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Section 16 Application for Filling of Pond for Permitted Agricultural Use in Sub-section 1 and the Remaining Portion (Portion) of Section E of Lot No. 1212 in D.D. 115 and the Discrepant Areas (Portion) adjacent to Section E of Lot No. 1212 in D.D. 115, Nam Sang Wai, Yuen Long, New Territories

Drainage Impact Assessment Report

Reference: P159-DIA-I2
Date: 16 December 2025
Confidential

Section 16 Application for Filling of Pond for Permitted Agricultural Use in Sub-section 1 and the Remaining Portion (Portion) of Section E of Lot No. 1212 in D.D. 115 and the Discrepant Areas (Portion) adjacent to Section E of Lot No. 1212 in D.D. 115, Nam Sang Wai, Yuen Long, New Territories

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Issue	Status	Prepared By	Date	Checked by	Date	Approved By	Date
1	-	Elvis Liu	Sep 25	Cheryl Chan	Sep 25	Joan Choi	Sep 25
2	-	Cheryl Chan	Dec 25	Cheryl Chan	Dec 25	Joan Choi	Dec 25

23/F Wui Tat Centre, 55 Connaught Road West, Hong Kong
[redacted]

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1 Introduction

1.1 Background

The planning application is for filling a pond for permitted agricultural use in Sub-section 1 and the Remaining Portion (Portion) of Section E of Lot No. 1212 in D.D. 115 and the Discrepant Areas (Portion) adjacent to Section E of Lot No. 1212 in D.D. 115 in Nam Sang Wai, Yuen Long, New Territories (hereafter as "the Site").

The Site mainly falls within an area designated as "Other Specified Uses" annotated as "Comprehensive Development to include Wetland Restoration Area" ("OU(CDWRA)") zone with a small portion in an area designed as "Village Type Development" ("V") zone on the Approved Nam Sang Wai Outline Zoning Plan No. S/YL-NSW/11 ("NSW OZP"). According to the Notes of the NSW OZP for "OU(CDWRA)" and "V" zones, 'Agricultural Use' falls into Column 1 that is always permitted by the Board.

The Site falls within the Wetland Buffer Area ("WBA") as designated under the TPB PG-No. 12C for "Application for Developments within Deep Bay Area under Section 16 of the Town Planning Ordinance". Complying with its "No-Net-Loss in Wetland" principle, this proposed use aligns with the guideline's intention to protect the ecological integrity of the fishponds and wetlands within the sensitive Wetland Conservation Area ("WCA") through the rehabilitation of agricultural area and fishponds.

The proposed area for cultivation was previously ponds and had been formed for more than two decades. It is currently covered with vegetation. In order to reflect the current situation of the Site and to regularize the pond filling, a planning application for filling of pond is proposed.

This proposal demonstrates that the proposed agricultural use is always permitted under the NSW OZP and the filling of pond is to reflect the current condition of the Site.

Due to concerns about possible drainage impact arising from the proposed development, Urban Green Consultants Ltd. (UGC) has been commissioned to

conduct a Drainage Impact Assessment (DIA) to demonstrate the acceptability of drainage impact upon the surrounding environment.

1.2 Study Objectives

The objectives of this DIA are to assess the possible drainage impacts that may be caused by the proposed development and to recommend mitigation measures to alleviate such impacts if necessary.

1.3 Report Structure

The remaining chapters of this report are shown below:

Chapter 2 – Site Context

Chapter 3 – Drainage Analysis

Chapter 4 – Conclusion

2 Site Context

2.1 Current Site Conditions and its Environs

The Site covers a total area of about 21,929m^2, including portion of Lot 1212 s.E R.P. of about 13,068 m^2., Lot 1212 s.E ss.1 of about 10m^2., and a portion of Discrepant Areas (Portion) adjacent to Lot 1212 s.E of about 8,851 m^2. The Site is currently fenced off, largely paved with vegetations covering a major portion of the site and a pond situated in the northwest.

The Site is located at the far fringe of Nam Sang Wai. The surrounding environment of the Site is in rural village context intermixed with temporary uses. The Site is surrounded by Shan Pui Tsuen and Shan Pui Chung Hau Tsuen, with other low-rise residential developments. The immediate northwest of the Site is the Hong Kong School of Motoring, while to the southwest is the transitional housing project of United Court providing about 1800 units. Figure 2.1 shows the Site location and its environs.

2.2 Existing Drainage Condition

A site survey was conducted on 7 May 2025. The Site is not served by any drainage system to direct surface runoff. Part of the runoff overflows directly into the Kam Tin River.

3 Drainage Analysis

3.1 Assessment Methodology and Assumptions

This DIA has adopted the Rational Method for runoff estimation:

$$Q_p = 0.278\ i \sum C_j\ A_j$$

where
Q_p is peak runoff (m^3/s);
i is rainfall intensity (mm/hr);
A_j is the j^{th} catchment (km^2);
C_j is the runoff coefficient of the j^{th} catchment (dimensionless).

The details of the Rational Method can be referred to the *Stormwater Drainage Manual* (SDM) (DSD, 2018).

Based on a 1:50 year flood protection standard in the SDM and the estimated time of concentration, the appropriate rainfall intensities (i) were calculated based on linear interpolation of the intermediate table values.

The assumptions of this DIA are summarised below:

- Rainstorm return period – 1 in 50 years
- Runoff coefficient for flatted grassland (heavy soil) – 0.25
- Manning's roughness coefficient for the proposed U-channels – 0.016

3.2 Design Parameters

Based on the geographical characteristics of the Site and its surroundings, 12 catchments (Catchment A – L) were identified as shown in Figure 3.1.

Surface runoff from Catchment A, B and C will be collected by a series of the proposed U-channels and discharged to the Kam Tin River via proposed U-channels M1 – M10. Sand trap will be provided together with the terminal manhole to collect sediment before the collected runoff is discharged to the existing watercourse. Figure 3.4 and Figure 3.5 shows the typical design of catchpit, u-channel and sand trap. The drainage proposal is shown in Figure 3.2.

For the surface runoff from Catchment D - L, the runoff will not flow towards the site. Therefore, the site will not collect the runoff from surrounding catchments.

The surface runoff from the Site has been estimated and presented in Appendix B.

3.3 Assessment Results

Detailed calculations of the estimated on-site catchment runoffs to the proposed drainage system are provided in Appendix B. The assessment results are summarized in Table 3.1.

Table 3.1 Estimated Runoffs to Proposed Drainage System

Channel Segment	Diameter / Width, m	Depth, m	Gradient	Catchment Runoff, m3/s	Capacity, m3/s	% of capacity flow	Sufficient Capacity?
M1-M2	0.450	0.450	0.003	0.041	0.180	23%	Y
M2-M3	0.450	0.450	0.003	0.076	0.180	42%	Y
M3-M4	0.450	0.450	0.003	0.076	0.180	42%	Y
M4-M5	0.450	0.450	0.003	0.076	0.180	42%	Y
M5-M6	0.600	0.600	0.003	0.235	0.387	61%	Y
M6-M7	0.600	0.600	0.003	0.235	0.387	61%	Y
M7-M8	0.600	0.600	0.005	0.235	0.499	47%	Y
M8-M10	0.600	0.600	0.005	0.235	0.499	47%	Y
M9-M10	0.600	0.600	0.010	0.235	0.592	40%	Y
M10 to Kam Tin River	0.450	0.450	0.020	0.235	0.464	51%	Y

Based on the results in Appendix B, the proposed drainage system has adequate capacity to cater the surface runoff from the proposed development.

3.4 Climate Change

To consider the effect of climate change in the drainage system, the project of rainfall increase of 11.1% for Mid-21st Century (2041-2060) and 16.0% for the and End of 21st Century (2081-2100) as well as design allowance in End of 21th Century of

12.1% as per requirements in Stormwater Drainage Manual (SDM) Corrigendum No. 1/2022 are adopted. Detailed calculations are provided in Appendix C.

The analysis indicated that the proposed drainage system would have sufficient capacity for the additional runoff from the proposed development with a 11.1% and 16% increase in rainfall intensity as well as 12.1% of design allowance. Hence, the proposed development would not cause adverse drainage impacts nor increase the flooding susceptibility of the surrounding areas.

3.5 Recommendation

Upon detailed design stage, the Project Proponent will appoint engineer and contractor to design and to construct the proposed drainage system. The detailed arrangement of the proposed drainage system and drainage connections will be further investigated at the detailed design. Detailed information of the proposed drainage system will be prepared and submitted to DSD and relevant parties during the detailed design stage.

4 Conclusion

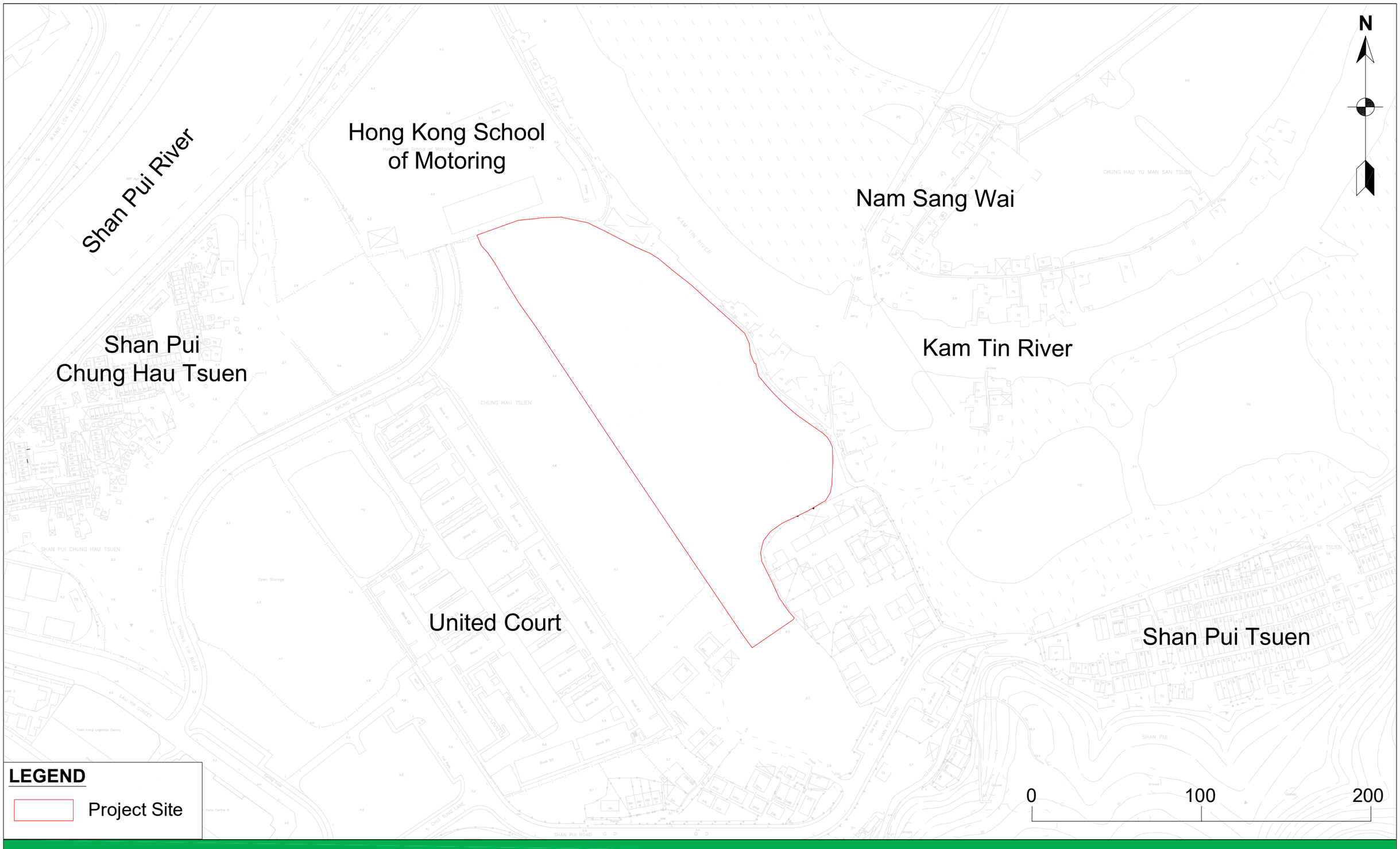
A Drainage Impact Assessment (DIA) has been conducted for the proposed development in Yuen Long, New Territories.

The peak surface runoff was calculated based on a 50-year return period, as well as projected increases in rainfall intensity attributed to both the Mid-21st Century and End of 21st Century (with design allowance) due to climate change.

Surface runoff from the Site will be collected by a series of U-channels and discharged to the Kam Tin River. The drainage analysis has demonstrated that the proposed drainage systems have adequate capacity to cater the surface runoff from the Site.

Based on the above, it is concluded that the proposed development will not result in any adverse drainage impacts.

Figures



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Section 16 Application for Filling of Pond for Permitted Agricultural Use in Sub-section 1 and the Remaining Portion (Portion) of Section E of Lot No. 1212 in D.D. 115 and the Discrepant Areas (Portion) adjacent to Section E of Lot No. 1212 in D.D. 115, Nam Sang Wai, Yuen Long, New Territories

Site Location and Its Environs

Figure 2.1

Rev. 0

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Section 16 Application for Filling of Pond for Permitted Agricultural Use in Sub-section 1 and the Remaining Portion (Portion) of Section E of Lot No. 1212 in D.D. 115 and the Discrepant Areas (Portion) adjacent to Section E of Lot No. 1212 in D.D. 115, Nam Sang Wai, Yuen Long, New Territories

Identified Catchment Areas

Figure 3.1

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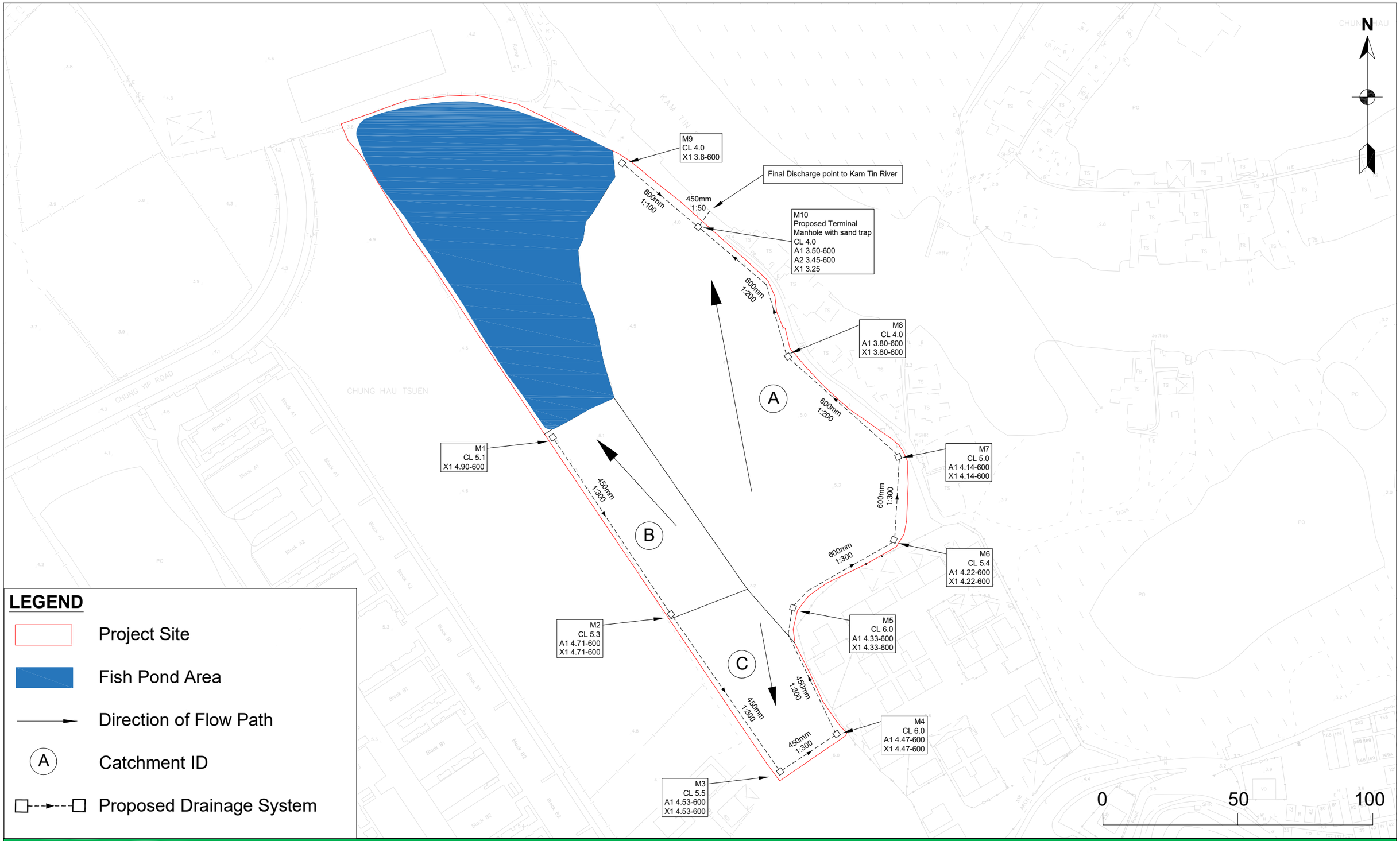

LEGEND

- Project Site
- Fish Pond Area
- Direction of Flow Path
- (A) Catchment ID
- Proposed Drainage System

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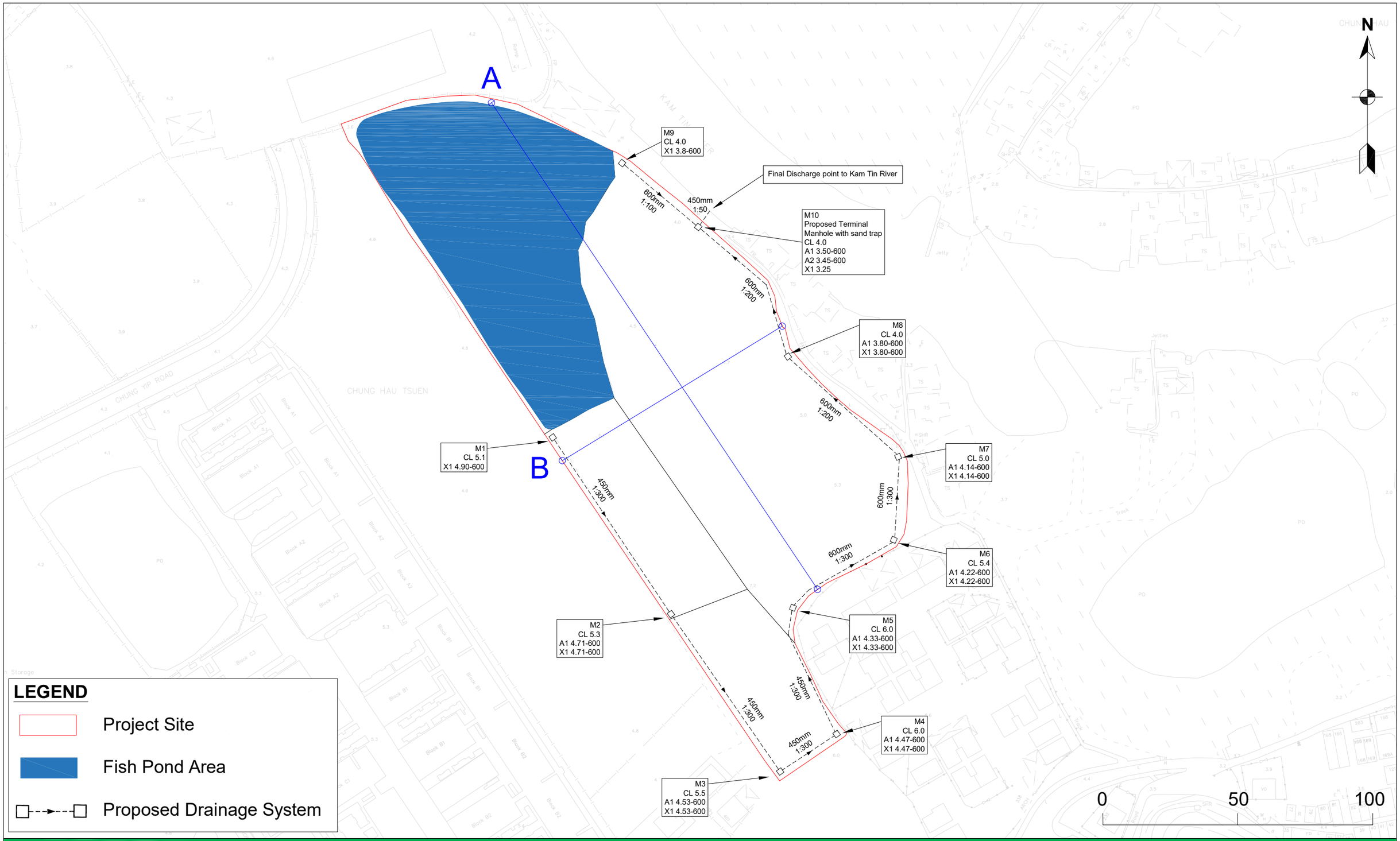
Drainage Proposal

Figure 3.2

Rev. 0



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Section 16 Application for Filling of Pond for Permitted Agricultural Use in Sub-section 1 and the Remaining Portion (Portion) of Section E of Lot No. 1212 in D.D. 115 and the Discrepant Areas (Portion) adjacent to Section E of Lot No. 1212 in D.D. 115, Nam Sang Wai, Yuen Long, New Territories

Cross Section of Existing and Proposed Ground Level

Figure 3.3

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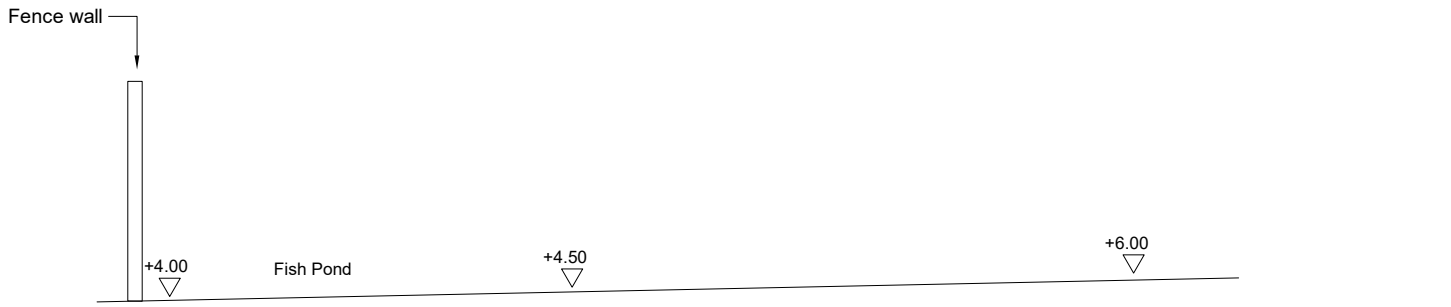
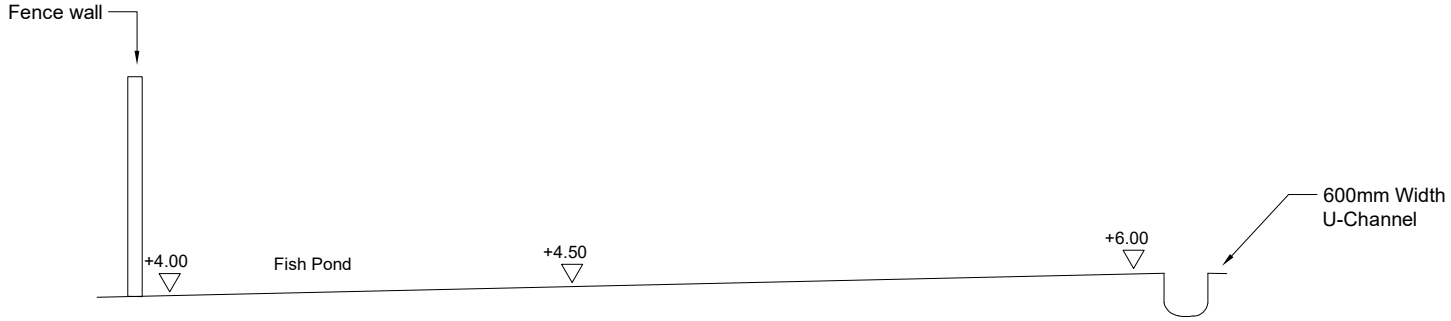


Existing Ground Level



Proposed Ground Level

SECTION A

NOT IN SCALE

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Section 16 Application for Filling of Pond for Permitted Agricultural Use in Sub-section 1 and the Remaining Portion (Portion) of Section E of Lot No. 1212 in D.D. 115 and the Discrepant Areas (Portion) adjacent to Section E of Lot No. 1212 in D.D. 115, Nam Sang Wai, Yuen Long, New Territories

Cross Section - Section A

Figure 3.3A

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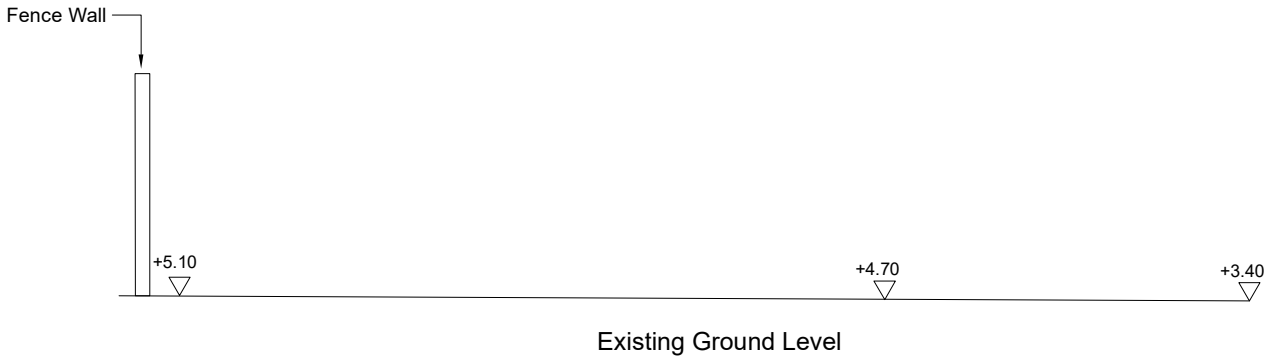
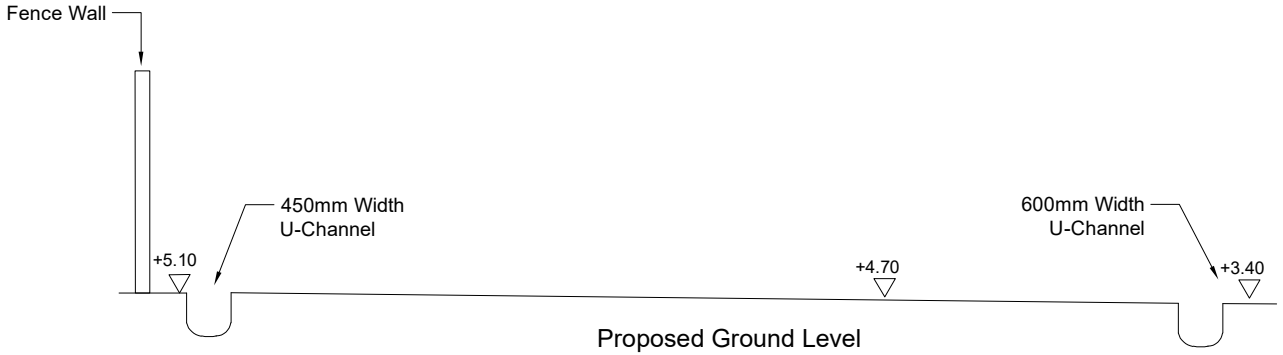




SECTION B

NOT IN SCALE

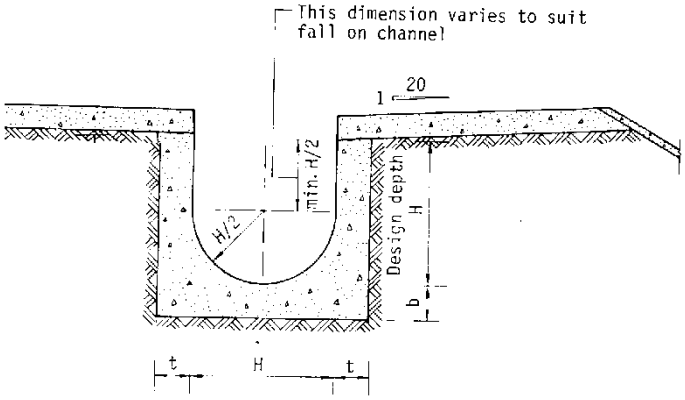
URBAN GREEN

Section 16 Application for Filling of Pond for Permitted Agricultural Use in Sub-section 1 and the Remaining Portion (Portion) of Section E of Lot No. 1212 in D.D. 115 and the Discrepant Areas (Portion) adjacent to Section E of Lot No. 1212 in D.D. 115, Nam Sang Wai, Yuen Long, New Territories

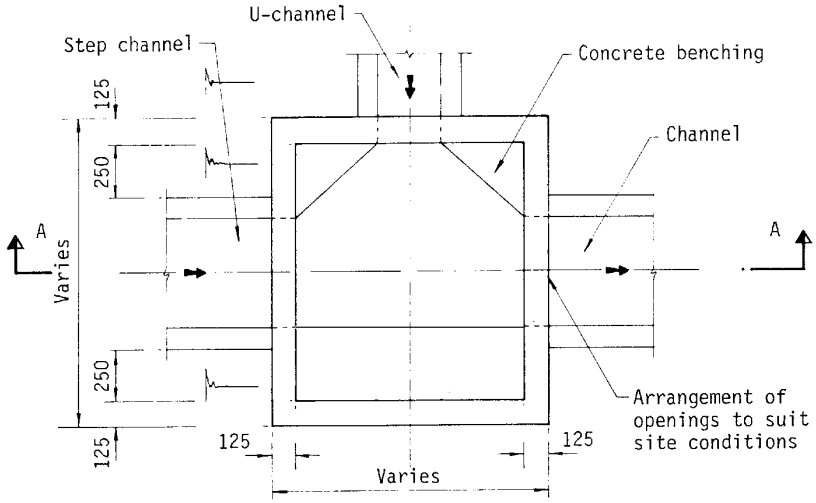
Cross Section - Section B

Figure 3.3B

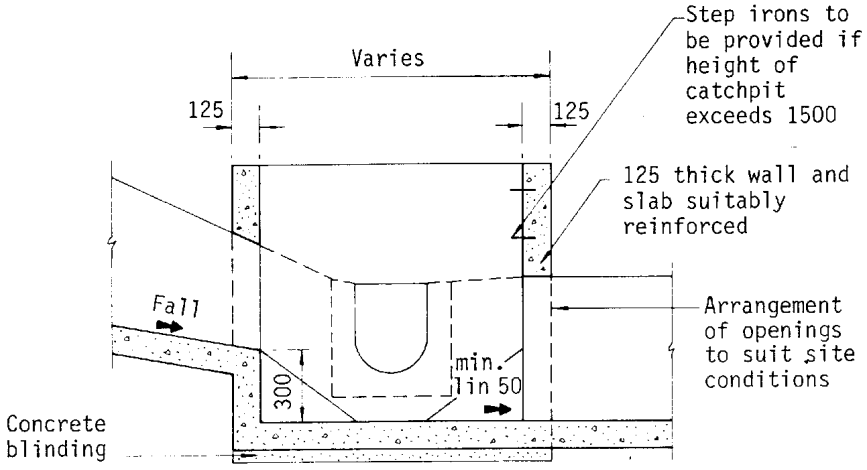
Rev. 0



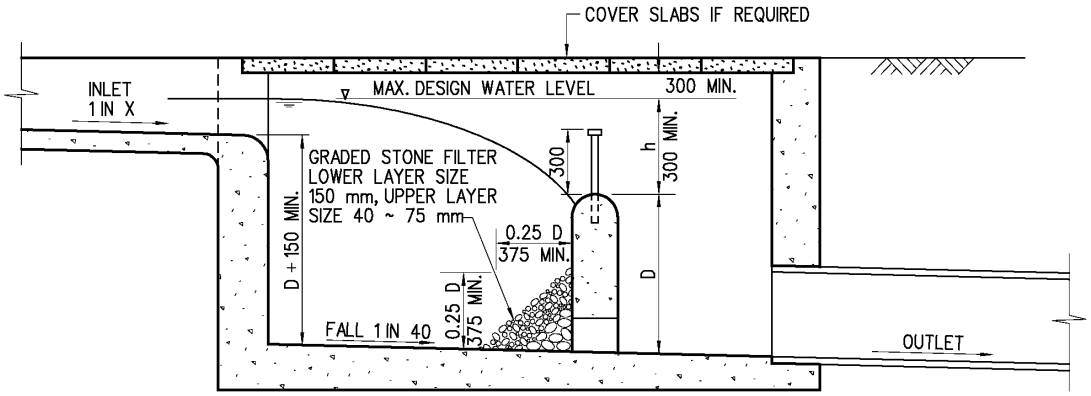
Typical Details of U-Channel



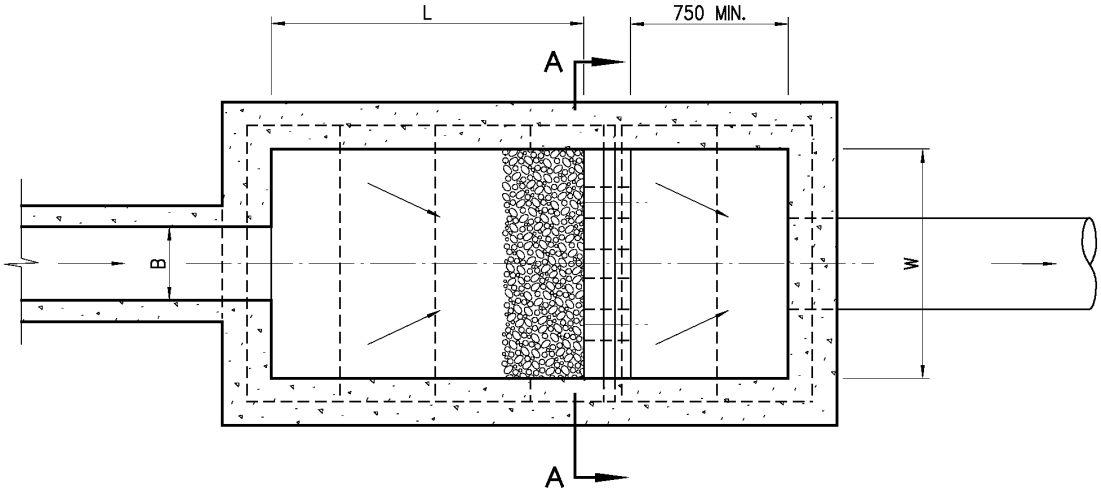
Typical Details of Catchpit



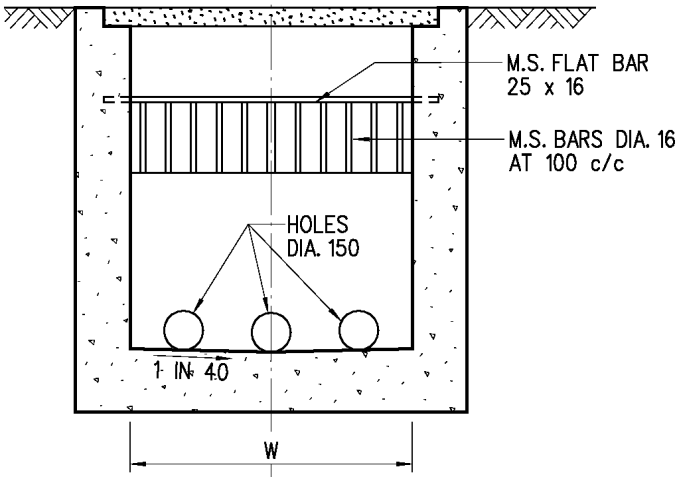
Section A-A



Typical Longitudinal Section of Sand Trap



Typical Plan of Sand Trap



Section A-A

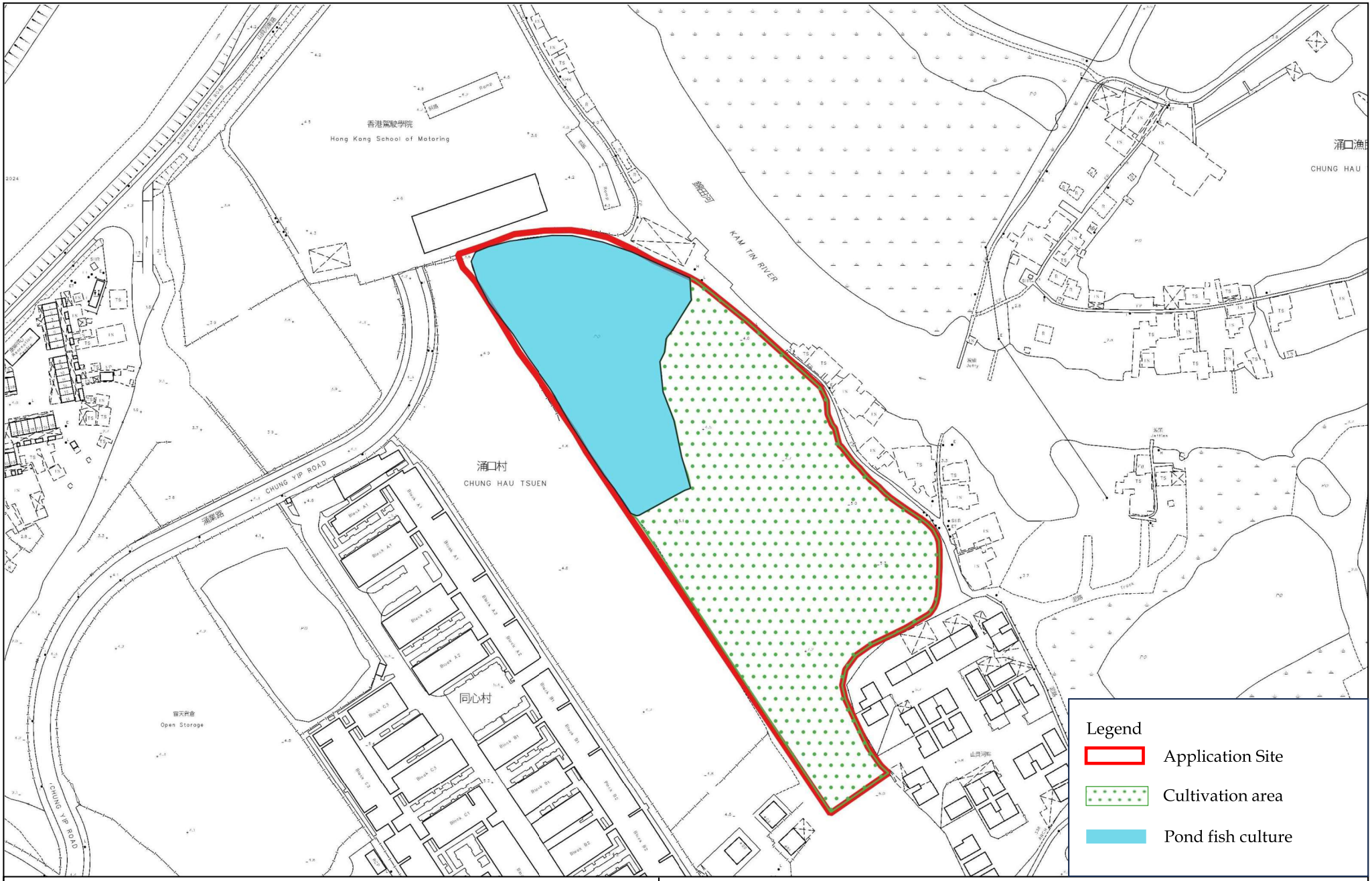
Notes:

1. All dimensions are in millimeters.
2. Size

   Depth: D not less than 750
   Width: W ≥ 3B
   Length: $4.8D^{0.67} h^{0.5} X^{-0.5} \geq 4B$
3. Graded Stone Filter shall be crusher run granite aggregate.
4. Capacity D W L to be according to size and nature of catchment, providing detention time not less than 5 minutes for max. design flow of inlet.
5. Source: From DSD drawing No. DS 1025B.

Appendix A

Proposed Layout Plan



LCH Planning and Development Consultants Limited

Figure 7 : Indicative Layout Plan

(Extracted based on Aerial Photo no. A22836 taken on 5.10.1990 by Lands Department)

Filling of Pond for Permitted Agricultural Use in Sub-section 1 and the Remaining Portion (Portion) of Section E of Lot No. 1212 in D.D. 115 and the Discrepant Areas (Portion) adjacent to Section E of Lot No. 1212 in D.D. 115, Nam Sang Wai, Yuen Long, New Territories

(Source: HK GEODATA STORE, HKSAR Government)

Appendix B

Detailed Drainage Analysis

Capacity Flow Estimation for Proposed Catchments and Drainage System with 50 Year Return Period

A.Calculation of All Catchment Runoff with Proposed Development

Catchment ID	Surface Type	Catchment Area (A), m^2	Catchment Area (A), km^2	Average Slope (H), m/100m	Flow Path Length (L), m	Inlet Time (t_0), min	Time of Concentration (t_c), min	Duration (t_d), min	a (50 year return period) [2]	b (50 year return period) [2]	c (50 year return period) [2]	Runoff Intensity, mm/hr	Runoff Coefficient (C)	C x A	Peak Runoff (Q_p), m^3/s
A	100% Grassland (heavysoil), flat	10,514	0.0105	2.11	151.30	7.46	7.46	7.46	505.5	3.29	0.355	218	0.25	0.0026	0.1590
B	100% Grassland (heavysoil), flat	2,504	0.0025	2.21	94.86	5.35	5.35	5.35	505.5	3.29	0.355	235	0.25	0.0006	0.0409
C	100% Grassland (heavysoil), flat	2,053	0.0021	1.66	72.15	4.40	4.40	4.40	505.5	3.29	0.355	245	0.25	0.0005	0.0350
														Total	**0.2349**

B. Capacity Flow Estimation and Adequacy Check for Proposed Drainage System

Pipe Segement	Shape	Diameter, m	Depth, m	Slope	Length, m	Manning's Roughness Coefficient [3]	Cross Section Area, m^2 [4]	Wetted Perimeter, m	Hydraulic Radius, m	Mean Velocity, m/s	Capacity Flow, m^3/s	Catchments Served	Runoff, m^3/s [1]	% of Capacity Flow	Sufficient Capacity? (Y/N)
M1-M2	U-Channel	0.450	0.450	0.003	76	0.016	0.163	1.157	0.14	0.93	0.151	B	0.041	27%	Y
M2-M3	U-Channel	0.450	0.450	0.003	69	0.016	0.163	1.157	0.14	0.93	0.151	B, C	0.076	50%	Y
M3-M4	U-Channel	0.450	0.450	0.003	23	0.016	0.163	1.157	0.14	0.93	0.151	B, C	0.076	50%	Y
M4-M5	U-Channel	0.450	0.450	0.003	49	0.016	0.163	1.157	0.14	0.93	0.151	B, C	0.076	50%	Y
M5-M6	U-Channel	0.600	0.600	0.003	44	0.016	0.289	1.542	0.19	1.12	0.324	A, B, C	0.235	72%	Y
M6-M7	U-Channel	0.600	0.600	0.003	29	0.016	0.289	1.542	0.19	1.12	0.324	A, B, C	0.235	72%	Y
M7-M8	U-Channel	0.600	0.600	0.005	53	0.016	0.289	1.542	0.19	1.45	0.419	A, B, C	0.235	56%	Y
M8-M10	U-Channel	0.600	0.600	0.005	59	0.016	0.289	1.542	0.19	1.45	0.419	A, B, C	0.235	56%	Y
M9-M10	U-Channel	0.600	0.600	0.010	35	0.016	0.289	1.542	0.19	2.05	0.592	A, B, C	0.235	40%	Y
M10 to Kam Tin River	U-Channel	0.450	0.450	0.020	6	0.016	0.163	1.157	0.14	2.39	0.389	A, B, C	0.235	60%	Y

Note:
[1] Runoff is calculated in accordance with DSD's "Stormwater Drainage Manual - Planning, Design and Management" (SDM), fifth edition, January 2018..
[2] 50 years return period of HKO Headquarters is adopted in the calculation according to Stormwater Drainage Manual - Corrigendum No. 1/2024.
[3] For the proposed U-channel, value of n for concrete-lined channels under fair condition (i.e. n = 0.016) is adopted in the calculation.
[4] 10% reduction in flow area has been considered as per the requirement in SDM (Section 9.3).

Appendix C

Detailed Drainage Analysis with Climate Change Considerations

Capacity Flow Estimation for Proposed Catchments and Drainage System with 50 Year Return Period (with rainfall increase of 11.1%)

A.Calculation of All Catchment Runoff with Proposed Development

Catchment ID	Surface Type	Catchment Area (A), m^2	Catchment Area (A), km^2	Average Slope (H), m/100m	Flow Path Length (L), m	Inlet Time (t_0), min	Time of Concentration (t_c), min	Duration (t_d), min	a (50 year return period) [2]	b (50 year return period) [2]	c (50 year return period) [2]	Runoff Intensity, mm/hr	Runoff Coefficient (C)	C x A	Peak Runoff (with rainfall increase of 11.1%) (Q_p), m^3/s
A	100% Grassland (heavysoil), flat	10,514	0.0105	2.11	151.30	7.46	7.46	7.46	505.5	3.29	0.355	218	0.25	0.0026	0.1766
B	100% Grassland (heavysoil), flat	2,504	0.0025	2.21	94.86	5.35	5.35	5.35	505.5	3.29	0.355	235	0.25	0.0006	0.0455
C	100% Grassland (heavysoil), flat	2,053	0.0021	1.66	72.15	4.40	4.40	4.40	505.5	3.29	0.355	245	0.25	0.0005	0.0388
														Total	**0.2610**

B. Capacity Flow Estimation and Adequacy Check for Proposed Drainage System

Pipe Segement	Shape	Diameter, m	Depth, m	Slope	Length, m	Manning's Roughness Coefficient [3]	Cross Section Area, m^2 [4]	Wetted Perimeter, m	Hydraulic Radius, m	Mean Velocity, m/s	Capacity Flow, m^3/s	Catchments Served	Runoff, m^3/s [1]	% of Capacity Flow	Sufficient Capacity? (Y/N)
M1-M2	U-Channel	0.450	0.450	0.003	76	0.016	0.163	1.157	0.14	0.93	0.151	B	0.045	30%	Y
M2-M3	U-Channel	0.450	0.450	0.003	69	0.016	0.163	1.157	0.14	0.93	0.151	B, C	0.084	56%	Y
M3-M4	U-Channel	0.450	0.450	0.003	23	0.016	0.163	1.157	0.14	0.93	0.151	B, C	0.084	56%	Y
M4-M5	U-Channel	0.450	0.450	0.003	49	0.016	0.163	1.157	0.14	0.93	0.151	B, C	0.084	56%	Y
M5-M6	U-Channel	0.600	0.600	0.003	44	0.016	0.289	1.542	0.19	1.12	0.324	A, B, C	0.261	80%	Y
M6-M7	U-Channel	0.600	0.600	0.003	29	0.016	0.289	1.542	0.19	1.12	0.324	A, B, C	0.261	80%	Y
M7-M8	U-Channel	0.600	0.600	0.005	53	0.016	0.289	1.542	0.19	1.45	0.419	A, B, C	0.261	62%	Y
M8-M10	U-Channel	0.600	0.600	0.005	59	0.016	0.289	1.542	0.19	1.45	0.419	A, B, C	0.261	62%	Y
M9-M10	U-Channel	0.600	0.600	0.010	35	0.016	0.289	1.542	0.19	2.05	0.592	A, B, C	0.261	44%	Y
M10 to Kam Tin River	U-Channel	0.450	0.450	0.020	6	0.016	0.163	1.157	0.14	2.39	0.389	A, B, C	0.261	67%	Y

Note:
[1] Runoff is calculated in accordance with DSD's "Stormwater Drainage Manual - Planning, Design and Management" (SDM), fifth edition, January 2018..
[2] 50 years return period of HKO Headquarters is adopted in the calculation according to Stormwater Drainage Manual - Corrigendum No. 1/2024.
[3] For the proposed U-channel, value of n for concrete-lined channels under fair condition (i.e. n = 0.016) is adopted in the calculation.
[4] 10% reduction in flow area has been considered as per the requirement in SDM (Section 9.3).

Capacity Flow Estimation for Proposed Catchments and Drainage System with 50 Year Return Period (with rainfall increase of 16% and 12.1% of design allowance in End of 21th Centry)

A.Calculation of All Catchment Runoff with Proposed Development

Catchment ID	Surface Type	Catchment Area (A), m^2	Catchment Area (A), km^2	Average Slope (H), m/100m	Flow Path Length (L), m	Inlet Time (t_0), min	Time of Concentration (t_c), min	Duration (t_d), min	a (50 year return period) [2]	b (50 year return period) [2]	c (50 year return period) [2]	Runoff Intensity, mm/hr	Runoff Coefficient (C)	C x A	Peak Runoff (with rainfall increase of 16% and 12.1% of design allowance in End of 21th Centry) (Q_p), m^3/s
A	100% Grassland (heavysoil), flat	10,514	0.0105	2.11	151.30	7.46	7.46	7.46	505.5	3.29	0.355	218	0.25	0.0026	0.2067
B	100% Grassland (heavysoil), flat	2,504	0.0025	2.21	94.86	5.35	5.35	5.35	505.5	3.29	0.355	235	0.25	0.0006	0.0532
C	100% Grassland (heavysoil), flat	2,053	0.0021	1.66	72.15	4.40	4.40	4.40	505.5	3.29	0.355	245	0.25	0.0005	0.0455
														Total	**0.3054**

B. Capacity Flow Estimation and Adequacy Check for Proposed Drainage System

Pipe Segement	Shape	Diameter, m	Depth, m	Slope	Length, m	Manning's Roughness Coefficient [3]	Cross Section Area, m^2 [4]	Wetted Perimeter, m	Hydraulic Radius, m	Mean Velocity, m/s	Capacity Flow, m^3/s	Catchments Served	Runoff, m^3/s [1]	% of Capacity Flow	Sufficient Capacity? (Y/N)
M1-M2	U-Channel	0.450	0.450	0.003	76	0.016	0.163	1.157	0.14	0.93	0.151	B	0.053	35%	Y
M2-M3	U-Channel	0.450	0.450	0.003	69	0.016	0.163	1.157	0.14	0.93	0.151	B, C	0.099	66%	Y
M3-M4	U-Channel	0.450	0.450	0.003	23	0.016	0.163	1.157	0.14	0.93	0.151	B, C	0.099	66%	Y
M4-M5	U-Channel	0.450	0.450	0.003	49	0.016	0.163	1.157	0.14	0.93	0.151	B, C	0.099	66%	Y
M5-M6	U-Channel	0.600	0.600	0.003	44	0.016	0.289	1.542	0.19	1.12	0.324	A, B, C	0.305	94%	Y
M6-M7	U-Channel	0.600	0.600	0.003	29	0.016	0.289	1.542	0.19	1.12	0.324	A, B, C	0.305	94%	Y
M7-M8	U-Channel	0.600	0.600	0.005	53	0.016	0.289	1.542	0.19	1.45	0.419	A, B, C	0.305	73%	Y
M8-M10	U-Channel	0.600	0.600	0.005	59	0.016	0.289	1.542	0.19	1.45	0.419	A, B, C	0.305	73%	Y
M9-M10	U-Channel	0.600	0.600	0.010	35	0.016	0.289	1.542	0.19	2.05	0.592	A, B, C	0.305	52%	Y
M10 to Kam Tin River	U-Channel	0.450	0.450	0.020	6	0.016	0.163	1.157	0.14	2.39	0.389	A, B, C	0.305	79%	Y

Note:
[1] Runoff is calculated in accordance with DSD's "Stormwater Drainage Manual - Planning, Design and Management" (SDM), fifth edition, January 2018..
[2] 50 years return period of HKO Headquarters is adopted in the calculation according to Stormwater Drainage Manual - Corrigendum No. 1/2024.
[3] For the proposed U-channel, value of n for concrete-lined channels under fair condition (i.e. n = 0.016) is adopted in the calculation.
[4] 10% reduction in flow area has been considered as per the requirement in SDM (Section 9.3).