Project TitleSection 12A Application for Proposed Rezoning from “Commercial”, “Open Space” and an area shown as 'Road' to “Residential (Group A)13” and Amend the Notes of the Zone Applicable to the Site for Proposed Flat, Shop and Services, Eating Place and Social Welfare Facility (Child Care Centre) Uses at 16 Po Tai Street, Ma On Shan

Drainage Impact Assessment Report

Issue 3 | 29 October 2026

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

Job number 304537

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Appendices

Appendix A

1. Introduction

1.1 Project Background

1.1.1 This Drainage Impact Assessment ("DIA"), appended to the Supporting Planning Statement, is prepared in support of the Planning Application under Section 12A of the Town Planning Ordinance (Cap. 131) for the Site for Proposed Flat, Shop and Services, Eating Place and Social Welfare Facility (Child Care Centre) Uses at 16 Po Tai Street, Ma On Shan. ("the Application Site").

1.1.2 The Application Site is located at an existing building site at 16 Po Tai Street which is surrounded by developed blocks of Oceanaire, Ocean View, La Costa and road named Sai Sha Road.

1.1.3 The Application Site is proposed to be redeveloped to two 21-storey residential blocks on top of a 5-storey commercial podium, which comprises of residential area from 6F to 29F, retail zone with GF/1F/2F, Child Care Centre at 2F, residential facilities and communal sky garden at 5F, carpark at basement from B1F and aboveground at 3F.

1.2 Objective

1.2.1 The objective of this report is to provide an assessment of the impact of storm water flow generation as a result of the proposed redevelopment on the connecting public drainage system adjacent to the proposed development and to propose mitigation measures (if any).

1.3 Reference Materials

1.3.1 The DIA has been prepared in accordance with the following design manuals and information have been adopted:

- DSD's Advice Note No. 1 – Application of the Drainage Impact Assessment Process to Private Sector Projects;
- Stormwater Drainage Manual (SDM) Fifth Edition, January 2018;
- Stormwater Drainage Manual – Corrigendum No. 1/2022;
- Stormwater Drainage Manual – Corrigendum No. 1/2024;
- Stormwater Drainage Manual – Corrigendum No. 2/2024 (SDM 2024);
- DSD's Advice Note No. 1 - Application of the Drainage Impact Assessment Process to Private Sector Projects; and
- Drainage Services Department Practice Note No. 2/2023 Guidelines on Flood Resilience

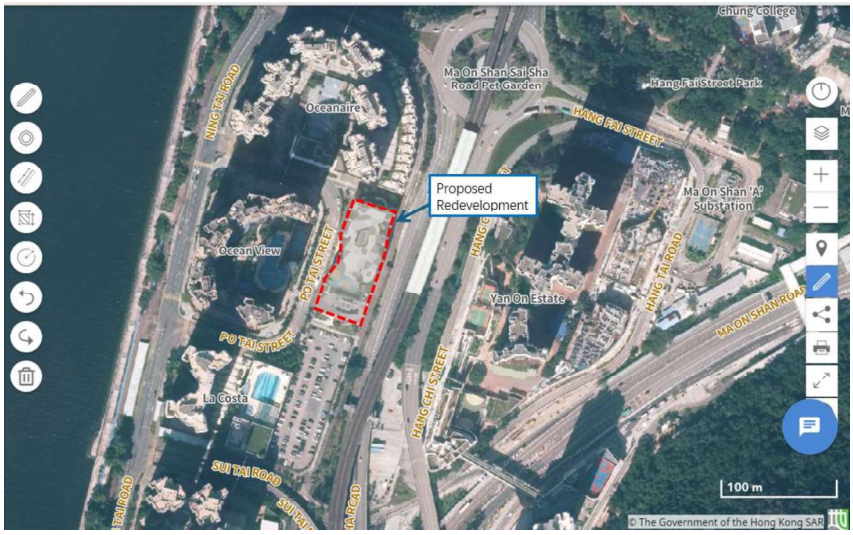
- Drainage Record Plans obtained from the GeoInfo[1] Map services of the Lands Department.

2. Project outline

2.1 Subject Development

2.2.1 The proposed redevelopment is located in Ma On Shan, bounded by Oceanaire to the north, Ocean View to the west, La Costa to the south. In the vicinity of the proposed redevelopment site there are mainly residential developments. The aerial photograph f the proposed redevelopment is shown in below **Figure 2.1**. **Appendix A- Plan 1** shows the location of the proposed redevelopment.

Figure 2.1: Aerial Photograph of the Subject Site (extracted from https://www.map.gov.hk/)



2.1.2 The total site area is approximately 5,090 m^2 and the design parameters are shown in **Table1.1** below.

Table 2.1 Redevelopment Parameters

Redevelopment Parameters	Proposed Redevelopment indicators
Area	5,090 m^2
Estimated GFA for residential area	25,450 m^2
No. of flats	540
Estimated GFA for commercial	5327.09 m^2

[1] https://www.map.gov.hk/gm/

Estimated F&B in proposed commercial	3,794.19 m^2
Estimated Child Care Centre	1,007.82 m^2

2.2 Project Interface

2.2.1 No foreseeable interaction or conflict with other development projects in the vicinity of the proposed development was identified when this DIA was conducted.

3. Methodology and Design Criteria

3.1 General

This DIA is following the standards set out in the Stormwater Drainage Manual (Fifth Edition) issued by Drainage Services Department in January 2018 (DSD SDM) with Corrigendum No. 1/2022,1/2024 and 2/2024 to assess the potential drainage impacts arising from the proposed development in the Subject Site.

3.2 Methodology

The recommended design return periods for the various drainage system are shown in *Table 10 of the DSD SDM which is extracted in the table below*.

Description	Design Return Period
Intensively Used Agricultural Land	2 to 5 years
Village Drainage including Internal Drainage System under a polder scheme	10 years
Main Rural Catchment Drainage Channel	50 years
Urban Drainage Trunk System	200 years
Urban Drainage Branch System	50 years

3.2.1 Determination of Peak Flow

The peak runoff is estimated using the Rational Method in accordance with *Section 7.5.2* of the *DSD SDM* with the following equation:

$$Q = 0.278CiA$$

Where, Q = peak runoff in m^3/s

C = runoff coefficient

i = rainfall intensity in mm/hr

A = catchment area in km^2

3.2.2 Runoff Coefficient

The runoff coefficients, C, for different surface characteristic to be adopted in this DIA for the peak runoff estimation are referenced to *Section 7.5.2 (b)* of the *DSD SDM*.

Surface Characteristics	Runoff Coefficient, C
Unpaved Area (Grassland)	0.3
Paved Area (Asphalt / Concrete)	0.90

3.2.3 Time of Concentration

The time of concentration is defined as the time required for runoff from the most remote part of the catchment to reach the point in the drainage system under design.

For urban catchments, the time of concentration is given by $t_c = t_e + t_f$

Where, t_e = time of entry in minutes

t_f = time of flow in minutes

3.2.4 Rainfall Intensity

The rainfall intensity is determined by the following equation with reference to *Section 4.3.3* of the *DSD SDM*:

$$i = \frac{a}{(t_d + b)^c}$$

where, i = rainfall intensity in mm/hr

t_d = duration in minutes

a, b, c = storm constants

The storm constants, i.e. a, b, and c, under Table 3a "Storm Constants for Different Return Period of HKO Headquarters" of the DSD SDM CORRIGENDUM No. 1/2024, which are recommended for general application, are adopted in this DIA.

According to Section 6.8 of the DSD SDM, the rainfall in Hong Kong is projected to increase under climate change. Considering the effect of climate change, 16.0% rainfall increase for end of 21st century (2081 –2100) and 12.1% rainfall increase for design allowance in end 21st century (around 2090) as given in Table 28 and Table 31 of the DSD SDM CORRIGENDUM No. 1/2022 respectively have been included in calculating the rainfall intensity. Therefore, the equation becomes:

$$i = \frac{a}{(t_d+b)^c} \times (1 + 16.0\% + 12.1\%)$$

where, i = rainfall intensity in mm/hr

t_d = duration in minutes

a, b, c = storm constants

3.2.5 Capacity Check

The capacities of drains have been calculated based on Colebrook-White equation, assuming full bore flow as below:

(a) Pipe capacity is calculated based on the continuity equation

$$Q = AV$$

Where Q = pipe full flow capacity in m^3/s

A = pipe cross-sectional area in m^2

V = velocity at full bore flow in m/s

(b) Velocity at full bore flow is based on the Colebrook-White equation

$$V= -(32gRS)^{0.5} \log \{(ks/14800R) + (1.255v/ R (32gRS)^{0.5})\}$$

Where V = velocity at full bore flow m/s

g = acceleration due to gravity in m/s^2

R = hydraulic radius in m

S = pipe gradient

ks = pipe roughness in mm

v = kinematic viscosity of water in m^2/s

(c) Reduction in Flow Area for Siltation

- 5% reduction in flow area if the gradient is greater than 1 in 25.
- 10% reduction in flow area in other cases.

3.2.6 Pipe Roughness

The Colebrook-White roughness (ks) adopted for concrete pipe is 0.6mm.

4. Existing Drainage Conditions

4.1 Existing Drainage Network

4.1.1 The site is located east to Po Tai Street; existing ground levels vary between 6.27mPD and 5.9mPD degrading from north to south. The existing drainage network (DN 600 to DN 1050) laid on west of the proposed redevelopment along Po Tai Street. A schematic is shown **in Figure 4.1.**

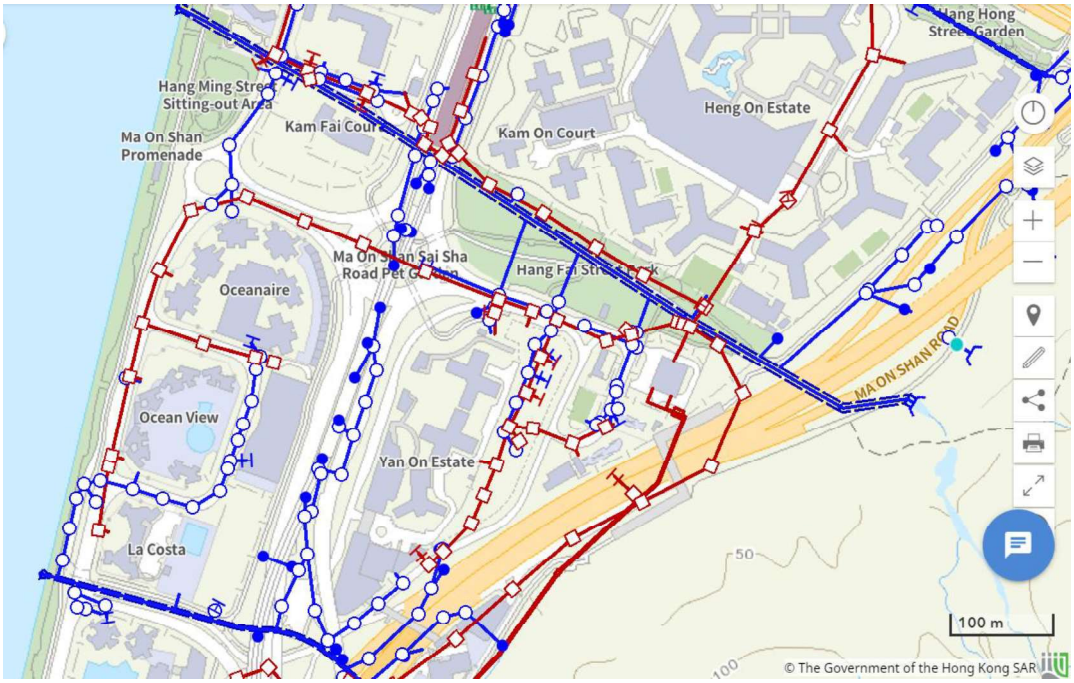


Figure 4.1 – Existing drainage network schematic

4.1.2 The vicinity network collected runoff including partial runoff discharged from Oceanaire, entire runoff discharged from we go mall, partially runoff discharged from Ocean view, and entire runoff discharged from la costa. The collected runoff continues downstream and discharges to an existing box culvert beneath Sui Tai Road and ultimately to the Sha Tin Hoi.

5. Assumptions and References

5.1 Climate Change

5.1.1 Climate change is taken into account in existing drainage system capacity check calculation. The Mid-Century assessment will be applied as the subject site and surround area are well developed area; and indicators 11.1%. Rainfall intensity increase for middle of 21st century (2081-2100) is included referring to Stormwater Drainage Manual CORRIGENDUM No. 1/2022, Table 28. The design allowance in middle of 21st century of 0% rainfall increase is included referring to Stormwater Drainage Manual CORRIGENDUM No. 1/2022, Table 31.

5.2 Desilting

5.2.1 Referring to SDM 2018 section 9.3(a), 10% reduction in flow area is adopted in capacity checking of pipe/channel for taking into account of the effects to flow capacity due to materials deposited on the pipe/channel bed.

6. Drainage Impact Assessment for the Proposed Development

6.1 Catchment Area Changes

6.1.1 The catchment of subject site has not been changed according to the redevelopment plan. The existing development covers an area of approximately 5090 m2 which is assumed to be 100% paved for conservative purpose. The proposed redevelopment is assumed to be fully paved as a conservative approach. The Indicative Layout Plans are at Appendix A for illustration.

6.2 Flooding Susceptibility

6.2.1 The proposed site formation level will be filled up to range from +5.9mPD to 6.27mPD, which is higher than the design extreme sea level of 1 in 200 return period at Tai Po Kau which is +5.59mPD referring to *Table 8 – DSD SDM CORRIGENDUM No. 1/2022*. It is also checked that there is no record of flood blackspot found at the Site and adjacent area.

6.3 Proposed Drainage Connections

6.3.1 **Appendix A – Plan 2** shows the proposed drainage connection point comprising: Terminal Manhole No. STMH-00 – This existing 525∅ terminal manhole connection to the existing public stormwater manhole SMH4055767 on Po Tai Street will be remained in use by the Proposed Redevelopment.

6.4 Assessment Result

6.4.1 **Appendix A – Plan 2** Runoff from the proposed redevelopment will be discharged to the existing public drainage system via the existing/proposed stormwater terminal manhole, namely STMH-00..

6.4.2 There is no runoff increase as the site conditions remains similar after the redevelopment, hence no impacts on the existing network and no flood risk increase (performance is no changed). The proposed development will not cause exceedance to the peak capacities of the existing public stormwater drainage system for a 1 in 50 years storm event for urban drainage branch system.

7. Conclusion

7.1.1 The results of hydraulic assessment show that the existing/proposed flow from the respective catchment areas resulting from the proposed redevelopment will not cause exceedance to the peak capacities of the existing public stormwater drainage system for a 1 in 50 years storm event for urban drainage branch system as the site conditions do not vary.

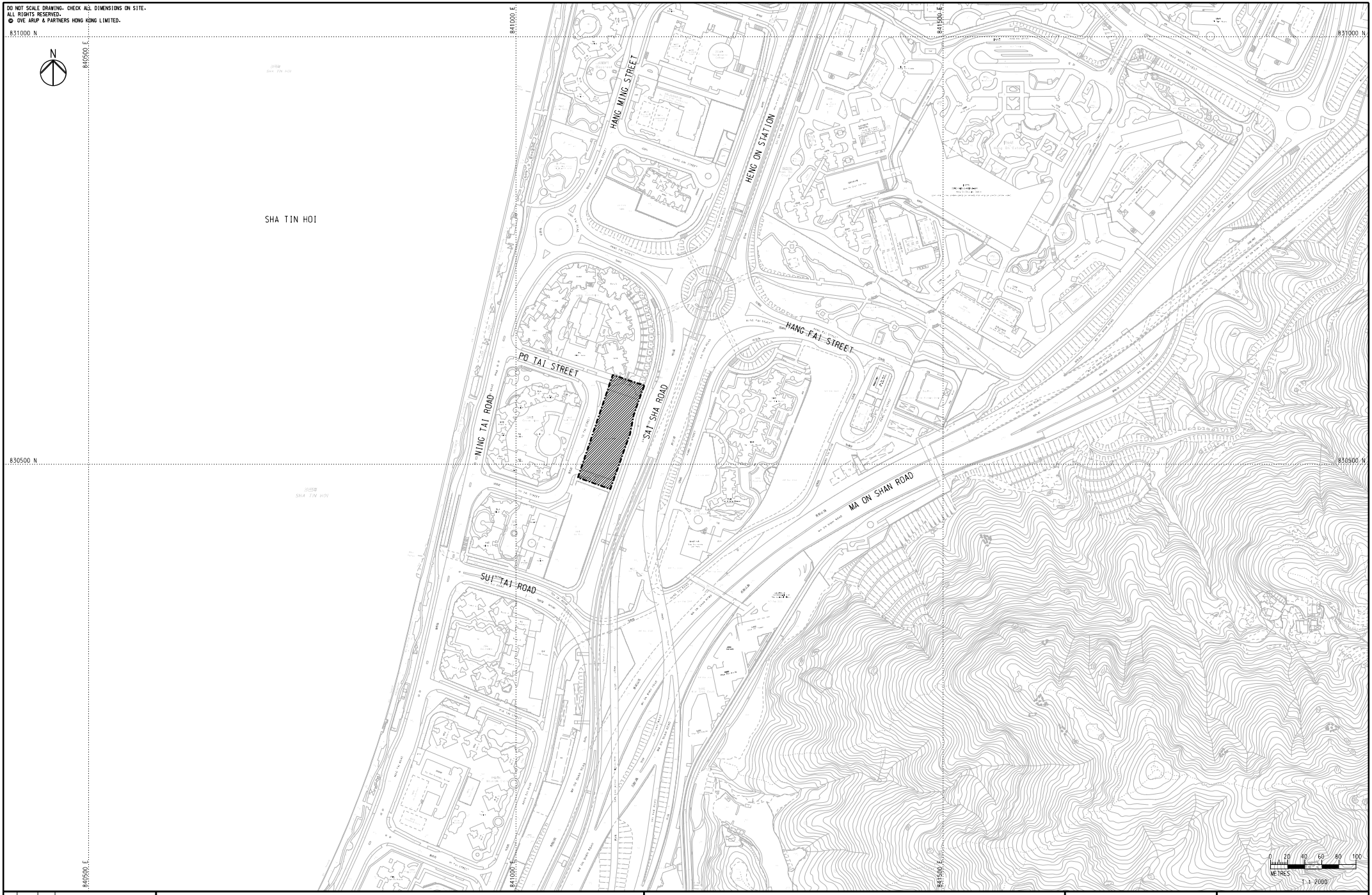
7.1.2 It would be considered for expanding on flood susceptibility in view of DSD PN 2/23 Guideline on flood resilience especially from coastal flood that compare sea level against road level and against formation level to propose raised building entrances during the detailed design stage if deemed necessary.

Appendix A

Drawings

Appendix A Plan 1 the Location Plan

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LEGEND

PROPOSED DEVELOPMENT

Job Title
Section 12A Application for Proposed Rezoning from “Commercial”, “Open Space” and an area shown as 'Road' to “Residential (Group A)13” and Amend the Notes of the Zone Applicable to the Site for Proposed Flat, Shop and Services, Eating Place and Social Welfare Facility (Child Care Centre) Uses at 16 Po Tai Street, Ma On Shan

Drawing Title
MASTER LOCATION PLAN

Drawing Status
SUBMISSION

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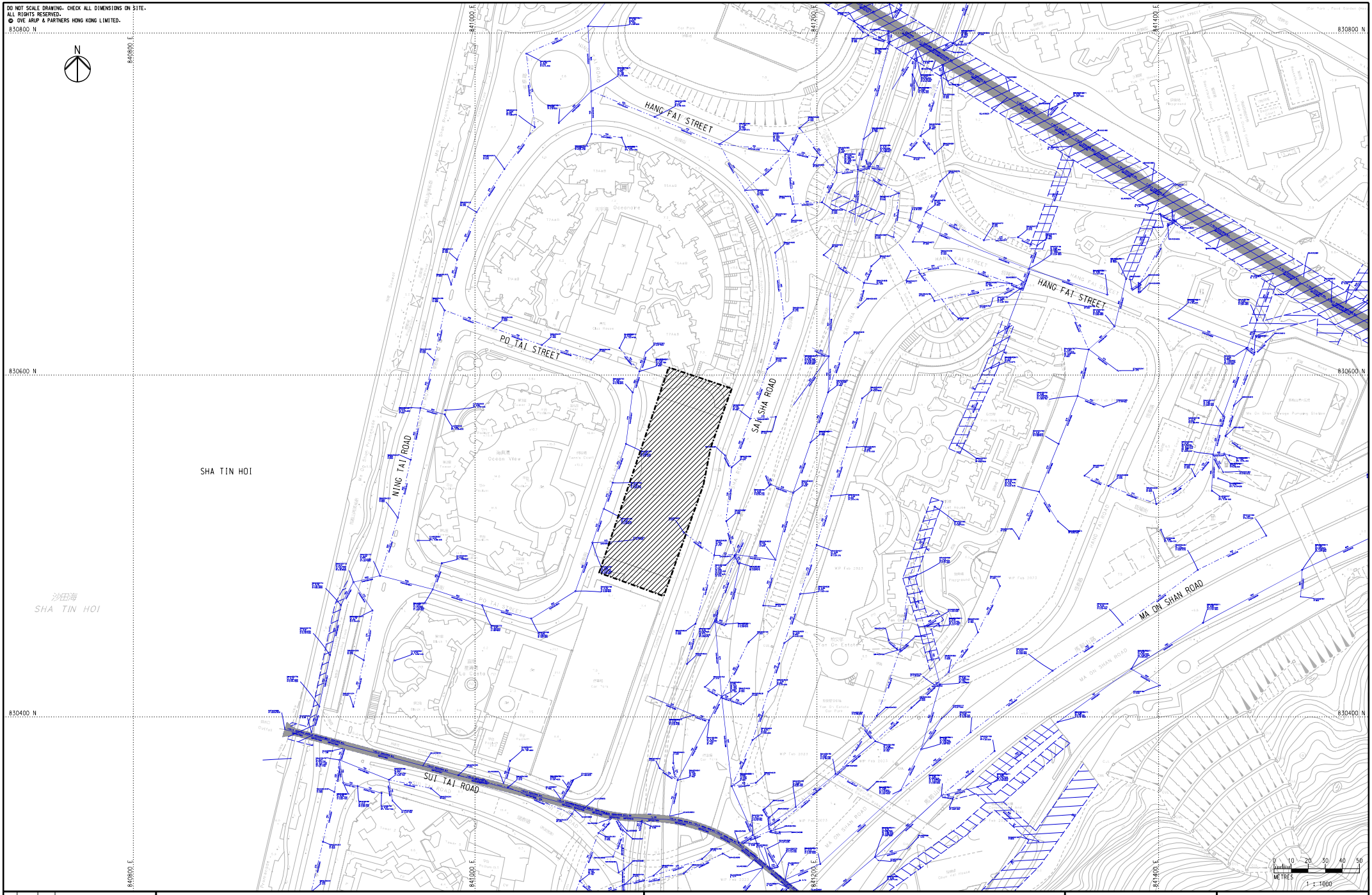
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Appendix A- Plan 2 Existing Drainage Layout

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LEGEND

PROPOSED DEVELOPMENT

EXISTING DRAINAGE AND MANHOLE

Job Title

Section 12A Application for Proposed Rezoning from “Commercial”, “Open Space” and an area shown as 'Road' to “Residential (Group A)13” and Amend the Notes of the Zone Applicable to the Site for Proposed Flat, Shop and Services, Eating Place and Social Welfare Facility (Child Care Centre) Uses at 16 Po Tai Street, Ma On Shan

Drawing Title

EXISTING DRAINAGE NETWORK

Drawing Status

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