

Appendix F

Water Supply Impact Assessment

CONFIDENTIAL

**Civil Engineering and Development
Department**

**Application for Permission under
Section 16 of the Town Planning
Ordinance (Cap. 131) for Proposed
Temporary Centralised Quarters for
Imported Labour in Construction
Sector for a Period of 3 Years in
“Industrial” Zone and Area Shown as
‘Road’ of Planning Area 36 of Hung
Shui Kiu/ Ha Tsuen New Development
Area**

Water Supply Impact Assessment

| August 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 278463

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ARUP

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1. Introduction

1.1 Background

1.1.1 Ove Arup and Partners Hong Kong Limited (Arup) was commissioned by the Civil Engineering and Development Department (CEDD) to submit a Section 16 Planning Application for Proposed Temporary Centralised Quarter for Imported Labour in Construction Sector within “Industrial” (“I”) Zone and area shown as 'Road' of Planning Area 36 of the draft Hung Shui Kiu and Ha Tsuen Outline Zoning Plan (“the HSK/HT OZP”) No. S/HSK/3 for a Period of 3 Years (“the proposed development”).

1.1.2 The proposed development will have a total PR of about 0.456 with domestic GFA of about 13,414m² and non-domestic GFA of about 1,065m² respectively. The 8 nos. of two-storey residential blocks will provide about 450 residential module of Modular Integrated Construction (MiC) to provide accommodation for about 1,800 numbers of imported labour. The Proposed Development is targeted to commence operation in Q3 2027.

1.2 Site Location

1.2.1 The Application Site, with an area of about 31,787 m², is situated at the western part of HSK/HT NDA adjacent to the planned high-density development under the Second Phase Development of Hung Shui Kiu / Ha Tsuen New Development Area (HSK/HT NDA), of which the construction works have commenced since 2024. The Application Site itself is part of the Advance Works phase 3 of HSK/NT NDA for implementation of site clearance/ site formation and associated infrastructure works.

1.3 Scope of Updated Technical Assessments

1.3.1 The scope of updated technical assessment for water supplies comprises the following:

- Undertake a review of the proposed water supply network and identify if there would be any deficiency / inadequate capacity based on the development parameters;
- Propose the preliminary modification measures for the purpose of the WSIA; and
- Submit the WSIA to support S16 application.

1.3.2 This section outlines the assessment of the sewerage impact potentially induced by the proposed development and includes:

- Estimation of fresh and flushing water demand arising from the Application Site;

- Assessment of potential impact on the existing water supply network imposed by the Application Site; and
- Proposed preliminary water supply works, if considered necessary.

2. Planning Data and Water Demand Estimation

2.1 Proposed Development

2.1.1 The development information is summarized in **Table 2.1**. The Indicative Scheme of the proposed development is shown in **Appendix A**.

Table 2.1 Proposed Development Parameters

Site Area (about)	About 31,787 m ²
Total Plot Ratio (about)	0.456
• Domestic PR	0.422
• Non-domestic PR	0.034
Total GFA (about)	14,479 m ²
• Domestic GFA	13,414 m ²
• Non-domestic GFA	1,065 m ²
Building Height	Residential Blocks: 2 storeys Ancillary Blocks: 1 to 2 storey(s)
Number of Blocks	8 Residential Blocks 6 Ancillary Blocks (including 3 Management Offices)
Population	About 1,800
Employment	About 100

2.2 Water Demand Parameters and Assumptions

2.2.1 The unit water demands are generally based on Water Supplies Department (WSD)'s Departmental Instruction (DI) No. 1309. The residential and non-residential unit water demands are presented below.

Unit Water Demand

2.2.2 The unit fresh and flushing water demands for residential users adopted in this assessment are summarised in **Table 2.2**. The proposed temporary quarters are intended to provide short-term accommodation for imported labour in the construction sector. The anticipated water usage is therefore broadly similar to a typical residential development, covering domestic uses such as drinking, cooking, washing, bathing, laundry and toilet flushing. No commercial, industrial or other high water-consumption activities are proposed within the site.

Table 2.2 Unit Water Demand

Fresh Water (m ³ /head/day)		Flushing Water (m ³ /head/day)	
Resident	Employment	Resident	Employment
0.14 ¹	0.05	0.07 ¹	0.05
Note: 1. The unit fresh water and flushing water demands adopted from Water Supply Impact Assessment (WSIA) of Agreement No. CE 47/2020 (CE) – Term Consultancy for Site Formation and Infrastructure Works for Proposed Housing Development in Zone 2 (2021–2024) – Feasibility Study Task Order No.8 Tam Mei.			

2.2.3 The unit fresh and flushing water demands for non-residential users are summarised in the following paragraphs.

Service Trade – Fresh Water Supply

2.2.4 Since no non-residential/commercial activities are proposed for these sites, the fresh water demand does not consider a factor for service trade.

Service Trade – Flushing Water Supply

2.2.5 No unit daily demand for flushing water demand is provided with reference to WSD's DI No. 1309 for this category of user.

Peaking Factors

2.2.6 The following peak demand factors are adopted:

- Peak flow rate in fresh water trunk main supplying from water treatment works to single service reservoir = 1.5 x mean daily fresh water demand of reservoir supply zone;
- Peak flow rate in fresh water distribution mains = 3 x mean daily fresh water demand;
- Peak flow rate in flushing water distribution mains = 2 x mean daily flushing water demand.

2.2.7 The maximum desirable flow velocity limit in **Table 2.3** below will be adopted for ultimate stage under normal water demand scenario (i.e. excluding fire-fighting demand scenario).

Table 2.3 Desirable Flow Velocity Limit

Fresh Water System		Flushing Water System	
Pipe Diameter	Flow Velocity Limit (m/s)	Pipe Diameter	Flow Velocity Limit (m/s)
> DN700	3	> DN1000	3
DN525 to DN700	2.5	DN800 to DN900	2.5
DN375 to DN450	2	DN525 to DN700	2
DN200 to DN300	1.5	DN300 to DN450	1.5

Residual Heads

- 2.2.8** The minimum residual heads for the proposed fresh water and flushing water supply systems, based on the requirements of WSD DI No. 1309, are shown in **Table 2.4**.

Table 2.4 Minimum Residual Heads in Water Supply System

Water Supply System	Minimum Residual Heads (m)
Fresh water – Normal	20
Fresh water – Firefighting	17
Flushing water	15

Reservoir Volume

- 2.2.9** To determine the fresh water storage volume, a 10% contingency is firstly applied to the average daily demand. Further, the storage volume is estimated as 80% of mean daily demand in accordance with the WSD's guidelines.
- 2.2.10** The required capacity of flushing water storage volume is calculated as 64% of mean daily demand of flushing water service reservoir.

3. Assessment of Water Supply Impact

3.1 Existing Fresh Water Supply System

3.1.1 Existing fresh water supply infrastructure is available in the vicinity of the proposed site.

3.1.2 Details of the existing fresh water main in the vicinity of the proposed site are presented in **Appendix B**.

3.2 Existing Flushing Water Supply System

3.2.1 Existing salt or flushing water supply system is not available in the vicinity of the proposed development.

3.3 Water Supply Impact

3.3.1 The fresh water and flushing water demands from the development site, based on the development parameters are summarised in **Table 3.1**.

Table 3.1 Water Demand from the Proposed Site

User	Population (head)	Unit Demand (m ³ /head/day)		Water Demand (m ³ /day)	
		Fresh Water	Flushing Water	Fresh Water	Flushing Water
Resident	1800	0.14	0.07	252.0	126.0
Employment	100	0.05	0.05	5.0	5.0
Total				257.0	131.0

3.3.2 It is noted that there is a fresh and flushing water demand of 257.0 m³/day and 131.0 m³/day for the development site.

3.3.3 As mentioned in **Section 3.1** and **3.2**, only the existing fresh water main will be available to serve the site for fresh water, fire-fighting, and flushing water purposes. As such, it is proposed to connect new fresh water main to the existing DN300 pipe along Kong Sham Western Highway.

3.3.4 **Table 3.2** summarises the storage volume required for the proposed development. Given that the increase in water demand represents only a small proportion of the overall storage capacity of the existing reservoirs, the existing Tan Kwai Tsuen South Fresh Water Service Reservoir (TKTSFSR) are considered to have sufficient spare capacity to accommodate the additional fresh water demand.

Table 3.2 Reservoir Volume Requirement

Required Storage Volume (m ³)			Occupancy to TKTSFWSR (%)
Fresh Water (m ³)	Fresh Water for Flushing (m ³)	Total (m ³)	
205.6	83.8	289.4	0.37

3.3.5

A hydraulic assessment was carried out in accordance with WSD's Guidelines for Hydraulic Modelling to estimate the head loss, and the results are presented in **Table 3.3**. Assuming a minimum residual head of 20 m in the existing DN300 water main, the additional water demand from the proposed development would result in only a marginal increase in head loss. Given that the existing water main is located at approximately +33.5 mPD, while the proposed development is situated at approximately +22.0 mPD, the available elevation difference is sufficient to accommodate the associated head loss. Therefore, the residual head at the development site is expected to remain above the minimum requirement of 20 m.

Table 3.3 Hydraulic Assessment for Proposed Fresh Water Main

Peak Flow (L/s)	Velocity (m/s)	Pipe Size (mm)	Pipe Inner Dia. (mm)	Pipe Length (m)	Head Loss (m)
12.0	0.80	NS180 (DN150)	138	130	1.13

4. Proposed Water Supply Works

- 4.1.1** To accommodate the additional fresh and flushing water demands arising from the proposed development, new water mains are proposed. A new NS180 (DN150) fresh water main will be connected to the existing DN300 fresh water main along Kong Sham Western Highway. NS125 (DN100), NS90 (DN80) temporary main for flushing (TMF), and NS180 (DN150) lead-ins are proposed to support fresh water, flushing water, and fire-fighting water demands. The proposed fresh water main layout is shown in **Appendix B**.

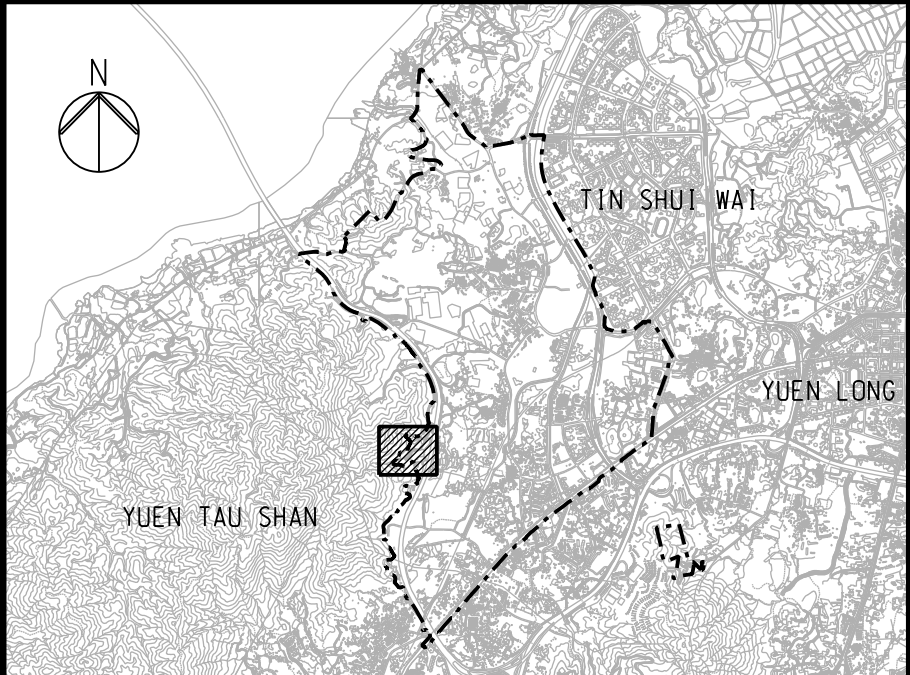
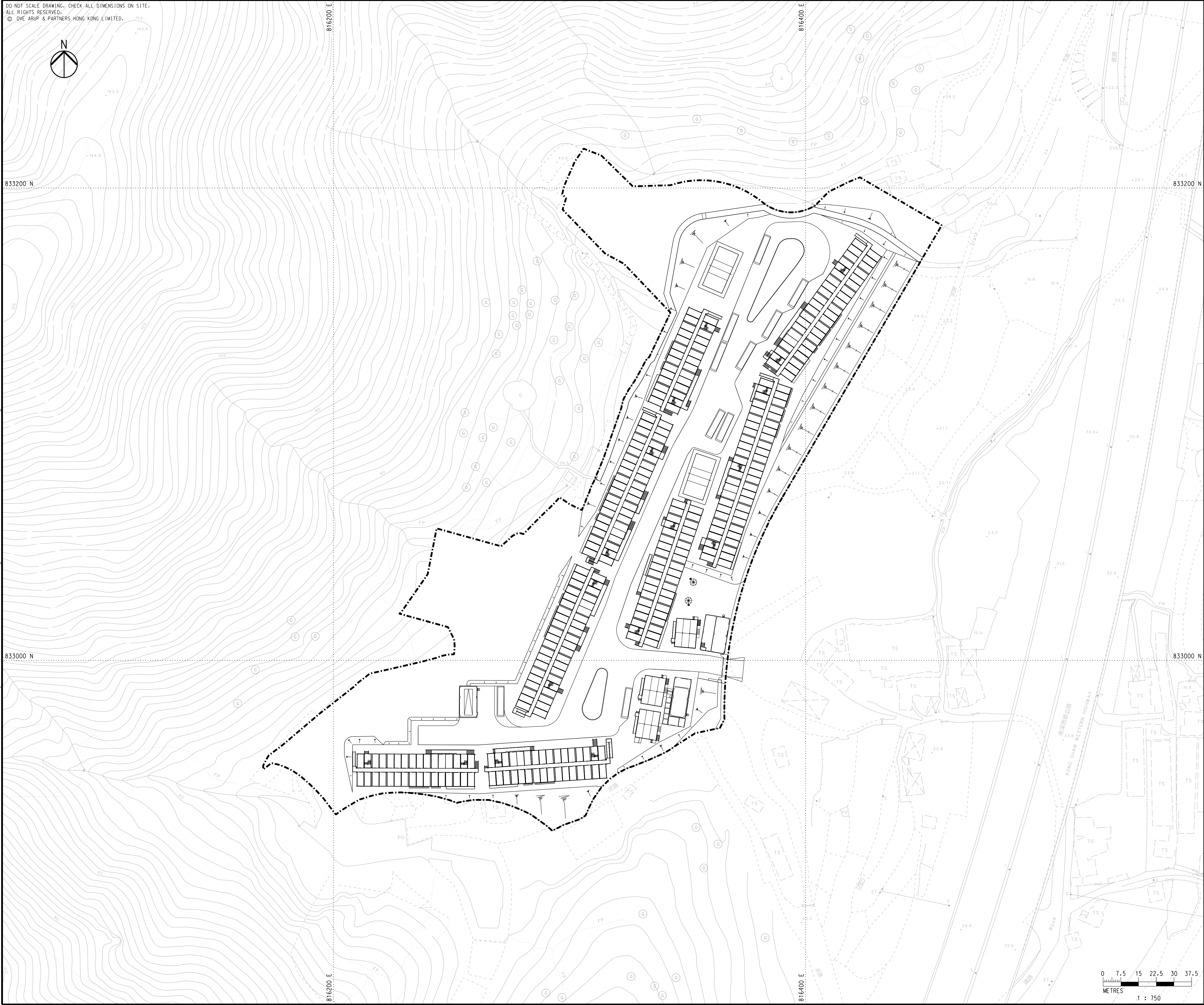
5. Summary

- 5.1.1** This report estimated the fresh and flushing water demands generated from the proposed development assessed the potential impact and recommended water supply works.
- 5.1.2** According to the assessment, the updated development parameters from the proposed project will result in an additional fresh water demand of 257 m³/day. For flushing water, the demand will be increased by 131 m³/day.
- 5.1.3** Since there is only an existing DN300 fresh water main in the vicinity of the proposed development, it is proposed to utilize this water main for supplying fresh water, fire-fighting, and flushing water for the proposed development.
- 5.1.4** A new NS180 (DN150) fresh water main is proposed to be teed off from the existing DN300 fresh water main along Kong Sham Western Highway.
- 5.1.5** A hydraulic assessment was conducted to assess the potential impact of the increased water demand to the existing fresh water supply network. It is considered that the existing surface reservoir have sufficient spare capacity to accommodate the additional fresh water demand. Regarding the impact to the existing DN300 fresh water main, the results indicated that the reduction in residual head due to the increased demand is minimal. In addition, since the elevation at the proposed site is at lower level comparing with the existing water main, the residual head at the development site is expected to remain above the minimum requirement of 20 m.
- 5.1.6** Upon the proposed water supply works, it is concluded that no adverse water supply impact would be imposed by the proposed development.

Appendix A

Indicative Scheme for the Proposed Development

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KEY PLAN

LEGEND

APPLICATION SITE

A	FIRST ISSUE	KF	07/26
Rev	Description	By	Date
Consultant			

ARUP

Project Title
Agreement No. CE 1/2020 (CE)
Hung Shui Kiu / Ha Tsuen
New Development Area Package A
Works for Second Phase Development
– Design and Construction

Drawing title
HSK / HT NDA
SECOND PHASE DEVELOPMENT
IMPORTED LABOUR QUARTERS
GENERAL LAYOUT PLAN

Drawing no. 278463/SK/C/479		Rev. A	
Drawn RY	Date 06/26	Checked EH	Approved KKC
Scale 1:750 @ A1		Status PRELIMINARY	

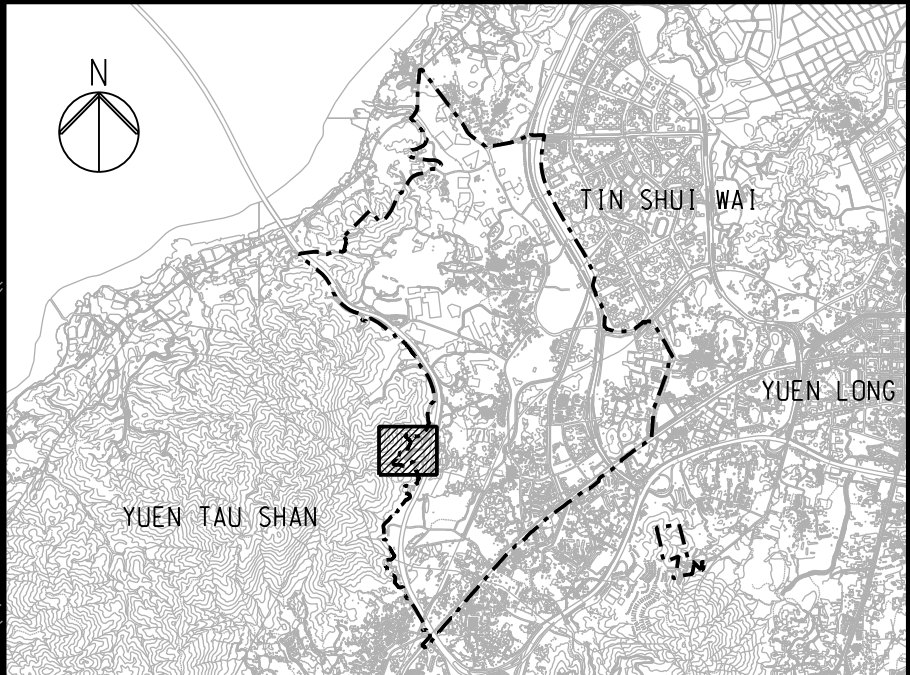
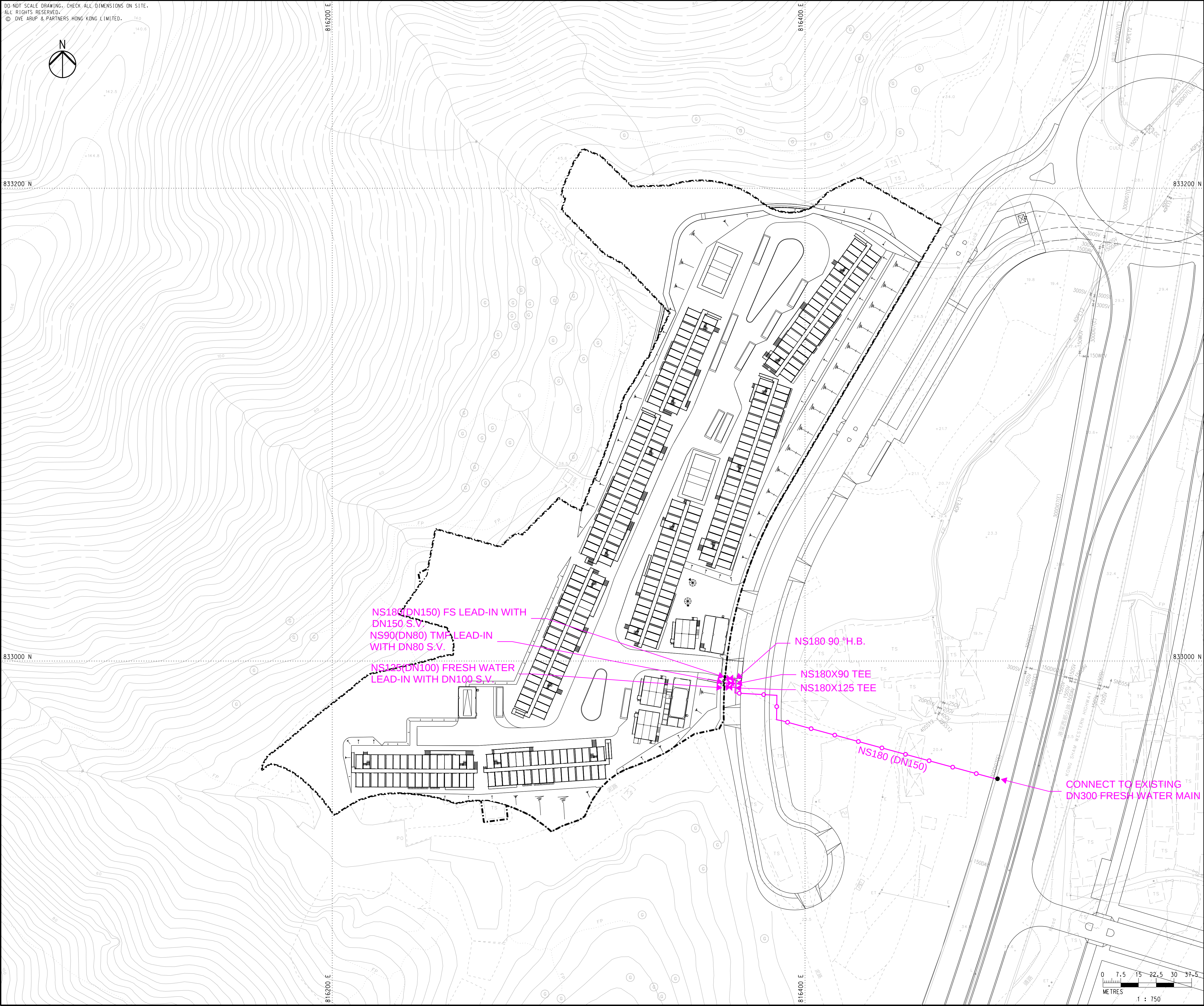
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Appendix B

Proposed Water Supply Layout Plan

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KEY PLAN

- LEGEND**
- APPLICATION SITE
 - EXISTING FRESH WATER MAIN
 - PROPOSED FRESH WATER MAIN
 - PROPOSED GATE VALVE

A		FIRST ISSUE		KF	07/26
Rev	Description	By	Date		
Consultant					
Project Title					
Agreement No. CE 1/2020 (CE)					
Hung Shui Kiu / Ha Tsuen					
New Development Area Package A					
Works for Second Phase Development – Design and Construction					
Drawing title					
HSK / HT NDA					
SECOND PHASE DEVELOPMENT					
IMPORTED LABOUR QUARTERS					
PROPOSED WATER SUPPLY					
LAYOUT PLAN					
Drawing no.				Rev.	
278463/SK/C/WSIA/001				A	
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