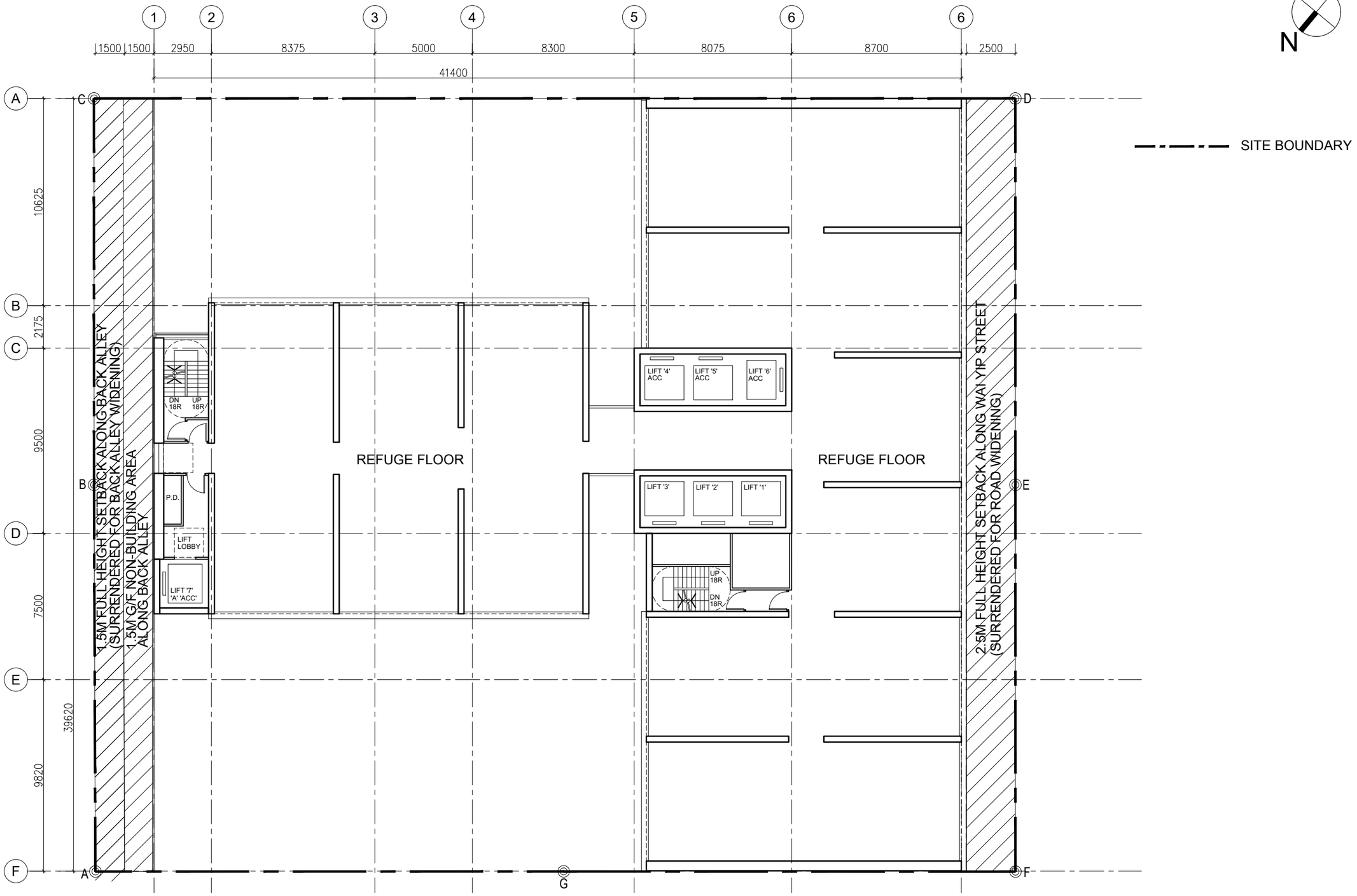

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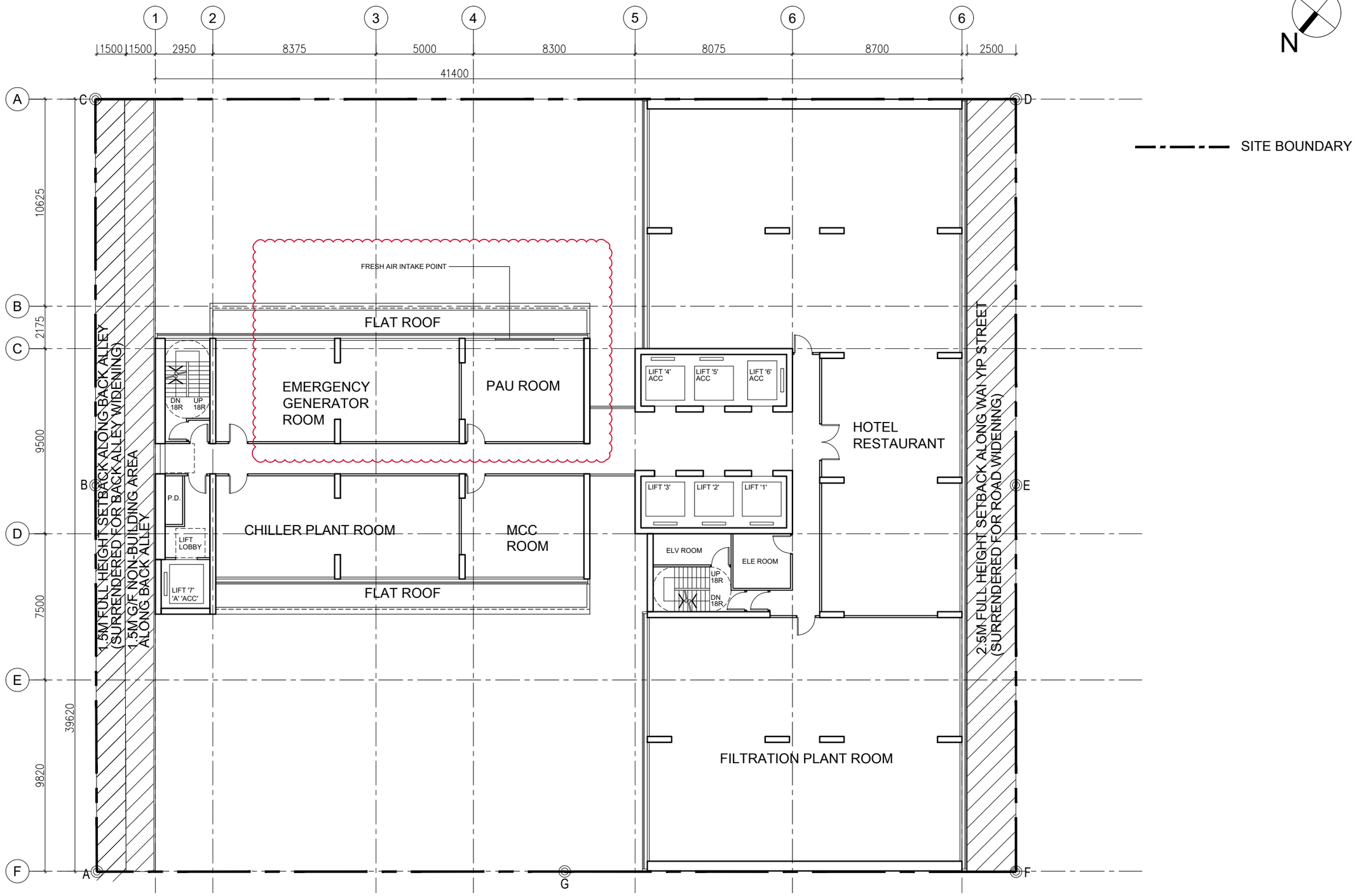
Drawing Title	Scale	Project	Job No.	
17/F PLAN	1:200 Date 15/11/2024	SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 201 AND 203 WAI YIP STREET, KWUN TONG, KOWLOON	A-2302	ALKF+ ANDREW LEE KING FUN & ASSOCIATES ARCHITECTS LTD



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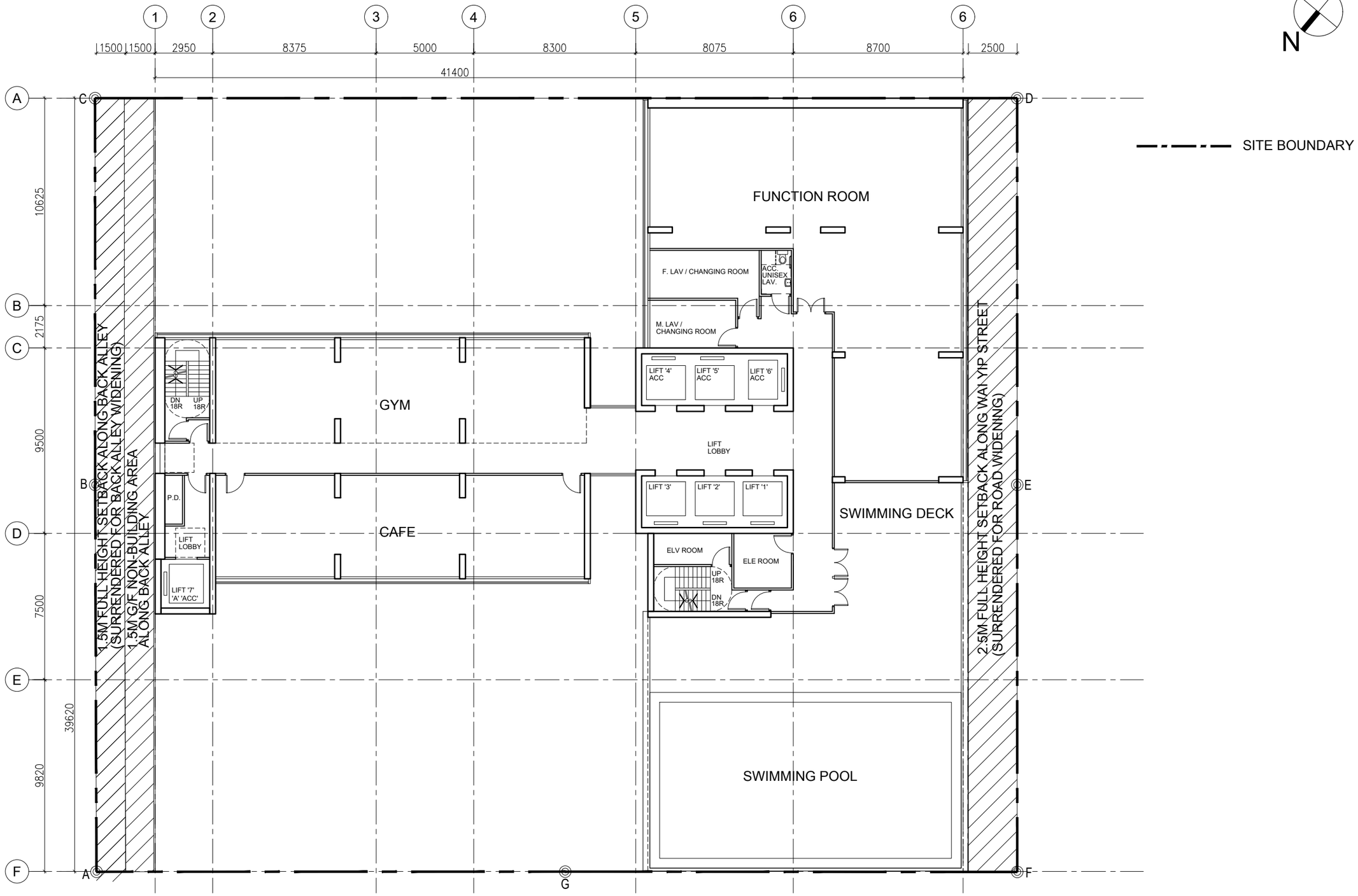

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Drawing Title 32/F PLAN	Scale 1:200 Date 15/11/2024	Project SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 201 AND 203 WAI YIP STREET, KWUN TONG, KOWLOON	Job No. A-2302

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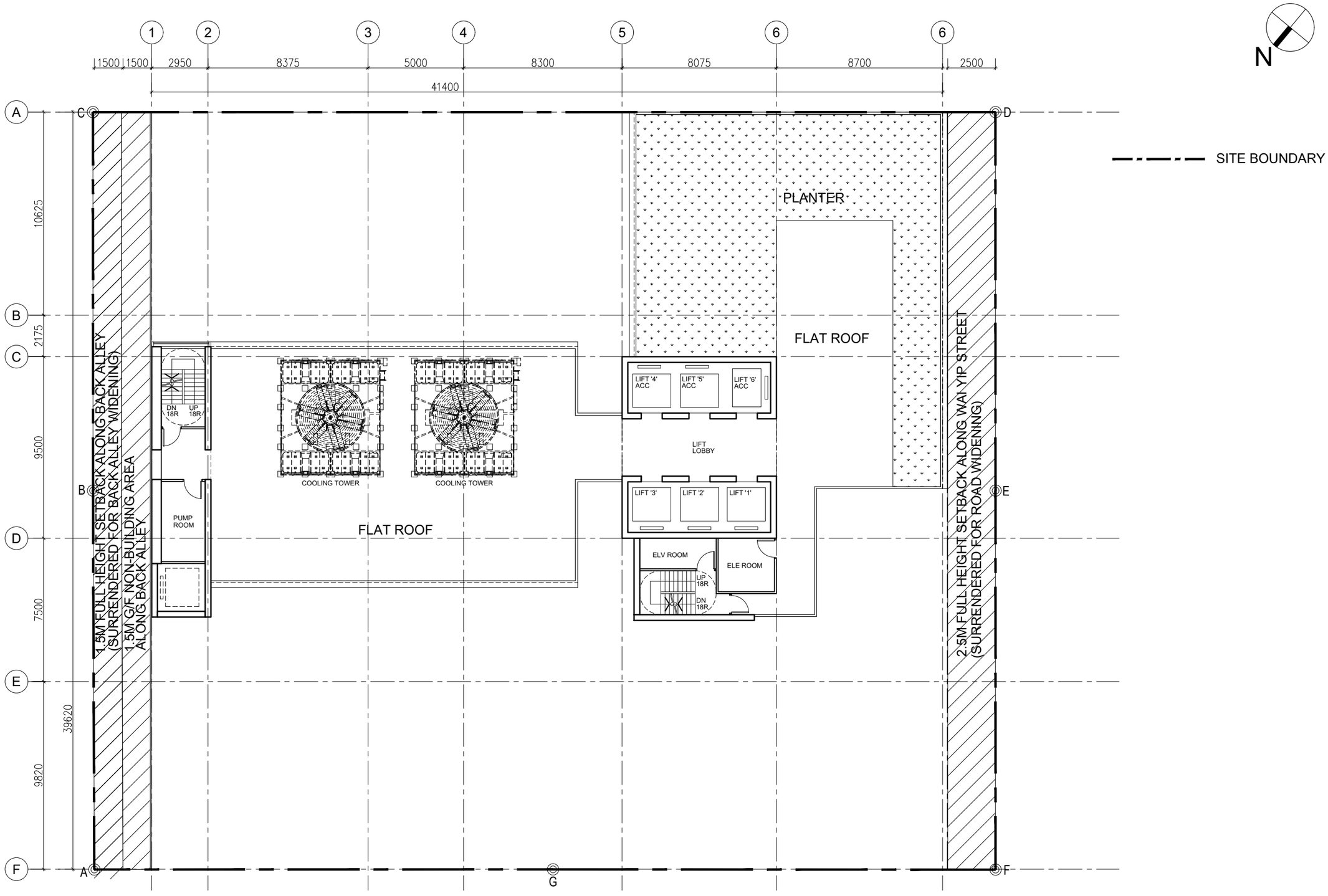

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Drawing Title	Scale	Project	Job No.
ROOF FLOOR PLAN	1:200	SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 201 AND 203 WAI YIP STREET, KWUN TONG, KOWLOON	A-2302
	Date 15/11/2024		

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Appendix 2.1 Detailed Sewerage Impact Assessment Calculations

Table 1. Calculation of Sewage Generation Rate of the Proposed Development (201 & 203 Wai Yip Street, Kwun Tong, Kowloon)

1. Hotel (3/F to 30/F)

Assumed area	=	25378	m^2
Assumed floor area per employee	=	31.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Hotels and Boarding Houses)
Total number of employees	=	812	employees
Design flow for commercial employees	=	1.58	m^3/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**1283.1**	m^3/day

2. Restaurant & Café (2/F, 31/F & 32/F)

Assumed Floor Area	=	861	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	44	employees
Design flow for commercial employees	=	1.58	m^3/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	**69.4**	m^3/day

3. Shop (G/F)

Assumed Floor Area	=	107	m^2
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	4	employees
Design flow for commercial employees	=	0.28	m^3/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	**1.0**	m^3/day

3. Indoor Swimming Pool

Assumed area	=	120	m^2
Assumed depth of water	=	1.5	m
Volume of water	=	180.0	m^3
Turnover Rate	=	4.0	hr (CAP132, Section 42 Swimming Pools Regulation (covered))
Surface loading rate of filter	=	50.0	m^3/m^2/hr
Filter areas required	=	0.9	m^2
Backwashing flow rate	=	30.0	m^3/m^2/hr
Design flow for backwashing	=	27.0	m^3/hr
Backwash duration	=	7.0	min/day
Backwash generation rate	=	**7.5**	litre/sec

Total Flow from Proposed Development

Flow Rate	=	1353.6	m^3/day
Catchment Inflow Factor	=	1.1	Refer to Table T-4, Catchment Infow Factor: East Kowloon
Flow Rate with catchment inflow factor	=	1488.9	m^3/day
Contributing Population	=	5515	people
Peaking factor	=	5	Refer to Table T-5 of GESF for population 5,000-10,000 incl. stormwater allowance
Peak Flow (without swimming pool)	=	7444.6	m^3/day
	=	86.2	litre/sec
Peak Flow (with swimming pool)	=	**93.7**	litre/sec

Table 2. Calculation for Sewage Generation Rate of the Existing Surrounding Building (Catchment A)

Catchment A

1. Career and Kenson Industrial Mansion 金凱工業大廈 (58 Hung To Road, Kwun Tong)

1a. Assumed Area	=	10714	m^2
1b. Assumed floor area per employee	=	26.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Transport)
1c. Total number of employees	=	407	employees
1d. Design flow for commercial employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - Commercial Employee)
1e. Design flow for commercial activities	=	100	litre/employee/day -- (refer to Table T-2 of GESF Job Type J3 - Transport, Storage & Communication)
Sewage generation rate	=	**73.3**	m^3/day (With reference to the Approved SIA in the Planning Application A/K14/808)

2. HKI Building 香江國際大廈 (56 Hung To Road, Kwun Tong)

2a. Assumed Area	=	8500	m^2
2b. Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
2c. Total number of employees	=	468	employees
2d. Design flow for commercial employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - Commercial Employee)
2e. Design flow for commercial activities	=	0	litre/employee/day -- (refer to Table T-2 of GESF Job Type J6 - Finance, Insurance, Real Estate & Business Ser
Sewage generation rate	=	**37.4**	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)

3. King Wan Industrial Building 景雲工廠大廈 (54 Hung To Road, Kwun Tong)

3a. Assumed Area	=	6097	m^2
3b. Assumed floor area per employee	=	26.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Transport)
3c. Total number of employees	=	232	employees
3d. Design flow for commercial employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - Commercial Employee)
3e. Design flow for commercial activities	=	100	litre/employee/day -- (refer to Table T-2 of GESF Job Type J3 - Transport, Storage & Communication)
Sewage generation rate	=	**41.8**	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)

4. Bamboos Centre 百本中心 (52 Hung To Road, Kwun Tong)

4a. Assumed Area	=	12090	m^2
4b. Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
4c. Total number of employees	=	665	employees
4d. Design flow for commercial employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - Commercial Employee)
4e. Design flow for commercial activities	=	0	litre/employee/day -- (refer to Table T-2 of GESF Job Type J6 - Finance, Insurance, Real Estate & Business Ser
Sewage generation rate	=	**53.2**	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)

5. House of Corona 寶冠大廈 (50 Hung To Road, Kwun Tong)

5a. Assumed Area	=	7287	m^2
5b. Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
5c. Total number of employees	=	401	employees
5d. Design flow for commercial employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - Commercial Employee)
5e. Design flow for commercial activities	=	0	litre/employee/day -- (refer to Table T-2 of GESF Job Type J6 - Finance, Insurance, Real Estate & Business Ser
Sewage generation rate	=	**32.1**	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)

6. Mow Hing Factory Building 茂興工業大廈 (205 Wai Yip Street, Kwun Tong)

6a. Assumed Area	=	7658	m^2
6b. Assumed floor area per employee	=	26.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Transport)
6c. Total number of employees	=	291	employees
6d. Design flow for commercial employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - Commercial Employee)
6e. Design flow for commercial activities	=	100	litre/employee/day -- (refer to Table T-2 of GESF Job Type J6 - Finance, Insurance, Real Estate & Business Ser
Sewage generation rate	=	**52.4**	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)

7. The MOD (207 Wai Yip Street, Kwun Tong)

7a. Assumed Area	=	16938	m^2
7b. Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Transport)
7c. Total number of employees	=	932	employees
7d. Design flow for commercial employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - Commercial Employee)
7e. Design flow for commercial activities	=	0	litre/employee/day -- (refer to Table T-2 of GESF Job Type J6 - Finance, Insurance, Real Estate & Business Ser
Sewage generation rate	=	**74.6**	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)

Sub-total Catchment A

Flow Rate	=	364.7	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)
Flow Rate with Catchment Inflow Factor	=	401.1	m^3/day (refer to Table T-4 of GESF - East Kowloon)
Contributing Population	=	1486	people
Peaking factor	=	6	Refer to Table T-5 of GESF for population 1,000 - 5,000 incl. stormwater allowance
Peak Flow	=	**2406.9**	m^3/day

Total Flow including Proposed Development and Catchment A

Flow Rate	=	1718.2	m^3/day
Flow Rate with Catchment Inflow Factor	=	1890.1	m^3/day (refer to Table T-4 of GESF - East Kowloon)
Contributing Population	=	7000	people
Peaking factor	=	5	Refer to Table T-5 of GESF for population 5,000 - 10,000 incl. stormwater allowance
Peak Flow (without swimming pool)	=	9450.3	m^3/day
	=	109.4	litre/sec
Peak Flow (with swimming pool)	=	**116.9**	litre/sec

Table 3. Calculation for Sewage Generation Rate of the Existing Surrounding Building (Catchment B)

Catchment B

1. GR8 Inno Tech Centre 廣域創科中心 (46 Tsun Yip Street, Kwun Tong)

1a. Assumed Area	=	7716	m^2
1b. Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate and Business Services)
1c. Total number of employees	=	424	employees
1d. Design flow for commercial employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - Commercial Employee)
1e. Design flow for commercial activities	=	0	litre/employee/day -- (refer to Table T-2 of GESF Job Type J6 - Finance, Insurance, Real Estate and Busiess Servi
1f. Sewage generation rate	=	**33.9**	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)

2. CFC - CATIC Building 航空科技大廈 (44 Tsun Yip Street, Kwun Tong)

2a. Assumed Area	=	5222	m^2
2b. Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate and Business Services)
2c. Total number of employees	=	287	employees
2d. Design flow for commercial employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - Commercial Employee)
2e. Design flow for commercial activities	=	0	litre/employee/day -- (refer to Table T-2 of GESF Job Type J6 - Finance, Insurance, Real Estate and Busiess Servi
2f. Sewage generation rate	=	**23.0**	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)

Sub-total Catchment B

Flow Rate	=	56.9	m^3/day
Flow Rate with Catchment Inflow Factor	=	62.6	m^3/day (refer to Table T-4 of GESF - East Kowloon)
Contributing Population	=	232	people
Peaking factor	=	8	Refer to Table T-5 of GESF for population <1,000 incl. stormwater allowance
Peak Flow	=	**500.5**	m^3/day

Total Flow including Proposed Development and Catchment A+B

Flow Rate	=	1775.1	m^3/day
Flow Rate with Catchment Inflow Factor	=	1952.6	m^3/day (refer to Table T-4 of GESF - East Kowloon)
Contributing Population	=	7232	people
Peaking factor	=	5	Refer to Table T-5 of GESF for population 5,000 - 10,000 incl. stormwater allowance
Peak Flow (without swimming pool)	=	9763.2	m^3/day
	=	113.0	litre/sec
Peak Flow (with swimming pool)	=	**120.5**	litre/sec

Table 4. Calculation for Sewage Generation Rate of the Existing Surrounding Building (Catchment C)

Catchment C

1. Full Pipe Capacity for all the buildings discharged to FMH4042873

Manhole Reference	Manhole Reference	Pipe Diameter	Area	Wetted Perimeter	Pipe Length	Invert Level 1	Invert Level 2	k_s	R	s	V	Q
		m	m^2	m	m	mPD	mPD	mm	m		m/s	L/s
FMH4042873	FMH4042874	1.050	0.866	3.299	60.7	-1.08	-1.17	0.3	0.263	0.0015	1.4061	1217.5

Total Flow including Proposed Development and Catchment A, B and C

Flow Rate [1]	=	1775.1	m^3/day
Flow Rate with Catchment Inflow Factor	=	1952.6	m^3/day (refer to Table T-4 of GESF - East Kowloon)
Contributing Population	=	7232	people
Peaking factor	=	5	Refer to Table T-5 of GESF for population 5,000 - 10,000 incl. stormwater allowance
Peak Flow (without swimming pool) [1]	=	1330.5	litre/sec
Peak Flow (with swimming pool) [1]	=	1338.0	litre/sec

[1] As full pipe capacity is assumed for Catchment C, peaking factor shall not be considered in the calculation. Instead, it shall be added in the Peak Flow directly.

Table 5. Calculation for Sewage Generation Rate of the Existing Surrounding Building (Catchment D)

Catchment D

1. Wai Yip Street Substation 偉業街變電站 (199 Wai Yip Street, Kwun Tong)

1a. Assumed Area	=	1041	m^2
1b. Total number of employees	=	3	employees (Assumed)
1c. Design flow for commercial employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - Commercial Employee)
1d. Design flow for commercial activities	=	250	litre/employee/day -- (refer to Table T-2 of GESF Job Type J2 - Electricity Gas & Water)
1e. Sewage generation rate	=	**0.99**	m^3/day

Sub-total CatchmentD

Flow Rate	=	1.0	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)
Flow Rate with Catchment Inflow Factor	=	1.1	m^3/day (refer to Table T-4 of GESF - East Kowloon)
Contributing Population	=	4	people
Peaking factor	=	8	Refer to Table T-5 of GESF for population <1,000 incl. stormwater allowance
Peak Flow	=	**8.7**	m^3/day

Total Flow including Proposed Development and Catchment A+B+C+D

Flow Rate	=	1776.1	m^3/day
Flow Rate with Catchment Inflow Factor	=	1953.7	m^3/day (refer to Table T-4 of GESF - East Kowloon)
Contributing Population	=	7236	people
Peaking factor	=	5	Refer to Table T-5 of GESF for population 5,000 - 10,000 incl. stormwater allowance
Peak Flow (without swimming pool) [1]	=	1330.6	litre/sec
Peak Flow (with swimming pool) [1]	=	**1338.1**	litre/sec

[1] As full pipe capacity is assumed for Catchment C, peaking factor shall not be considered in the calculation. Instead, it shall be added in the Peak Flow directly.

Table 6. Calculation for Sewage Generation Rate of the Existing Surrounding Building (Catchment E)

Catchment E

1. Full Pipe Capacity for all the buildings discharged to FMH4042830

Manhole Reference	Manhole Reference	Pipe Diameter	Area	Wetted Perimeter	Pipe Length	Invert Level 1	Invert Level 2	k_s	R	s	V	Q
		m	m^2	m	m	mPD	mPD	mm	m		m/s	L/s
FMH4042830	FMH4042876	0.225	0.040	0.707	5.1	1.83	1.52	0.6	0.056	0.0605	3.2314	128.5

Total Flow including Proposed Development and Catchment A+B+C+D+E

Flow Rate	=	1776.1	m^3/day
Flow Rate with Catchment Inflow Factor	=	1953.7	m^3/day (refer to Table T-4 of GESF - East Kowloon)
Contributing Population	=	7236	people
Peaking factor	=	5	Refer to Table T-5 of GESF for population 5,000 - 10,000 incl. stormwater allowance
Peak Flow (without swimming pool) [1]	=	1459.1	litre/sec
Peak Flow (with swimming pool) [1]	=	**1466.6**	litre/sec

[1] As full pipe capacity is assumed for Catchment C and E, peaking factor shall not be considered in the calculation. Instead, it shall be added in the Peak Flow directly.

Table 10. Calculation for Sewage Generation Rate of the Existing Surrounding Building (Catchment F)

Catchment F

1. Two Harbour Square (180 Wai Yip Street, Kwun Tong)

1a. Assumed Area	=	53010	m^2
1b. Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate and Business Services)
1c. Total number of employees	=	2916	employees
1d. Design flow for commercial employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - Commercial Employee)
1e. Design flow for commercial activities	=	0	litre/employee/day -- (refer to Table T-2 of GESF Job Type J6 - Finance, Insurance, Real Estate and Busiess Servi
Sewage generation rate	=	**233.3**	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)

2. One Harbour Square (181 Hoi Bun Road, Kwun Tong)

2a. Assumed Area	=	35855	m^2
2b. Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate and Business Services)
2c. Total number of employees	=	1972	employees
2d. Design flow for commercial employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - Commercial Employee)
2e. Design flow for commercial activities	=	0	litre/employee/day -- (refer to Table T-2 of GESF Job Type J6 - Finance, Insurance, Real Estate and Busiess Servi
Sewage generation rate	=	**157.8**	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)

Sub-total Catchment F

Flow Rate	=	391.0	m3/day (With reference to the Approved SIA in the Planning Application A/K14/808)
Flow Rate with Catchment Inflow Factor	=	430.1	m^3/day (refer to Table T-4 of GESF - East Kowloon)
Contributing Population	=	1593	people
Peaking factor	=	6	Refer to Table T-5 of GESF for population 1,000 - 5,000 incl. stormwater allowance
Peak Flow	=	**2580.9**	m^3/day

Total Flow including Proposed Development and Catchment A+B+C+D+E+F

Flow Rate	=	2167.2	m^3/day
Flow Rate with Catchment Inflow Factor	=	2383.9	m^3/day (refer to Table T-4 of GESF - East Kowloon)
Contributing Population	=	8829	people
Peaking factor	=	5	Refer to Table T-5 of GESF for population 5,000 - 10,000 incl. stormwater allowance
Peak Flow (without swimming pool) [1]	=	1484.0	litre/sec
Peak Flow (with swimming pool) [1]	=	**1491.5**	litre/sec

[1] As full pipe capacity is assumed for Catchment C and E, peaking factor shall not be considered in the calculation. Instead, it shall be added in the Peak Flow directly.

Table 8. Comparision of the Hydraulic Capacity of Existing and Proposed Sewers for Sewerage generated from the Proposed Development and Surrounding Catchment Areas

Manhole Reference	Manhole Reference	Pipe Diameter	Area	Wetted Perimeter	Pipe Length	Invert Level 1	Invert Level 2	k_s	R	s	V	Q	Estimated Cumulative Peak Flow	Percentage of Pipe Capacity	Status	Remarks
		m	m^2	m	m	mPD	mPD	mm	m		m/s	L/s	L/s	%		
Terminal Manhole	FMH4043092	0.300	0.071	0.942	3.0	1.57	1.53	0.3	0.075	0.0133	1.97	139.0	93.7	67%	OK	Proposed Sewer: Subject Site
FMH4043092	FMH4043093	0.225	0.040	0.707	4.9	1.53	1.48	6.0	0.056	0.0102	0.91	36.1	116.9	323%	Spill	Subject Site + Catchment A
FMH4043093	FMH4043094	0.225	0.040	0.707	9.0	1.46	1.43	6.0	0.056	0.0033	0.52	20.6	120.5	584%	Spill	Subject Site + Catchment A + Catchment B
FMH4043094	FMH4043095	0.225	0.040	0.707	7.6	1.43	1.37	6.0	0.056	0.0079	0.80	31.7	120.5	380%	Spill	Subject Site + Catchment A + Catchment B
FMH4043095	FMH4042874	0.375	0.110	1.178	5.3	1.28	0.50	0.3	0.094	0.1460	7.56	835.1	120.5	14%	OK	Proposed Sewer: Subject Site + Catchment A + Catchment B
FMH4042874	FMH4042875	1.050	0.866	3.299	23.6	-1.17	-1.21	3.0	0.263	0.0017	1.16	1004.8	1338.0	133%	Spill	Subject Site + Catchment A + Catchment B + Catchment C
FMH4042875	FMH4042876	1.050	0.866	3.299	101.3	-1.21	-1.36	6.0	0.263	0.0015	0.98	848.7	1338.1	158%	Spill	Subject Site + Catchment A + Catchment B + Catchment C + Catchment D
FMH4042876	FMH4042877	1.050	0.866	3.299	37.0	-1.36	-1.41	6.0	0.263	0.0014	0.94	810.5	1491.5	184%	Spill	Subject Site + Catchment A + Catchment B + Catchment C + Catchment D + Catchment E + Catchment F
FMH4042877	FGJ4003400	1.050	0.866	3.299	24.0	-1.41	/	6.0	0.263	0.0014	0.94	810.5	1491.5	184%	Spill	Subject Site + Catchment A + Catchment B + Catchment C + Catchment D + Catchment E + Catchment F
FGJ4003400	FGJ4003380	1.050	0.866	3.299	2.5	-1.41	/	6.0	0.263	0.0014	0.95	825.2	1491.5	181%	Spill	Subject Site + Catchment A + Catchment B + Catchment C + Catchment D + Catchment E + Catchment F

Remarks:

(1) g=gravitational acceleration; k_s=equivalent sand roughness; s=gradient; v=kinematic viscosity of water; V=mean velocity

(2) Table 2:

For existing pipe, The value of ks = 3.0mm is used for the calculation of slimed concrete sewer, poor condition, with velocity flowing half full to be approximately 1.2m/s (based on Table 5: Recommended roughness values in Sewerage Manual);
The value of ks = 6.0mm is used for the calculation of slimed concrete sewer, poor condition, with velocity flowing half full to be approximately 0.75m/s (based on Table 5: Recommended roughness values in Sewerage Manual)

For proposed pipe, The value of ks = 0.3mm is used for the calculation of slimed uPVC sewer, poor condition, with velocity flowing half full to be approximately 1.2m/s (based on Table 5: Recommended roughness values in Sewerage Manual);
The value of ks = 1.5mm is used for the calculation of slimed concrete sewer, poor condition, with velocity flowing half full to be approximately 0.75m/s (based on Table 5: Recommended roughness values in Sewerage Manual)

(3) The value of velocity (V) is referred to the Tables for the hydraulic design of pipes, sewers and channels (8th edition)

(4) Equation used:

$$V = -2(2gDS)^{0.5}\log\left(\frac{k}{3.7D} + \frac{2.5\nu}{D(2gDS)^{0.5}}\right)$$

(5) As there is no downstream invert level for the sewers connecting FMH402877 to FGJ4003380, the slopes for the sewers are assumed to follow the sewer FWD4048556. Site surveys shall be conducted in the detail design stage.

Table 9. Comparision of the Hydraulic Capacity of Existing and Proposed Sewers for Sewerage generated from the Proposed Development and Surrounding Catchment Areas

Manhole Reference	Manhole Reference	Pipe Diameter	Area	Wetted Perimeter	Pipe Length	Invert Level 1	Invert Level 2	k_s	R	s	V	Q	Estimated Cumulative Peak Flow	Percentage of Pipe Capacity	Status	Remarks
		m	m^2	m	m	mPD	mPD	mm	m		m/s	L/s	L/s	%		
Terminal Manhole	FMH4043092	0.300	0.071	0.942	3.0	1.57	1.53	0.3	0.075	0.0133	1.9662	139.0	93.7	67%	OK	Proposed Sewer: Subject Site
FMH4043092	FMH4043093	0.375	0.110	1.178	4.9	1.53	1.48	0.3	0.094	0.0102	1.9793	218.6	116.9	53%	OK	Subject Site + Catchment A
FMH4043093	FMH4043094	0.375	0.110	1.178	9.0	1.48	1.37	0.3	0.094	0.0123	2.1687	239.5	120.5	50%	OK	Subject Site + Catchment A + Catchment B
FMH4043094	FMH4043095	0.375	0.110	1.178	7.6	1.37	1.28	0.3	0.094	0.0119	2.1320	235.5	120.5	51%	OK	Subject Site + Catchment A + Catchment B
FMH4043095	FMH4042874	0.375	0.110	1.178	5.3	1.28	0.50	0.3	0.094	0.1460	7.5611	835.1	120.5	14%	OK	Proposed Sewer: Subject Site + Catchment A + Catchment B
FMH4042874	FMH4042875	1.250	1.227	3.927	23.6	-1.17	-1.21	0.3	0.313	0.0017	1.6768	2057.8	1338.0	65%	OK	Subject Site + Catchment A + Catchment B + Catchment C
FMH4042875	FMH4042876	1.800	2.545	5.655	101.3	-1.21	-1.36	0.3	0.450	0.0015	1.9553	4975.7	1338.1	27%	OK	Subject Site + Catchment A + Catchment B + Catchment C + Catchment D
FMH4042876	FMH4042877	1.800	2.545	5.655	37.0	-1.36	-1.41	0.3	0.450	0.0014	1.8661	4748.6	1491.5	31%	OK	Subject Site + Catchment A + Catchment B + Catchment C + Catchment D + Catchment E + Catchment F
FMH4042877	FGJ4003400	1.800	2.545	5.655	24.0	-1.41	/	0.3	0.450	0.0014	1.9004	4836.0	1491.5	31%	OK	Subject Site + Catchment A + Catchment B + Catchment C + Catchment D + Catchment E + Catchment F
FGJ4003400	FGJ4003380	1.800	2.545	5.655	2.5	-1.41	/	0.3	0.450	0.0014	1.9004	4836.0	1491.5	31%	OK	Subject Site + Catchment A + Catchment B + Catchment C + Catchment D + Catchment E + Catchment F

Remarks:

(1) g=gravitational acceleration; k_s=equivalent sand roughness; s=gradient; v=kinematic viscosity of water; V=mean velocity

(2) Table 2:
For proposed pipe, The value of ks = 0.3mm is used for the calculation of slimed uPVC sewer, poor condition, with velocity flowing half full to be approximately 1.2m/s (based on Table 5: Recommended roughness values in Sewerage Manual);
The value of ks = 1.5mm is used for the calculation of slimed concrete sewer, poor condition, with velocity flowing half full to be approximately 0.75m/s (based on Table 5: Recommended roughness values in Sewerage Manual)

(3) The value of velocity (V) is referred to the Tables for the hydraulic design of pipes, sewers and channels (8th edition)

(4) Equation used: $V=-\sqrt{(8gDs)}\log\left(\frac{k_s}{3.7D}+\frac{2.51v}{D\sqrt{(2gDs)}}\right)$

(5) As there is no downstream invert level for the sewers connecting FMH402877 to FGJ4003380, the slopes for the sewers are assumed to follow the sewer FWD4048556. Site surveys shall be conducted in the detail design stage.

(6) The proposed information for upgrading sewers are in light blue colour.