

## **Appendix 6 –**

Sewerage Statement with Previous Sewerage  
Impact Assessment Reattached



Section 12A Application for Amendment to the  
Approved Yuen Long Outline Zoning Plan (OZP) No. S/YL/27  
For Permitted Flat with Shop and Services and Social Welfare Facility Uses  
at Lot 3678 in D.D. 120, Yuen Long, New Territories

Sewerage Statement

## **1. INTRODUCTION**

This Sewerage Statement is to support the Section 12A Application for proposed Amendment to the Approved Yuen Long Outline Zoning Plan (OZP) No. S/YL/27 to rezone the application site from “Residential (Group A)” to “Residential (Group A)9” at Lot 3678 in D.D. 120, Yuen Long, New Territories.

The applicant submitted a development proposal which involves a 21-storey composite building block for about 74 residential flats (from 10/F to 20/F), a RCHE with 170 beds and ancillary facilities (from 3/F to 9/F) and commercial uses (i.e. shop and services) (from G/F to 2/F) with two levels of basement car parks through a Section 16 planning application (case no. A/YL/319). As liaised with the Planning Department, a Section 12A application is however a more appropriate mechanism to facilitate the proposal. Hence, a new S12A application under the same set of scheme and development parameters is now applied.

In support of the said Section 16 planning application (A/YL/319), a Sewerage Impact Assessment (SIA) has been conducted and confirmed the technical feasibility of the proposed development in sewerage aspects. With the incorporation of mitigation measures, significant adverse sewerage impacts are not anticipated and the Director of Environmental Protection (DEP) has no objection to the application from environmental planning perspective.

## **2. SEWERAGE IMPACT**

This Sewerage Statement is submitted to reaffirm that the scheme and development programme as the basis of the approved SIA is remained unchanged for the current Section 12A Application (**Table 1.1** refers).

**Table 1.1 Key Development Parameters of the Proposed Development under the Previous Scheme submitted under Section 16 Planning Application and the Current Scheme for Section 12A Application**

	<b>Previous Scheme submitted under Section 16 Planning Application (A/YL/319)</b>	<b>Current Scheme for Section 12A Application</b>
<b>No. of Storeys</b>	21 storeys and 2 basement floors	21 storeys and 2 basement floors
<b>Total Gross Floor Area (GFA) (about)</b>	9,333m <sup>2</sup>	9,333m <sup>2</sup>
<b>Building Height</b>	Not more than +82.34 mPD	Not more than +82.34 mPD
<b>Proposed Major Floor Use</b>	B2/F to B1/F: Carpark G/F: Shop and Services, RCHE(s) (Lobby and Lift), Carpark Entrance and Lay-by 1/F to 2/F: Shop and Services and RCHE(s) (lift) 3/F to 7/F: Dormitory for RCHE(s) 8/F to 9/F: Office and Back-of-House for RCHE(s) 10/F to 19/F: Flats 20/F: Clubhouse	B2/F to B1/F: Carpark G/F: Shop and Services, RCHE(s) (Lobby and Lift), Carpark Entrance and Lay-by 1/F to 2/F: Shop and Services and RCHE(s) (lift) 3/F to 7/F: Dormitory for RCHE(s) 8/F to 9/F: Office and Back-of-House for RCHE(s) 10/F to 19/F: Flats 20/F: Clubhouse
<b>Population Size (for Flat only)</b>	208 (Based on an average household size of 2.8)	208 (Based on an average household size of 2.8)
<b>Tentative Population Intake Year</b>	2027/2028	2027/2028
<b>Proposed RCHE</b>		
Total No. of Beds	160 to 220 (The current scheme proposes 170 RCHE beds)	160 to 220 (The current scheme proposes 170 RCHE beds)
<b>Proposed Flats</b>		
Total No. of Flats	74	74

The assessment results and the mitigation measures identified in the approved SIA Report are also applicable to the current S.12A application. Therefore, it is evaluated that insurmountable adverse sewerage impacts are also not anticipated for the current S.12A application. The same SIA Report with relevant wordings updated to “S.12A application” is attached.



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PROPOSED RELAXATION OF PLOT RATIO  
RESTRICTION FOR FLAT WITH SHOP AND SERVICES  
AND SOCIAL WELFARE FACILITY (RESIDENTIAL CARE  
HOME FOR THE ELDERLY) USES IN LOT NO. 3678 IN  
D.D. 120, YUEN LONG, NEW TERRITORIES

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SEWERAGE IMPACT ASSESSMENT REPORT

AUGUST 2024

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## 1. INTRODUCTION

### 1.1 PROJECT BACKGROUND

The Full Year Limited (the Applicant) proposes to develop a 23-storey composite building (including 2 basement floors) comprising mainly flat with shop and services and social welfare facility (Residential Care Home(s) for the Elderly) (RCHE(s)) in Lot No. 3678 in D.D. 120, Yuen Long, New Territories (the proposed development/the Site).

DeSPACE (International) Limited has been engaged to prepare a Sewerage Impact Assessment (SIA) Report for the Section 12A Planning Application under the Town Planning Ordinance of the proposed development.

### 1.2 PROJECT LOCATION

The Site is located at south of Yuen Long Pau Cheung Square and is surrounded by composite buildings. It was formerly the site of an old theatre with around 60 years of history which was closed in 2020 and demolished. **Appendix 1** shows the location of the Site.

### 1.3 PROPOSED LAND USE

The master layout plan is provided in **Appendix 2**. The Site area, of approximately 780m<sup>2</sup>, is expected to comprise a 23-storey composite building (including 2 basement floors) with mainly flat with shop and services and RCHE(s) in “Residential (A)” (“R(A)”) zone within the approved Yuen Long Outline Zoning Plan No. S/YL/27 (the OZP). The anticipated year of the population intake is 2027/2028.

### 1.4 OBJECTIVE OF THE REPORT

The objective of this SIA Report is to assess whether the capacity of the sewerage networking is sufficient to cope with the peak sewage flow arising from the proposed Development during its operation stage and to recommend appropriate mitigation measures to alleviate unacceptable sewerage impact, if any.

## 2. BACKGROUND

### 2.1 EXISTING CONDITION

With reference to the drainage records obtained from the Drainage Services Department's drainage record plans, the sewage discharged from the application premises discharged via the public sewer (Manhole No. FMH1048046) along the north of the Site (Please refer to **Appendix 3**).

The collected sewage will flow along the 150mm diameter sewer underneath the north of the Site, then further flow via the 150mm diameter sewer at Manhole No. FMH1018371 underneath the Yuen Long Pau Cheung Square with the discharge from catchment from the south side.

### 2.2 SEWAGE IMPACT DURING OPERATION OF PROPOSED REDEVELOPMENT

Sewage during operation is mainly generated by the residents of the residential units and RCHE and the customers and staff of the shop and services. Sewage will be collected by internal sewage system within the Site and discharge to the municipal sewerage system via Manhole No. FMH1048046, then flow along the original sewerage pipe to downstream.

Sewage generated from the Proposed Development would be collected and conveyed to the nearest public sewerage system, which is the Ping Shun Street Sewage Pumping Station and San Wai Sewage Treatment Works, via proper connections. No sewage will be released to the environment without treatment.

## 3. SEWERAGE ANALYSIS

### 3.1 ASSUMPTION

In order to assess the acceptability of the sewerage impact arising from the operation of the proposed development, the sewage generation has been estimated based on the assumptions shown in **Table 3.1**.

Table 3.1 Summary of Parameters for Estimating Sewage Generation from the Proposed Development

Parameters	Value	Justification
Population		
RCHE Dormitory at 3/F to 7/F	220 persons	There will be a range of 160-220 beds according to the

		supplementary planning statement, 220 persons is adopted for conservation approach. (NB: The current scheme proposes 170 RCHE beds)
<b>Unit Flow Factors</b>		
Car Park at B2/F, B1/F and G/F	0.18 m <sup>3</sup> /day	GESF (Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +0.1 (J3 Transport, Storage & Communication)
Management Office for Residential Unit at G/F (Employee)	0.28 m <sup>3</sup> /day	GESF (Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +0.2 (Community, Social & Personal Service)
Shop and Services at G/F to 2/F	0.28 m <sup>3</sup> /day	GESF (Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) + 0.2 (Wholesale & Retail)
RCHE at G/F, 3/F to 9/F (Resident)	0.19 m <sup>3</sup> /day	GESF (Table T-1) - UFF for Institutional and Special Class
RCHE at G/F, 3/F to 9/F (Employee)	0.28 m <sup>3</sup> /day	GESF (Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +0.2 (Community, Social & Personal Service)
Kitchen for RCHE at 8/F (Employee)	1.58 m <sup>3</sup> /day	GESF (Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +1.5 (Restaurants & Hotel)
Flat at 10/F to 20/F (clubhouse at 20/F)	0.37 m <sup>3</sup> /day	GESF (Table T-1) - UFF for Domestic Flow 0.370 (R3 Private Development)
Clubhouse at 20/F (Employee)	0.28 m <sup>3</sup> /day	GESF (Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) + 0.2 (Community, Social & Personal Services)



Catchment Inflow Factor		
P <sub>CI</sub> F	1.00	Catchment Inflow Factor = 1 for vicinity located in 'Yuen Long' based on EPD's GESF Table T-4.
Peaking Factor		
P	8	Peaking factor = 8 for contributing population <1,000 for sewer (including storm water allowance) based on EPD's GESF Table T-5
Roughness Values (k <sub>s</sub> )		
Existing Pipes	0.6mm	Conservation value of 'Sewers slimed to about half depth; velocity, when flowing half full, approximately 1.2 m/s – Clayware' was adopted based on the Sewerage Manual (Part 1) Table 5

### 3.2 METHODOLOGY

Evaluation of the capacity of sewers has been conducted by estimating the sewage/wastewater generation from the upstream and downstream catchments of the receiving sewers, and to further study the acceptability of the sewerage impact arising from operation of the proposed development.

The capacities of the downstream sewers have been calculated by Colebrook-White Equation for circular pipes flowing full, assuming full bore flow with no surcharge, as follows:

$$V = -\sqrt{8gDs} * \log\left(\frac{ks}{3.7D} + \frac{2.51v}{D\sqrt{2gDs}}\right)$$

Where

v=mean velocity, m/s

g=gravitational acceleration, m/s<sup>2</sup>

D=internal pipe diameter, m

ks=hydraulic pipeline roughness, m

v=kinematic viscosity of fluid, m<sup>2</sup>/s

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

The flow capacity of sewer from Manhole FMH1018375 to Manhole FMH1018369 has been assessed to ensure the downstream section have sufficient capacity for the sewage flowing from all the section upstream, provided that the capacity of the upstream sections is not exceeded. Therefore, if the sewerage system can provide sufficient receiving capacity for the cumulative sewage quantities, there would be no unacceptable impact on the downstream sewerage system.

### 3.3 Assessment Results & Discussion

Detailed calculations of sewage flow generation and hydraulic capacity are provided in **Appendices 4 to 7**. The estimated cumulative peak discharge of all downstream sewerage of the proposed Site account for no more than 100% of the hydraulic capacity of the concerned sewer. No exceedance of hydraulic capacity for all cumulative peak discharge is anticipated under the proposed sewerage network with upgraded pipework.

### 3.4 Assessment Summary

To summarize, there will be one sewer discharge point from the Site to the inlet of proposed sewer terminal manhole which will then be connected to the public sewer manhole along the Yuen Long Pau Cheung Square. In view of the proposed development and the vicinity, the following proposed upgraded pipe works are recommended:

- Proposed upgraded pipe works for the Pipes FWD1019560, FWD1019561, FWD1062247, FWD1019559 and FWD1019558 by new 200 mm, 200 mm, 225 mm, 500 mm and 500 mm diameter sewers respectively.

According to the estimated sewage generation calculations, it is anticipated that the proposed sewerage will have sufficient capacity to cater for the sewage generated from the proposed Site. No adverse sewerage impact associated with the proposed Development is anticipated.

Detailed alignment and the design of the connecting sewer will be subject to the detailed design of the Project<sup>1</sup>. The Applicant shall be responsible for appointing a qualified engineer for properly design and construct of the connecting sewers, likely at the design stage of Project. Agreement and approval from relevant government departments, including DSD, shall be obtained in due course.

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<sup>1</sup> The cover level(s) of the terminal manhole(s) should be higher than that of the downstream public manholes(s).

#### 4. CONCLUSION

The potential sewerage impact due to the application site has been quantitatively addressed. Based on the estimated sewage flow for the Site presented in **Appendix 4**, the total peak sewage flow projected for the Site is about 161.59 m<sup>3</sup>/day.

All sewage generated from the Site will be conveyed to the public sewerage system via the proposed sewer terminal manhole. The sewage generation calculations on the proposed sewerage system have indicated that the proposed upgraded pipe works for the Pipes FWD1019560, FWD1019561, FWD1062247, FWD1019559 and FWD1019558 by new 200 mm, 200 mm, 225 mm, 500 mm and 500 mm diameter sewers respectively, will have sufficient capacity to cater for sewage discharged from the Site and surrounding catchments

The maximum estimated peak flow from the proposed Site and all cumulative catchment areas will account for less than 100% of the flow capacity of the sewerage system. Hence, it is concluded that no adverse sewerage impacts arising from the development is anticipated.

**Appendix 1**  
**Location Plan**

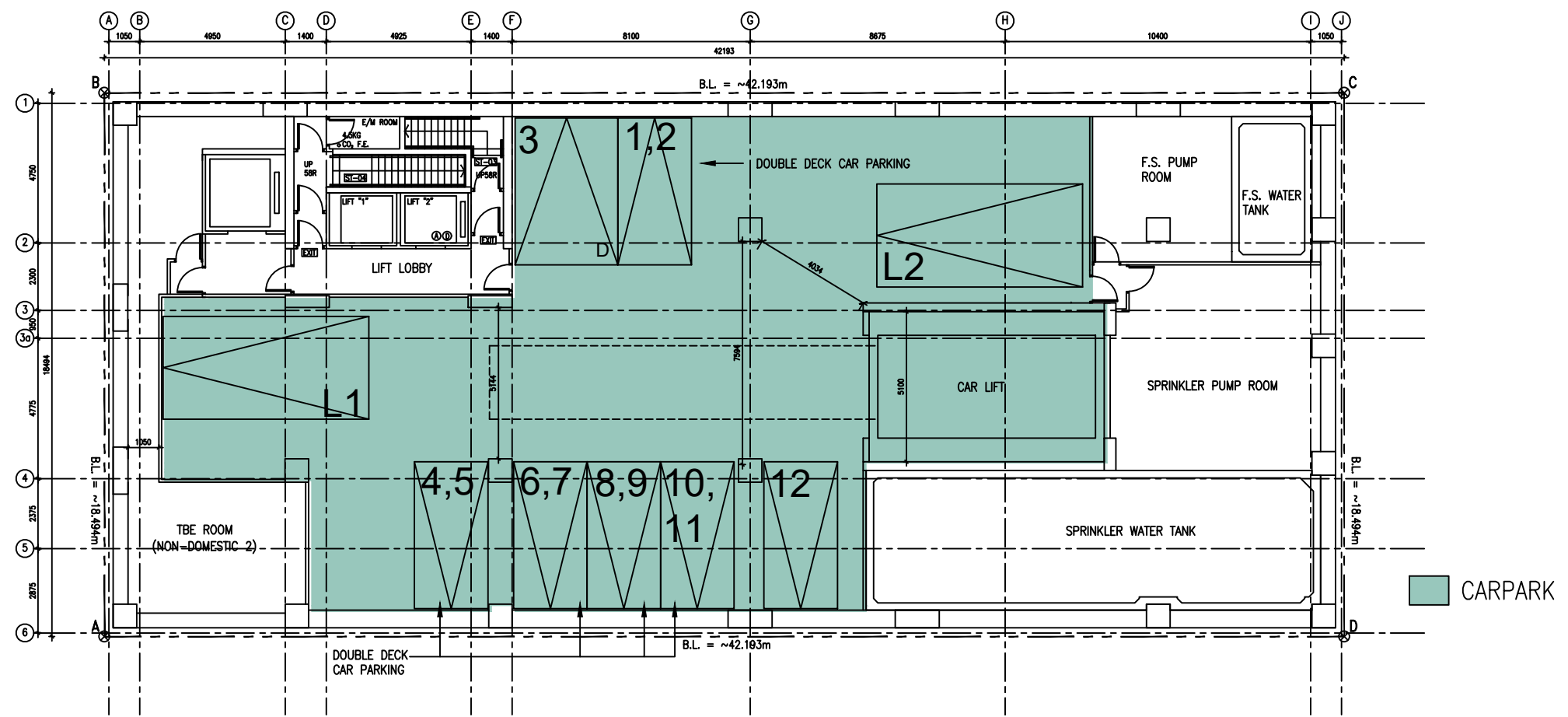


<b>LEGEND:</b>  Application Site	<b>FIGURE NO.</b> 1	<b>FIGURE TITLE:</b> Location Plan	<b>PROJECT NAME:</b> Redevelopment of Yuen Long Theatre at Lot No. 3678 in D.D. 120, Yuen Long, New Territories	<b>PREPARED BY:</b>  DeSPACE (International) Limited
	<b>SCALE:</b> A4 - 1:900			
	<b>DATE:</b> 14.5.2024			

## **Appendix 2**

### **Proposed Development Scheme**

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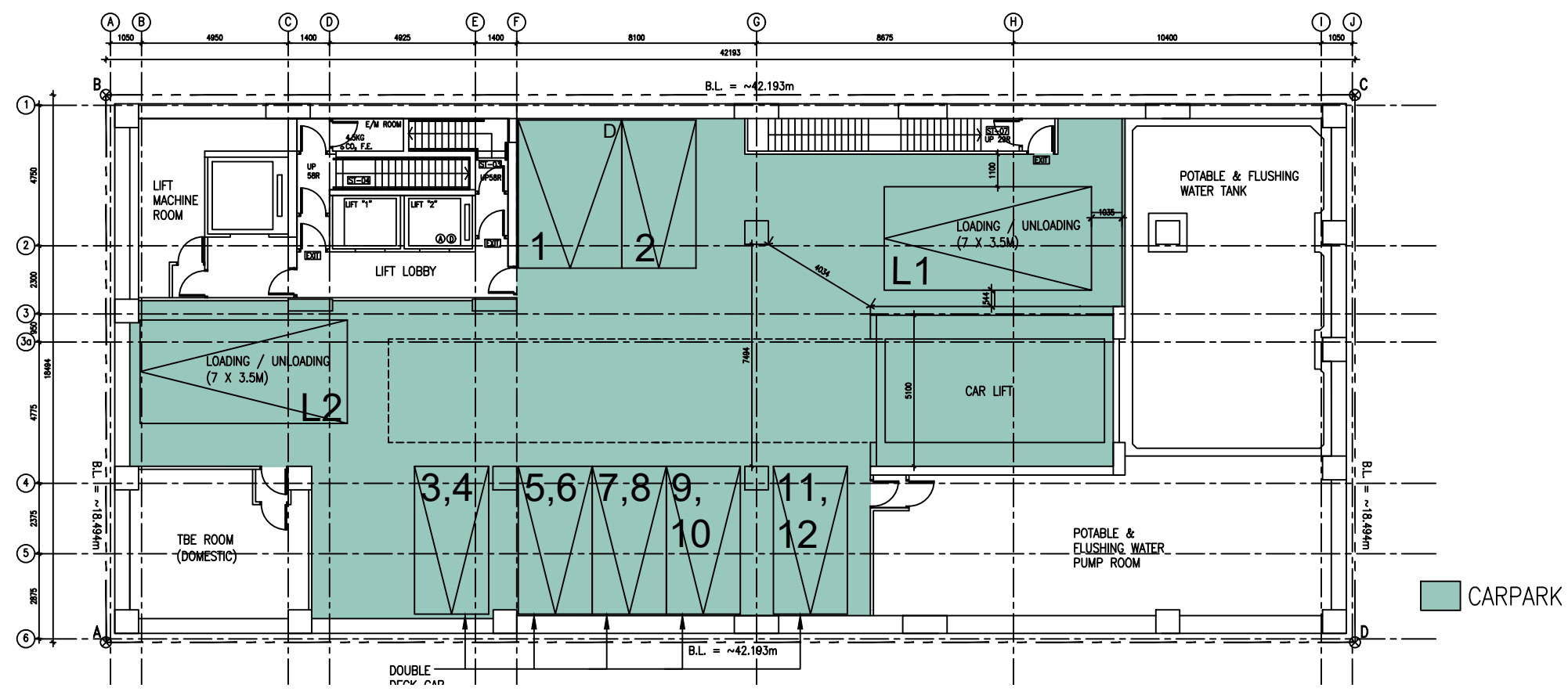


# B2/F LAYOUT PLAN

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Project Name:		
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Architect : I Consultants & Contracting Company Limited		
Traffic Consultant : CTA Consultants Limited		
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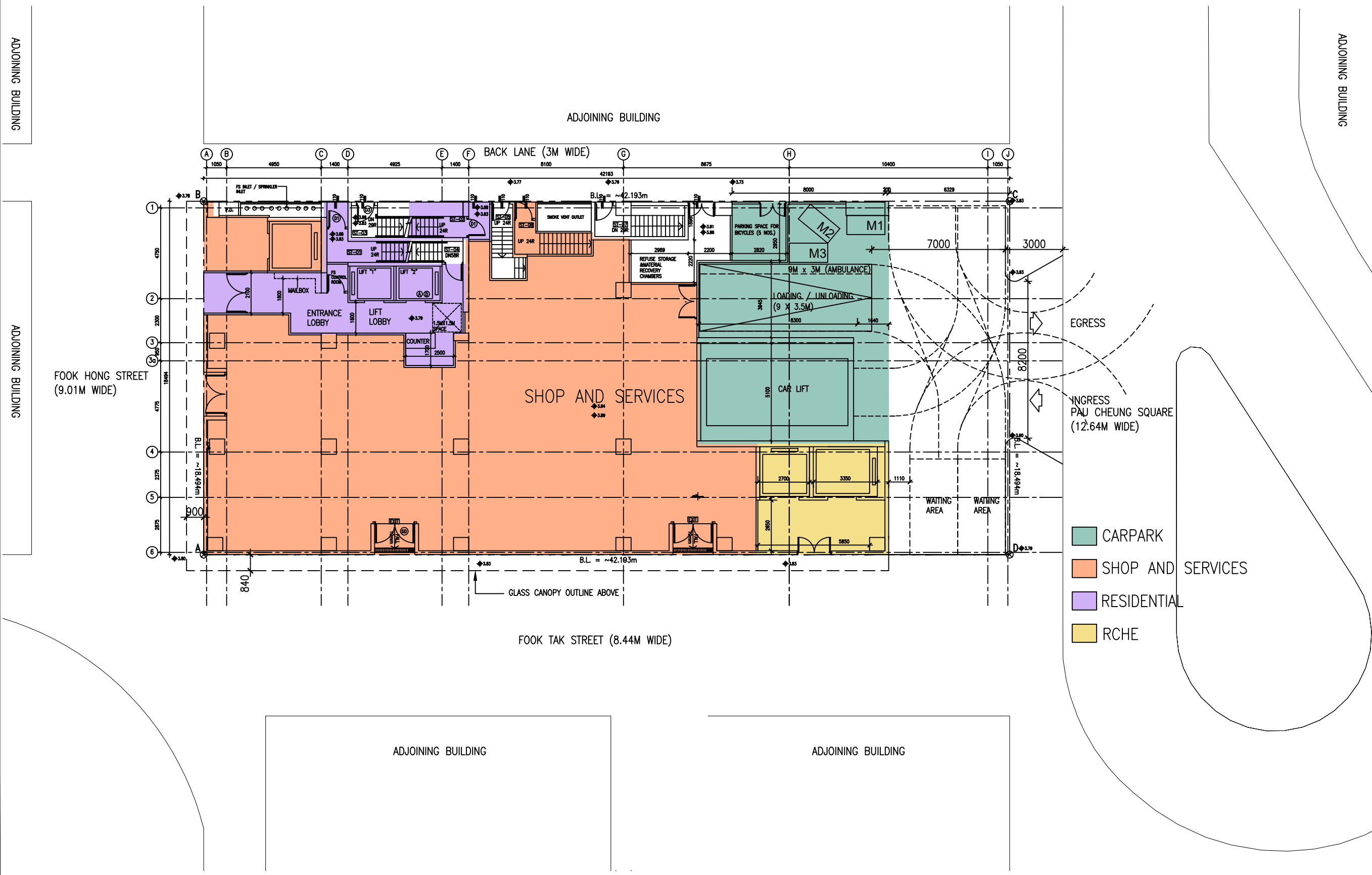
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# B1/F LAYOUT PLAN

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Planning Consultant : DeSPACE (International) Limited		
Architect : I Consultants & Contracting Company Limited		
Traffic Consultant : CTA Consultants Limited		
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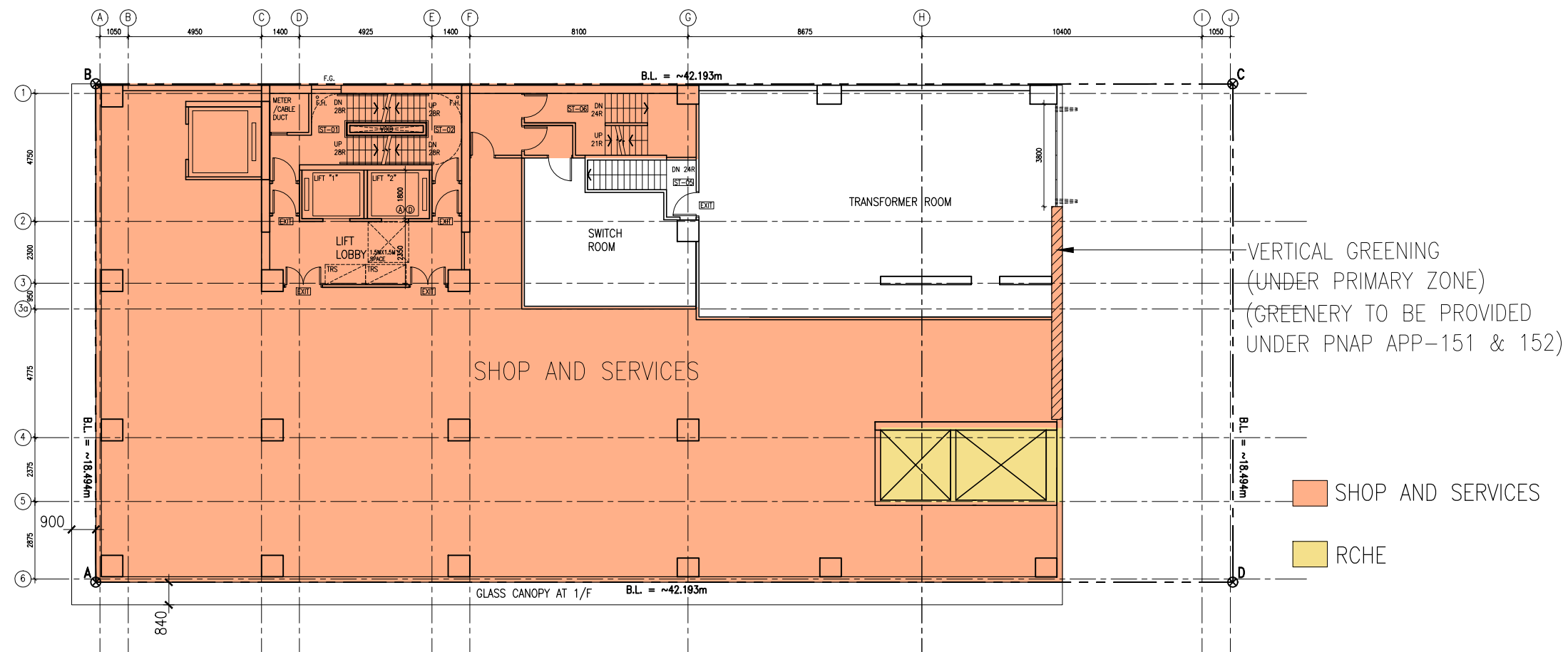


- CARPARK
- SHOP AND SERVICES
- RESIDENTIAL
- RCHE

# G/F LAYOUT PLAN

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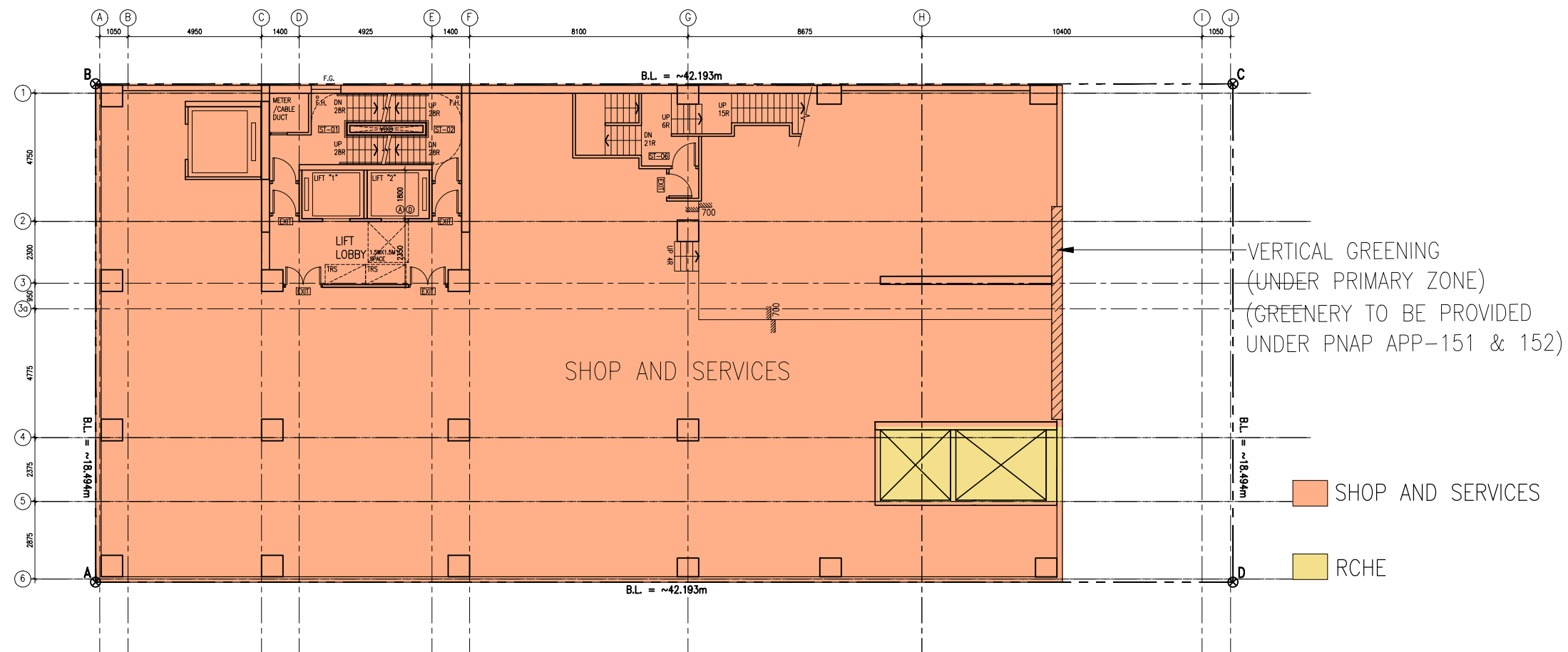
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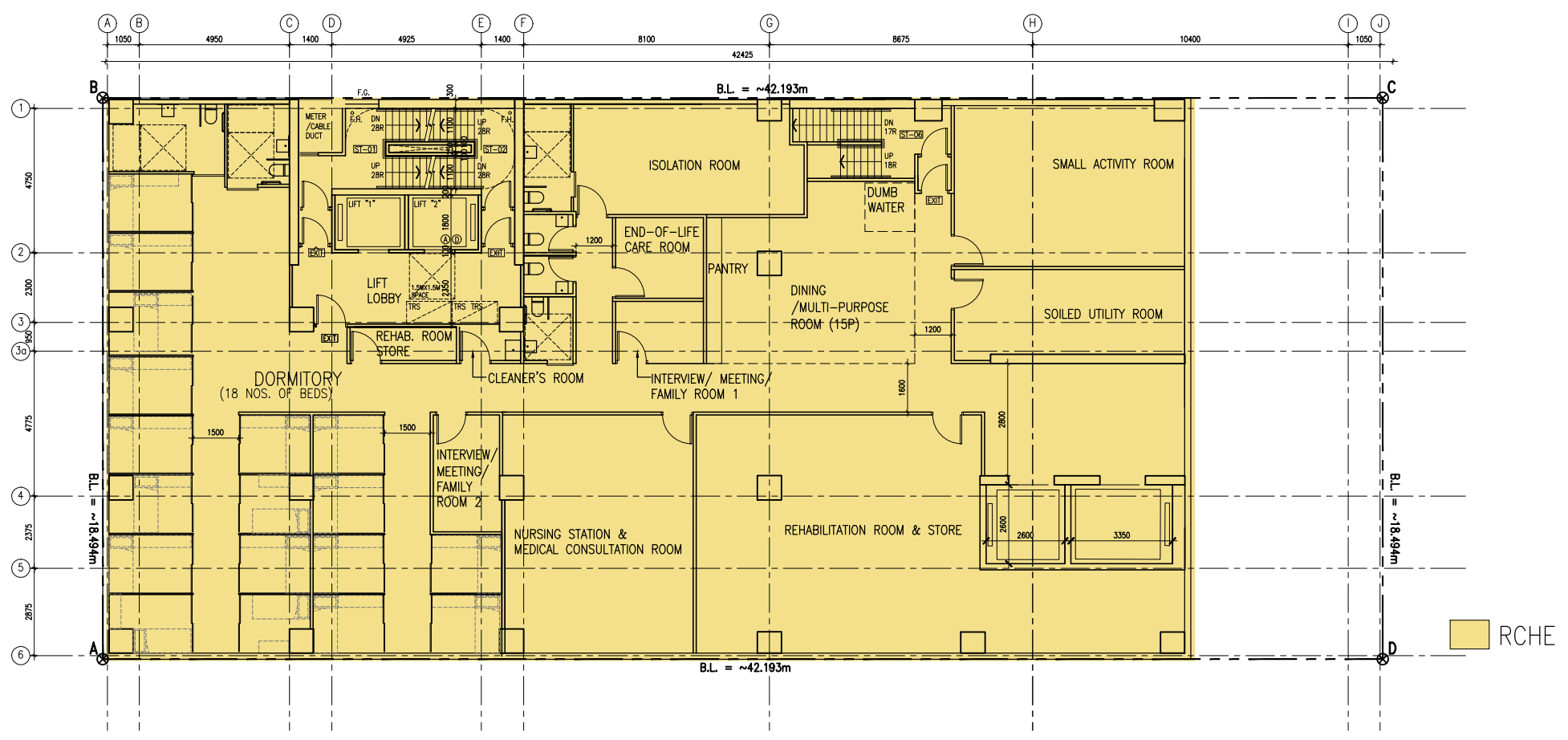
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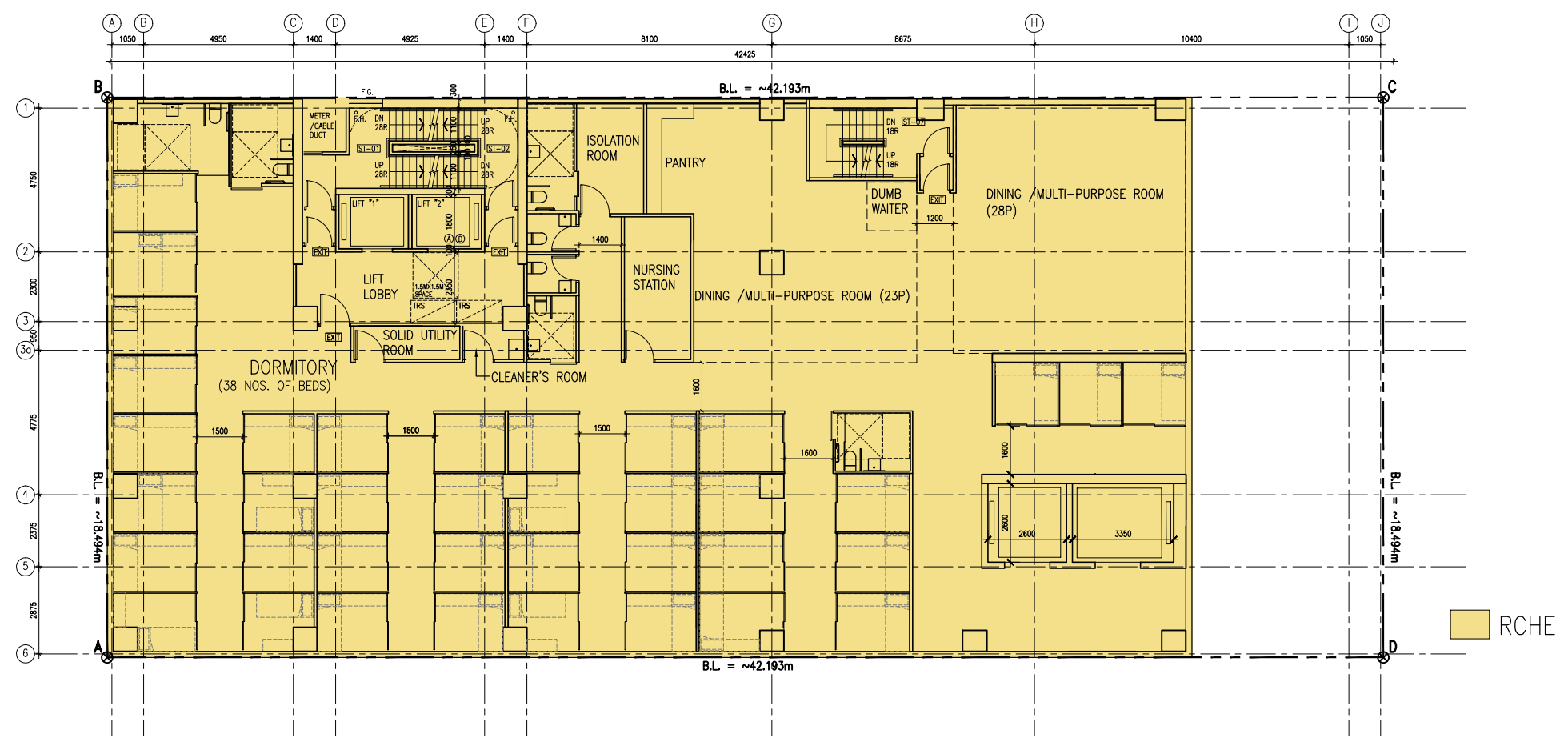
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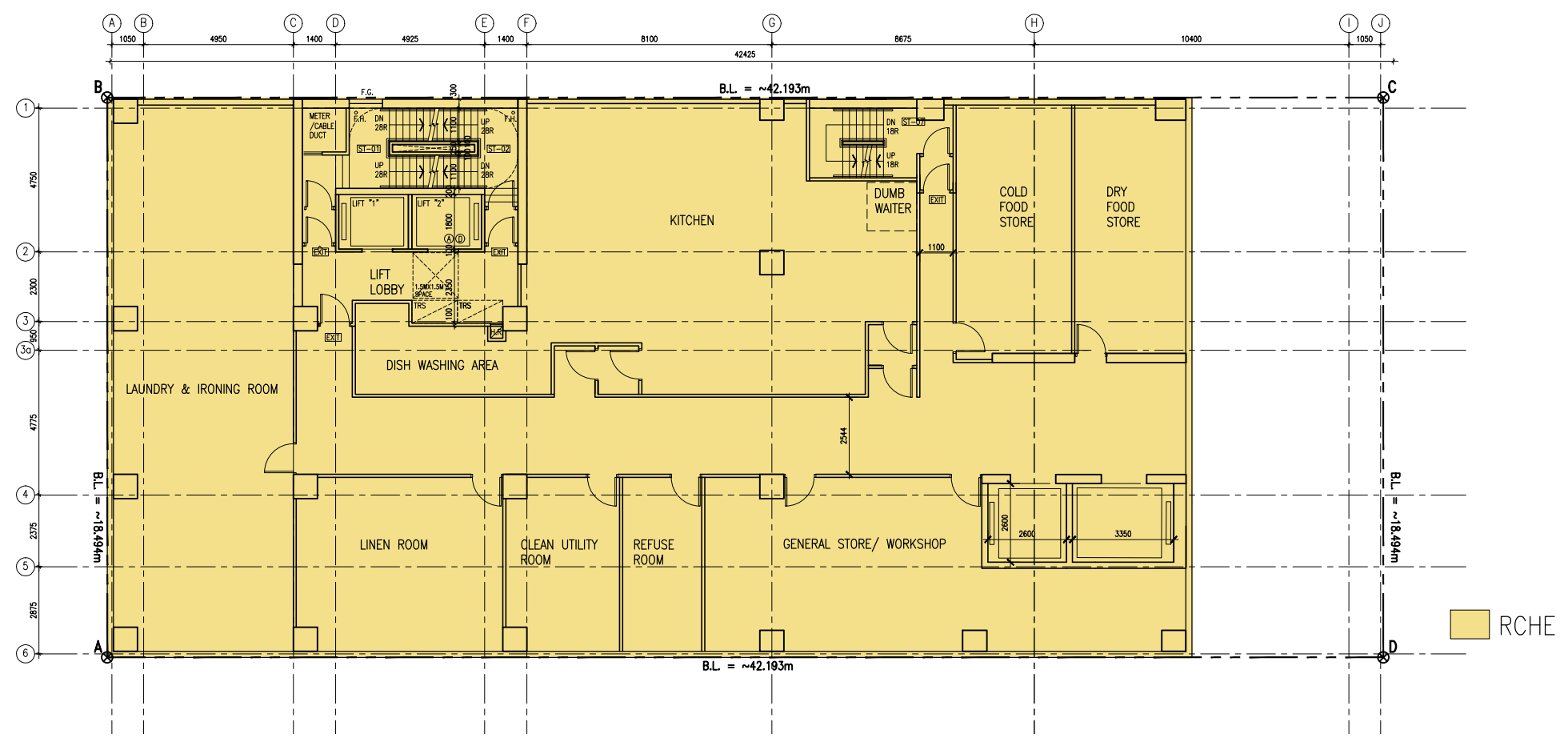
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## 4/F TO 7/F LAYOUT PLAN (DORMITORY FOR RCHE)

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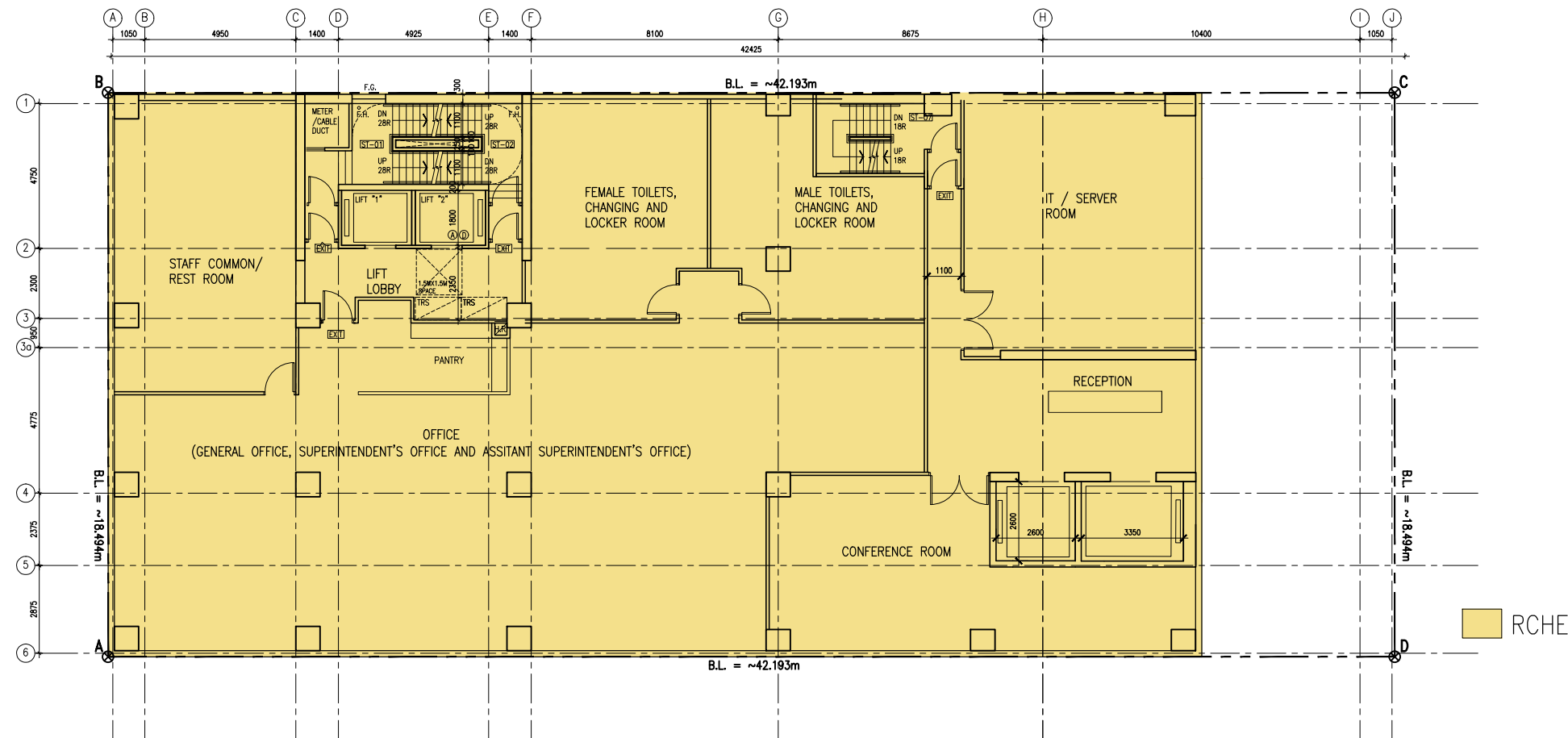
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## 8/F LAYOUT PLAN (OFFICE & BOH FOR RCHE)

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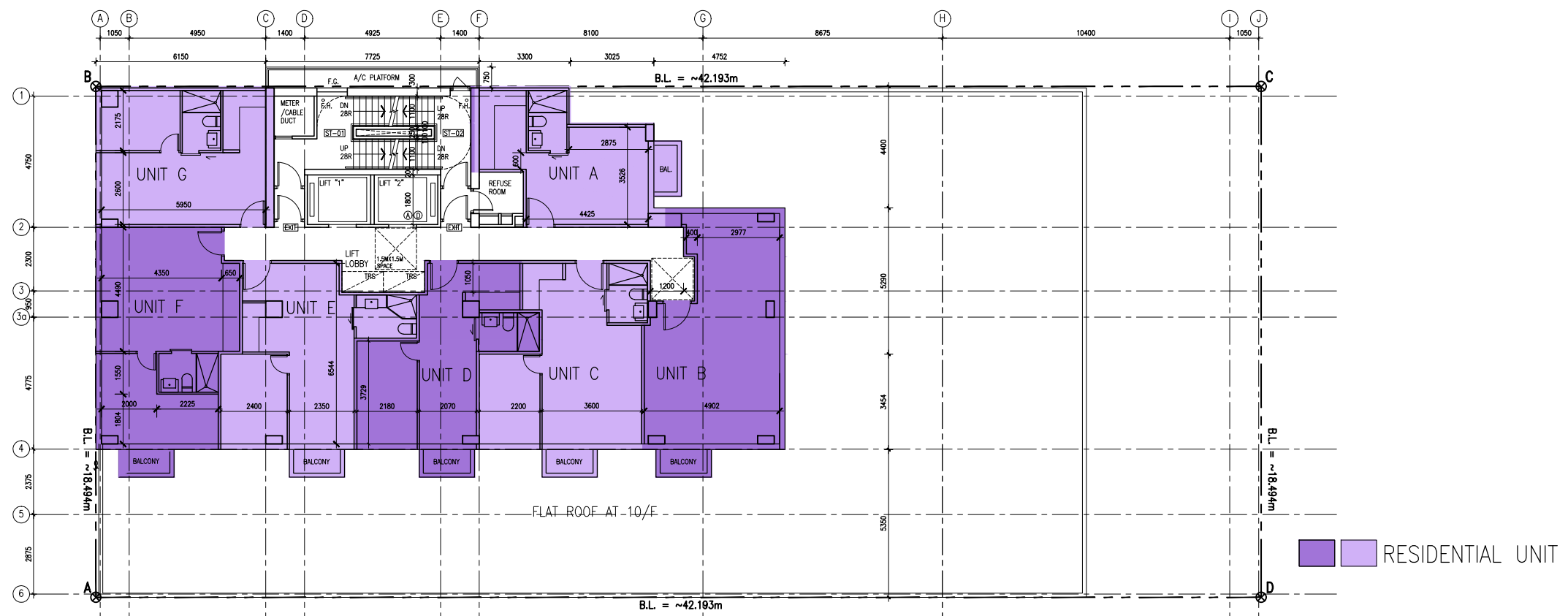


## 9/F LAYOUT PLAN (OFFICE & BOH FOR RCHE)

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Traffic Consultant : CTA Consultants Limited		
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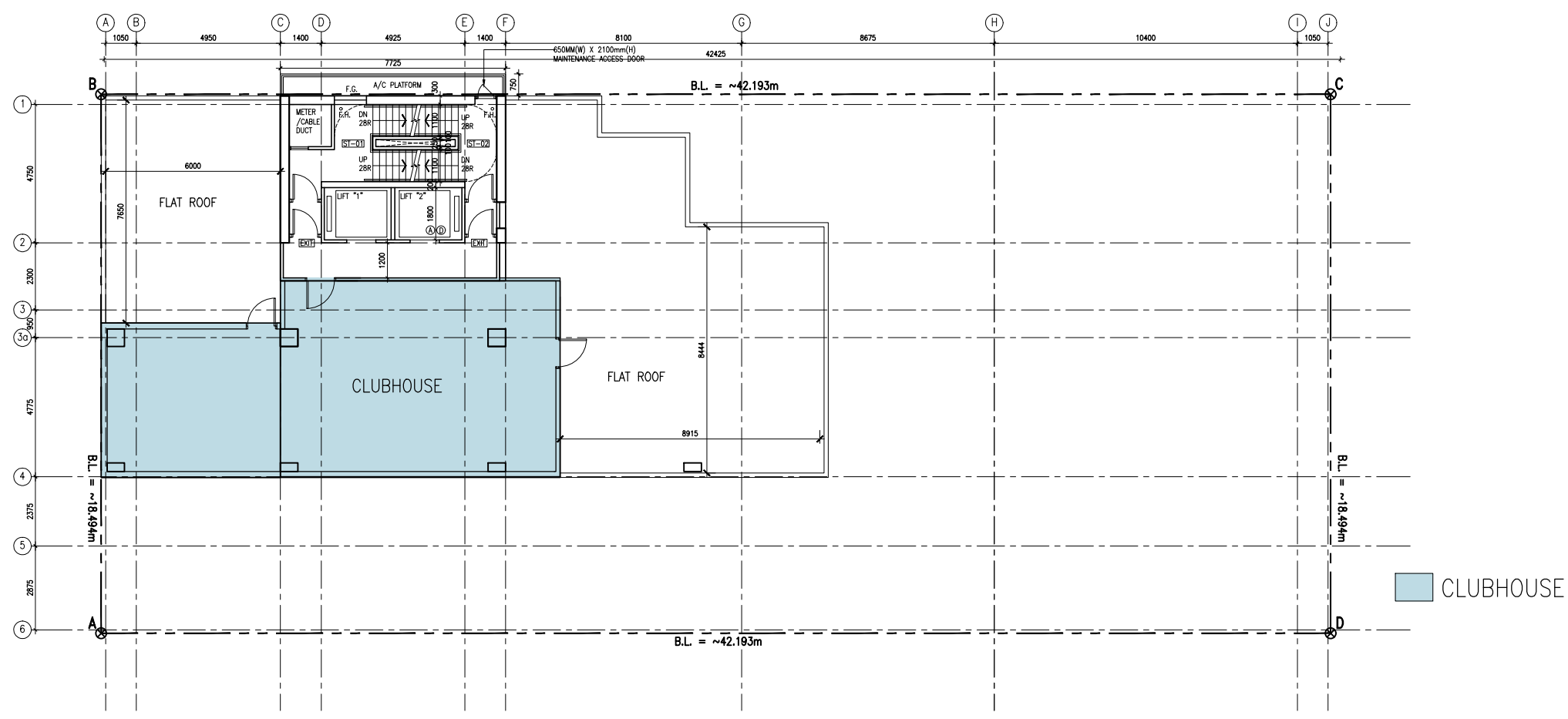
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# 10/F TO 19/F LAYOUT PLAN

Rev.	Date	Description
Project Name: Redevelopment of Yuen Long Theatre at Lot No. 3678 in D.D. 120, Yuen Long, N.T.		
Planning Consultant : DeSPACE (International) Limited		
Architect : I Consultants & Contracting Company Limited		
Traffic Consultant : CTA Consultants Limited		
Environmental Consultant : BeeXergy Consulting Limited		
Structural and Geotechnical Engineer : S. T. Wong & Partners Limited		
Drawing Title: 10/F TO 17/F LAYOUT PLAN		
Designed by: JODY		Drawn by: JODY
Checked by: CAL.		
Scale: 1 : 200	Paper: A3	
Drawing Number GBP009		Revision Letter

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 - Notify the Architect immediately of any discrepancy found herein.



## 20/F (CLUBHOUSE) LAYOUT PLAN

Rev.	Date	Description
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Project Name:  
 Redevelopment of Yuen Long Theatre at Lot No. 3678 in D.D. 120, Yuen Long, N.T.

Planning Consultant : DeSPACE (International) Limited

Architect : I Consultants & Contracting Company Limited

Traffic Consultant : CTA Consultants Limited

Environmental Consultant : BeeXergy Consulting Limited

Structural and Geotechnical Engineer : S. T. Wong & Partners Limited

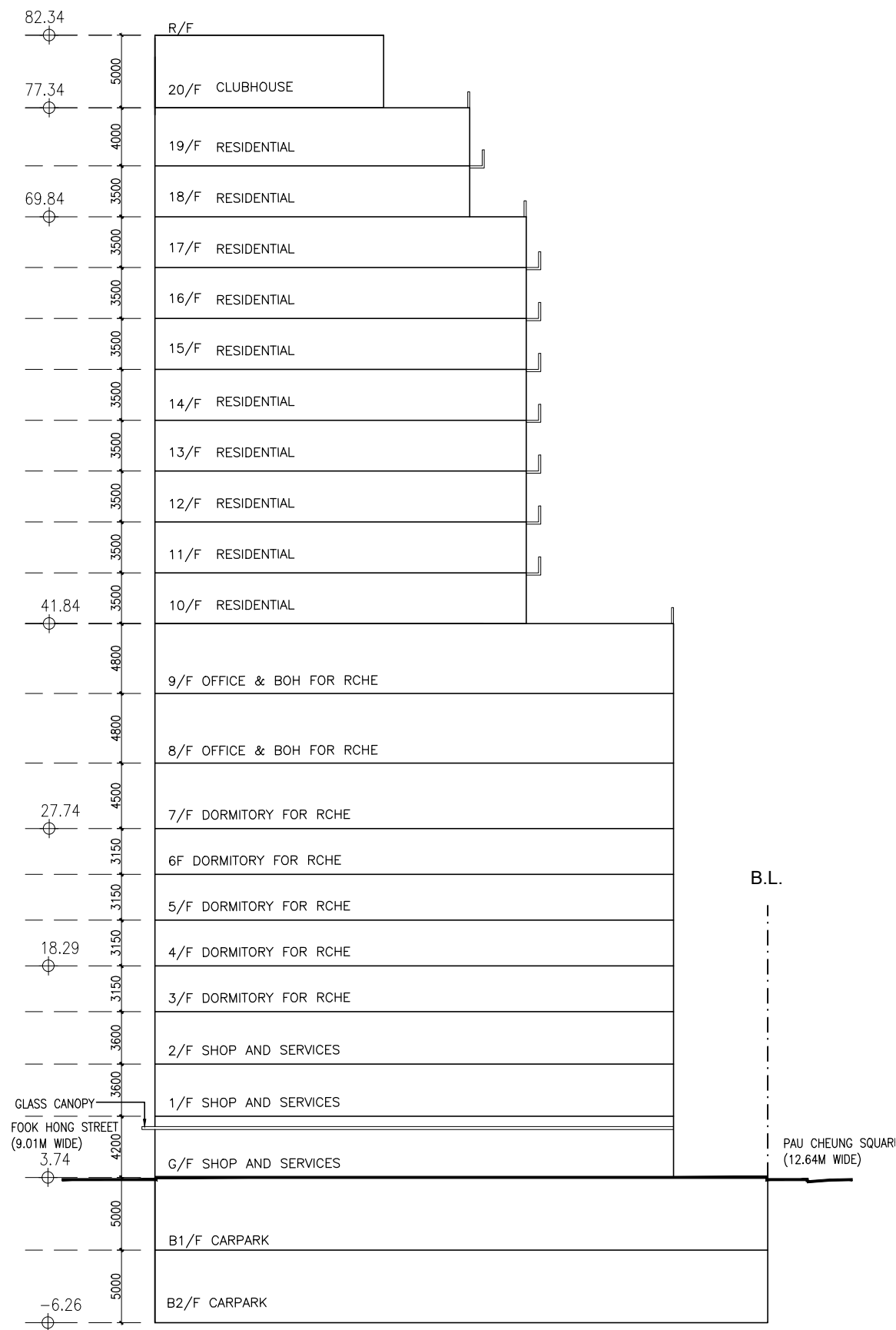
Drawing Title:  
 20/F (CLUBHOUSE) LAYOUT PLAN

Designed by: JODY  
 Drawn by: JODY  
 Checked by: CAL.

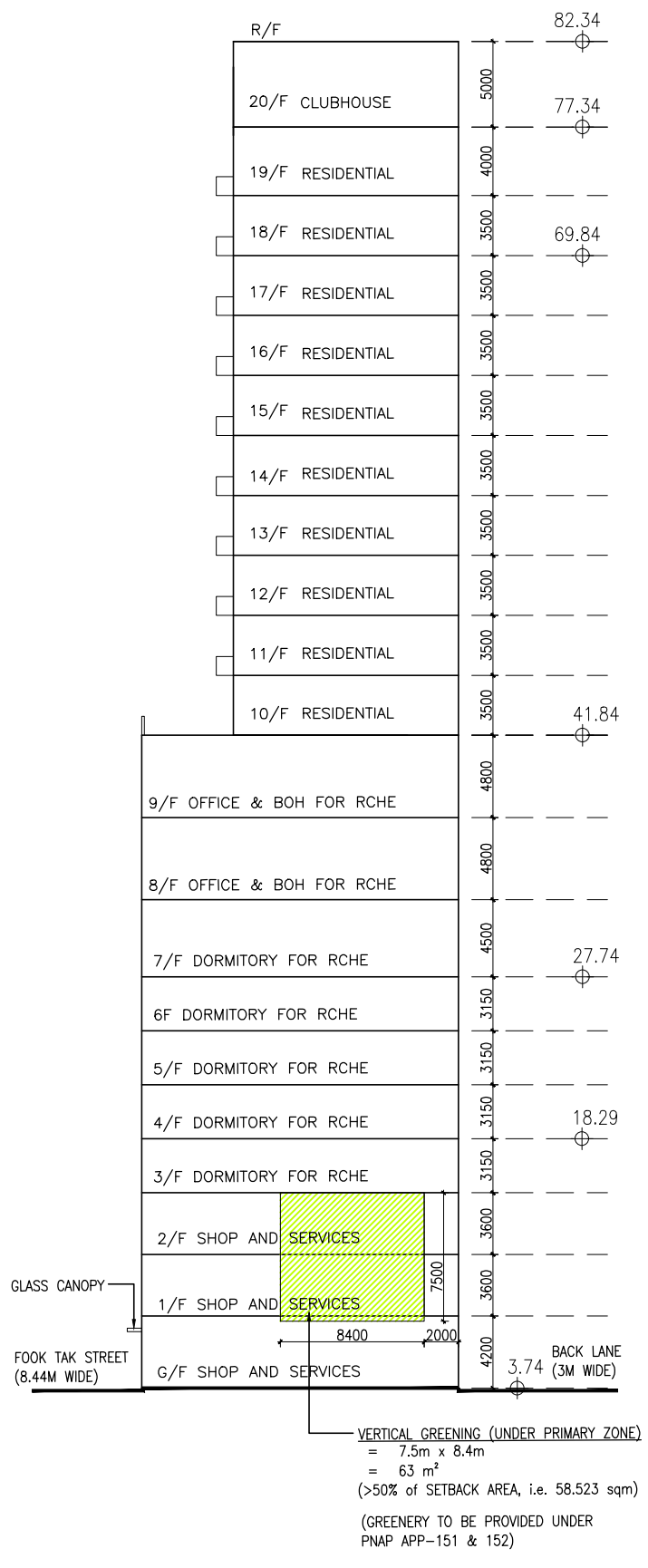
Scale: 1 : 200      Paper: A3

Drawing Number: GBP011

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**SCHEMATIC SECTION  
(FACING FOOK TAK STREET)**



**SCHEMATIC ELEVATION  
(FACING PAU CHEUNG SQUARE)**

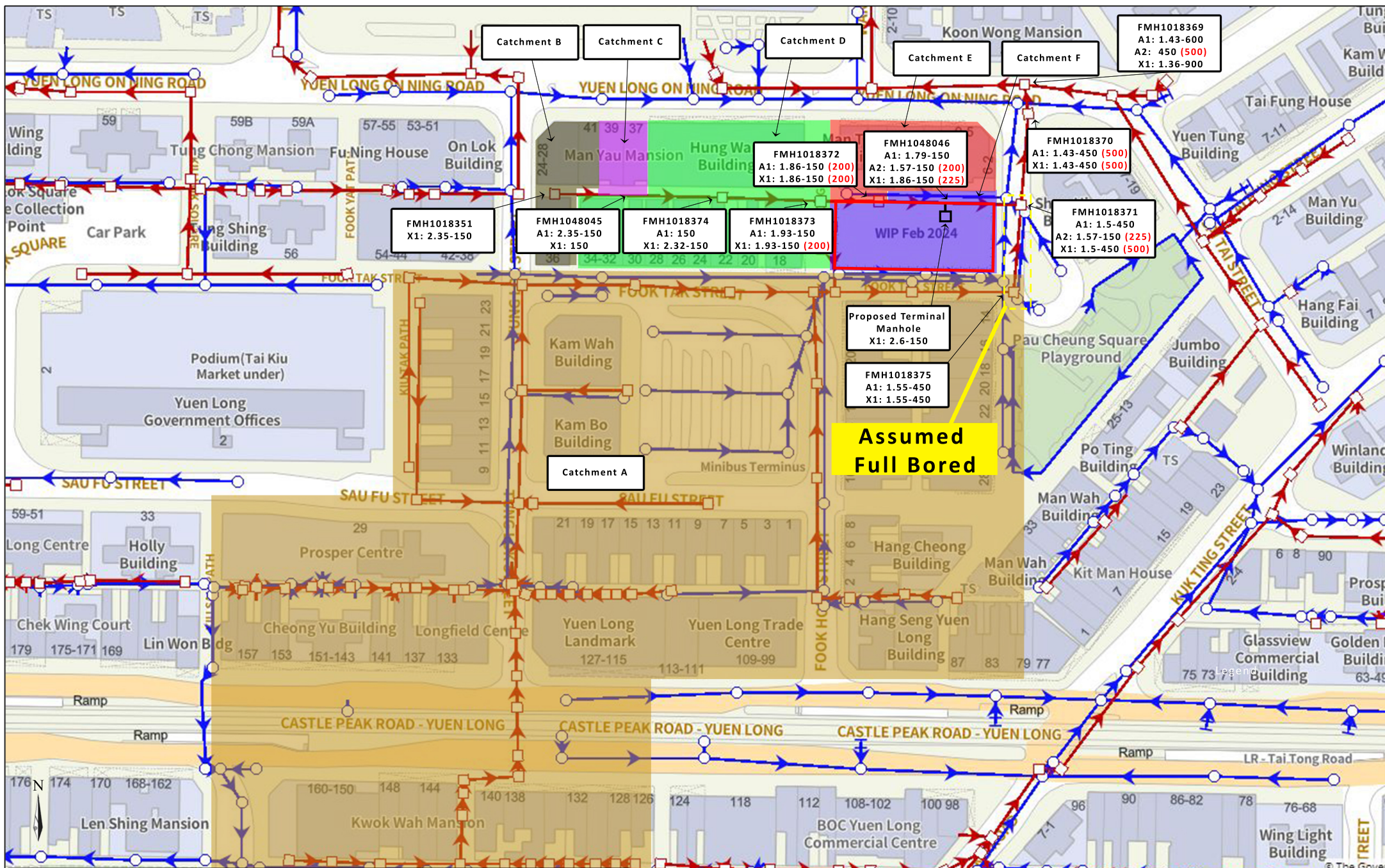
VERTICAL GREENING (UNDER PRIMARY ZONE)  
 = 7.5m x 8.4m  
 = 63 m<sup>2</sup>  
 (>50% of SETBACK AREA, i.e. 58.523 sqm)  
 (GREENERY TO BE PROVIDED UNDER  
 PNAP APP-151 & 152)

Rev.	Date	Description
Project Name:		
Redevelopment of Yuen Long Theatre at Lot No. 3678 in D.D. 120, Yuen Long, N.T.		
Planning Consultant : DeSPACE (International) Limited		
Architect : I Consultants & Contracting Company Limited		
Traffic Consultant : CTA Consultants Limited		
Environmental Consultant : BeeKergy Consulting Limited		
Structural and Geotechnical Engineer : S. T. Wong & Partners Limited		
Drawing Title:		
SCHEMATIC SECTION AND ELEVATION		
Designed by: JODY		Revision Letter
Drawn by: JODY		
Checked by: CAL.		
Scale: 1 : 400	Paper: A3	
Drawing Number: GBP013		

## **Appendix 3**

### **Existing Sewerage Plan**





Remark: The cover level(s) of terminal manhole(s) should be higher than that of the downstream public manhole(s).

<b>LEGEND:</b> Application Site Proposed Mitigation	<b>FIGURE NO.</b> 1	<b>FIGURE TITLE:</b> Existing and Proposed Sewerage Plan	<b>PROJECT NAME:</b> Redevelopment of Yuen Long Theatre at Lot No. 3678 in D.D. 120, Yuen Long, New Territories	<b>PREPARED BY:</b> DeSPACE (International) Limited
	<b>SCALE:</b> A4 - 1:1300			
	<b>DATE:</b> 14.5.2024			

## **Appendix 4**

### **Calculation of Sewage Generation from the Proposed Development**

**Calculation of Sewage Generation from the Proposed Development**

<b>1. YLT - Car Park at B1 and B2</b>			
Total GFA	958	m <sup>2</sup>	
Area/Employee	26.32	CIFSUS (Table 8) - Worker Density	3.8 (Transport)
Estimated Population	36		
Unit Flow Factor	0.18	GESF(Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +0.1 (J3 Transport, Storage & Communication)	
Estimated Dry Weather Flow	6.55	m <sup>3</sup> /day	
<b>2. YLT - Management Office for Residential Unit at G/F (Employee)</b>			
Total GFA	4.25	m <sup>2</sup>	
Total number of employees	1.0	Based on the proposed operation for management office	
Unit Flow Factor	0.28	GESF(Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +0.2 (Community, Social & Personal Service)	
Estimated Dry Weather Flow	0.28	m <sup>3</sup> /day	
<b>3. YLT - Shop at G/F to 2/F</b>			
Total GFA	1546	m <sup>2</sup>	
Area/Employee	28.571	CIFSUS (Table 8) - Worker Density 3.5 (Retail Trade)	
Estimated Population	54.11		
Unit Flow Factor	0.28	GESF(Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) + 0.2 (Wholesale & Retail)	
Estimated Dry Weather Flow	15.15	m <sup>3</sup> /day	
<b>4. YLT- RCHE at G/F, 3/F to 9/F (Resident)</b>			
Total number of beds	220		
Unit Flow Factor	0.19	GESF(Table T-1) - UFF for Institutional and Special Class	
Estimated Dry Weather Flow	41.8	m <sup>3</sup> /day	
<b>5. YLT- RCHE at G/F, 3/F to 9/F (Employee)</b>			
Total GFA	1187	m <sup>2</sup>	
Area/Employee	30.3030303	CIFSUS (Table 8) - Worker Density 3.3 (Community, Social & Personal Service)	
Estimated Population	39.171		
Unit Flow Factor	0.28	GESF(Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +0.2 (Community, Social & Personal Service)	
Estimated Dry Weather Flow	10.96788	m <sup>3</sup> /day	
<b>6. YLT - Kitchen for RCHE at 8/F (Employee)</b>			
Total GFA	116	m <sup>2</sup>	
Area/Employee	19.60784314	CIFSUS (Table 8) - Worker Density 5.1 (Restaurants)	
Total number of employees	5.9		
Unit Flow Factor	1.58	GESF(Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +1.5 (Restaurants & Hotel)	
Estimated Dry Weather Flow	9.34728	m <sup>3</sup> /day	
<b>7. YLT - Flat at 10/F to 20/F</b>			
Total number of units	74		
Total number of residents	207.2	Average Household Size of 2.8 in Yuen Long from 2022 Population and Household Statistics Analysed by District Council District	
Unit Flow Factor	0.37	GESF(Table T-1) - UFF for Domestic Flow 0.370 (R3 Private Development)	
Estimated Dry Weather Flow	76.664	m <sup>3</sup> /day	
<b>8. YLT - Clubhouse at 20/F (Employee)</b>			
Total GFA	89.1	m <sup>2</sup>	
Area/Employee	30.3030303	CIFSUS (Table 8) - Worker Density 3.3 (Community, Social & Personal Services)	
Total number of employees	2.9		
Unit Flow Factor	0.28	GESF(Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) + 0.2 (Community, Social & Personal Services)	
Estimated Dry Weather Flow	0.823284	m <sup>3</sup> /day	
<b>Total Flow from Proposed Development</b>			
Total Average Daily Dry Weather Flow	161.59	m <sup>3</sup> /day	

## **Appendix 5**

### **Calculation of Sewage Generation from Upstream and Downstream Catchments**



Calculation of Sewage Generation from Upstream and Downstream Catchments		Remarks
<b>Catchment A</b>		
Assumed Full Bored		
<b>Catchment B</b>		
36 Fook Tak St, Yuen Long	G/F to M/F	3.5 (Retail)  GESF(Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +0.2 (J4 Wholesale & Retail)
Total GFA	177.276 m <sup>2</sup>	
Area/Employee	28.57	
Estimated Population	6.20466	
Unit Flow Factor	0.28 m <sup>3</sup> /person/day	
Estimated Dry Weather Flow	1.74 m <sup>3</sup> /day	
36 Fook Tak St, Yuen Long	2/F to 5/F	Average Household Size of 2.8 in Yuen Long from 2022 Population and Household Statistics Analysed by District Council District GESF(Table T-1) - UFF for Domestic Flow 0.370 (R3 Private Development)
Total number of units	10 units	
Total number of residents	28 people	
Unit Flow Factor	0.37 m <sup>3</sup> /person/day	
Estimated Dry Weather Flow	10.36 m <sup>3</sup> /day	
On Ting Building, 41-45 On Ning Road	G/F to M/F	3.5 (Retail)  GESF(Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +0.2 (J4 Wholesale & Retail)
Total GFA	289.476 m <sup>2</sup>	
Area/Employee	28.57	
Estimated Population	10.13166	
Unit Flow Factor	0.28 m <sup>3</sup> /person/day	
Estimated Dry Weather Flow	2.84 m <sup>3</sup> /day	
On Ting Building, 41-45 On Ning Road	2/F to 5/F	Average Household Size of 2.8 in Yuen Long from 2022 Population and Household Statistics Analysed by District Council District GESF(Table T-1) - UFF for Domestic Flow 0.370 (R3 Private Development)
Total number of units	16 units	
Total number of residents	44.8 people	
Unit Flow Factor	0.37 m <sup>3</sup> /person/day	
Estimated Dry Weather Flow	16.576 m <sup>3</sup> /day	
<b>Catchment C</b>		
Man Yau Building, 37-39 On Ning Road	G/F to M/F	3.5 (Retail)  GESF(Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +0.2 (J4 Wholesale & Retail)
Total GFA	223.584 m <sup>2</sup>	
Area/Employee	28.57	
Estimated Population	7.82544	
Unit Flow Factor	0.28 m <sup>3</sup> /person/day	
Estimated Dry Weather Flow	2.19 m <sup>3</sup> /day	
Man Yau Building, 37-39 On Ning Road	2/F to 5/F	Average Household Size of 2.8 in Yuen Long from 2022 Population and Household Statistics Analysed by District Council District GESF(Table T-1) - UFF for Domestic Flow 0.370 (R3 Private Development)
Total number of units	10 units	
Total number of residents	28 people	
Unit Flow Factor	0.37 m <sup>3</sup> /person/day	
Estimated Dry Weather Flow	10.36 m <sup>3</sup> /day	
<b>Catchment D</b>		
20-34 Fook Tak St, Yuen Long	G/F to M/F	3.5 (Retail)  GESF(Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +0.2 (J4 Wholesale & Retail)
Total GFA	865.98 m <sup>2</sup>	
Area/Employee	28.57	
Estimated Population	30.3093	
Unit Flow Factor	0.28 m <sup>3</sup> /person/day	
Estimated Dry Weather Flow	8.49 m <sup>3</sup> /day	
20-34 Fook Tak St, Yuen Long	2/F to 5/F	Average Household Size of 2.8 in Yuen Long from 2022 Population and Household Statistics Analysed by District Council District GESF(Table T-1) - UFF for Domestic Flow 0.370 (R3 Private Development)
Total number of units	40 units	
Total number of residents	112 people	
Unit Flow Factor	0.37 m <sup>3</sup> /person/day	
Estimated Dry Weather Flow	41.44 m <sup>3</sup> /day	
Hung Wan Building, 21-35 On Ning Road	G/F to M/F	3.5 (Retail)  GESF(Table T-2) - UFF for Commercial Flow and Student Flow 0.080 (Commercial Employee) +0.2 (J4 Wholesale & Retail)
Total GFA	762.96 m <sup>2</sup>	
Area/Employee	28.57	
Estimated Population	26.7036	
Unit Flow Factor	0.28 m <sup>3</sup> /person/day	
Estimated Dry Weather Flow	7.48 m <sup>3</sup> /day	

Hung Wan Building, 21-35 On Ning Road	2/F to 5/F		
Total number of units	36 units		
Total number of residents	100.8 people		Average Household Size of 2.8 in Yuen Long from 2022 Population and Household Statistics Analysed by District Council District
Unit Flow Factor	0.37 m <sup>3</sup> /person/day		GESF(Table T-1) - UFF for Domestic Flow
Estimated Dry Weather Flow	37.296 m <sup>3</sup> /day		0.370 (R3 Private Development)
18 Fook Tak St, Yuen Long	G/F to M/F		
Total GFA	177.48 m <sup>2</sup>		
Area/Employee	28.57		3.5 (Retail)
Estimated Population	6.2118		
Unit Flow Factor	0.28 m <sup>3</sup> /person/day		GESF(Table T-2) - UFF for Commercial Flow and Student Flow
Estimated Dry Weather Flow	1.74 m <sup>3</sup> /day		0.080 (Commercial Employee) +0.2 (J4 Wholesale & Retail)
18 Fook Tak St, Yuen Long	2/F to 5/F		
Total number of units	10 units		
Total number of residents	28 people		Average Household Size of 2.8 in Yuen Long from 2022 Population and Household Statistics Analysed by District Council District
Unit Flow Factor	0.37 m <sup>3</sup> /person/day		GESF(Table T-1) - UFF for Domestic Flow
Estimated Dry Weather Flow	10.36 m <sup>3</sup> /day		0.370 (R3 Private Development)
<b>Catchment E</b>			
C1(i).Man Tat Building, 19 On Ning Rd	G/F to M/F		
Total GFA	133.722 m <sup>2</sup>		
Area/Employee	28.57		3.5 (Retail)
Estimated Population	4.68027		
Unit Flow Factor	0.28 m <sup>3</sup> /person/day		GESF(Table T-2) - UFF for Commercial Flow and Student Flow
Estimated Dry Weather Flow	1.3104756 m <sup>3</sup> /day		0.080 (Commercial Employee) +0.2 (J4 Wholesale & Retail)
C1(ii).Man Tat Building, 19 On Ning Rd	2/F to 5/F		
Total number of units	8 units		
Total number of residents	22.4 people		Average Household Size of 2.8 in Yuen Long from 2022 Population and Household Statistics Analysed by District Council District
Unit Flow Factor	0.37 m <sup>3</sup> /person/day		GESF(Table T-1) - UFF for Domestic Flow
Estimated Dry Weather Flow	8.288 m <sup>3</sup> /day		0.370 (R3 Private Development)
Fook Loi Building, 11-17 On Ning Road	G/F to M/F		
Total GFA	338.538 m <sup>2</sup>		
Area/Employee	28.57		3.5 (Retail)
Estimated Population	11.84883		
Unit Flow Factor	0.28 m <sup>3</sup> /person/day		GESF(Table T-2) - UFF for Commercial Flow and Student Flow
Estimated Dry Weather Flow	3.3176724 m <sup>3</sup> /day		0.080 (Commercial Employee) +0.2 (J4 Wholesale & Retail)
Fook Loi Building, 11-17 On Ning Road	2/F to 5/F		
Total number of units	30 units		
Total number of residents	84 people		Average Household Size of 2.8 in Yuen Long from 2022 Population and Household Statistics Analysed by District Council District
Unit Flow Factor	0.37 m <sup>3</sup> /person/day		GESF(Table T-1) - UFF for Domestic Flow
Estimated Dry Weather Flow	31.08 m <sup>3</sup> /day		0.370 (R3 Private Development)
C3(i).On Wing Building, 5-9 On Ning Road	G/F to M/F		
Total GFA	252.96 m <sup>2</sup>		
Area/Employee	28.57		3.5 (Retail)
Estimated Population	8.8536		
Unit Flow Factor	0.28 m <sup>3</sup> /person/day		GESF(Table T-2) - UFF for Commercial Flow and Student Flow
Estimated Dry Weather Flow	2.479008 m <sup>3</sup> /day		0.080 (Commercial Employee) +0.2 (J4 Wholesale & Retail)
C3(ii).On Wing Building, 5-9 On Ning Road	2/F to 5/F		
Total number of units	20 units		
Total number of residents	56 people		Average Household Size of 2.8 in Yuen Long from 2022 Population and Household Statistics Analysed by District Council District
Unit Flow Factor	0.37 m <sup>3</sup> /person/day		GESF(Table T-1) - UFF for Domestic Flow
Estimated Dry Weather Flow	20.72 m <sup>3</sup> /day		0.370 (R3 Private Development)
<b>Catchment F</b>			
The Subject Site			
Estimated Dry Weather Flow	161.59 m <sup>3</sup> /day		Refer to Appendix 5

## **Appendix 6**

### **Total Estimated Peak Flow After Development**

**Total Estimated Peak Flow After Development**

**After Development**

Catchment	From the Most Upstream	Total Estimated Dry Weather Flow (m <sup>3</sup> /day)	Catchment Inflow Factor <sup>[1]</sup>	Cumulative Average Dry Weather Flow (m <sup>3</sup> /day)	Contributing Population <sup>[2]</sup>	Peaking Factor <sup>[3]</sup>	Total Estimated Peak Flow (m <sup>3</sup> /day)	Total Estimated Peak Flow (L/s)
B	36 Fook Tak St, Yuen Long	12.10	1	12.10	44.80	8	96.78	1.12
	On Ting Building, 41-45 On Ning Road	19.41	1	31.51	116.70	8	252.08	2.92
B to C	Man Yau Building, 37-39 On Ning Road	12.55	1	44.06	163.19	8	352.49	4.08
B to C to D	20-34 Fook Tak St, Yuen Long	49.93	1	93.99	348.10	8	751.90	8.70
	Hung Wan Building, 21-35 On Ning Road	44.77	1	138.76	513.93	8	1110.09	12.85
	18 Fook Tak St, Yuen Long	12.10	1	150.86	558.74	8	1206.88	13.97
B to C to D to E	Man Tat Building, 19 On Ning Rd	9.60	1	160.46	594.29	8	1283.67	14.86
	Fook Loi Building, 11-17 On Ning Road	34.40	1	194.86	721.69	8	1558.85	18.04
	On Wing Building, 5-9 On Ning Road	23.20	1	218.06	807.61	8	1744.44	20.19
B to C to D to E to F	<b>The Subject Site</b>	161.59	1	379.64	1406.08	6	2277.85	26.36
B to C to D to E to F to A	Assumed Full Bored							

Remarks:

<sup>[1]</sup> Catchment Inflow Factor = 1.00 (Yuen Long) based on EPD's GESF Table T-4

<sup>[2]</sup> Based on the equation from GESF: 
$$\text{Contributing Population} = \frac{\text{Calculated total average flow (m}^3\text{/day)}}{0.27 \text{ (m}^3\text{/person/day)}}$$

<sup>[3]</sup> Peaking Factor=8 for population <1000, and 6 for population 1000-5000 (including stormwater allowance) base on EPD's GESF Table T-5

## **Appendix 7**

### **Calculation of Flow Capacity**

Calculation of Flow Capacity

Proposed Building (Without Mitigation Measures)

Pipe Name	Manhole Reference		Length (m)	Invert Level (mPD)		d (m)	r (m)	s	g (m/s <sup>2</sup> )	k <sub>s</sub> (m)	v (m <sup>2</sup> /s)	V (m/s)	Area (m <sup>2</sup> )	Q <sub>c</sub> (m <sup>3</sup> /s)	Accumulated ADWF (m <sup>3</sup> /day)	P <sub>c</sub>	P	Catchment	Sewer Capacity (L/s)	Sewage Flow (L/s)		% of Peak Flow to		% of capacity %	Remarks
	Upstream	Downstream		Upstream	Downstream															Before Development	After Development	Before Development	After Development		
	FWD1019563	FMH1018375		FMH1018371	23															1.55	1.5	0.45	0.225		
FWD1019541	FMH1018351	FMH1048045	18	2.41	2.35	0.15	0.075	0.003	9.810	0.00060	0.0000011	0.573	0.018	0.009	31.51	116.70	8	B	9.12	2.92	2.92	31.99%	31.99%	31.99%	
FWD1062244 <sup>3</sup>	FMH1048045	FMH1018374	27	2.35	2.32	0.15	0.075	0.001	9.810	0.00060	0.0000011	0.326	0.018	0.005	44.06	163.19	8	B+C	5.18	4.08	4.08	78.72%	78.72%	78.72%	
FWD1019562	FMH1018374	FMH1018373	26.5	2.32	1.93	0.15	0.075	0.015	9.810	0.00060	0.0000011	1.220	0.018	0.019	150.86	558.74	8	B+C+D	19.40	13.97	13.97	72.00%	72.00%	72.00%	
FWD1019561	FMH1018373	FMH1018372	15.5	1.93	1.86	0.15	0.075	0.005	9.810	0.00060	0.0000011	0.670	0.018	0.011	150.86	558.74	8	B+C+D	10.65	13.97	13.97	131.16%	131.16%	131.16%	
FWD1019560	FMH1018372	FMH1048046	15.3	1.86	1.79	0.15	0.075	0.005	9.810	0.00060	0.0000011	0.674	0.018	0.011	218.06	807.61	8	B+C+D+E	10.72	20.19	20.19	188.32%	188.32%	188.32%	
FWD1062247	FMH1048046	FMH1018371	19	1.57	1.5	0.15	0.075	0.004	9.810	0.00060	0.0000011	0.604	0.018	0.010	379.64	1406.08	6	B+C+D+E+site(F)	9.60	20.19	26.36	210.33%	274.65%	274.65%	
FWD1019559	FMH1018371	FMH1018370	24	1.5	1.43	0.45	0.225	0.003	9.810	0.00060	0.0000011	1.091	0.159	0.156	379.64 <sup>3</sup>	1406.08	6	A+B+C+D+E+site(F)	156.10	154.69	160.86	99.10%	103.05%	103.05%	
FWD1019558 <sup>3</sup>	FMH1018370	FMH1018369	6.4	1.43	1.36	0.45	0.225	0.011	9.810	0.00060	0.0000011	2.125	0.159	0.304	379.64 <sup>3</sup>	1406.08	6	A+B+C+D+E+site(F)	304.18	154.69	160.86	50.85%	52.88%	52.88%	

Proposed Building (With Mitigation Measures)

Pipe Name	Manhole Reference		Length (m)	Invert Level (mPD)		d (m)	r (m)	s	g (m/s <sup>2</sup> )	k <sub>s</sub> (m)	v (m <sup>2</sup> /s)	V (m/s)	Area (m <sup>2</sup> )	Q <sub>c</sub> (m <sup>3</sup> /s)	Accumulated ADWF (m <sup>3</sup> /day)	P <sub>c</sub>	P	Catchment	Sewer Capacity (L/s)	Sewage Flow (L/s)		% of Peak Flow to		% of capacity %	Remarks
	Upstream	Downstream		Upstream	Downstream															Before Development	After Development	Before Development	After Development		
	FWD1019563	FMH1018375		FMH1018371	23															1.55	1.5	0.45	0.225		
FWD1019541	FMH1018351	FMH1048045	18	2.41	2.35	0.15	0.075	0.003	9.810	0.00060	0.0000011	0.573	0.018	0.009	31.51	116.70	8	B	9.12	2.92	2.92	31.99%	31.99%	31.99%	
FWD1062244 <sup>3</sup>	FMH1048045	FMH1018374	27	2.35	2.32	0.15	0.075	0.001	9.810	0.00060	0.0000011	0.326	0.018	0.005	44.06	163.19	8	B+C	5.18	4.08	4.08	78.72%	78.72%	78.72%	
FWD1019562	FMH1018374	FMH1018373	26.5	2.32	1.93	0.15	0.075	0.015	9.810	0.00060	0.0000011	1.220	0.018	0.019	150.86	558.74	8	B+C+D	19.40	13.97	13.97	72.00%	72.00%	72.00%	
FWD1019561	FMH1018373	FMH1018372	15.5	1.93	1.86	0.2	0.1	0.005	9.810	0.00060	0.0000011	0.809	0.031	0.023	150.86	558.74	8	B+C+D	22.86	13.97	13.97	61.10%	61.10%	61.10%	
FWD1019560	FMH1018372	FMH1048046	15.3	1.86	1.79	0.2	0.1	0.005	9.810	0.00060	0.0000011	0.814	0.031	0.023	218.06	807.61	8	B+C+D+E	23.01	20.19	20.19	87.73%	87.73%	87.73%	
FWD1062247	FMH1048046	FMH1018371	19	1.57	1.5	0.225	0.1125	0.004	9.810	0.00060	0.0000011	0.787	0.040	0.028	379.64	1406.08	6	B+C+D+E+site(F)	28.17	20.19	26.36	71.68%	93.60%	93.60%	
FWD1019559	FMH1018371	FMH1018370	24	1.5	1.43	0.5	0.25	0.003	9.810	0.00060	0.0000011	1.166	0.196	0.206	379.64 <sup>3</sup>	1406.08	6	A+B+C+D+E+site(F)	206.01	154.69	160.86	75.09%	78.09%	78.09%	
FWD1019558 <sup>3</sup>	FMH1018370	FMH1018369	6.4	1.43	1.36	0.5	0.25	0.011	9.810	0.00060	0.0000011	2.271	0.159	0.325	379.64 <sup>3</sup>	1406.08	6	A+B+C+D+E+site(F)	325.04	154.69	160.86	47.59%	49.49%	49.49%	

Hydraulic Check of the Proposed Connection Sewer

Pipe Name	Manhole Reference		Length (m)	Invert Level (mPD)		d (m)	r (m)	s	g (m/s <sup>2</sup> )	k <sub>s</sub> (m)	v (m <sup>2</sup> /s)	V (m/s)	Area (m <sup>2</sup> )	Q <sub>c</sub> (m <sup>3</sup> /s)	ADWF (m <sup>3</sup> /day)	P <sub>c</sub>	P	Catchment	Sewer Capacity (L/s)	Sewage Flow (L/s)		% of Peak Flow to		% of capacity %	Remarks
	Upstream	Downstream		Upstream	Downstream															Before Development	After Development	Before Development	After Development		
	Proposed Pipe	Proposed Manhole		FMH1048046	4.2															2.6	1.79	0.15	0.075		

Legend

- d = pipe diameter, m
- r = pipe radius (m) = 0.5d
- s = slope of the total energy line
- k<sub>s</sub> = hydraulic pipeline roughness, m
- V = Velocity of flow calculated based on Colebrook-White Equation, m/s
- ADWF = Average Dry Weather Flow, m<sup>3</sup>/day
- Q<sub>c</sub> = Flow Capacity (10% sedimentation incorporated), m<sup>3</sup>/s
- P<sub>c</sub> = Contributing Population = ADWF/0.27
- P = Peaking Factor (including stormwater allowance)

Remarks:

- The value of k<sub>s</sub> = 0.6mm for velocities greater than 1.2m/s, otherwise 3mm) is adopted for the calculation of slimed clayware sewer, poor condition (based on Table 5: Recommended Roughness Values in Sewerage Manual)
- The mean velocity is calculated using the Colebrook-White Equation.
- The invert level of Pipes FWD1062244 (upstream & downstream) and FWD1019558 (downstream) are not found in the Drainage Services Department's drainage record plan. Interpolation is used to calculate the appropriate invert levels.
- Since Catchment A is assumed as fully bored, its estimated dry weather flow is negligible for the accumulated ADWF.