
Attachment 3

Revised Sewerage Impact Assessment

Prepared by

Ramboll Hong Kong Limited

**SECTION 16 PLANNING APPLICATION FOR PROPOSED
MINOR RELAXATION OF GROSS FLOOR AREA AND BUILDING
HEIGHT RESTRICTIONS FOR PERMITTED OFFICE USE AND
OTHER PERMITTED USES IN "COMMERCIAL (7)" ZONE
BOUNDED BY KING'S ROAD AND TAIKOO SHING ROAD,
QUARRY BAY**

SEWERAGE IMPACT ASSESSMENT

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Signed



Project Reference

SA1111KREI00

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1. INTRODUCTION

1.1 Background and Objectives

- 1.1.1 The "Commercial (7)" ("C(7)") zone bounded by King's Road and Taikoo Shing Road on the Quarry Bay Outline Zoning Plan (OZP) consists of 1111 King's Road (formerly known as Cityplaza One), Cityplaza and east HONG KONG.
- 1.1.2 The "C(7)" zone is subject to a maximum non-domestic gross floor area (GFA) of 123,129m² and is subject to 2 building height (BH) bands: 1111 King's Road and east HONG KONG are subject to maximum BH of 135mPD; while Cityplaza in between 1111 King's Road and east HONG KONG is subject to maximum BH of 45mPD.
- 1.1.3 In this planning application, to support office extension of 1111 King's Road, extra GFA and BH is required for 1111 King's Road. Therefore, two items that require planning permission from the Town Planning Board (the Board) are involved:
- Minor relaxation of the GFA restriction of "C(7)" zone from 123,129m² to 148,629m² (+25,500m² / 20.7%)
 - Minor relaxation of the BH restriction of 1111 King's Road from 135mPD to 165mPD (+30m / 22.2%)
- 1.1.4 The increase in GFA and BH will be absorbed by 1111 King's Road only, other buildings in the "C(7)" zone will not be affected.
- 1.1.5 The location of "C(7)" Zone and 1111 King's Road extension is shown in **Figure 1.1**.
- 1.1.6 Ramboll Hong Kong Limited is commissioned by the project proponent to carry out sewerage impact assessment for the additional sewage generated from the development arising from the proposed minor relaxation of GFA and BH restrictions.

1.2 Proposed Development

- 1.2.1 The Applicant proposes additional GFA and BH to 1111 King's Road for its extension above the existing office building. The proposed extension will be constructed on top of the existing office building, no changes to the existing 1111 King's Road will be made.
- 1.2.2 The existing GFA of 1111 King's Road is about 78,069m². This planning application applies for an increase in office GFA, bringing 13 new storeys to the existing office building of 1111 King's Road, involving 25,500m² increase in GFA for office use. Out of the 13 new storeys, 10 storeys will be for office use, 2 floors are for mechanical and electrical (M&E) facilities, and 1 floor will be designated as refuge floor-cum-sky garden. **Figure 1.2** shows the indicative floor plan of 1111 King's Road extension and section plan.
- 1.2.3 The tentative completion of Proposed Development is in Year 2029.

Figure 1.1 **Location of "C(7)" Zone and 1111 King's Road Extension**

Figure 1.2 **Indicative Floor Plan of 1111 King's Road Extension and Section Plan**

2. SEWERAGE IMPACT ASSESSMENT

2.1 Scope of Work

- 2.1.1 The aim of this SIA is to assess if existing sewerage network is sufficient to cope with the additional sewage flow from the Proposed Development and propose corresponding mitigation measures if necessary.

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. 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 of commercial activities have been adopted in the SIA calculation in accordance with Tables T-1, T-2 and T-3 of the GESF:
- J6 – Finance, Insurance, Real Estate & Business Services: 0 m³/day
- 2.2.4 The catchment inflow, P_{CIF} of 1.25 (Shau Kei Wan), is adopted in catchment calculations.

2.3 Existing Sewerage System

- 2.3.1 According to the Geoinfo Map, the sewers discharged from Proposed Development will be conveyed to the existing public manhole FMH7036243.

2.4 Wastewater Generated by the Existing and Proposed Development

- 2.4.1 The increase in GFA covers the use of office use, M&E facilities and refuge floor-cum-sky garden. As a conservative assessment, it is assumed all additional area is for office use.
- 2.4.2 Detailed calculations of sewage generation from the Existing and Proposed Development are given in **Table 2-1** below and **Appendix 2.1**.

Table 2-1 Estimated Peak Flow from the Proposed Development

Calculation for Sewage Generation Rate of the Proposed Development at the Subject Site			
1. Office			
Assumed Area	=	25500	m ²
Assumed floor area per employee	=	18.2	m ² per employee -- (refer to Table 8 of CIFSUS – Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	1403	employees
Design flow for commercial employees	=	0.08	m ³ /employee/day – (refer to Table T-3 of GESF – J6 Finance, Insurance, Real Estate & Business Services)
Sewerage generation rate	=	112.2	m ³ /day
Total Flow from the Proposed Development			
Flow rate	=	112.2	m ³ /day
Flow rate with P _{CF}	=	140.3	m ³ /day (refer to Table T-4 of GESF – Shau Kei Wan - 1.25) people (refer to Section 12 of GESF -- Contributing population is the Flow rate with P _{CF} ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Contributing population	=	520	(refer to Table T-5 of GESF for a population between 5,000 – 10,000 incl. stormwater allowance)
Peaking factor	=	8	
Peak flow	=	13.0	litre/sec

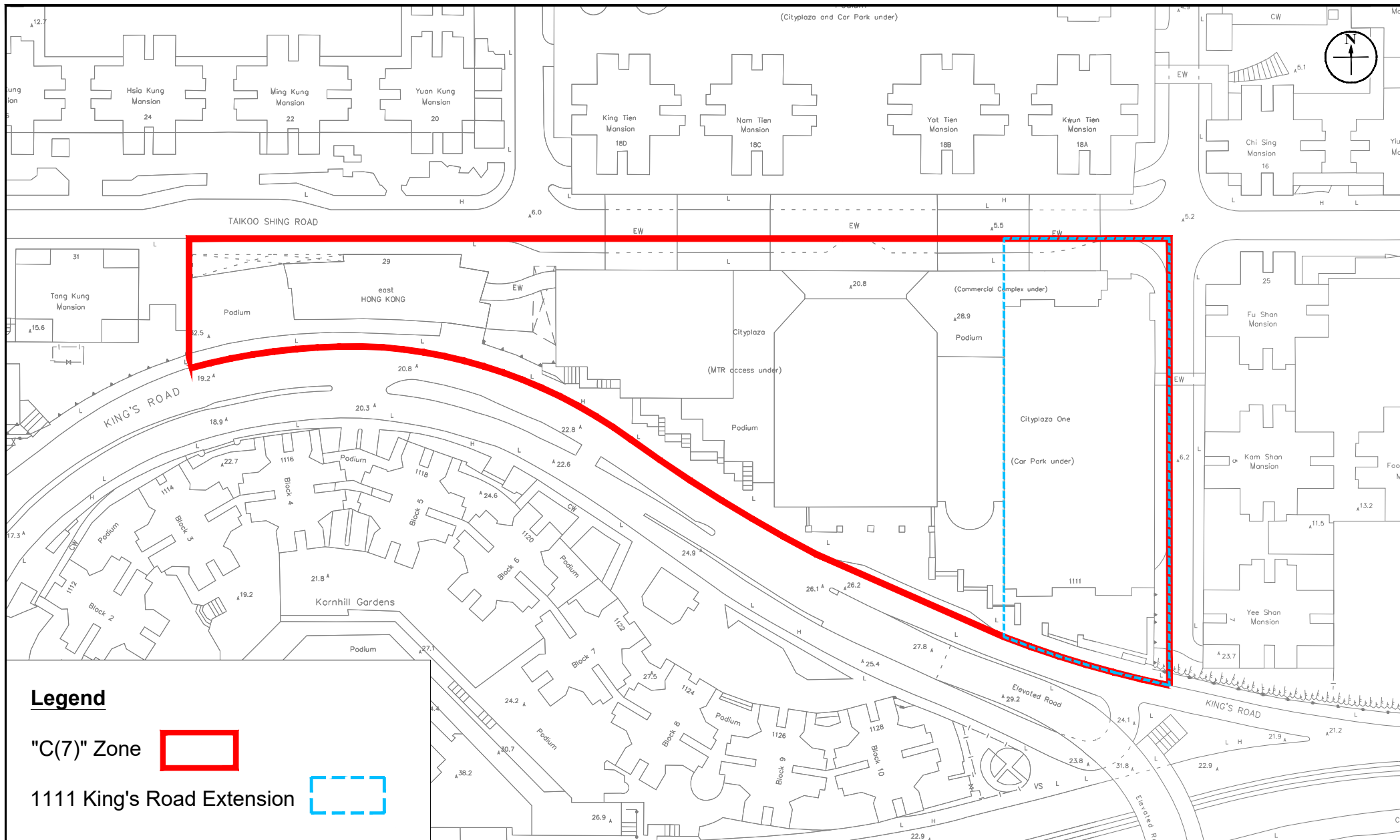
2.5 Assessment of Sewerage Impact

- 2.5.1 Sewage generated from the Proposed Development will be discharged to the existing public manhole FMH7036243 at Taikoo Shing Road as shown in **Figure 2.1**. The sewerage record plans obtained from Drainage Services Department (DSD) are attached in **Appendix 2.2**. Catchment in the vicinity of the Subject Site is shown in **Figure 2.2**.
- 2.5.2 Detailed calculation of sewage generation, peak flow estimation and the capacity of the public sewers can be referred to **Appendix 2.1**. Based on the assessment results, sewers (FMH7036243 to FMH7036248, FMH7036249 to FNH7036270 and FSH7001300 to FMH7036294) would not have sufficient capacity for the future public sewers to cater for the sewage generated from the Proposed Development as well as the surrounding existing buildings.
- 2.5.3 Upgrading works on the sewers (FMH7036243 to FMH7036248, FMH7036249 to FNH7036270 and FSH7001300 to FMH7036294) by the project proponent are required. About 383m of sewers required upgrading works. The details of the proposed upgrading sewers can be referred to **Table 13 of Appendix 2.1** and **Figure 2.3**.
- 2.5.4 The sewerage generated from the Proposed Development would be conveyed to the nearby Tai Koo Shing Pumping Station (TKSPS) with its design capacity of 22,464m³ (i.e. 260 L/s). It will occupy 5% of the TKSPS which is deemed insignificant. Therefore, it can be deduced that the capacity of the TKSPS and the pipes connected to TKSPS are enough for the sewage generated from the Proposed Development. The contributions of sewage generated from the Subject Site on TKSPS can be referred to Table 13 of **Appendix 2.1**.
- 2.5.5 After the proposed upgrading pipe works, there would not have any adverse impact on the public sewerage system.

3. CONCLUSION

- 3.1.1 The potential sewerage impact arising from the Proposed Development has been quantitatively assessed by comparing the estimated sewage flow from the existing development and Proposed Development.
- 3.1.2 Based on the calculations as shown in **Appendix 2.1**, the increase in GFA for the Proposed Development would generate the peak flow of 13 L/s. Upgrading works on the sewers (FMH7036243 to FMH7036248, FMH7036249 to FNH7036270 and FSH7001300 to FMH7036294) are required. About 383m of sewers required upgrading works.
- 3.1.3 The capacity of existing sewers and Tai Koo Shing Pumping Station are sufficient to cater for the sewage generated from the Proposed Development.
- 3.1.4 After the proposed upgrading pipe works, there would not have any adverse impact on the public sewerage system

Figure



Legend

"C(7)" Zone



1111 King's Road Extension



Figure: 1.1

Title: Location of "C(7)" Zone and 1111 King's Road Extension

Project: Section 16 Planning Application for Proposed Minor Relaxation of Gross Floor Area and Building Height Restrictions for Permitted Office Use and Other Permitted Uses in "Commercial (7)" Zone Bounded by King's Road and Taikoo Shing Road, Quarry Bay

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Drawn by: SC

Checked by: TC

Rev.: 1.1

Date: Dec 2025

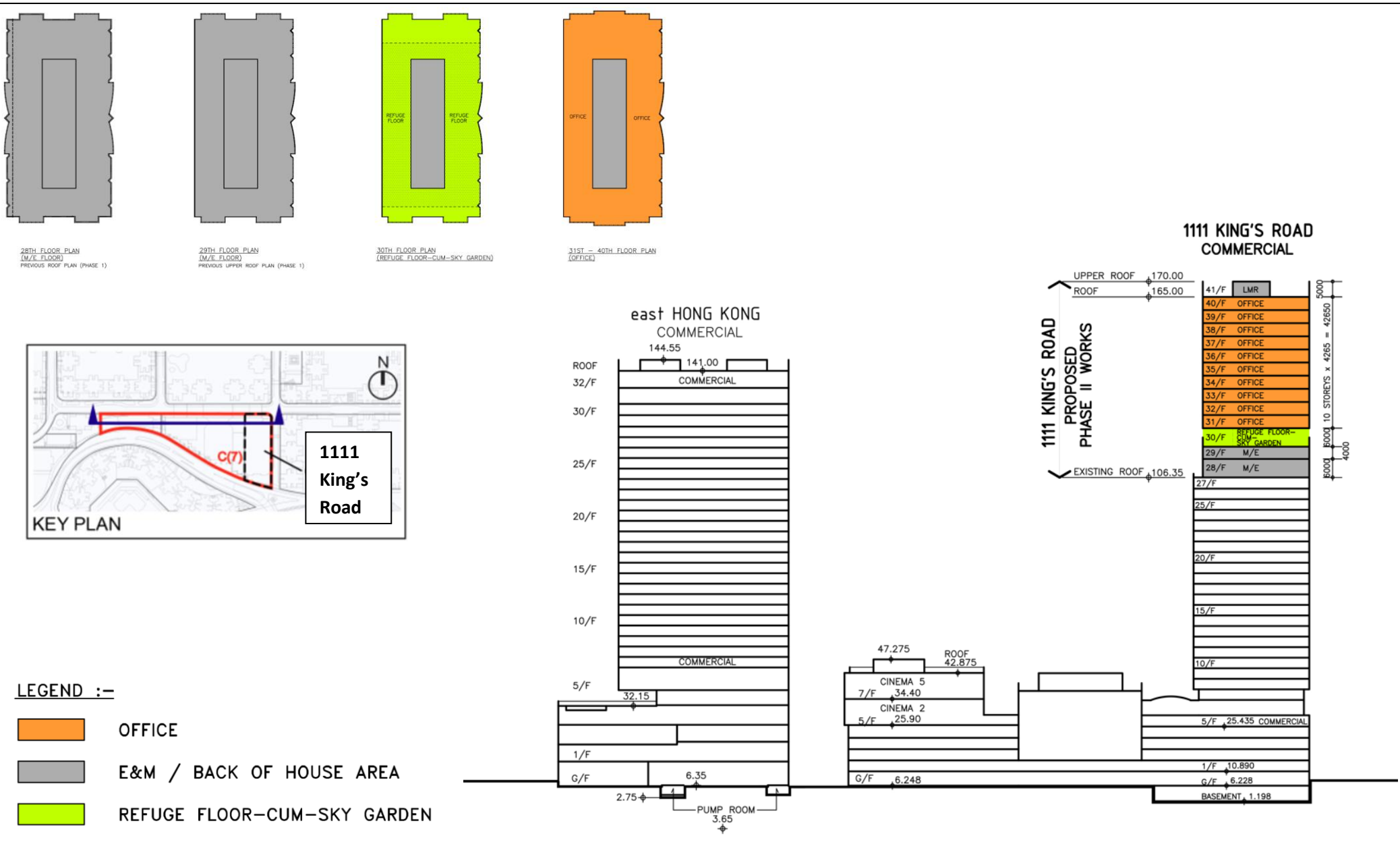


Figure: 1.2

Title: Indicative Floor Plan of 1111 King's Road Extension and Section Plan

Project: Section 16 Planning Application for Proposed Minor Relaxation of Gross Floor Area and Building Height Restrictions for Permitted Office Use and Other Permitted Uses in "Commercial (7)" Zone bounded by King's Road and Taikoo Shing Road, Quarry Bay



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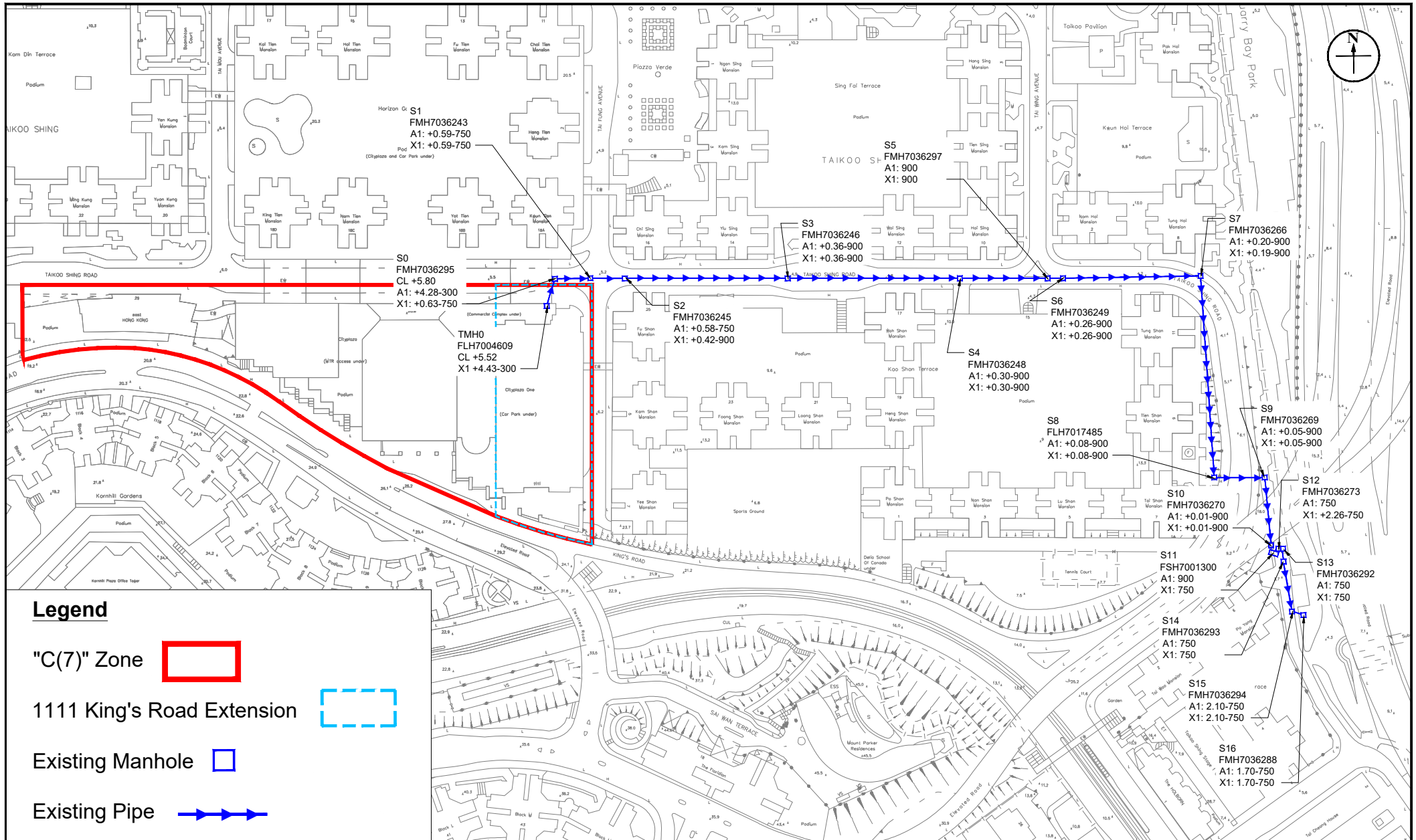


Figure: 2.1

Title: Existing Sewerage System in the Vicinity of the Subject Site

Project: Section 16 Planning Application for Proposed Minor Relaxation of Gross Floor Area and Building Height Restrictions for Permitted Office Use and Other Permitted Uses in "Commercial (7)" Zone Bounded by King's Road and Taikoo Shing Road, Quarry Bay

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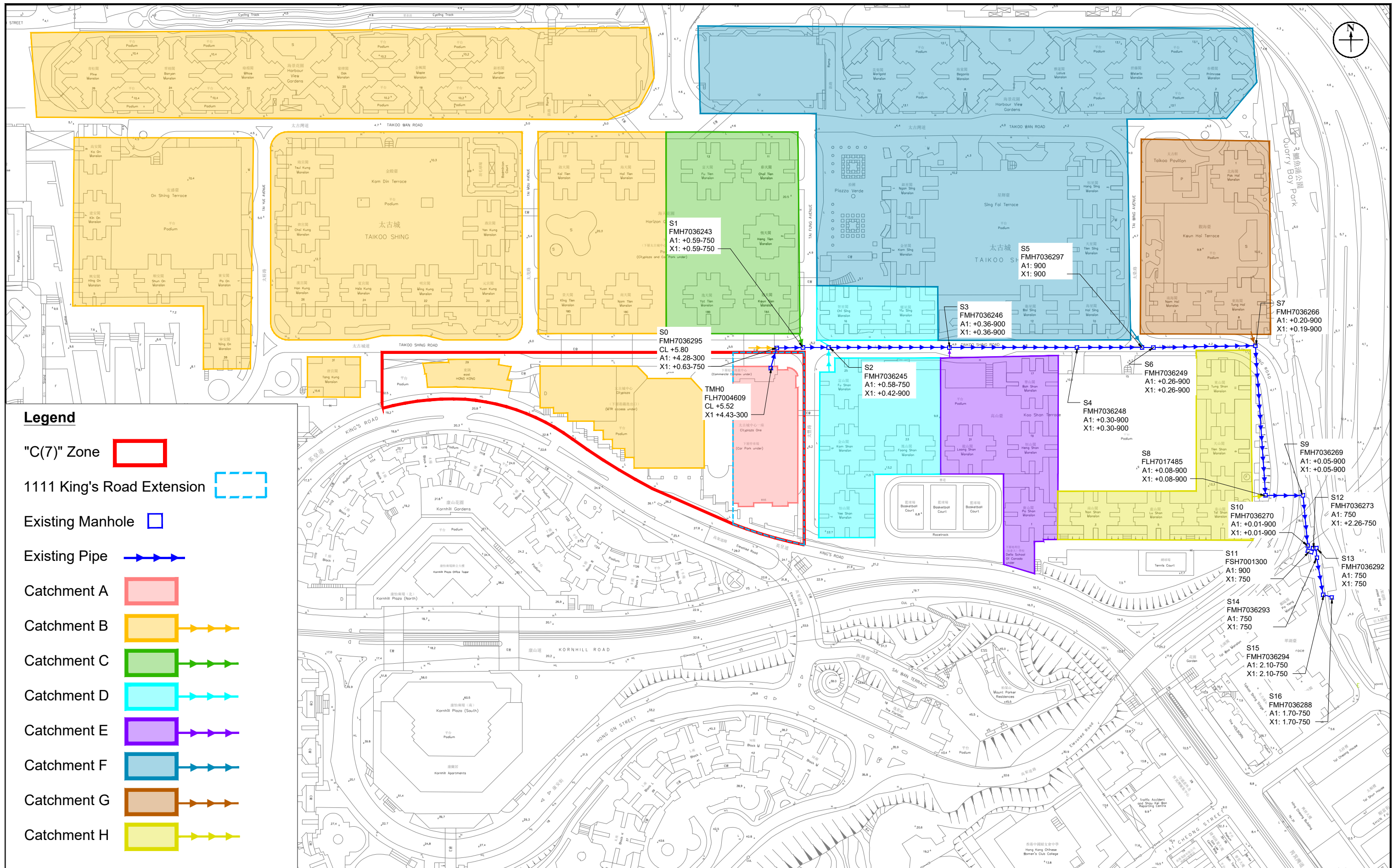


Figure: 2.2

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

Project: Section 16 Planning Application for Proposed Minor Relaxation of Gross Floor Area and Building Height Restrictions for Permitted Office Use and Other Permitted Uses in "Commercial (7)" Zone Bounded by King's Road and Taikoo Shing Road, Quarry Bay

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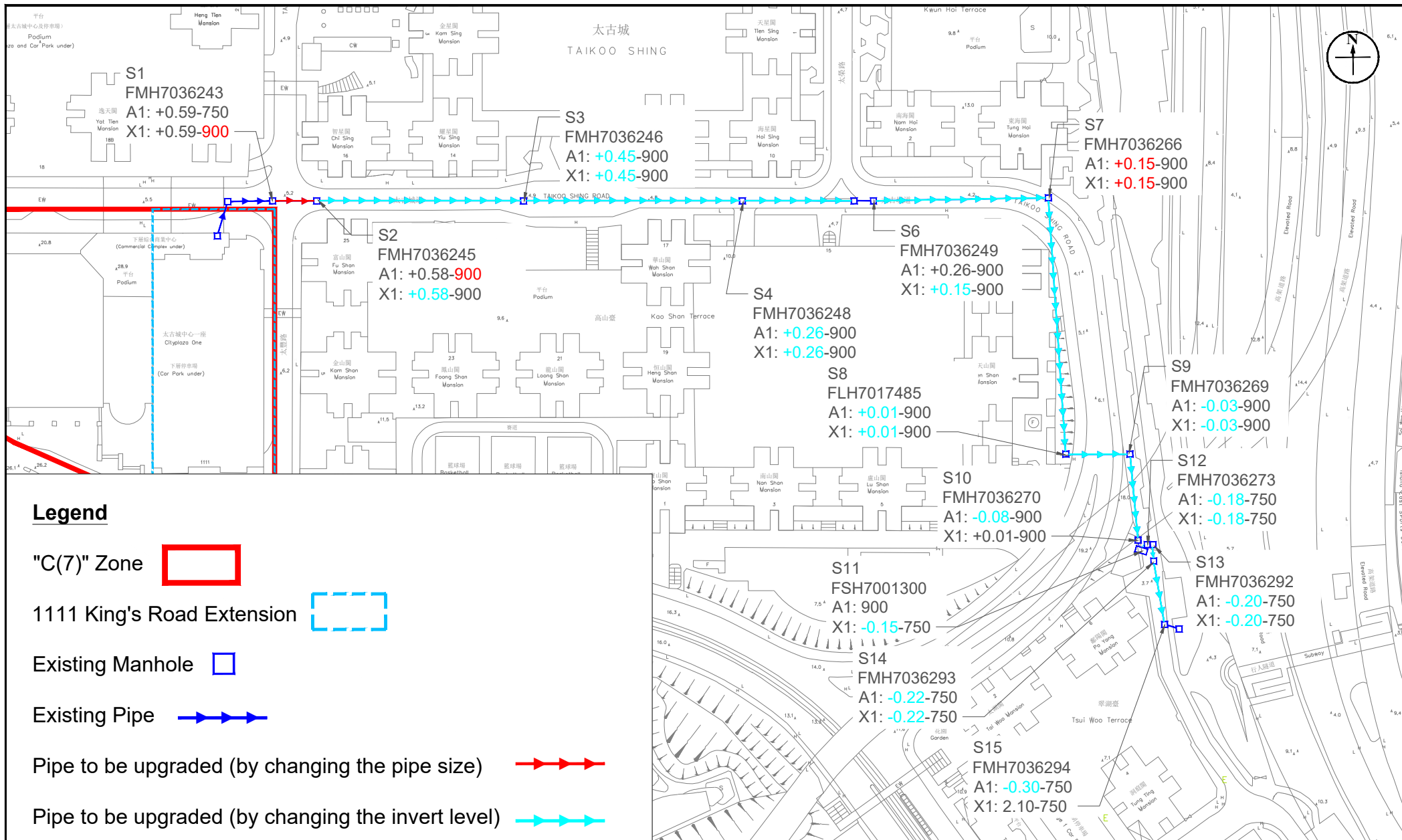


Figure: 2.3

Title: Proposed Upgrading Sewerage System

Project: Section 16 Planning Application for Proposed Minor Relaxation of Gross Floor Area and Building Height Restrictions for Permitted Office Use and Other Permitted Uses in "Commercial (7)" Zone Bounded by King's Road and Taikoo Shing Road, Quarry Bay

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Drawn by: SC

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Appendix 2.1 Detailed Sewerage Impact Assessment Calculations

Table 1 Calculation for Sewage Generation Rate of the Future Development (Proposed Additional Office at 1111 King's Road)

1. Office			
Assumed area	=	25500	m ²
Assumed floor area per employee	=	18.2	m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate & Business Services)
Total number of employees	=	1403	employees
Design flow for commercial employees	=	0.08	m ³ /employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate & Business Services)
Sewage generation rate	=	112.2	m ³ /day
Total Flow from the Future Development			
Flow rate	=	112.2	m ³ /day
Flow rate with P _{CIF}	=	140.3	m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	520	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	=	8	(refer to Table T-5 of GESF for a population <1,000 incl. stormwater allowance)
Peak flow	=	<u>13.0</u>	litre/sec

Table 2 Calculation for Sewage Generation Rate of Catchment A

1. 1111 King's Road

Assumed area	=	78069	m ²
Assumed floor area per employee	=	18.2	m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate and Business Services)
Total number of employees	=	4294.0	employees
Design flow for commercial employees	=	0.08	m ³ /employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate and Business Services)
Sewage generation rate	=	343.5	m ³ /day

Total Flow from the Future Development and Catchment A

Flow rate	=	455.8	m ³ /day
Flow rate with P _{CIF}	=	569.7	m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	2110	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 between 1,000 - 5,000 incl. stormwater allowance)
Peak flow	=	<u><u>39.6</u></u>	litre/sec

Table 3 Calculation for Sewage Generation Rate of Catchment B

1a. On Shing Terrace

Number of units	=	1357	units (from Centaline: https://hk.centanet.com/estate/en/Taikoo-Shing/2-OVDUURFSJJ)
Number of residents	=	3800	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27	m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	1026.0	m ³ /day

1b. Restaurants

Assumed area	=	2201	m ²
Assumed floor area per employee	=	19.6	m ² per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	112	employees
Design flow for commercial employees	=	1.58	m ³ /employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	177.4	m ³ /day

2. Kam Din Terrace

Number of units	=	1663	units (from centaline: https://hk.centanet.com/estate/en/Taikoo-Shing-Kam-Din-Terrace/2-OVDUURFSSJ)
Number of residents	=	4656	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27	m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	1257.1	m ³ /day

3a. East Hong Kong

Assumed area	=	20070.4	m ² (measured in Geoinfo Map 784 m2 x 32 xtoreys x 80%)
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	=	642	employees
Design flow for commercial employees	=	1.58	m ³ /employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	1014.8	m ³ /day

3b. East Hong Kong (Outdoor Swimming Pool)

Assumed area	=	300	m ² (Assumed 100m x 3m)
Assumed depth of water	=	1.5	m
Volume of water	=	450.0	m ³
Turnover Rate	=	6.0	hr (CAP132, Section 42 Swimming Pools Regulation (open air pool))
Surface loading rate of filter	=	50.0	m ³ /m ² /hr
Filter areas required	=	1.5	m ²
Backwashing flow rate	=	30.0	m ³ /m ² /hr
Design flow for backwashing	=	45.0	m ³ /hr
Backwash duration	=	3.0	min/day
Backwash generation rate	=	2.25	m ³ /day
Backwash generation rate	=	12.5	litre/sec

4a. City Plaza (Retail)

Assumed Area	=	21241	m ² (Assume 85% of GFA is Retail)
Assumed floor area per employee	=	29.4	m ² per employee -- (refer to Table 8 of CIFSUS - All Economic Activities (All Types))
Total number of employees	=	722.0	employees
Design flow for commercial employees	=	0.28	m ³ /employee/day -- (refer to Table T-2 of GESF)
Sewage generation rate	=	202.2	m ³ /day

4b. City Plaza (F&B)

Assumed Floor Area	=	3748	m ² (Assume 15% of GFA is F&B)
Assumed floor area per employee	=	19.6	m ² per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	191	employees
Design flow for commercial employees	=	1.58	m ³ /employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	302.1	m ³ /day

5a. Harbour View Gardens (West)

Number of units	=	1328	units (from Centaline: https://hk.centanet.com/estate/en/Taikoo-Shing/2-OVDUURFSUJ)
Number of residents	=	3718	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27	m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	1003.9	m ³ /day

5b. Swimming Pool in Harbour View Gardens

Assumed area	=	248.7	m ²
Assumed depth of water	=	1.5	m
Volume of water	=	373.0	m ³
Turnover Rate	=	6.0	hr (CAP132, Section 42 Swimming Pools Regulation (open air pool))
Surface loading rate of filter	=	50.0	m ³ /m ² /hr
Filter areas required	=	1.2	m ²
Backwashing flow rate	=	30.0	m ³ /m ² /hr
Design flow for backwashing	=	37.3	m ³ /hr
Backwash duration	=	3.0	min/day
Backwash generation rate	=	1.86	m ³ /day
Backwash generation rate	=	10.4	litre/sec

6. 14 Tai Koo Wan Road

Assumed Area	=	32962	m ²
Assumed floor area per employee	=	29.4	m ² per employee -- (refer to Table 8 of CIFSUS - All Economic Activities (All Types))
Total number of employees	=	1121	employees
Design flow for commercial employees	=	0.08	m ³ /employee/day -- (refer to Table T-2 of GESF)
Sewage generation rate	=	89.7	m ³ /day

7a. Horizon Gardens (Kai Tien Mansion, Hoi Tien Mansion, King Tien Mansion, Nam Tien Mansion)

Number of units	=	768	units
Number of residents	=	2150	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27	m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	580.5	m ³ /day

7b. Swimming Pool in Horizon Gardens

Assumed area	=	490.0	m ²
Assumed depth of water	=	1.5	m
Volume of water	=	735.0	m ³
Turnover Rate	=	6.0	hr (CAP132, Section 42 Swimming Pools Regulation (open air pool))
Surface loading rate of filter	=	50.0	m ³ /m ² /hr
Filter areas required	=	2.5	m ²
Backwashing flow rate	=	30.0	m ³ /m ² /hr
Design flow for backwashing	=	73.5	m ³ /hr
Backwash duration	=	3.0	min/day
Backwash generation rate	=	3.68	m ³ /day
Backwash generation rate	=	20.4	litre/sec

**8a. Half of City Plaza (Under Horizon Gardens)
(Retail)**

Assumed Area	=	21619	m ² (Assume 80% of GFA is retail)
Assumed floor area per employee	=	29.4	m ² per employee -- (refer to Table 8 of CIFSUS - All Economic Activities (All Types))
Total number of employees	=	735	employees
Design flow for commercial employees	=	0.28	m ³ /employee/day -- (refer to Table T-2 of GESF)
Sewage generation rate	=	205.8	m ³ /day

**8b. Half of City Plaza (Under Horizon Gardens)
(F&B)**

Assumed Floor Area	=	5405	m ² (Assume 20% of GFA is F&B)
Assumed floor area per employee	=	19.6	m ² per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	276	employees
Design flow for commercial employees	=	1.58	m ³ /employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	435.5	m ³ /day

Total Flow from the Catchment B

Flow rate	=	6294.8	m ³ /day
Flow rate with P _{CF}	=	7868.5	m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	29143	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with P _{CF} ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 1,000 - 5,000 incl. stormwater allowance)
Peak flow	=	364.3	litre/sec

Total Flow from the Future Development and Catchment A and B to Manhole FMH7036295

Flow rate	=	6750.6	m ³ /day
Flow rate with P _{CF}	=	8438.2	m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	31253	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with P _{CF} ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10,000 - 50,000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	390.7	litre/sec
Peak flow (with swimming pool)	=	433.9	litre/sec

Table 4 Calculation for Sewage Generation Rate of Catchment C

1a. Horizons Garden (Fu Tien Mansion, Choi Tien Mansion, Heng Tien Mansion, Yat Tien Mansion, Kwun Tien Mansion)

Number of units	=	960	units
Number of residents	=	2688	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27	m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	725.8	m ³ /day

2a. Half of City Plaza (Under Horizon Gardens)

Assumed Area	=	21919	m ² (Assume 80% of GFA is retail)
Assumed floor area per employee	=	29.4	m ² per employee -- (refer to Table 8 of CIFSUS - All Economic Activities (All Types))
Total number of employees	=	745	employees
Design flow for commercial employees	=	0.28	m ³ /employee/day -- (refer to Table T-2 of GESF)
Sewage generation rate	=	208.7	m ³ /day

2b. Half of City Plaza (Under Horizon Gardens) (F&B)

Assumed Floor Area	=	5480	m ² (Assume 20% of GFA is F&B)
Assumed floor area per employee	=	19.6	m ² per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	279	employees
Design flow for commercial employees	=	1.58	m ³ /employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	441.6	m ³ /day

Total Flow from the Catchment C

Flow rate	=	1376.0	m ³ /day
Flow rate with P _{CIF}	=	1720.0	m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	6370	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	=	5	(refer to Table T-5 of GESF for a population between 1,000 - 5,000 incl. stormwater allowance)
Peak flow	=	99.5	litre/sec

Total Flow from the Future Development and Catchment A, B and C to FMH7036243

Flow rate	=	8126.5	m ³ /day
Flow rate with P _{CIF}	=	10158.2	m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	37623	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	=	4	(refer to Table T-5 of GESF for a population between 10,000 - 50,000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	470.3	litre/sec
Peak flow (with swimming pool)	=	<u>513.6</u>	litre/sec

Table 5 Calculation for Sewage Generation Rate of Catchment D

1. Fu Shan Mansion		
Number of units	=	216 units
Number of residents	=	605 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4 m ³ /day
2. Kam Shan Mansion		
Number of units	=	216 units
Number of residents	=	605 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4 m ³ /day
3. Yee Shan Mansion		
Number of units	=	216 units
Number of residents	=	605 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4 m ³ /day
4. Foong Shan Mansion		
Number of units	=	216 units
Number of residents	=	605 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4 m ³ /day
5. Chi Sing Mansion		
Number of units	=	208 units
Number of residents	=	582 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	157.1 m ³ /day
6. Yiu Sing Mansion		
Number of units	=	208 units
Number of residents	=	582 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	157.1 m ³ /day
7. Restaurants		
Assumed area	=	661 m ²
Assumed floor area per employee	=	19.6 m ² per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	34 employees
Design flow for commercial employees	=	1.58 m ³ /employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	53.3 m ³ /day
Total Flow from the Catchment D		
Flow rate	=	1020.9 m ³ /day
Flow rate with P _{CIF}	=	1276.2 m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	4727 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 between 1,000 - 5,000 incl. stormwater allowance)
Peak flow	=	88.6 litre/sec
Total Flow from the Future Development and Catchment A, B, C and D to FMH7036245		
Flow rate	=	9147.5 m ³ /day
Flow rate with P _{CIF}	=	11434.4 m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	42349 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	=	4 (refer to Table T-5 of GESF for a population between 10,000 - 50,000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	529.4 litre/sec
Peak flow (with swimming pool)	=	<u>572.6</u> litre/sec

Table 6 Calculation for Sewage Generation Rate of Catchment E

1. Po Shan Mansion			
Number of units	=	216	units
Number of residents	=	605	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27	m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4	m ³ /day
2. Heng Shan Mansion			
Number of units	=	216	units
Number of residents	=	605	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27	m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4	m ³ /day
3. Wah Shan Mansion			
Number of units	=	216	units
Number of residents	=	605	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27	m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4	m ³ /day
4. Loong Shan Mansion			
Number of units	=	216	units
Number of residents	=	605	residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27	m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4	m ³ /day
5. Delia School of Canada			
Total number of teachers & staff	=	160	people (information from https://en.wikipedia.org/wiki/DSC_International_School,_Hong_Kong)
Design flow for teachers & staff	=	0.28	m ³ /person/day (refer to Table T-2 of GESF , Community, Social & Personal Services)
Total number of students	=	1300	people (information from https://en.wikipedia.org/wiki/DSC_International_School,_Hong_Kong)
Design flow for students	=	0.04	m ³ /person/day (refer to Table T-2 of GESF, School Student)
Sewage Generation rate	=	96.8	m ³ /day
Total Flow from the Catchment E			
Flow rate	=	750.2	m ³ /day
Flow rate with P _{CF}	=	937.8	m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	3473	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with P _{CF} ÷ 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 between 1,000 - 5,000 incl. stormwater allowance)
Peak flow	=	65.1	litre/sec
Total Flow from the Future Development and Catchment A, B, C, D and E to FMH7036246			
Flow rate	=	9897.7	m ³ /day
Flow rate with P _{CF}	=	12372.1	m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	45823	people (refer to Section 12 of GESF -- Contributing population is the Flow rate with P _{CF} ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	4	(refer to Table T-5 of GESF for a population between 10,000 - 50,000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	572.8	litre/sec
Peak flow (with swimming pool)	=	616.1	litre/sec

Table 7 Calculation for Sewage Generation Rate of Catchment F

1. 12 Tai Koo Wan Road		
Assumed Area	=	41512.8 m ²
Assumed floor area per employee	=	18.2 m ² per employee -- (refer to Table 8 of CIFSUS - Financial, Insurance, Real Estate and Business Services)
Total number of employees	=	2283.0 employees
Design flow for commercial employees	=	0.08 m ³ /employee/day -- (refer to Table T-2 of GESF - J6 Finance, Insurance, Real Estate and Business Services)
Sewage generation rate	=	182.6 m ³ /day
2a. Harbour View Gardens (East)		
Number of units	=	1071 units (from Centaline: https://hk.centanet.com/estate/en/Taikoo-Shing-Harbour-View-Gardens-East/2-OVDUURF50J)
Number of residents	=	2999 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	809.7 m ³ /day
2b. Swimming Pool in Harbour View Gardens		
Assumed area	=	280.0 m ²
Assumed depth of water	=	1.5 m
Volume of water	=	420.0 m ³
Turnover Rate	=	6.0 hr (CAP132, Section 42 Swimming Pools Regulation (open air pool))
Surface loading rate of filter	=	50.0 m ³ /m ² /hr
Filter areas required	=	1.4 m ²
Backwashing flow rate	=	30.0 m ³ /m ² /hr
Design flow for backwashing	=	42.0 m ³ /hr
Backwash duration	=	3.0 min/day
Backwash generation rate	=	2.10 m ³ /day
Backwash generation rate	=	11.7 litre/sec
3. Nuan Sing Mansion		
Number of units	=	208 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	582 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	157.1 m ³ /day
4. Kam Sing Mansion		
Number of units	=	208 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	582 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	157.1 m ³ /day
5. Wai Sing Mansion		
Number of units	=	208 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	582 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	157.1 m ³ /day
5. Hoi Sing Mansion		
Number of units	=	208 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	582 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	157.1 m ³ /day
6. Tien Sing Mansion		
Number of units	=	208 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	582 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	157.1 m ³ /day
7. Hang Sing Mansion		
Number of units	=	208 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	582 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	157.1 m ³ /day
8. Restaurants		
Assumed area	=	662 m ²
Assumed floor area per employee	=	19.6 m ² per employee -- (refer to Table 8 of CIFSUS - Restaurant)
Total number of employees	=	34 employees
Design flow for commercial employees	=	1.58 m ³ /employee/day -- (refer to Table T-2 of GESF - J10 Restaurant & Hotels)
Sewage generation rate	=	53.3 m ³ /day
Total Flow from the Catchment F		
Flow rate	=	1988.6 m ³ /day
Flow rate with P _{CF}	=	2485.7 m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	9206 people (refer to Section 12 of GESF -- Contributing population is the Flow rate with P _{CF} ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	5 (refer to Table T-5 of GESF for a population between 1,000 - 5,000 incl. stormwater allowance)
Peak flow	=	143.8 litre/sec
Total Flow from the Future Development and Catchment A, B, C, D, E and F to FMH7036297		
Flow rate	=	11886.2 m ³ /day
Flow rate with P _{CF}	=	14857.8 m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	55029 people (refer to Section 12 of GESF -- Contributing population is the Flow rate with P _{CF} ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	4 (refer to Table T-5 of GESF for a population between 5,000 - 10,000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	688.1 litre/sec
Peak flow (with swimming pool)	=	743.1 litre/sec

Table 8 Calculation for Sewage Generation Rate of Catchment G

1. Pak Hoi Mansion		
Number of units	=	216 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	605 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4 m ³ /day
2. Nam Hoi Mansion		
Number of units	=	216 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	605 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4 m ³ /day
3. Tung Hoi Mansion		
Number of units	=	216 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	605 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4 m ³ /day
4. Swimming Pool in Kwun Hoi Terrace		
Assumed area	=	200.0 m ²
Assumed depth of water	=	1.5 m
Volume of water	=	300.0 m ³
Turnover Rate	=	6.0 hr (CAP132, Section 42 Swimming Pools Regulation (open air pool))
Surface loading rate of filter	=	50.0 m ³ /m ² /hr
Filter areas required	=	1.0 m ²
Backwashing flow rate	=	30.0 m ³ /m ² /hr
Design flow for backwashing	=	30.0 m ³ /hr
Backwash duration	=	3.0 min/day
Backwash generation rate	=	1.50 m ³ /day
Backwash generation rate	=	8.3 litre/sec
5. Saint Anna Anglo Chinese Kindergarten		
Total number of teachers & staff	=	16 people (information from https://kap2024.azurewebsites.net/edb/schoolinfo.php?lanq=en&schid=5939&district=hkeast&category=&voucher=&schoolno=&schoolname=%E8%B1%96%E5%AE%89%E5%A8%9C%E4%B8%AD%E8%BB%B1%E6%96%87%E5%B9%BC%E7%A8%9A%E5%9C%92&othe)
Design flow for teachers & staff	=	0.28 m ³ /person/day (refer to Table T-2 of GESF , Community, Social & Personal Services)
Total number of students	=	173 people (information from https://kap2024.azurewebsites.net/edb/schoolinfo.php?lanq=en&schid=5939&district=hkeast&category=&voucher=&schoolno=&schoolname=%E8%B1%96%E5%AE%89%E5%A8%9C%E4%B8%AD%E8%BB%B1%E6%96%87%E5%B9%BC%E7%A8%9A%E5%9C%92&othe)
Design flow for students	=	0.04 m ³ /person/day (refer to Table T-2 of GESF, School Student)
Sewage Generation rate	=	11.4 m ³ /day
Total Flow from the Catchment G		
Flow rate	=	501.5 m ³ /day
Flow rate with P _{CF}	=	626.8 m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	2322 people (refer to Section 12 of GESF -- Contributing population is the Flow rate with P _{CF} ÷ 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 between 1,000 - 5,000 incl. stormwater allowance)
Peak flow	=	43.5 litre/sec
Total Flow from the Future Development and Catchment A, B, C, D, E, F and G to FMH7036266		
Flow rate	=	12387.7 m ³ /day
Flow rate with P _{CF}	=	15484.6 m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	57350 people (refer to Section 12 of GESF -- Contributing population is the Flow rate with P _{CF} ÷ 0.27, while 0.27 is the average unit flow factor of all typical residents plus employees)
Peaking factor	=	4 (refer to Table T-5 of GESF for a population between 10,000 - 50,000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	712.7 litre/sec
Peak flow (with swimming pool)	=	776.0 litre/sec

Table 9 Calculation for Sewage Generation Rate of Catchment H

1. Nan Shan Mansion		
Number of units	=	216 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	605 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4 m ³ /day
2. Lu Shan Mansion		
Number of units	=	216 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	605 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4 m ³ /day
3. Tai Shan Mansion		
Number of units	=	216 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	605 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4 m ³ /day
4. Tien Shan Mansion		
Number of units	=	216 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	605 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4 m ³ /day
5. Tung Shan Mansion		
Number of units	=	216 units (from https://zh.wikipedia.org/zh-hk/%E5%A4%AA%E5%8F%A4%E5%9F%8E)
Number of residents	=	605 residents (refer to Census and Statistics Department 2021 data - average household size of 2.8 in Eastern)
Design flow	=	0.27 m ³ /day (Private R2 in Table T-1 of GESF)
Sewage generation rate	=	163.4 m ³ /day
Total Flow from the Catchment H		
Flow rate	=	816.8 m ³ /day
Flow rate with P _{CIF}	=	1020.9 m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	3781 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 between 1,000 - 5,000 incl. stormwater allowance)
Peak flow	=	70.9 litre/sec
Total Flow from the Future Development and Catchment A, B, C, D, E, F, G and H to FMH7036270		
Flow rate	=	13204.4 m ³ /day
Flow rate with P _{CIF}	=	16505.5 m ³ /day (refer to Table T-4 of GESF - Shau Kei Wan - 1.25)
Contributing population	=	61132 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	=	4 (refer to Table T-5 of GESF for a population between <50,000 incl. stormwater allowance)
Peak flow (without swimming pool)	=	752.5 litre/sec
Peak flow (with swimming pool)	=	<u>815.8</u> litre/sec

Table 10 Hydraulic Capacity of Existing Sewers

Segment	Manhole Reference	Manhole Reference	Pipe Dia. (mm)	Pipe Length (m)	Invert Level 1 (mPD)	Invert Level 2 (mPD)	g (m/s ²)	k _s (m)	s	v (m ² /s)	V (m/s)	Area (m ²)	Q (m ³ /s)	Estimated Capacity (L/s)	Remark
TMH0 - S0	FLH7004609	FMH7036295	300	10.3	4.43	4.28	9.81	0.0003	0.0146	0.000001	2.07	0.071	0.1	146.1	
S0 - S1	FMH7036295	FMH7036243	750	13.4	0.63	0.59	9.81	0.0030	0.0030	0.000001	1.24	0.442	0.5	548.2	
S1 - S2	FMH7036243	FMH7036245	750	14.3	0.59	0.58	9.81	0.0060	0.0007	0.000001	0.54	0.442	0.2	238.1	
S2 - S3	FMH7036245	FMH7036246	900	70.3	0.42	0.36	9.81	0.0060	0.0009	0.000001	0.67	0.636	0.4	427.9	
S3 - S4	FMH7036246	FMH7036248	900	74.3	0.36	0.30	9.81	0.0060	0.0008	0.000001	0.65	0.636	0.4	416.2	
S4 - S5	FMH7036248	FMH7036297	900	37.6	0.3	N/A	9.81	0.0030	0.0067	0.000001	2.09	0.636	1.3	1327.7	(5) (6)
S5 - S6	FMH7036297	FMH7036249	900	5.9	N/A	0.26	9.81	0.0030	0.0067	0.000001	2.09	0.636	1.3	1327.7	(5) (6)
S6 - S7	FMH7036249	FMH7036266	900	59.3	0.26	0.2	9.81	0.0060	0.0010	0.000001	0.73	0.636	0.5	466.0	
S7 - S8	FMH7036266	FLH7017485	900	87.5	0.19	0.08	9.81	0.0060	0.0013	0.000001	0.82	0.636	0.5	519.5	
S8 - S9	FLH7017485	FMH7036269	900	21.3	0.08	0.05	9.81	0.0060	0.0014	0.000001	0.86	0.636	0.6	550.2	
S9 - S10	FMH7036269	FMH7036270	900	27.6	0.05	0.01	9.81	0.0060	0.0014	0.000001	0.88	0.636	0.6	557.7	
S10 - S11	FMH7036270	FSH7001300	900	2.4	0.01	N/A	9.81	0.0030	0.0067	0.000001	2.09	0.636	1.3	1327.7	(5) (6)
S11 - S12	FSH7001300	FMH7036273	750	1.7	N/A	N/A	9.81	0.0030	0.0067	0.000001	1.86	0.442	0.8	819.7	(5) (6)
S12 - S13	FMH7036273	FMH7036292	750	0.9	2.26	N/A	9.81	0.0030	0.0067	0.000001	1.86	0.442	0.8	819.7	(5) (6)
S13 - S14	FMH7036292	FMH7036293	750	5.0	N/A	N/A	9.81	0.0030	0.0067	0.000001	1.86	0.442	0.8	819.7	(5) (6)
S14 - S15	FMH7036293	FMH7036294	750	21.1	N/A	2.1	9.81	0.0030	0.0067	0.000001	1.86	0.442	0.8	819.7	(5) (6)
S15 - S16	FMH7036294	FMH7036288	750	4.7	2.1	1.7	9.81	0.0030	0.0843	0.000001	6.60	0.442	2.9	2917.5	

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

(2) The values of k_s = 6.0mm and 3.0mm is used for the calculation of slimed concrete sewer, poor condition @mean velocity = approximately 0.75m/s and 1.2m/s (based on Table 5: Recommended Roughness Values in Sewerage Manual)

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

(4) Equation used:
$$V = \frac{1.49}{n} R^{2/3} \sqrt{S}$$

(5) N/A = No information is provided in the geoinfo map and sewerage plan provided by DSD.

(6) As there are no invert level information for FMH7036297, FSH7001300, FMH7036273, FMH7036292 and FMH7036293, the slopes of the segments are assumed to be in 1/150.

Table 11 Contributions of Sewage generated from the subject site and Catchments

Segment	Manhole Reference	Manhole Reference	Pipe Dia. (mm)	Pipe Length (m)	Gradient	Estimated Capacity (L/s)	Included Catchment	Estimated Flow from the Proposed Development only (L/s)	Contributed by the Proposed Development only (%)	Estimated Flow from the Proposed Development and Catchments (L/s)	Contributed by the Proposed Development and Catchments (%)	Status	Remark
TMH0 - S0	FLH7004609	FMH7036295	300	10.3	0.0146	146.1	Proposed Development + Catchment A	13.0	8.9	39.6	27.1	OK	
S0 - S1	FMH7036295	FMH7036243	750	13.4	0.0030	548.2	Proposed Development + Catchment A+B	13.0	2.4	433.9	79.2	OK	
S1 - S2	FMH7036243	FMH7036245	750	14.3	0.0007	238.1	Proposed Development + Catchment A+B+C	13.0	5.5	513.6	215.7	Spill	
S2 - S3	FMH7036245	FMH7036246	900	70.3	0.0009	427.9	Proposed Development + Catchment A+B+C+D	13.0	3.0	572.6	133.8	Spill	
S3 - S4	FMH7036246	FMH7036248	900	74.3	0.0008	416.2	Proposed Development + Catchment A+B+C+D+E	13.0	3.1	616.1	148.0	Spill	
S4 - S5	FMH7036248	FMH7036297	900	37.6	0.0067	1327.7	Proposed Development + Catchment A+B+C+D+E	13.0	1.0	616.1	46.4	OK	
S5 - S6	FMH7036297	FMH7036249	900	5.9	0.0067	1327.7	Proposed Development + Catchment A+B+C+D+E+F	13.0	1.0	743.1	56.0	OK	
S6 - S7	FMH7036249	FMH7036266	900	59.3	0.0010	466.0	Proposed Development + Catchment A+B+C+D+E+F	13.0	2.8	743.1	159.5	Spill	
S7 - S8	FMH7036266	FLH7017485	900	87.5	0.0013	519.5	Proposed Development + Catchment A+B+C+D+E+F+G	13.0	2.5	776.0	149.4	Spill	
S8 - S9	FLH7017485	FMH7036269	900	21.3	0.0014	550.2	Proposed Development + Catchment A+B+C+D+E+F+G+H	13.0	2.4	815.8	148.3	Spill	
S9 - S10	FMH7036269	FMH7036270	900	27.6	0.0014	557.7	Proposed Development + Catchment A+B+C+D+E+F+G+H	13.0	2.3	815.8	146.3	Spill	
S10 - S11	FMH7036270	FSH7001300	900	2.4	0.0067	1327.7	Proposed Development + Catchment A+B+C+D+E+F+G+H	13.0	1.0	815.8	61.4	OK	
S11 - S12	FSH7001300	FMH7036273	750	1.7	0.0067	819.7	Proposed Development + Catchment A+B+C+D+E+F+G+H	13.0	1.6	815.8	99.5	Spill	
S12 - S13	FMH7036273	FMH7036292	750	0.9	0.0067	819.7	Proposed Development + Catchment A+B+C+D+E+F+G+H	13.0	1.6	815.8	99.5	Spill	
S13 - S14	FMH7036292	FMH7036293	750	5.0	0.0067	819.7	Proposed Development + Catchment A+B+C+D+E+F+G+H	13.0	1.6	815.8	99.5	Spill	
S14 - S15	FMH7036293	FMH7036294	750	21.1	0.0067	819.7	Proposed Development + Catchment A+B+C+D+E+F+G+H	13.0	1.6	815.8	99.5	Spill	
S15 - S16	FMH7036294	FMH7036288	750	4.7	0.0843	2917.5	Proposed Development + Catchment A+B+C+D+E+F+G+H	13.0	0.4	815.8	28.0	OK	

Table 12 Hydraulic Capacity of Proposed Upgrading Sewer

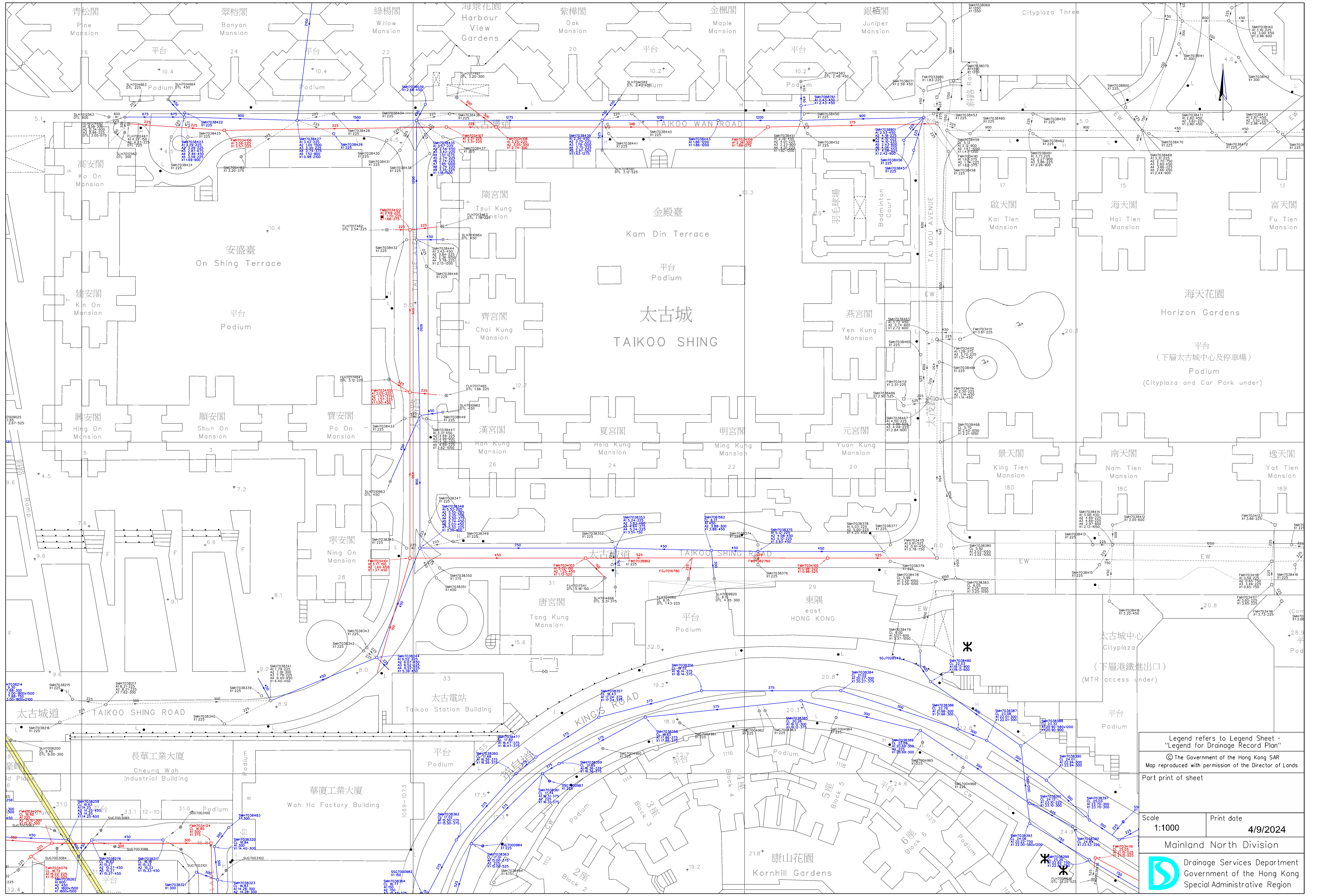
Segment	Manhole Reference	Manhole Reference	Pipe Dia. (mm)	Pipe Length (m)	Invert Level 1 (mPD)	Invert Level 2 (mPD)	g (m/s ²)	k _s (m)	s	v (m ² /s)	V (m/s)	Area (m ²)	Q (m ³ /s)	Estimated Capacity (L/s)	Estimated Flow from the Proposed Development and Catchments (L/s)	Contributed by the Proposed Development and Catchments (%)	Status
S1 - S2	FMH7036243	FMH7036245	900	14.3	0.59	0.58	9.81	0.0003	0.0007	0.000001	0.87	0.636	0.6	556.5	514	92.3	OK
S2 - S3	FMH7036245	FMH7036246	900	70.3	0.58	0.45	9.81	0.0003	0.0019	0.000001	1.44	0.636	0.9	914.5	573	62.6	OK
S3 - S4	FMH7036246	FMH7036248	900	74.3	0.45	0.26	9.81	0.0003	0.0026	0.000001	1.69	0.636	1.1	1078.0	616	57.1	OK
S6 - S7	FMH7036249	FMH7036266	900	59.3	0.26	0.15	9.81	0.0003	0.0019	0.000001	1.44	0.636	0.9	915.9	743	81.1	OK
S7 - S8	FMH7036266	FLH7017485	900	87.5	0.15	0.01	9.81	0.0003	0.0016	0.000001	1.34	0.636	0.8	849.6	776	91.3	OK
S8 - S9	FLH7017485	FMH7036269	900	21.3	0.01	-0.03	9.81	0.0003	0.0019	0.000001	1.45	0.636	0.9	922.2	816	88.5	OK
S9 - S10	FMH7036269	FMH7036270	900	27.6	-0.03	-0.08	9.81	0.0003	0.0018	0.000001	1.42	0.636	0.9	904.8	816	90.2	OK
S11 - S12	FSH7001300	FMH7036273	750	1.7	-0.15	-0.18	10.81	0.0003	0.0176	0.000001	4.22	0.442	1.9	1863.0	816	43.8	OK
S12 - S13	FMH7036273	FMH7036292	750	0.9	-0.18	-0.20	11.81	0.0003	0.0211	0.000001	4.82	0.442	2.1	2131.1	816	38.3	OK
S13 - S14	FMH7036292	FMH7036293	750	5.0	-0.20	-0.22	12.81	0.0003	0.0040	0.000001	2.17	0.442	1.0	960.8	816	84.9	OK
S14 - S15	FMH7036293	FMH7036294	750	21.1	-0.22	-0.30	13.81	0.0003	0.0038	0.000001	2.20	0.442	1.0	970.4	816	84.1	OK

- Remarks:
- (1) g=gravitational acceleration; k_s=equivalent sand roughness; s=gradient; v=kinematic viscosity of water; V=mean velocity
 - (2) The values of k_s = 1.5mm and 0.3mm is used for the calculation of slimed uPVC sewer, poor condition @mean velocity = approximately 0.75m/s and 1.2m/s (based on Table 5: Recommended Roughness Values in Sewerage Manual)
 - (3) The value of velocity (V) is referred to the Tables for the hydraulic design of pipes, sewers and channels (8th edition)
 - (4) Equation used: $V = \sqrt{(8gDs) \log\left(\frac{k_s}{3.7D} + \frac{2.51v}{D\sqrt{(2gDs)}}\right)}$

Table 13 Contributions of Sewage generated from the Subject Site on Tai Koo Shing Pumping Station (TKSPS)

Design Capacity of Tai Koo Shing Pumping Station (m3/day)	Design Capacity of Tai Koo Shing Pumping Station (L/s)	Estimated Flow from the Proposed Development (L/s)	Contributed by the Proposed Development (%)
22464	260	13.0	5%

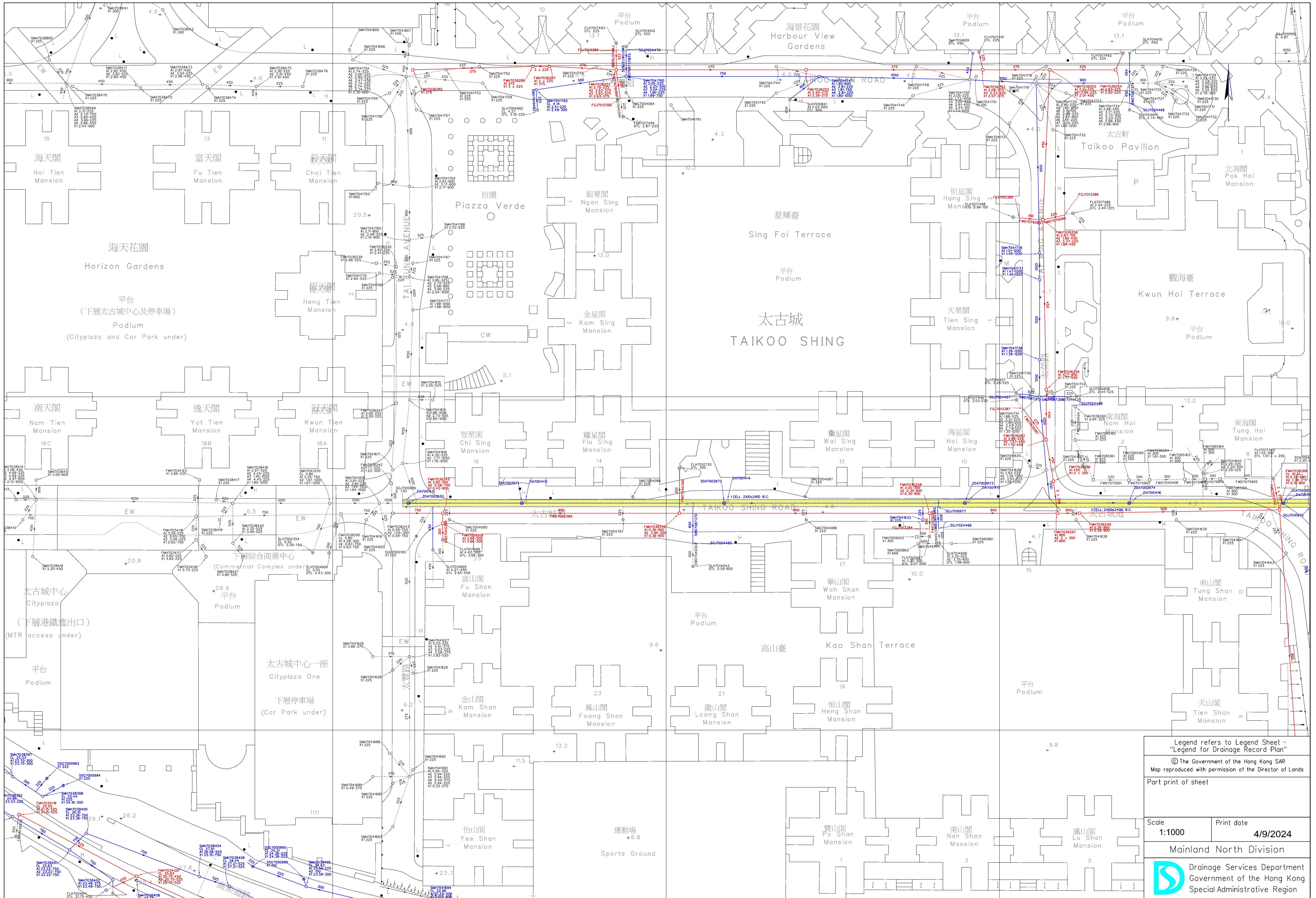
Appendix 2.2 Sewerage Record Plans obtained from DSD



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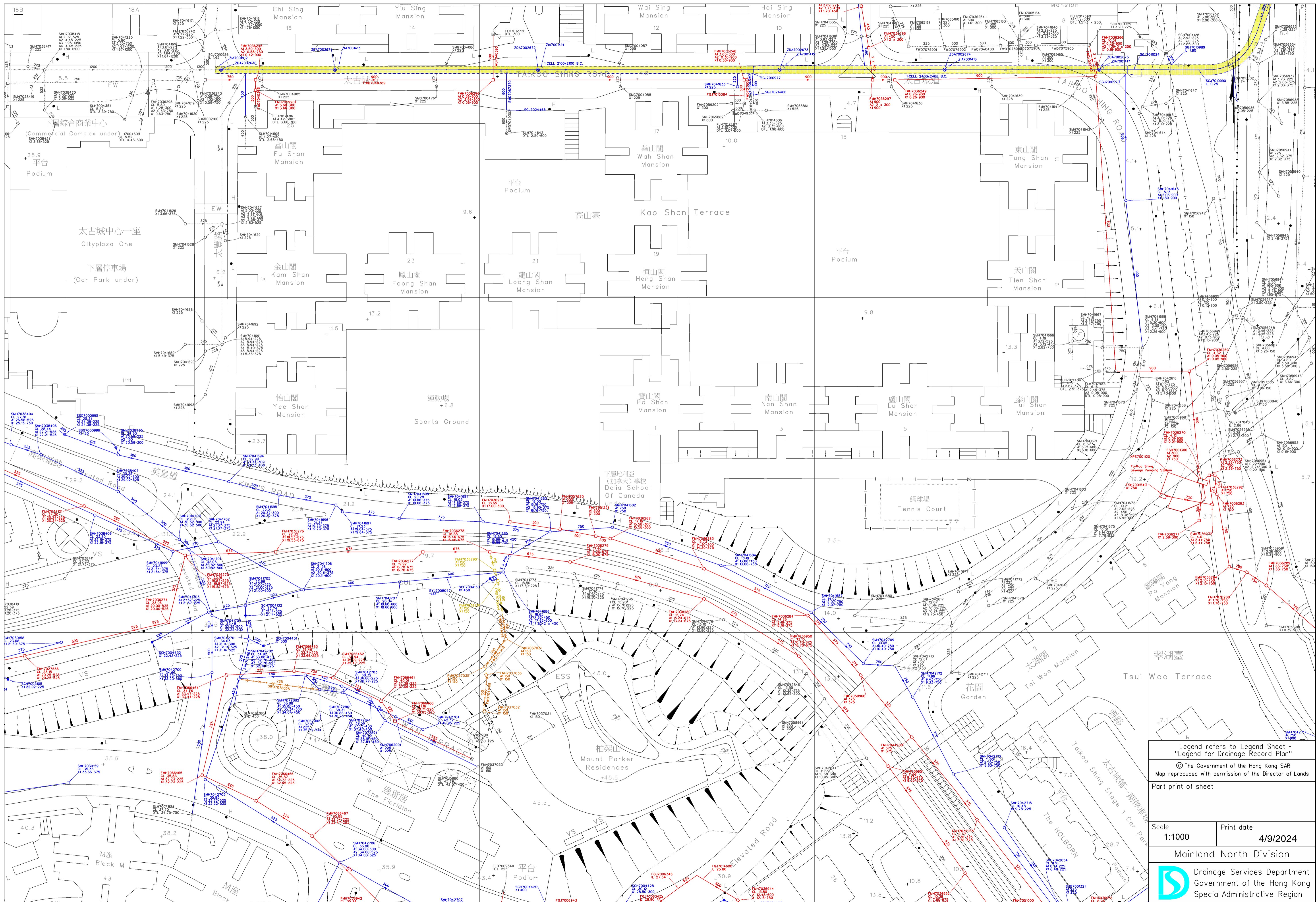


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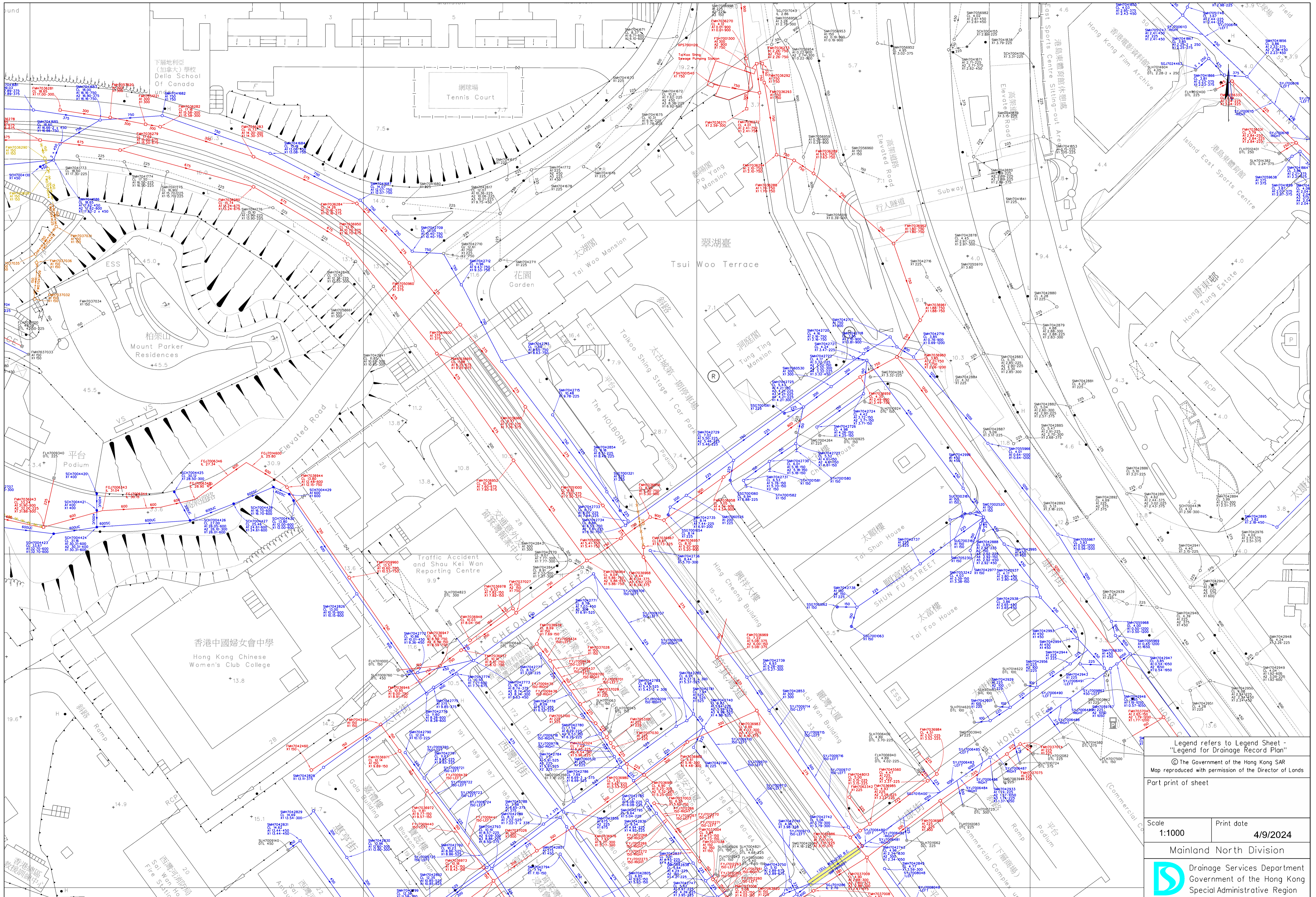


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