

Attachment F

Revised Sewerage Impact Assessment

Application for Amendment of Plan under Section 12A of the Town Planning Ordinance (Cap. 131), to Rezone the Application Site from “Open Space” to “Residential (Group A)11”, for Proposed Residential Development with Social Welfare Facilities, Religious Institution, and Shop and Services at Sha Tin Town Lot 310 in D.D. 184, Sha Tin, New Territories
(Planning Application No. Y/ST/63)

Application for Amendment of Plan under Section 12A of the Town Planning Ordinance (Cap. 131), to Rezone the Application Site from “Open Space” to “Residential (Group A) 11” at Sha Tin Town Lot 310 in D.D. 184, Sha Tin

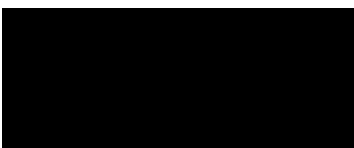
Sewerage Impact Assessment Report

Reference

Issue 2 | September 2026

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 299123



Contents

1.	Introduction	1
1.1	Project Background	1
1.2	Proposed Development	1
1.3	Purpose of this Report	2
2.	Methodology and Design Criteria	3
2.1	Methodology	3
2.2	Parameters and Assumptions	3
3.	Sewerage Impact Assessment	6
3.1	Existing and Planned Sewerage Infrastructure	6
3.2	Sewage Generation from the Existing Development	6
3.3	Sewage Generation from the Proposed Development	7
3.4	Proposed Development Sewerage System	7
3.5	Potential Sewerage Impact	8
4.	Construction, Operation and Maintenance of New Sewerage Facilities	9
5.	Conclusion	10

Table 1.1	Development Parameters	1
Table 2.1	Unit Flow Factor for Domestic Flows	3
Table 2.2	Unit Flow Factor for Commercial Flows	3
Table 2.3	Peaking Factors for Various Population Ranges	4
Table 3.1	Sewage Flow Estimation for the Existing Facilities discharging to FMH4039860	6
Table 3.2	Sewage Flow Estimation for the Proposed Development	7
Table 3.3	Proposed Sewage pipe connection from Terminal Manhole to Existing Sewerage Network	8
Table 3.4	Sewers Capacity Check	8

Drawings

Appendices

Appendix A

Master Layout Plan

Appendix B

Sewage Generation Estimation

Appendix C

Existing and Proposed Sewerage Network

1. Introduction

1.1 Project Background

- 1.1.1.1 This Sewerage Impact Assessment (“SIA”), appended to the Supporting Planning Statement, is prepared in support of the Planning Application under Section 12A of the Town Planning Ordinance (Cap. 131) for the Proposed Residential Development with ‘Social Welfare Facility’, ‘Religious Institution’ and ‘Shop and Services’ (“Proposed Amendment”) at Sha Tin Town Lot (STTL) 310 in D.D. 184, Sha Tin, New Territories (“the Application Site”).

1.2 Proposed Development

- 1.2.1.1 The Application Site has a site area of about 5,225 m² and it is proposed with residential development with clubhouse, reprovision of Hong Kong Bible Research and Education Centre, Residential Care Home for the Elderly, Parents/Relative Resource Centre and Shop and Services, as shown in **Appendix A**. Key development parameters of the Application Site are shown in **Table 1.1** below.

Table 1.1 Development Parameters

Description	Site Information
Site Location	Sha Tin Town Lot (STTL) 310 in D.D. 184, Sha Tin
Application Site Area	About 5,225 m ²
GFA	Domestic: 26,125 m ² Clubhouse: 1,050 m ² Reprovision of Hong Kong Bible Research and Education Centre: 2,900 m ² Residential Care Home for the Elderly (RCHE) (including 100 beds): 2,980 m ² Parents/Relative Resource Centre (PRC): 238 m ² Shop and Services: 562 m ²
No. of Units (About)	450
Anticipated Population (About)	Domestic: 1,125 Clubhouse ⁽¹⁾ : 35 Reprovision of Hong Kong Bible Research and Education Centre ⁽¹⁾ : 96 RCHE ⁽¹⁾ : 199 PRC ⁽¹⁾ : 8 Shop and Services ⁽²⁾ : 29

- (1) Community, Social & Personal Services = 3.3 employee per 100m² of GFA based on PlanD's Commercial and Industrial Floor Space Utilization Survey "CIFSUS" Table 8.

- (2) Retail Trade Services = 3.5 employee per 100m² of GFA based on PlanD's Commercial and Industrial Floor Space Utilization Survey "CIFSUS" Table 8.

1.3 Purpose of this Report

- 1.3.1.1 The aim of this Sewerage Impact Assessment (SIA) Study is to review and update the sewerage network arising from proposed development to assess the impact of the proposed development to the existing sewerage network and to propose mitigation measures (if required).
- 1.3.1.2 The scope of the Project comprises comprehensive development private housing, social welfare facilities, a religious institution and shops in Sha Tin.
- 1.3.1.3 The SIA Report shall be prepared, which should:
- (a) fully satisfy the requirements of this Scope in respect of the prediction and assessment of impacts, the identification of sewerage impact mitigation measures and the associated residual impacts;
 - (b) provide assessment and evaluation of the sewerage impact and cumulative effects arising from the Project sufficient to identify those issues of key concern during the construction and operation of the Project;
 - (c) define measurable sewerage parameters and features likely to be affected by the Project;
 - (d) recommend optimum sewerage scheme for the Project;
 - (e) prescribe the specification for detailed design, construction and operation requirements of the recommended sewerage scheme;
 - (f) provide the assessment findings, conclusions, recommendations and a mechanism for implementation; and
 - (g) include any revisions or supplements to the above as might be required by the EPD and DSD.
- 1.3.1.4 The SIA Report shall be submitted for approval by EPD and DSD on the methodologies, findings, proposals, recommendations and conclusions of the SIA.
- 1.3.1.5 This Sewerage Impact Assessment Report is structured as follows:
- Section 1 – Introduction**, introduces the Project Background, Objectives and Scope of the Project.
 - Section 2 – Methodology and Design Criteria**, presents the Methodology and Design Criteria.
 - Section 3 – Sewerage Impact Assessment**, presents the Sewerage Impact Assessment.
 - Section 4 – Construction, Operation and Maintenance of New Sewerage Facilities**, presents Construction, Operation and Maintenance of New Sewerage Facilities.
 - Section 5 – Conclusion**, summarises the Conclusions.

2. Methodology and Design Criteria

2.1 Methodology

2.1.1.1 The following methodology is adopted in carrying out the SIA:

- Identify the scope, parameters and programme of the development;
- Estimate the sewage flow generation of the development;
- Identify the existing and planned sewerage systems within and near the proposed development boundary;
- Examine the impact arising from new sewage generation from the proposed development on the existing sewerage network; and
- Identify new and upgrading sewerage works to support the proposed development.

2.1.1.2 The SIA has been carried out in accordance with the following guidelines set out in EPD Report No. EPD/TP1/05 Guidelines for Estimating Sewage Flows (GESF) for Sewerage Infrastructure Planning Version 1.0 and DSD's Sewerage Manual.

2.2 Parameters and Assumptions

2.2.1.1 The key parameters used for flow estimation in this SIA are unit flow factor, the population/employee density and flow from plumbing and drainage.

Unit Flow Factor – Domestic Flows

2.2.1.2 The Unit flow factors (UFF) for domestic sewage flow due to residential population of the proposed development and the existing sewerage catchment are shown in **Table 2.1** based on the Table T-1 of GESF.

Table 2.1 Unit Flow Factor for Domestic Flows

Residential Type	Unit Flow Factor (m ³ /person/day) ^[1]
Private R3	0.37
Institutional and Special Class	0.19
Modern Village	0.27

Unit Flow Factor – Commercial Flows

2.2.1.3 The UFFs for commercial sewage flows due to employed population of the proposed development and the existing sewerage catchment are shown in **Table 2.2** based on the Table T-2 of GESF.

2.2.1.4 The total unit flow generated from an employee in a particular trade is the sum of the UFF of the employee and the UFF of commercial activities of a particular trade under consideration.

Table 2.2 Unit Flow Factor for Commercial Flows

Commercial Type	UFF (m ³ /employee/day)
Commercial Employee	0.080
Commercial Activities	

Application for Amendment of Plan under Section 12A of the Town Planning Ordinance (Cap. 131), to Rezone the Application Site from "Open Space" to "Residential (Group A) 11" at Sha Tin Town Lot 310 in D.D. 184, Sha Tin

Commercial Type	UFF (m ³ /employee/day)
(a) Specific trades:	
J4 – Wholesale & Retail	0.200
J7 – Agriculture & Fishing	-
J10 – Restaurants & Hotels	1.500
J11 – Community, Social & Personal Services	0.200

Peaking Factors

- 2.2.1.5 The peaking factors to cater for seasonal/diurnal flow variations, and infiltration and inflow due to storm events are referenced to EPD's GESF and shown in **Table 2.3**.

Table 2.3 Peaking Factors for Various Population Ranges

Population Range	Peaking Factor (Including Stormwater Allowance) for Facility with Existing Upstream Sewerage	Peaking Factor (Excluding Stormwater Allowance) for Facility with Existing Upstream Sewerage
<i>Sewers</i>		
< 1,000	8	6
1,000 – 5,000	6	5
5,000 – 10,000	5	4
10,000 – 50,000	4	3
> 50,000	Max (7.3/N ^{0.15} , 2.4) ^[1]	Max (6/N ^{0.175} , 1.6) ^[1]
<i>Sewage Treatment Works, Preliminary Treatment Works and Pumping Stations</i>		
< 10,000	4	3
10,000 – 25,000	3.5	2.5
25,000 – 50,000	3	2
> 50,000	Max (3.9/N ^{0.065} , 2.4) ^[1]	Max (2.6/N ^{0.065} , 1.6) ^[1]
Note: [1] N = Contributing population in thousands		

- 2.2.1.6 With consideration of the reduced hydraulic performance due to the deterioration of sewer pipes with time, peaking factors (including stormwater allowance) is adopted in this Study.

Population Density

- 2.2.1.7 A person per flat (PPF) ratio of 2.5 is assumed with reference to the average domestic household size of the Tertiary Planning Unit 755.
- 2.2.1.8 The employment population density has been referenced to Table 8 of PlanD's Commercial and Industrial Floor Space Utilization Survey "CIFSUS":
- Retail Trade: Assume 3.5 employee per 100m² of GFA
 - Restaurants: Assume 5.1 employee per 100m² of GFA
 - Community, Social & Personal Services: Assume 3.3 employee per 100m² of GFA

Hydraulic Analysis

- 2.2.1.9 Colebrook-White equation is applied for pipe hydraulic analysis. The design roughness coefficients (Ks) for existing pipeline system are assumed to be 0.6 mm (Slimed sewer slimed to about half depth; velocity when flowing half full approximately 1.2 m/s, clayware, under poor condition). The material adopted for proposed pipes is HDPE; a conservative roughness coefficient of 0.3 mm has been adopted in consideration of its reduced hydraulic performance in future due to degradation of material.
- 2.2.1.10 For small diameter sewers of diameter less than 300mm, the flow velocity of at least 0.7m/s shall occur daily, or that a gradient of at least 1:DN (i.e. Nominal diameter of the sewer in mm) is provided, provided that a flow of 2 times of Average Dry Weather Flow (ADWF) is assumed to occur at least once daily. For larger diameter sewers of diameter up to 900mm, a self-cleansing velocity of 1.0m/s in full pipe condition shall be achieved. The maximum flow velocity at peak flow shall be 3m/s.

3. Sewerage Impact Assessment

3.1 Existing and Planned Sewerage Infrastructure

Existing Sewerage System

- 3.1.1.1 The area of the Application Site is unsewered.
- 3.1.1.2 Based on the DSD records, there is an existing sewerage network with sewers with 225mm dia. and 1,800mm dia. along Tai Chung Kiu Road which ultimately connects to the Sha Tin Sewage Treatment Works (STSTW). The design capacity of STSTW is 340,000 m³/day.

Planned Sewerage System

- 3.1.1.3 With reference to the submitted S12A planning application (No. Y/ST/62) for rezoning the adjacent site at Ng Yuen from “Open Space (O)” Zone to “Other Specified Uses” annotated “Hotel Development” Zone for a proposed hotel development, a 450mm diameter sewer pipe is proposed to convey sewage generated from the proposed hotel development to the existing 1,800mm diameter trunk sewer (FWD4003788) along Tai Chung Kiu Road, which will not have cumulative effect in the discharge path from this development into FMH4039860, which is further described in **Section 3.4.1.1**.

3.2 Sewage Generation from the Existing Development

- 3.2.1.1 The sewage flow generated from the existing facilities discharging to FMH4039860 (downstream of the Application Site) is about 36.8 m³/day (ADWF), while the peak flow is 3.4 L/s (peak factor = 8). The detailed calculations for sewage flow estimation are included in **Appendix B** and summarised in **Table 3.1**.

Table 3.1 Sewage Flow Estimation for the Existing Facilities discharging to FMH4039860

<i>Existing Development</i>	Estimated ADWF (m³/day) ⁽²⁾
Garden Villa A	2.4
Garden Villa B ⁽⁴⁾	2.4
NG Yuen (Oikos) ⁽⁴⁾	2.6
Shing Mun River Promenade Garden No. 1 Public Toilet	21.42
Shing Mun River Promenade Garden No. 1 Refreshment Kiosk	3.2
Catchment Inflow Factor ⁽³⁾	1.15
Total ADWF (m³/day)	36.8
Contributing population	136
Peaking Factor ⁽¹⁾	8
Peak Flow (L/s)	3.4

Remarks:

(1) Peaking Factor = 8 for contributing population <1000 (including stormwater allowance) based on EPD's GESF Table T-5.

(2) Numbers are rounded to 1 decimal place.

(3) GESF Table T-4 refer to Sha Tin

(4) Site to be redeveloped as a proposed hotel under planning application No. Y/ST/62. Sewage will not discharge to FMH4039860 after development.

3.3 Sewage Generation from the Proposed Development

3.3.1.1 The sewage flow generated from the Application Site with proposed development is about 629.9m³/day (ADWF), while the peak flow is 43.7 L/s (peak factor = 6). The detailed calculations for sewage flow estimation are included in **Appendix B** and summarised in **Table 3.2**.

Table 3.2 Sewage Flow Estimation for the Application Site with Proposed Development

<i>Proposed Development</i>	<i>Estimated ADWF (m³/day) ⁽²⁾</i>
Residential	416.3
Clubhouse	9.8
Reprovision of Hong Kong Bible Research and Education Centre	26.9
RCHE	46.7
PRC	2.2
Shop and Services	45.8
Peak Catchment Inflow Factor ⁽³⁾	1.15 ⁽³⁾
Total ADWF	629.9
Contributing population	2,323
Peaking Factor ⁽¹⁾	6
Peak Flow (L/s)	43.7

Remarks:

(1) Peaking Factor =6 for contributing population = 1,000 – 5,000 (including stormwater allowance) based on EPD's GESF Table T-5.

(2) Numbers are rounded to 1 decimal place

(3) GESF Table T-4 refer to Sha Tin

3.4 Proposed Development Sewerage System

Sewerage Connection Proposal

3.4.1.1 To accommodate the sewage generation from Application Site with proposed development, a new 225mm dia. HDPE sewer is proposed laying along the side of Shing Mun Channel and connect to the existing manhole on the southwestern side of Shing Mun River Promenade Garden No.1. The proposed sewers are shown in **Table 3.3**, from the proposed terminal manhole (TMH) to the existing manhole (ID: FMH4039860). Proposed connection drawing is in **Appendix C**.

Table 3.3 Proposed Sewage pipe connection from Terminal Manhole to Existing Sewerage Network

Upstream MH	Downstream MH	Sewer size (mm)	Upstream Invert Level (mPD)	Downstream Invert Level (mPD)
TMH	MH1	225	3.80	3.70
MH1	MH2	225	3.70	3.1
MH2	FMH4039860	225	3.1	2.5

Sewerage Capacity Checking

- 3.4.1.2 Hydraulic capacity check has been undertaken for the downstream sewerage system and results are presented in **Table 3.4**. The assessed sewers have sufficient capacity to convey the sewage flows under proposed conditions; the maximum utilisation rate is below 87%. No sewers upgrading works is required due to the proposed development and the proposed development has no impact to the downstream sewers. Detailed calculations are included in **Appendix B**.

Table 3.4 Sewers Capacity Check

Location option	Upstream (MH)	Downstream (MH)	Sewer size (mm)	Upstream Invert Level (mPD)	Downstream Invert Level (mPD)	% of Max. Peak flow to sewer capacity
Existing Sewer	FMH4039860	FMH4038083	225	2.50	1.37	1%
	FMH4038083	FMH4038084	225	1.37	0.98	6%
	FMH4038084	FMH4038085	225	0.98	-3.13	2%
With Proposed Development	TMH	MH1	225	3.80	3.70	77%
	MH1	MH2	225	3.70	3.1	87%
	MH2	FMH4039860	225	3.1	2.5	81%
	FMH4039860	FMH4038083	225	2.50	1.37	70%
	FMH4038083	FMH4038084	225	1.37	0.98	78%
	FMH4038084	FMH4038085	225	0.98	-3.13	23%

3.5 Potential Sewerage Impact

- 3.5.1.1 Sewage flow will eventually be discharged into the STSTW . Based on the hydraulic analysis, the increase of sewage flow due the proposed development in the Application Site is insignificant compared to the capacity of STSTW (maximum ~0.2% increase at future capacity), it is expected there will be no adverse impact to the existing sewerage network due to the proposed development. No upgrade of the size of sewage facilities is required.

4. Construction, Operation and Maintenance of New Sewerage Facilities

- 4.1.1.1 The proposed sewerage works within the development boundary including the construction of new sewers connection and the proposed manholes will be constructed, operated and maintained by the future management agent.
- 4.1.1.2 The proposed sewerage connection mentioned in **Section 3.4** will be undertaken by the project proponent. The portion of sewers downstream of terminal manhole will be handed over to DSD upon completion of construction works for future maintenance as part of the public network.

5. Conclusion

- 5.1.1.1 A sewerage impact assessment has been carried out for the proposed development in the Application Site at Sha Tin.
- 5.1.1.2 Sewage generated from the existing facilities downstream of the Application Site is ADWF 36.8 m³/day or peak flow of 3.4 L/s (peaking factor = 8), whilst sewage from the Indicative Scheme is ADWF 629.9 m³/day or peak flow of 43.7 L/s (peaking factor = 6). To discharge sewage generated from the Application Site, a new sewerage main is proposed. Sewage from the Application Site will be discharged through a 225 mm dia. sewer from a new terminal manhole (i.e. TMH) into the existing sewerage network.
- 5.1.1.3 The STSTW are deemed to be designed to cater for the regional sewage generation, thus it is not anticipated for any adverse impact to STSTW due to the proposed development.

Appendix A

Master Layout Plan



NOTES:
DO NOT SCALE DRAWING, FIGURED DIMENSIONS ARE TO BE FOLLOWED.
READ THIS DRAWING IN CONNECTION WITH GENERAL ARCHITECTURAL PLANS, STRUCTURAL PLANS AND OTHER RELATED DRAWINGS. THE ARCHITECT/ ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN.
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KEY PLAN SCALE 1:2000

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Rev	Description	By	Date
Consultant			
ARUP			
Contract No. and Title			
SHATIN TOWN LOT 310			
Drawing Title			
MASTER LAYOUT PLAN			
Drawing no.			Rev.
299123/22/S12A_1000 (COLOUR)			01
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01	SECOND SUBMISSION	FH	07/26
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Rev	Description	By	Date

Consultant

ARUP

Contract No. and Title

SHATIN TOWN LOT 310

Drawing Title

GROUND FLOOR PLAN

Drawing no. 299123/22/S12A_1001 (2)		Rev. 01	
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Scale 1: 400		Status	

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Appendix B

Sewage Generation Estimation

ARUP Job Title: Application for Amendment of Plan under Section 12A of the Town Planning Ordinance (Cap. 131), to Rezone the Application Site from “Open Space” to “Residential (Group A) 11” at Sha Tin Town Lot 310 in D.D. 184, Sha Tin Calculation: Estimation of Sewage Discharge from Existing Development	Job No.	Sheet No.	Rev.
	299123	1	0
	Made by MP Date 01/2026 Chd. JW		

Existing Development		
Garden Villa A		
Number of Blocks	1	
Number of Flats	3	Flats
Size of household/flat ⁽¹⁾	2.9	Persons/flat
Population	9	Persons
Per Capita Flow ⁽²⁾ - Modern Village	0.27	m ³ /day/person
Estimated Dry Weather Flow	2.4	m ³ /day
Garden Villa B ⁽⁷⁾		
Number of Blocks	1	
Number of Flats	3	Flats
Size of household/flat ⁽¹⁾	2.9	Persons/flat
Population	9	Persons
Per Capita Flow ⁽²⁾ - Modern Village	0.27	m ³ /day/person
Estimated Dry Weather Flow	2.4	m ³ /day
Ng Yuen (Oikos) ⁽⁷⁾		
Area	970	m ³
Employee per GFA (in 100m ²)	3.3	Persons
Employee Population	32.00	Persons
Per Capita Flow ⁽³⁾ - J7	0.08	m ³ /day/person
Estimated Dry Weather Flow	2.6	m ³ /day
Shing Mun River Promenade Garden No. 1 Public Toilet		
Number of water closets = 11 9 litre/opertation 6 operations per hour sewage discharge = 11 x 9 x 6 x 20 = 11,880 l/day = 11.88 m ³ /day Number of urinals = 3 Water flush volume per cycle = 4.5 l/cycle 5 min. flushing interval = 4.5 x 60/5 = 54 l/hour sewage discharge = 3 x 54 x 20 = 3,240 l/day = 3.24 m ³ /day Number of Sink = 7 45 l/hour Sewage Discharge = 7 x 45 x 20 = 6,300 l/day = 6.30 m ³ /day Total Sewage Discharge = 21.42 m ³ /day	21.42	m ³ /day
Shing Mun River Promenade Garden No. 1 Refreshment Kiosk		
Area	20	m ³
Employee per GFA (in 100m ²)	5	Persons
Employee Population	2	Persons
Per Capita Flow ⁽⁴⁾ - J10 Restaurants & Hotels	1.58	m ³ /day/person
Estimated Dry Weather Flow	3.2	m ³ /day
Catchment Inflow Factor P _{CIF} ⁽⁵⁾ - Sha Tin	1.15	
Total Estimated Dry Weather Flow (including catchment inflow factor)	36.8	m³/day
Contributing Population	136	Persons
Peaking Factor ⁽⁶⁾	8	
Total Estimated Peak Flow	3.4	L/s

1. A person per flat (PPF) ratio of 2.9 is adopted based on the average house hold size in Sha Tin District Council in Table 130-06806 : Average household size and median monthly household income of households by District Council district of 2023 General Household Survey.
2. Unit flow factor per resident = 0.27 m³/day for modern village based on EPD's GESF Table T-1.
3. Unit Flow Factor per employee = 0.08 m³/day (0.08m³/day for Commercial J7 specific trades for agriculture & Fishing) based on EPD's GESF Table T-2.
4. Unit Flow Factor per employee = 1.58 m³/day (0.08m³/day + 1.50m³/day for Commercial J10 specific trades for agRestaurants & Hotels) based on EPD's GESF Table T-2.
5. Catchment Inflow Factor = 1.15, for Sha Tin District based on EPD's GESF Table T-4.
6. Peaking Factor = 8, for contributing population <1,000 (including stormwater allowance) based on EPD's GESF Table T-5.
7. Site to be redeveloped as a proposed hotel under planning application No. Y/ST/62. Sewage will not discharge to FMH4039860 after development.

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	299123	2	1
	Made by MP Date 09/2026 Chd. JW		

Calculation: **Estimation of Sewage Discharge from Proposed Development**

Proposed Site		
Residential		
Domestic GFA	26,125	m ²
Number of Units	450	
Size of Unit ⁽¹⁾	2.5	Persons/unit
Per Capita Flow ⁽²⁾ - R3	0.37	m ³ /day/person
Total Population	1,125	Persons
Estimated Dry Weather Flow	416.3	m ³ /day
Reprovision of Hong Kong Bible Research and Education Centre		
GFA	2,900	m ²
Employee per GFA (in 100 m ²) ⁽⁵⁾	3.3	Persons/GFA
Employee Population	96	Persons
Per Capita Flow ⁽³⁾ - J11	0.28	m ³ /day/person
Estimated Dry Weather Flow	26.9	m ³ /day
RCHE		
GFA	2,980	m ²
Employee per GFA (in 100 m ²) ⁽⁵⁾	3.3	Persons/GFA
Employee Population	99	Persons
Per Capita Flow ⁽³⁾ - J11	0.28	m ³ /day/person
Number of Elderly	100	
Per Capita Flow ⁽⁸⁾ - Institutional and special class	0.19	m ³ /day/person
Estimated Dry Weather Flow	46.7	m ³ /day
PRC		
GFA	238	m ²
Employee per GFA (in 100 m ²) ⁽⁵⁾	3.3	Persons/GFA
Employee Population	8	Persons
Per Capita Flow ⁽³⁾ - J11	0.28	m ³ /day/person
Estimated Dry Weather Flow	2.2	m ³ /day
Shop and Services		
GFA	562	m ²
Employee per GFA (in 100 m ²) ⁽⁵⁾	5.1	Persons/GFA
Employee Population	29	Persons
Per Capita Flow ⁽⁴⁾ - J10	1.58	m ³ /day/person
Estimated Dry Weather Flow	45.8	m ³ /day
Clubhouse		
GFA	1,050	m ²
Employee per GFA (in 100 m ²) ⁽⁵⁾	3.3	Persons/GFA
Employee Population	35	Persons
Per Capita Flow ⁽³⁾ - J11	0.28	m ³ /day/person
Estimated Dry Weather Flow	9.8	m ³ /day
Total Estimate Dry Weather Flow	547.7	m³/day
Catchment Inflow Factor ⁽⁶⁾ - Sha Tin	1.15	
Total Estimated Dry Weather Flow (including catchment inflow factor)	629.9	m³/day
Contributing Population	2,333	
Peaking Factor ⁽⁷⁾	6	
Total Estimated Peak Flow	43.7	L/s
1. A person per flat (PPF) ratio of 2.5 is assumed, according to the average household size in 2021 Population Census. 2. Unit flow factor per resident = 0.37 m³/day for domestic housing population R3 based on EPD's GESF Table T-1. 3. Unit Flow Factor per employee = 0.28 m³/day (0.08m³/day for Commercial Employee + 0.20m³/day for J11 specific trades for community, social and personal services) based on EPD's GESF Table T-2. 4. Unit Flow Factor per employee = 1.58 m³/day (0.08m³/day for Commercial Employee + 1.50m³/day for J10) based on EPD's GESF Table T-2. 5. The Numbers of employee per 100m² of GFA are based on PlanD's Commercial and Industrial Floor Space Utilization Survey "CIFSUS" Table 8. 6. Catchment Inflow Factor = 1.15, for Sha Tin District based on EPD's GESF Table T-4. 7. Peaking Factor = 6, for contributing population >1000 and <5000 (including stormwater allowance) based on EPD's GESF Table T-5. 8. Unit flow factor per resident = 0.19 m³/day for institutional and social class based on EPD's GESF Table T-1.		

ARUP

Job No.

Sheet No.

Rev.

299123

3

1

Member/Location

Job Title

Application for Amendment of Plan under Section 12A of the Town Planning Ordinance (Cap. 131), to Rezone the Application Site from “Open Space” to “Residential (Group A) 11” at Sha Tin Town Lot 310 in D.D. 184, Sha Tin

Drg. Ref.

Calculation

Hydraulic Assessment on Existing and Proposed Sewerage System After Proposed Development

Made by

MP

Date

09/2026

Chd.

JW

Key Equations and Assumptions

Pipe Design Capacity

$Q_p=VA$

Pipe Full-bore Velocity

$$V = -\sqrt{32gRS_f} \log \left[\frac{k_s}{14.8R} + \frac{1.255V}{R\sqrt{32gRS_f}} \right]$$

Roughness Coeff.,

Ks =

0.15

mm

Ks=

0.3

mm

(for slimed uPVC pipe material, normal condition)

(for slimed uPVC pipe material, poor condition)

Acceleration due to gravity,

g =

9.81

m/s²

Kinematic Viscosity,

v =

0.000001

m²/s

Key Notes

(*) Peaking factor is extracted from EPD's GESF Table T-5, under the scenario of "including stormwater allowance".

(**) Catchment Inflow Factor is extracted from EPD's GESF Table T-4, under Catchment Sha Tin.

USMH	DSMH	USGL(mPD)	DSGL(mPD)	USIL(mPD)	DSIL(mPD)	US Cover (m)	DS Cover (m)	Length (m)	Gradient	Gradient (1 in)	Pipe size (mm)	Area (m²)	Siltation	Reduced Area (m2)	sqrt(32gRs)	Perimeter (m)	R (m)	ks (mm)	Pipe Full-bore Velocity, V (m/s)	Pipe Design Capacity, Q _p (L/s)	Additional ADWF (m³/day) ⁽¹⁾	Accumulated ADWF (m³/day)	Contributing Population	Peaking Factor ⁽²⁾	Peak Flow (L/s)	Additional Flow (L/s)	Capacity Check
Existing Sewerage System Checking																											
FMH4039860	FMH4038083	4.90	5.60	2.50	1.37	2.18	4.01	91.6	0.012	81.1	225	0.040	10%	0.036	0.467	0.707	0.056	0.300	1.582	62.89	8.5	8.5	32	8	0.79	0.00	1%
FMH4038083	FMH4038084	5.60	6.10	1.37	0.98	4.01	4.90	35.7	0.011	91.5	225	0.040	10%	0.036	0.439	0.707	0.056	0.300	1.487	59.13	28.3	36.8	136	8	3.41	0.00	6%
FMH4038084	FMH4038085	6.10	5.60	0.98	-3.13	4.90	8.51	33.9	0.121	8.2	225	0.040	5%	0.038	1.463	0.707	0.056	0.300	5.012	199.27	0.0	36.8	136	8	3.41	0.00	2%
Proposed Sewerage System Checking																											
TMH	MH1	5.00	4.60	3.80	3.70	0.98	0.67	10.0	0.010	100.0	225	0.040	10%	0.036	0.420	0.707	0.056	0.300	1.422	56.53	629.9	629.9	2,333	6	43.74	0.00	77%
MH1	MH2	4.60	4.60	3.70	3.10	0.67	1.28	75.0	0.008	125.0	225	0.040	10%	0.036	0.376	0.707	0.056	0.300	1.269	50.47	0.0	629.9	2,333	6	43.74	0.00	87%
MH2	FMH4039860	4.60	4.90	3.10	2.50	1.28	2.18	65.0	0.009	108.3	225	0.040	10%	0.036	0.404	0.707	0.056	0.300	1.365	54.28	0.0	629.9	2,333	6	43.74	0.00	81%
FMH4039860	FMH4038083	4.90	5.60	2.50	1.37	2.18	4.01	91.6	0.012	81.1	225	0.040	10%	0.036	0.467	0.707	0.056	0.300	1.582	62.89	2.8	632.7	2,343	6	43.93	0.00	70%
FMH4038083	FMH4038084	5.60	6.10	1.37	0.98	4.01	4.90	35.7	0.011	91.5	225	0.040	10%	0.036	0.439	0.707	0.056	0.300	1.487	59.13	28.3	660.9	2,448	6	45.90	0.00	78%
FMH4038084	FMH4038085	6.10	5.60	0.98	-3.13	4.90	8.51	33.9	0.121	8.2	225	0.040	5%	0.038	1.463	0.707	0.056	0.300	5.012	199.27	0.0	660.9	2,448	6	45.90	0.00	23%

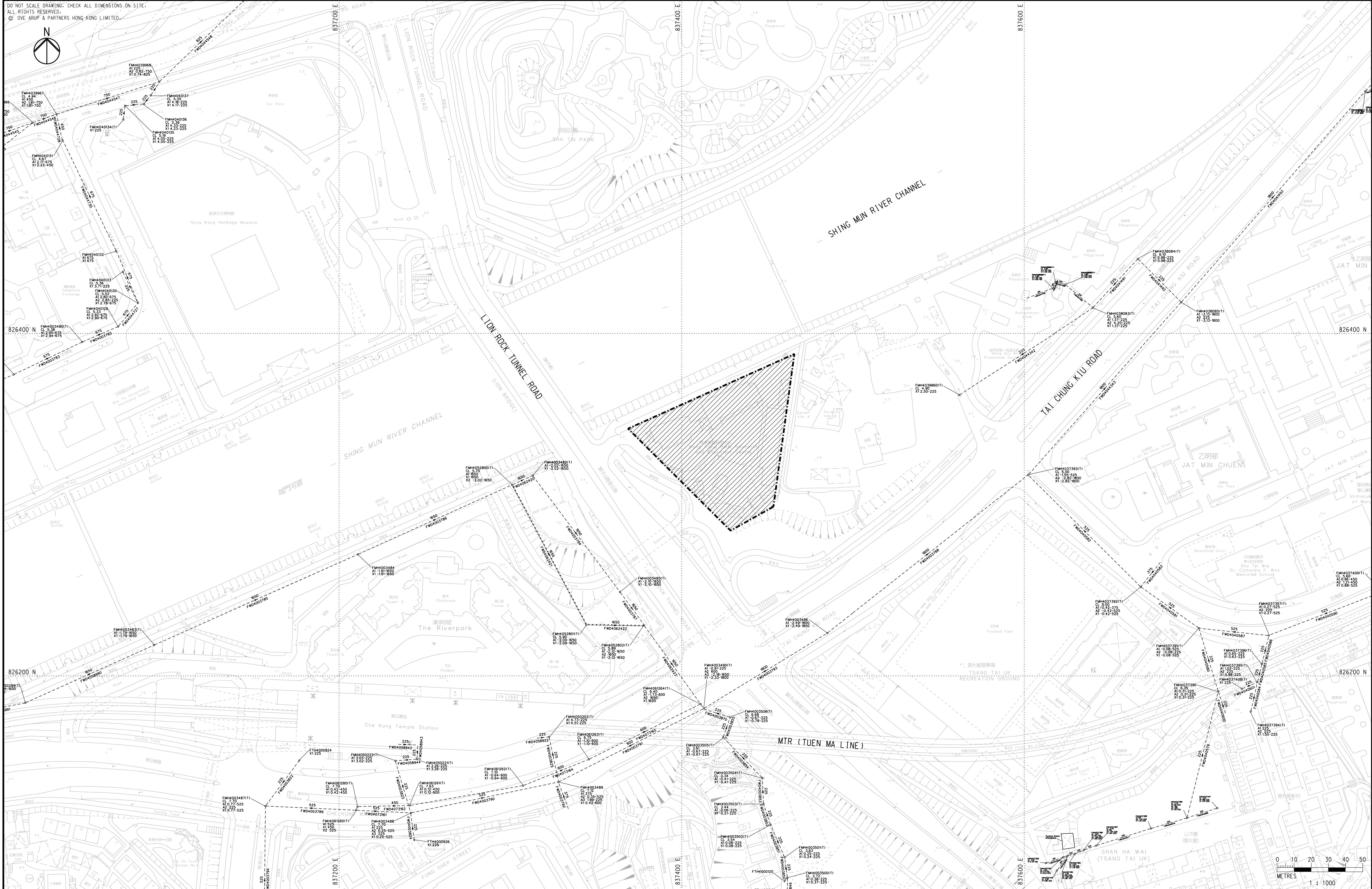
Notes:

(1) Refer to Catchment calculations.

Appendix C

Existing and Proposed Sewerage Network

Proposed Residential Development with 'Social Welfare Facility', 'Religious Institution' and 'Shop and Services' at Sha Tin Town Lot (STTL) 310 in D.D. 310, Sha Tin, New Territories under Section 12A of the Town Planning Ordinance (Cap. 131)



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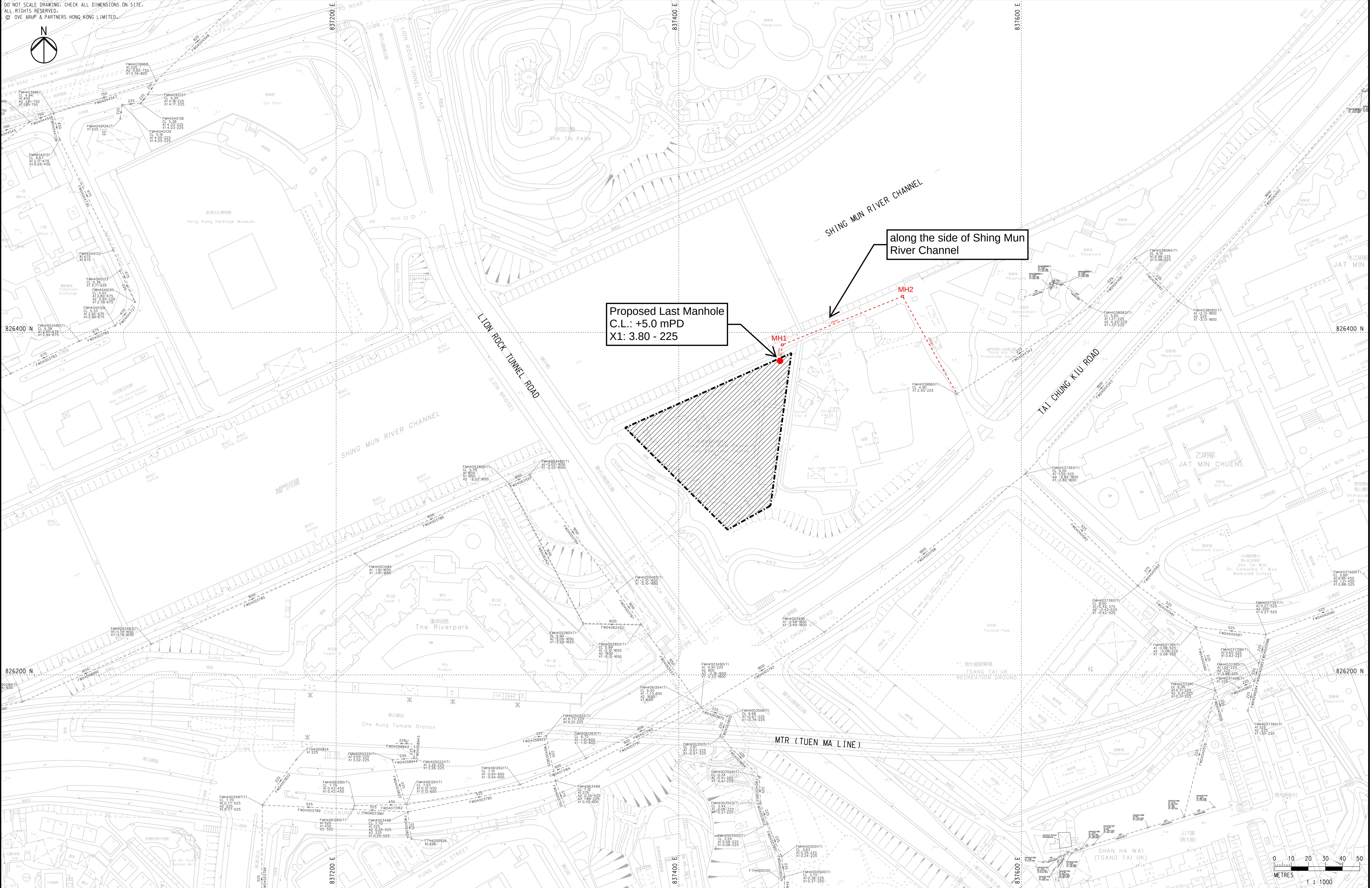
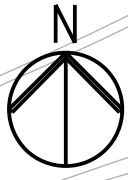
LEGEND	
	PROPOSED DEVELOPMENT
	EXISTING SEWER AND MANHOLE

Job Title
Application for Amendment of Plan under Section 12A of the Town Planning Ordinance (Cap. 131), to Rezone the Application Site from “Open Space” to “Residential (Group A) 11” at Sha Tin Town Lot 310 in D.D. 184, Sha Tin

Drawing Title	
EXISTING SEWERAGE NETWORK	
Drawing Status	SUBMISSION

ARUP	
Scale	1:1000 @ A1
Drn.	RY
Date	02/25
Chd.	JW
Passed	KK
Job No.	299123
Drawing No.	C/S1A/001
Rev.	A

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LEGEND

- PROPOSED DEVELOPMENT
- EXISTING SEWER AND MANHOLE
- PROPOSED SEWER AND MANHOLE

Job Title

Application for Amendment of Plan under Section 12A of the Town Planning Ordinance (Cap. 131), to Rezone the Application Site from “Open Space” to “Residential (Group A) 11” at Sha Tin Town Lot 310 in D.D. 184, Sha Tin

Drawing Title

PROPOSED SEWERAGE NETWORK

Drawing Status

SUBMISSION

ARUP

Scale 1:1000 @ A1

Drn. RY Date 02/25 Chd. JW Passed KK

Job No. 299123 Drawing No. C/S1A/002 Rev. A

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