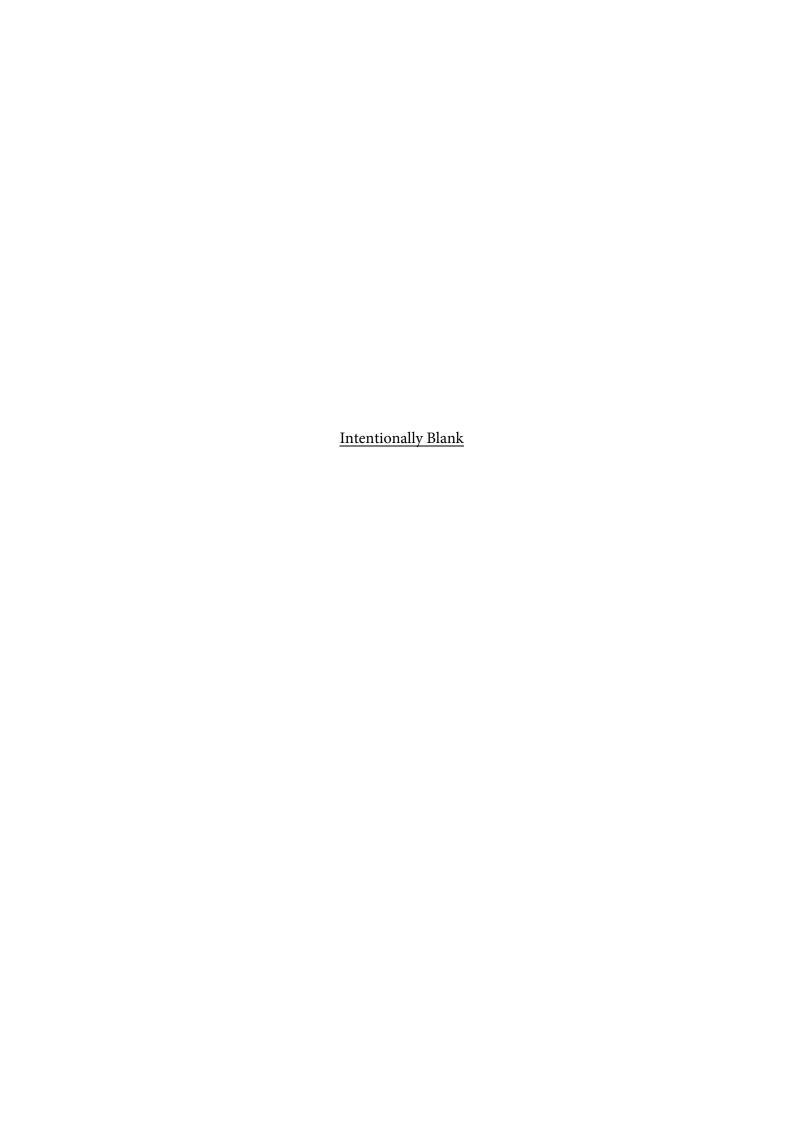
Appendix 3

Sewerage and Drainage Impact Appraisal





Sewerage and Drainage Impact Appraisal

For

Amendment of Plan to

Rezone from "Residential (Group D)" ("R(D)"), "Residential (Group E)"

("R(E)") and an area shown as 'Road'

to "Residential (Group C)3) ("R(C)3"

on the Approved Ho Chung Outline Zoning Plan No. S/SK-HC/11

at Various Lots in Demarcation District 210 and Demarcation District 244

and Adjoining Government land

Ho Chung, Sai Kung, New Territories, Hong Kong

Prepared by: Prudential Surveyors International Limited

Version: A

Date: August 2023

Sewerage and Drainage Impact Appraisal for Amendment of Plan
Rezone from "Residential (Group D)" ("R(D)"), "Residential (Group E)" ("R(E)" and an area shown as 'Road' to "Residential (Group C)3) ("R(C)3" on the Approved Ho Chung Outline Zoning Plan No. S/SK-HC/11 at Various Lots in Demarcation District 210 and Demarcation District 244 and Adjoining Government land Ho Chung, Sai Kung New Territories, Hong Kong

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Sewerage and Drainage Impact Appraisal for Amendment of Plan
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1. Introduction

1.1 Background

- 1.1.1 This Sewerage and Drainage Appraisal is to support a planning permission from the Town Planning Board (TPB) under Section 12A of the Town Planning Ordinance (CAP. 131) for a proposed rezone of the Subject Site from "Residential (Group D)" ("R(D)"), "Residential (Group E)" ("R(E)") and an area shown as 'Road' to "Residential (Group C)3)" ("R(C)3") within various lots within DD210 and DD244 and adjoining government land in Ho Chung, Sai Kung, New Territories. The application Site (the Site) is composed of 3 parcels, namely Parcel A, B and C. [refer to Figure 1.1]
- 1.1.2 The owner of the application site has the intention to construct six individual houses with twelve car parking spaces in Parcels A and B of the Site and two individual house with four car parking spaces in Parcel C of the Site.

1.2 Site and its Surroundings

- 1.1.3 A site visit was carried out on 6 July 2023. Per the observations from the site visit, it was observed that the Site is situated in rural environs with a mixture of residential, industrial and storage uses with dwellings. [refer to **Figure 1.2**] The details of the surrounding are that:
 - to the north of the Site is some 2 and 3-storey rural housing;
 - to the east of the Site are some car repair workshops and to the further east are residential blocks of Marina Cove;
 - to the south of the Site is the former Production Centre of Asia Television Limited (abandoned); and
 - to the west of the Site is Luk Mei Village with a mixture of traditional single-storey village-type developments and modern 3-storey New Territories Exempted Houses (NTEHs).
- 1.1.4 Apart from residential buildings, there are scattered structures in the vicinity of the Site intended primarily for industrial uses including an unnamed warehouse, a motor repair workshop (Bayview Motors Company), a food factory under Koon Yick Food Manufacturing Company (冠益華記食品廠) ("Koon Yick").

1.3 Proposed Development

1.1.5 The proposed development is to erect six individual houses in Parcel A and B of the Site and two individual houses in Parcel C of the Site. The proposed gross floor area (GFA) of the houses are summarised in Table 1.1

Propose House	Gross Floor Area (GFA) (sqm) (about)
House 1	283.35
House 2	283.35
House 3	283.35
House 4	283.35
House 5	283.35
House 6	283.35
House 7	345.75
House 8	345.75
Total	2,391.6
Average	298.95

Table 1.1 Proposed GFA of Houses

2. Sewerage Impact Appraisal

2.1 Scope of Works

The objective of this Sewerage Impact Appraisal (SIA) is to assess whether the capacity of the sewerage networking is sufficient to cope with the peak sewerage flow arising from the proposed comprehensive residential development.

Existing drainage record plan from the Drainage Services Department (DSD) is shown in **Figure 2.1**.

2.2 Existing Sewerage Facilities

According to the drainage record plan, there is no existing public sewerage network serving the project site. [refer to **Figure 2.1**]. Hence, the project site is an unsewered area at present.

2.3 Proposed Sewerage Treatment

In consideration that the project site is unsewered area, it is necessary to consider the provision of an on-site underground Sewerage Treatment Plant, which will be used for treatment of sewerage generated from the proposed development.

The applicant will be responsible for the construction, operation and maintenance of the on-site underground Sewerage Treatment Plant and all inter-connecting sewerage pipework (polyethylene pipes) within the project site. The sewerage collected from each house will be discharged to septic tank and soil soakway pit.

The design, operation and maintenance of the proposed underground Sewerage Treatment Plant are in compliance with EPD's Practice Note for Professional Person (ProPECC) PN 5/93. It is proposed to construct four entire underground Sewerage Treatment Plant (involve inlet trap, septic tank, outlet trap, inter-connecting pipes and soil soakway pit) for proposed houses. The proposed capacity of the each septic tank is 15.98 cu.m and it is greater than the estimated daily water consumption of each proposed house. A reference septic tank is illustrated in **Figure 2.2** and the calculation of septic tank are shown in Table 2. For the proposed soil soakway pit, its size should be determined basing on soil absorption rate and therefore it should be determined in detail design stage.

		(mm)
Proposed Septic Tank	(L-t)x BxD	(5700-150)1600x1800 =
Capacity		15.98 cu.m
The proposed septic tank		
System aims to serve one		
house with 4 Nos. of		
Person.		
Estimate Ultimate per	Design Flow Rate	0.37 x 6 = 2.22
capita daily water	x Peak Factor	cu.m/person/day
consumption		
Required Septic Tank	Nos of Person Per House x	4 x 2.22 = 8.88 is less
Capacity	estimated daily water	Septic Tank Capacity

Sewerage and Drainage Impact Appraisal for Amendment of Plan
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	consumption	(15.98 cu.m)
Tank to be desludged		
every 6 months		
The soil soakway pit to be		
designed in accordance with		
PROPECC PN5/93 and its size		
shall be determined base on		
absorption capacity of soil and		
ultimate consumption rate.		

Table 2.1 - Calculation of Septic Tank

In addition, the proposed septic tank would be inspected at least once every 6 months by the applicant. If there is any flooding / overflow from the Septic Tank or foul smell become noticeable, immediate inspection would be carried out. Desluging the Septic Tank when thickness of sludge exceeds 30cm or ¼ of overall water depth or clogging of the septic tank outlet pipe or the soakaway pit or soil is suspected. Last, disposing the sludge would be carried out properly. Sludge removed would be transported by specialist contractors to sewerage treatment works for disposal.

The location of the proposed underground Sewerage Treatment Plant for the project site is illustrated in **Figure 2.3**.

Once the concerned public sewerage system is available in the vicinity, the Septic Tank System will be abandoned and replaced with a pump pit and a connection terminal manhole. All sewerage generated from the proposed development will be conveyed to the public sewerage system.

2.4 Assessment Criteria, Methodology and Assumptions

The adopted unit flow factor and global peaking factors will adopt the figures stipulated in the Guidelines for Estimating Sewerage Flows for Sewerage Infrastructure Planning (GESF) (Version 1.0) issued by the Environmental Protection Department (EPD) in March 2005 to estimate the sewerage flow generated from the proposed development.

With reference to Table T-1: Unit Flow Factors for Domestic Flows in the GESF (Version 1.0), the unit flow factors for private housing R4 domestic flow is 0.37cu.m/person/day.

2.5 Estimation of Sewerage Flow

The primary source of contaminants arising from the project site will be from bathrooms, toilets and kitchens from residential houses.

Table 2.2 shows the estimated peak sewerage flow for the proposed development.

Calculation for Sewerage Flow Generation Rate of the Project									
Site									
1a. Total number of units	=	8	units						
1b. Total number of residents	=	32	people						
1c. Design flow	=	0.37	cu.m/person/day - refer to Private R4 in Table T-1 ofGESF						
1d. Sewerage generation rate	=	9.25	cu.m/day						
1e. Peak factor	=	6	refer to Section 3.3 from EPD's Guidelines for Design of Small Sewerage Treatment Plant						
1f. Estimated total peak flow	=	6 x 9.25 =55.5	cu.m/day						
Sewerage to be discharge to Septic Tank									
2a. Number of septic tank proposed for the development	=	8	units						
2b. Number of persons served by each septic tank	=	32 /8 = 4	people						
2c. Required capacity of each septic tank	=	4x 0.37 x 6 = 8.88	cu.m/day						
2d. Design capacity of each septic tank	=	15.984 > 8.88	cu.m/day – refer to Table 2.1						

Table 2.2 - Estimated Sewerage Flow from the project site

As shown in Table 2.2 above, the estimated total peak flow for the proposed development is 55.5 cu.m/day and the capacity of each proposed septic tank (15.984 cu.m/day) is greater than required capacity (8.88 cu.m/day).

2.6 Discussion

According to the drainage record plans obtained from DSD, there is no existing public sewerage network serving the project site. Sewerage from the project site is proposed to be discharged to the proposed underground Sewerage Treatment Plant.

The applicant shall take the maintenance responsibility of the septic tank and soil

soakway pit in order to maintain the operation of the proposed underground Sewerage Treatment Plant.

According to the design of the septic tank for the proposed development presented in Table 2 and estimated sewerage generation, it is anticipated that the proposed underground Sewerage Treatment Plants shown in **Figure 2.3** will have sufficient capacity to cater for sewerage generated from the proposed residential development.

2.7 Conclusion

Based on the sewerage generated and the capacity of the septic tank, it is anticipated that there will be no serious adverse sewerage impact to the area after the implementation of the development.

3. Drainage Impact Appraisal

3.1 Scope of Works

The objective of this Drainage Impact Appraisal (DIA) is to assess whether the proposed development may cause adverse impacts on drainage and flooding. These impacts will be identified and mitigation measures will be proposed in order to demonstrate that the proposed development will not cause an unacceptable increase in the risk of flooding in areas upstream of, adjacent to or downstream of the development.

Existing drainage record plan from the Drainage Services Department (DSD) was attached in **Figure 2.1**.

3.2 Existing and Planned Drainage Facilities

According to the drainage record plan, there is no existing public drainage network serving the project site [refer to **Figure 2.1**].

Upon a site investigation carried out on July 6 2023, a series of unnamed stormwater manholes were located along Ho Chung North Road and Luk Mei Tsuen Road (main road) and a series of U-channels were identified along Luk Mei Tsuen Road of the Parcel B and Parcel C of the Site. According to the information provided by the Contractor of Highways Department's Hiram's Highway Improvement Stage 1 Project [refer to **Figure 3.1A and 3.1B**], there is an existing nominal diameter (DN) 300 storm drain located under Ho Chung North Road and 450-525 storm drains located under Luk Mei Tsuen Road in the vicinity of the Site. The storm drains were completed in February 20211. The U-channels identified along Luk Mei Tsuen Road were recently built in 2023.

A drainage layout plan comprising the mentioned drainage information is presented in **Figure 3.2.**

3.3 Drainage Catchment Area

The drainage catchment areas included upstream catchment area and the Site. **Figure 3.3** illustrates the estimated overall upstream catchment area. The catchment area within the subject site includes the open area and the roof of the buildings.

¹ Highways Department's web site (2023) Hiram's Highway Improvement Stage 1

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The surface runoff discharged from the upstream catchment area would be collected by the existing perimeter U-channel surrounding the site along Luk Mei Tsuen Road.

3.4 Proposed Drainage System

For Parcel A and B of the Site, the surface runoff discharged from the site will gravitate to lower grounds and be collected by the proposed perimeter U-channel surrounding the Site and the proposed U-channel located across the Site. The storm water collected from the U-channel would flow into the precast concrete pipes to a proposed new manhole. The new manhole will be connected to the existing unnamed stormwater manhole along Ho Chung North Road.

For Parcel C of the Site, the surface runoff discharged from the site will be collected by the proposed perimeter U-channel surrounding the Site. The storm water collected from the U-channel would flow into the precast concrete pipes to a proposed new manhole. The new manhole will be connected to the existing unnamed stormwater manhole along Ho Chung North Road.

The indicative drainage connection is shown in **Figure 3.4**.

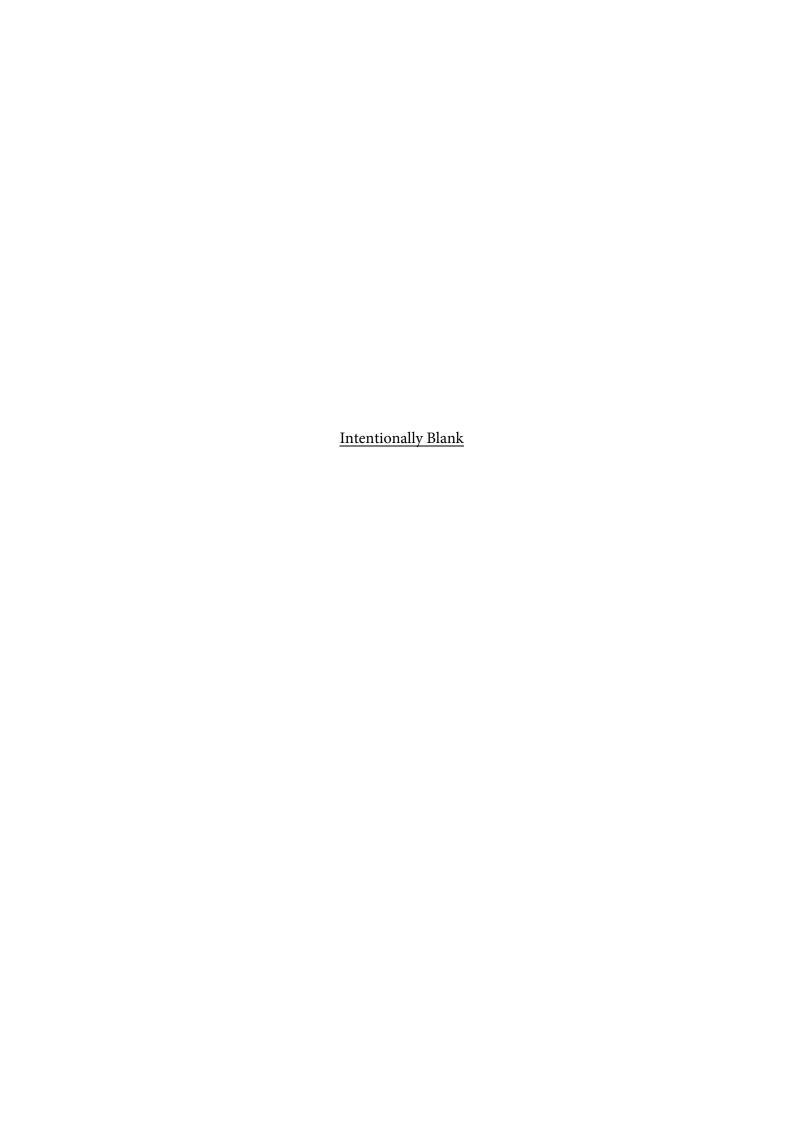
3.5 Discussion

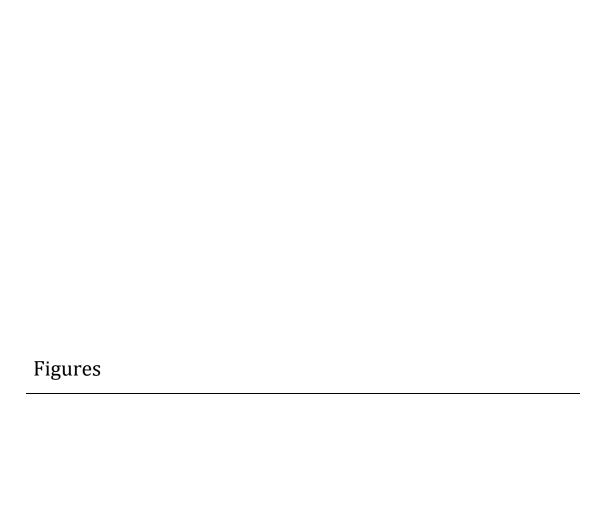
According to the drainage record plans obtained from DSD, there is no existing public drainage network serving the project site. A series of unnamed drainage pipes on Ho Chung North Road are have been built for the Highways Department's Hiram's Highway Improvement Stage 1 Project. These drainage pipes are capable to collect the surface runoff from our project site.

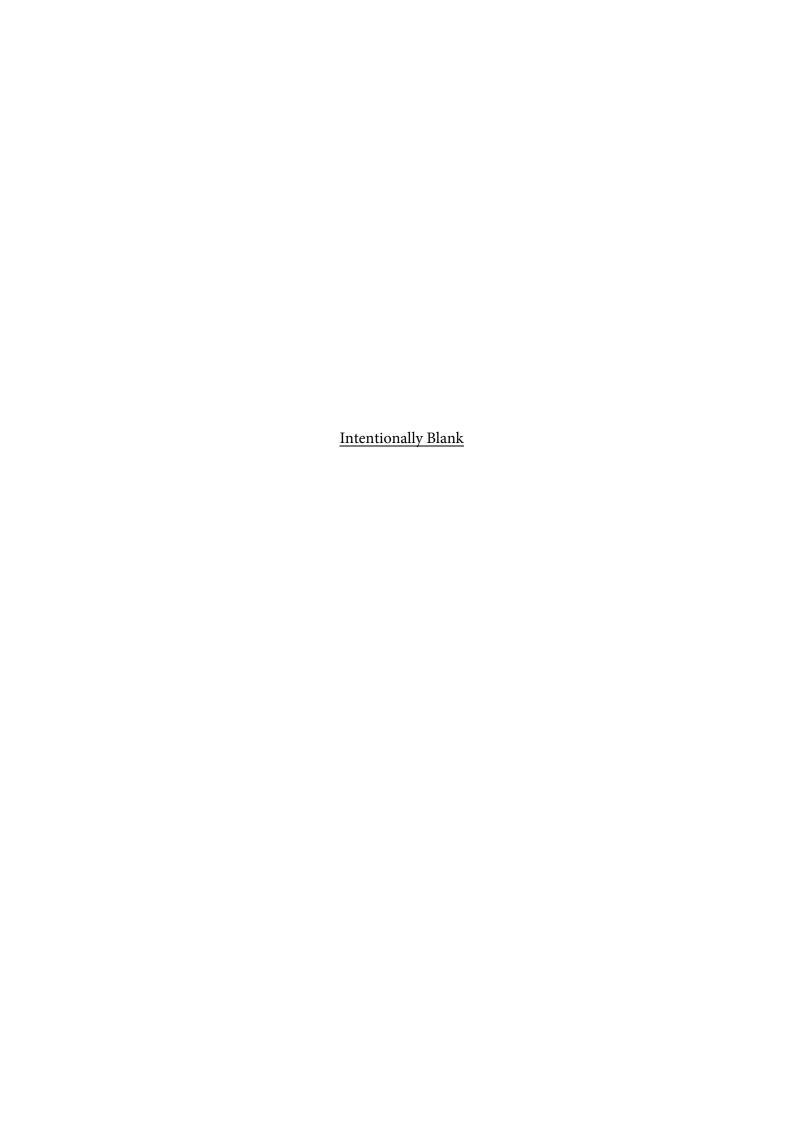
The surface runoff from the site will be collected by the proposed perimeter U-channel and discharged to the unnamed storm water manholes along Ho Chung Road/Luk Mei Tsuen Road.

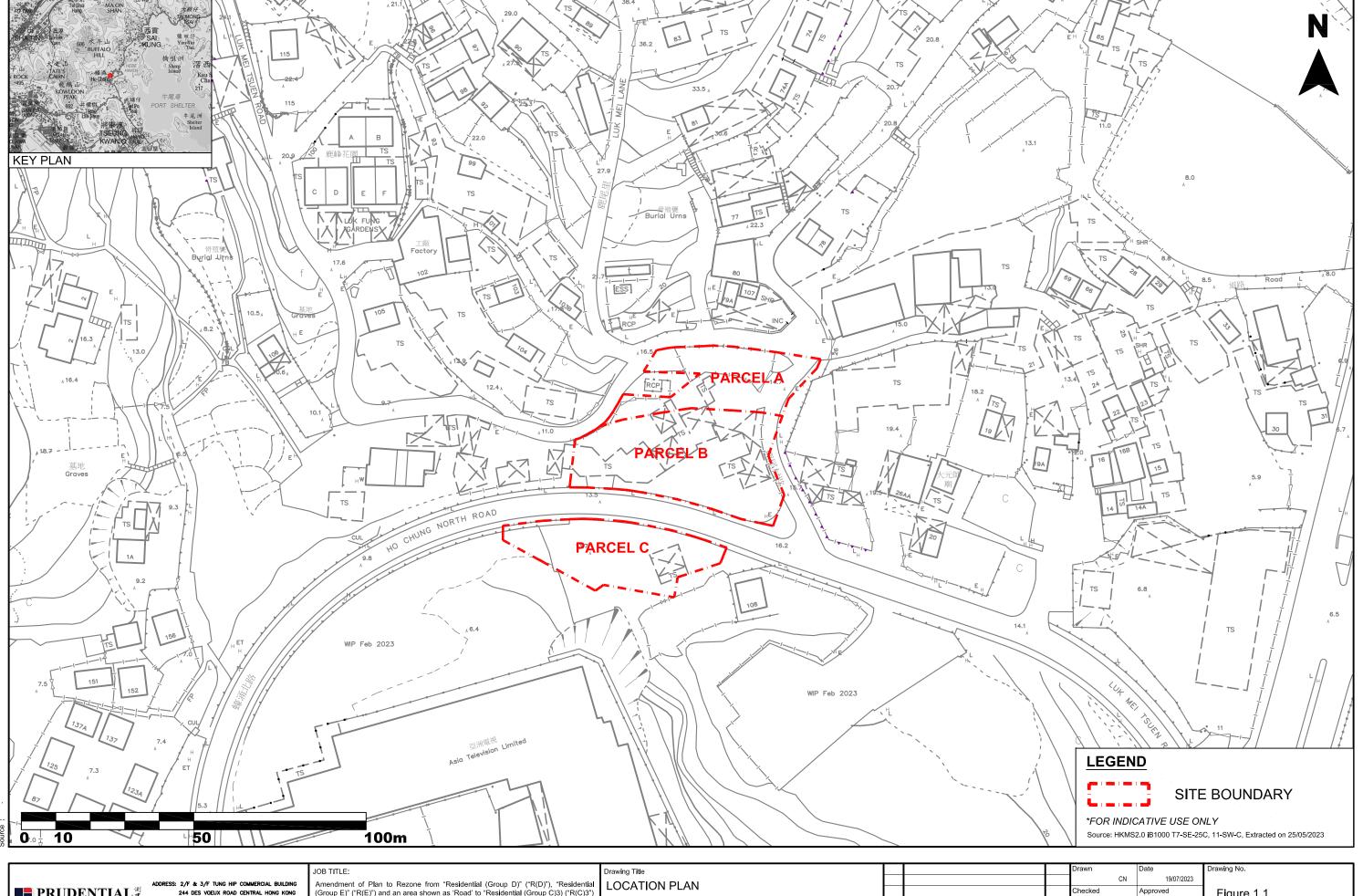
3.6 Conclusion

Based on the proposed drainage system, It is anticipated that there will be no serious adverse drainage impact to the existing drainage system after the implementation of the development.









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Amendment of Plan to Rezone from "Residential (Group D)" ("R(D)"), "Residential (Group E)" ("R(E)") and an area shown as 'Road' to "Residential (Group C)3) ("R(C)3") on the Approved Ho Chung Outline Zoning Plan No. S/SK-HC/11 at Various Lots in Demarcation District 210 and Demarcation District 244 and Adjoining Government land, Ho Chung, Sai Kung, New Territories, Hong Kong

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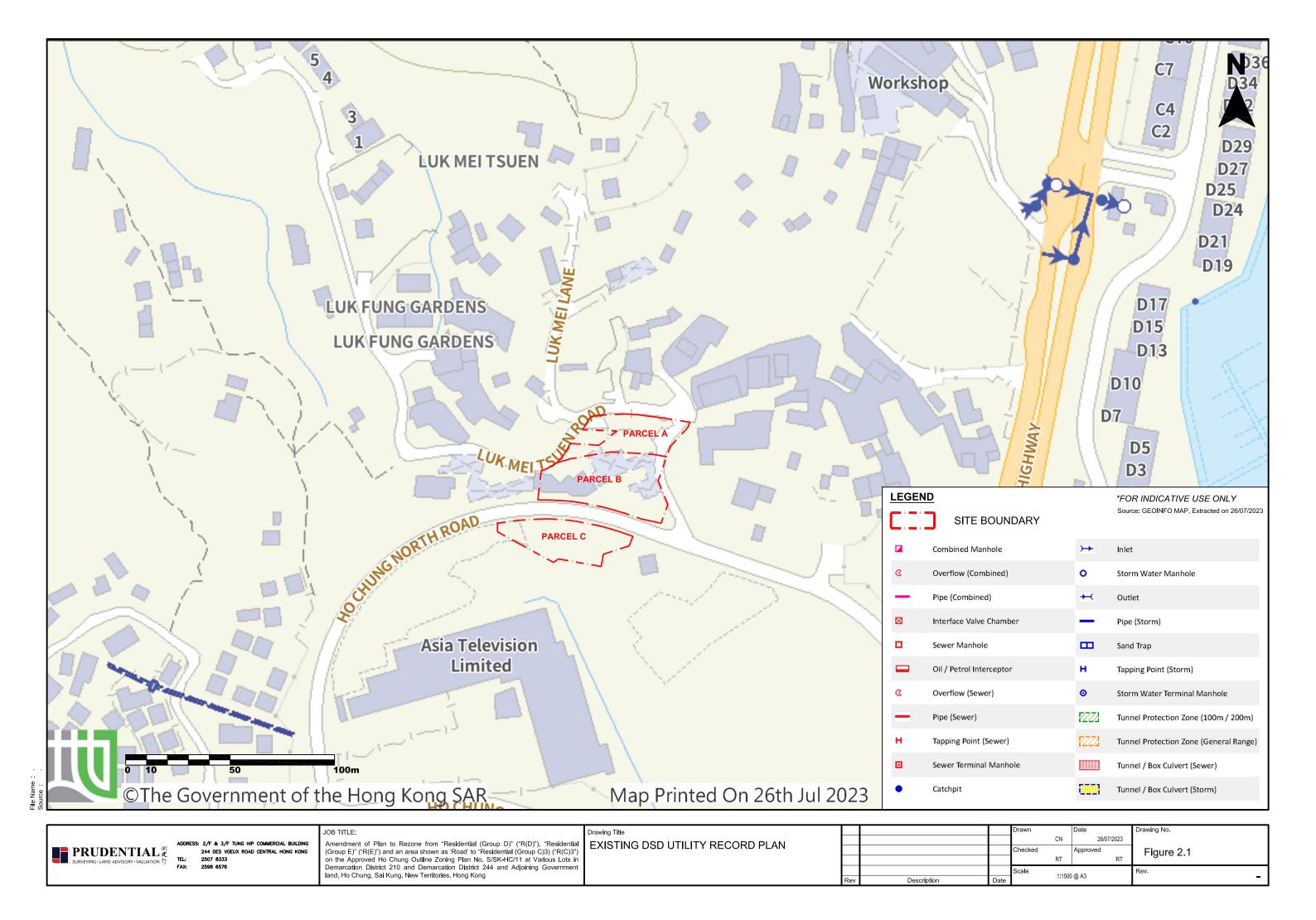
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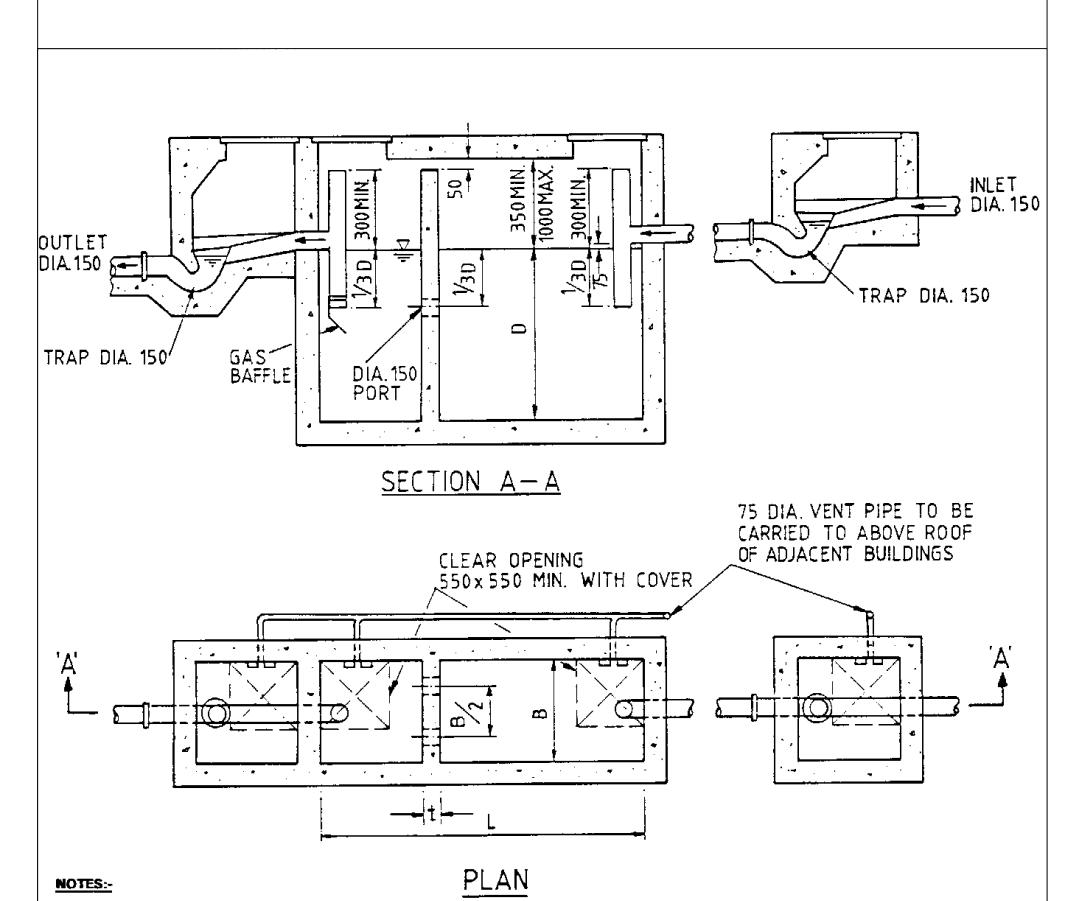
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Drawing Title

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ı				1	CN	08/08/2023	FIGURE 1.2
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- 1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.
- 2. SIZE
 - a. 4B ≥ L > 3B
 - b. 1800 mm ≥ D > 1200 mm
 - c. RATIO OF VOLUMES OF FIRST AND SECOND CHAMBERS = 2:1
- 3. CAPACITY (SUBJECT TO NOTE 2)
 - a. CAPACITY $C = (L+t) \times B \times D$
 - b. NOT LESS THAN 2.3 m³ BUT NOT MORE THAN 41 m³
 - c. NOT LESS THAN ON WHERE N IS THE NUMBER OF PERSONS SERVED AND Q IS THE ESTIMATED ULTIMATE PER CAPITA DAILY WATER CONSUMPTION
 - d. SURFACE WATER MUST NOT BE CONNECTED TO THE TANK
 - e. TANK TO BE DESLUDGED EVERY 6 MONTHS
- 4. NO OVERFLOW OR BYPASS PIPE IS ALLOWED.
- 5. PLEASE REFER TO THE BOOKLET "GUIDANCE NOTES ON DISCHARGES FROM VILLAGE HOUSES" PUBLISHED BY EPD FOR FURTHER GUIDELINES ON OPERATION AND MAINTENANCE OF SEPTIC TANK SYSTEM.

*FOR INDICATIVE USE ONLY
Source: EDP ProPECC PN 5/93 Appendix D

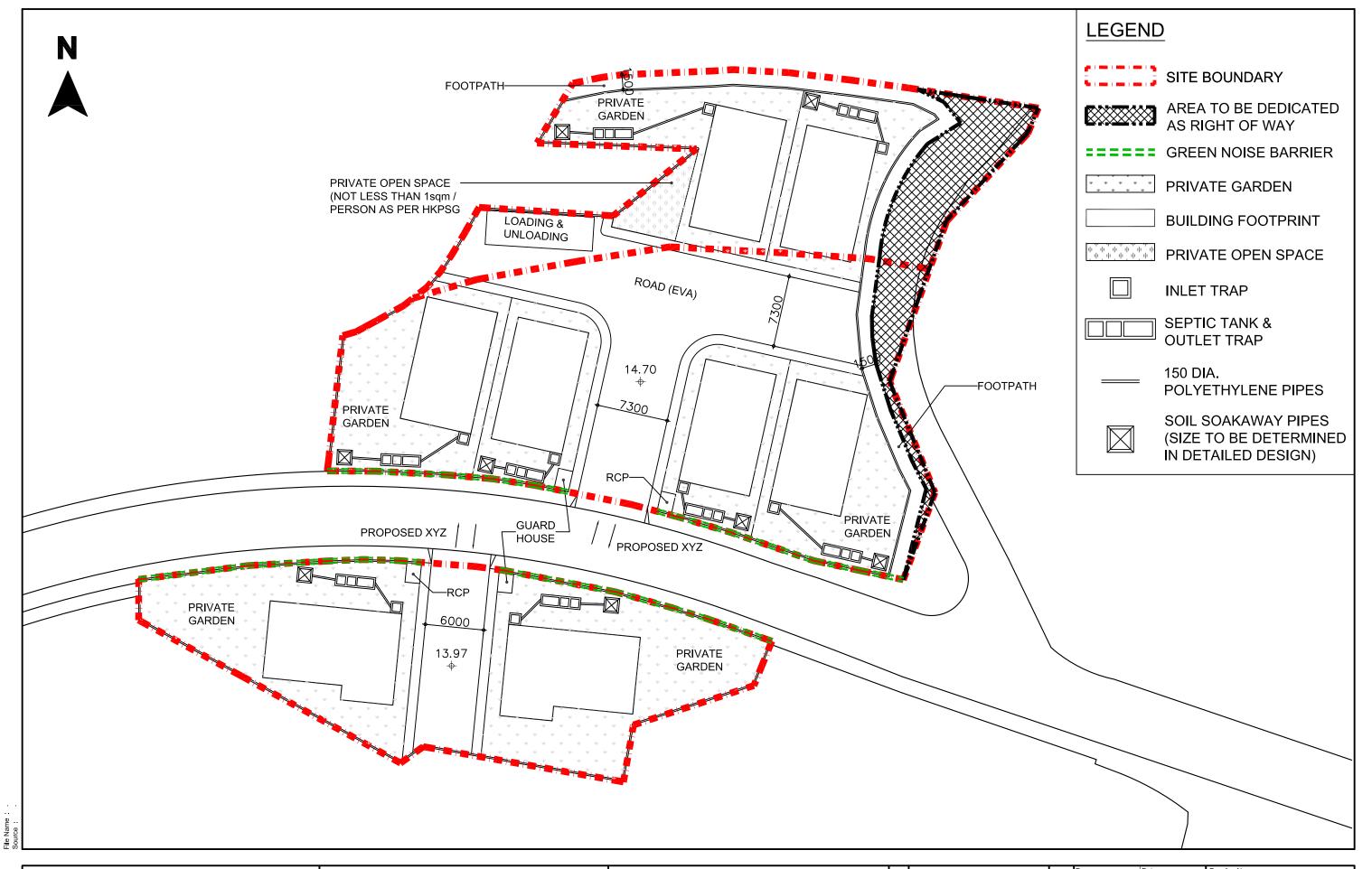


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REFERENCE SEPTIC TANK

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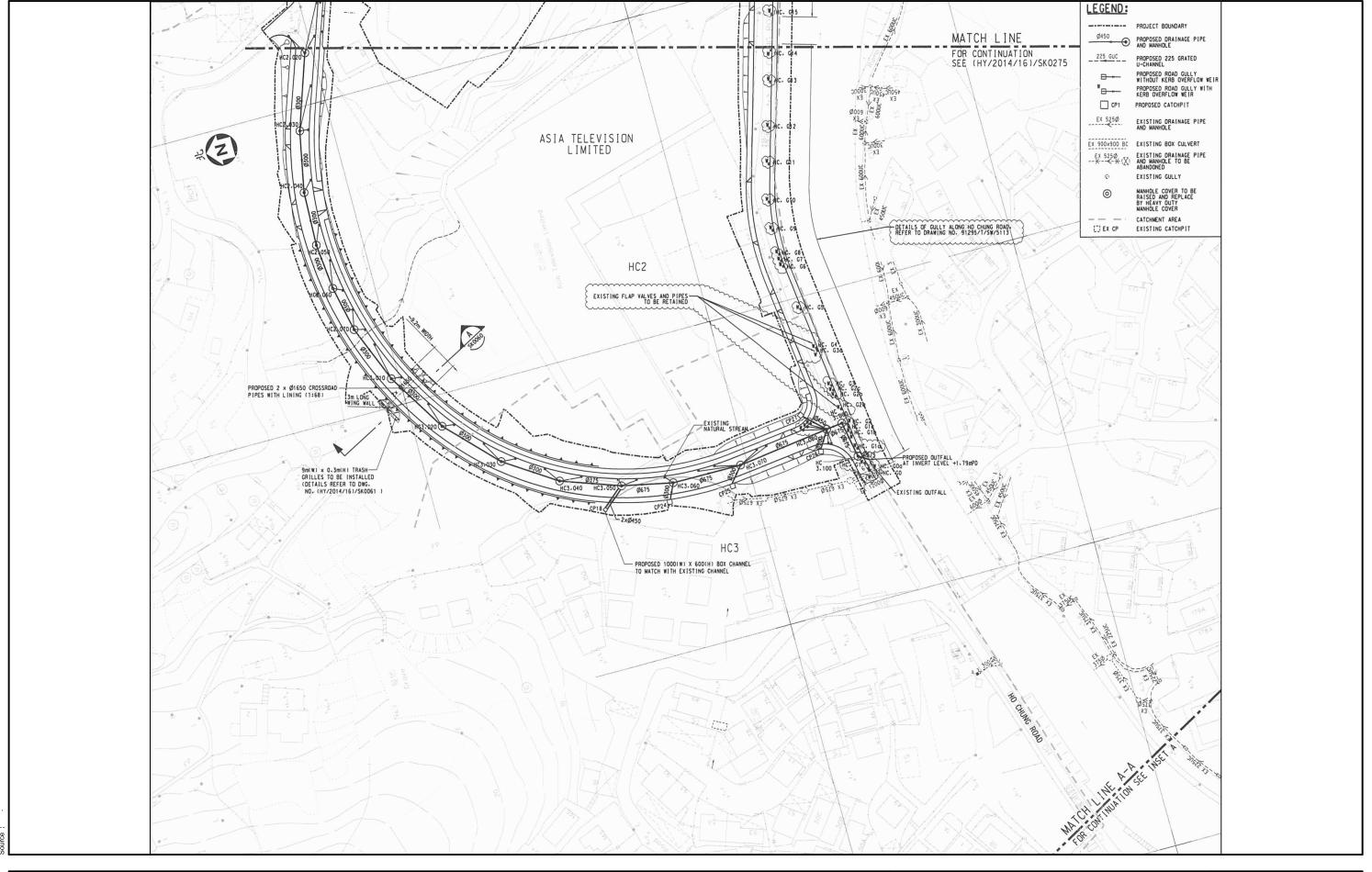
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Demarcation District 210 and Demarcation District 244 and Adjoining Government land, Ho Chung, Sai Kung, New Territories, Hong Kong

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PROPOSED SEWERAGE LAYOUT PLAI	٧

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ADDRESS: 2/F & 3/F TUNG HIP COMMERCIAL BUILDING
244 DES VOEUX ROAD CENTRAL HONG KONG
TEL: 2507 8333
FAX: 2598 6576

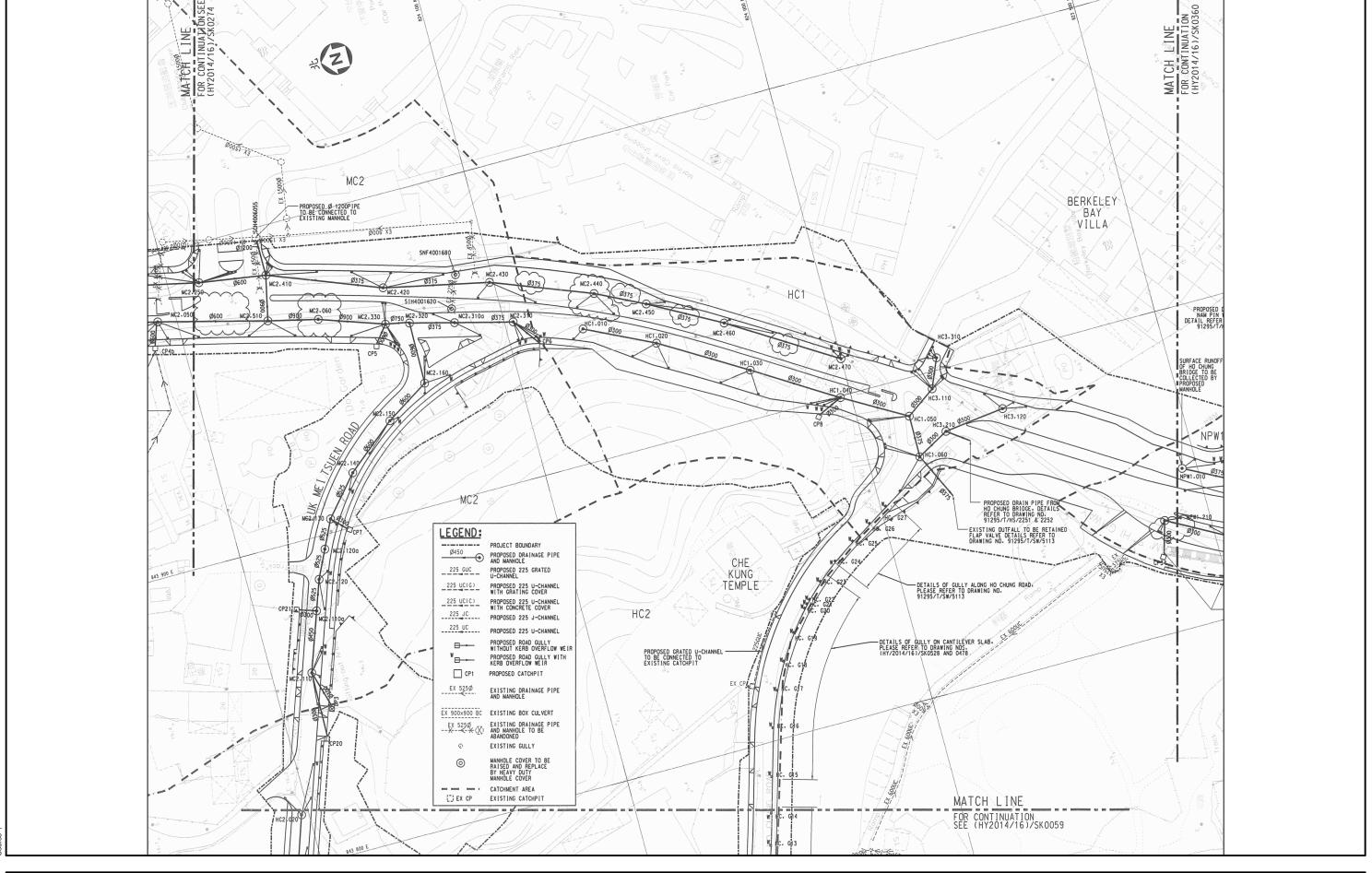
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Drawing Title

PROPOSED DRAINAGE LAYOUT FROM THE HIRAM'S
HIGHWAY IMPROVEMENT STAGE 1 PROJECT

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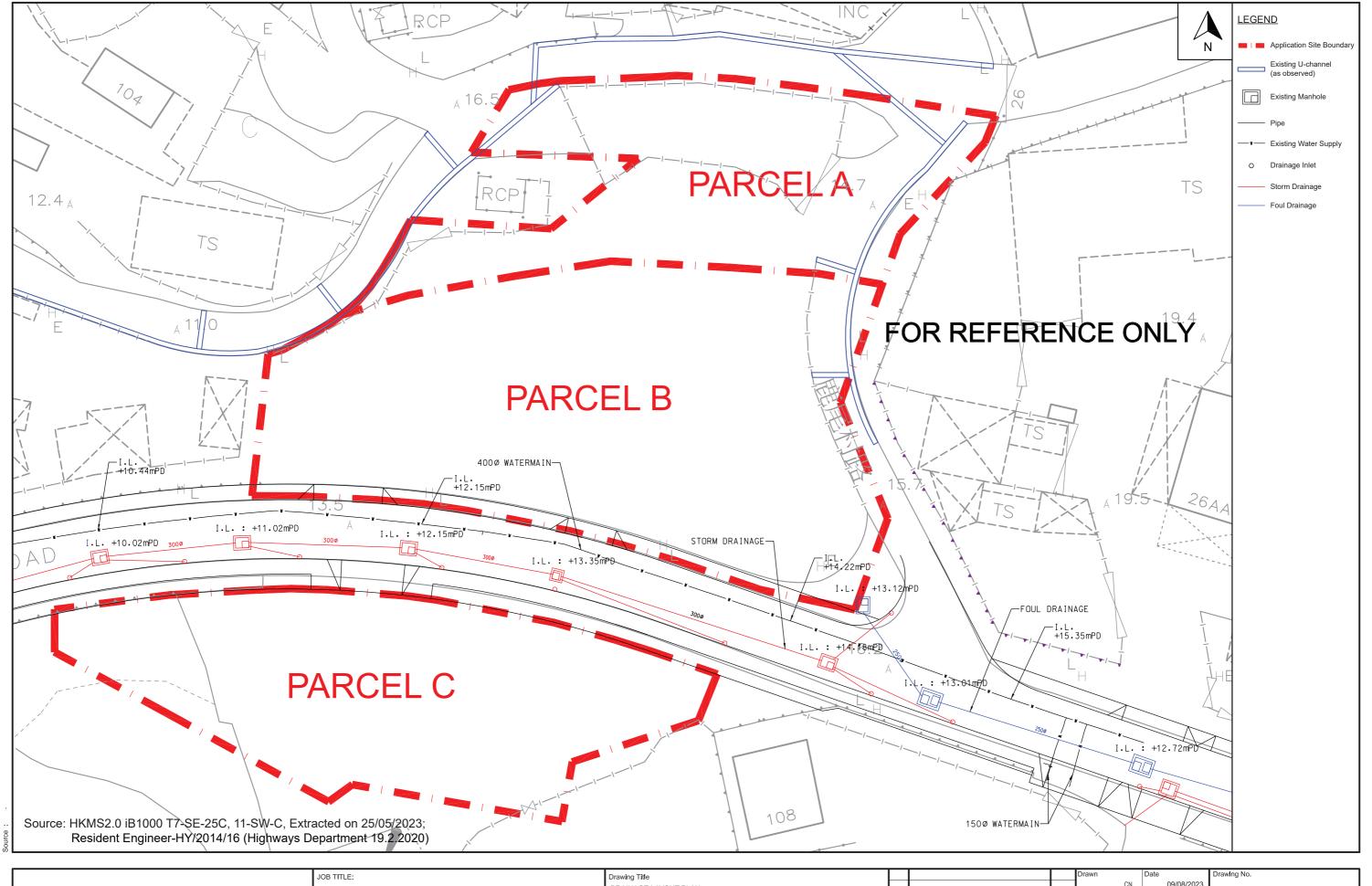
ADDRESS: 2/F & 3/F TUNG HIP COMMERCIAL BUILDING
244 DES VOEUX ROAD CENTRAL HONG KONG
TEL: 2507 8333
FAX: 2598 6576

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PROPOSED DRAINAGE LAYOUT FROM THE HIRAM'S HIGHWAY IMPROVEMENT STAGE 1 PROJECT

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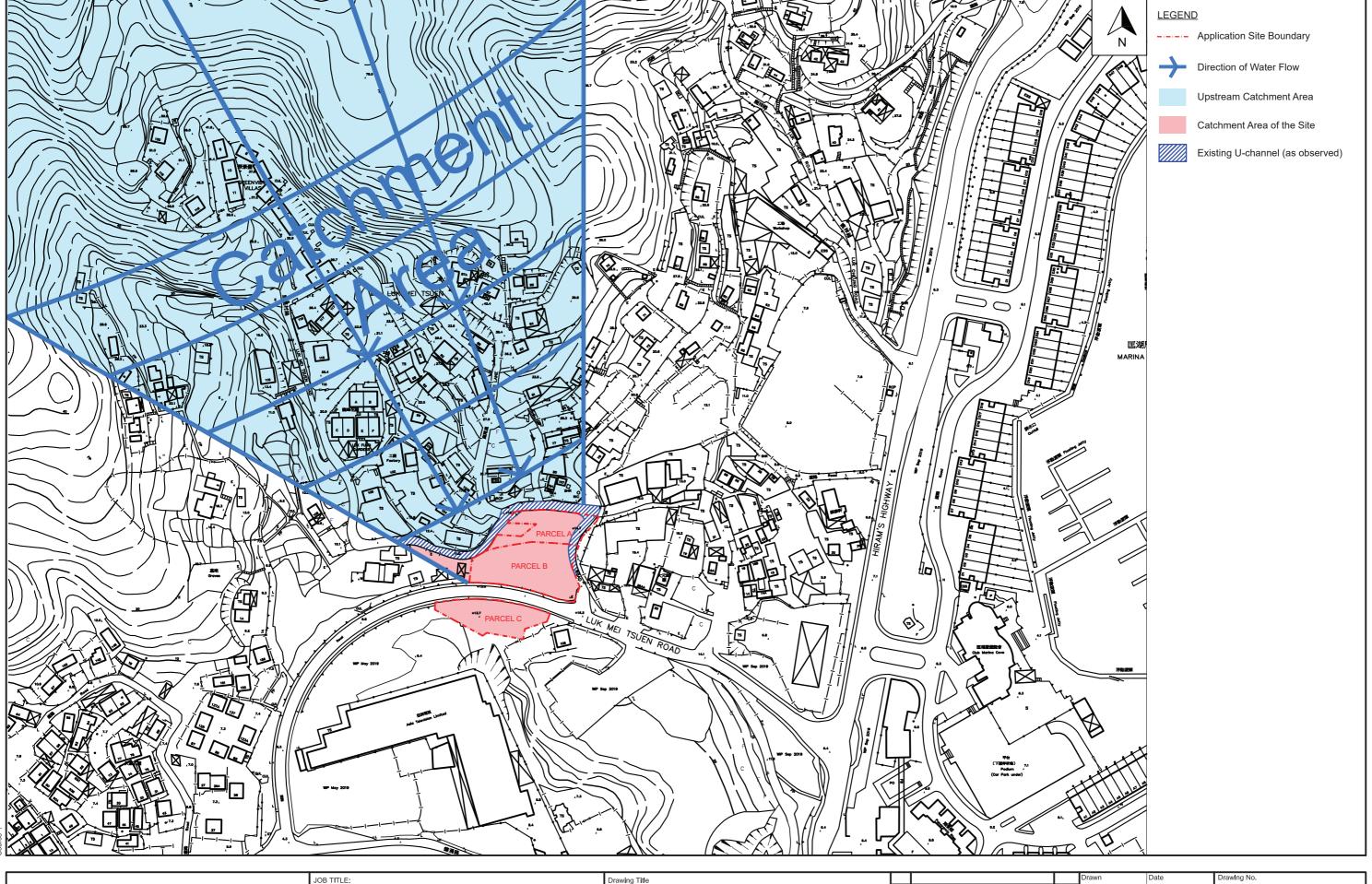
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DRAINAGE LAYOUT PLAN

09/08/2023 Approved Figure 3.2 Description



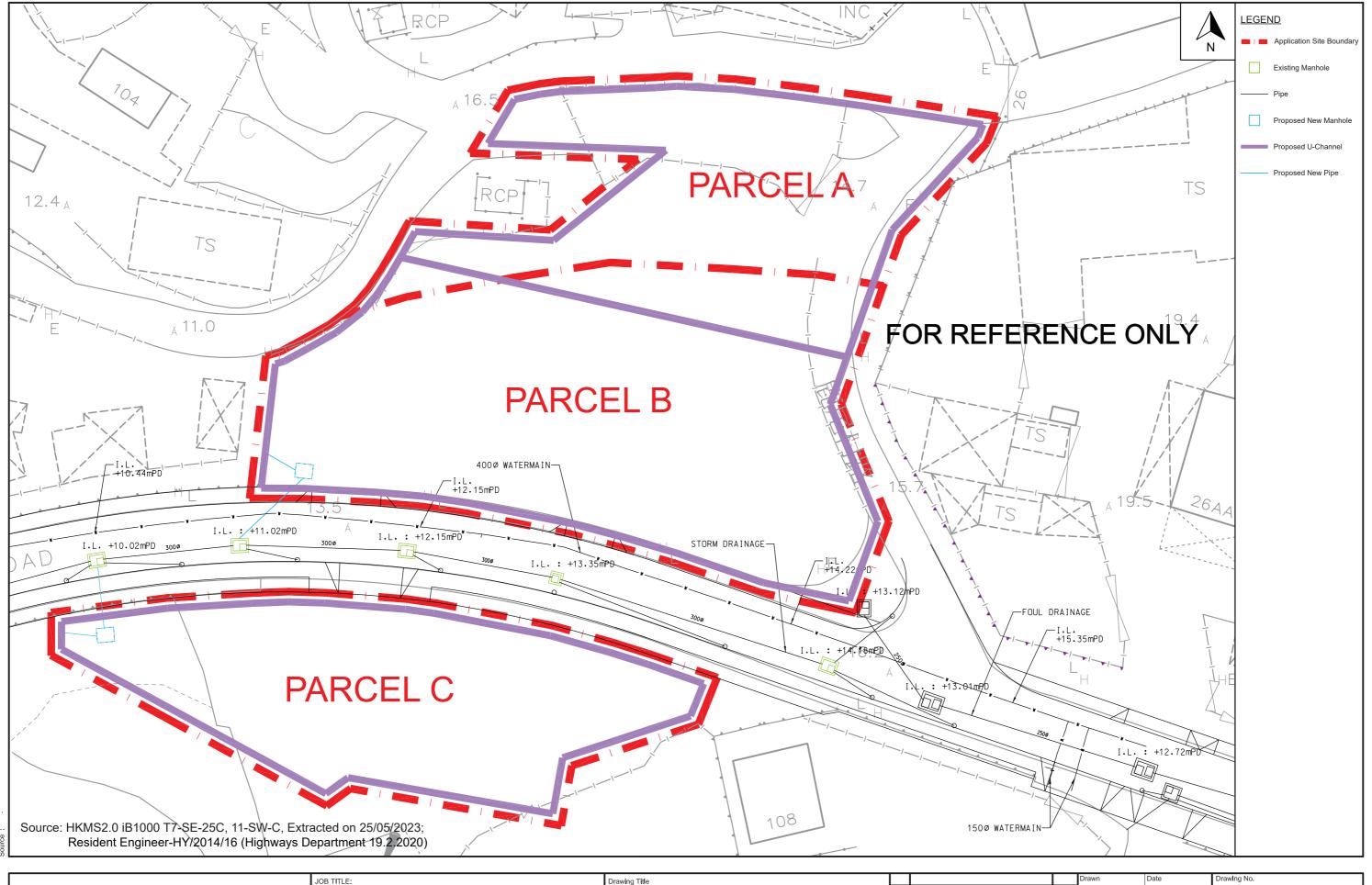
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CATCHMENT AREA PLAN

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PROPOSED DRAINAGE CONNECTION

07/08/2023 Figure 3.4 Description