Appendix 8

DRAINAGE IMPACT ASSESSMENT

URBAN GREEN

Proposed Amendment to the Approved Sha Tin Outline Zoning Plan No. S/ST/40 from “Industrial (1)” zone to “Residential (Group A)10” zone at Nos.8-14 Siu Lek Yuen Road, Sha Tin, New Territories (STTL Nos.196 and 276)

Drainage Impact Assessment Report

Reference: P161-DIA-I1
Date: August 2026
Confidential

URBAN GREEN

Proposed Amendment to the Approved Sha Tin Outline Zoning Plan No. S/ST/40 from "Industrial (1)" zone to "Residential (Group A)10" zone at Nos.8-14 Siu Lek Yuen Road, Sha Tin, New Territories (STTL Nos.196 and 276)

Drainage Impact Assessment Report

Checked and Approved by:

Joan Choi
Director

Reference: P161-DIA-I1

Date: 25 August 2026

Issue	Status	Prepared By	Date	Checked by	Date	Approved By	Date
1	-	Elvis Liu	25-Aug-26	Emily Tang	25-Aug-26	Joan Choi	25-Aug-26

[redacted]

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Contents

1 Introduction 3

1.1 Background 3

1.2 Objective of the DIA 3

1.3 Report Structure 3

2 Site Context 4

2.1 Site Location and Its Environs 4

2.2 Site Characteristic and the Proposed Redevelopment 4

2.3 Existing Drainage Condition 4

3 Drainage Analysis 5

3.1 Assessment Methodology and Assumptions 5

3.2 Design Parameters 6

3.3 Assessment Results 6

3.4 Astronomical Tide 8

3.5 Storm Surge 8

4 Climate Change 9

5 Conclusion 10

List of Figures

Figure 2.1 Site Location and its Environs

Figure 3.1 Identified Catchment Areas and Existing Drainage System

List of Tables

Table 3.1 Changes in Grassland and Concrete Areas

Table 3.2 Estimated Runoff of the Existing Development and the Proposed Redevelopment

Table 3.3 Estimated Proposed Site Catchment Runoff from Existing Drainage Pipe to Existing Public Drainage System

List of Appendices

Appendix A Detailed Drainage Analysis

Appendix B Detailed Drainage Analysis with Climate Change Considerations

Appendix C Astronomical Tide Prediction in Tai Po Kau

1 Introduction

1.1 Background

Urban Green Consultants Limited (UGC) has been appointed to prepare a Drainage Impact Assessment (DIA) to support the Section 12A ("S12A") Planning Application / Rezoning Request ("RR") to amend the Approved Sha Tin Outline Zoning Plan No. S/ST/40 (the Approved OZP) gazetted on 17 July 2026 at Nos.8-14 Siu Lek Yuen Road, Sha Tin, New Territories (the "Site"/ "Rezoning Site") (Sha Tin Town Lot ("STTL") Nos.196 and 276).

The Rezoning Site has an area of approx. 7,668m^2 and is currently zoned Industrial (1)" ("I(1)") on the Approved OZP. There are no development restrictions on plot ratio ("PR"), building height ("BH"), gross floor area ("GFA") or site coverage ("SC") stipulated on "I(I)" zone. 'Flat' is neither a Column 1 nor Column 2 use under the "I(1)" zone. This RR seeks to rezone the Site from "I(1)" zone to "Residential (Group A)10" ("R(A)10") zone subject to a PR restriction of 6 and BH restriction of 127mPD, as stipulated on the Plan, to facilitate the comprehensive redevelopment of two(2) existing Industrial Buildings ("IBs") into a private residential development with commercial uses ("Proposed Redevelopment"). An Indicative Development Scheme (Appendix 1 of the Planning Statement refers) is prepared to demonstrate the feasibility of the proposed zoning and to illustrate the proposed zoning parameters.

1.2 Objective of the DIA

The objectives of this DIA are to assess the potential drainage impact arising from the Proposed Redevelopment and recommend mitigation measures, if necessary, to alleviate the impacts.

1.3 Report Structure

The remaining chapters of this report are shown below:

Chapter 2 – Site Context

Chapter 3 – Drainage Analysis

Chapter 4 – Climate Change

Chapter 5 – Conclusion

2 Site Context

2.1 Site Location and Its Environs

The Rezoning Site is bounded by Siu Lek Yuen Road to its north, Sha Tin Industrial Centre Block A and B to its west, Yuen Shun Circuit to its south, and PCCW Yuen Chau Kok Telephone Exchange and Planned Student Hostel to its east. The Rezoning Site is currently occupied by industrial uses. Figure 2.1 shows the Rezoning Site location and its environs.

2.2 Site Characteristic and the Proposed Redevelopment

The Proposed Redevelopment comprises of two 32-storey residential towers above a 2-storey Podium (including carpark, retail shops and an eating place), and a 1-storey clubhouse and podium garden at a proposed BH of 127mPD and with a PR of 6. The Proposed Redevelopment will provide a total of 928 residential flats, with a total gross floor area of 46,008 m^2.

2.3 Existing Drainage Condition

Based on the drainage plans (reference no.: 7-SE-12A-2 and 7-SE-12A-3) obtained from Drainage Services Department (DSD) on 22 August 2025, the Rezoning Site is currently served by the public government drainage facilities along Yuen Shun Circuit, Siu Lek Yuen Road and Siu Lek Yuen Road Playground. The surface runoff from the Rezoning Site can be collected and discharged to these facilities via the proposed terminal manhole.

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) with Corrigendum No. 1/2022, 1/2024, 2/2024.

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 concrete-paved area – 0.8
- Runoff coefficient for flatted grassland (heavy soil) – 0.13

The existing paving condition of the Rezoning Site has runoff coefficients of 0.8 for concrete which are adopted in this DIA. It is anticipated that the extent of the existing paving condition will be improved upon approval of this RR as more landscape areas have been proposed.

3.2 Design Parameters

1 catchment (Catchments A) was identified based on the geographical characteristics of the Rezoning Site as shown in Figure 3.1. The existing public drainage system will collect the surface runoff from catchment A.

The surface runoff within the Rezoning Site area will be collected by internal stormwater drain and conveyed to the proposed terminal manhole P1. The collected stormwater from the proposed terminal manhole P1 will be discharged into the existing public drainage system via the existing discharge manhole A1.

The surface runoff from relevant catchment has been estimated and presented in Appendix A.

3.3 Assessment Results

The surface characteristics of the on-site catchment area (i.e. Catchment A) will be changed after the Proposed Redevelopment. The changes in surface characteristics of the on-site catchment area are summarised in Table 3.1.

Table 3.1 Changes in Grassland and Concrete Areas

On-Site Catchment Area	Existing Development		Proposed Redevelopment	
	Soft Landscape	Concrete	Soft Landscape	Concrete
A	1%	99%	17.85%	82.15%

As summarised above, the concrete paving area for on-site catchment is decreased which imply a decrease of the surface runoff generated from the Rezoning Site after the Proposed Redevelopment. The decrease of on-site catchments runoff is summarised in Table 3.2.

Table 3.2 Estimated Runoff of the Existing Development and the Proposed Redevelopment

On-Site Catchment Area	Estimated Runoff, m^3/s	
	Existing Development	Proposed Redevelopment
A	0.3589	0.3078
Total Decrease of Runoff m^3/s		**0.0511**

As shown in Table 3.2, a total of 0.0511 m^3/s decreased runoff will be resulted from the Proposed Redevelopment. Estimation of the on-site runoff of the existing development and the Proposed Redevelopment are detailed in Table A1 and Table A2 of Appendix A.

Based on the results above, the existing public drainage facilities at Siu Lek Yuen Road will be capable of receiving the decreased volume. Moreover, with reference to the Flooding Blackspots available on the DSD's website, the Rezoning Site is not located within the flooding blackspots locations / regions. As a result, no unacceptable drainage impact is anticipated from the Proposed Redevelopment.

The capacities of the existing drainage pipes of the Rezoning Site to the existing public drainage system are checked by comparing with the peak surface runoff from the Proposed Redevelopment. For the worst-case scenario, value of n used for calculating circular pipes by using Manning's Equation were assumed to be 0.015 (fair condition). The results of the capacities checking are demonstrated in Table B1 of Appendix A and summarized in Table 3.3 below.

Table 3.3 Estimated Proposed Site Catchment Runoff from Existing Drainage Pipe to Existing Public Drainage System

Channel Segment (1)	Diameter, m	Gradient	Capacity, m^3/s	Runoff, m^3/s	% of Capacity Flow	Catchment Served	Sufficient Capacity? (Y/N)
P1 - A1	0.300	0.2933	0.4085	0.3078	75%	A	Y

Note:
(1) All segments are circular pipes.

Based on the results, the surface runoff of the Proposed Redevelopment can be collected and conveyed to the existing public drainage system, and no adverse drainage impacts are predicted.

3.4 Astronomical Tide

Given the Site is located in close proximity to the Shing Mun River, the potential backwater effect due to elevated river water levels has been reviewed in this assessment. Appendix C presents the Hong Kong Observatory (HKO) astronomical tide prediction for Tai Po Kau, being the nearest HKO tide prediction station to the Site. The maximum predicted high tide level is 2.87 m above Chart Datum (mCD), which is equivalent to 3.02 mPD. The invert level of the proposed terminal manhole P1 is 3.84 mPD. Therefore, a freeboard of approximately 0.82m is maintained above the highest predicted astronomical tide level. As such, no backwater effect due to astronomical tide is anticipated in the area.

3.5 Storm Surge

The potential backwater effect induced by storm surge has also been reviewed in this assessment, noting that the Site is located immediately adjacent to the Shing Mun River. The extreme sea level at Tai Po Kau, as presented in Table 8 of the Stormwater Drainage Manual (SDM) (DSD, 2018) with Corrigendum No. 1/2022, has been adopted for the calculations, as shown in Appendix B. Detailed calculations are presented in Appendix A. Although the invert level of the proposed terminal manhole P1 (3.84 mPD) is lower than the design extreme sea level (4.41 mPD), the cover level of manhole P1 is 5.95 mPD. Therefore, a freeboard of around 1.54 m is maintained above the design extreme sea level, indicating that no backwater effect due to storm surge is expected at the Site.

4 Climate Change

Climate change projection for Hong Kong estimates the increases in rainfall intensity of 11.1% and 16.0% for the Mid-21st Century (2041-2060) and the End of 21st Century (2081-2100) respectively. To assess the impact on the surface water drainage system, both uplift percentages were applied to the rainfall intensity to estimate the increased runoff and quantify any projected capacity requirements. The assessment has been included in Table B1 of Appendix B.

The analysis indicated that the existing drainage system would have sufficient capacity for the additional runoff from the Proposed Redevelopment with a 11.1% and 16% increase in rainfall intensity due to climate change. In addition, sufficient freeboard is maintained under extreme sea level rise due to Climate Change with reference to Table 29 – 31 and Appendix 2 of the Stormwater Drainage Manual (SDM) (DSD, 2018) with Corrigendum No. 1/2022. No backwater effect is anticipated at the Site. Hence, the Proposed Redevelopment would not cause adverse drainage impacts nor increase the flooding susceptibility of the surrounding areas.

5 Conclusion

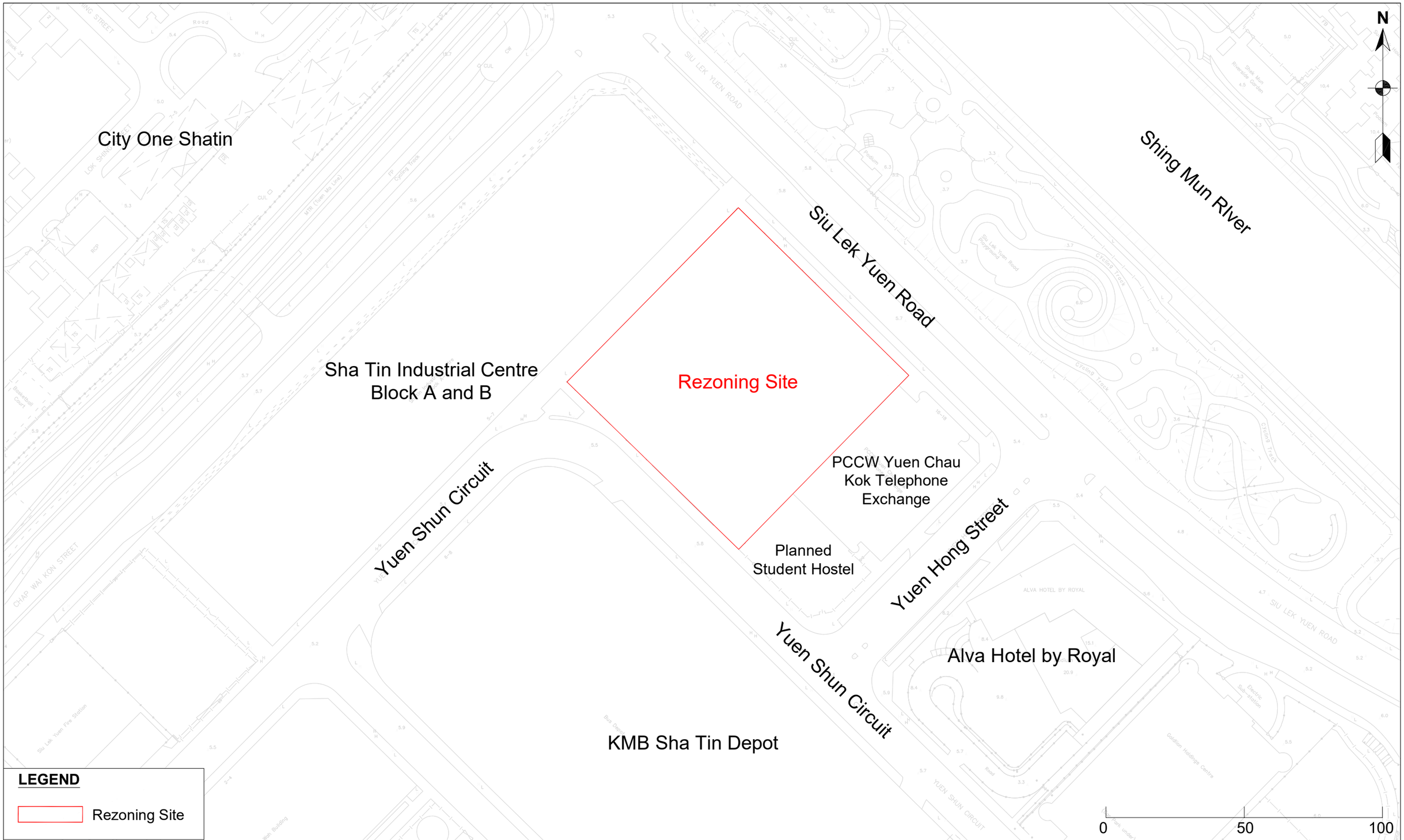
A Drainage Impact Assessment (DIA) has been conducted for the Proposed Redevelopment at Nos.8-14 Siu Lek Yuen Road, Sha Tin, New Territories.

As the peak surface runoff based on 50 years return period will be decreased after redevelopment due to the additional provision of landscaping area, the existing public drainage facilities should be capable of receiving the decreased volume as indicated above. In addition, with reference to the Flooding Blackspots available on the DSD's website, the Rezoning Site is not located within the flooding blackspots locations / regions. As a result, no unacceptable drainage impact is anticipated from the Proposed Redevelopment.

For the proposed terminal manhole connected to the existing public drainage system at Siu Lek Yuen Road, the assessment results have demonstrated that the existing circular pipe has sufficient capacity to receive the surface runoff from the Proposed Redevelopment based on a 50-year return period, as well as projected increase in rainfall intensity attributed to the End of 21st Century climate change horizons. In addition, no backwater effect is expected as a result of astronomical tide or storm surge.

Based on the above, it is concluded that the Proposed Redevelopment shall not result in any adverse drainage impacts.

Figures



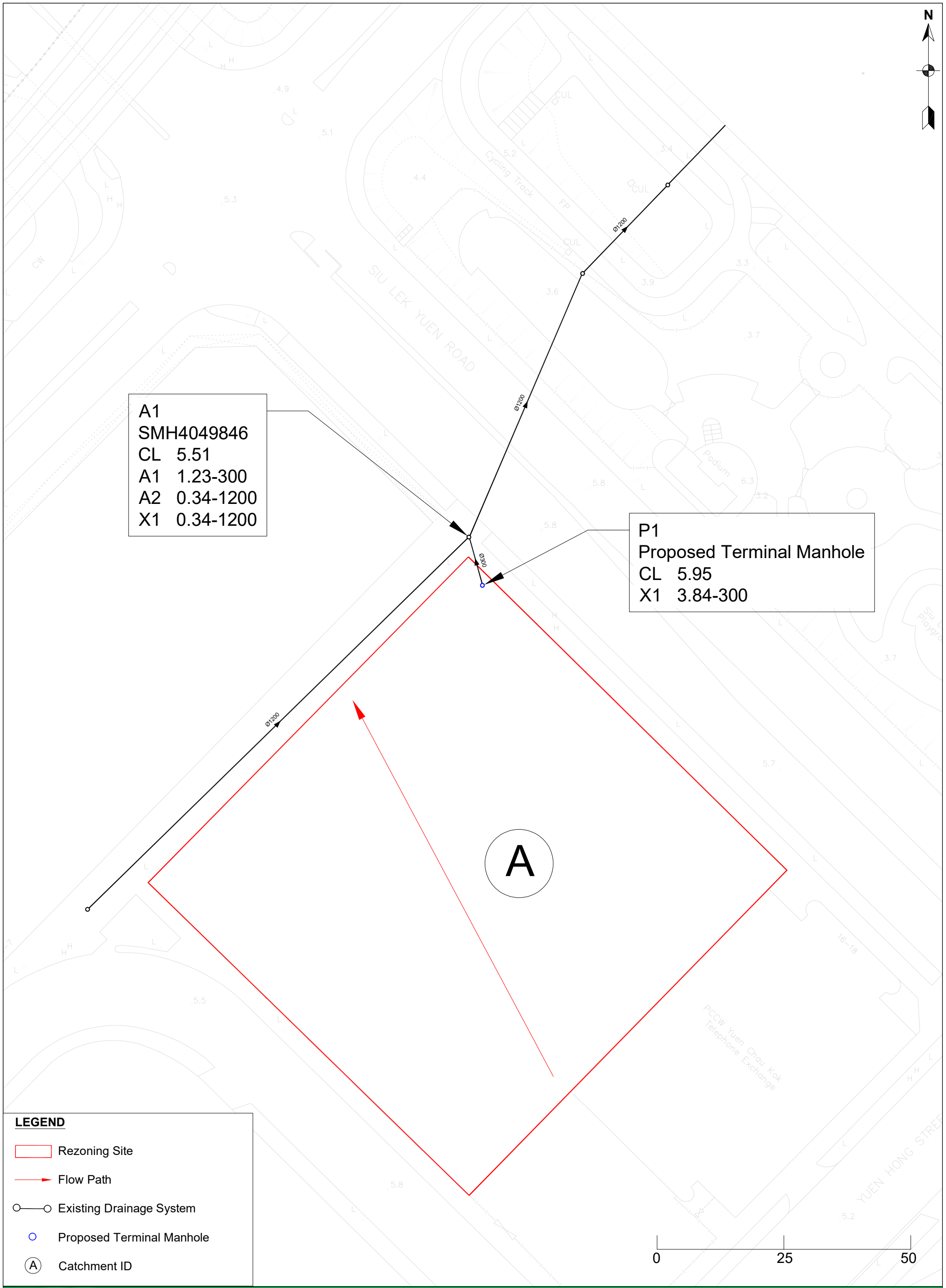
Proposed Amendment to the Approved Sha Tin Outline Zoning Plan No. S/ST/40 from "Industrial (1)" zone to "Residential (Group A)10" zone at Nos.8-14 Siu Lek Yuen Road, Sha Tin, New Territories (STTL Nos.196 and 276)

Site Location and its Environs

Figure 2.1

Rev.1

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Proposed Amendment to the Approved Sha Tin Outline Zoning Plan No. S/ST/40 from "Industrial (1)" zone to "Residential (Group A)10" zone at Nos.8-14 Siu Lek Yuen Road, Sha Tin, New Territories (STTL Nos.196 and 276)

Identified Catchment Area and Existing Drainage System

Figure 3.1

Rev. 0

Appendix A

Detailed Drainage Analysis

Capacity Flows Estimation for Propose Catchments and Drainage System with 50 Year Return Period

A1. Calculation of On-Site Runoff (Existing 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)	b (50 year return period)	c (50 year return period)	Runoff intensity mm/hr	Runoff coefficient (C)	C x A	Peak runoff (Q_p), m^3/s
A	99% Concrete + 1% Grassland (heavysoil), flat	7668	0.00767	0.33	90.80	6.70	6.70	6.70	451.3	2.5	0.34	212	0.7933	0.00608	0.3589
														Total	**0.3589**

A2. Calculation of On-Site Runoff (After Redevelopment)

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)	b (50 year return period)	c (50 year return period)	Runoff intensity mm/hr	Runoff coefficient (C)	C x A	Peak runoff (Q_p), m^3/s
A	82.15% Concrete + 17.85% Grassland (heavysoil), flat	7668	0.00767	0.33	90.80	6.70	6.70	6.70	451.3	2.5	0.34	212	0.680405	0.00522	0.3078
														Total	**0.3078**
													Total Decrease of Runoff		**0.0511**

B1. Contribution Estimation and Adequacy Check for the Existing Drainage Pipe Connection to the Existing Public Sewerage System

Point (Channel No.)	Channel	Diameter, m	Length, m	initial mPD,X(m)	Ending mPD,A(m)	Slope	Manning's Roughness Coefficient [2]	Cross Section Area,m^2	Wetted Perimeter,m	Hydraulic radius,m	Mean Velocity,m/s	Capacity flow,m^3/s [3]	Catchment Served	Runoff,m^3/s	% of capacity flow	Sufficient Capacity(Y/N)	Cover Level of Manhole, mPD	Extreme Sea Level, mPD [3]	Freeboard, m	Overflow?
P1 - A1	Circular	0.300	8.90	3.84	1.23	0.2933	0.015	0.0707	0.9425	0.075	6.4211	0.4085	A	0.3078	75%	Y	5.95	4.41	1.54	Not Overflow

Note:

[1] Runoff is calculated in accordance with DSD's "*Stormwater Drainage Manual - Planning, Design and Managemen*t" (SDM), fifth edition, January 2018.
[2] For the existing drainage segment, value of n for vitrified sewer pipes under fair condition was assume (i.e. n = 0.015).
[3] The extreme sea level is obtained from Table 8 of the Stormwater Drainage Manual (DSD, 2018) with Corrigendum No. 1/2022.

Equation used:

$$t_0 = \frac{0.14465L}{H^{0.2}A^{0.1}} \qquad t_c = t_0 + t_f \qquad i = \frac{a}{(t_d + b)^c} \qquad Q_p = 0.278\,C\,i\,A$$

Appendix B

Detailed Drainage Analysis with Climate Change Considerations

Capacity Flows Estimation for Propose Catchments and Drainage System with 50 Year Return Period (11.1% increase)

A1. Calculation of On-Site Runoff (Existing 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)	b (50 year return period)	c (50 year return period)	Runoff Intensity with 11.1% Increase, mm/hr	Runoff coefficient (C)	C x A	Peak runoff (Q_p), m^3/s
A	99% Concrete + 1% Grassland (heavysoil), flat	7668	0.00767	0.33	90.80	6.70	6.70	6.70	451.3	2.5	0.34	236	0.7933	0.00608	0.3987
														Total	**0.3987**

A2. Calculation of On-Site Runoff (After Redevelopment)

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)	b (50 year return period)	c (50 year return period)	Runoff Intensity with 11.1% Increase, mm/hr	Runoff coefficient (C)	C x A	Peak runoff (Q_p), m^3/s
A	82.15% Concrete + 17.85% Grassland (heavysoil), flat	7668	0.00767	0.33	90.80	6.70	6.70	6.70	451.3	2.5	0.34	236	0.680405	0.00522	0.3420
														Total	**0.3420**
													Total Decrease of Runoff		**0.0567**

B1. Contribution Estimation and Adequacy Check for the Existing Drainage Pipe Connection to the Existing Public Sewerage System

Point (Channel No.)	Channel	Diameter, m	Length, m	initial mPD,X(m)	Ending mPD,A(m)	Slope	Manning's Roughness Coefficient [2]	Cross Section Area,m^2	Wetted Perimeter,m	Hydraulic radius,m	Mean Velocity,m/s	Capacity flow,m^3/s [3]	Catchment Served	Runoff,m^3/s	% of capacity flow	Sufficient Capacity(Y/N)	Cover Level of Manhole, mPD	Extreme Sea Level in Mid 21st Century, mPD [3]	Freeboard, m	Overflow?
P1 - A1	Circular	0.300	8.90	3.84	1.23	0.2933	0.015	0.0707	0.9425	0.075	6.4211	0.4085	A	0.3420	84%	Y	5.95	4.82	1.13	Not Overflow

Note:

[1] Runoff is calculated in accordance with DSD's "*Stormwater Drainage Manual - Planning, Design and Management*" (SDM), fifth edition, January 2018..

[2] For the existing drainage segment, value of n for vitrified sewer pipes under fair condition was assume (i.e. n = 0.015).

[3] The extreme sea level is obtained from Table 8 of the Stormwater Drainage Manual (DSD, 2018) with Corrigendum No. 1/2022, adding with mean sea level rise from Table 29, storm surge increase from Table 30a and design allowance from Appendix 2.

Equation used:

$$t_0 = \frac{0.14465L}{H^{0.2}A^{0.1}} \qquad t_c = t_0 + t_f \qquad i = \frac{a}{(t_d + b)^c} \qquad Q_P = 0.278\,C\,i\,A$$

Capacity Flows Estimation for Propose Catchments and Drainage System with 50 Year Return Period (16% increase)

A1. Calculation of On-Site Runoff (Existing 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)	b (50 year return period)	c (50 year return period)	Runoff Intensity with 16.0% Increase, mm/hr	Runoff coefficient (C)	C x A	Peak runoff (Q_p), m^3/s
A	99% Concrete + 1% Grassland (heavysoil), flat	7668	0.00767	0.33	90.80	6.70	6.70	6.70	451.3	2.5	0.34	246	0.7933	0.00608	0.4163
														Total	**0.4163**

A2. Calculation of On-Site Runoff (After Redevelopment)

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)	b (50 year return period)	c (50 year return period)	Runoff Intensity with 16.0% Increase, mm/hr	Runoff coefficient (C)	C x A	Peak runoff (Q_p), m^3/s
A	82.15% Concrete + 17.85% Grassland (heavysoil), flat	7668	0.00767	0.33	90.80	6.70	6.70	6.70	451.3	2.5	0.34	246	0.680405	0.00522	0.3570
														Total	**0.3570**
													Total Decrease of Runoff		**0.0592**

B1. Contribution Estimation and Adequacy Check for the Existing Drainage Pipe Connection to the Existing Public Sewerage System

Point (Channel No.)	Channel	Diameter, m	Length, m	initial mPD,X(m)	Ending mPD,A(m)	Slope	Manning's Roughness Coefficient [2]	Cross Section Area,m^2	Wetted Perimeter,m	Hydraulic radius,m	Mean Velocity,m/s	Capacity flow,m^3/s [3]	Catchment Served	Runoff,m^3/s	% of capacity flow	Sufficient Capacity(Y/N)	Cover Level of Manhole, mPD	Extreme Sea Level at the End of 21st Century, mPD [3]	Freeboard, m	Overflow?
P1 - A1	Circular	0.300	8.90	3.84	1.23	0.2933	0.015	0.0707	0.9425	0.075	6.4211	0.4085	A	0.3570	87%	Y	5.95	5.42	0.53	Not Overflow

Note:

[1] Runoff is calculated in accordance with DSD's "*Stormwater Drainage Manual - Planning, Design and Management*" (SDM), fifth edition, January 2018..

[2] For the existing drainage segment, value of n for vitrified sewer pipes under fair condition was assume (i.e. n = 0.015).

[3] The extreme sea level is obtained from Table 8 of the Stormwater Drainage Manual (DSD, 2018) with Corrigendum No. 1/2022, adding with mean sea level rise from Table 29, storm surge increase from Table 30b and design allowance from Table 31.

Equation used:

$$t_0 = \frac{0.14465L}{H^{0.2}A^{0.1}} \qquad t_c = t_0 + t_f \qquad i = \frac{a}{(t_d + b)^c} \qquad Q_P = 0.278\,C\,i\,A$$

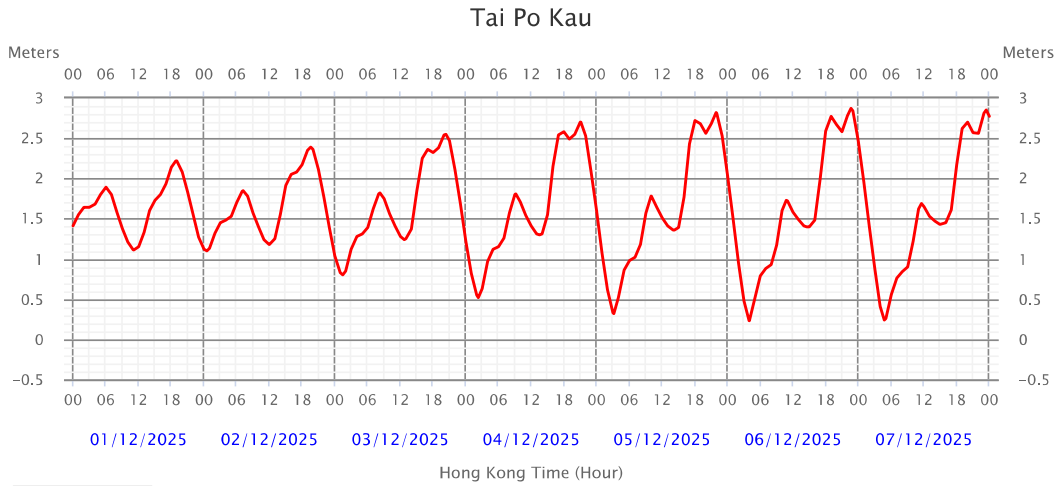
Appendix C

Astronomical Tide Prediction in Tai Po Kau

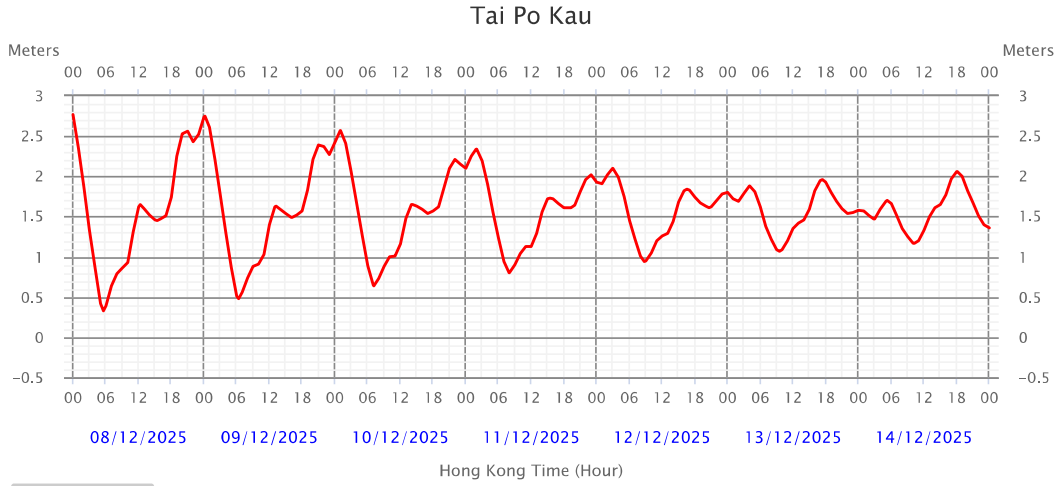
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Astronomical Tide Prediction

Predicted Tides at Tai Po Kau in DEC 2025

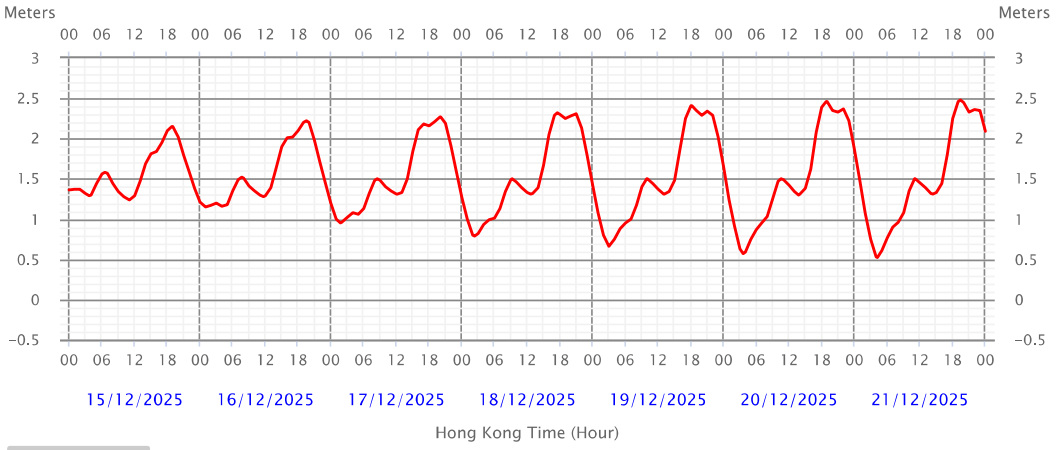


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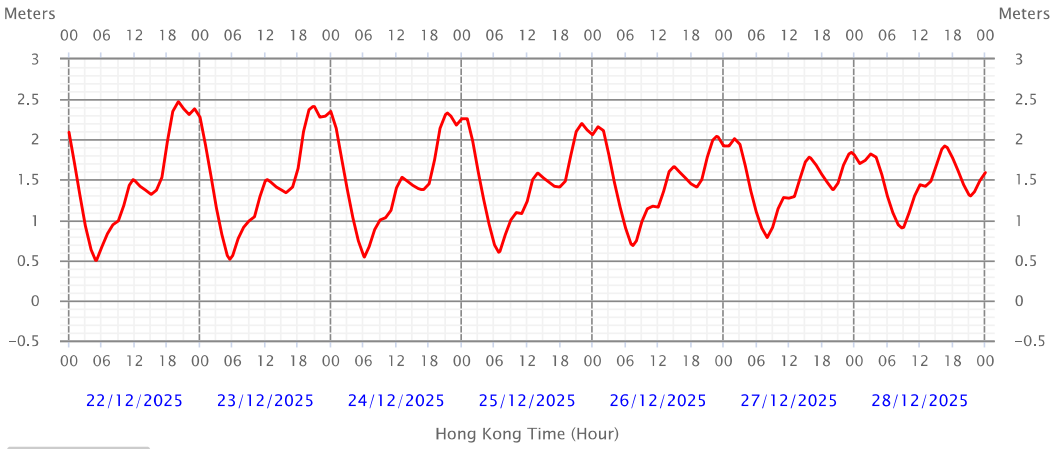
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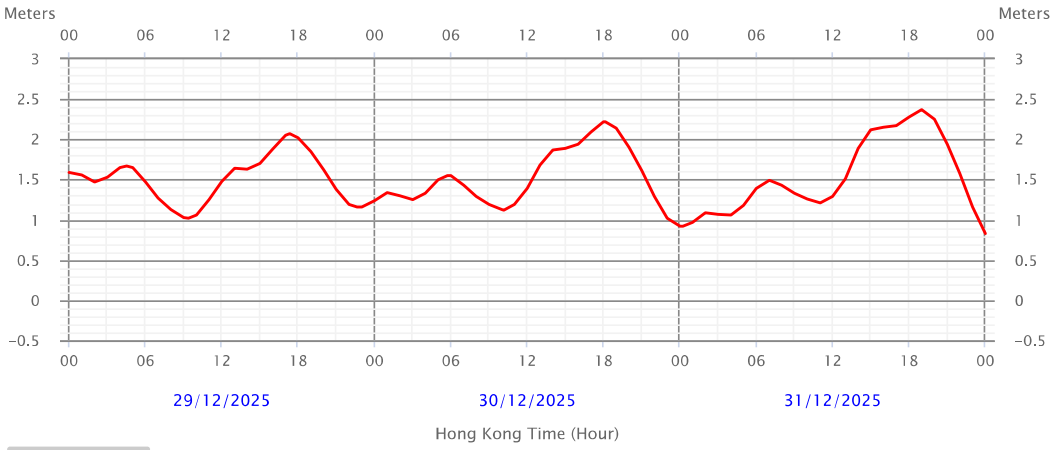
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Notes

