

Appendix F

Drainage and Sewerage Impact Assessment

SECTION 16 APPLICATION FOR PROPOSED FLATS, SHOP AND SERVICES, AND EATING PLACES WITH MINOR RELAXATION AND DOMESTIC AND NON-DOMESTIC PLOT RATIO AND BUILDING HEIGHT RESTRICTION IN "RESIDENTIAL (GROUP E)" ZONE AT NO.4 TUNG YUEN STREET, YAU TONG, KOWLOON

DRAINAGE & SEWERAGE IMPACT ASSESSMENT

Date 17 December 2024
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Signed 

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1. INTRODUCTION

1.1 Background and Objectives

1.1.1 The Proposed Development is located at No. 4 Tung Yuen Street, Yau Tong ("Application Site"). It is zoned as "R(E)" site under OZP S/K15/27 Cha Kwo Ling, Yau Tong, Lei Yue Mun, gazetted on 18/11/2022.

1.1.2 This S16 application is submitted to the Town Planning Board for the Proposed Flat, Shop and Services, and Eating Places with Minor Relaxation of Plot Ratio and Building Height Restrictions at the Application Site.

1.1.3 Ramboll Hong Kong Limited is commissioned by the Applicants to prepare this Drainage and Sewerage Impact Assessment (DSIA) Mitigation measures will be identified if it is necessary. Development parameters of the Proposed Development are provided by project architect, P&T.

1.2 Application Site and its Environ

1.2.1 The Application Site has an area of about 2,419 m², which are situated in Yau Tong area. The Application Site is bounded by Yau Tong Sewage Pumping Station to the Northwest, Tung Yuen Street to the Northeast, The Coastline to the Southeast. Figure 1.1 shows the location of the Application Site and its environ.

1.3 Proposed Residential Development

1.3.1 The Proposed Development consist of 1 residential tower, providing not more than 342 residential units. The residential tower is situated atop a 3 storeys podium for shop and services, eating place, and clubhouse with two level of basements for carparking and loading/ unloading spaces.

1.3.2 The development parameters of the Proposed Development are shown in Appendix 1.1.

2. DRAINAGE IMPACT ASSESSMENT

- 2.1.1 Surface runoff is mainly from rainfall, and it would be directly to existing public storm drains. As the paved and unpaved area for the Application Site remain unchanged, the proposed development can be completed without aggravating the flooding conditions within, upstream, or downstream of the Application Site. Therefore, it is anticipated that there will not be any impact on the existing drainage system. As such, no upgrading work on the drainage system is required.

3. SEWERAGE IMPACT ASSESSMENT

3.1 Scope of Work

3.1.1 The aim of this SIA is to assess whether the capacity of the sewerage network serving the Application Site is sufficient to cope with the sewage flow from the proposed development.

3.2 Assessment Criteria and Methodology

3.2.1 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.

3.2.2 Environmental Protection Department's (EPD's) Guidelines for Estimating Sewage Flows for Sewerage 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.

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

- Residential housing: 0.19m³/day (Private R1)
- Restaurant & Hotel: 1.58m³/day (Commercial Employee and J10 – Restaurant & Hotel)
- Wholesale & Retail: 0.28m³/day (Commercial Employee and J4 – Wholesale & Retail)
- Industrial: 1.08m³/day (Industrial Employee and J1 – Yau Tong)

3.2.4 The catchment inflow factor, PCIF of 1.1 (East Kowloon), is adopted in catchment calculations.

3.3 Existing and Future Sewerage System

3.3.1 With reference to the sewerage impact assessment of the Yau Tong Inland Lots (YTILs) 4 S.B & 9, Yau Tong Marine Lot (YTML) 57 and adjoining Government Land for the proposed amendments to Approved Scheme (under Application No. A/K15/119), the sewers of the area will be upgraded by the Charm Smart Development Limited. The future sewerage network proposed under the SIA of YTILs 4 S.B & 9, YTML 57 and adjoining Government Land is shown in Appendix 3.1.

3.3.2 All the sewage generated from the proposed development will be discharged to the terminal manhole (T0) which is located at the eastern side of the proposed development. The terminal manhole TMH-01 (S0) is connected to the planned manhole FMH4034524 (S1) outside the proposed development via a new Ø300mm polyethylene pipe.

3.3.3 Invert levels and pipe size of the proposed terminal manholes and new manholes are shown in Figure 3.1.

3.4 Wastewater Generated by the Proposed Development

3.4.1 The sewage generated by the proposed development will be mainly contributed by the residential units and restaurant.

3.4.2 Detailed calculation of sewage generation from the proposed development is given in Table 3.1 below.

Table 3.1 Estimated Peak Flow

<i>Calculation for Sewage Generation Rate of the Proposed Development at the Application Site</i>		
1. Proposed Residential Development		
Total number of residential units	= 342	units
Total number of residents	= 855	residents (refer to Census and Statistics Department 2021 data - average household size of 2.5 in Yau Tong West)
Design flow	= 0.19	m ³ /person/day -- (Private R1 in Table T-1 of GESF)
Sewage generation rate	= 162.5	m ³ /day
2. Club House		
Assumed Area	= 735	m ² (refer to Appendix 1.1)
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	= 34	employees
Design flow	= 200	litre/employee/day -- (refer to Table T-2 of GESF - J11 Community, Social & Personal Services)
Sewage generation rate	= 6.7	m ³ /day
3. Swimming Pool		
Assumed area	= 250	m ² (refer to Appendix 1.1)
Average depth of water	= 1.5	m (assumption)
Volume of swimming pool	= 375	m ³
Turnover rate	= 6	hr
Surface loading rate of filter	= 50	m ³ /m ² /hr
Filter areas required	= 1.3	m ²
Backwash duration	= 3	min/d
Backwash flow rate	= 30	m ³ /m ² /hr
Design flow for swimming pool backwashing	= 37.5	m ³ /hr
Design flow for swimming pool backwashing	= 10.4	litre/sec
4. Retail		
Assumed area	= 1306.3	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	= 80	employees
Design flow	= 200	litre/employee/day -- (refer to Table T-2 of GESF – J4 Wholesale & Retail)
Sewage generation rate	= 12.9	m ³ /day
5. F&B		
Assumed used area	= 870.8	m ²
Assumed floor area per employee	= 19.6	m ² per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	= 44	employees
Design flow for commercial employee	= 80	litre/employee/day -- (refer to Table T-2 of GESF)
Design flow for commercial activities	= 1500	litre/employee/day -- (refer to Table T-2 of GESF Job Type J10)
Sewage generation rate	= 69.5	m ³ /day
Flow rate (without swimming pool)	= 251.6	m ³ /day

Flow rate with P_{CIF} (without swimming pool)	=	276.7	m ³ /day (refer to Table T-4 of GESF – East Kowloon - 1.0)
Contributing population	=	1025	people
Peaking factor	=	6	(refer to Table T-5 of GESF for a population between 1000-5000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	17.5	litre/sec
Peak flow (with swimming pool)	=	<u>27.9</u>	litre/sec
Remark:			
(1) CAP 132, Section 42 Swimming Pools Regulation: Covered pool: Turnover rate = once every 4 hours, Open Air Pool: Turnover rate = once every 6 hours			

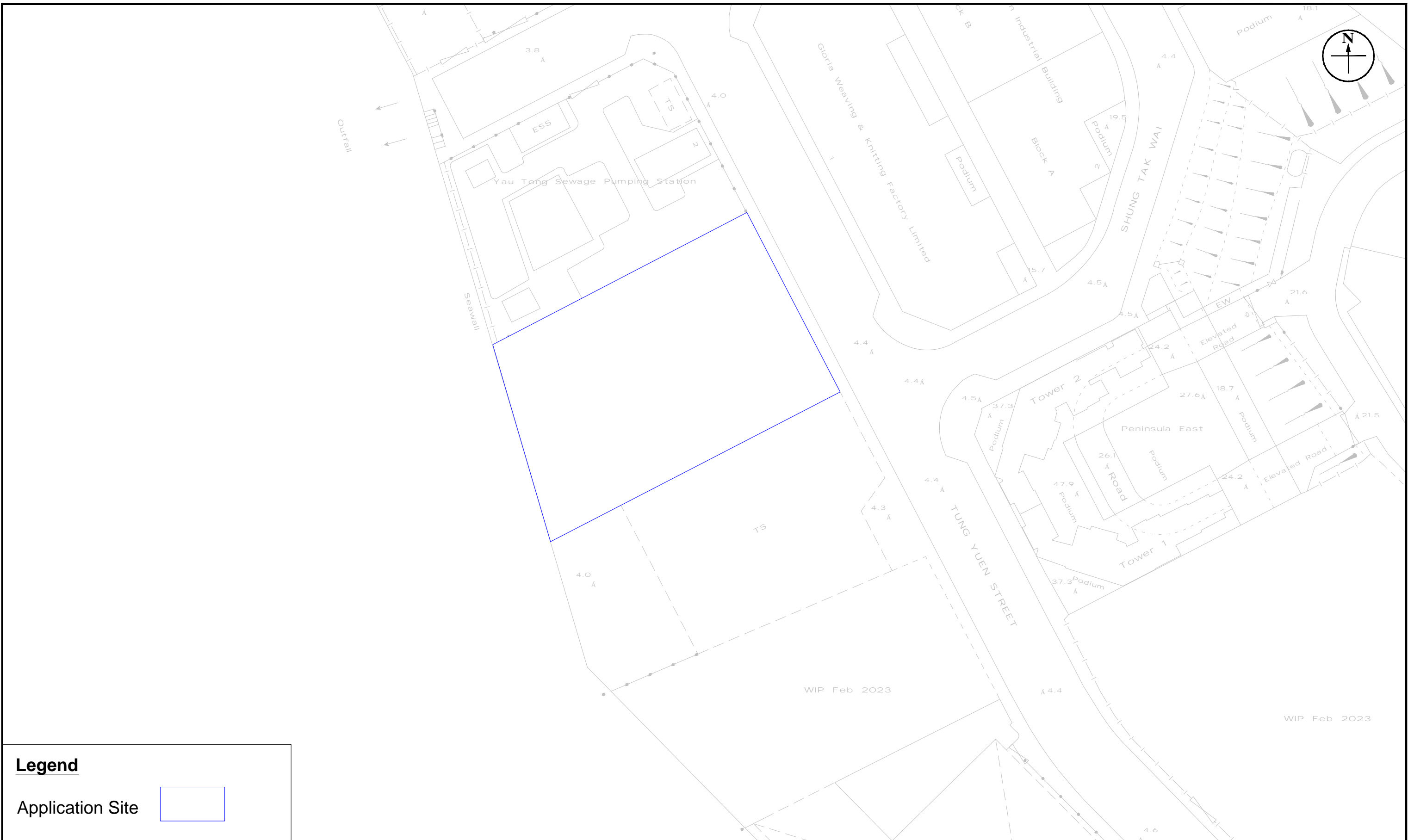
3.5 Assessment of Sewerage Impact

- 3.5.1 Sewage generated from the proposed development will be discharged via the terminal manhole to the existing public manhole FMH4034524 (S1) at Tung Yuen Street as shown in Figure 3.1. Catchments in the vicinity of the Application Site are shown in Figure 3.2.
- 3.5.2 Detailed calculation of sewage generation, peak flow estimation and the capacity of the public sewer can be referred to Appendix 3.2. Based on the assessment results, there would be sufficient capacity for the future public sewers to cater for the sewage generated from the Proposed Development as well as the surrounding existing buildings and nearby approved developments.
- 3.5.3 No further upgrading of the future public sewers is required.

4. OVERALL CONCLUSION

- 4.1.1 As the paved and unpaved area for the Application Site remain unchanged, the proposed development can be completed without aggravating the flooding conditions within, upstream, or downstream of the Application Site. Therefore, it is anticipated that there will not be any impact on the existing drainage system. As such, upgrading work on the drainage system is NOT required.
- 4.1.2 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 future sewerage system in the vicinity which is to be constructed by Charm Smart Development Limited.
- 4.1.3 Based on the results of sewerage impact assessment, as shown in Appendix 3.2, the capacity of planned future sewerage system will be sufficient to cater for the sewage generated from the proposed development. Upgrading on the future sewerage system is NOT required.
- 4.1.4 This DIA and SIA confirm the feasibility of the proposed development in terms of its drainage and sewerage impact.

Figures



Legend

Application Site

Figure: 1.1	RAMBOLL
Title: Location of the Application Site and its Environ	Drawn by: SC
Project: Proposed Flats, Shop and Services, and Eating Places with Minor Relaxation and Domestic and Non-domestic Plot Ratio and Building Height Restriction in "Residential (Group E)" Zone at Nos.4 Tung Yuen Street, Yau Tong, Kowloon	Checked by: TC
	Rev.: 1.0
	Date: Nov 2024

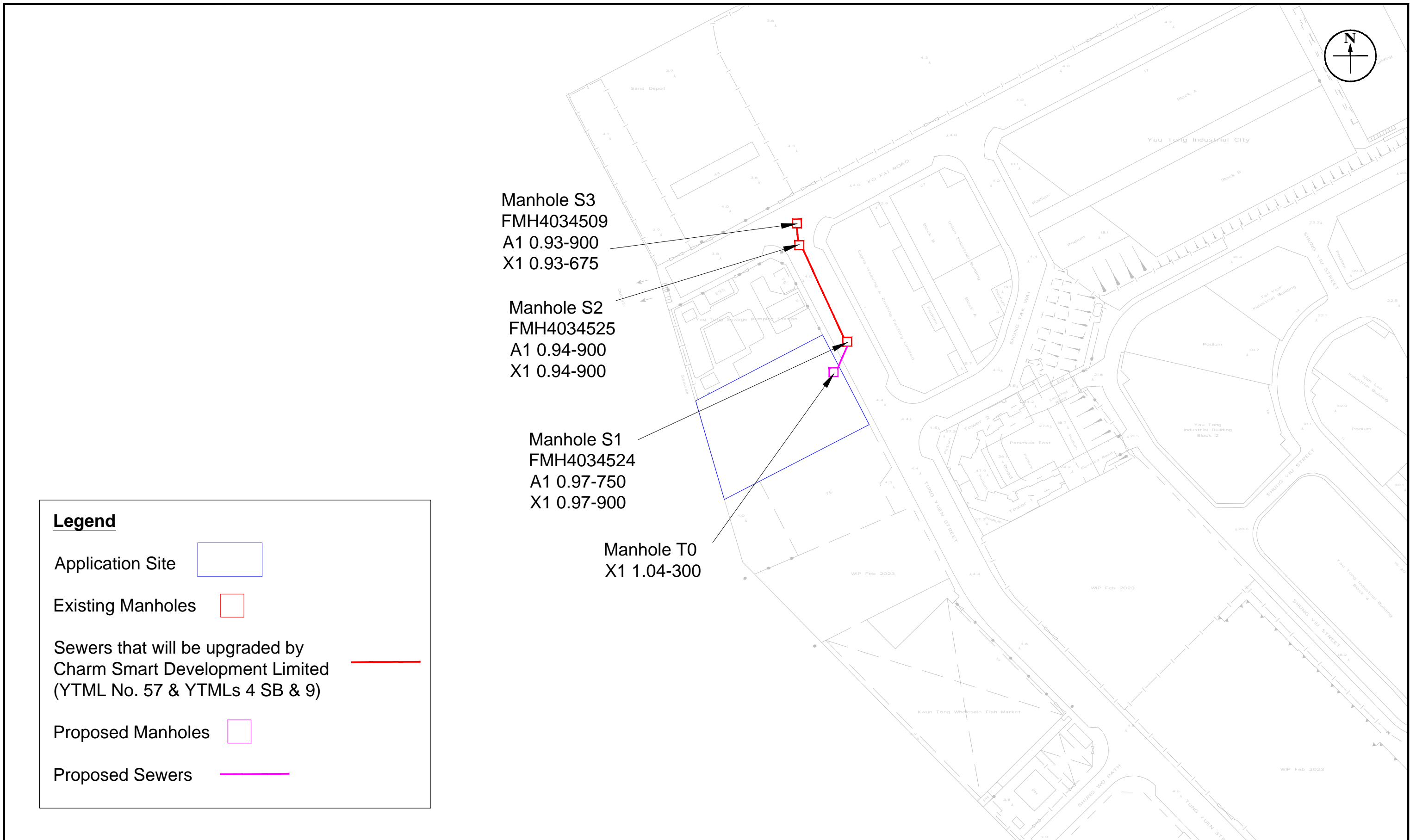


Figure: 3.1

Title: Sewerage System in the Vicinity of the Subject Site

Project: Proposed Flats, Shop and Services, and Eating Places with Minor Relaxation and Domestic and Non-domestic Plot Ratio and Building Height Restriction in "Residential (Group E)" Zone at Nos.4 Tung Yuen Street, Yau Tong, Kowloon

RAMBOLL

Drawn by: SC

Checked by: TC

Rev.: 1.0

Date: Nov 2024

Appendix

Appendix 1.1 Key Development Parameters

4.3 Key Development Parameters

4.3.1 The key development parameters of the Proposed Scheme as compared with the OZP Scenario (i.e. Development Parameters of “R(E)” zone under the OZP) are summarised in **Table 4-1** below.

Table 4-1 Key Development Parameters of the Proposed Scheme

Key Development Parameters	OZP Scenario (i.e. Development Parameters of “R(E)” zone under the OZP) (a)	Proposed Scheme (b)	Differences/ Compliance (b) – (a)
Site Area (m²)	About 2,419m ²	About 2,419m ²	-
Proposed Uses	‘Flat’ is Column 2 use; ‘Shop and Services’ and ‘Eating Place’ are always permitted on the lowest three floors of a building, taken to include basements., excluding floors containing wholly or mainly car parking, loading/unloading bays and/or plant room)	‘Flat’ is Column 2 use; ‘Shop and Services’ and ‘Eating Place’ are always permitted on the lowest three floors of a building, taken to include basements., excluding floors containing wholly or mainly car parking, loading/unloading bays and/or plant room)	Column 2 uses (S16 Application required)
Plot Ratio (PR)			
- Total PR	Not more than 6	Not more than 6.9 ^[1]	+ 15%
- Domestic PR	Not more than 5	Not more than 6	+ 20%
- Non-domestic PR	Not more than 1	Not more than 0.9 ^[2]	-
Gross Floor Area (GFA) (m²) ^[1]			
- Total GFA (excluding Bonus GFA to be claimed)	Not more than 14,514m ²	Not more than 16,691.1m ²	+ 15%
- Domestic GFA (excluding Bonus GFA to be claimed)	Not more than 12,095m ²	Not more than 14,514m ²	+ 20%
- Non-domestic GFA	Not more than 2,419m ²	Not more than 2,177.1m ² ^[2]	-
Bonus Plot Ratio (Bonus GFA)	Provision under Remark (5) of the Notes of “R(E)” zone	Not more than 0.082 ^[3] (to be included in Domestic PR) (Not more than 198m ²)	Provision under Remark (5) of the Notes of “R(E)” zone
Building Height (BH) (mPD)	Not more than 80mPD	80mPD to 100mPD (for inland portion only)	+25% (for inland portion only)
No. of Storeys	N/A	22 - 28 storeys (for inland portion only), excluding 2 storeys of basement carpark	-

Key Development Parameters	OZP Scenario (i.e. Development Parameters of "R(E)" zone under the OZP (a))	Proposed Scheme (b)	Differences/ Compliance (b) – (a)
Site Coverage (SC)			
- Below 15m	N/A	Not more than 70%	-
- Above 15m	N/A	Not more than 33.3%	-
No. of Residential Block	N/A	1	-
No. of Flats	N/A	About 342	-
Average Flat Size	N/A	About 43m ²	-
Anticipated Population	N/A	About 855 ^[4]	-
Local Open Space	N/A	Total area of not less than 855m ² , which includes a voluntary waterfront promenade of not less than 608m ² for public access and enjoyment	-
Greenery Provision	N/A	Not less than 20%	-
Car Parking Spaces			
Private Car Parking Spaces	N/A	63 (incl. 2 accessible car parking spaces)	
- Residential	N/A	50	-
- Visitor	N/A	5	-
- Shop and Services/ Eating Place	N/A	8	-
Motorcycle Parking Spaces	N/A	4	
Loading/ Unloading (L/UL) Bays	N/A	3 (1 Light Goods Vehicle Space and 2 Heavy Goods Vehicle Spaces)	-
Completion Year	N/A	2032	-

Notes:

- [1] Proposed clubhouse GFA (5% of total domestic GFA) is exempted from GFA calculation.
- [2] The area of the covered public passageway (about 223m²) for public access from Tung Yuen Street to the waterfront promenade through our proposed building at ground level is not included in the non-domestic GFA of 2,177.1m². Considering the nature of serving the public and users of the proposed development with reference to PNAP APP-108, the 223m² is proposed as an exempted GFA.
- [3] On top of the PR/GFA set out above, a bonus PR of not more than 0.082 (equivalent to a GFA of not more than 198m²) will be claimed for the 39.586m² of ODP-required setback areas. While the bonus PR will be subject to approval by the Building Authority under Building (Planning) Regulations (B(P)R) 22(2) at detailed design stage, nevertheless, the bonus PR has been incorporated in the building bulk (including BH) of the Proposed Scheme and adopted in the technical assessments.
- [4] A person per flat (PPF) ratio of 2.5 is adopted with reference to the average domestic household size of the subject Yau Tong West District Council Constituency Area as reported in the 2021 Population Census results published by the Census and Statistics Department.

Appendix 3.1 Future Sewerage Network Proposed under the SIA of YTILs 4 S.B & 9, YTML 57 and adjoining Government Land

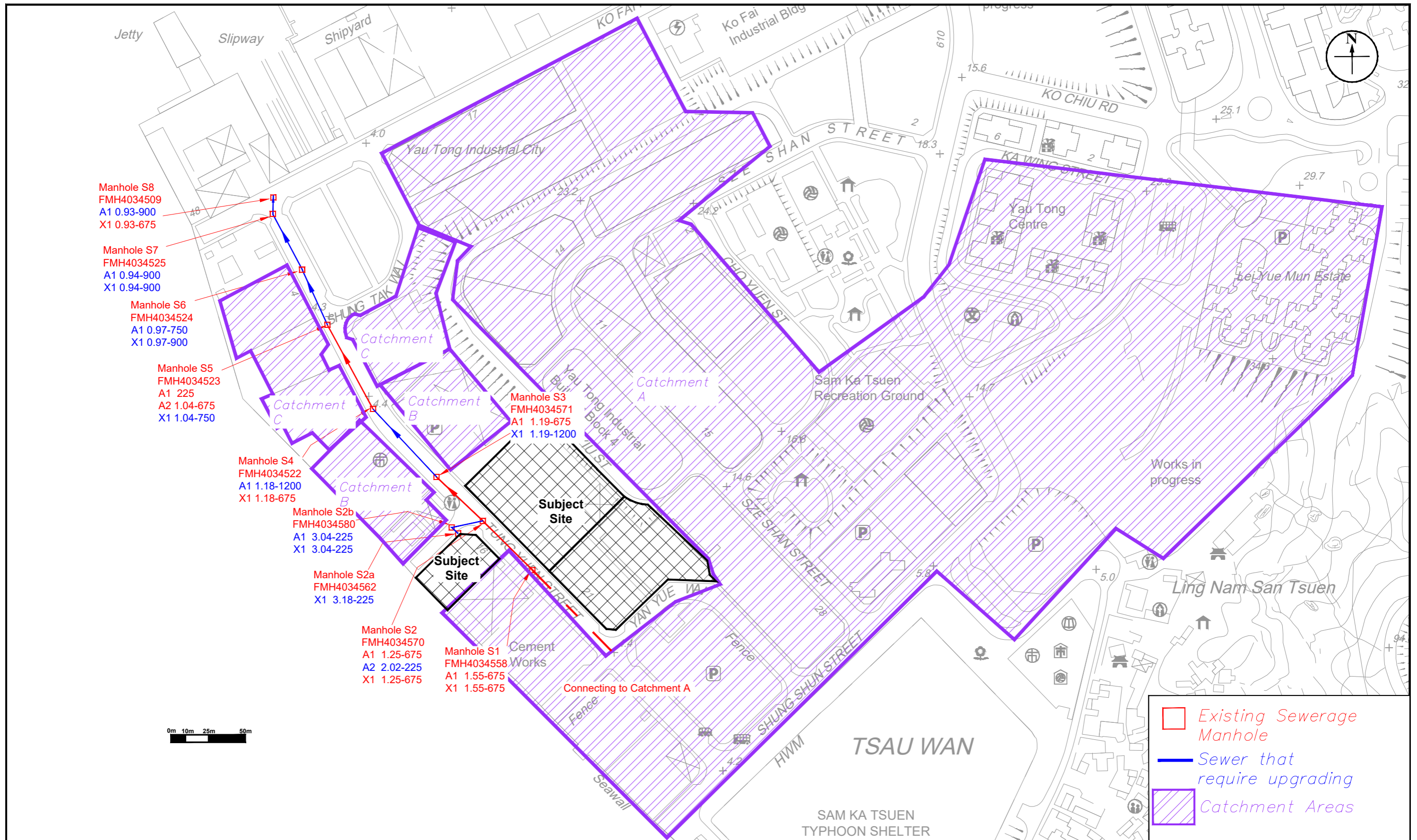


Figure: 4

Title: Existing Sewerage System and Catchment Areas in the Vicinity of the Subject Site

Project: Drainage and Sewerage Impact Assessment for Proposed Development at YTML No. 57 and YTILs 4 sB & 9, and Adjoining Government Land, Yau Tong

RAMBOLL

Drawn by: VC

Checked by: TC

Rev.: 1.1

Date: Nov 2020

Appendix 3.2 Detailed Sewerage Impact Assessment Calculations

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

1. Proposed Residential Development	Remarks
1. Residential Towers (T1-T3)	
a. Total number of units	= 342 units
b. Total number of residents	= 855 people -- (average household size of 2.5 from Hong Kong 2021 Population Census -Yau Tong West)
c. Design flow	= 0.19 m ³ /person/day -- (Private R1 in Table T-1 of GESF)
d. Sewage Generation rate	= 162.5 m ³ /day
2. Club House	
a. Assumed used area	= 735 m ²
b. Assumed floor area per employee	= 30.3 m ² per employee -- (refer to Table 8 of CIFSUS - Community, Social & Personal Services)
c. Total number of employees	= 24 employees
d. Design flow for commercial employee	= 80 litre/employee/day -- (refer to Table T-2 of GESF)
e. Design flow for commercial activities	= 200 litre/employee/day -- (refer to Table T-2 of GESF Job Type J11)
f. Sewage generation rate	= 6.7 m ³ /day
3. Swimming Pool	
a. Assumed Area of Swimming Pool	= 250 m ²
b. Average Depth of Water	= 1.5 m (assumption)
c. Volume of Swimming Pool	= 375 m ³
d. Turnover Rate	= 6 hr
e. Surface Loading Rate of Filter	= 50 m ³ /m ² /hr
f. Filter Areas required	= 1.3 m ²
g. Backwash Duration	= 3 min/d
h. Backwash flow rate	= 30 m ³ /m ² /hr
i. Design flow for Swimming Pool Backwashing	= 37.5 m ³ /hr
j. Design flow for Swimming Pool Backwashing	= 10.4 litre/sec
4. Retail	
a. Assumed used area	= 1306.3 m ²
b. Assumed floor area per employee	= 28.6 m ² per employee -- (refer to Table 8 of CIFSUS - Retail Trade)
c. Total number of employees	= 46 employees
d. Design flow for commercial employee	= 80 litre/employee/day -- (refer to Table T-2 of GESF)
e. Design flow for commercial activities	= 200 litre/employee/day -- (refer to Table T-2 of GESF Job Type J4)
f. Sewage generation rate	= 12.9 m ³ /day
5. F&B	
a. Assumed used area	= 870.8 m ²
b. Assumed floor area per employee	= 19.6 m ² per employee -- (refer to Table 8 of CIFSUS - Restaurant)
c. Total number of employees	= 44 employees
d. Design flow for commercial employee	= 80 litre/employee/day -- (refer to Table T-2 of GESF)
e. Design flow for commercial activities	= 1500 litre/employee/day -- (refer to Table T-2 of GESF Job Type J10)
f. Sewage generation rate	= 69.5 m ³ /day
Total Flow at Manhole T0	
Flow Rate (Without Swimming Pool)	= 251.6 m ³ /day
Flow Rate with inflow factor (Without Swimming Pool)	= 276.7 m ³ /day (Catchment Inflow Factor for East Kowloon = 1.1)
Population	= 1025 people
Peaking factor	= 6 Refer to Table T-5 of GESF for population 1,000 - 5,000 including stormwater allowance
Peak Flow (Without Swimming Pool)	= 17.5 litre/sec
Peak Flow (With Swimming Pool)	= 27.9 litre/sec

Table 2a Hydraulic Capacity at Sewers along Tung Yuen Street, Yau Tong

Segment	Manhole Reference	Manhole Reference	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	
T0-S1	Terminal Manhole	FMH4034524	300	9.5	1.04	0.97	9.81	0.0015	0.007	0.000001	1.19	0.07	0.08	84
S1-S2	FMH4034524	FMH4034525	900	41.7	0.97	0.94	9.81	0.0015	0.001	0.000001	0.75	0.64	0.48	477
S2-S3	FMH4034525	FMH4034509	900	8.0	0.94	0.93	9.81	0.0015	0.001	0.000001	0.99	0.64	0.63	629

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

(2) The value of k_s = 1.5 mm is used with reference to Slimed uPVC Sewers, poor example in Table 5 of Sewerage Manual Part 1.

(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 pipe information in Table 2a is obtained from Sewerage Impact Assessment for Proposed Development at YTML No. 57 and YTILs 4 sB & 9, and Adjoining Government Land, Yau Tong (R7481_v1.3)

Table 3a Hydraulic Capacity of Sewers (Catchment A)

1. Full Bore of Pipes FWD4036773, FWD4036778 and FWD4125280 (Assumption)

Pipe Reference	Manhole Reference	Manhole Reference	Pipe Dia.	Pipe Length	Upstream Invert Level	Downstream Invert Level	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	
FWD4036773	FMH4034555	FMH4034556	600	39.7	1.89	1.86	9.81	0.006	0.001	0.000001	0.48	0.28	0.14	137
FWD4036778	FMH4034561	FMH4034556	225	46.7	2.14	1.84	9.81	0.006	0.006	0.000001	0.72	0.04	0.03	29
FWD4125280	FMH4099933	FMH4034556	225	15.9	2.14	2.10	9.81	0.006	0.003	0.000001	0.45	0.04	0.02	18
													Sub-total	183

Remarks:

- (1) g=gravitational acceleration; k_s=equivalent sand roughness; s=gradient; v=kinematic viscosity of water; V=mean velocity
- (2) The value of k_s = 6mm is used for the calculation of concrete sewer (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 pipe information is obtained from Geoinfo Map.

2. 18 Tung Yuen Street (From Sewerage Impact Assessment for Proposed Development at YTML No. 57 and YTILs 4 sB & 9, and Adjoining Government Land, Yau Tong (R7481_v1.3))

- a. Sewage Generation rate at FMH4034557 = 91 m³/day (from EPD)
- b. Sewage Generation rate at FMH4034558 = 136 m³/day (from EPD)
- c. Total Dewaterage Generate rate = 227 m³/day

3. Application for Proposed Admendments to Approved Scheme (under Application No. A/K15/119) in “CDA(3)” Zone and Area Shown as ‘Road’, at YTML No. 57, YTILs No. 4 sB and 9, and Adjoining Government Land, Tung Yuen Street, Yau Tong, Kowloon (R7481_v1.3)

- a. Sewage Generation rate = 1075.2 m³/day

4. Residential (Other Proposed Residential Development ref. YTML No. 69 & YTIL No. 4RP) (From Sewerage Impact Assessment for Proposed Development at YTML No. 57 and YTILs 4 sB & 9, and Adjoining Government Land, Yau Tong (R7481_v1.3))

- a. Sewage Generation rate = 627 m³/day (from EPD)

5. Commercial (Kwun Tong Wholesale Fish Market and Tung Yuen Street Cooked Food Market) (From Sewerage Impact Assessment for Proposed Development at YTML No. 57 and YTILs 4 sB & 9, and Adjoining Government Land, Yau Tong (R7481_v1.3))

- a. Sewage Generation rate = 30 m³/day

6. Peninsula East (From Sewerage Impact Assessment for Proposed Development at YTML No. 57 and YTILs 4 sB & 9, and Adjoining Government Land, Yau Tong (R7481_v1.3))

- a. Sewerage Generate rate = 193.5 m³/day

7. Industrial (Redland Concrete Limited) (From Sewerage Impact Assessment for Proposed Development at YTML No. 57 and YTILs 4 sB & 9, and Adjoining Government Land, Yau Tong (R7481_v1.3))

- a. Sewerage Generate rate = 27 m³/day

Total Flow at Manhole S1 (FMH4034524), including Proposed Development and Catchment A

- Flow Rate (Without Swimming Pool & Item 1 of Catchment A) = 2431.3 m³/day
- Flow Rate with inflow factor (Without Swimming Pool) = 2674.4 m³/day (Catchment Inflow Factor for East Kowloon = 1.1)
- Population = 9905 people
- Peaking factor = 5 Refer to Table T-5 of GESF for population 5,000 - 10,000 including stormwater allowance)
- Peak Flow (Without Swimming Pool) = 323.8 litre/sec
- Peak Flow (With Swimming Pool) = 334.2 litre/sec

Table 4a Comparison of the Hydraulic Capacity of Existing Sewers for Sewerage generated from the Proposed Development and Surrounding Catchment Areas

Segment	Pipe Dia. (mm)	Pipe Length (m)	Gradient	Estimated Capacity (L/s)	Estimated Flow including the Proposed Development only (L/s)	Contributed by the Proposed Development only (%)	Status	Estimated Flow including the Proposed Development and Catchment Areas (L/s)	Contributed by the Proposed Development and the Surrounding Catchment Areas (%)	Status	Included Catchment Area
T0-S1	300	9.5	0.0074	84	27.9	33.2%	OK	27.9	33.2%	OK	A
S1-S2	900	41.7	0.0007	477	27.9	5.9%	OK	334.2	70.1%	OK	A
S2-S3	900	8.0	0.0012	629	27.9	4.4%	OK	334.2	53.1%	OK	A