

Appendix 1
Revised Sewerage Impact Assessment (SIA)

SECTION 12A PLANNING APPLICATION

TO REZONE THE APPLICATION SITE FROM “RESIDENTIAL (GROUP C)” AND “RESIDENTIAL (GROUP D)” TO “GOVERNMENT, INSTITUTION OR COMMUNITY (2) AT LOT 827 RP IN D.D. 130 AND ADJOINING GOVERNMENT LAND, LAM TEI, TUEN MUN, NEW TERRITORIES

Sewerage Impact Assessment

June 2026

Applicant: Cyber Epoch Holdings Limited, Glory Day Development Limited
Prepared By: DeSPACE (International) Limited

1. Introduction

The Applicant, **CYBER EPOCH HOLDINGS LIMITED** and **GLORY DAY DEVELOPMENT LIMITED**, proposes to rezone the application site from “Residential (Group C)” (“R(C)”) and “Residential (Group D)” (“R(D)”) to Government, Institution or Community (2)” (“G/IC (2)”) at Lot 827 RP in D.D.130, Lam Tei, Tuen Mun, New Territories (hereinafter referred to as “the Site”) for permitted social welfare facility (Residential Care Home for Persons with Disabilities) (RCHD). **The expected intake year of the proposed development is 2031.**

The aim of this **Sewerage Impact Assessment** is to review the capacity of the existing sewerage network resulting from the proposed composite development.

2. Sewerage Disposal Network

According to the drainage record plans obtained from the Government, the sewage from the Site is expected to be conveyed to the nearest public manhole FMH1015065 and flow underneath the Fuk Hang Tsuen Road to the north direction (**See Figure 1**).

3. Assessment Criteria

This assessment has been prepared in accordance with the guidelines and reference as follows:

- A Technical Paper of Environmental Protection Department’s (EPD’s) Guidelines for Estimating Sewage Flows for Sewerage Infrastructure Planning, Version 1.0 (GESF): - It outlines the methodology and provides guidance for estimating sewage flows in sewerage infrastructure planning. Sewage flow parameters and peaking factors are adopted.
- Commercial and Industrial Floor Space Utilization Survey (CIFSUS) conducted by the Planning Department during November 2004 to March 2005: - It is referred to determine the worker density for different economic activities and planned usage type.
- Sewerage Manual (SM) published by the Drainage Services Department (DSD) in May 2013: - It offers guidance on the planning, design, construction, operation and maintenance of public gravity sewerage system in Hong Kong.
- Relevant Drainage Record Plans obtained from the Drainage Service Department: - It shows the details of existing sewerage record.

4. Assessment of Sewerage Impact

For the purpose of this Sewerage Impact Assessment, a total number of 320 residents and 60 staff for the proposed RCHD development have been assumed to be occupied within the proposed composite development. The wastewater generated will be contributed by the residents and employees.

Table: Sewage Flow Estimate

	No. of persons	Unit Flow Factor (m ³ /person/day)	Estimated Dry Weather Flow	Catchment Inflow Factor ^[1]	Flow Rate (m ³ /day)	Contributing Population ^[2]	Peaking Factor ^[3]	Peak Flow (L/s)
RCHD Residents	320	0.19 ^[4]	60.8	1.1	85.36	316.15	8	8.69
RCHD employees	60	0.28 ^[5]	16.8					

Remarks:

[1] Catchment Inflow Factor=1.1 (Tuen Mun) is based on EPD's GESF Table T-4.

[2] It is based on the equation from GESF: Contributing Population = $\frac{\text{Calculated total average flow}}{0.27}$

[3] Peaking Factor= 8 for population <1,000 (including stormwater allowance) as per EPD's GESF Table T-5

[4] Unit flow factor = 0.19 (Institutional and special class) is based on EPD's GESF Table T-1

[5] Unit flow factor = 0.28 (Commercial Employee + J11) is based on EPD's GESF Table T-2

5. Overall Sewer Capacity

The estimated cumulative peak discharge of all downstream sewerage generated from the proposed development with the concerned catchments account for no more than **80%** of the hydraulic capacity of the concerned sewer (from manholes FMH1015065 to **FMH1024442**). No exceedance of hydraulic capacity for all cumulative peak discharge is anticipated. Detailed calculations of sewage generation and hydraulic capacity are provided in **Appendix 1**. All existing sewers have sufficient capacity and no upgrading is required to serve the proposed composite development.

Appendix 1

Detailed Calculations of Sewage Generation and Hydraulic Capacity

Table 1 Calculation for Sewage Generation Rate of the Proposed Development

I. RCHD	
Nos. of Beds	320 the upper-end provision in the proposal
Nos. of Staff	60 As advised by the Applicant
Unit Flow Factor for the Residents	0.19 m ³ /day/person - from GESF(Table T-1) - UFF for Domestic Flows (Institutional and special class)
Unit Flow Factor for staff	0.28 m ³ /day/person - from GESF(Table T-2) - UFF for Commercial Flows and Student Flows (Commercial Employee and J11 Community, Social & Personal Services)
Estimated Dry Weather Flow	77.60 m ³ /day
Total Flow from Proposed Development	
Catchment Inflow Factor	1.1 Catchment Inflow Factor = 1.10 (Tuen Mun) from EPD's GESF Table T-4
Flow Rate	85.36 m ³ /day
Contributing Population	316.15 0.27 from EPD's GESF
Peaking Factor	8 Peaking Factor=8 for population <1,000 (including stormwater allowance) from EPD's GESF Table T-5
Peak Flow	8.69 L/s

Table 2 Calculation for Sewage Generation

Existing Development

A1	<p>Discrete Houses on the north of Fuk Hang Tsuen Path</p> <ul style="list-style-type: none"> Number of Houses 25 Number of storeys per House 3 Number of Flats 75 Average Domestic Household Size 2.6 Population 195 Unit Flow Factor 0.27 m³/person/day Estimated Dry Weather Flow 52.65 m³/day 	<p>from GeoInfo Map Assuming 3 storeys per House Assuming 1 flat per storey from 2026 Population Census from GESF (Table T-1) - UFF for Domestic Flow (Modern Village) under Datum (2002)</p>
A2	<p>Fuk Hang Tsuen Road Public Toilet</p> <ul style="list-style-type: none"> Number of WC 5 Discharge from WC (Qty * Discharge Unit (DU)) (DU=1.8 L/s) 9 L/s Discharge from Basin (Qty * Discharge Unit (DU)) (DU=0.3 L/s) 1.5 L/s No of Single Urinal with Cistern 2 Discharge from Basin (Qty * Discharge Unit (DU)) (DU=0.5 L/s) 1 L/s Sum of DUs 11.5 L/s Wastewater Flow Rate (K * \sumDU) (K=1.0) 3.39 L/s Estimated Dry Weather Flow 293.00 m³/day 	<p>Data provided by FEHD PESDG Table 5 Data provided by FEHD PESDG Table 5 Data provided by FEHD PESDG Table 5 PESDG Table 6</p>
B	<p>GreenView 2/F-11/F Residential Flats</p> <ul style="list-style-type: none"> Total number of units 32 units Average Domestic Household Size 2.6 Total number of Residents 83 Unit Flow Factor 0.27 m³/person/day Estimated Dry Weather Flow 22.46 m³/day <p>GreenView Clubhouse</p> <ul style="list-style-type: none"> Assumed Area 585 m² Assumed Floor Area Per Employee 30.3 m² per worker Total number of Employees 19 Unit Flow Factor For Commercial Activities 0.28 m³/person/day Estimated Dry Weather Flow 5.41 m³/day 	<p>from Centaline Property Hong Kong from 2026 Population Census from GESF (Table T-1) - UFF for Domestic Flow (Private R2) under Datum (2002) from Table 8 of CHSUS - Community, Social & Personal Services from GESF (Table T-2) - UFF for Domestic Flow (111 Community, Social & Personal Services) under Datum (2002)</p>
D	<p>Pok Oi Hospital Tuem Mun Lam Tai Nursing and Residential Care Home for the Elderly</p> <ul style="list-style-type: none"> Total Nos. of the Elderly's Residents 1434 Total Nos. of Staff 270 Unit Flow Factor for the Elderly's Residents 0.19 m³/person/day Unit Flow Factor for the staff 0.28 m³/person/day Estimated Dry Weather Flow 348.06 m³/day 	<p>from EPD's GHSF (Table T-1) - UFF for Domestic Flows (Institutional and special class) under Datum (2002) from EPD's GESF (Table T-2) - UFF of Commercial Flows and Student Flows for Commercial Employee and 111 Community, Social & Personal Services under Datum (2002)</p>
E	<p>The Sherwood Block 9-13 Residential Flats</p> <ul style="list-style-type: none"> Total number of units 720 units Average Domestic Household Size 2.6 Total number of residents 1872 people Unit Flow Factor 0.27 m³/person/day Estimated Dry Weather Flow 505.44 m³/day 	<p>from Centaline Property Hong Kong from 2026 Population Census from GESF (Table T-1) - UFF for Domestic Flow (Private R2) under Datum (2002)</p>

Table 3 Total Estimated Peak Flow

Segment	Included Catchment	Total Estimated Dry Weather Flow (m ³ /day)	Catchment Inflow Factor ^[1]	Cumulative Average Dry Weather Flow (m ³ /day)	Contributing Population ^[2]	Peaking Factor ^[3]	Total Estimated Peak Flow (m ³ /day)	Total Estimated Peak Flow (L/s)
S1, S2 and S3	A	345.65	1.1	380.21	1408.19	6	2281.27	26.40
S4	A + B + C	451.12	1.1	496.23	1837.89	6	2977.39	34.46
S5, S6, S7, S8	A + B + C + D	799.18	1.1	879.10	3255.92	6	5274.58	61.05
S9, S10, S11, S12, S13, S14 and S15	A + B + C + D + E	1304.62	1.1	1435.08	5315.12	6	8610.49	99.66

Remarks:

^[1] Catchment Inflow Factor = 1.10 (Tuen Mun) based on EPD's GESF Table T-4

^[2] Based on the equation from GESF:

$$\text{Contributing Population} = \frac{\text{Calculated total average flow (m}^3\text{/day)}}{0.27 \text{ (m}^3\text{/person.day)}}$$

^[3] Peaking Factor = 6 for population 1,000-5,000 and 5 for population 5,000-10,000 (including stormwater allowance) base on EPD's GESF Table T-5

Table 4 Sewer Capacity Check

Segment	Pipe Name	Manhole Reference		Pipe Diameter (m)	Pipe Length (m)	Invert Level (mPD)		g (m/s ²)	k _s (m)	s	v (m ² /s)	V (m/s)	Sectional Area (m ²)	Q (m ³ /s)	Sewer Capacity (L/s)	Estimated Sewage Flow (L/s)	% of Peak Flow to Sewer Capacity
		Upstream	Downstream			Upstream	Downstream										
S1	FWD1016422	FMH1015062	FMH1015063	0.3	15.8	13.59	13.46	9.81	0.0003	0.0082	0.00000114	1.5421	0.071	0.109	109.00	26.40	24.22%
S2	FWD1016423	FMH1015063	FMH1015064	0.3	21.5	13.46	13.27	9.81	0.0003	0.0088	0.00000114	1.5991	0.071	0.113	113.03	26.40	23.36%
S3	FWD1016424	FMH1015064	FMH1015065	0.3	37	13.27	12.89	9.81	0.0003	0.0103	0.00000114	1.7260	0.071	0.122	122.00	26.40	21.64%
S4	FWD1016425	FMH1015065	FMH1015066	0.3	6.2	12.89	12.83	9.81	0.0003	0.0097	0.00000114	1.6746	0.071	0.118	118.37	34.46	29.11%
S5	FWD1016426	FMH1015066	FMH1015067	0.3	22.6	12.83	12.61	9.81	0.0003	0.0097	0.00000114	1.6796	0.071	0.119	118.73	34.46	29.03%
S6	FWD1016427	FMH1015067	FMH1015068	0.3	55.7	12.61	12.1	9.81	0.0003	0.0092	0.00000114	1.6282	0.071	0.115	115.09	34.46	29.94%
S7	FWD1016428	FMH1015068	FMH1015069	0.3	49.1	12.1	11.65	9.81	0.0003	0.0092	0.00000114	1.6290	0.071	0.115	115.15	34.46	29.93%
S8	FWD1016429	FMH1015069	FMH1015070	0.3	50	11.65	11.09	9.81	0.0003	0.0112	0.00000114	1.8036	0.071	0.127	127.49	34.46	27.03%
S9	FWD1016430	FMH1015070	FMH1015071	0.3	51.5	11.09	10.52	9.81	0.0003	0.0111	0.00000114	1.7928	0.071	0.127	126.72	61.05	48.17%
S10	FWD1018348	FMH1015071	FMH1015770	0.3	36.1	10.52	10.11	9.81	0.0003	0.0114	0.00000114	1.8164	0.071	0.128	128.39	99.66	77.62%
S11	FWD1017073	FMH1015770	FMH1017771	0.3	5.6	10.11	10.04	9.81	0.0003	0.0125	0.00000114	1.9069	0.071	0.135	134.79	99.66	73.94%
S12	FWD1017074	FMH1017771	FMH1017772	0.3	19	10.04	9.83	9.81	0.0003	0.0111	0.00000114	1.7915	0.071	0.127	126.63	99.66	78.70%
S13	FWD1017075	FMH1017772	FMH1015773	0.3	18.7	9.83	9.61	9.81	0.0003	0.0118	0.00000114	1.8492	0.071	0.131	130.71	99.66	76.24%
S14	FWD1017076	FMH1015773	FMH1024441	0.3	40.3	9.61	8.7	9.81	0.0003	0.0226	0.00000114	2.5724	0.071	0.182	181.84	99.66	54.81%
S15	FWD1027041	FMH1024441	FMH1024442	0.45	3.7	8.6	8.2	9.81	0.0003	0.1081	0.00000114	7.2861	0.159	1.159	1158.80	99.66	8.60%

Remarks:

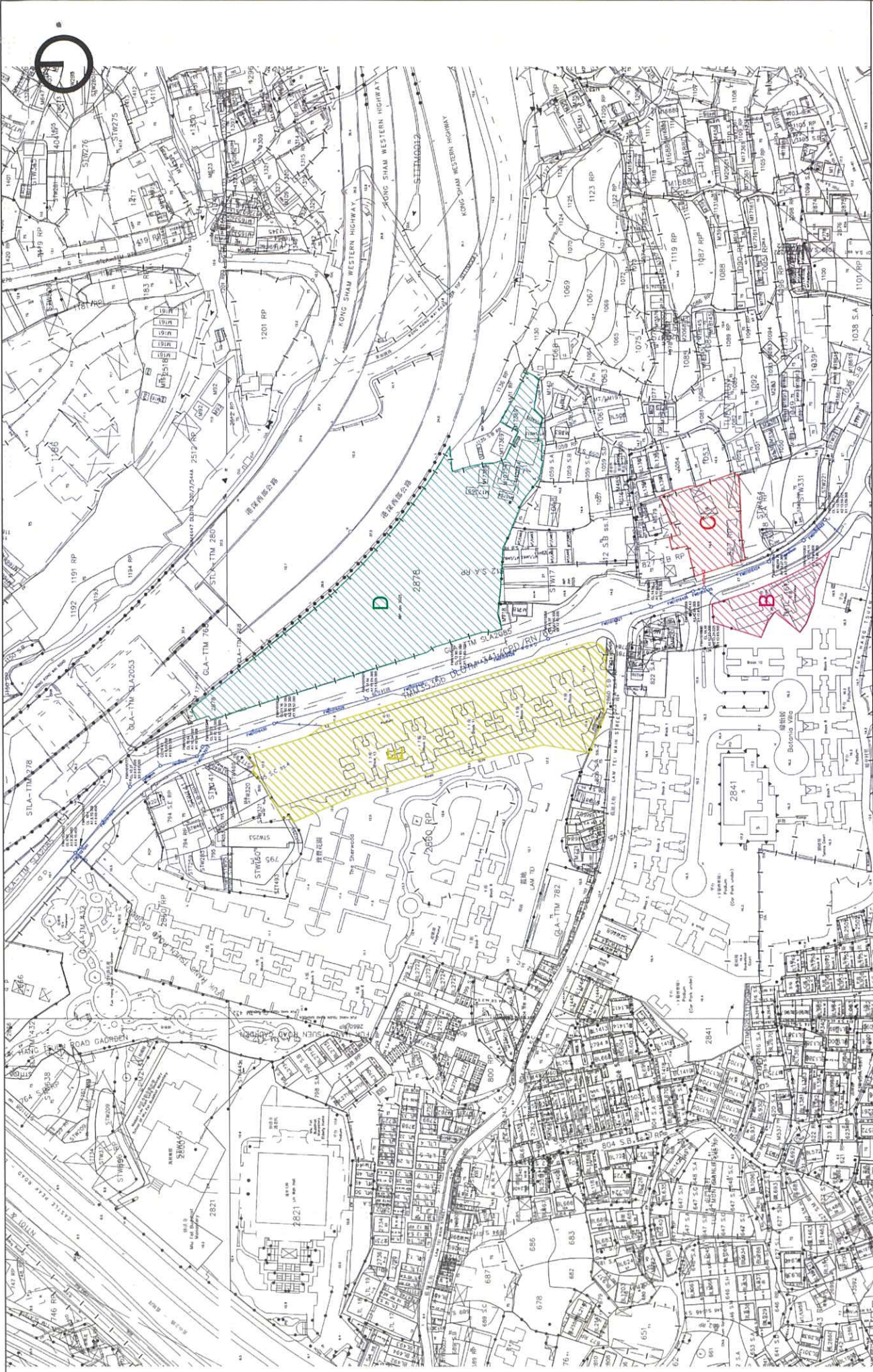
- (1) g=gravitational acceleration; k_s=equivalent pipeline roughness; s=hydraulic gradient; v=kinematic viscosity of fluid; V=mean velocity
- (2) A sewer connection is proposed from the Application Site to the existing sewerage network. The details of the proposed sewer are provided below:

Pipe Name	Manhole Reference		Pipe Diameter (m)	Pipe Length (m)	Invert Level (mPD)		g (m/s ²)	k _s (m)	s	v (m ² /s)	V (m/s)	Sectional Area (m ²)	Q (m ³ /s)	Sewer Capacity (L/s)	Estimated Sewage Flow (L/s)	% of Peak Flow to Sewer Capacity
	Upstream	Downstream			Upstream	Downstream										
Proposed Sewerage Pipe	Proposed Development	FMH1015065	0.3	6.5	13	12.89	9.81	0.0003	0.0169	0.00000114	2.2233	0.071	0.157	157.15	8.69	5.53%

(3) The value of k_s = 0.3mm is adopted for the calculation of slimed polyethylene sewer, poor condition (based on Table 5: Recommended Roughness Values in Sewerage Manual)

$$v = \frac{(8.22) \sqrt{g s}}{3.7 D} \approx \frac{2.51 v}{D (2g s)}$$

(4) The mean velocity is calculated using the Colebrook-White Equation:



PREPARED BY:

SCALE:

N.T.S

DATE:

June 2026

LEGEND:



Site Boundary

Existing Sewerage Manhole

Proposed Sewerage Manhole

Existing Sewerage Pipe

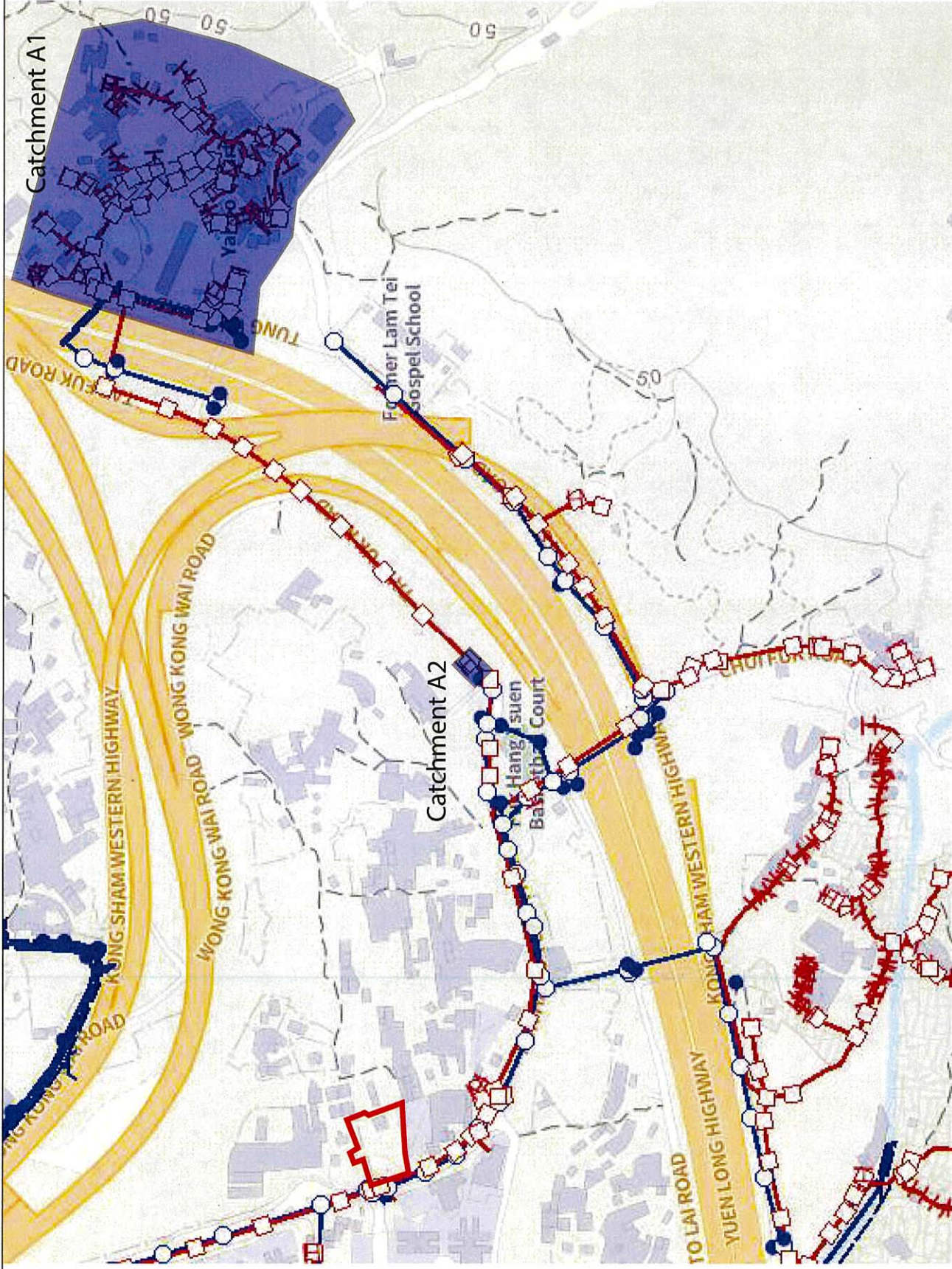
Proposed Sewerage Pipe

DRAWING TITLE:
Sewerage Network Plan

DRAWING NUMBER:
Figure 1



DeSPACE (International) Limited



DRAWING TITLE:

UPSTREAM CATCHMENT PLAN

DRAWING NUMBER:

FIGURE 2

LEGEND:



SITE BOUNDARY



UPSTREAM CATCHMENTS

SCALE:

N.T.S

DATE:

JUNE 2026

PREPARED BY:



DeSPACE (International) Limited

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S14	FWD1017076	FMH1015773	FMH1024441	0.3	40.3	9.61	8.7	9.81	0.0003	0.0226	0.00000114	2.5724	0.071	0.182	181.84	99.66	54.81%
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Remarks:

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Pipe Name	Manhole Reference		Pipe Diameter (m)	Pipe Length (m)	Invert Level (mPD)		g (m/s ²)	k _c (m)	s	v (m ² /s)	V (m/s)	Sectional Area (m ²)	Q (m ³ /s)	Sewer Capacity (L/s)	Estimated Sewage Flow (L/s)	% of Peak Flow to Sewer Capacity
	Upstream	Downstream			Upstream	Downstream										
Proposed Sewerage Pipe	FWD1015065	FWD1015066	0.3	6.5	13	12.89	9.81	0.0003	0.0169	0.00000114	2.2233	0.071	0.157	157.15	8.69	5.53%

(3) The value of k_c=0.3mm is adopted for the calculation of slotted polyethylene sewer, poor condition (based on Table 5: Recommended Roughness Values in Sewerage Manual)

(4) The mean velocity is calculated using the Colebrook-White Equation:

$$V = \frac{1}{\sqrt{f}} \sqrt{\frac{2gDs}{3}} \sqrt{\frac{2.51v}{D} + \frac{2.51v}{D} \sqrt{\frac{2.51v}{D} + \frac{2.51v}{D}}}$$