Appendix 5

Sewerage Impact Assessment

Prepared by

Ramboll Hong Kong Limited

S16 PLANNING APPLICATION FOR PROPOSED COMPOSITE DEVELOPMENT AT 43-49A HANKOW ROAD, TSIM SHA TSUI, KOWLOON

SEWERAGE IMPACT ASSESSMENT

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1. INTRODUCTION

1.1 Background and Objectives

1.1.1 This Sewerage Impact Assessment (SIA) has been prepared to support the S16 Planning Application for Proposed Composite Development at 43-49A Hankow Road, Tsim Sha Tsui, Kowloon (hereafter the "Application Site").

1.1.2 The purpose of this assessment is to confirm the feasibility of the Application Site in terms of its sewerage impact.

1.2 Application Site and its Environ

1.2.1 According to the Approved Tsim Sha Tsui Outline Zoning Plan (OZP) No. S/K1/28, the Application Site falls within an area zoned "Commercial" ("C6").

1.2.2 The Application Site is located in Tsim Sha Tsui, Kowloon. To the immediate north of the Application Site are the mixed-use developments on 51-57 Hankow Road. While to the immediate south and west of the Application Sites are the commercial developments, Maxwell Centre and Astoria Building. Hankow Road is located at the immediate east of the Application Site. The Application Site is currently a 10-storey residential building, namely the Hankow Apartments. Figure 1.1 shows the location and the environ of the Application Site.

1.3 Proposed Development

1.3.1 The site area of the Application Site is about 1,074.47 m^2. The Proposed Development consists of one single composite tower with retail, office and residential use, with a proposed domestic plot ratio of about 3.4 and a proposed non-domestic plot ratio of about 8.6, providing 110 residential units. 3 storeys of Shop/ Food and Beverage (F&B), 4 storeys of Office/ Shop/ F&B and 8 storeys of Office are proposed under 11 residential floors.

1.3.2 The anticipated completion year of the Proposed Development is 2027. For the indicative plan of the Proposed Development, please refer to the Planning Statement.

2. SEWERAGE IMPACT ASSESSMENT

2.1 Scope of Work

2.1.1 The aim of this SIA is to assess whether the capacity of the existing sewerage network is sufficient to cope with the sewage flow generated from the Proposed Development.

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 and T-2 of the GESF:

- Residential housing: 0.27m^3/day (Private R2)
- Service Apartment: 0.19m^3/day (Institutional and Special Class)
- Retail: 0.28m^3/day (Commercial Employee and J4 – Wholesale & Retail)
- Office: 0.08m^3/day (Commercial Employee and J6 – Finance, Insurance, Real Estate & Business Services)
- Restaurant/Bakery/Hotel: 1.58m^3/day (Commercial Employee and J10 – Restaurants & Hotels)
- Clubhouse/Salon/Yoga Studio/Massage Studio/Fitness Gym/Clinic: 0.28m^3/day (Commercial Employee and J11 – Community, Social & Personal Services)

2.2.4 The catchment inflow factor, P_{CIF} of 1.0 (Central Kowloon), is adopted in the calculations.

2.3 Existing and Future Sewerage System

2.3.1 According to the Drainage Record obtained from DSD, there is a Ø225mm sewer pipe running along Hankow Road from 57 Hankow Road to Maxwell Centre, and a Ø375mm sewer pipe running between Maxwell Centre and Sands Building. Sewage generated from the Application Site is now discharged to a Ø150mm sewer pipe. The building drainage plan is shown in Appendix 2.2. Existing sewers in the vicinity of the Application Site are shown in Figure 2.1. A new terminal manhole P1 is proposed to connect the Proposed Development to the existing manhole FMH4000707 (S1) with a Ø225mm polyethylene pipe. The existing Ø150mm sewer pipe will be replaced by the new Ø225mm polyethylene pipe as the pipe diameter of the existing Ø150mm pipe cannot meet the minimum requirement of Ø200mm according to DSD's Sewerage Manual.

2.4 Wastewater Generated by the Proposed Development

2.4.1 Wastewater arising from the Proposed Development will be primarily contributed by residents in residential units, users and staff of the clubhouse, office, retail and F&B services.

2.4.2 To assess the worst-case scenario, sewage generation rates of floors with multi-purpose use will be assumed as restaurants, i.e., the largest unit flow factor.

2.4.3 Detailed calculation of sewage generation from the Proposed Development is given in Table 2.1 below.

Table 2.1 Estimated Peak Flow

Calculation for Sewage Generation Rate of the Proposed Development at the Application Site			
Residential Units			
Total number of residential units	=	110	units
Total number of residents	=	253	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	270	litre/person/day -- (refer to Private R2 in Table T-1 of GESF)
Sewage generation rate	=	68.3	m^3/day
Clubhouse			
Non-domestic GFA (for clubhouse)	=	172	m^2
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	=	6	employees
Design flow for commercial activities	=	280	Litre/employee/day (J11 in Table T-2 of GESF)
Sewage generation rate	=	1.6	m^3/day
Office			
Total Area	=	4,809	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Finance, Insurance, Real Estate & Business Service)
Total number of employees	=	264	employees
Design flow for employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Service)
Sewage generation rate	=	21.2	m^3/day
F&B			
Total Area	=	4,402	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	224	employees
Design flow for employees	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurants & Hotels)
Sewage generation rate	=	354.7	m^3/day
Total Flow from the Proposed Development			
Flow rate	=	445.7	m^3/day
Flow rate with P_{CIF} (Central Kowloon - 1.0)	=	445.7	m^3/day (refer to Table T-4 of GESF – Central Kowloon – 1.0)
Contributing population	=	1651	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with P_{CIF} ÷ 0.27, while

Calculation for Sewage Generation Rate of the Proposed Development at the Application Site

Peaking factor	=	6	0.27 is the average unit flow factor of all typical residents plus employees) (refer to Table T-5 of GESF for a population of 1,000 – 5,000 incl. stormwater allowance)
Peak flow	=	31.0	litre/sec

Remark:
For job type J11, the "per-employee" unit flow factor takes into account the flows of customers and tenants.

2.5 Assessment of Sewerage Impact

2.5.1 Sewage generated from the Application Site will be discharged to the existing manhole FMH4000707 (S1), as shown in Figure 2.1. Catchments in the vicinity of the Application Site are shown in Figure 2.2.

2.5.2 The estimated sewage flow from the Application Site and the existing catchments have been compared with the capacity of the existing sewerage system as shown in Appendix 2.1.

2.6 Discussion

2.6.1 According to the calculation results presented in Table 4 of Appendix 2.1, capacity of the existing sewerage network will be sufficient to accommodate sewage generated from the Proposed Development.

2.6.2 Therefore, sewage generation from the Proposed Development would not impose adverse sewerage impact onto the nearby existing public sewage system.

3. OVERALL CONCLUSION

3.1.1 The potential sewerage impact arising from the Application Site has been quantitatively assessed by comparing the estimated sewage flow from the Proposed Development and the capacity of the existing sewerage system in the vicinity.

3.1.2 Based on the results of sewerage impact assessment, as shown in Appendix 2.1, the capacity of existing sewerage system will be sufficient to cater for the sewage generated from the Proposed Development. Hence, no upgrading works to the existing downstream sewerage system will be required.

3.1.3 The existing sewer connecting the terminal manhole (P1) of the Proposed Development to S1 is a Ø150mm pipe, it is proposed to upgrade this sewer to Ø225mm by the Applicant to meet the minimum pipe size requirement set out in Section 5.1.6, Part 1, Sewerage Manual.

3.1.4 This SIA confirms the feasibility of the Proposed Development in terms of its sewerage impact.

Figures

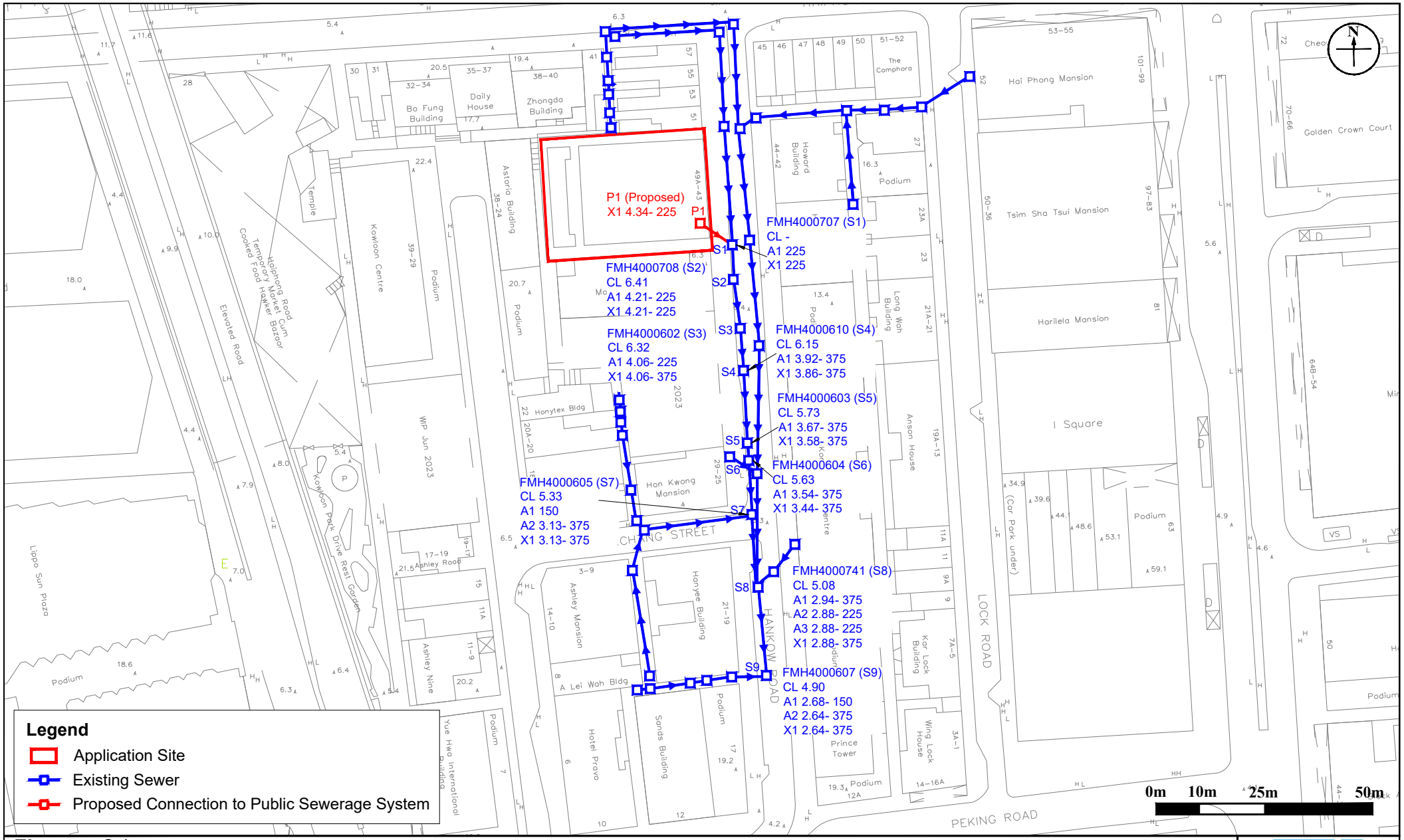

Figure: 2.1

Title: Existing Sewerage System in vicinity of the Application Site

Project: S16 Planning Application for Proposed Composite Development at 43-49A Hankow Road, Tsim Sha Tsui, Kowloon

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Drawn by:	YM
Checked by:	KY
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Date:	Aug 2023

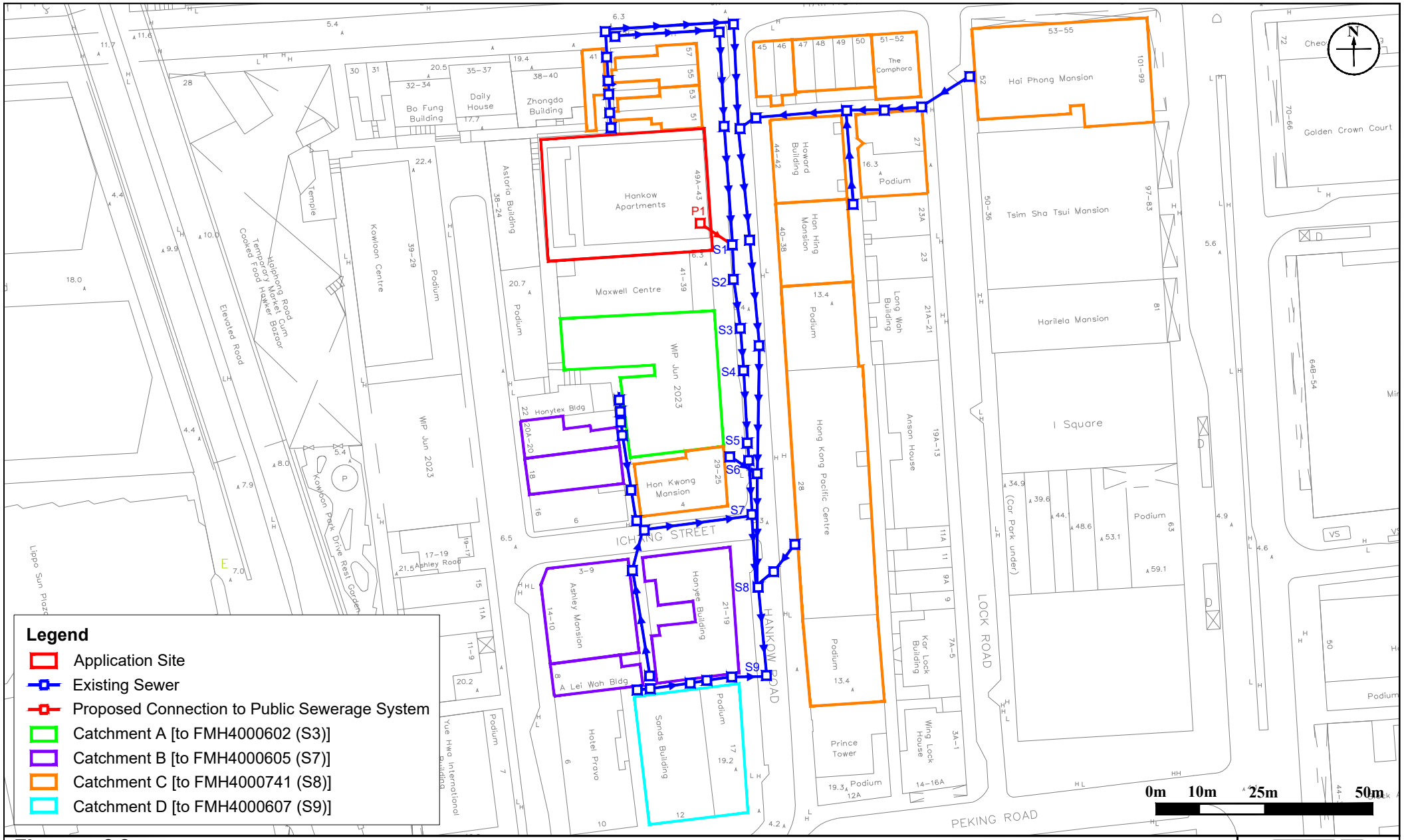

Figure: 2.2

Title: Existing Sewerage System and Catchment Area in vicinity of the Application Site

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Drawn by: YM

Checked by: KY

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Date: Aug 2023

Appendix

Appendix 2.1

Detailed Sewerage Impact Assessment Calculations

Table 1 Calculation for Sewage Generation Rate of the Proposed Development at the Project Site

Residential Units (discharges to FMH4000707)			
Total number of residential units	=	110	units
Total number of residents	=	253	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	68.3	m^3/day
Office (discharges to FMH4000707)			
Total Area	=	4,809	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Finance, Insurance, Real Estate & Business Service)
Total number of employees	=	264	employees
Design flow for employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Service)
Sewage generation rate	=	21.2	m^3/day
F&B (discharges to FMH4000707)			
Total Area	=	4,402	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	224	employees
Design flow for employees	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurants & Hotels)
Sewage generation rate	=	354.7	m^3/day
Clubhouse (discharges to FMH4000707)			
Total Area	=	172	m^2
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	=	6	employees
Design flow for employees	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	=	1.6	m^3/day
Total Flow from the Proposed Development			
Flow rate	=	445.7	m^3/day
Flow rate with P_{CIF} (Central Kowloon - 1.0)	=	445.7	m^3/day (refer to Table T-4 of GESF - Central Kowloon - 1.0)
Contributing population	=	1651	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with P_{CIF} ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	6	(refer to Table T-5 of GESF for a population of 1000-5000 incl. stormwater allowance)
Peak flow	=	31.0	litre/sec

Table 2 Hydraulic Capacity of Existing and Proposed Sewers - Free Flow Condition (Proposed 225mm Pipe)

Segment	Manhole Reference	Manhole Reference	Material	Pipe Dia.	Pipe Length	Invert Level 1	Invert Level 2	g	k_s	s	v	V	Area	Q	Estimated Capacity
				mm	m	mPD	mPD	m/s^2	m		m^2/s	m/s	m^2	m^3/s	L/s
P1-S1	-	FMH4000707	Polyethylene	225	5.33	4.34	4.28	9.81	0.0003	0.011	0.000001	1.50	0.04	0.06	59
S1-S2	FMH4000707	FMH4000708	Clayware	225	6.44	4.28	4.21	9.81	0.0006	0.011	0.000001	1.37	0.04	0.05	55
S2-S3	FMH4000708	FMH4000602	Clayware	225	11.44	4.21	4.06	9.81	0.0006	0.013	0.000001	1.50	0.04	0.06	60
S3-S4	FMH4000602	FMH4000610	Clayware	375	9.10	4.06	3.92	9.81	0.0006	0.015	0.000001	2.25	0.11	0.25	249
S4-S5	FMH4000610	FMH4000603	Clayware	375	16.11	3.86	3.67	9.81	0.0006	0.012	0.000001	1.97	0.11	0.22	217
S5-S6	FMH4000603	FMH4000604	Clayware	375	3.31	3.58	3.54	9.81	0.0006	0.012	0.000001	1.99	0.11	0.22	220
S6-S7	FMH4000604	FMH4000605	Clayware	375	11.79	3.44	3.13	9.81	0.0006	0.026	0.000001	2.95	0.11	0.33	325
S7-S8	FMH4000605	FMH4000741	Clayware	375	15.34	3.13	2.94	9.81	0.0006	0.012	0.000001	2.02	0.11	0.22	223
S8-S9	FMH4000741	FMH4000607	Clayware	375	20.55	2.88	2.64	9.81	0.0006	0.012	0.000001	1.96	0.11	0.22	216

Remarks: (1) g=gravitational acceleration; k_s=equivalent sand roughness; s=gradient; v=kinematic viscosity of water; V=mean velocity
(2) The invert levels of manhole existing P1 is obtained from the drainage plan of BRAVO.
(3) Since invert levels at manholes S1 are missing from the drainge record plan, they are calculated by interpolation using the invert levels of nearby manaholes. (highlighted in blue). The invert
(4) The values of ks = 0.6mm are used for the calculation of slimed clayware sewer, poor condition @mean velocity = approximately 1.2m/s respectively (based on Table 5: Recommended
(5) The values of ks = 0.3mm are used for the calculation of slimed PE sewer, poor condition @mean velocity = approximately 1.2m/s respectively (based on Table 5: Recommended
(6) The value of velocity (V) is referred to the Tables for the hydraulic design of pipes, sewers and channels (8th edition)
(7) Equation used: $V=-\sqrt{(8gDs)}\log\left(\frac{k_s}{3.7D}+\frac{2.51v}{D\sqrt{(2gDs)}}\right)$

Table 3 Calculation for Sewage generation rate of the Existing Surrounding Building

Catchment A, discharges to FMH4000602 (S3)

1. Work In Progress to be redeveloped as Grade A Commercial Building (31-37 Hankow Road)
   https://www.loftergroup.com/post/lofter-group-partners-with-bentallgreenoak-schroders-capital-to-acquire-site-in-tsim-sha-tsui

Assumed area	=	10,758	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Finance, Insurance, Real Estate & Business Service)
Total number of employees	=	592	employees
Design flow for employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Service)
Sewage generation rate	=	47.3	m^3/day
Total Flow of Catchment A, discharges to FMH4000602 (S3)	=	47.3	m^3/day

Table 3 Calculation for Sewage generation rate of the Existing Surrounding Building

Catchment B, discharges to FMH4000605 (S7)

1. Restaurant at 20A-20 Ashley Road

Assumed area	=	96	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	5	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	7.7	m^3/day

2. 20A-20 Ashley Road
https://hk.centanet.com/estate/en/20-20A-Ashley-Road/2-UODVQRRARO

Total number of residential units	=	13	units
Total number of residents	=	30	375
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	8.1	m^3/day

3. Citadines Ashley Hong Kong (Restaurant on G/F) (18 Ashley Road)

Assumed area	=	38	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	2	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	3.1	m^3/day

4. Citadines Ashley Hong Kong (Salon on 1/F) (18 Ashley Road)

Assumed area	=	151	m^2
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	=	5	employees
Design flow for employees	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	=	1.4	m^3/day

5. Citadines Ashley Hong Kong (Restaurant on 2-3/F) (18 Ashley Road)

Assumed area	=	301	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	15	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	24.3	m^3/day

6. Citadines Ashley Hong Kong (Service Apartment) (18 Ashley Road)
https://www.trip.com/hotels/hong-kong-hotel-detail-429996/citadines-ashley-hong-kong/

Total number of residential units	=	36	units
Total number of residents	=	83	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	190	litre/person/day -- (Institutional and special class in Table T-1 of GESF)
Sewage generation rate	=	15.7	m^3/day

7. Ashley Mansion (Restaurants on G/F) (3-9 Ichang Street)

Assumed area	=	339	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	17	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	27.3	m^3/day

Table 3 Calculation for Sewage generation rate of the Existing Surrounding Building

8. Ashley Mansion (Retail on G/F) (3-9 Ichang Street)

Assumed area	=	31	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	=	1	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	0.3	m^3/day

9. Ashley Mansion (Office on 1-3/F) (3-9 Ichang Street)

Assumed area	=	1,084	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Finance, Insurance, Real Estate & Business Service)
Total number of employees	=	60	employees
Design flow for employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Service)
Sewage generation rate	=	4.8	m^3/day

10. Ashley Mansion (Residential on 4-17/F) (3-9 Ichang Street)
https://www.hkp.com.hk/en/estate/Kowloon-Tsim-Sha-Tsui-Ashley-Mansion-E01400

Total number of residential units	=	41	units
Total number of residents	=	94	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	25.5	m^3/day

11. A Lei Wah Building (Restaurants on G/F) (8 Ashley Road)

Assumed area	=	116	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	6	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	9.3	m^3/day

12. A Lei Wah Building (Salon on UG/F) (8 Ashley Road)

Assumed area	=	116	m^2
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	=	4	employees
Design flow for employees	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	=	1.1	m^3/day

13. A Lei Wah Building (Residential on 1-5/F) (8 Ashley Road)
https://hk.centanet.com/estate/en/A.-Lei-Wah-Building/2-UOVOQRRJRO

Total number of residential units	=	10	units
Total number of residents	=	23	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	6.2	m^3/day

14. Hanyee Building (Restaurants on G-1/F) (19-21 Hankow Road)

Assumed area	=	300	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	15	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	24.2	m^3/day

Table 3 Calculation for Sewage generation rate of the Existing Surrounding Building

15. Hanyee Building (Retail on G/F) (19-21 Hankow Road)

Assumed area	=	243	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	=	8	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	2.4	m^3/day

16. Hanyee Building (Office on 1-3/F) (19-21 Hankow Road)
https://hk.centanet.com/estate/en/Hanyee-Building/2-UOOVFRUJRO

Assumed area	=	3,731	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Finance, Insurance, Real Estate & Business Service)
Total number of employees	=	205	employees
Design flow for employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Service)
Sewage generation rate	=	16.4	m^3/day

17. Hanyee Building (Yoga Studio on 9/F) (19-21 Hankow Road)

Assumed area	=	32	m^2
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	=	1	employees
Design flow for employees	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	=	0.3	m^3/day

18. Hanyee Building (Hostel on 4/F) (19-21 Hankow Road)

Assumed area	=	96	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	=	3	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	4.8	m^3/day

Total Flow of Catchment B, discharges to FMH4000605 (S7)	=	182.8	m^3/day

Table 3 Calculation for Sewage generation rate of the Existing Surrounding Building

Catchment C, discharges to FMH4000741 (S8)

1. 41 Haiphong Road

Assumed area	=	167	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	=	6	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	1.6	m^3/day

2. Retail on G/F at 55-57 Hankow Road

Assumed area	=	157	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	=	5	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	1.5	m^3/day

3. Yoga Studio on 1/F at 55-57 Hankow Road

Assumed area	=	128	m^2
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	=	4	employees
Design flow for employees	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	=	1.2	m^3/day

4. Residential unit on 2-4/F at 55-57 Hankow Road

https://hk.centanet.com/estate/en/55-Hankow-Road/2-ESYDPPAXPS
https://hk.centanet.com/estate/en/57-Hankow-Road/2-ESYYPPASPS

(The total number of residential units are derived by substracting non-residential use units from total number of units of the building)

Total number of residential units	=	6	units
Total number of residents	=	14	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	3.7	m^3/day

5. Bakery on G/F at 51-53 Hankow Road

Assumed area	=	77	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	4	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	6.2	m^3/day

6. Retail on G-1/F at 51-53 Hankow Road

Assumed area	=	144	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	=	5	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	1.4	m^3/day

7. Massage and Fitness Studio on 2-3/F at 51-53 Hankow Road

Assumed area	=	129	m^2
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	=	4	employees
Design flow for employees	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	=	1.2	m^3/day

Table 3 Calculation for Sewage generation rate of the Existing Surrounding Building

8. Residential unit on 1-4/F at 51-53 Hankow Road
https://hk.centanet.com/estate/en/51-Hankow-Road/2-ESGBPPAAPS
https://hk.centanet.com/estate/en/53-Hankow-Road/2-ESDGPPAJPS
(The total number of residential units are derived by substrating non-residential use units from total number of units of the building)

Total number of residential units	=	5	units
Total number of residents	=	12	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	3.1	m^3/day

9. Bakery on G/F at 45-46 Haiphong Road

Assumed area	=	47	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	2	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	3.8	m^3/day

10. Retail on G-2/F at 45-46 Haiphong Road

Assumed area	=	241	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	=	8	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	2.4	m^3/day

11. Residential unit on 2-6/F at 45-46 Haiphong Road
https://hk.centanet.com/estate/en/45-Haiphong-Road/2-ESPDBPEAPS
https://hk.centanet.com/estate/en/46-Haiphong-Road/2-ESSYBPEJPS
(The total number of residential units are derived by substrating non-residential use units from total number of units of the building)

Total number of residential units	=	9	units
Total number of residents	=	21	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	5.6	m^3/day

10. Retail on G/F at 47-50 Hankow Road

Assumed area	=	179	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	=	6	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	1.8	m^3/day

11. Residential unit on 2-9/F at 47-50 Haiphong Road
https://hk.centanet.com/estate/en/47-Haiphong-Road/2-ESEWBPEXPS
https://hk.centanet.com/estate/en/48-Haiphong-Road/2-ESEPGPESPS
(The total number of residential units are derived by substrating non-residential use units from total number of units of the building)

Total number of residential units	=	16	units
Total number of residents	=	37	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	9.9	m^3/day

Table 3 Calculation for Sewage generation rate of the Existing Surrounding Building

12. Service Apartment on 2-9/F at 47-50 Haiphong Road
https://www.dash.co/en/hong-kong/tsim-sha-tsui/

Total number of residential units	=	16	units
Total number of residents	=	37	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	190	litre/person/day -- (Institutional and special class in Table T-1 of GESF)
Sewage generation rate	=	7.0	m^3/day

13. The Camphora (Retail on G/F) (51-52 Haiphong Road)

Assumed area	=	126	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	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	1.2	m^3/day

14. The Camphora (51-52 Haiphong Road)
https://www.sinosuites.com.hk/suites/en/thecamphora/

Total number of residential units	=	27	units
Total number of residents	=	62	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	190	litre/person/day -- (Institutional and special class in Table T-1 of GESF)
Sewage generation rate	=	11.8	m^3/day

15. Hai Phong Mansion (Retail on G & 5/F) (53-55 Haiphong Road)

Assumed area	=	922	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	=	32	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	9.0	m^3/day

16. Hai Phong Mansion (Hostel on 2, 9, 10, 11, 13/F) (53-55 Haiphong Road)
https://hk.centanet.com/estate/en/Hai-Phong-Mansion/2-ESKWBPBAPS

Assumed area	=	462	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	=	15	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	23.4	m^3/day

17. Hai Phong Mansion (Restaurant on 3/F) (53-55 Haiphong Road)
https://www.openrice.com/en/hongkong/r-cats-tea-room-tsim-sha-tsui-western-r692445

Assumed area	=	120	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	6	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	9.7	m^3/day

18. Hai Phong Mansion (Residential) (53-55 Haiphong Road)
https://hk.centanet.com/estate/en/Hai-Phong-Mansion/2-ESKWBPBAPS
(The total number of residential units are derived by substrating non-residential use units from total number of units of the building)

Total number of residential units	=	114	units
Total number of residents	=	262	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	70.8	m^3/day

Table 3 Calculation for Sewage generation rate of the Existing Surrounding Building

19. Lokville Commerical Building (27 Lock Road)
https://property.jll.com.hk/en/office-lease/hong-kong/tsim-sha-tsui/lokville-commercial-building-hkg-p-000ali

Assumed area	=	2,943	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Finance, Insurance, Real Estate & Business Service)
Total number of employees	=	162	employees
Design flow for employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Service)
Sewage generation rate	=	12.9	m^3/day

20. Howard Building (Bakery & Restaurant on G/F) (42-44 Hankow Road)

Assumed area	=	114	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	6	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	9.2	m^3/day

21. Howard Building (Retail on G-1/F) (42-44 Hankow Road)
https://hk.centanet.com/estate/en/Howard-Building/2-ESEKBPAAPS

Assumed area	=	148	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	=	5	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	1.5	m^3/day

22. Howard Building (Office on 1, 7, 8/F) (42-44 Hankow Road)

Assumed area	=	355	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Finance, Insurance, Real Estate & Business Service)
Total number of employees	=	19	employees
Design flow for employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Service)
Sewage generation rate	=	1.6	m^3/day

23. Howard Building (Massage Studio on 2/F) (42-44 Hankow Road)

Assumed area	=	177	m^2
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	=	6	employees
Design flow for employees	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	=	1.6	m^3/day

24. Howard Building (Residential) (42-44 Hankow Road)
(The total number of residential units are derived by substrating non-residential use units from total number of units of the building)

Total number of residential units	=	11	units
Total number of residents	=	25	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	6.8	m^3/day

25. Han Hing Mansion (Restaurant on G/F) (38-40 Hankow Road)

Assumed area	=	74	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	4	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	6.0	m^3/day

Table 3 Calculation for Sewage generation rate of the Existing Surrounding Building

26. Han Hing Mansion (Retail on G/F) (38-40 Hankow Road)

Assumed area	=	110	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	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	1.1	m^3/day

27. Han Hing Mansion (Salon on UG/F) (38-40 Hankow Road)

Assumed area	=	256	m^2
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	=	8	employees
Design flow for employees	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	=	2.4	m^3/day

28. Han Hing Mansion (Residential) (38-40 Hankow Road)

Total number of residential units	=	22	units
Total number of residents	=	51	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	13.7	m^3/day

29. Han Kwong Mansion (Retail on G-1/F) (38-40 Hankow Road)

Assumed area	=	378	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	=	13	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	3.7	m^3/day

30. Han Kwong Mansion (Restaurant on G/F) (38-40 Hankow Road)

Assumed area	=	47	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	2	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	3.8	m^3/day

31. Han Kwong Mansion (Residential) (38-40 Hankow Road)
https://hk.centanet.com/estate/en/Han-Hing-Mansion/2-ESPSBPAXPS

Total number of residential units	=	22	units
Total number of residents	=	51	residents (refer to Population and Household Statistics Analysed by District Council District 2021 - average household size of 2.3 in Tertiary Planning Unit 211)
Design flow	=	270	litre/person/day -- (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	13.7	m^3/day

32. Hong Kong Pacific Centre (Restaurant on B-1/F) (28 Hankow Road)

Assumed area	=	425	m^2
Assumed floor area per employee	=	19.6	m^2 per employee -- (refer to Table 8 of CIFSUS - Restaurants)
Total number of employees	=	22	employees
Design flow	=	1580	litre/employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	34.2	m^3/day

Table 3 Calculation for Sewage generation rate of the Existing Surrounding Building

33. Hong Kong Pacific Centre (Retail on G-1/F) (28 Hankow Road)

Assumed area	=	1729	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	=	61	employees
Design flow	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J4 Wholesale & Retail)
Sewage generation rate	=	16.9	m^3/day

34. Hong Kong Pacific Centre (Clinic on G-1/F) (28 Hankow Road)

Assumed area	=	208	m^2
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	=	7	employees
Design flow for employees	=	280	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	=	1.9	m^3/day

35. Hong Kong Pacific Centre (Office) (28 Hankow Road)
https://www.sino-offices.com/en/our-properties/hong-kong-pacific-centre

Assumed area	=	12,990	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Finance, Insurance, Real Estate & Business Service)
Total number of employees	=	714	employees
Design flow for employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Service)
Sewage generation rate	=	57.2	m^3/day

Total Flow of Catchment C, discharges to FMH4000741 (S8)	=	364.5	m^3/day

Table 3 Calculation for Sewage generation rate of the Existing Surrounding Building

Catchment D, discharges to FMH4000607 (S9)

1. Sands Building (17 Hankow Road)
https://office.propwiser.com.hk/en/Building/tsim-sha-tsui/sands-building/373

Assumed area	=	4,645	m^2
Assumed floor area per employee	=	18.2	m^2 per employee -- (refer to Table 8 of CIFSUS - Finance, Insurance, Real Estate & Business Service)
Total number of employees	=	255	employees
Design flow for employees	=	80	litre/employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Service)
Sewage generation rate	=	20.4	m^3/day

Total Flow of Catchment D, discharges to FMH4000607 (S9)	=	20.4	m^3/day

Remarks:
(1) Assumed Area (i.e. Gross Floor Area) is calculated as 80% of the total area.
(2) For job types J10 and J11, the "per-employee" unit flow factor takes into account the flows of customers and tenants.
(3) The uses of different premises was verified on site in July 2023.

Sub-total

Total Flow at P1 (including Proposed Development)	=	445.7	m^3/day
Total Flow at S1 (including Proposed Development)	=	445.7	m^3/day
Total Flow at S2 (including Proposed Development)	=	445.7	m^3/day
Total Flow at S3 (including Proposed Development)	=	493.1	m^3/day
Total Flow at S4 (including Proposed Development)	=	493.1	m^3/day
Total Flow at S5 (including Proposed Development)	=	493.1	m^3/day
Total Flow at S6 (including Proposed Development)	=	493.1	m^3/day
Total Flow at S7 (including Proposed Development)	=	675.9	m^3/day
Total Flow at S8 (including Proposed Development)	=	1,040.4	m^3/day
Total Flow at S9 (including Proposed Development)	=	1,060.9	m^3/day

Sub-total with Catchment Inflow Factor = 1.0 (Central Kowloon)

Total Flow at P1 (including Proposed Development)	=	445.7	m^3/day
Total Flow at S1 (including Proposed Development)	=	445.7	m^3/day
Total Flow at S2 (including Proposed Development)		445.7	m^3/day
Total Flow at S3 (including Proposed Development)	=	493.1	m^3/day
Total Flow at S4 (including Proposed Development)	=	493.1	m^3/day
Total Flow at S5 (including Proposed Development)	=	493.1	m^3/day
Total Flow at S6 (including Proposed Development)	=	493.1	m^3/day
Total Flow at S7 (including Proposed Development)	=	675.9	m^3/day
Total Flow at S8 (including Proposed Development)	=	1,040.4	m^3/day
Total Flow at S9 (including Proposed Development)	=	1,060.9	m^3/day

Table 4 Comparision of the Hydraulic Capacity of Existing Sewers for Sewerage generated from the Proposed Development and Surrounding Catchment Areas (Proposed 225mm Pipe)

Segment	Manhole Reference	Manhole Reference	Pipe Dia. (mm)	Pipe Length (m)	Gradient	Estimated Capacity (L/s)	Peak Flow from the Proposed Development only (L/s)	Contribution from the Proposed Development only (%)	Status	Daily Flow (m^3/day)	Contributing Population	Peaking Factor	Peak Flow from the Proposed Development and Catchment Areas (L/s)	Contribution from the Proposed Development and the Surrounding Catchment Areas (%)	Status
P1-S1	-	FMH4000707	225	5.3	0.011	59	31.0	52.1%	OK	445.7	1,651	6	31.0	52.1%	OK
S1-S2	FMH4000707	FMH4000708	225	6.4	0.011	55	31.0	56.6%	OK	445.7	1,651	6	31.0	56.6%	OK
S2-S3	FMH4000708	FMH4000602	225	11.4	0.013	60	31.0	51.9%	OK	445.7	1,651	6	31.0	51.9%	OK
S3-S4	FMH4000602	FMH4000610	375	9.1	0.015	249	31.0	12.5%	OK	493.1	1,826	6	34.2	13.8%	OK
S4-S5	FMH4000610	FMH4000603	375	16.1	0.012	217	31.0	14.2%	OK	493.1	1,826	6	34.2	15.7%	OK
S5-S6	FMH4000603	FMH4000604	375	3.3	0.012	220	31.0	14.1%	OK	493.1	1,826	6	34.2	15.6%	OK
S6-S7	FMH4000604	FMH4000605	375	11.8	0.026	325	31.0	9.5%	OK	493.1	1,826	6	34.2	10.5%	OK
S7-S8	FMH4000605	FMH4000741	375	15.3	0.012	223	31.0	13.9%	OK	675.9	2,503	6	46.9	21.1%	OK
S8-S9	FMH4000741	FMH4000607	375	20.6	0.012	216	31.0	14.3%	OK	1040.4	3,853	6	72.3	33.4%	OK

Appendix 2.2

Proposed Drainage Plan

LEGEND:

FOUL WATER PIPE (PE) — S

STORM WATER PIPE (CONCRETE PIPE) — R

EXISTING WATER PIPE

TERMINAL FOUL WATER MANHOLE (TYPE T1_1)

TERMINAL STORM WATER MANHOLE (TYPE T1_1)

PROPOSED GOV'T STORM WATER MANHOLE

EXISTING FOUL WATER MANHOLE

EXISTING STORM WATER MANHOLE

JOB TITLE:	PROPOSED COMMERCIAL DEVELOPMENT AT 43-49A HANKOW ROAD TSIM SHA TSUI, KOWLOON
SKETCH TITLE:	PROPOSED FOUL WATER AND STORM WATER CONNECTION
SKETCH NO.:	INQ22-297/DR/0001
SCALE:	1:150 @A3