Appendix 11

Sewerage Impact Assessment

PROJECT NO. P2319

SEWERAGE IMPACT ASSESSMENT REPORT FOR PROPOSED RESIDENTIAL DEVELOPMENT(S) WITH RETAIL, PUBLIC VEHICLE PARK AND SOCIAL WELFARE FACILITIES AT VARIOUS LOTS AND ADJOINING GOVERNMENT LAND AT FUNG YUEN, TAI PO NEW TERRITORIES

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Section

Appendices

1. Introduction

Greg Wong & Associates was commissioned to carry out a sewerage impact assessment (SIA) for Proposed Residential Development in Fung Yuen in Tai Po.

Sewerage impact assessment (hereinafter referred to as 'SIA') including all adverse sewerage impacts as may arise from the development of the site, and all necessary mitigation and improvement works shall be submitted to the relevant government department for their approval.

The location plan and master layout plan of the proposed development are enclosed in **Appendices A** and **B**. The existing land use is shown in **Appendix C**. This Sewerage Impact Assessment (SIA) report is prepared for approval from authorities concerned.

This S.12A application is to seek the Town Planning Board's approval for the proposed amendments to the Draft Tai Po Outline Zoning Plan No. S/TP/31 ("the OZP") for the proposed development at various lots and adjoining Government Land at Fung Yuen, Tai Po, New Territories ("the Development Site").

The proposed development will include residential development(s) with supporting retail and public vehicle park facilities in Area (A); and a social welfare complex comprising a Residential Care Home for the Elderly ("RCHE") and a Day Care Unit ("DCU") for the Elderly in Area (B).

The Applicant submitted an s.12A Planning Application (No. Y/TP/38) to TPB in 2022 to rezone the current western portion of the "CDA(1)" zone to "R(B)13" zone to enable a proposed residential development with retail facilities and public vehicle park, and amending the maximum building height restriction of the "G/IC" zone from 2 storeys to 8 storeys to the south of the "CDA(1)" zone for a proposed 8-storey Social Welfare Complex. While tremendous effort has been put to address and resolve the comments from Planning Department and relevant Government departments during circulation of the application, it is noted that majority of the Government departments have no further adverse comment on the technical assessments attached to Application No. Y/TP/38 since almost 3 years efforts being put by the Applicant & consultancy team.

Taking into account comments received from relevant Government departments and in order to achieve a wholistic planning scheme for the entire "CDA(1)" zone, the Applicant has put forward to include the CDA(1) Future Phase proposed in Application No. Y/TP/38 into the Development Site of this Application. The Proposed Development Proposal in this Application is largely the same as that under Application No. Y/TP/38. The Development Site of this Application is solely formed by the previous development sites, i.e. Area (A), Area(B) and the "CDA(1)" Future Phase. The total GFA, PR, building height, no. of units and estimated population of the Development Proposal is almost exactly the same as that under Application No. Y/TP/38.

2. Existing Sewerage Condition

2.1 The Development Site

The total site covers 35,201 square metre. Area (A) and Area (B) fall within areas zoned "CDA(1)" and "G/IC" respectively on the Draft Tai Po OZP No. S/TP/31. Area (A) is mainly covered with vegetation and occupied by local village tracks, few structures and a watercourse running in a north-south direction, whereas the southern part of Area (B) is occupied by Tin Sam Sewage Pumping Station, and the remaining area of Area (B) is largely vacant and covered with vegetation and a water course. A site reconnaissance has been carried out and the existing land uses of the site are recorded on the Existing Sewerage and Land Use Plans in **Appendix C**.

2.2 Existing Sewerage

The sewerage record plans for the site have been retrieved from Drainage Services sewerage system is located underneath the Fung Yuen Road, which serves for the residents uphill and nearby. It is connected to the Tin Sam Sewage Pumping Station at the end of the Fung Yuen road. The sewerage record plans are enclosed in **Appendix D**.

			Fung Yuen Lo Tsuen A (A1)	***Fung Yuen Lo Tsuen B (A2)***	***Mak Uk (A3)***	***Tin Sam (C1)***	***Le Jardin (C2)***
No. of Flats			42	210	165	78	-
Occupant per Flats (2024 census)			2.6	2.6	2.6	2.6	-
Population	Residential		109	546	429	203	0
	Employee		0	0	0	0	10**
Unit Flow Factor (UFF)	Domestic	m^3/day/ person	0.150	0.150	0.270	0.270	-
	Commercial Employee	m^3/day/ employee	0.080	0.080	0.080	0.080	0.080
	Commercial Activities	m^3/day/ employee	0.200	0.200	0.200	0.200	0.200
Foul Water Flow (Q)	Domestic	m^3/s	0.000189	0.000948	0.001341	0.000634	-
	Commercial Employee	m^3/s	0.000000	0.000000	0.000000	0.000000	0.000009
	Commercial Activities*	m^3/s	0.000000	0.000000	0.000000	0.000000	0.000023
	Total	*m^3/s*	*0.000189*	*0.000948*	*0.001341*	*0.000634*	*0.000032*

Table 2.1 Assumed Populations and Average Foul Flow which catchment covers the existing developments within A1 + A2 + A3 + C1 + C2 to manhole FMH1005429

* J11 – Community, Social & Personal Services are assumed as commercial activities for existing residential A1 to C2 (refer to Table T-2 of "Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning")

**2000m^2/employee are assumed to manage Le Jardin

	Catchment A (A1 + A2 + A3 + C1 + C2)
Calculated Total Average Flow (m3/s)	0.003145
Peaking Factor	6*
Total Peak Flow (m3/s)	0.018867

*Peaking Factor (including stormwater allowance) for facility with existing upstream sewerage is adopted and Peaking Factor Calculation is attached in Table 3.6

Table 2.2 Total Peak Flow Calculations from existing developments (Catchment A1 + A2 + A3 + C1 + C3) to manhole FMH1005429

2.3 Capacity of Existing Sewerage System

From the DSD sewerage record plan, only 225mm diameter pipe is located outside the proposed development. It is anticipated that the capacity of the existing sewerage system is insufficient for the proposed development.

3. Proposed Sewerage System

3.1 Proposed Development in Area (A) Phase I

The future sewage discharge from the development site depends on the design population which in turn is governed by planning parameters. The number of person per occupied flat (PPOF) ratio of 2.6 has been adopted based on the average domestic household size from 2024 Population Census. According to the Master Layout Plan in **Appendix B**, there will be 1,718 units in the proposed Phase I Residential Development while the estimated population is about 4,467. As it is a new upstream sewerage system in the proposed development, according to the Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning published by EPD, peaking factors (excluding stormwater allowance) has been used to assess and shown in the following table:

			Phase I Residential Towers (B1)
No. of Flats			1718
Occupant per Flats (2024 census)			2.6
Population	Residential		4467
	Employee		65
Unit Flow Factor (UFF)	Domestic	m^3/day/person	0.270
	Commercial Employee	m^3/day/employee	0.080
	Commercial Activities*	m^3/day/employee	0.200
Foul Water Flow (Q)	Domestic	m^3/s	0.013959
	Commercial Employee	m^3/s	0.000060
	Commercial Activities	m^3/s	0.000150
	Total	*m^3/s*	***0.014169***

Table 3.1 Assumed Populations and Foul Water Flow of Proposed Residential Development

* J11 – Community, Social & Personal Services are assumed as commercial activities for proposed residential B1 (refer to Table T-2 of "Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning")

Assumptions:

1. Unit Flow Factor for Domestic Flows is taken as "Planning for Future Private R2".
2. The population of employee is assumed to be 10 for each residential tower and 5 for club house.

			Commercial Complex (B2)
Population	Commercial Activities		Shop & Services
	Gross Floor Area (GFA)	m^2	800.000
	Worker Density	workers per GFA (in 100 m^2)	3.5
	Employee		28
Unit Flow Factor (UFF)	Commercial Employee	m^3/day/employee	0.08
	Commercial Activities*	m^3/day/employee	0.20
Foul Water Flow (Q)	Commercial Employee	m^3/s	2.59259E-05
	Commercial Activities	m^3/s	6.48148E-05
	Sub-total	*m^3/s*	*9.07407E-05*

Table 3.2 Assumed Populations and Foul Water Flow of Proposed Commercial Complex

* J11 – Community, Social & Personal Services are assumed as commercial activities for proposed commercial B2 (refer to Table T-2 of "Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning")

Assumptions:

1. The population of employee is assumed based on Table 8, CIFSUS.

	Swimming Pool (B3)
Pool Area (m^2)*	150
Pool Depth (m)*	1
Pool Volume (m^3)	150 x 1 = 150 m^3
Turnorver Rate (hrs)	6
Surface Loading Rate of Filter ($m^3/m^2/hr$)	20
Filter Areas Required (m^2)	150 / 6 / 20 = 1.25
Backwash Duration (min/d)	3
Backwash Flow Rate ($m^3/m^2/hr$)	30
Design Flow for Swimming Pool Backwashing	3 x 30 x 1.25 / 60 = 1.875 m^3/d
	0.0000217 m^3/s

Table 3.3 Backwashing Calculations of the Swimming Pool from the Proposed Development

*The outdoor swimming pool dimension is subjected to detail design stage

An outdoor swimming pool with volume of 150m3 is proposed. The backwashing discharge from the proposed swimming pool is 0.000022m^3/s. Due to the insufficient spare capacity of the existing sewerage system, the scheme of constructing an on-site packaged sewage treatment plant will be adopted. According to Guidelines for the Design of Small Sewage Treatment Plants, the design peak flow arriving at the STP as a proportion of dry weather flow (DWF) shall be taken as 4 DWF for population over 1000. To construct an on-site packaged sewage treatment plant, the installed capacity of the plant would be 3 x the Average Dry Weather Flow (ADWF) with an equalization tank.

Average Dry Weather Flow (ADWF) (m^3/s)	0.014169 + 0.000022 + 9.08E-05 = 0.01428

Table 3.4 Calculations of the Average Dry Weather Flow of proposed Area (A) Phase I development

	Resident	Employee	Swimming Pool	Total
Calculated Total Average Flow (m3/day)	1206.06	26.04	1.88	1233.98
Contributing Population	4467	97	7	4571
Peaking Factor***	3	3	-	3
Overall Design Peak Flow (m3/day)	3618.18	78.12	1.88	3698.18

Table 3.5 Peaking Factor Calculation of Proposed Area (A) Phase I Development to the Sewage Treatment Plant

**According to Guidelines for Estimating Sewage Flows for Sewage Infrastructure Plannining – T-5(b) for Sewage Treatment Works*

***The Total Average Flow do not include swimming pool flow as swimming pool sewage generation occur at non-peaking hour (about 00:00-06:00 and will be subjected to detail design stage) and in a constant flow*

****STP can be designed to cater for a peak flow of 3 ADWF, excess flow over 3 ADWF being equalized in an equalization tank. Equalization tanks should be designed to hold the excess flow for a period of two hours, 1 ADWF excess sewerage flow will be equalized in an 110m^3 equalization tank. The dimension of equalization tank will be subjected to detail design stage*

The proposed design of the treatment plant is subjected to the detailed design stage. The installed capacity of the proposed sewage treatment plants (STPs) is estimated as 0.0428m^3/s (Peaking factor do not adopted for swimming pool sewage), which is 3698m^3/day. The design of STP would follow EPD's Guideline for the Design of Small STP, and be duly certified by Authorized Person for compliance of relevant requirements. The responsible party for constructing and maintaining the plant would be the lot owner. The sewage treatment process is briefly discussed in the following. The first process is primary treatment. Physical solids would be settled while the light solid would be floated in the primary sedimentation tank. They will be removed afterwards. Then, the sewage will flow to secondary treatment. Dissolved and suspended biological matters are removed by aerobic biological process. Lastly, tertiary treatment will be done to the wastewater to improve effluent quality before discharging to the receiving environment. According to the information advised by the STP supplier, for the maintenance of the STP, the maintenance frequency would be generally twice a week. The duration of each maintenance would be 1-2 hours. The STP would still operate normally during the regular maintenance. There will be spare parts of the STP on site for maintenance convenience. The location plan of the STP and the proposed discharge point is shown in **Appendix E**. Discharge licence under WPCO would be obtained prior to operation of the STP. Regular monitoring or audit will be conducted during construction phase (for construction works) and operation phase (for the proposed STP).

Moreover, according to the normal practice advised by the STP supplier, standby equipment (e.g. pumps) of the sewage treatment plant will be stored on site as a contingency plan. When facing any emergency situation, standby equipment will be provided for maintenance. Tankers would be arranged to tanker away raw sewage to avoid

discharge of the untreated raw sewage when there is plant failure before the storage capacity of the sewage treatment plant is exhausted during the maintenance period. It would be the same case for emergency situation such as power failure and plant breakdown. The lot owner will be responsible for the implementation and maintenance of the proposed STP.

3.2 G/IC zone

The proposed G/IC facilities has floor area of about 4,782 s.m. for the provision of a 150-place residential care home for the elderly cum a 30-place day care unit.

			Social Welfare Complex (D1)
No. of Flats			-
Occupant per Flats (2024 census)			-
Population	Residential		150
	Employee		110
Unit Flow Factor (UFF)	Domestic	m^3/day/ person	0.270
	Commercial Employee	m^3/day/ employee	0.080
	Commercial Activities	m^3/day/ employee	0.200
Foul Water Flow (Q)	Domestic	m^3/s	0.000469
	Commercial Employee	m^3/s	0.000102
	Commercial Activities	m^3/s	0.000255
	Total	*m^3/s*	*0.000825*
Peaking Factor (P)			6*
Peak Foul Water Flow (Qp)	*=Q x P*	m^3/s	*0.004951*

Table 3.6 Assumed Populations and Average Foul Flow which catchment covers the existing developments within D1 to manhole FMH1005429

**Peaking Factor (excluding stormwater allowance) for facility with new upstream sewerage is adopted*

The calculated peak sewerage flow from proposed development of Social Welfare Complex is about 0.0050 m3/s. According to the sewerage record plan from DSD, there is no existing sewer for the proposed Social Welfare Complex. It is recommended that an internal sewerage system be provided to deliver flow to the existing sewerage system at FMH1005429. The proposed sewerage works are shown in **Appendix F**. The calculation is attached in **Appendix G**.

The alignment of the proposed sewers connecting the proposed buildings and the proposed on-site treatment plant within the Development Site (Area (A) and (B)) are shown in **Appendix E** which will be subjected to detail design stage.

3.3 Proposed Development in Area (A) Phase II

According to the Master Layout Plan in **Appendix B**, there will be 270 units in the proposed Phase II Residential Development while the estimated population is about 702. As it is a new upstream sewerage system in the proposed development, according to the Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning published by EPD, peaking factors (excluding stormwater allowance) has been used to assess and shown in the following table:

			Phase II Residential Tower (E)
No. of Flats			270
Occupant per Flats (2024 census)			2.6
Population	Residential		702
	Employee		10
Unit Flow Factor (UFF)	Domestic	m^3/day/ person	0.270
	Commercial Employee	m^3/day/ employee	0.080
	Commercial Activities	m^3/day/ employee	0.200
Foul Water Flow (Q)	Domestic	m^3/s	0.002194
	Commercial Employee	m^3/s	0.000009
	Commercial Activities	m^3/s	0.000023
	Total	*m^3/s*	0.002226
Peaking Factor (P)			6*
Peak Foul Water Flow (Qp)	*=Q x P*	m^3/s	*0.013357*

Table 3.7 Assumed Populations and Average Foul Flow which catchment covers the Area(A) Phase II residential developments to manhole FMH1005458

**Peaking Factor (excluding stormwater allowance) for facility with new upstream sewerage is adopted*

Assumptions:

1. Unit Flow Factor for Domestic Flows is taken as “Planning for Future Private R2”.
2. The population of employee is assumed to be 10 for each residential tower.

The calculated peak sewerage flow from the proposed Phase II residential tower is about 0.0134 m3/s. An existing sewerage system from nos. FTH1013660 to FWD1065306 are located within the Area(A) Phase II. The sewerage FTH1013660 to FWD1065306 will be demolished and an internal sewerage system will be proposed to deliver flow to the existing sewerage system at FMH1005458 during construction stage. The foul water flow will be discharge to the public sewerage system with no adverse impact. The abandoned pipe shall be removed or filled up to the satisfaction of DSD refer to DSD technical Circular No. 1/2022 – Handling of Abandoned Pipes under DSD’s Purview. The proposed sewerage works are shown in **Appendix F**. The calculation is attached in **Appendix G**. The alignment of the proposed sewers connecting the proposed buildings and the public sewerage system are shown in **Appendix E** which will be subjected to detail design stage.

	Catchment A+C	*Catchment B**	*Catchment D*	*Catchment E*
Calculated Total Average Flow (m3/day)	*271.7*	*1234.0*	*71.3*	*192.3*
Contributing Population	*1007*	*4571*	*265*	*713*
Peaking Factor	*6*	*3*	*6*	*6*

Table 3.8 Peaking Factor Calculation of existing catchments (A1+A2+A3+C1+C2) and proposed development (B1+B2+B3+D1+E)

**The Total Average Flow in Catchment B do not include swimming pool flow as swimming pool sewage generation occur at non-peaking hour (about 00:00-06:00 and will be subjected to detail design stage) and in a constant flow*

4. Potential Sewerage Impacts and Proposed Mitigation Measures

The spare capacity of existing sewage system is insufficient for the proposed two phases of residential development in Area (A). A new sewage system should be developed to cater for the designed sewage loading arising from the proposed development in Area (A) Phase I. Therefore, an on-site packaged sewage treatment plant is proposed for the sewerage generated from Phase I residential towers, swimming pool and Commercial Complex. The installed capacity for the sewage treatment plant is 0.0428 m^3/s, which is 3698 m^3/day. Hence the existing sewerage characteristics will not be adversely affected by the proposed development. The detailed design of the sewage treatment plant, particularly the proposed footprint of the plant(s), any emergency storage and its retention period, the sludge off-site arrangement etc., will be submitted during detail design stage.

The sewage from the proposed development in Area (A) Phase I will be treated by sewage treatment plant and discharged to existing stormwater drainage system, which is a stream course. The treated sewage effluents will comply with all relevant statutory standards before discharge. The calculated peak sewage flow discharged offsite from STP (estimated to be only 0.0428m^3/s) is insignificant to the total flow of stormwater to the stream course. Hence, no adverse impact to the proposed drainage system due to treated sewage will be resulted.

The sewerage generated from the Social Welfare Complex in Area (B) will be discharged into public sewerage system at FMH1005429. It is considered that the existing sewerage characteristics will not be adversely affected by the proposed development. The lot owner shall undertake the construction of the proposed connection sewer from Social Welfare Complex to the existing sewer.

The sewerage generated from the Area (A) Phase II will be discharged into public sewerage system at FMH1005458. It is considered that the existing sewerage characteristics will not be adversely affected by the proposed development. The lot owner shall undertake the construction of the proposed connection sewer from the Area (A) Phase II to the existing sewer.

The preventive measures for overflow of raw sewage below is applicable for this development:

- With design capacity to be able to treat 3 times of ADWF;
- Equalization tank to store the ADWF for up to 2 hours to handle emergency situation;
- Provision of effluent storage tank with volume of 2 times ADWF;
- Apart from standby unit/ equipment STP, backup power should be provided;
- According to ProPECC 1/23, "two duty and one standby pumps should be provided in equalization tanks";
- Sensors with alarm system and flowmeter will be provided to monitor the flow rate to

avoid overflow,
- The STP plant room shall be water-tight and leak proof,
- Plant staff to adjust the hydraulic level and retention times in the treatment unit to prevent overflow
- Arrangement of temporary piping to form an alternative sewage route to handle emergency overflow situation, and
- Contingency/ emergency plan and maintenance program should be prepared and implemented in detail design stage.

5. Potential Water Quality Impacts and Proposed Mitigation Measures in Construction Stage and Operation Stage

The proposed development is within the Tolo Habour & Channel Water Control Zone. License will be obtained for the discharge of treated effluent from the proposed sewage treatment plant into the existing stream. The effluent discharged by the proposed sewage treatment plant will comply with the relevant standards as laid out in the Water Pollution Control Ordinance (WPCO) and its Technical Memorandum so that it will have no adverse impact on the water quality of the existing stream.

The existing stream within the site will be preserved in-situ. The proposed discharge point is located over 600m from Fung Yuen SSSI and the water gathering ground to its north, which are located at a higher altitude of between 20mPD and 150mPD. More importantly, the proposed discharge point is at a downstream location with a lower altitude of about 6mPD far away from the SSSI. There will not be any backflow of treated effluent to Fung Yuen SSSI and the water gathering ground. Based on drainage record plan, a stream course that runs from the upstream hillside collects and conveys runoff from upstream and the site are connected to existing box culverts at Ting Kok Road. The treated effluent flow from sewage treatment plant is designed with allowable capacity and mitigation measures are proposed for the potential water quality impacts that no adverse effect will be induced by the proposed development on these water sensitive receivers.

All effluent produced from construction and operation stages should be pre-treated to comply with the relevant standards in the Water Pollution Control Ordinance and its Technical Memorandum, and it should be sited away from natural section of water courses to ensure no adverse effect will be induced by the proposed development.

5.1 Potential Water Quality Impacts and Proposed Mitigation Measures during Construction Stage

<u>Mitigation Measures for General Construction Activities and Construction Site Run-off</u>

The existing stream will be preserved in-situ. The proposed development will not cause direct impact on the stream, it will only have potential indirect impacts during construction of the development. With the implementation of good site practice and appropriate pollution control measures to minimize impacts during construction, adverse water quality impacts are not anticipated. With reference to the WPCO, ETWB TC (Works) No. 5/2005, ProPECCPN 2/24, ProPECCPN 1/23 and Guidelines for the Design of Small Sewage Treatment Plants, the following mitigation measures are proposed:

as follows:

(a) The proposed works site inside or in the proximity of natural rivers and streams should be temporarily isolated, such as by placing of sandbags or silt curtains with lead edge at bottom and properly supported props, to prevent adverse impacts on the stream water qualities.

(b) The natural bottom and existing flow in the river should be preserved as much as possible to avoid disturbance to the river habitats. If temporary access track on riverbed is unavoidable, this should be kept to the minimum width and length. Temporary river crossings should be supported on stilts above the riverbed.

(c) Stockpiling of construction materials, if necessary, should be properly covered and located away from any natural stream/river.

(d) Construction debris and spoil should be covered up and/or properly disposed of as soon as possible to avoid being washed into nearby streams/rivers by rain.

(e) Construction effluent, site run-off and sewage should be properly collected and/or treated. Wastewater from a construction site should be managed with the following approach in descending order:

i. Minimisation of wastewater generation;

ii. Reuse and recycle;

iii. Treatment.

Proper locations for discharge outlets of wastewater treatment facilities well away from the natural streams/rivers should be identified.

(f) Removal of existing vegetation alongside the riverbanks should be avoided or minimised. When disturbance to vegetation is unavoidable, all disturbed areas should be hydroseeded or planted with suitable vegetation to blend in with the natural environment upon completion of works.

(g) Adequate lateral support may need to be erected in order to prevent soil/mud from slipping into the stream/river, but without unduly impeding the flow during heavy rain.

(h) Supervisory staff should be assigned to station on site to closely supervise and monitor the works.

(i) Portable toilets will be provided for site staff and workers. Licensed collectors shall tanker away the accumulated sewage for disposal and further treatment.

(j) Discharge license shall be obtained during construction phase. Discharge of the treated effluent shall comply with the discharge license.

Under ProPECC PN2/24 Construction Site Drainage, various guidelines for the handling and disposal of construction site discharges are included. The guidelines include the use of sediment traps, wheel washing facilities for vehicles leaving the site, adequate maintenance of drainage systems to prevent flooding and overflow, sewage collection and treatment, and comprehensive waste management (collection, handling, transportation, and disposal) procedures.

<u>Mitigation Measures for Accidental Spillage of Chemicals During Construction Phase</u>

Site drainage will be well maintained, and good construction practices will be adopted to ensure that chemicals (e.g. oils, fuels and solvents) will be used and stored in designated areas which have pollution prevention facilities. All fuel tanks and storage areas will be sited on sealed areas to prevent spillage of fuels and solvents to the nearby watercourses. All waste oils and fuels will be collected in designated tanks prior to disposal. As chemicals will be managed, stored and handled properly and will not enter the existing stream. Therefore, it is expected that no water quality impacts caused by accidental spillage would be generated.

The ProPECC Note PN 1/23 provides guidelines and practices for handling, treatment and disposal of various effluent discharges to stormwater drains and foul sewers. The design of site drainage and disposal of various effluents generated within the Development Site will follow the relevant guidelines and practices as given in the ProPECC Note PN 1/23. No unacceptable water quality impact is therefore envisaged.

5.2 Potential Water Quality Impacts and Proposed Mitigation Measures during Operation Stage

Mitigation Measures to Protect the Watercourse in Development Site

As mentioned in Section 4, there will be no potential water quality impact from the Sewage Treatment Plant during the operation phase. The treated sewage effluents from the plant will comply with all relevant statutory standards before discharge. Best practices in ProPECC PN 1/23 “Drainage Plans subject to comments by the Environmental Protection Department” would be followed in operation phase as well.

Nevertheless, the following measures are proposed to avoid/minimize direct or indirect impact to the natural stream in operation stage, if any:

(a) Drainage channels shall be provided for slope, if any, to prevent soil erosion through intercepting and conveying surface runoff to designated discharge points;

(b) Surface of exposed soil slope shall be hydroseeded or landscaped for protection against surface erosion, while surface of covered soil slope shall be shotcreted and

(c) Sufficient fall shall be provided to paved surfaces to prevent ponding.

(d) The natural bottom and existing flow in the stream should be preserved as much as possible to avoid disturbance to the river habitats.

(e) Removal of existing vegetation (including trees) alongside the stream banks should be avoided or minimised. When disturbance to vegetation and trees are unavoidable, all disturbed areas should be planted with native vegetation and trees as far as possible to blend in with the natural environment upon completion of works.

(f) Drainage in covered carparks should be connected to foul sewers via petrol interceptors.

(g) Sewerage from the swimming pool with using of cleaning agents should be treated at the sewerage treatment plant properly before discharge.

During the detailed design stage, environmentally friendly design shall be adopted in order to maintain the naturalness, landscape as well as ecological value of the natural stream.

Mitigation Measures for Surface Runoff During Operation Phase

The Proposed Development is a residential development, and the pollutants (e.g. debris, refuse, dust, oil, grease and grit) deposited on road surfaces and paved areas will be very limited. To mitigate the potential water pollution due to the contaminated surface runoff, facilities such as sand traps, silt traps, sedimentation basins and oil interceptors will be installed in the drainage system for the proposed paved areas to contain the contaminants possibly found in the surface runoff before discharge. Moreover, good management measures such as regular cleaning and sweeping of the Site will be adopted. Cleaning will be carried out prior to the occurrence of rainstorm wherever practicable. Manholes, as well as stormwater gullies, ditches provided at the Site will be regularly inspected and cleaned (e.g. monthly). Additional inspection and cleansing will be carried out before heavy rainfall forecasted.

Mitigation Measures for Application of Fertilisers and Pesticides

Good management practices will be adopted to properly manage the application rate and time during irrigation to minimise chance of run-off. Use of fertilisers and pesticides will be properly controlled, e.g. applications prior to forecasted heavy rain event will also be avoided to minimise the potential for run-off of residual fertiliser. Priority will be given to remove infected/ sick plantings over the use of pesticides. In addition, use of more specific, systemic and biodegradable pesticide in low dosage will be more preferred. The use and handling of fertilisers and pesticides should follow the Pesticides in Public Areas by Agriculture, Fisheries and Conservation Department, Food and Health Bureau and Leisure and Cultural Services Department. All of the adopted biological products will be the registered pesticide by Agriculture, Fisheries and Conservation Department under the Pesticides Ordinance.

The use of fertilisers and pesticides is limited to the garden. A buffer zone of 10m from the existing stream will be established and no spray of fertilisers and pesticides will be allowed within the buffer zone.

With the implementation of above mentioned mitigation measure, the water quality impact associated with irrigation runoff of fertilisers, pesticides and soil/sediment during operation phase is considered insignificant.

Mitigation Measures for Wash-off of Garden Soil / Sediment

Measures (e.g. garden curbs) will be taken to prevent the washing away of garden soil / sediment into the on-site drainage system. Adequately designed sand/silt removal facilities such as sand traps, silt traps and sedimentation basins will be also installed in the drainage system.

5.3 In conclusion, with the implementation of the mitigation measures of the potential water quality impact proposed above, adverse direct or indirect water quality impacts arising from the construction and operation stages of the project are not anticipated.

6. Changes to Sewerage Characteristic

6.1 New terminal manhole and sewer are proposed to the existing sewerage system. It is considered that the existing sewerage characteristic will not be adversely affected by the proposed development. The detailed design of the sewerage system will be submitted during detail design stage.

7. Proposed sewer diversion

7.1 An existing sewer between manhole nos. FMH1034907 and FMH1034910 is partially located in the site. The sewerage system is considered to be diverted outside the proposed development. A foul water manhole and sewerage pipe is proposed to connect the manhole FMH1034907 and FMH1034910. The proposed catchment area remains unchanged with existing condition. Is it considered that the existing characteristic will not be adversely affected by the proposed diversion. The lot owner shall undertake the construction of the proposed connection sewer from the FMH1034907 to the FMH1034910. The proposed sewerage works are shown in **Appendix F**. The proposed manhole level and layout are indicative and will be subjected to detail design.

8. Conclusion

8.1 Existing sewerage is found in the close vicinity of site. The main stream of the sewerage system is located underneath the Fung Yuen Road.

8.2 A sewage treatment plant which is capable of handling a peak sewage flow of $0.0428m^3/s$ is proposed to be constructed within the site for the development.

8.3 The sewage from the proposed development in Area (A) Phase I will be treated by sewage treatment plant in compliance with all relevant statutory standards before discharging to proposed stormwater drainage system, which is a stream channel, which will be preserved in-situ.

8.4 The sewage from the Social Welfare Complex in Area (B) will be discharged to the public sewerage system with no adverse impact.

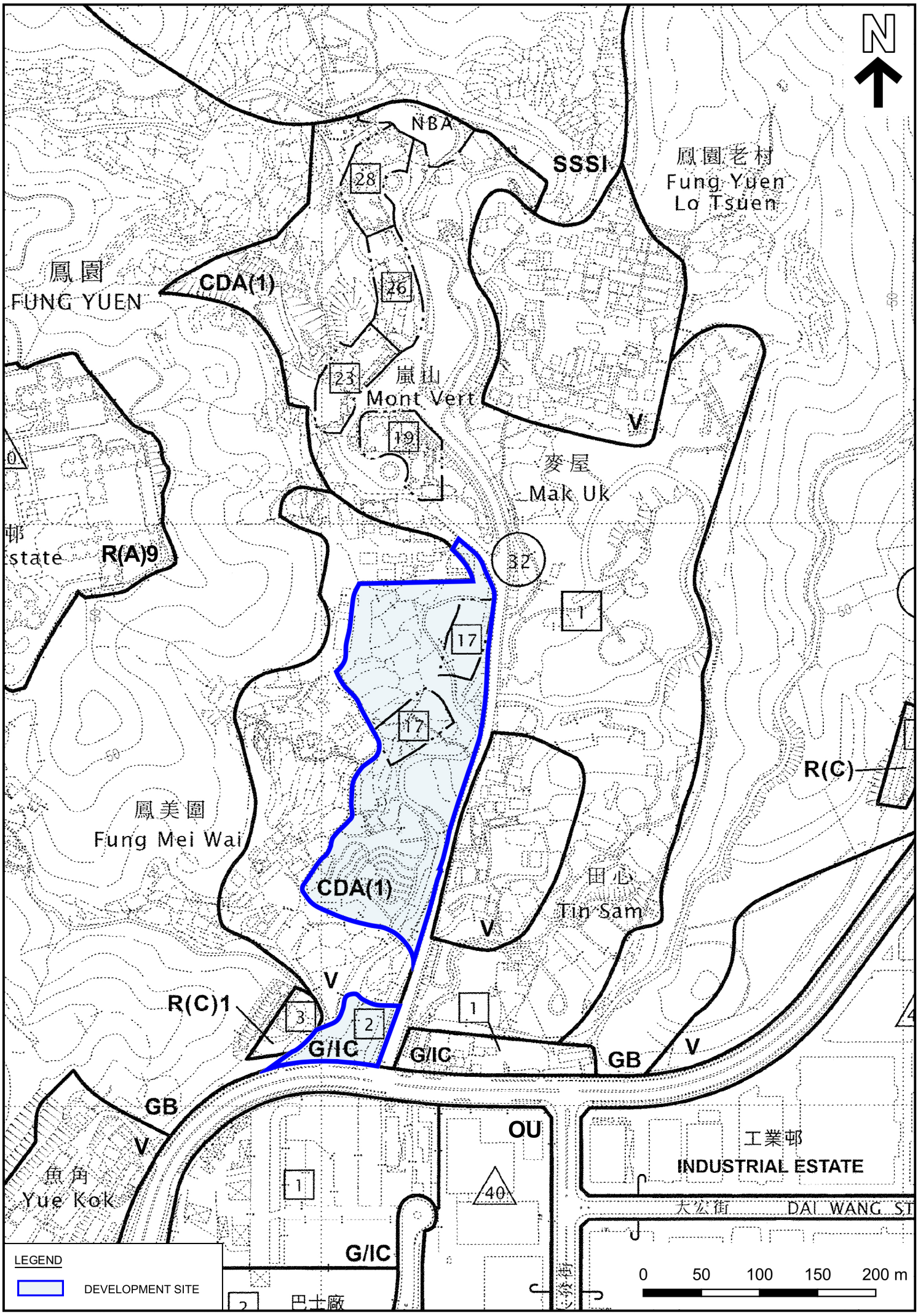
8.5 The sewage from the proposed development in Area (A) Phase II will be discharged to the public sewerage system with no adverse impact.

8.6 New sewerage system is proposed to the existing sewerage system to discharge the sewerage within the site for the development.

8.7 With the implementation of the mitigation measures as proposed in this report, adverse sewerage impact or water quality impact is not anticipated.

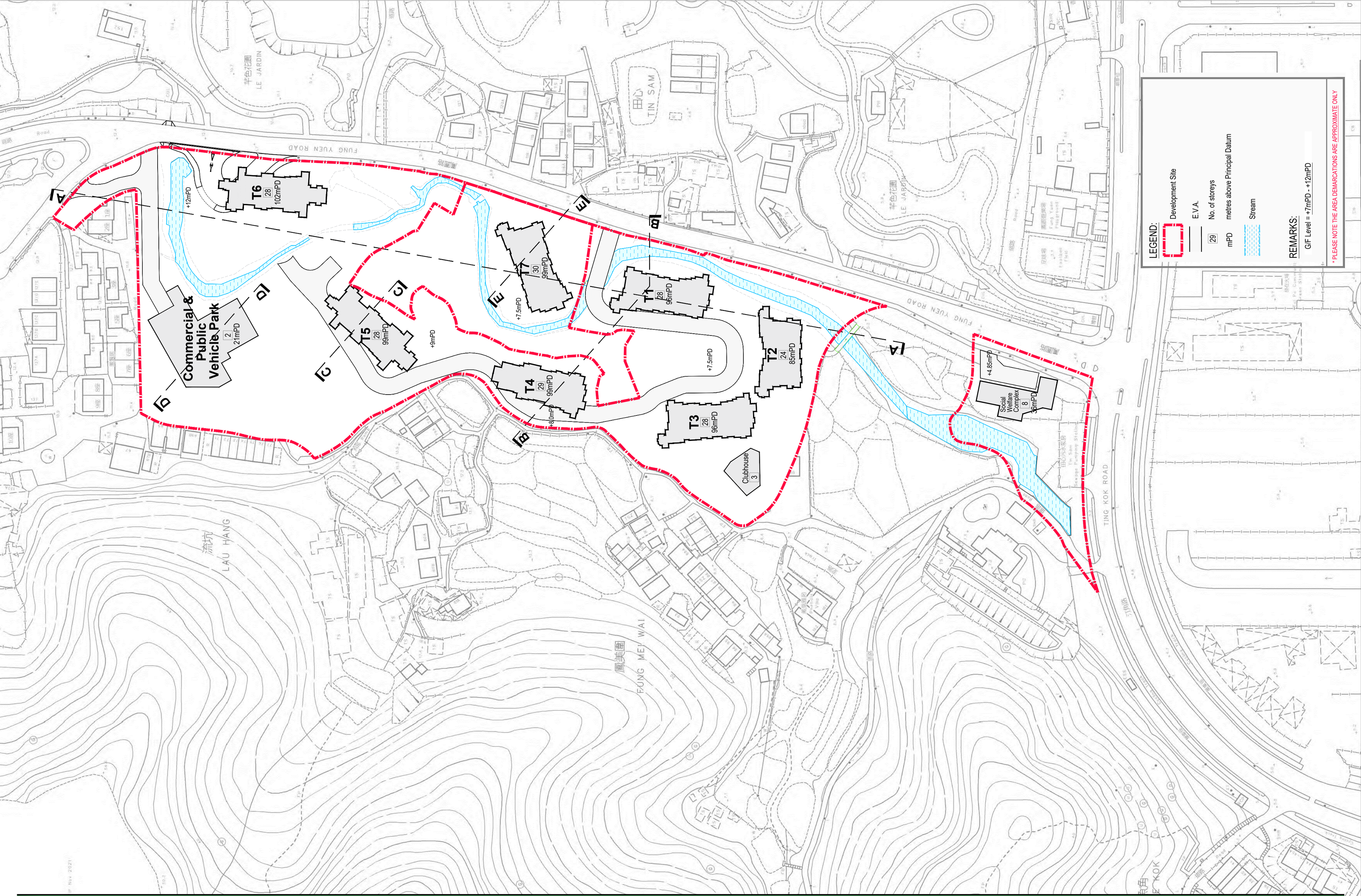
Appendix A

Site Location Plan


N
NBA
SSSI
鳳園老村
Fung Yuen
Lo Tsuen
鳳園
FUNG YUEN
CDA(1)
嵐山
Mont Vert
麥屋
Mak Uk
V
R(A)9
R(C)
鳳美園
Fung Mei Wai
CDA(1)
田心
Tin Sam
R(C)1
G/IC
GB
OU
工業邨
INDUSTRIAL ESTATE
大公街
DAI WANG ST
魚角
Yue Kok
巴士廠
LEGEND
DEVELOPMENT SITE
0
50
100
150
200 m

Appendix B

Master Layout Plan



REZONING APPLICATION
AT FUNG YUEN ROAD,
TAI PO, N.T.

Indicative Layout Plan

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10/09/2025
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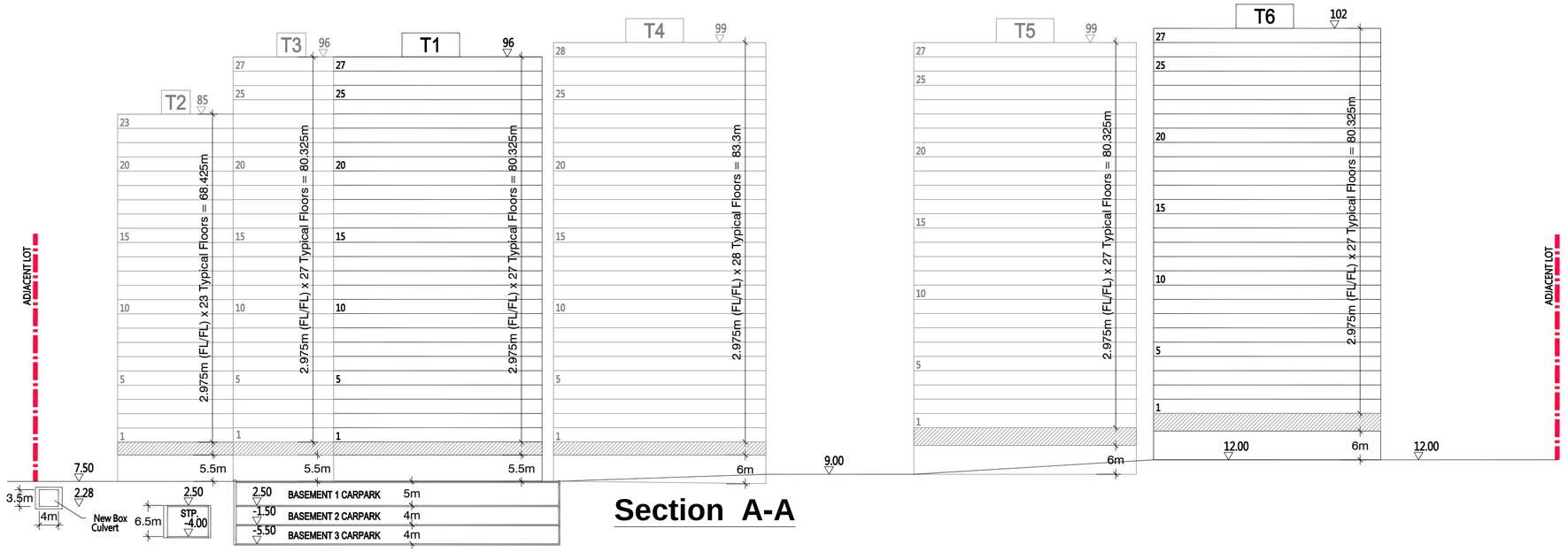
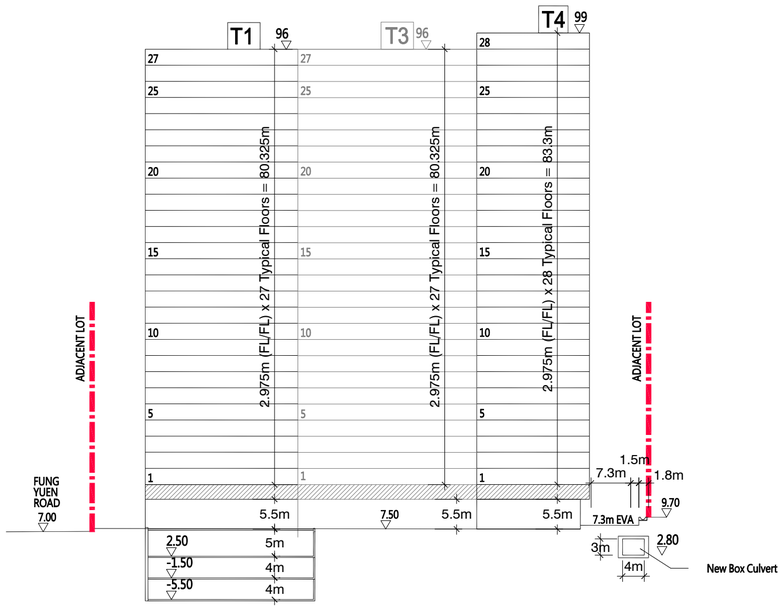
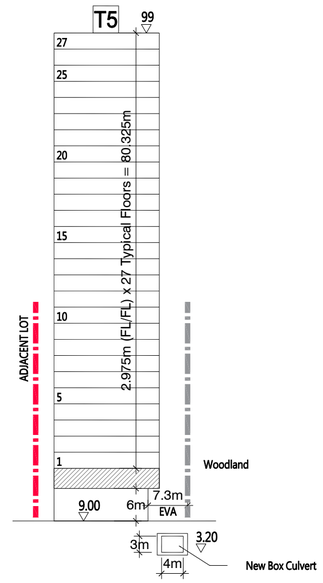


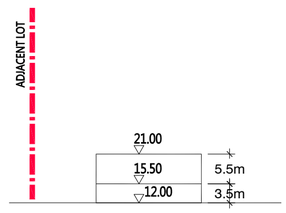
Section A-A



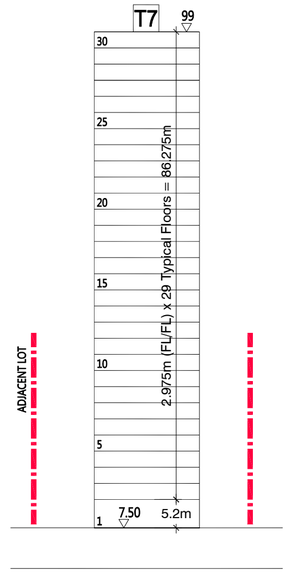
Section B-B



Section C-C



Section D-D



Section E-E

REZONING APPLICATION
AT FUNG YUEN ROAD,
TAI PO, N.T.

Diagrammatical Section Plan

Dwg No: 250804_carman_(r3)- fung yuen (for submission lands).dwg
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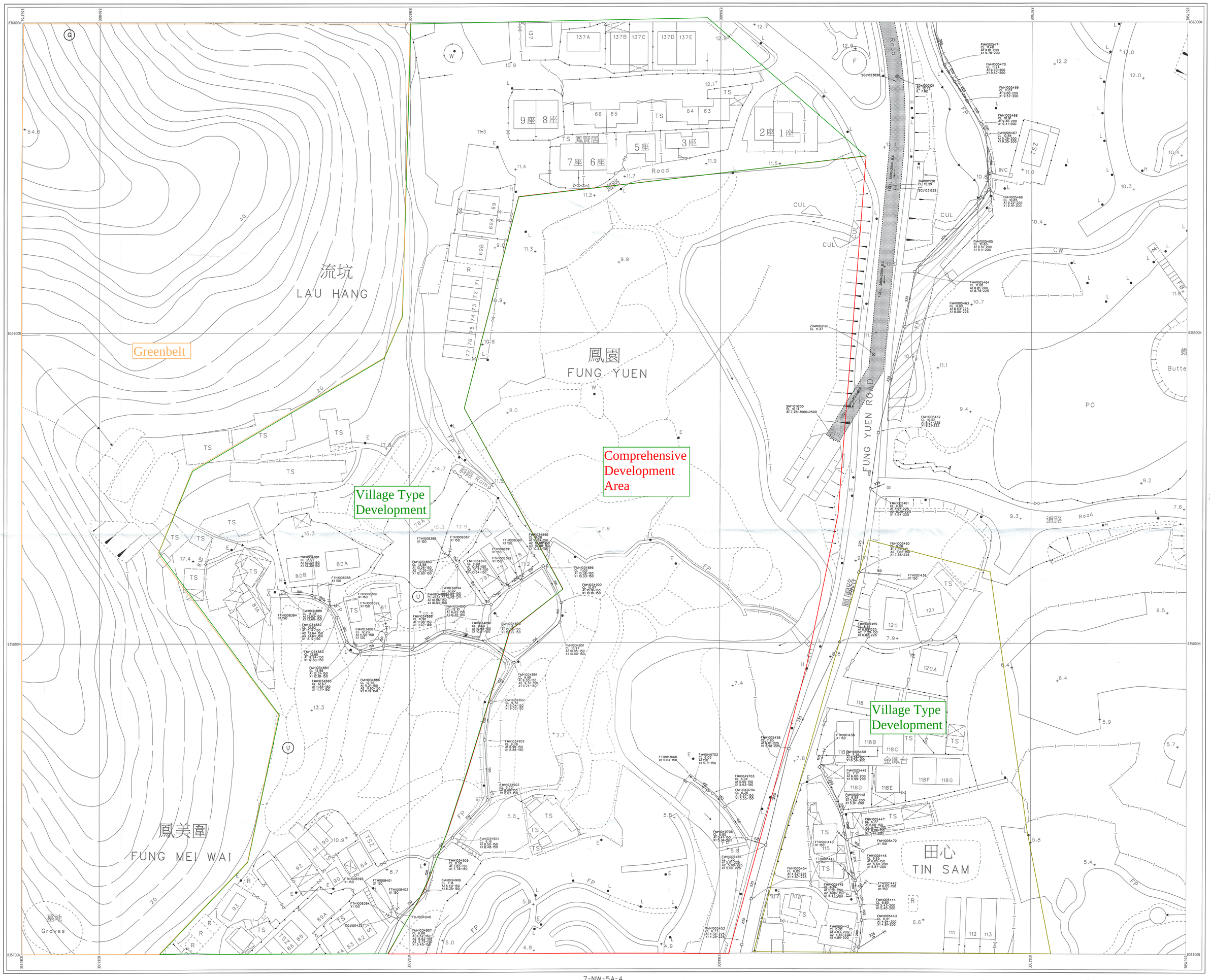
Appendix C

Existing Sewerage and Land Use Plans



Please note that drainage information is now available in the GeoInfo Map services of the Lands Department (https://www.map.gov.hk/gm/?lg=en). Please refer to the Quick Reference Guide of the system for the operation.

For legend of drainage record plans, please refer to the following URL: (https://www.dsd.gov.hk/EN/Files/Legend_BW.pdf)

Metres 20 10 0 20 40 60 80 100 Metres

SCALE 1 : 500

Mainland North Division
Drainage Services Department

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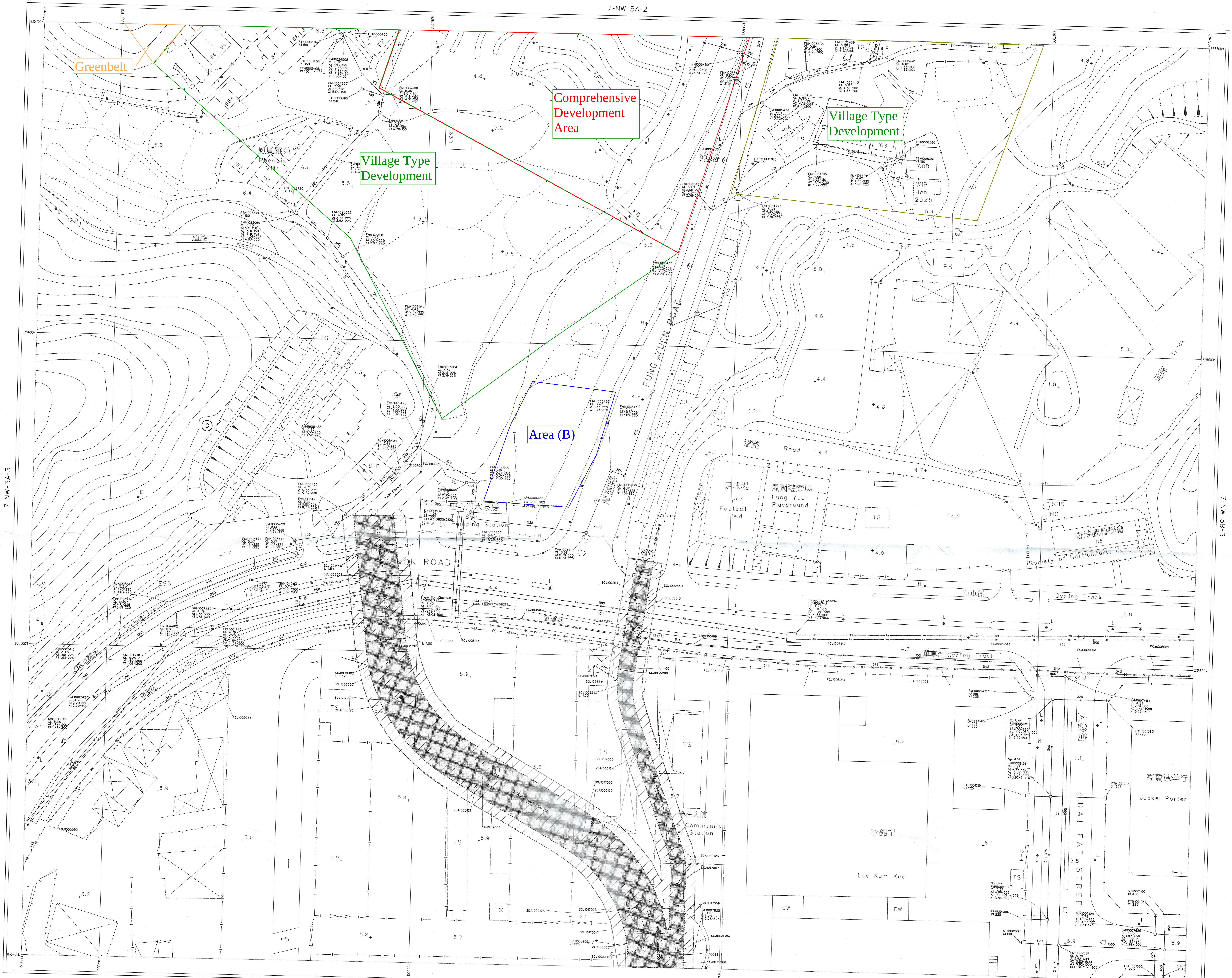
Drainage Record Sheet Number

7-NW-5A-2

Last Updating : 1/4/2025

Map data renewed on January 2025

3 JUN 2025



Please note that drainage information is now available in the GeoInfo Map services of the Lands Department (https://www.map.gov.hk/gm/?lg=en). Please refer to the Quick Reference Guide of the system for the operation.

For legend of drainage record plans, please refer to the following URL: (https://www.dsd.gov.hk/EN/Files/Legend_BW.pdf)

Metres 20 10 0 20 40 60 80 100 Metres

SCALE 1 : 500

Mainland North Division
Drainage Services Department

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Drainage Record Sheet Number

7-NW-5A-4

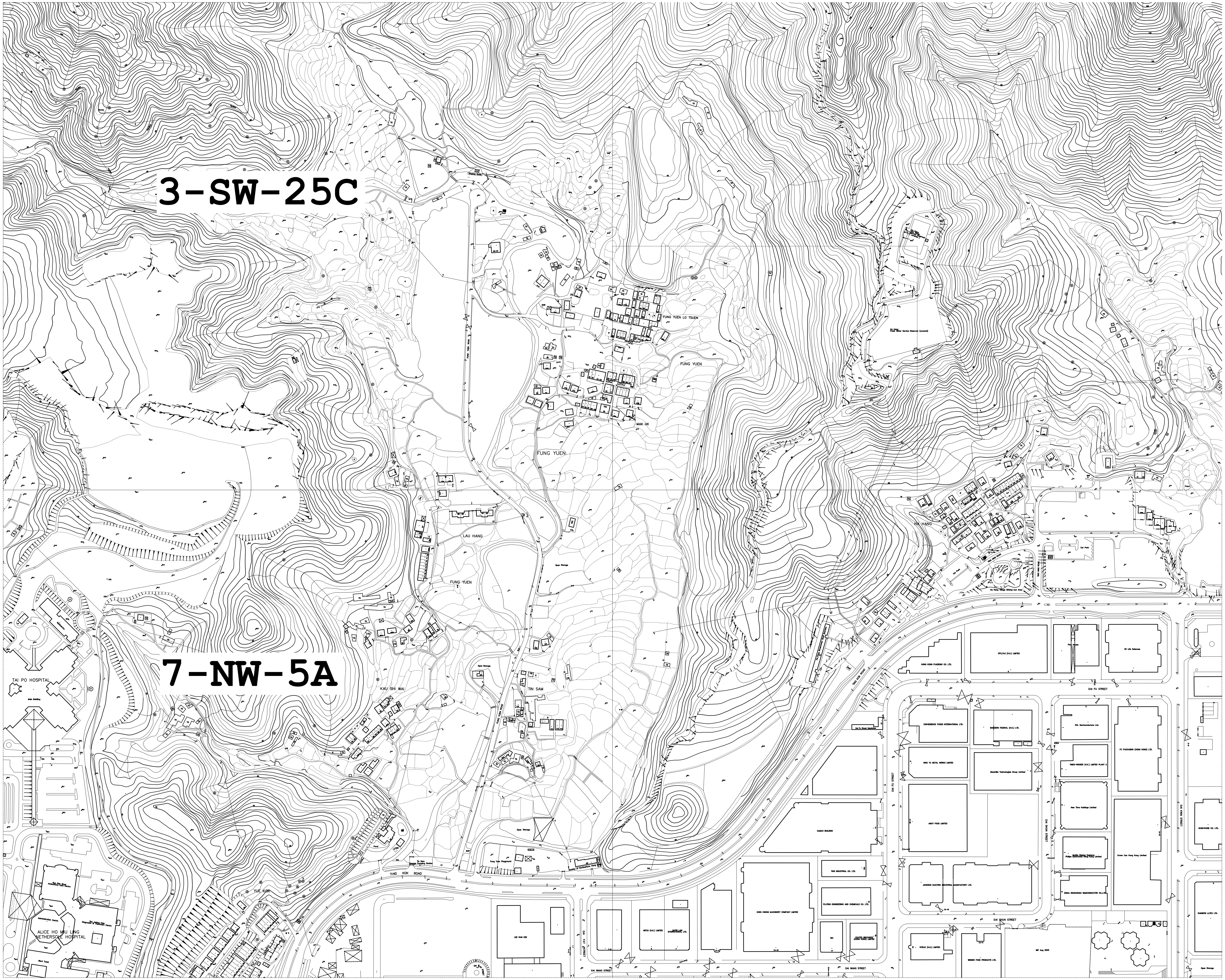
Last Updating : 1/4/2025

Map data renewed on January 2025

3 JUN 2025

Appendix D

Sewerage Record Plan (from DSD)



3-SW-25C
7-NW-5A
FUNG YUEN LO TSUEN
FUNG YUEN
MAK UK
LAU HANG
HA HANG
KAU SHI WAI
TIN SAM
TAI PO HOSPITAL
ALICE HO MIU LING
NETHERSOLE HOSPITAL
TING KOK ROAD
DAI FU STREET
DAI SHUN STREET
DAI WANG STREET

第8座 Tower 8
會所二 Clubhouse 2
第7座 Tower 7
第6座 Tower 6
第5座 Tower 5
會所一 Clubhouse 1
第3座 Tower 3
第2座 Tower 2
第1座 Tower 1
會所三 Clubhouse 3
平台 (下層停車場) Podium (Car Park under)
平台 Podium
嵐山 MONT VERT
鳳園 FUNG YUEN
鳳園村公所
活動室
遊樂場 Playground
麥氏宗祠
骨殖甕 Burial Urns
墓地 Graves
12座 鳳賢居 Case Papillon
11座
10座
道路 Road

Please note that drainage information is now available in the GeoInfo Map services of the Lands Department (https://www.map.gov.hk/gm/?lg=en). Please refer to the Quick Reference Guide of the system for the operation.

For legend of drainage record plans, please refer to the following URL: (https://www.dsd.gov.hk/EN/Files/Legend_BW.pdf)

7-NW-5A-2

SCALE 1 : 500

Metres 20 10 0 20 40 60 80 100 Metres

Mainland North Division
Drainage Services Department

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Drainage Record Sheet Number

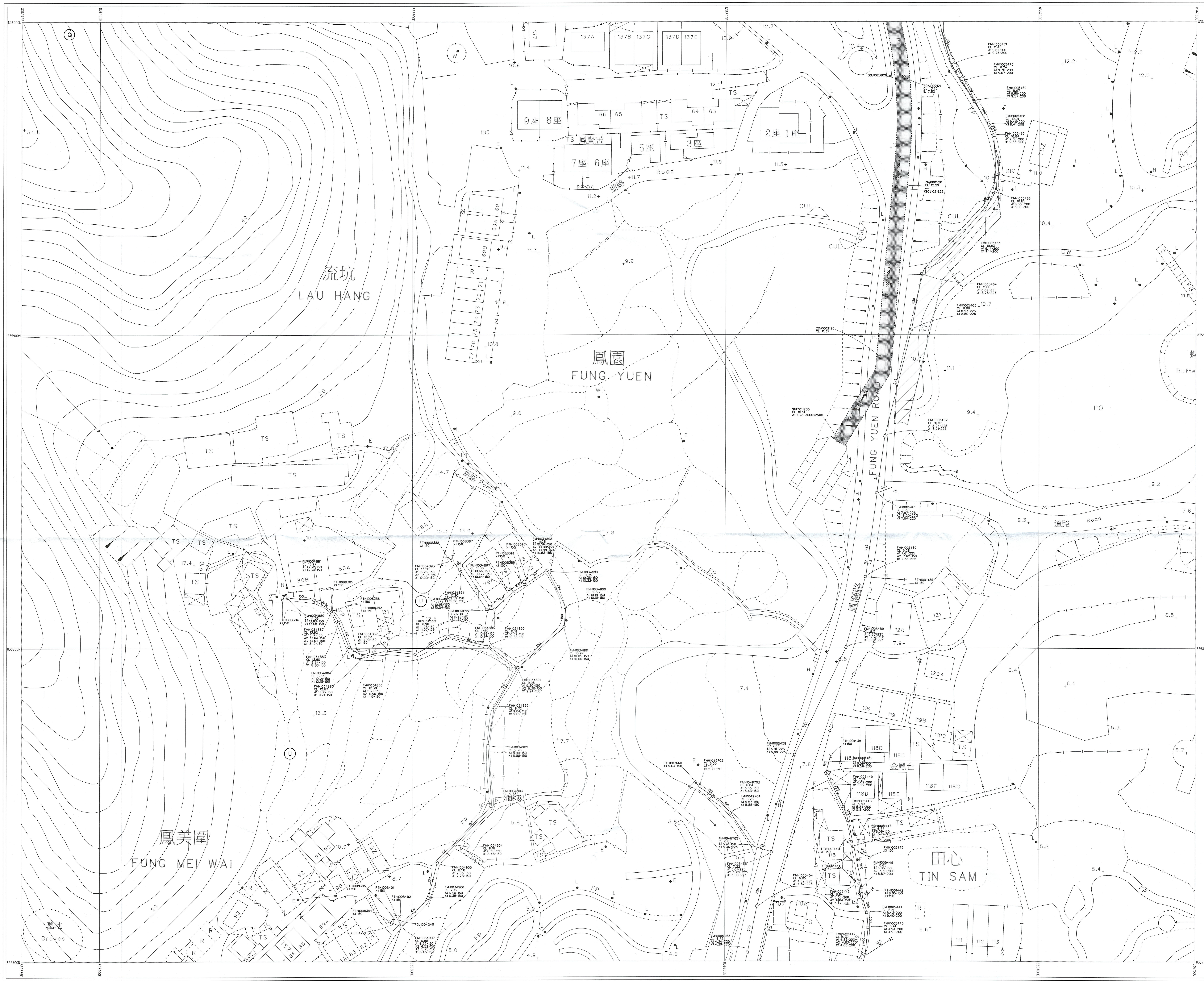
3-SW-25C-4

Last Updating : 1/4/2025

Map data renewed on January 2025

3 JUN 2025

3-SW-25C-4



7-NW-5A-1

7-NW-5B-1

7-NW-5A-4

Please note that drainage information is now available in the GeoInfo Map services of the Lands Department (https://www.map.gov.hk/gm/?lg=en). Please refer to the Quick Reference Guide of the system for the operation.

For legend of drainage record plans, please refer to the following URL: (https://www.dsd.gov.hk/EN/Files/Legend_BW.pdf)

SCALE 1 : 500

Metres 20 10 0 20 40 60 80 100 Metres

Mainland North Division
Drainage Services Department

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Drainage Record Sheet Number

7-NW-5A-2

Last Updating : 1/4/2025

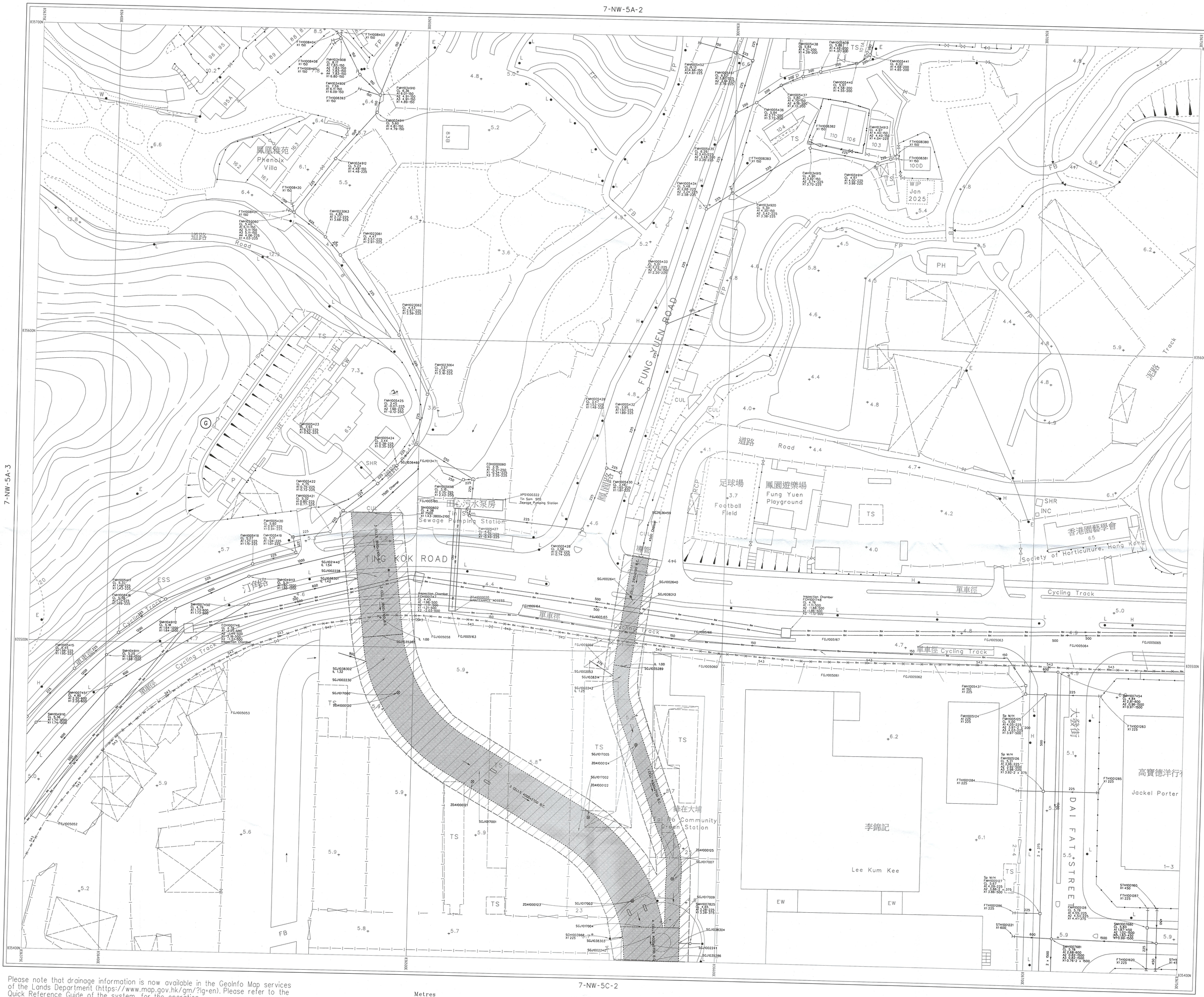
Map data renewed on January 2025

3 JUN 2025

7-NW-5A-2

7-NW-5A-3

7-NW-5B-3



Please note that drainage information is now available in the GeoInfo Map services of the Lands Department (https://www.map.gov.hk/gm/?lg=en). Please refer to the Quick Reference Guide of the system for the operation.

For legend of drainage record plans, please refer to the following URL: (https://www.dsd.gov.hk/EN/Files/Legend_BW.pdf)

7-NW-5C-2

Metres

SCALE 1 : 500

Metres

Mainland North Division
Drainage Services Department

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Drainage Record Sheet Number

7-NW-5A-4

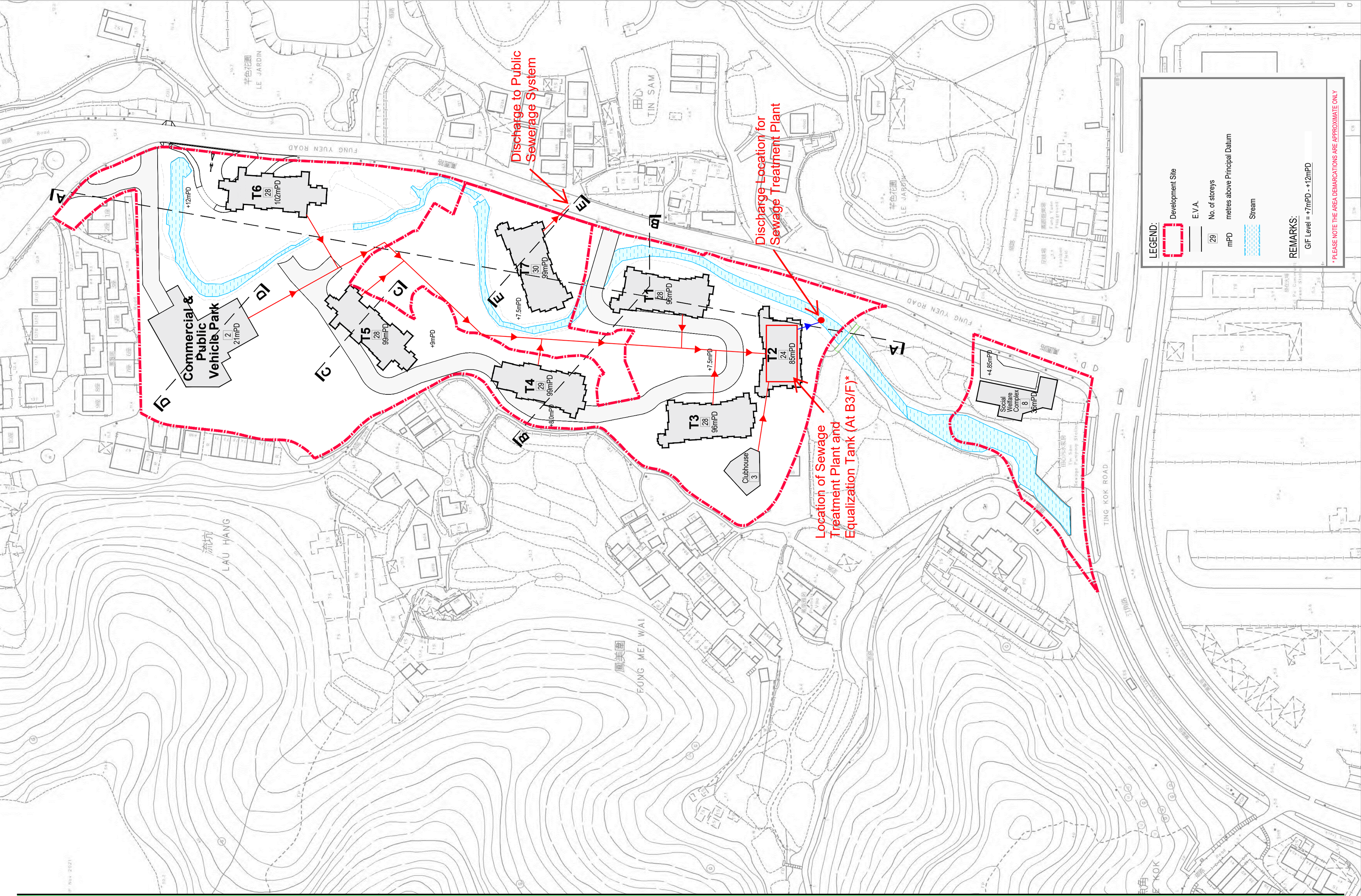
Last Updating : 1/4/2025

Map data renewed on January 2025

3 JUN 2025

Appendix E

Location Plan of Proposed Sewage Treatment Plant



REZONING APPLICATION AT FUNG YUEN ROAD, TAI PO, N.T.

Indicative Layout Plan

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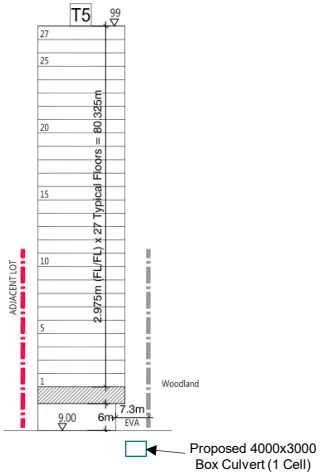
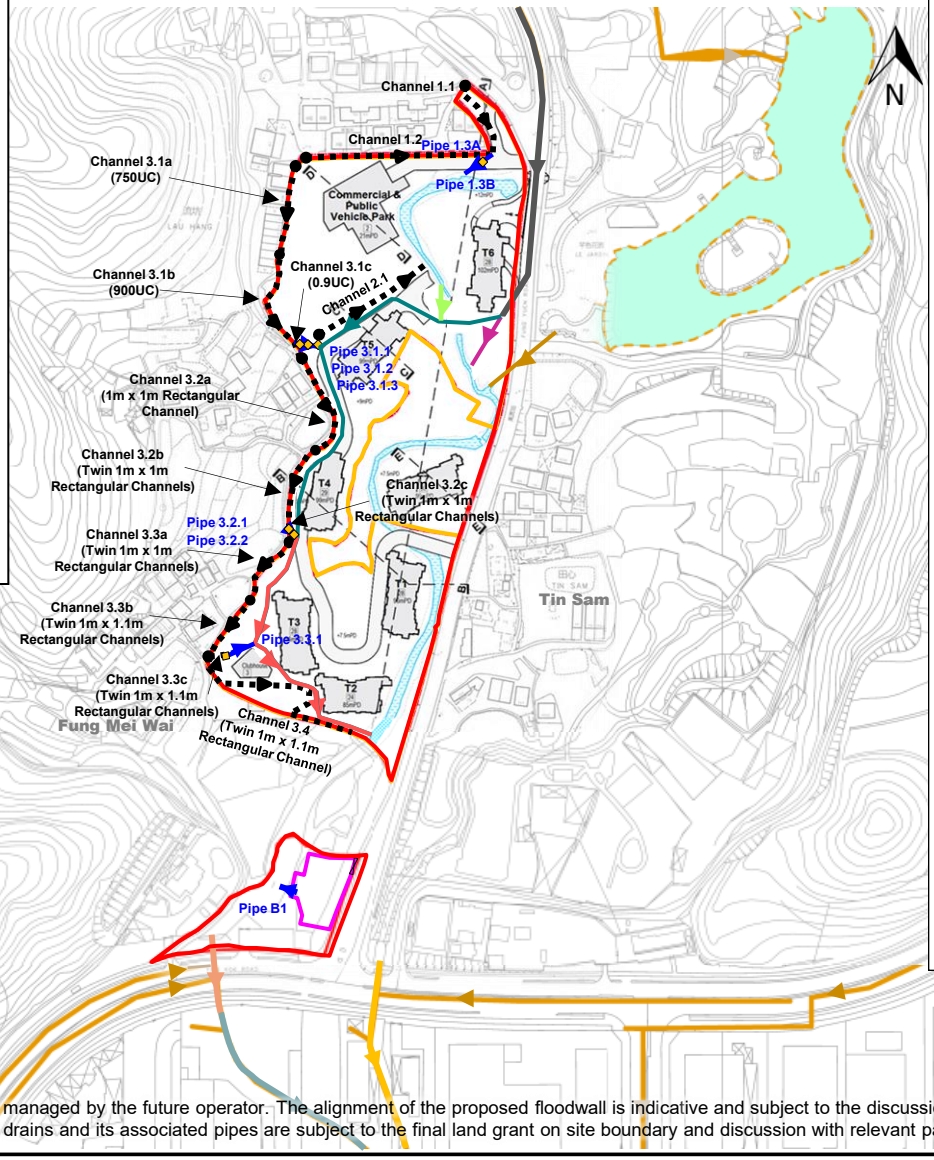


Section C-C



Legend

- Stream Course
- Storm Storage Pond
- Development Site Boundary
- Development Phase Boundary
- Existing Drainage System (225-1800mm Pipe)
- Existing 3800x2100 Box Culverts (3 Cells)
- Existing 4000x2700 Box Culverts (3 Cells)
- Existing 4000x2700 Box Culvert (1 Cell) (Near Ting Kok Road)
- Existing 3600x2500 Culvert (1 Cell)
- Proposed 4000x3000 Box Culvert (1 Cell)
- Proposed 4000x3500 Box Culvert (1 Cell)
- Proposed 1650mm Pipe
- Proposed 1050mm Pipe
- Proposed floodwall of the social welfare complex
- Proposed Boundary Drains with cover
- Proposed Backdrop Manhole

Remarks:
* The proposed Social Welfare Complex will be managed by the future operator. The alignment of the proposed floodwall is indicative and subject to the discussion with relevant parties at detailed design stage.
* The final alignment of the proposed boundary drains and its associated pipes are subject to the final land grant on site boundary and discussion with relevant parties at detailed design stage.

Project	**Proposed Residential Development(s) with Retail, Public Vehicle Park and Social Welfare Facilities at Various Lots and Adjoining Government Land at Fung Yuen, Tai Po, New Territories**
Title	**Proposed Drainage System**

MOTT MACDONALD

Appendix A3

Date	Scale	File
Sep 2025	N.T.S.	

Appendix F

Sewerage Catchment Index Plan and Proposed Sewerage Plan

Existing Sewerage Plan

Fung Yuen Lo Tsuen A (A1)

Fung Yuen Lo Tsuen B (A2)

Mak Uk (A3)

Sewerage Discharge From Upstream Catchment Area A

FMH1005471

Sewerage Discharge To Downstream

FUNG YUEN ROAD

鳳園 FUNG YUEN

芊色花園 LE JARDIN

麥屋 MAK UK

骨灰龕 Burial Urns

Clubhouse 3

第1座 Tower 1

遊樂場 Playground

WIP May 2022

Existing Sewerage Plan

Sewerage Discharge From Upstream

FMH1005471
A1 9.81-200
X1 9.78-200

FMH1005470
A1 9.70-200
X1 9.67-200

FMH1005469
A1 9.60-200
X1 9.57-200

FMH1005468
A1 9.46-200
X1 9.41-200

FMH1005467
A1 9.38-200
X1 9.35-200

FMH1005466
A1 9.22-200
X1 9.19-200

FMH1005465
A1 9.14-200
X1 9.11-200

FMH1005464
A1 8.81-200
X1 8.78-225

FMH1005463
A1 8.53-225
X1 8.50-225

FMH1005462
A1 8.24-225
X1 8.21-225

FMH1005461
A1 7.97-225
X1 7.94-225

FMH1005460
A1 7.61-225
X1 7.58-225

FMH1005459
A1 6.85-225
X1 6.82-225

FTH1013660
X1 5.64-150

FMH1005458
A1 6.01-225
X1 5.98-225

FMH1049702
A1 150
X1 5.71-150

FMH1049703
A1 5.65-150
X1 5.63-150

FMH1049704
A1 5.57-150
X1 5.55-150

FMH1049705
A1 5.41-150
X1 5.36-225

FWD106530

FMH1005455
A1 5.09-225
X1 5.00-225

FMH1005454
A1 4.62-225
X1 4.57-225

FMH1005453
A1 4.34-225
X1 4.29-225

FMH1005451
A1 3.81-225
X1 3.76-225

FMH1005435
A1 3.40-225
X1 3.35-225

Sewerage Discharge From Catchment C

FMH1005434
A1 2.68-225
X1 2.58-225

FMH1005433
A1 2.22-225
X1 2.20-225

FMH1005432
A1 1.93-225
X1 1.89-225

FMH1005429
A1 1.53-225
X1 1.48-225

FMH1005430
A1 1.65-225
X1 1.61-225

FMH1005428
A1 0.79-225
X1 0.74-225

FMH1005427
A1 -0.35-225
X1 -0.40-225

Sewerage Discharge To Tin Sam Sewage Pumping Station

FTH1008402
X1 150

FTH1008401
X1 150

FTH1008395
X1 150

FTH1008394
X1 150

FMH1034907
A1 6.52-150
A2 6.52-150
A3 5.75-150
X1 5.45-150

FMH1034909
A1 6.11-150
X1 6.09-150

FTH1008393
X1 150

FMH1034910
A1 6.01-150
A2 4.91-150
A3 4.91-150
X1 4.89-150

Tin Sam (C1)

Le Jardin (C2)

流坑 LAU HANG

鳳園 FUNG YUEN

鳳美園 FUNG MEI WAI

芊色花園 LE JARDIN

TING KOK ROAD

Proposed Sewerage Plan

Commercial Complex (B2)

Phase I Residential Towers (B1)

Phase II Residential Towers (E)

Swimming Pool (B3)

Social Welfare Complex (D1)

Tin Sam (C1)

Le Jardin (C2)

Sewerage Discharge From Upstream

FMH1005471
A1 9.81-200
X1 9.78-200

FMH1005470
A1 9.70-200
X1 9.67-200

FMH1005469
A1 9.60-200
X1 9.57-200

FMH1005468
A1 9.46-200
X1 9.41-200

FMH1005467
A1 9.38-200
X1 9.35-200

FMH1005466
A1 9.22-200
X1 9.19-200

FMH1005465
A1 9.14-200
X1 9.11-200

FMH1005464
A1 8.81-200
X1 8.78-225

FMH1005463
A1 8.53-225
X1 8.50-225

FMH1005462
A1 8.24-225
X1 8.21-225

FMH1005461
A1 7.97-225
X1 7.94-225

FMH1005460
A1 7.61-225
X1 7.58-225

FMH1005459
A1 6.85-225
X1 6.82-225

FMH1005458
A1 6.01-225
A2 6.01-225
X1 5.98-225

Proposed Terminal Manhole 3
X1 6.06-225

FMH1005455
A1 5.09-225
X1 5.00-225

FMH1005454
A1 4.62-225
X1 4.57-225

FMH1005453
A1 4.34-225
X1 4.29-225

FMH1005451
A1 3.81-225
X1 3.76-225

FMH1005435
A1 3.40-225
X1 3.35-225

FMH1005434
A1 2.68-225
X1 2.58-225

FMH1005433
A1 2.22-225
X1 2.20-225

FMH1005432
A1 1.93-225
X1 1.89-225

Proposed Terminal Manhole 2
X1 2.00-225

FMH1005430
A1 1.65-225
X1 1.61-225

FMH1005429
A1 1.53-225
A2 1.53-225
X1 1.48-225

FMH1005428
A1 0.79-225
X1 0.74-225

FMH1005427
A1 -0.35-225
X1 -0.40-225

Sewerage Discharge To Tin Sam Sewage Pumping Station

Sewerage Discharge From Catchment C

Sewage Treatment Plant
X1 7.50-225

Discharge Location in Streamcourse
A1 7.10-225

Proposed Foul Water Manhole
A1 5.07-150
X1 5.07-150

FTH1008402
X1 150

FTH1008401
X1 150

FTH1008395
X1 150

FTH1008394
X1 150

FMH1034907
A1 6.52-150
A2 6.52-150
A3 5.75-150
X1 5.45-150

FMH1034910
A1 6.01-150
A2 4.91-150
A3 4.91-150
X1 4.89-150

FMH1034909
A1 6.11-150
X1 6.09-150

FTH1008393
X1 150

FUNG YUEN ROAD

TING KOK ROAD

鳳園 FUNG YUEN

鳳美園 FUNG MEI WAI

芊色花園 LE JARDIN

Football Field

Fung Yuen Playground

Society of Horticulture, Hong Kong

Cycling Track

Appendix G

Hydraulic Design Check for Proposed Sewerage System

P2319 Fung Yuen

Rev date: 4/5/2025

Sewerage Drainage Design

Proposed Sewerage Scheme

Catchment Label		*Area A Phase II (Area E)*	*Social Welfare Complex (Area D)*	*Fuen Yuen Lo Tsuen A + Fuen Yuen Lo Tsuen B + Mak Uk (Area A)*	*Tin Sum + Le Jardin (Area C)*	*Sewage Treatment Plant*									
Peak Foul Water Flow (m^3/s)		0.0134	0.0050	0.0149	0.0040	0.0428									

From Sewerage Manual Part 1, Third Edition, May 2013:

Colebrook-White Equation for circular pipes flowing full,

Velocity, V = $-\sqrt{(8gDs)}\ \log\left(\frac{ks}{3.7D}+\frac{2.51v}{D\sqrt{(2gDs)}}\right)$

Capacity, Q = $V \times \pi \times D^2 / 4$

Assumptions:

Kinematic Viscosity of fluid, v =	0.00000114	m^2/s	(For Sewerage)
Hydraulic Pipeline Roughness, ks =	3	mm	(for slimed sewers - clayware in poor condition; Table 5, Sewerage Manual Part 1, Third Edition, May 2013)
Kinematic Viscosity of fluid, v =	0.000001	m^2/s	(For Treated Sewerage)
Hydraulic Pipeline Roughness, ks =	0.6	mm	(Concrete (Precast Concrete Pipes with 'O' Ring Joints in poor condition))

From Manhole	*To Manhole*	*Diameter, D (m)*	*Cross-section (m^2)*	*Wetted Perimeter (m)*	*Length (m)*	*Inlet Invert*	*Outlet Invert*	*Slope, s*	*Hydraulic Radius (m)*	*Viscosity, v (m^2/s)*	*Roughness, ks (m)*	*Velocity, V (m/s)*	*Capacity, Q (m^3/s)*	*Estimated FLow, F (m^3/s)*	*Ref. Area*	*% of Capacity*
Proposed Social Welfare Complex + Fuen Yuen Lo Tsuen A + Fuen Yuen Lo Tsuen B + Mak Uk + Tin Sum + Le Jardin + Proposed Area A Phase II																
FMH1005458	FMH1005455	0.225	0.040	0.707	32.70	5.98	5.09	0.027	0.056	0.00000114	0.003	1.69	0.0672	0.0282	Area A+Area E	42.0%
FMH1005455	FMH1005454	0.225	0.040	0.707	16.70	5.00	4.62	0.023	0.056	0.00000114	0.003	1.55	0.0615	0.0282	Area A+Area E	45.9%
FMH1005454	FMH1005453	0.225	0.040	0.707	13.30	4.57	4.34	0.017	0.056	0.00000114	0.003	1.35	0.0536	0.0282	Area A+Area E	52.7%
FMH1005453	FMH1005451	0.225	0.040	0.707	12.30	4.29	3.81	0.039	0.056	0.00000114	0.003	2.03	0.0805	0.0282	Area A+Area E	35.1%
FMH1005451	FMH1005435	0.225	0.040	0.707	17.25	3.76	3.40	0.021	0.056	0.00000114	0.003	1.48	0.0589	0.0282	Area A+Area E	48.0%
FMH1005435	FMH1005434	0.225	0.040	0.707	31.40	3.35	2.68	0.021	0.056	0.00000114	0.003	1.50	0.0595	0.0322	Area A+Area C+Area E	54.2%
FMH1005434	FMH1005433	0.225	0.040	0.707	38.50	2.58	2.22	0.009	0.056	0.00000114	0.003	0.99	0.0394	0.0322	Area A+Area C+Area E	81.9%
FMH1005433	FMH1005432	0.225	0.040	0.707	23.80	2.20	1.93	0.011	0.056	0.00000114	0.003	1.09	0.0434	0.0322	Area A+Area C+Area E	74.3%
FMH1005432	FMH1005430	0.225	0.040	0.707	28.30	1.89	1.65	0.008	0.056	0.00000114	0.003	0.94	0.0375	0.0322	Area A+Area C+Area E	86.0%
FMH1005430	FMH1005429	0.225	0.040	0.707	5.00	1.61	1.53	0.016	0.056	0.00000114	0.003	1.30	0.0515	0.0322	Area A+Area C+Area E	62.6%
FMH1005429	FMH1005428	0.225	0.040	0.707	19.90	1.48	0.79	0.035	0.056	0.00000114	0.003	1.91	0.0759	0.0372	Area A+Area C+Area D+Area E	49.0%
FMH1005428	FMH1005427	0.225	0.040	0.707	37.00	0.74	-0.35	0.029	0.056	0.00000114	0.003	1.76	0.0699	0.0372	Area A+Area C+Area D+Area E	53.1%
Proposed Area A Phase II to Main																
Terminal manhole 3	FMH1005458	0.225	0.040	0.707	11	6.06	6.01	0.005	0.056	0.00000114	0.003	0.69	0.0274	0.0134	Area E	48.7%
Proposed Area D to Main																
Terminal manhole 2	FMH1005429	0.225	0.040	0.707	12	2.00	1.53	0.039	0.056	0.00000114	0.003	2.03	0.0807	0.0050	Area D	6.1%
STP to Streamcourse*																
Sewage Treatment Plant	Streamcourse	0.225	0.040	0.707	13	7.50	7.10	0.03	0.056	0.000001	0.0006	2.30	0.0916	0.0428	STP	46.7%

*Sewerage shall be treated by Sewage Treatment Plant to improve effluent quality before discharging to the streamcourse with no adverse impact

Extracted from DIA Report

The STP discharge point will be located near to T2 which is close to the Control Point 4a. The maximum water level of Point 4a is 6.790mPD.

Table 4.2: Predicted peak water levels and freeboard of stream near the Site under 10, 50 and 200 years flood events for the enti

Case	Control Points	Cross Section line ID	Existing Condition					Proposed Condition (with mitigation)					Change in Water Level (m) (i.e. Proposed Condition- Existing Condition)
			West Bank Level (mPD)	East Bank Level (mPD)	Water Level (mPD)	West Bank Freeboard (m)	East Bank Freeboard (m)	West Bank Level (mPD)	East Bank Level (mPD)	Water Level (mPD)	West Bank Freeboard (m)	East Bank Freeboard (m)	
10A	1	Section 5-5-Section 5-5-Section 6-6	7.620	6.709	8.649	-1.029	-1.940	9.000	12.000	6.536	2.464	5.464	-2.113
	2	Section 7-7-Section 8-8	7.100	7.138	8.576	-1.476	-1.438	9.000	9.000	7.075	1.925	1.925	-1.501
	3a	FUNG_YUEN_W_CH1130-FUNG_YUEN_W_CH1160-FUNG_YUEN_W_CH1160	6.930	7.590	7.968	-1.038	-0.378	8.00	7.590	6.446	1.554	1.144	-1.522
	3b	FUNG_YUEN_W_CH1160	6.720	7.400	7.568	-0.848	-0.168	8.00	7.500	6.294	1.706	1.206	-1.274
	3c	FUNG_YUEN_W_CH1200-HF279-1	6.224	6.381	6.851	-0.627	-0.470	7.200	7.500	5.523	1.677	1.977	-1.328
	4a	FUNG_YUEN_W_CH1300-FUNG_YUEN_W_CH1300-FUNG_YUEN_W_CH1400	4.590	5.622	4.895	-0.305	0.727	7.500	5.622	4.662	2.838	0.960	-0.233
	5a*	FUNG_YUEN_W_CH1300-FUNG_YUEN_W-FUNG_YUEN_W_CH1400-FUNG_YUEN_W_CH	4.465	4.026	4.695	-0.230	-0.669	4.465	4.026	4.668	-0.203	-0.642	-0.027
	5b*	FUNG_YUEN_W_CH1400-FUNG_YUEN_W_CH1450	3.749	3.425	4.656	-0.907	-1.231	3.749	3.425	4.690	-0.941	-1.265	0.034
	6*	FUNG_YUEN_W_CH1450	3.640	3.000	4.682	-1.042	-1.682	3.640	3.000	4.728	-1.088	-1.728	0.046
10B	1	Section 5-5-Section 5-5-Section 6-6	7.620	6.709	8.296	-0.676	-1.587	9.000	12.000	5.687	3.313	6.313	-2.609
	2	Section 7-7-Section 8-8	7.100	7.138	8.289	-1.189	-1.151	9.000	9.000	6.988	2.012	2.012	-1.301
	3a	FUNG_YUEN_W_CH1130-FUNG_YUEN_W_CH1160-FUNG_YUEN_W_CH1160	6.930	7.590	7.712	-0.782	-0.122	8.00	7.590	6.358	1.642	1.232	-1.354
	3b	FUNG_YUEN_W_CH1160	6.720	7.400	7.337	-0.617	0.063	8.00	7.500	6.225	1.775	1.275	-1.112
	3c	FUNG_YUEN_W_CH1200-HF279-1	6.224	6.381	6.605	-0.381	-0.224	7.200	7.500	5.473	1.727	2.027	-1.132
	4a	FUNG_YUEN_W_CH1300-FUNG_YUEN_W_CH1300-FUNG_YUEN_W_CH1400	4.590	5.622	4.906	-0.316	0.716	7.500	5.622	4.814	2.686	0.808	-0.092
	5a*	FUNG_YUEN_W_CH1300-FUNG_YUEN_W-	4.465	4.026	4.819	-0.354	-0.793	4.465	4.026	4.827	-0.362	-0.801	0.008

Case	Control Points	Cross Section line ID	Existing Condition					Proposed Condition (with mitigation)					Change in Water Level (m) (i.e. Proposed Condition- Existing Condition)
			West Bank Level (mPD)	East Bank Level (mPD)	Water Level (mPD)	West Bank Freeboard (m)	East Bank Freeboard (m)	West Bank Level (mPD)	East Bank Level (mPD)	Water Level (mPD)	West Bank Freeboard (m)	East Bank Freeboard (m)	
		FUNG_YUEN_W_CH1400-FUNG_YUEN_W_CH											
	5b*	FUNG_YUEN_W_CH1400-FUNG_YUEN_W_CH1450	3.749	3.425	4.818	-1.069	-1.393	3.749	3.425	4.844	-1.095	-1.419	0.026
	6*	FUNG_YUEN_W_CH1450	3.640	3.000	4.849	-1.209	-1.849	3.640	3.000	4.861	-1.221	-1.861	0.012
50A	1	Section 5-5-Section 5-5-Section 6-6	7.620	6.709	8.885	-1.265	-2.176	9.000	12.000	7.503	1.497	4.497	-1.382
	2	Section 7-7-Section 8-8	7.100	7.138	8.717	-1.617	-1.579	9.000	9.000	7.229	1.771	1.771	-1.488
	3a	FUNG_YUEN_W_CH1130-FUNG_YUEN_W_CH1160-FUNG_YUEN_W_CH1160	6.930	7.590	8.106	-1.176	-0.516	8.00	7.590	6.544	1.456	1.046	-1.562
	3b	FUNG_YUEN_W_CH1160	6.720	7.400	7.698	-0.978	-0.298	8.00	7.500	6.372	1.628	1.128	-1.326
	3c	FUNG_YUEN_W_CH1200-HF279-1	6.224	6.381	7.006	-0.782	-0.625	7.200	7.500	5.619	1.581	1.881	-1.387
	4a	FUNG_YUEN_W_CH1300-FUNG_YUEN_W_CH1300-FUNG_YUEN_W_CH1400	4.590	5.622	5.640	-1.050	-0.018	7.500	5.622	5.526	1.974	0.096	-0.114
	5a*	FUNG_YUEN_W_CH1300-FUNG_YUEN_W-FUNG_YUEN_W_CH1400-FUNG_YUEN_W_CH	4.465	4.026	5.568	-1.103	-1.542	4.465	4.026	5.540	-1.075	-1.514	-0.028
	5b*	FUNG_YUEN_W_CH1400-FUNG_YUEN_W_CH1450	3.749	3.425	5.559	-1.810	-2.134	3.749	3.425	5.543	-1.794	-2.118	-0.016
	6*	FUNG_YUEN_W_CH1450	3.640	3.000	5.561	-1.921	-2.561	3.640	3.000	5.572	-1.932	-2.572	0.011
50B	1	Section 5-5-Section 5-5-Section 6-6	7.620	6.709	8.649	-1.029	-1.940	9.000	12.000	7.281	1.719	4.719	-1.368
	2	Section 7-7-Section 8-8	7.100	7.138	8.576	-1.476	-1.438	9.000	9.000	7.117	1.883	1.883	-1.459
	3a	FUNG_YUEN_W_CH1130-FUNG_YUEN_W_CH1160-FUNG_YUEN_W_CH1160	6.930	7.590	7.969	-1.039	-0.379	8.00	7.590	6.474	1.526	1.116	-1.495
	3b	FUNG_YUEN_W_CH1160	6.720	7.400	7.568	-0.848	-0.168	8.00	7.500	6.308	1.692	1.192	-1.260
	3c	FUNG_YUEN_W_CH1200-HF279-1	6.224	6.381	6.869	-0.645	-0.488	7.200	7.500	5.916	1.284	1.584	-0.953

Case	Control Points	Cross Section line ID	Existing Condition					Proposed Condition (with mitigation)					Change in Water Level (m) (i.e. Proposed Condition- Existing Condition)
			West Bank Level (mPD)	East Bank Level (mPD)	Water Level (mPD)	West Bank Freeboard (m)	East Bank Freeboard (m)	West Bank Level (mPD)	East Bank Level (mPD)	Water Level (mPD)	West Bank Freeboard (m)	East Bank Freeboard (m)	
	4a	FUNG_YUEN_W_CH1300-FUNG_YUEN_W_CH1300-FUNG_YUEN_W_CH1400	4.590	5.622	5.956	-1.366	-0.334	7.500	5.622	5.904	1.596	-0.282	-0.052
	5a*	FUNG_YUEN_W_CH1300-FUNG_YUEN_W-FUNG_YUEN_W_CH1400-FUNG_YUEN_W_CH	4.465	4.026	5.920	-1.455	-1.894	4.465	4.026	5.910	-1.445	-1.884	-0.010
	5b*	FUNG_YUEN_W_CH1400-FUNG_YUEN_W_CH1450	3.749	3.425	5.920	-2.171	-2.495	3.749	3.425	5.901	-2.152	-2.476	-0.019
	6*	FUNG_YUEN_W_CH1450	3.640	3.000	5.921	-2.281	-2.921	3.640	3.000	5.924	-2.284	-2.924	0.003
200A	1	Section 5-5-Section 5-5-Section 6-6	7.620	6.709	8.917	-1.297	-2.208	9.000	12.000	7.911	1.089	4.089	-1.006
	2	Section 7-7-Section 8-8	7.100	7.138	8.737	-1.637	-1.599	9.000	9.000	7.288	1.712	1.712	-1.449
	3a	FUNG_YUEN_W_CH1130-FUNG_YUEN_W_CH1160-FUNG_YUEN_W_CH1160	6.930	7.590	8.132	-1.202	-0.542	8.00	7.590	6.602	1.398	0.988	-1.530
	3b	FUNG_YUEN_W_CH1160	6.720	7.400	7.724	-1.004	-0.324	8.00	7.500	6.419	1.581	1.081	-1.305
	3c	FUNG_YUEN_W_CH1200-HF279-1	6.224	6.381	7.033	-0.809	-0.652	7.200	7.500	5.747	1.453	1.753	-1.286
	4a	FUNG_YUEN_W_CH1300-FUNG_YUEN_W_CH1300-FUNG_YUEN_W_CH1400	4.590	5.622	5.827	-1.237	-0.205	7.500	5.622	5.719	1.781	-0.097	-0.108
	5a*	FUNG_YUEN_W_CH1300-FUNG_YUEN_W-FUNG_YUEN_W_CH1400-FUNG_YUEN_W_CH	4.465	4.026	5.765	-1.300	-1.739	4.465	4.026	5.729	-1.264	-1.703	-0.036
	5b*	FUNG_YUEN_W_CH1400-FUNG_YUEN_W_CH1450	3.749	3.425	5.756	-2.007	-2.331	3.749	3.425	5.717	-1.968	-2.292	-0.039
	6*	FUNG_YUEN_W_CH1450	3.640	3.000	5.754	-2.114	-2.754	3.640	3.000	5.750	-2.110	-2.750	-0.004
200B	1	Section 5-5-Section 5-5-Section 6-6	7.620	6.709	8.649	-1.029	-1.940	9.000	12.000	8.097	0.903	3.903	-0.552
	2	Section 7-7-Section 8-8	7.100	7.138	8.576	-1.476	-1.438	9.000	9.000	7.289	1.711	1.711	-1.287
	3a	FUNG_YUEN_W_CH1130-FUNG_YUEN_W_CH1160-FUNG_YUEN_W_CH1160	6.930	7.590	7.981	-1.051	-0.391	8.00	7.590	6.850	1.150	0.740	-1.131

Case	Control Points	Cross Section line ID	Existing Condition					Proposed Condition (with mitigation)					Change in Water Level (m) (i.e. Proposed Condition- Existing Condition)
			West Bank Level (mPD)	East Bank Level (mPD)	Water Level (mPD)	West Bank Freeboard (m)	East Bank Freeboard (m)	West Bank Level (mPD)	East Bank Level (mPD)	Water Level (mPD)	West Bank Freeboard (m)	East Bank Freeboard (m)	
	3b	FUNG_YUEN_W_CH1160	6.720	7.400	7.586	-0.866	-0.186	8.00	7.500	6.791	1.209	0.709	-0.795
	3c	FUNG_YUEN_W_CH1200-HF279-1	6.224	6.381	7.089	-0.865	-0.708	7.200	7.500	6.788	0.412	0.712	-0.301
	4a	FUNG_YUEN_W_CH1300-FUNG_YUEN_W_CH1300-FUNG_YUEN_W_CH1400	4.590	5.622	6.808	-2.218	-1.186	7.500	5.622	6.790	0.710	-1.168	-0.018
	5a*	FUNG_YUEN_W_CH1300-FUNG_YUEN_W-FUNG_YUEN_W_CH1400-FUNG_YUEN_W_CH	4.465	4.026	6.802	-2.337	-2.776	4.465	4.026	6.810	-2.345	-2.784	0.008
	5b*	FUNG_YUEN_W_CH1400-FUNG_YUEN_W_CH1450	3.749	3.425	6.815	-3.066	-3.390	3.749	3.425	6.852	-3.103	-3.427	0.037
	6*	FUNG_YUEN_W_CH1450	3.640	3.000	6.826	-3.186	-3.826	3.640	3.000	6.824	-3.184	-3.824	-0.002

Remarks:-

1. Location of control points refers to **Appendix E**.
2. +ve value of freeboard indicates predicted water level is lower than the river bank level.
3. -ve value of freeboard indicates predicted water level is higher than the river bank level.
4. Under proposed condition, river banks within Site boundaries are adjusted due to the increase of site formation.

* Due to the backwater effect under high tide condition, water level at control points 5a, 5b and 6 is relatively high. However, the downstream drainage network has sufficient capacity under low tide condition.