Prepared by

Ramboll Hong Kong Limited

S16 APPPLICATION FOR 16 KIMBERLEY ROAD (CHAMPAGNE COURT – BLOCK B) HOTEL DEVELOPMENT

SEWERAGE IMPACT ASSESSMENT

Date	**December 2025**
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Signed	
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CHAPTERS

TABLES

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1. INTRODUCTION

1.1 Background

1.1.1 The Subject Site is located at Tsim Sha Tsui, Kowloon, which the Site falls mainly within areas zoned "Commercial (C(6))", under the Approved Tsim Sha Tsui Outline Zoning Plan (OZP No. S/K1/30).

1.1.2 Ramboll Hong Kong Limited has been appointed to conduct the sewerage impact assessment for the Subject Site.

1.2 Subject Sites and its Environs

1.2.1 The Subject Site covers an area of about 1,141 m^2 and is currently zoned as "Commercial (C(6))".

1.2.2 The Site is bounded by Kimberley Road to the North, Carnarvon Road to the East, Granville Road to the South and Nathan Road to the East.

1.2.3 **Figure 1.1** shows the location and the environs of the Subject Site.

1.3 Proposed Development

1.3.1 According to the latest development scheme as shown in **Table 1.1**, a 35-storey hotel with hotel guest rooms, function rooms, conference rooms and F&B facilities will be developed and the proposed master layout plan is shown in **Appendix 1.1**. The expected completion year is 2029/2030.

Table 1.1 Development Parameters of the Proposed Development

Function	Assumed Total Area (m^2)
Hotel guest rooms	**7,671**
Function rooms	**2,270**
Conference rooms	**1,816**
Restaurant & café (F&B)	**1,832**
Total	**13,588 [1]**

[1] The total non-domestic GFA is 17116.5 m^2. However, for the SIA calculation, area 13,588 m^2 is adopted which excludes staircases, lift shafts, lobby areas, back-of-house spaces, and plant rooms.

1.4 Sewerage Impact

1.4.1 The potential sewerage impact arising from the operation phase should be assessed and mitigated to fulfil the requirements under the relevant legislations and guidelines. The details will be discussed in **Section 3**.

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 Subject Site with the sewage flow from the existing usage, and to determine whether adverse sewerage impact is anticipated.

2.2 Assessment Criteria and Methodology

2.2.1 According to the Drainage Record obtained from the Drainage Services Department, there is public sewer network serving the Subject Site and the surrounding environment. **Figure 2.1** shows the location of the sewer sections concerned.

2.2.2 The Environmental Protection Department's (EPD's) Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning, Version 1 (GESF) is referred to estimate the quantity of the sewage generated from the Subject Site and the existing development. Sewage flow parameters and global peaking factors in this document are adopted.

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

2.2.4 In order to represent worst-case scenario, the sewerage impact assessment was conducted based on the assumption that all phases of the Subject Site have been completed.

2.2.5 Based on the designed use, the sewage flow from the proposed hotel development is determined and compared with the capacity of the existing sewerage system in order to investigate the necessity of sewerage system upgrading work.

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 FMH4000835 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. Detailed Calculation refers to **Appendix 2.1**.

Table 2.1 Estimated Peak Flow

Calculation for Sewage Generation Rate of the Proposed Development (Hotel)			
1. Hotel Rooms			
Assumed area	=	7671	m^2
Assumed floor area per employee	=	31.3	m^2/employee (refer to Table T-8 of CIFSUS – Hotels and Boarding Houses)
Total number of employees	=	245	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	=	**387.8**	m^3/ day

2. Function Rooms & Conference Rooms			
Assumed area	=	4086	m^2
Assumed floor area per employee	=	29.4	m^2/employee (refer to Table T-8 of CIFSUS –All Economic Activities (All Types))
Total number of employees	=	139	employees
Design flow for commercial employees	=	0.08	m^3/employee/day (refer to Table T-2 of GESF – J6 Business Services)
Sewage generation rate	=	**11.1**	m^3/ day
3. Restaurant & Café (1/F to 5/F)			
Assumed area	=	1832	m^2
Assumed floor area per employee	=	19.6	m^2/employee (refer to Table T-8 of CIFSUS –All Economic Activities (All Types))
Total number of employees	=	93	employees
Design flow for commercial employees	=	1.58	m^3/employee/day (refer to Table T-2 of GESF – J6 Business Services)
Sewage generation rate	=	147.6	m^3/ day
Total Flow from the Proposed Development			
Flow rate	=	546.6	m^3/day
Flow rate with P_{CIF}	=	546.6	m^3/day (refer to Table T-4 of GESF – Central Kowloon - 1.0)
Contributing Population	=	2024	employees
Peaking Factor	=	6	Refer to Table T-5 of GESF for population 1,000-5,000 incl. stormwater allowance
Peak Flow	=	**38.0**	L/s

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 Subject Site to Manhole S1 FMH4000835 which is located at the Kimberley Road.

2.5.2 Catchments in the vicinity of the Application Site are shown in **Figure 2.2**. The sources for the area of existing development in the catchments are given in **Table 2.2**.

Table 2.2 Sources for the Area of Existing Development in the Catchments

Catchment	Sources for the Area of Existing Development
Catchment A	Measured in Geoinfo Map
Catchment B	Provided by the Development Owner
Catchment C	Reference from EIA Report of AEIAR-260/2024 - Construction of Annex Block at Hong Kong Observatory Headquarters, Tsim Sha Tsui

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 FWD4010908 and FWD4000927 are not sufficient for the sewerage generated from the proposed development and the surrounding catchment. Therefore, sewers FWD4010908 and FWD4000927 are proposed to upgrade to 375mm with total length of about 34m.

2.5.4 Upgrading works on the public sewers FWD4010908 and FWD4000927 will be conducted by the project proponent are required.

2.5.5 Beside upgrading works on the above-mentioned pipes, a new 225mm sewer is proposed to connect manhole FMH4000835.

2.5.6 The proposed development is expected to be completed by the year of 2029/2030 and hence the proposed upgrading works and new pipe will be completed before 2029/2030 or prior to the commissioning of the proposed development.

3. CONCLUSION

3.1.1 The Subject Site is located at Tsim Sha Tsui, Kowloon, which the Site falls mainly within areas zoned "Commercial (C(6))", under the Approved Tsim Sha Tsui Outline Zoning Plan (OZP No. S/K1/30).

3.1.2 The Proposed development is to develop a hotel building. The development consists of a 35-storey hotel with hotel guest rooms, function rooms, conference rooms and F&B facilities.

3.1.3 The estimated sewage generation rate of the Proposed Development has been quantitatively addressed. The estimated peak sewage generation from the Proposed Development is about 38.0 litre/sec.

3.1.4 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 FWD4010908 and FWD4000927 will be conducted by the project proponent are required. Beside upgrading works on the above-mentioned pipes, a new 225mm sewer is proposed to connect manhole FMH4000835. After the proposed upgrading and new pipe works, there would not have any adverse impact on the public sewerage system.

Figures

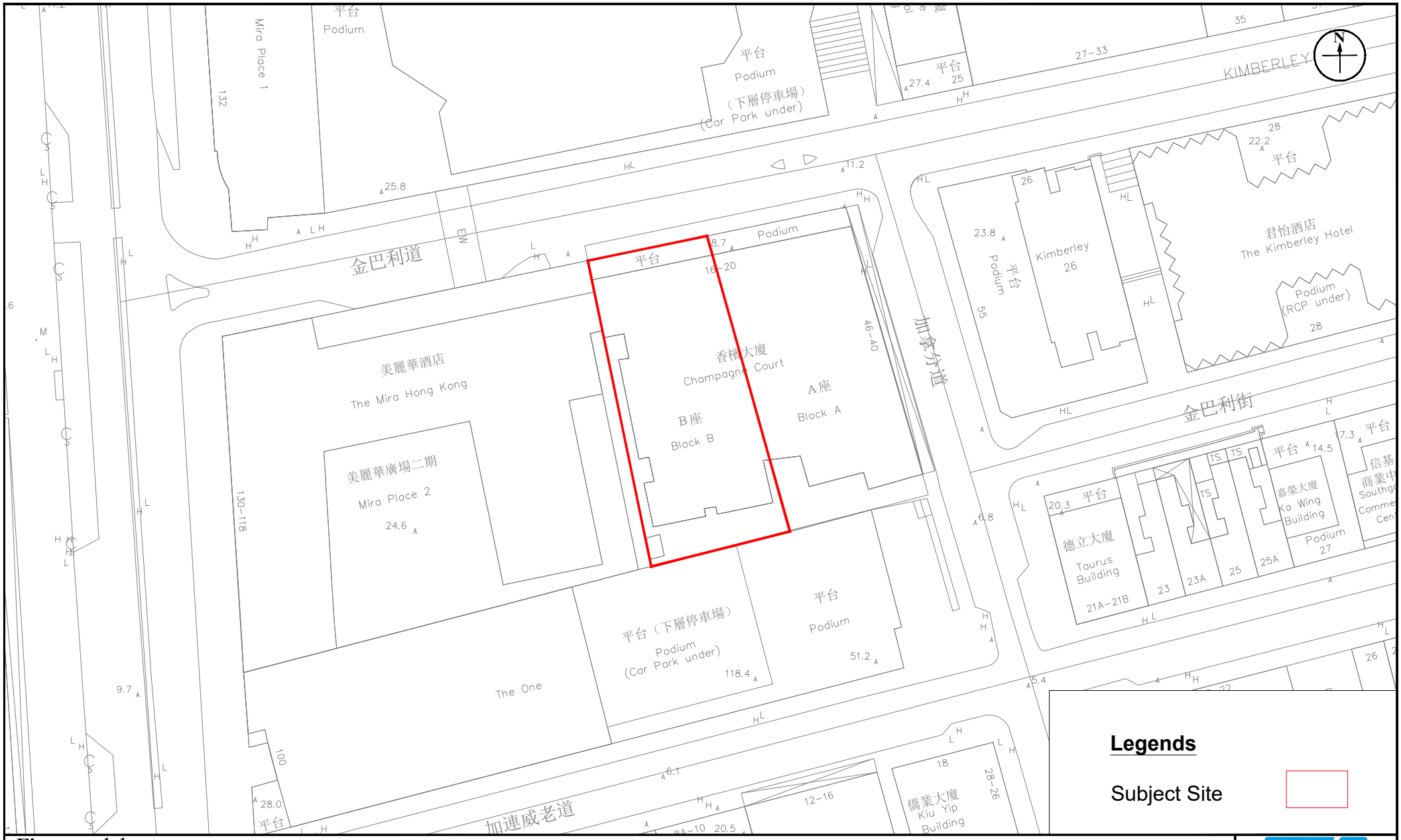

Figure: 1.1

Title: Location and the environs of the Subject Site

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RAMBOLL

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Checked by:	TC
Rev.:	1.0
Date:	Sept 2025

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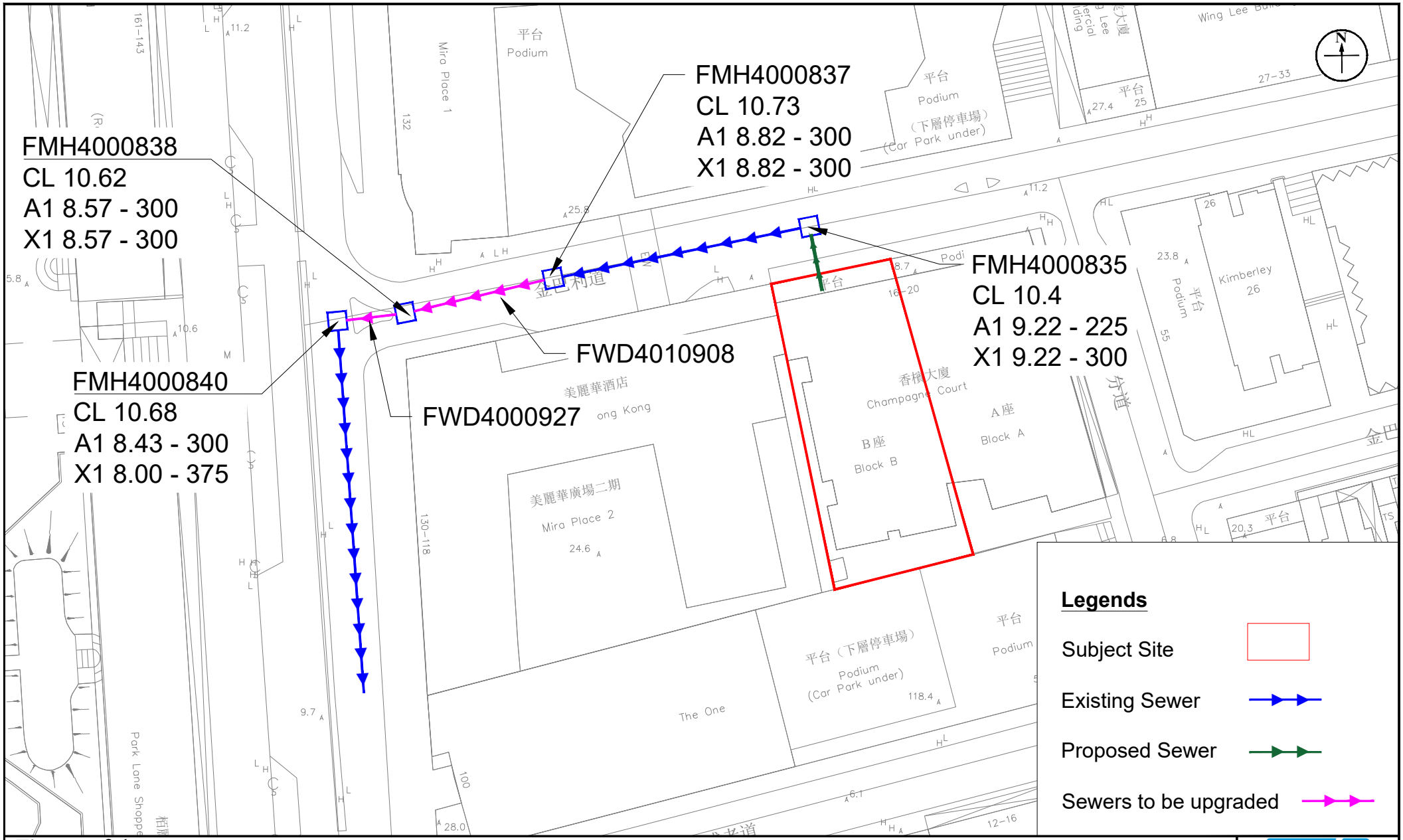

Figure: 2.1	RAMBOLL
Title: Existing and Proposed Sewerage System in the Vicinity of the Subject Site	Drawn by: SC Checked by: TC
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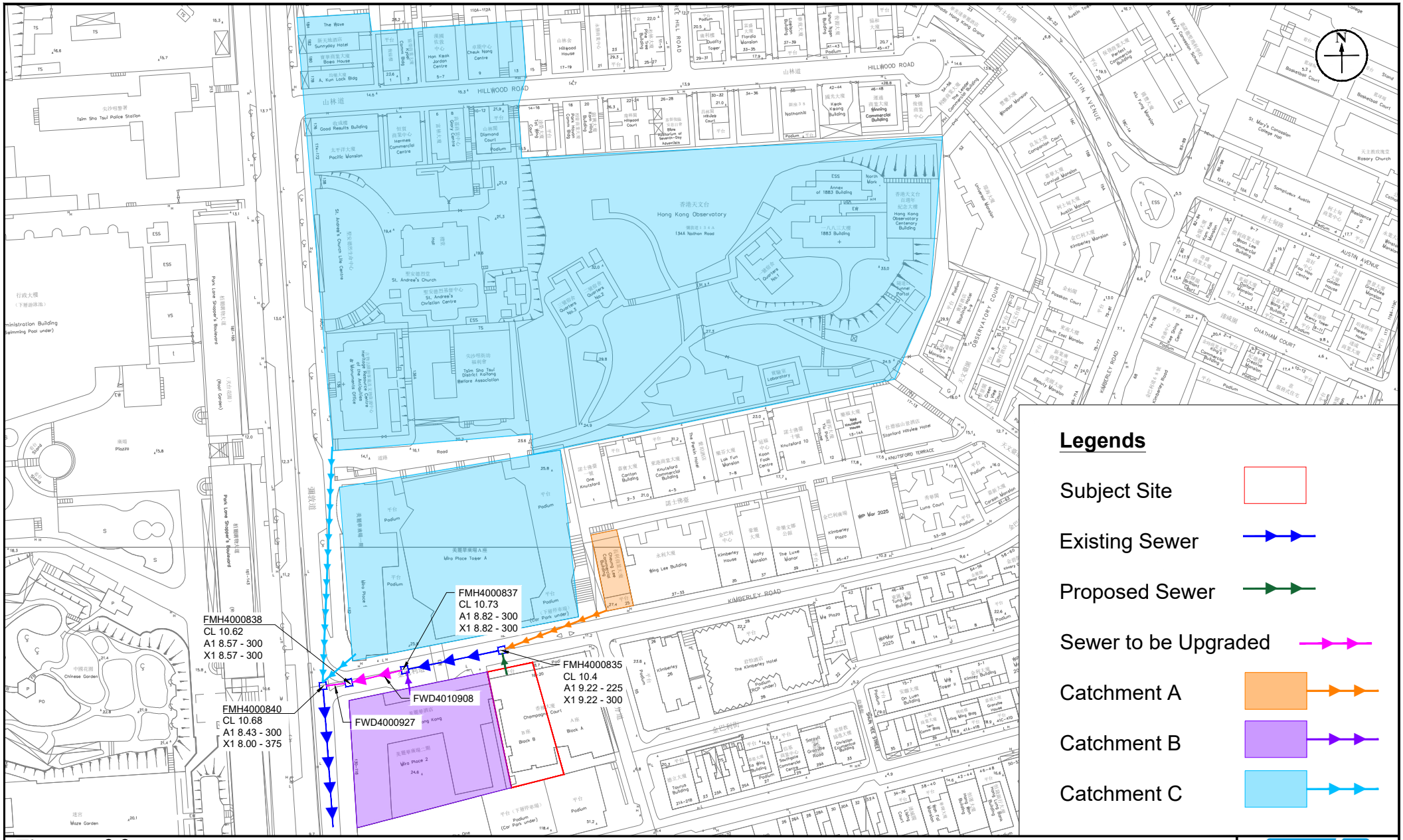

Figure: 2.2

Title: Existing/ Proposed/ Upgrading Sewerage System and Catchment Area in the Vicinity of the Subject Site

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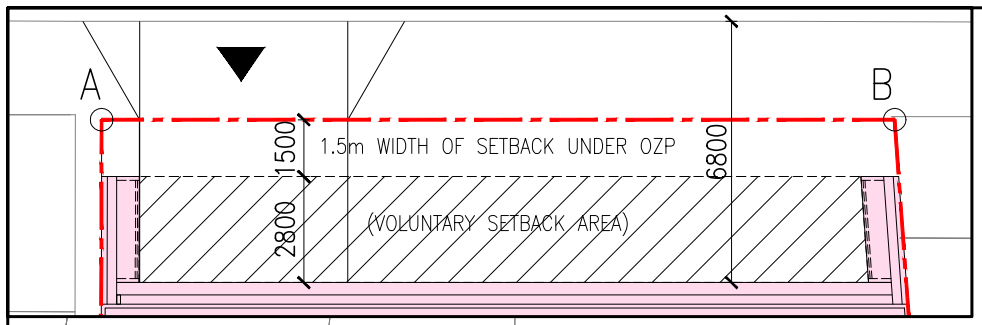
Appendix 1.1 The Master Layout Plan of the Proposed Development



1 / – ENLARGED PART PLAN
SCALE 1:200

B / SK-20

KIMBERLEY ROAD

1 / –

ADJOINING LOT K.I.L. 6022 S.A. & S.C.

ADJOINING LOT K.I.L. 6022 S.B. SS.1

THE REMAINING PORTION OF SECTION B OF KOWLOON INLAND LOT NO. 6022

A' / SK-19

A / SK-19

B' / SK-20

CARNARVON ROAD

LEGEND:

PROPOSED BUILDING FOOTPRINT

PROPOSED VEHICULAR INGRESS/EGRESS

LOT BOUNDARY

VOLUNTARY SETBACK AREA

GRANVILLE ROAD

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MASTER LAYOUT PLAN

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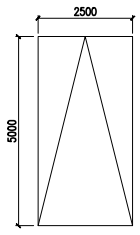
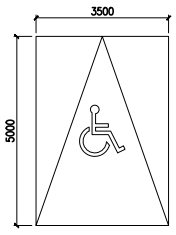
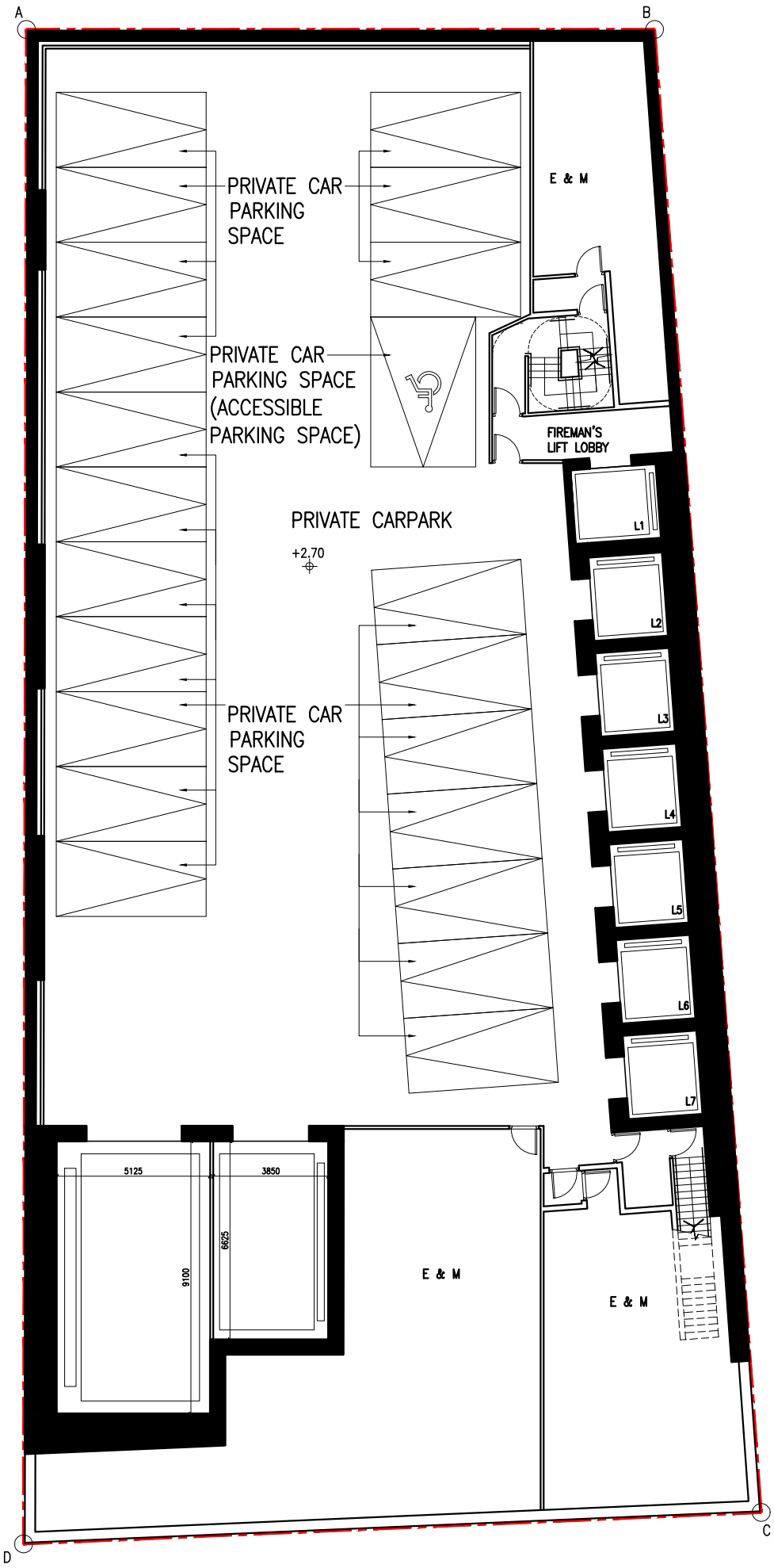


PRIVATE CAR PARKING SPACE



PRIVATE CAR PARKING SPACE (ACCESSIBLE PARKING SPACE)



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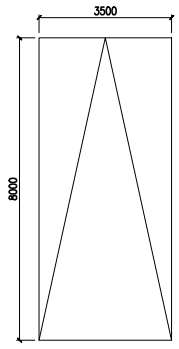
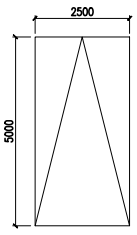
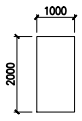


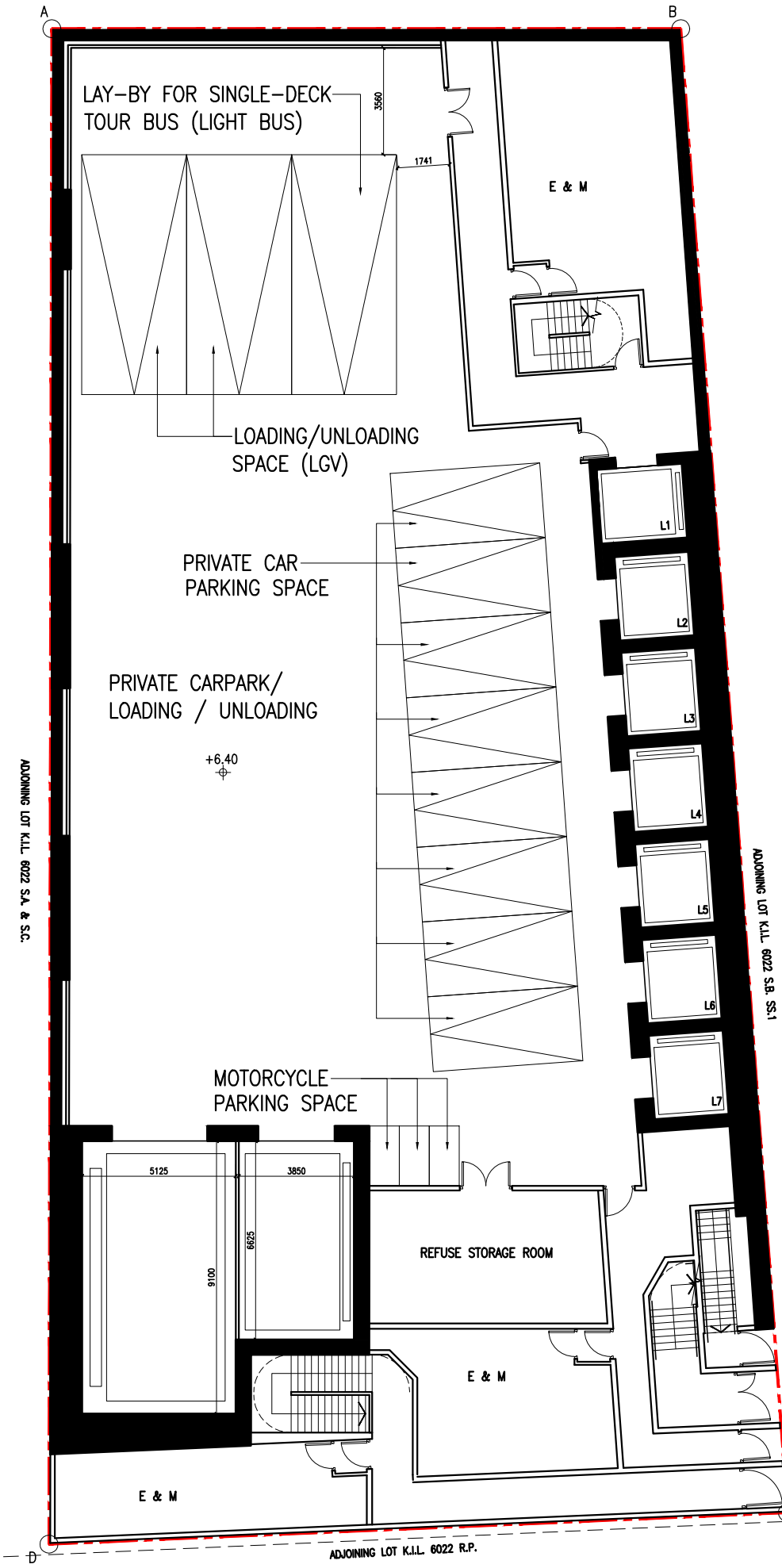
LOADING/UNLOADING SPACE (LGV) / LAY-BY FOR SINGLE-DECK TOUR BUS (LIGHT BUS)



PRIVATE CAR PARKING SPACE



MOTORCYCLE PARKING SPACE



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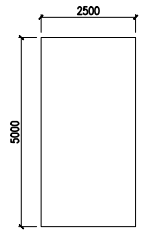

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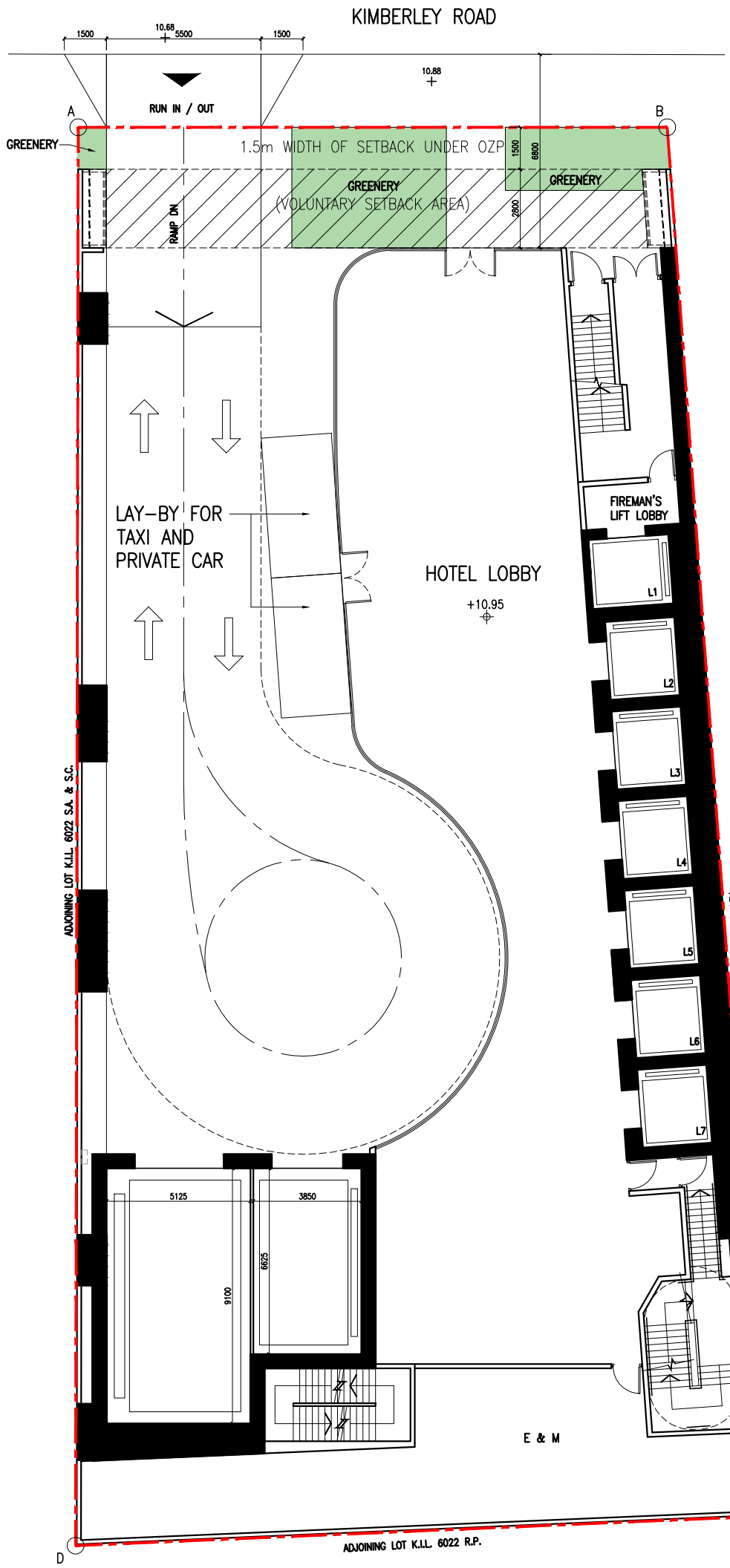

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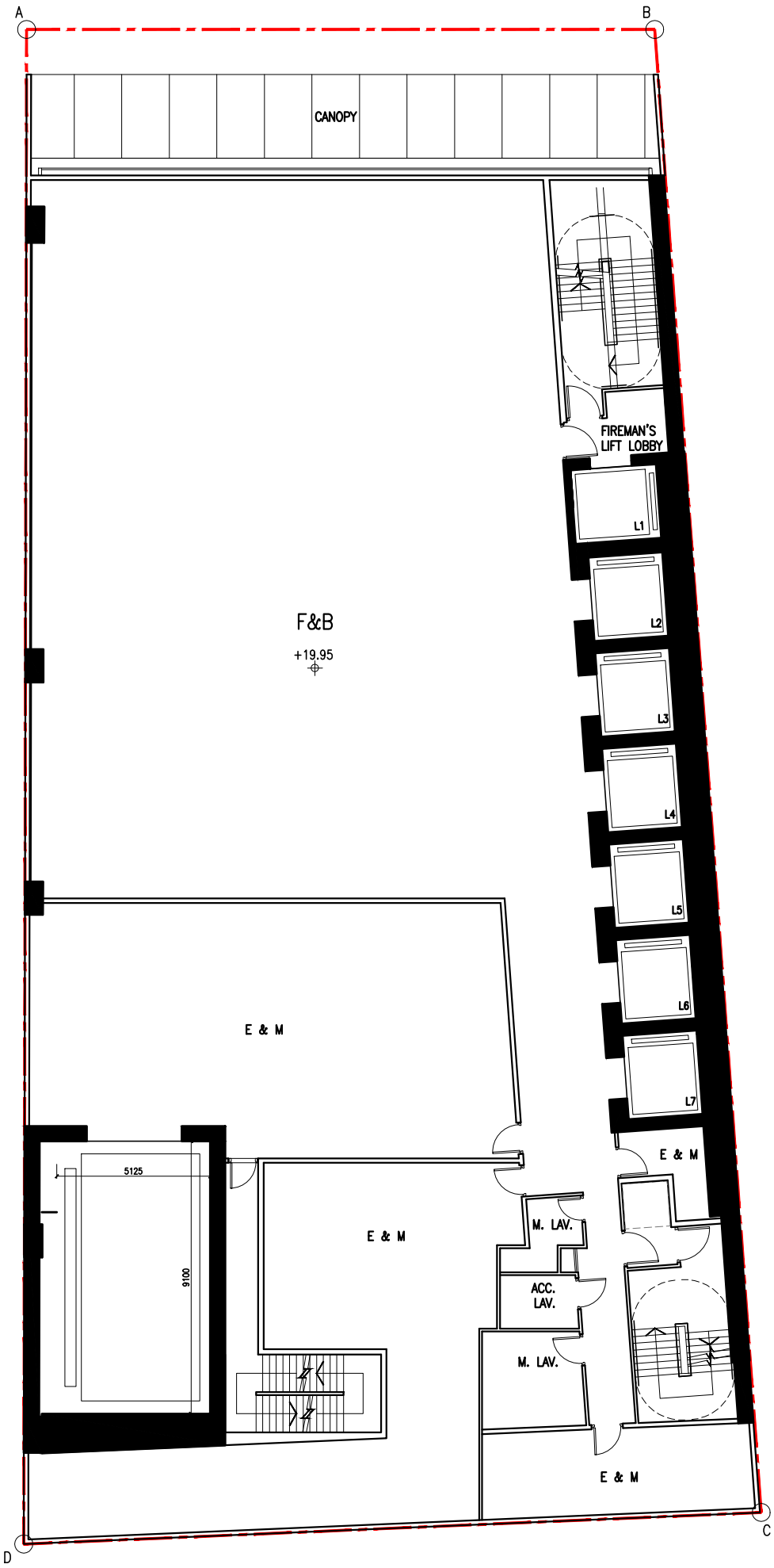

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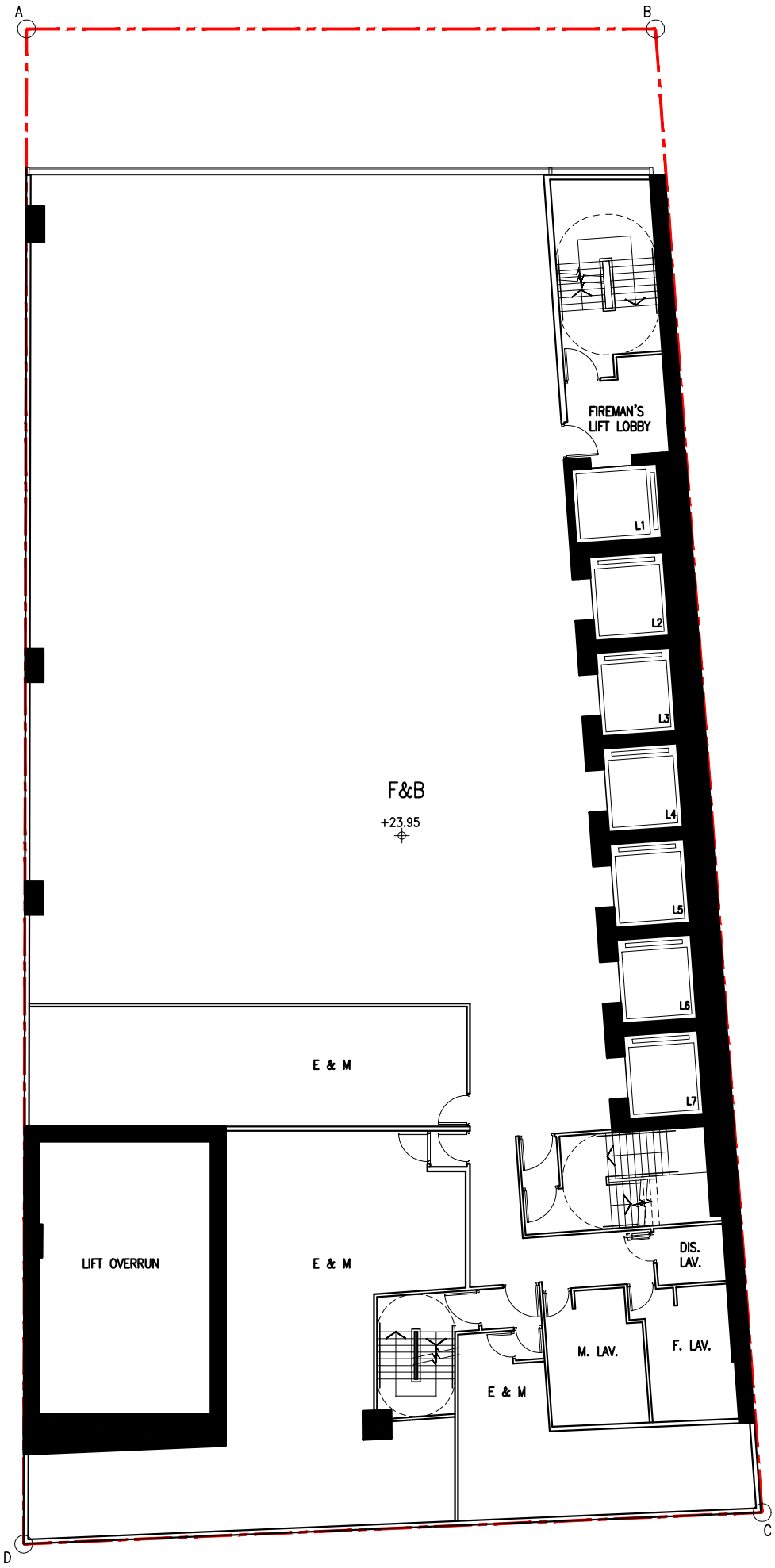

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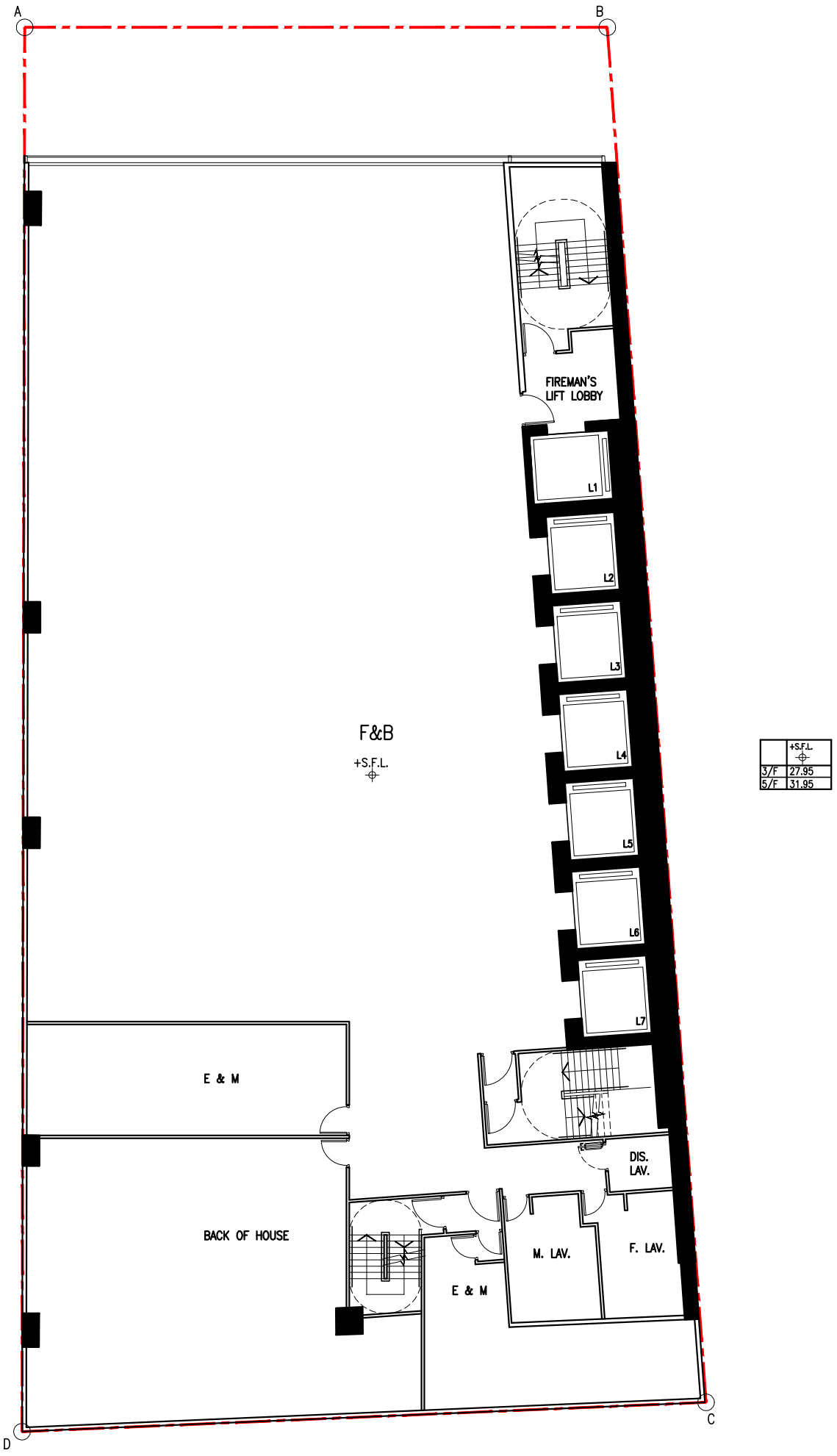

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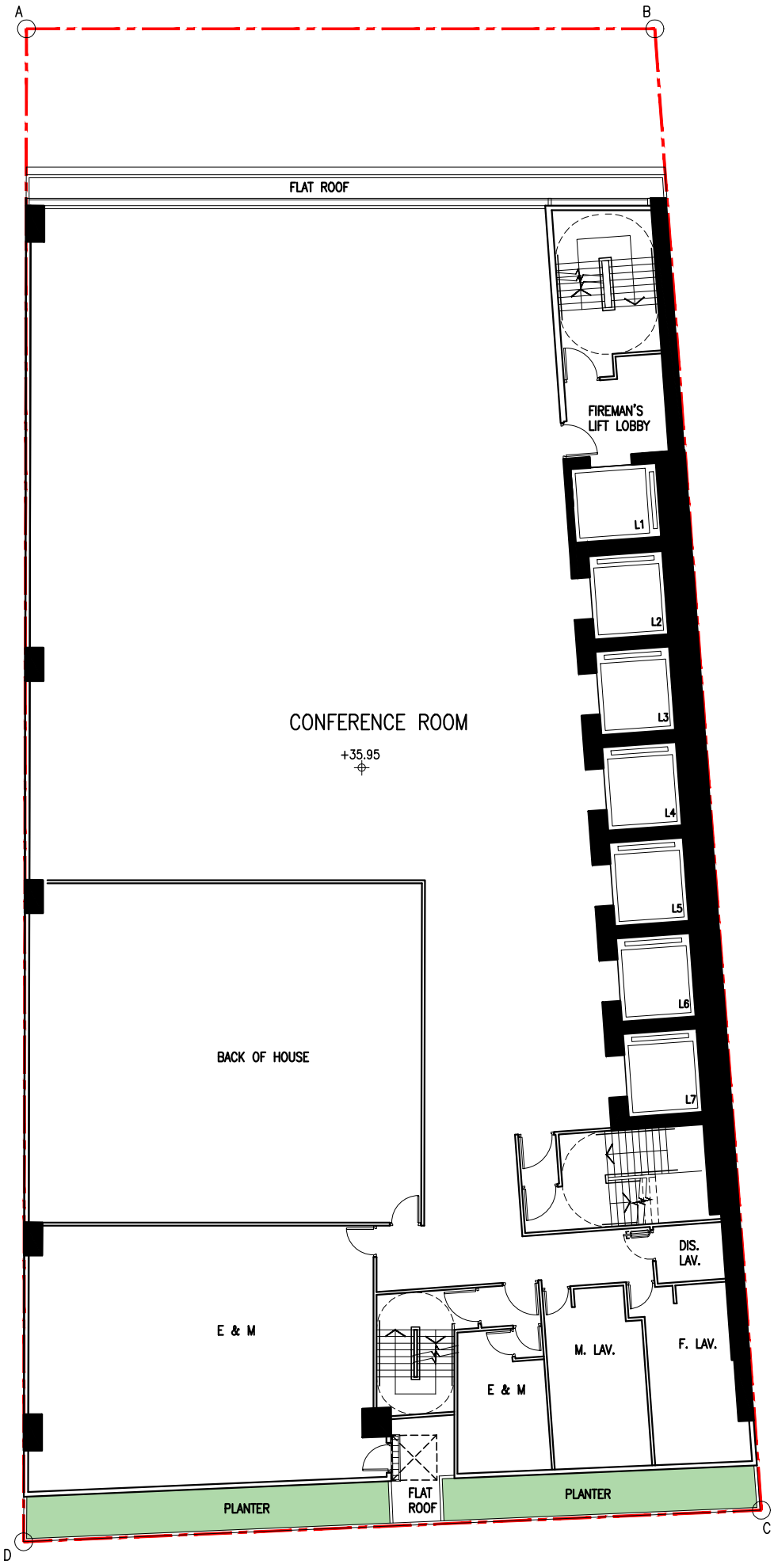

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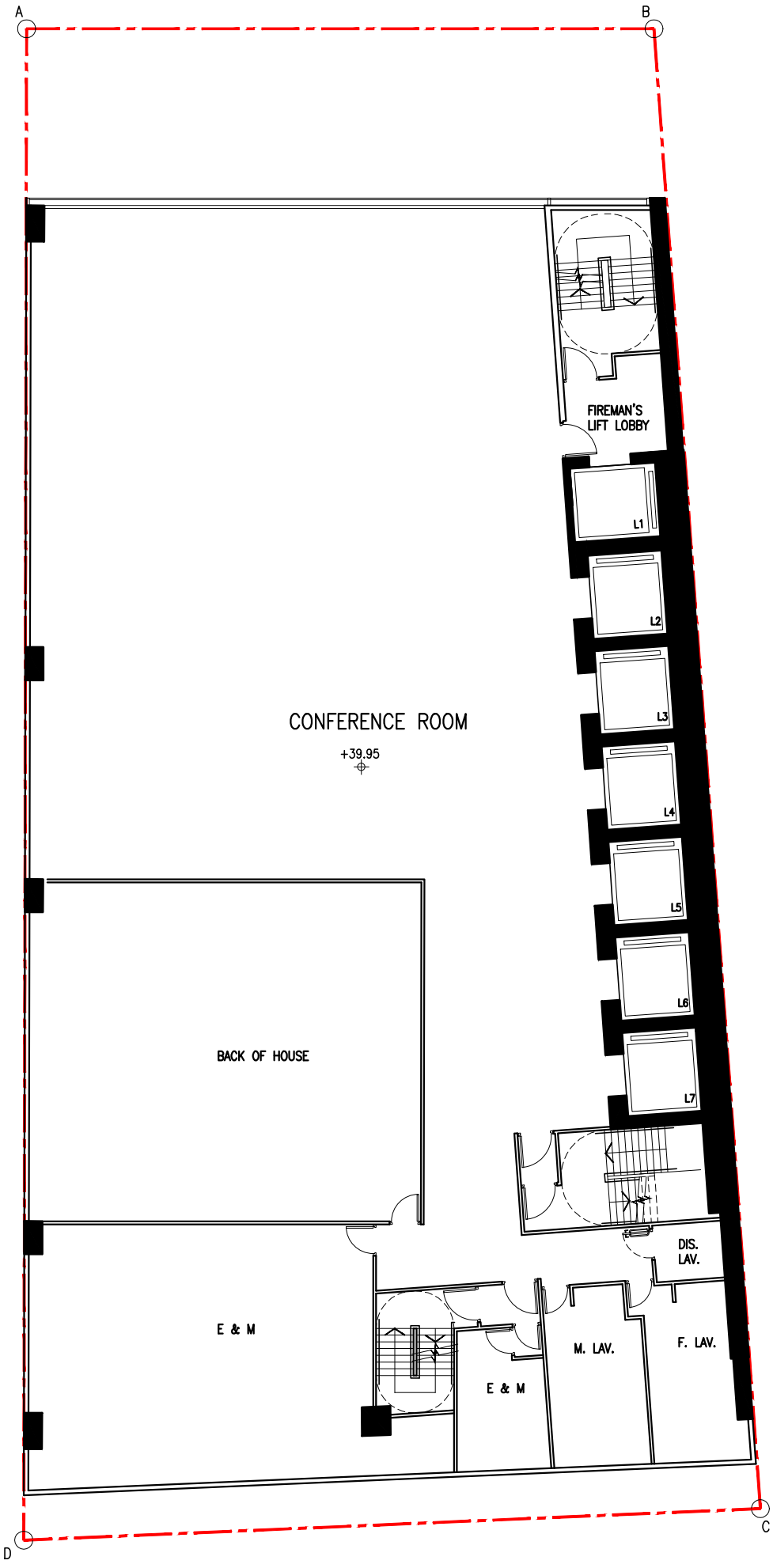

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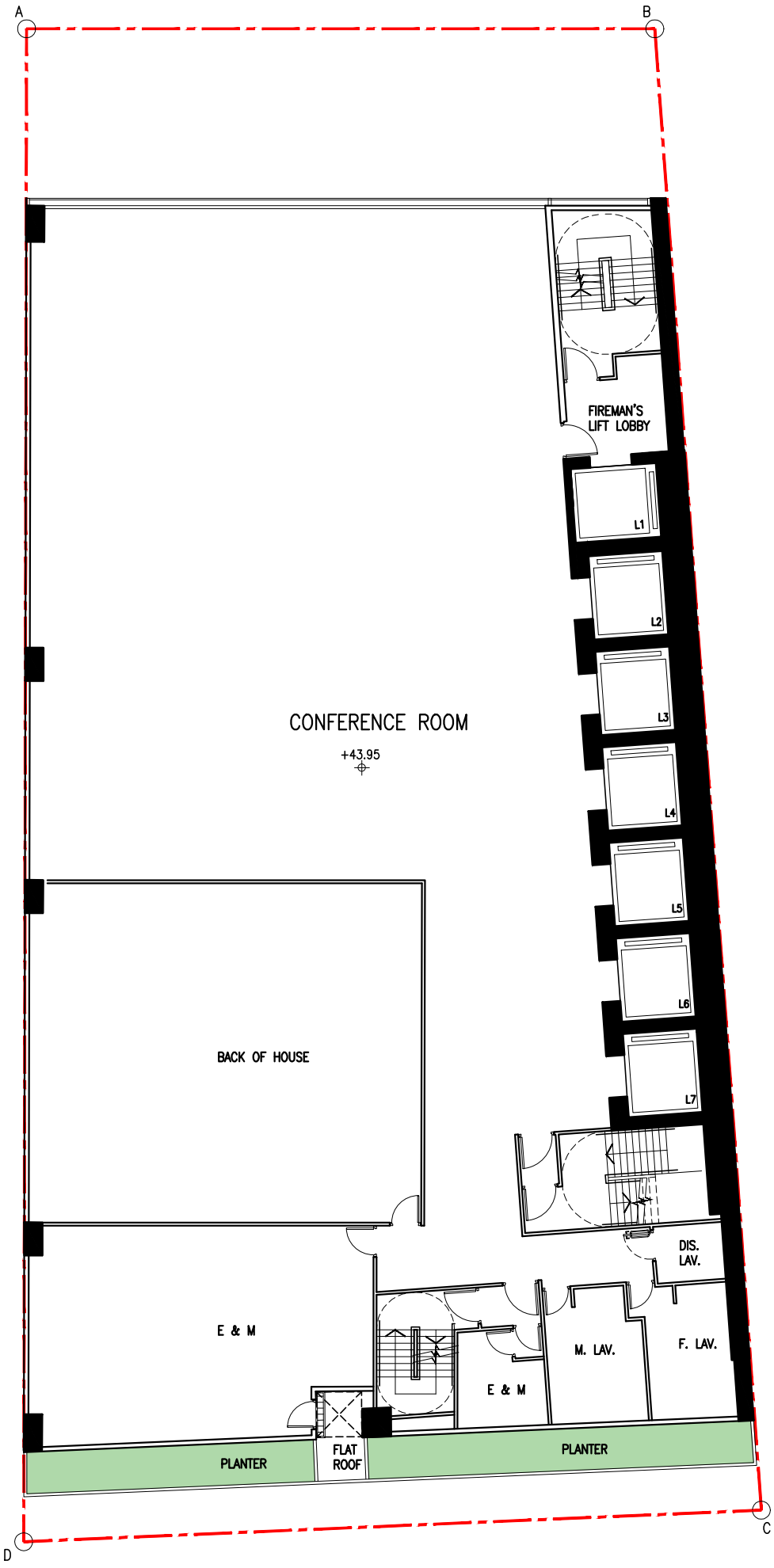

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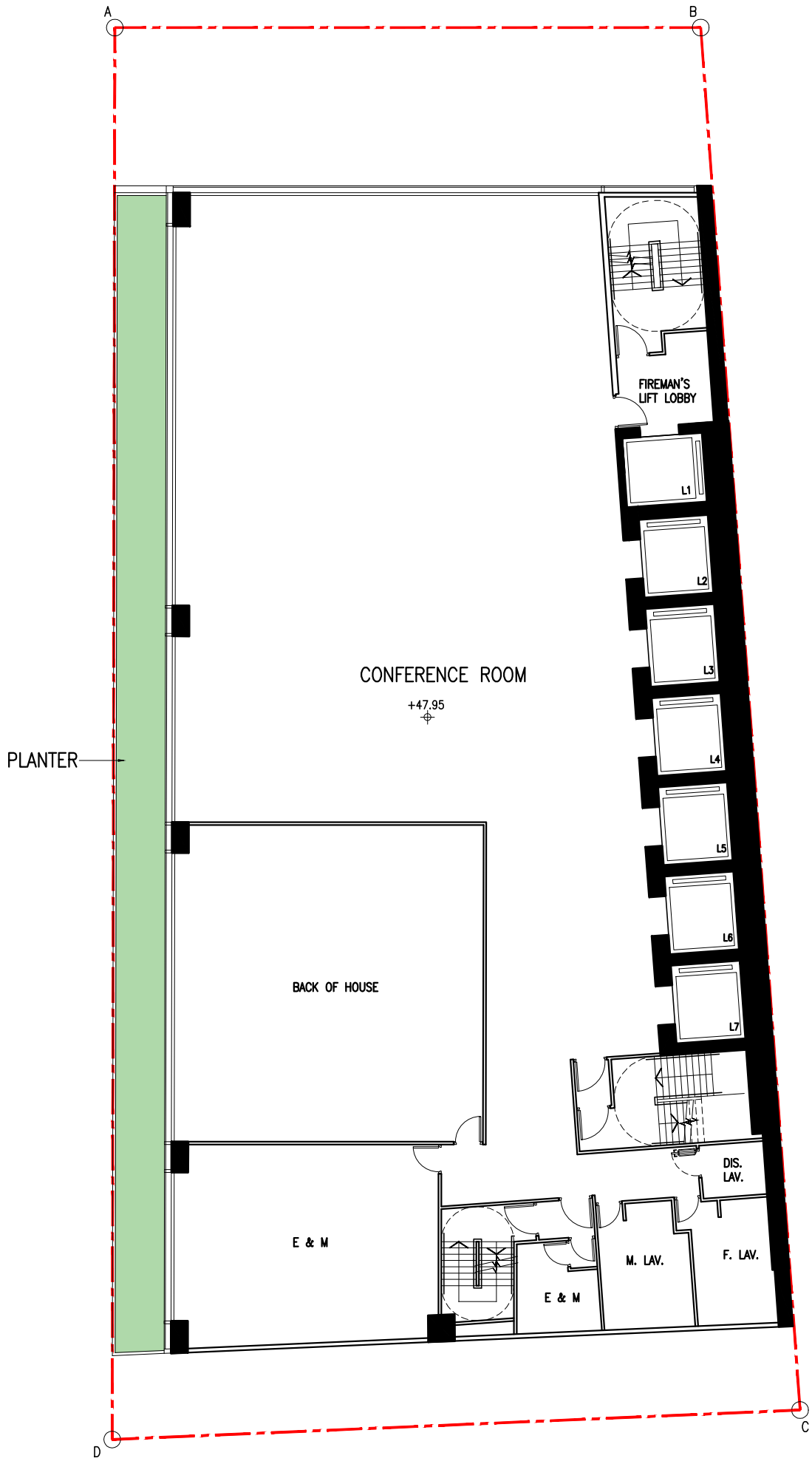

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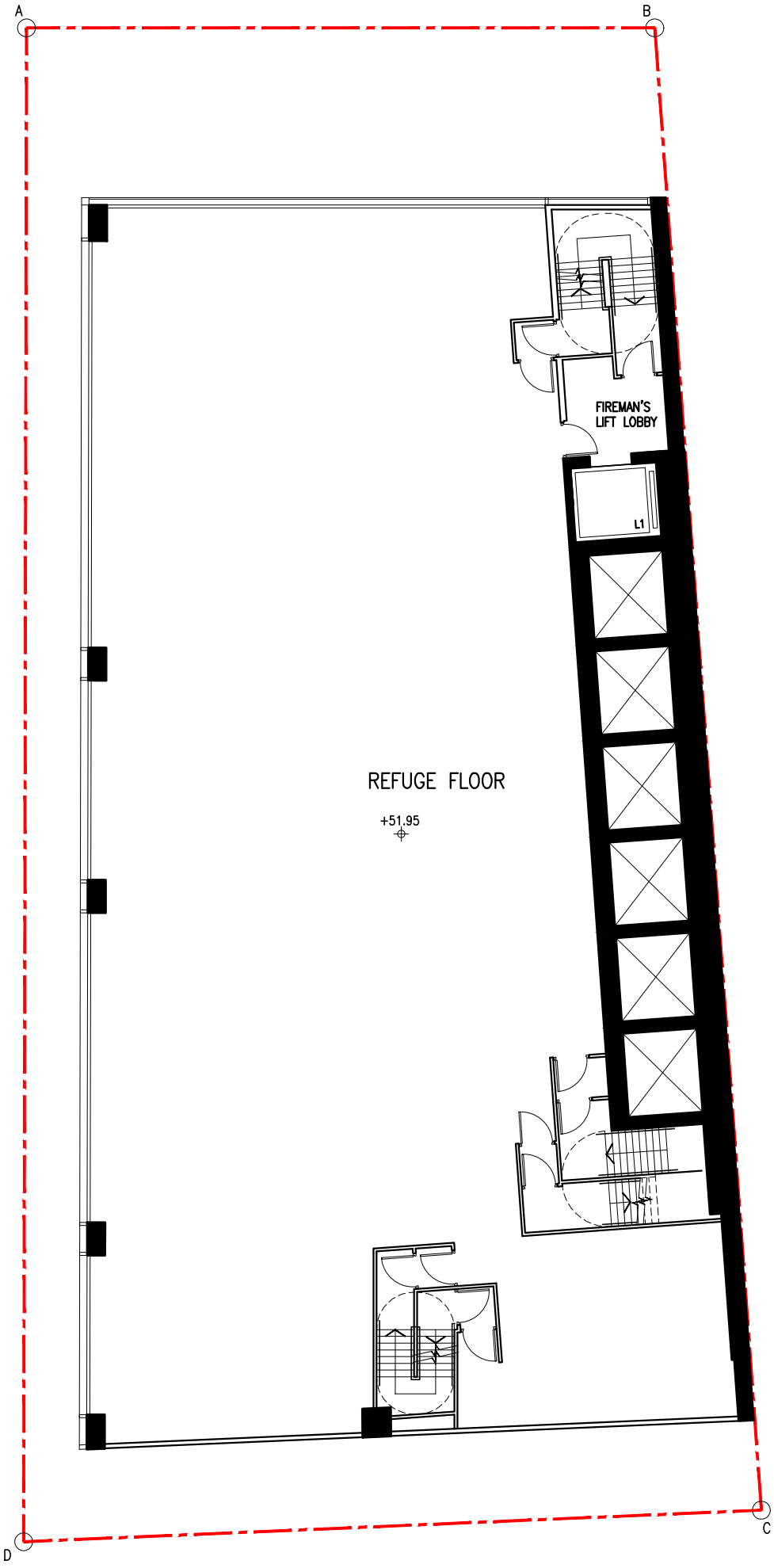

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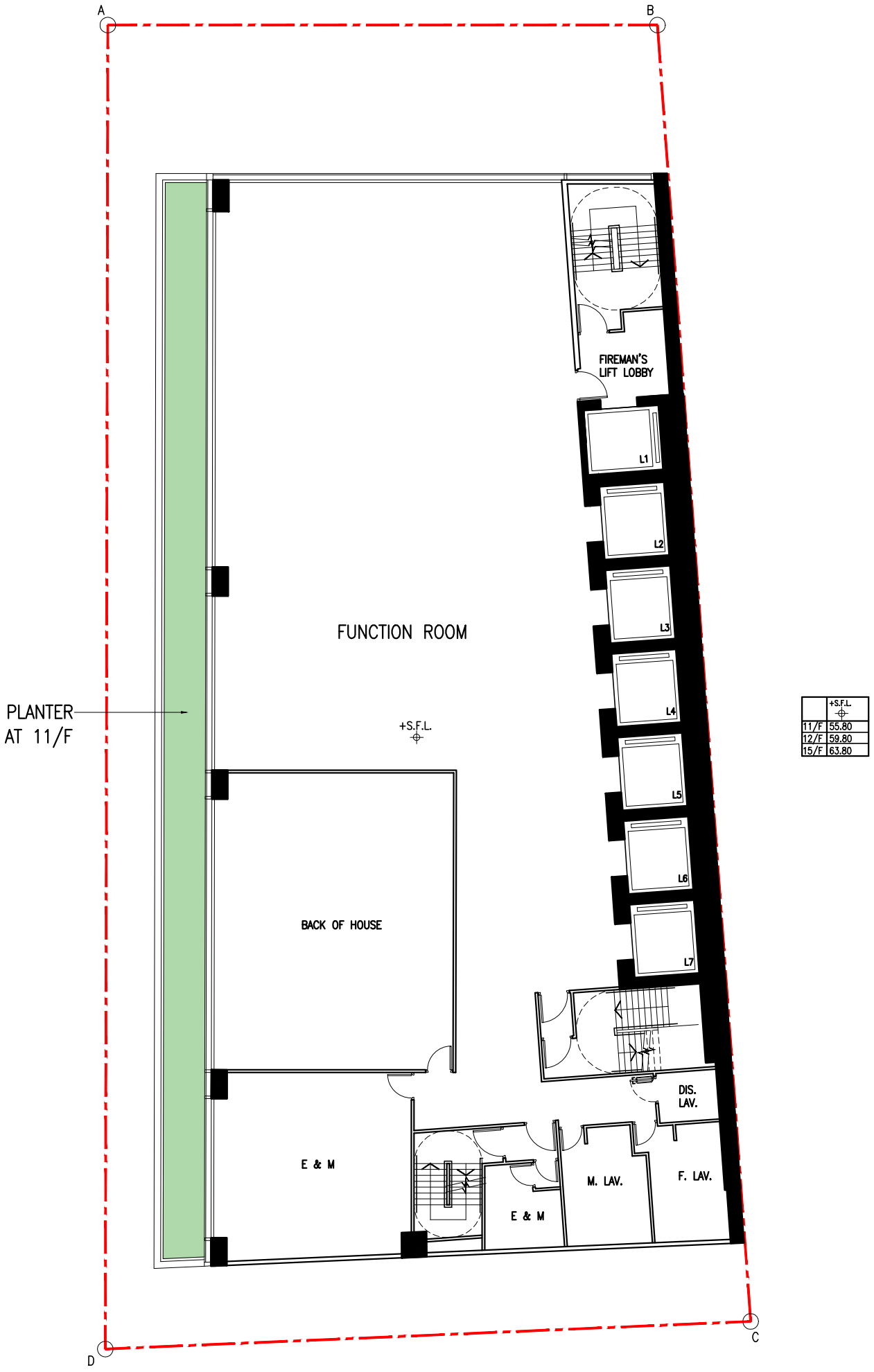

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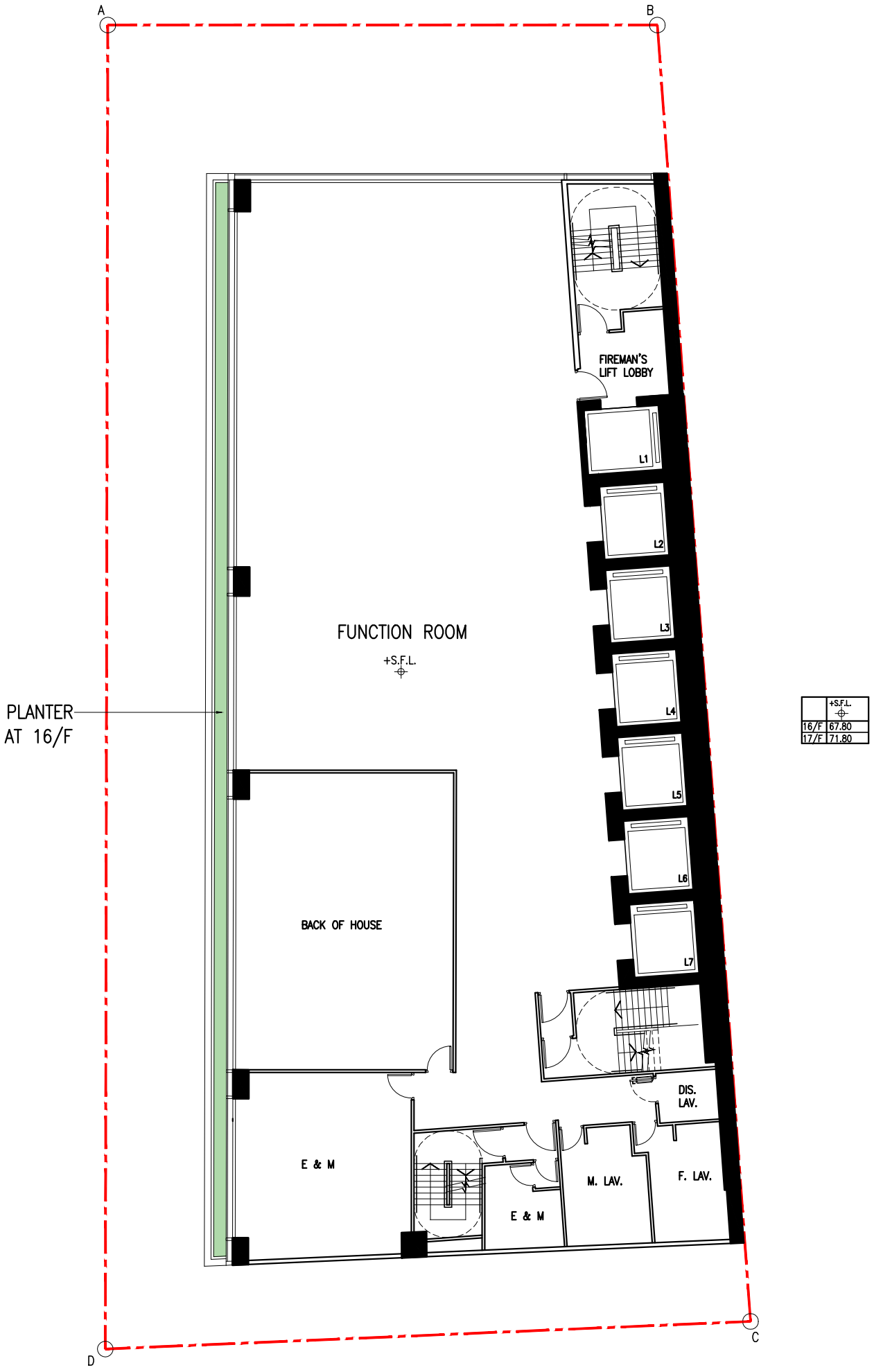
DRAWING NUMBER / 圖號
SK-10-1



SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 16 KIMBERLEY ROAD, TSIM SHA TSUI, KOWLOON

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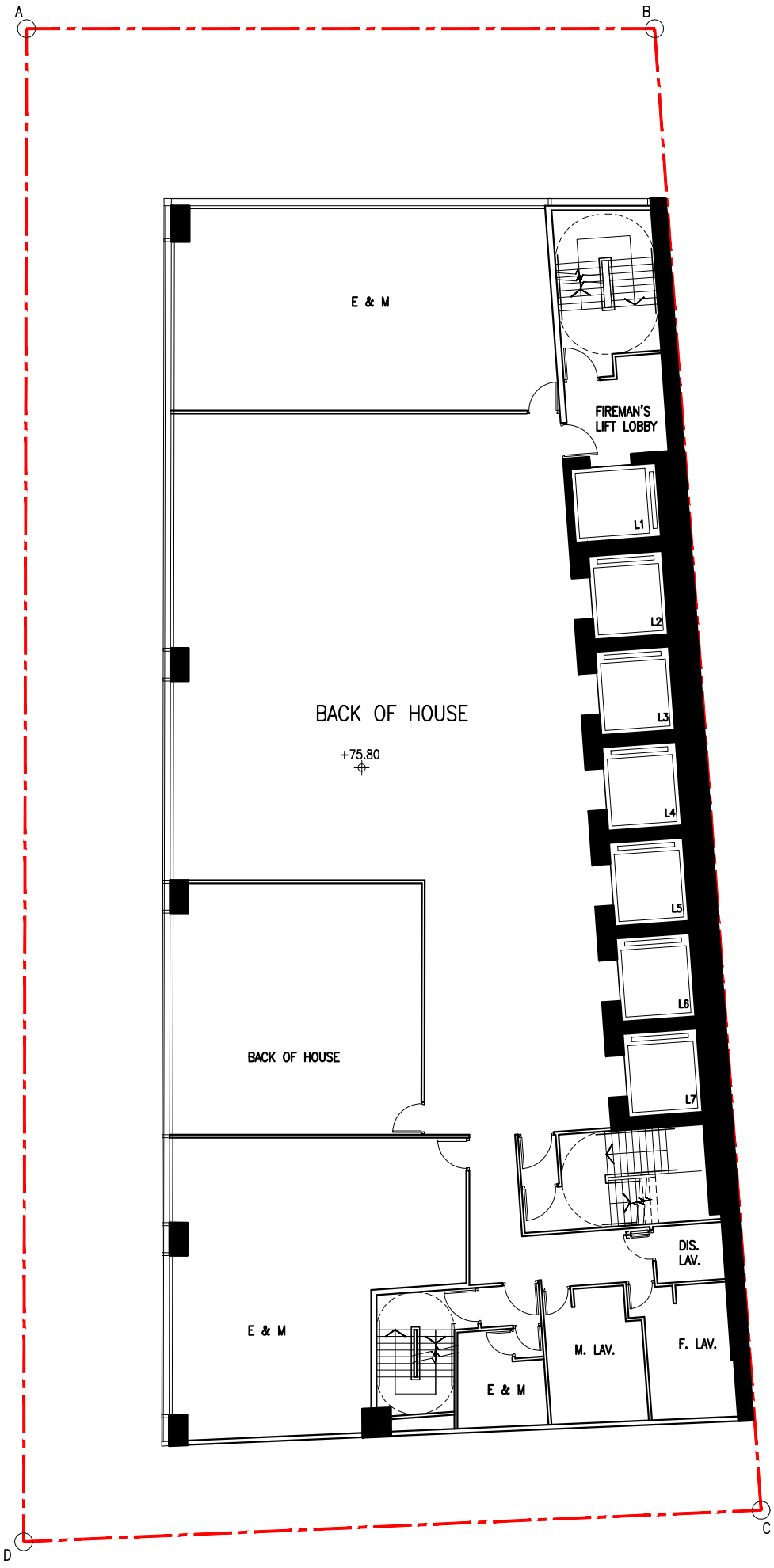
DRAWING / 圖名
16TH TO 17TH FLOOR PLAN

DRAWING NUMBER / 圖號
SK-10-2



SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 16 KIMBERLEY ROAD, TSIM SHA TSUI, KOWLOON

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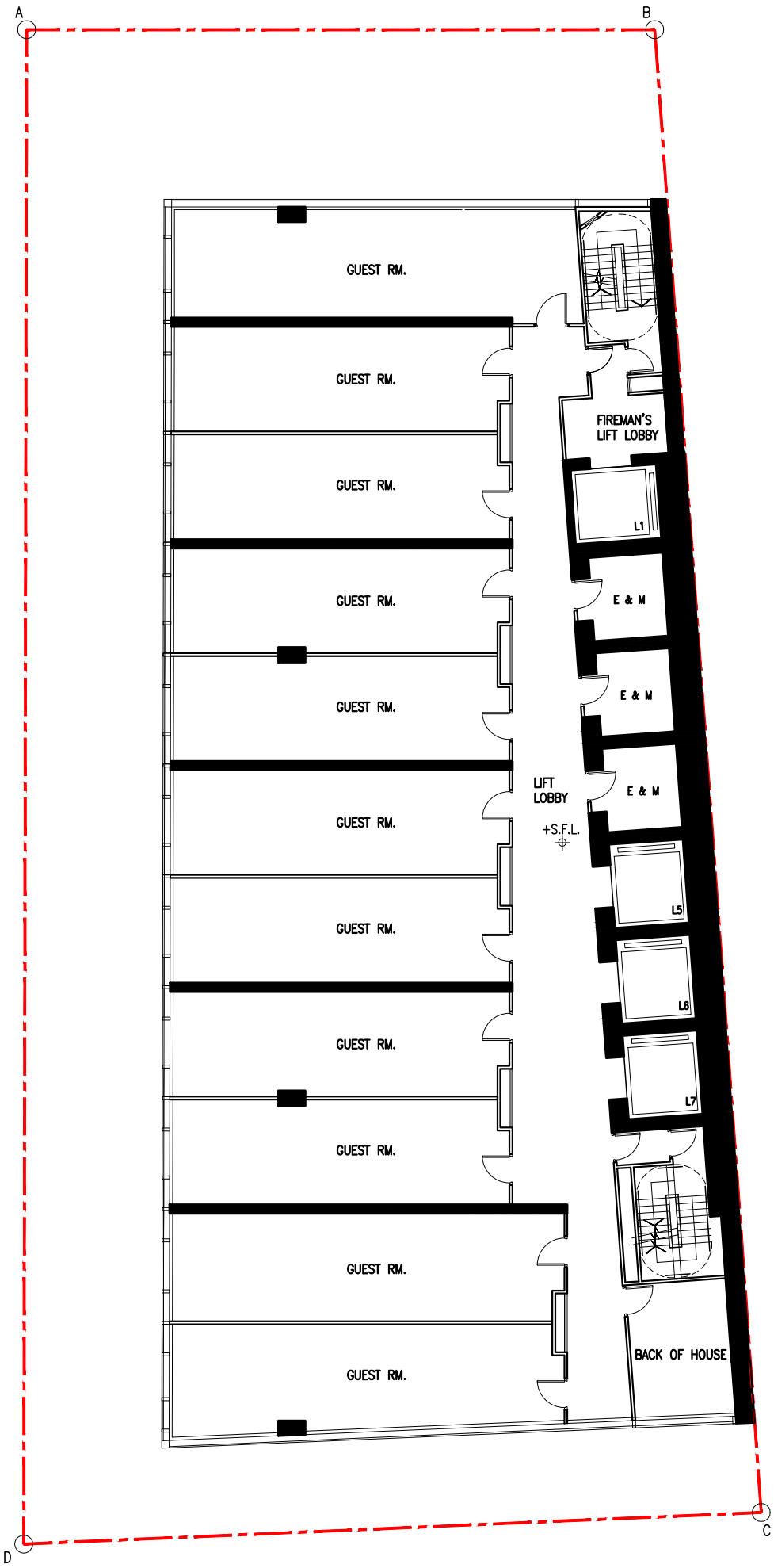
DRAWING / 圖名
18TH FLOOR PLAN

DRAWING NUMBER / 圖號
SK-11



	+S.F.L.
19/F	79.80
20/F	83.30
21/F	86.80
22/F	90.30
23/F	93.80
25/F	97.30
26/F	100.80
27/F	104.30
28/F	107.80
29/F	111.30
30/F	114.80
31/F	118.30
32/F	121.80

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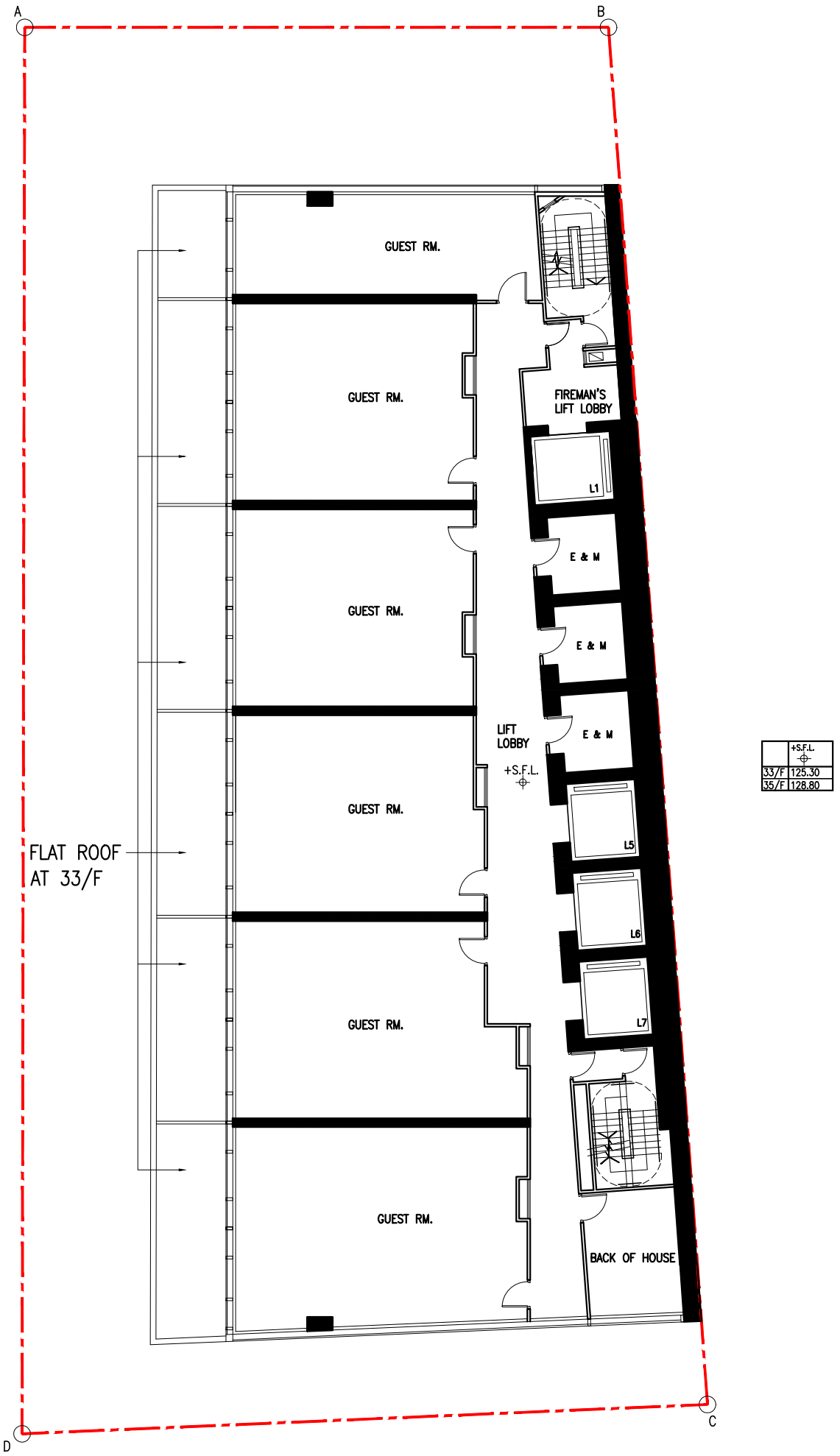
DRAWING / 圖名
19TH TO 32ND FLOOR PLAN
(NUMBER OF 24TH OMITTED)

DRAWING NUMBER / 圖號
SK-12



SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 16 KIMBERLEY ROAD, TSIM SHA TSUI, KOWLOON

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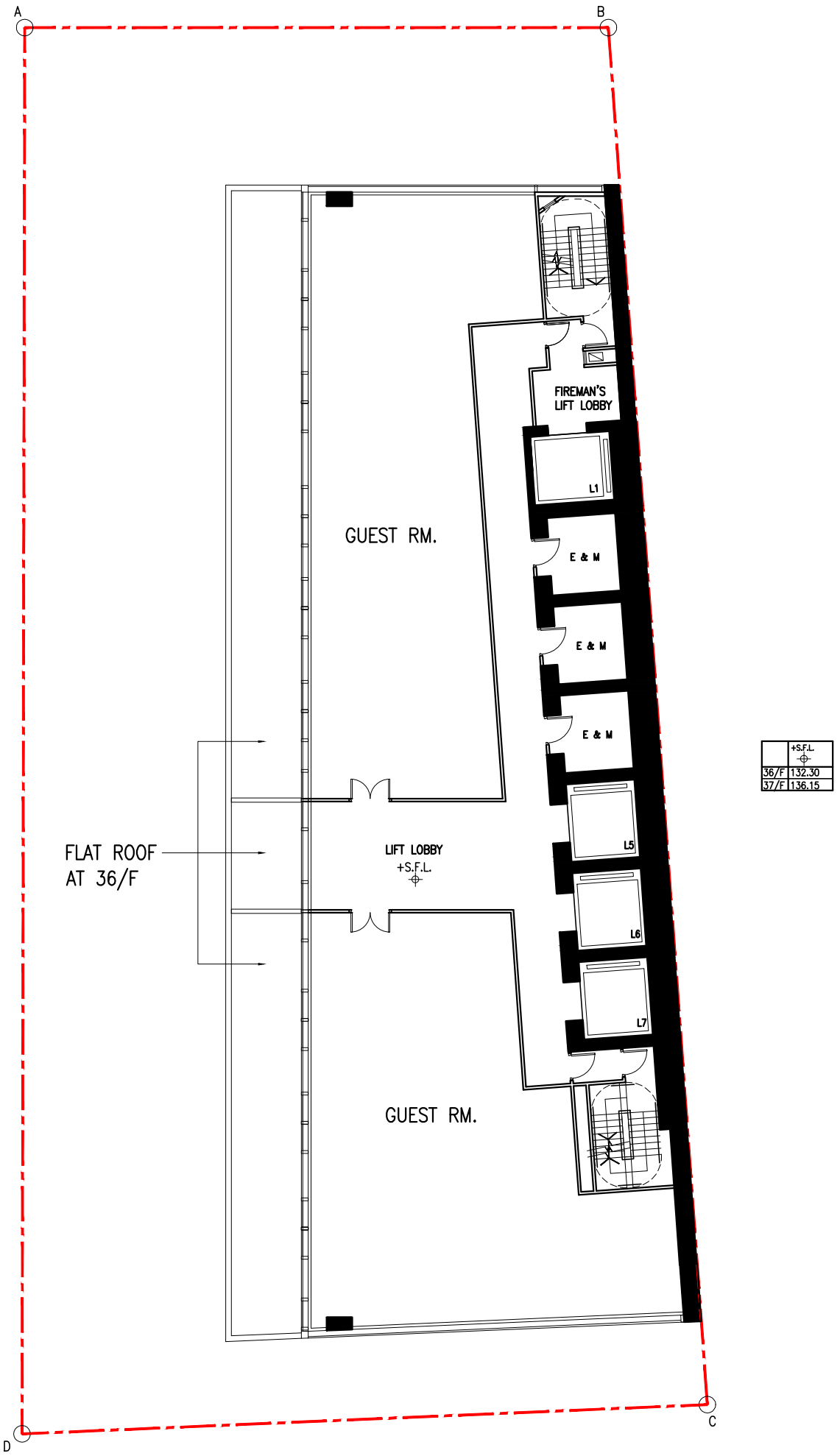
DRAWING / 圖名
33RD TO 35TH FLOOR PLAN
(NUMBER OF 34TH OMITTED)

DRAWING NUMBER / 圖號
SK-13



SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 16 KIMBERLEY ROAD, TSIM SHA TSUI, KOWLOON

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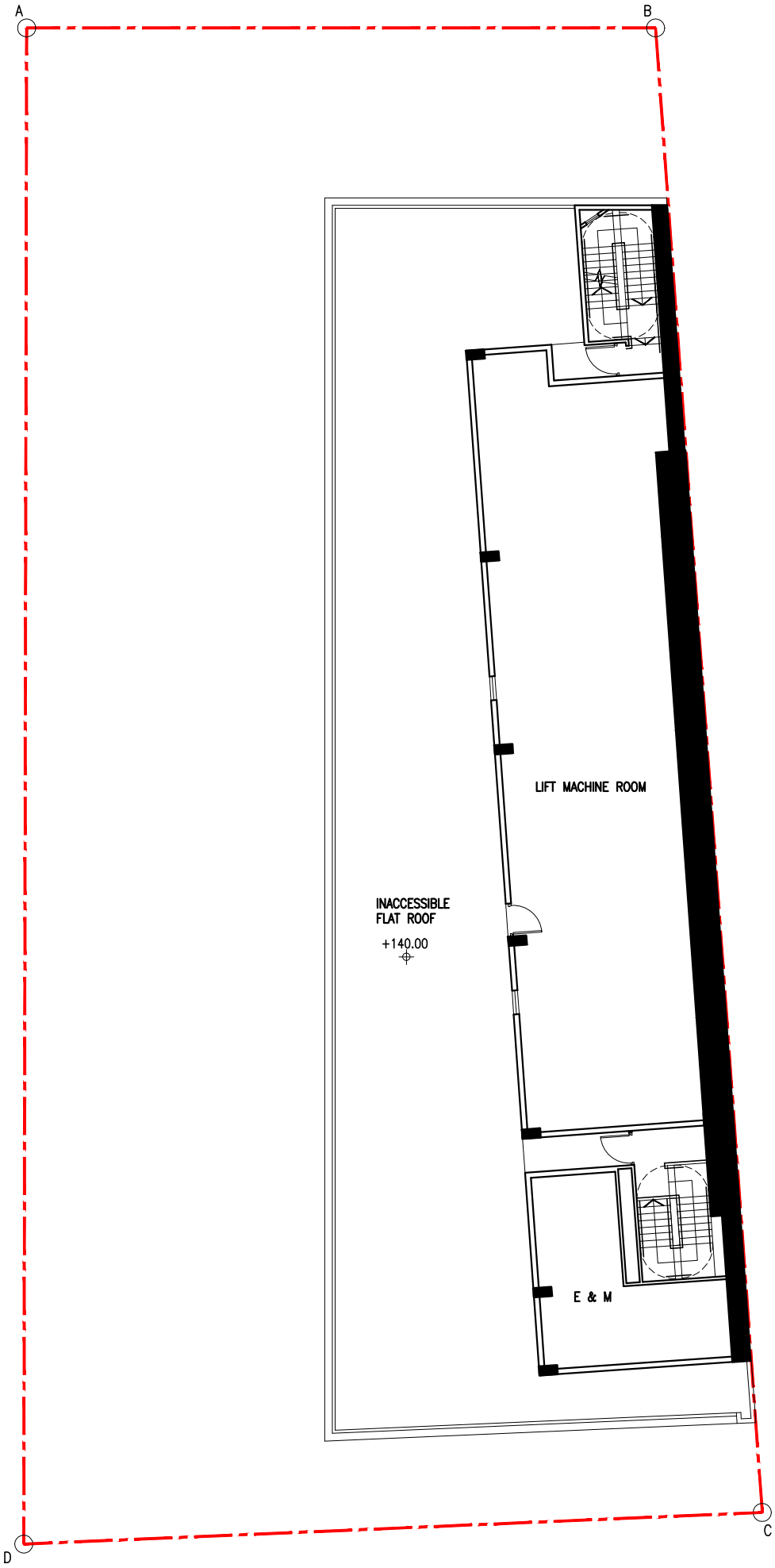
DRAWING / 圖名
36TH TO 37TH FLOOR PLAN

DRAWING NUMBER / 圖號
SK-14



SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 16 KIMBERLEY ROAD, TSIM SHA TSUI, KOWLOON

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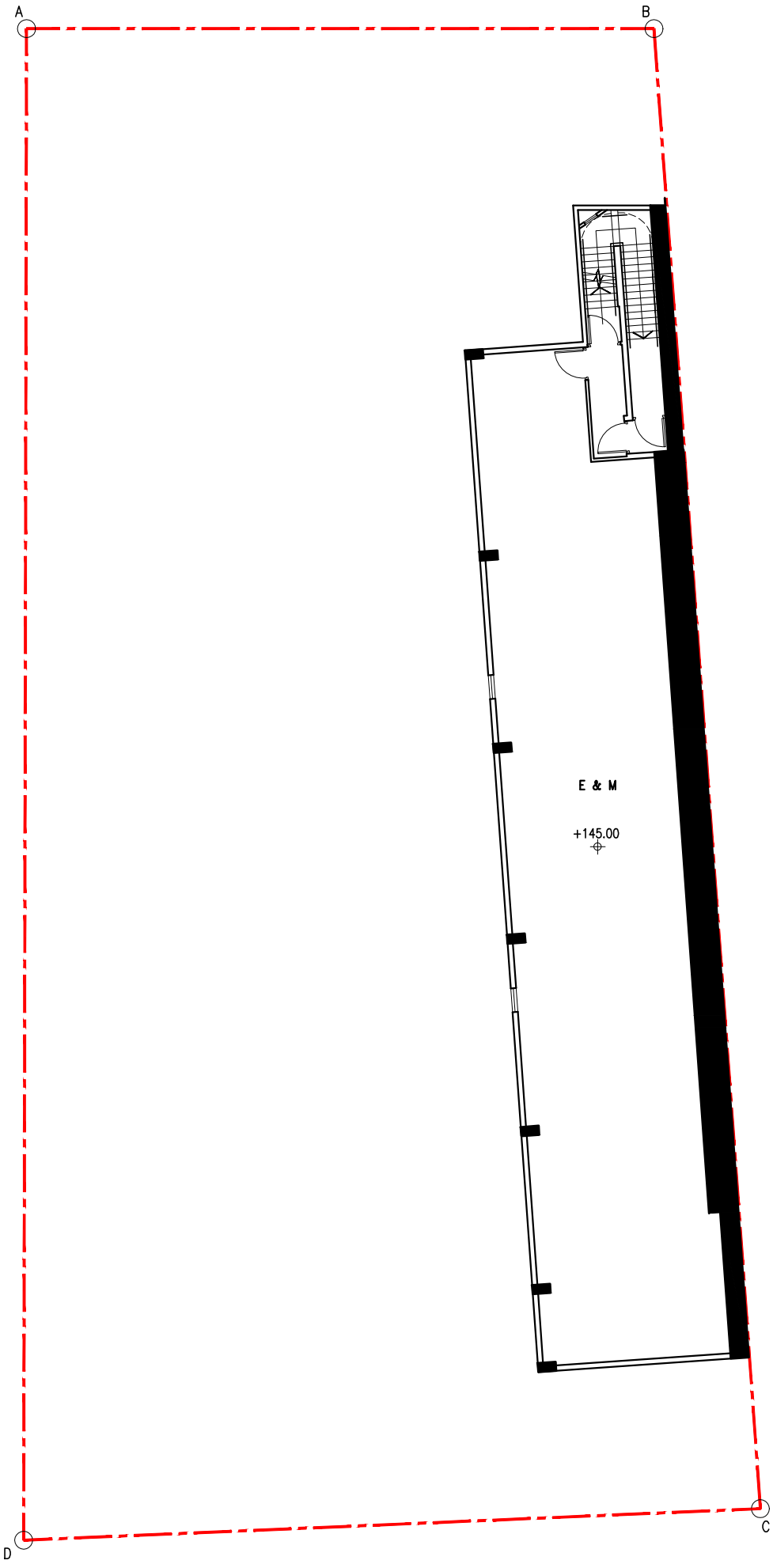
DRAWING / 圖名
ROOF PLAN

DRAWING NUMBER / 圖號
SK-15



SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 16 KIMBERLEY ROAD, TSIM SHA TSUI, KOWLOON

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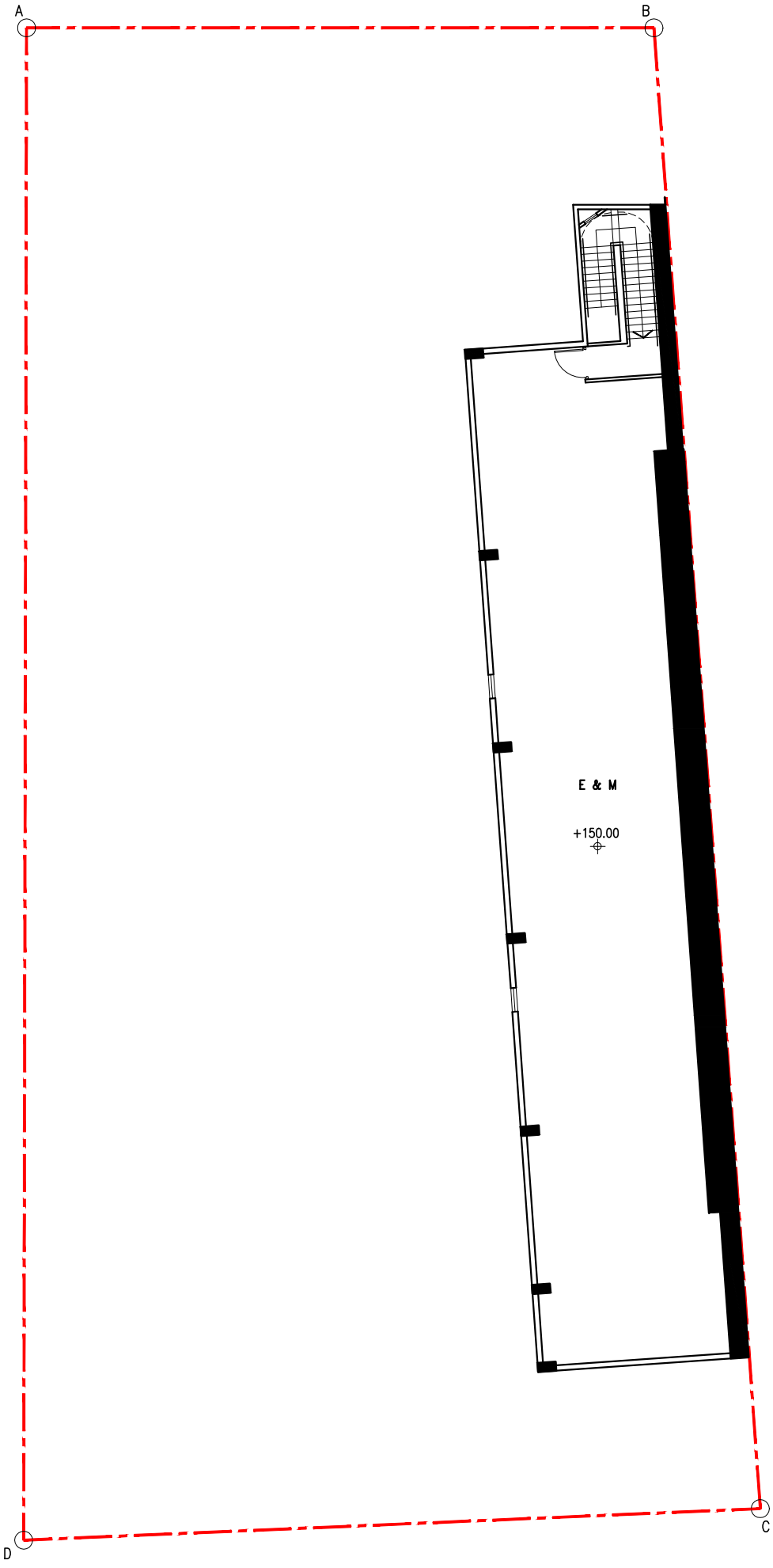
DRAWING / 圖名
UPPER ROOF PLAN AT +145.00mPD

DRAWING NUMBER / 圖號
SK-16



SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 16 KIMBERLEY ROAD, TSIM SHA TSUI, KOWLOON

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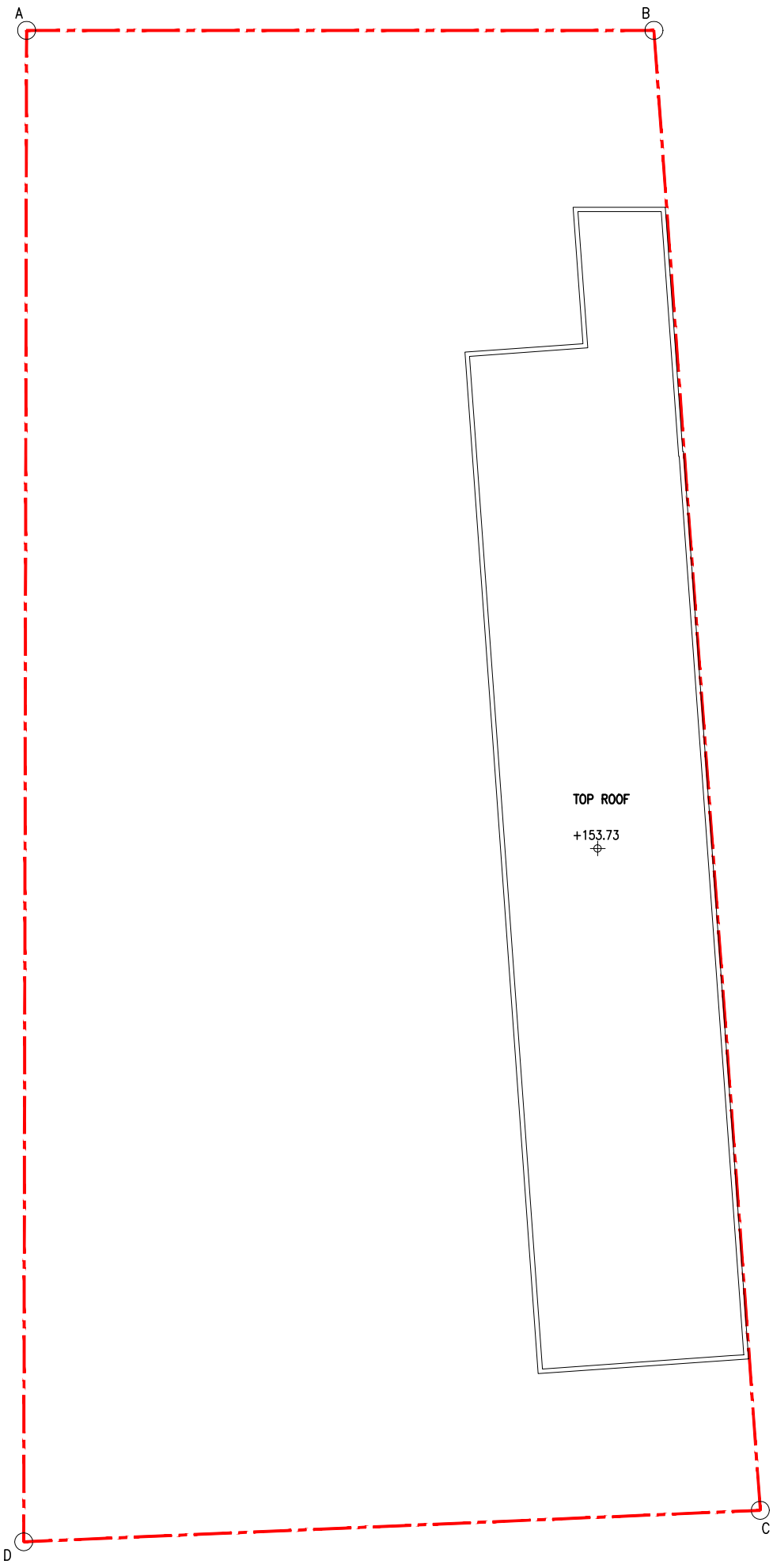
DRAWING / 圖名
UPPER ROOF PLAN AT +150.00mPD

DRAWING NUMBER / 圖號
SK-17



SECTION 16 PLANNING APPLICATION FOR PROPOSED HOTEL WITH MINOR RELAXATION OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS AT 16 KIMBERLEY ROAD, TSIM SHA TSUI, KOWLOON

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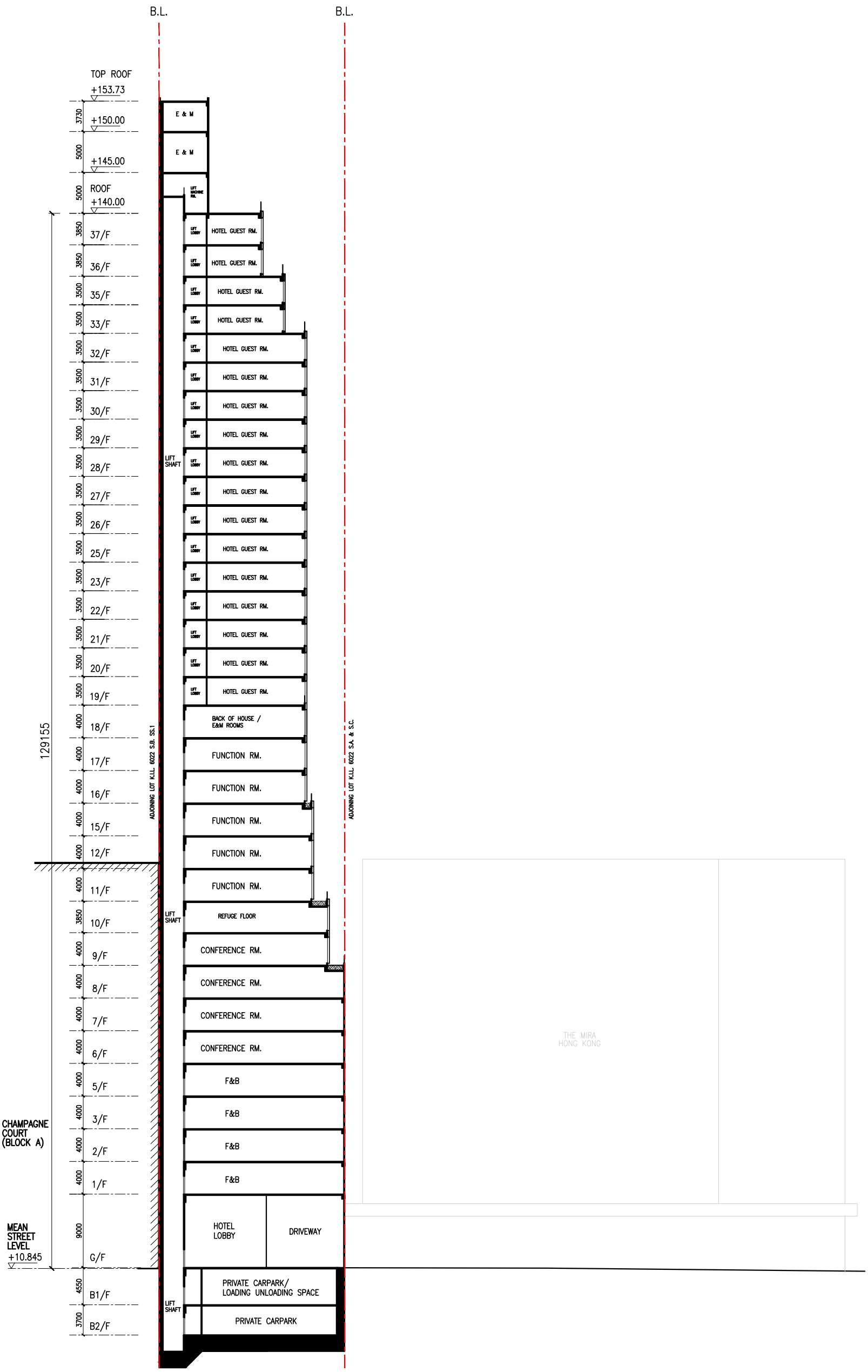
DRAWING / 圖名
TOP ROOF PLAN

DRAWING NUMBER / 圖號
SK-18



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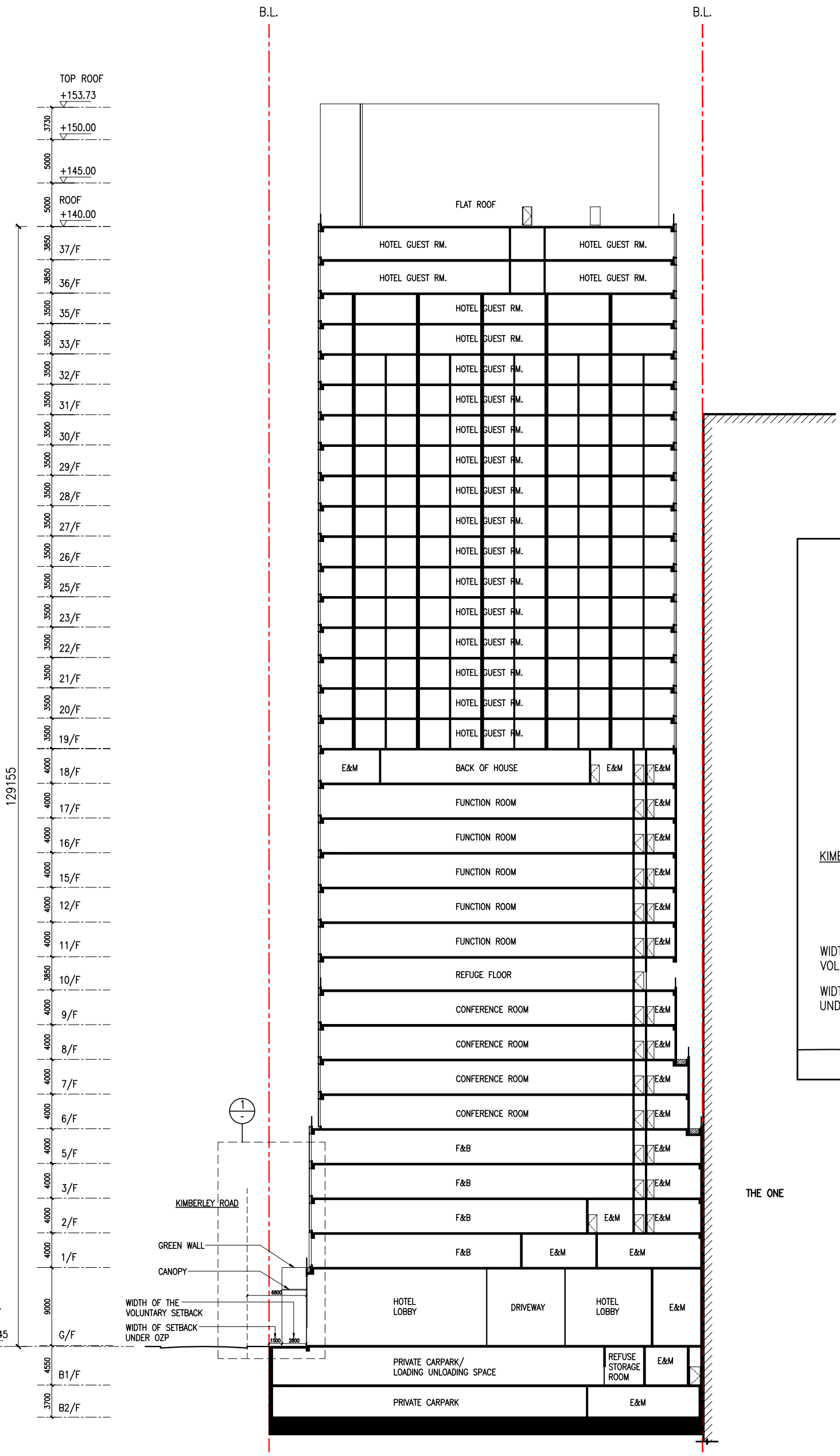
DRAWING / 圖名
DIAGRAMMATIC SECTION AA'

DRAWING NUMBER / 圖號
SK-19



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DRAWING / 圖名
DIAGRAMMATIC SECTION BB'

DRAWING NUMBER / 圖號
SK-20

Appendix 2.1 Detailed Sewerage Impact Assessment Calculations

Table 1. Calculation of Sewage Generation Rate of the Proposed Development (Hotel)

1. Hotel Rooms (19/F to 37/F)			
Assumed area	=	7671	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	=	245	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	=	**387.8**	m^3/day
2. Function rooms & Conference rooms (6/F to 17/F)			
Assumed area	=	4086	m^2
Assumed floor area per employee	=	29.4	m^2 per employee -- (refer to Table 8 of CIFSUS - All Economic Activities (All Types))
Total number of employees	=	139	employees
Design flow for commercial employees	=	0.08	m^3/employee/day -- (refer to Table T-2 of GESF - J6 Business Services)
Sewage generation rate	=	**11.1**	m^3/day
3. Restaurant & Café (1/F to 5/F)			
Assumed Floor Area	=	1832	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	93	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	=	**147.6**	m^3/day
Total Flow from Proposed Development			
Flow Rate	=	546.6	m^3/day
Catchment Inflow Factor	=	1.0	Refer to Table T-4, Catchment Infow Factor: Central Kowloon
Flow Rate with catchment inflow factor	=	546.6	m^3/day
Contributing Population	=	2024	people
Peaking factor	=	6	Refer to Table T-5 of GESF for population 1,000-5,000 incl. stormwater allowance
Peak Flow	=	**38.0**	litre/sec

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

Catchment A

1a. Cheung Lee Commercial Building - Restaurant (G/F to 2/F)

Assumed Area	=	840	m^2 (Site Area 280m^2 x 3 floors)
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	43	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	=	**67.7**	m^3/day

1b. Cheung Lee Commercial Building - Office (3/F to 18/F)

Assumed area	=	4480	m^2 (Site Area 280m^2 x 16 floors)
Assumed floor area per employee	=	29.4	m^2 per employee -- (refer to Table 8 of CIFSUS - All Economic Activities (All Types))
Total number of employees	=	152	employees
Design flow for commercial employees	=	0.08	m^3/employee/day -- (refer to Table T-2 of GESF - J6 Business Services)
Sewage generation rate	=	**12.2**	m^3/day

Total Flow from Catchmet A

Flow Rate	=	79.9	m^3/day
Catchment Inflow Factor	=	1.0	Refer to Table T-4, Catchment Infow Factor: Central Kowloon
Flow Rate with catchment inflow factor	=	79.9	m^3/day
Contributing Population	=	296	people
Peaking factor	=	8	Refer to Table T-5 of GESF for population <1,000 incl. stormwater allowance
Peak Flow	=	**7.4**	litre/sec

Total Flow from Propsed Development and Catchmet A

Flow Rate	=	626.4	m^3/day
Catchment Inflow Factor	=	1.0	Refer to Table T-4, Catchment Infow Factor: Central Kowloon
Flow Rate with catchment inflow factor	=	626.4	m^3/day
Contributing Population	=	2320	people
Peaking factor	=	6	Refer to Table T-5 of GESF for population 1,000 - 5,000 incl. stormwater allowance
Peak Flow	=	**43.5**	litre/sec

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

Catchment B

1a. The Mira Hong Kong - Hotel

Assumed area	=	21144	m^2 (Provided by Development Owner)
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	=	677	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	=	**1069.0**	m^3/day

1b. Mira Place 2 - Retail

Assumed area	=	11322	m^2 (Provided by Development Owner & Assumed 3/4 of GFA of Mira Place 2 is Retail)
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	396	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	=	**111.0**	m^3/day

1b. Mira Place 2 - F&B

Assumed Floor Area	=	6047	m^2 (Provided by Development Owner & Assumed 1/4 of GFA of Mira Place 2 is F&B)
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	308	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	=	**487.3**	m^3/day

Total Flow from Catchmet B

Flow Rate	=	1667	m^3/day
Catchment Inflow Factor	=	1.0	Refer to Table T-4, Catchment Infow Factor: Central Kowloon
Flow Rate with catchment inflow factor	=	1667.3	m^3/day
Contributing Population	=	6175	people
Peaking factor	=	5	Refer to Table T-5 of GESF for population 5,000 - 10,000 incl. stormwater allowance
Peak Flow	=	**96.5**	litre/sec

Total Flow from Propsed Development, Catchmet A & B

Flow Rate	=	2293.7	m^3/day
Catchment Inflow Factor	=	1.0	Refer to Table T-4, Catchment Infow Factor: Central Kowloon
Flow Rate with catchment inflow factor	=	2293.7	m^3/day
Contributing Population	=	8495	people
Peaking factor	=	5	Refer to Table T-5 of GESF for population 5,000 - 10,000 incl. stormwater allowance
Peak Flow	=	**132.7**	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 FMH4002496

Manhole No.	=	FMH4002496	
Manhole No.	=	FMH4002455	
Pipe Diameter	=	0.150	m
Area	=	0.018	m^2
Wetted Perimeter	=	0.471	m
Pipe Length	=	14.8	m
Invert Level 1	=	11.98	mPD
Invert Level 2	=	11.05	mPD
Hydraulic Pipeline Roughness ($k_{s)}$	=	3.0	mm
Hydraulic Gradient (s)	=	0.06	
Mean Velocity (V)	=	1.95	m/s
Max Capacity of Sewer (Q)	=	**34.4**	L/s

2. St. Andrew's Church Kowloon (138 Nathan Rd, Tsim Sha Tsui)

Assumed Area	=	3000	m^2 (from EIA Report of AEIAR-260/2024 - Construction of Annex Block at Hong Kong Observatory Headquarters, Tsim Sha Tsui)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	99	employees
Design flow for commercial employees	=	0.28	m^3/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	=	**27.7**	m^3/day

3. Antiquities and Monuments Office (136 Nathan Rd, Tsim Sha Tsui)

Assumed Area	=	900	m^2 (from EIA Report of AEIAR-260/2024 - Construction of Annex Block at Hong Kong Observatory Headquarters, Tsim Sha Tsui)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	30	employees
Design flow for commercial employees	=	0.28	m^3/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	=	**8.3**	m^3/day

4. Tsim Sha Tsui District Kai Fong Welfare Association (136A Nathan Rd, Tsim Sha Tsui)

Assumed Area	=	6000	m^2 (from EIA Report of AEIAR-260/2024 - Construction of Annex Block at Hong Kong Observatory Headquarters, Tsim Sha Tsui)
Assumed floor area per employee	=	30.3	m^2 per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
Total number of employees	=	198	employees
Design flow for commercial employees	=	0.28	m^3/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	=	**55.4**	m^3/day

5. Hong Kong Observatory Headquarter

Sewage generation rate	=	**110.5**	m^3/day (from EIA Report of AEIAR-260/2024 - Construction of Annex Block at Hong Kong Observatory Headquarters, Tsim Sha Tsui)

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

6a. Mira Place 1 & Mira Place Tower A (132-134 Nathan Rd, Tsim Sha Tsui) - Office

Assumed area	=	44400	m^2 (from EIA Report of AEIAR-260/2024 - Construction of Annex Block at Hong Kong Observatory Headquarters, Tsim Sha Tsui)
Assumed floor area per employee	=	29.4	m^2 per employee -- (refer to Table 8 of CIFSUS - All Economic Activities (All Types))
Total number of employees	=	1510	employees
Design flow for commercial employees	=	0.08	m^3/employee/day -- (refer to Table T-2 of GESF - J6 Business Services)
Sewage generation rate	=	**120.8**	m^3/day

6b. Mira Place 1 & Mira Place Tower A (132-134 Nathan Rd, Tsim Sha Tsui) - Retail

Assumed area	=	24300	m^2 (from EIA Report of AEIAR-260/2024 - Construction of Annex Block at Hong Kong Observatory Headquarters, Tsim Sha Tsui)
Assumed floor area per employee	=	28.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
Total number of employees	=	851	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	=	**238.1**	m^3/day

6b. Mira Place 1 & Mira Place Tower A (132-134 Nathan Rd, Tsim Sha Tsui) - F&B

Assumed Floor Area	=	8100	m^2 (from EIA Report of AEIAR-260/2024 - Construction of Annex Block at Hong Kong Observatory Headquarters, Tsim Sha Tsui)
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	413	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	=	**652.7**	m^3/day

Total Flow from Carchment C

Flow Rate [1]	=	1213.6	m^3/day [1]
Flow Rate with Catchment Inflow Factor	=	1213.6	m^3/day (refer to Table T-4 of GESF - Central Kowloon)
Contributing Population	=	4495	people
Peaking factor	=	6	Refer to Table T-5 of GESF for population 5,000 - 10,000 incl. stormwater allowance
Peak Flow [1]	=	118.7	litre/sec [1]

Total Flow from Proposed Development, Catchment A, B & C

Flow Rate [1]	=	3507.2	m^3/day [1]
Flow Rate with Catchment Inflow Factor	=	3507.2	m^3/day (refer to Table T-4 of GESF - Central Kowloon)
Contributing Population	=	12990	people
Peaking factor	=	4	Refer to Table T-5 of GESF for population 10,000 - 50,000 incl. stormwater allowance
Peak Flow [1]	=	196.8	litre/sec [1]

[1] For full pipe capacity, peaking factor shall not be considered in the calculation. Instead, it shall be added in the Peak Flow directly.

Table 5. 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	FMH4000835	0.225	0.040	0.707	9.3	9.40	9.22	0.3	0.056	0.0194	1.98	78.7	38.0	48%	OK	Proposed Sewer: Subject Site
FMH4000835	FMH4000837	0.300	0.071	0.942	41.3	9.22	8.82	3.0	0.075	0.0097	1.22	86.5	43.5	50%	OK	Subject Site + Catchment A
FMH4000837	FMH4000838	0.300	0.071	0.942	23.6	8.82	8.57	3.0	0.075	0.0106	1.28	90.4	132.7	147%	Spill	Subject Site + Catchment A & B
FMH4000838	FMH4000840	0.300	0.071	0.942	10.3	8.57	8.43	3.0	0.075	0.0136	1.45	102.4	132.7	130%	Spill	Subject Site + Catchment A & B
FMH4000840	FMH4000841	0.375	0.110	1.178	60.3	8.00	7.11	0.6	0.094	0.0148	2.20	243.0	196.8	81%	OK	Subject Site + Catchment A, B & C

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 = 0.6 is used for the calculation of slimed clayware sewer, poor condition, with velocity flowing half full to be approximately 1.2m/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);

(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:

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

Table 6. Comparision of the Hydraulic Capacity of Upgrading 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	%		
FMH4000837	FMH4000838	**0.375**	0.110	1.178	23.6	8.82	8.57	0.3	0.094	0.0106	2.01	222.5	132.7	60%	OK	Subject Site + Catchment A & B
FMH4000838	FMH4000840	**0.375**	0.110	1.178	10.3	8.57	8.43	0.3	0.094	0.0136	2.28	252.3	132.7	53%	OK	Subject Site + Catchment A & B

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);

(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) The proposed information for upgrading sewers are in purple colour.