Prepared for

Kam Luk Investment Company Limited

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Ramboll Hong Kong Limited

PROPOSED PUBLIC RESIDENTIAL HOUSING / STARTER HOMES DEVELOPMENT AT UDWYT LOT 14RP AND ADJOINING GOVERNMENT LAND (SITE A) & PROPOSED PRIVATE RESIDENTIAL DEVELOPMENT AT UDWYT LOT 11 RP AND ADJOINING GOVERNMENT LAND (SITE B), WONG YUE TAN, TAI PO

WATER SUPPLY IMPACT ASSESSMENT



Date February 2025

Prepared by Miko Wan

Environmental Consultant

Signed

Approved by Calvin Chiu

Technical Director

O La

Signed

Project Reference **NFDUDWYTEI00**

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1. INTRODUCTION

1.1 Project Background

- 1.1.1 Referring to the Lands Sharing Pilot Scheme ("LSPS") application at Lo Fai Road/ Ting Kok Road with application no. LSPS/001 on 19 July 2021, the applicant has revised the submission.
- 1.1.2 The application involves two private lots, namely Lot 14 RP and Lot 11 RP in Unsurveyed District at Wong Yue Tan ("UDWYT") and adjoining Government Lands ("GL"). Lot 14 RP and adjoining Government Land (Site A) would be designated for public housing / Starter Homes Housing development, whereas Lot 11 RP and adjoining Government Land (Site B) would be designated for proposed private residential development.
- 1.1.3 As per request from Water Supplies Department (WSD) (dated 1 September 2021), a Water Supply Impact Assessment (WSIA) is submitted herewith for further information.
- 1.1.4 Ramboll Hong Kong Limited has been commissioned by the Applicant to provide environmental consultancy services for the WSIA for the Proposed Development at Site A and Site B.

1.2 Site A and Site B and its Environ

- 1.2.1 Site A and Site B are located at Ting Kok Road in Tai Po with residential developments and Tai Po Industrial Estate nearby. The existing use of the sites is vacant.
- 1.2.2 Site A is bounded by Ting Kok Road to the south, and Lo Fai Road to the west. The area to the north to east is vegetated slope area zoned Green Belt.
- 1.2.3 Site B is bounded by Ting Kok Road to the south. The area to the south to east is vegetated slope area zoned Green Belt.
- 1.2.4 The location and its environs are shown in **Figure 1**.

1.3 Proposed Development

1.3.1 Site A will consist of 1,290 public residential housing / SH housing units with population density of 2.8 while Site B will have 460 private housing units with population density of 2.8 (based on 2021 population census average domestic household size in Tai Po New Town). In addition, GIC uses such as residential care home for elderly (RCHE) and retail facilities will be included in Site A as well. The expected year for completion of the Proposed Development is 2033 tentatively. Yet, it may take extra time to design and complete the development so that the project may be completed as late as by 2033.



2. WATER SUPPLY IMPACT ASSESSMENT

2.1 Scope of Work

2.1.1 The aim of this study is to assess whether the capacity of the existing water supply facilities serving Site A and Site B is sufficient to cope with the water demands from the Proposed Development. Data and record plans from Water Supplies Department (WSD) were obtained to facilitate the WSIA.

2.2 Assessment Criteria and Methodology

- 2.2.1 According to the information of fresh water and flushing water supply zones provided by WSD, Site A and Site B will be served by the Tai Po East Low Level Fresh Water Service Reservoir (TPELLFWSR), which has a capacity of 14,600 m³. There is existing water main in the vicinity of the sites. The sites are outside the existing saltwater supply zone. The nearest saltwater supply facility is Tai Po Salt Water Pumping Station (Tai Po SWPS), with design daily output of 38,000 m³/day. The existing saltwater main nearest to the sites is immediately adjacent to Tai Po East Fresh Water Pumping Station. The existing water supply network is shown in **Figure 2** and **Appendix 2**.
- 2.2.2 Reference has been made to the Water Supplies Department's Departmental Instruction 1309 (WSD DI 1309), as well as Environmental Protection Department's (EPD's) Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF). In addition, Planning Department's (PlanD) Commercial and Industrial Floor Space Utilization Survey (CIFUS) have also been used.
- 2.2.3 WSD DI 1309 sets out the design criteria for water supplies in Hong Kong and includes unit water demands for various classes of consumer. Apart from the above, EPD's GESF includes unit sewage flow factors for various residential development.
- 2.2.4 For this WSIA, WSD's data from DI 1309 has been referenced to provide unit water demands for the various population categories. with the relevant EPD GESF unit sewage flow factors to determine overall unit water demand factors. PlanD's CIFSUS has been also referenced for calculation of the population density where necessary.
- 2.2.5 The unit water demand has been combined with the relevant development parameters to assess the future water demands, from which the potential impacts have been assessed. Calculations for the water demands of the Indicative Scheme are included in **Appendix 1**.

2.3 Assessment of Water Demand

- 2.3.1 As shown in table 1 in **Appendix 1**, the mean daily demand (MDD) of fresh water arising from Site A will amount to about 1,459.1 m³/day of fresh water and 439.8 m³/day of flushing water, and the MDD arising from Site B will be about 450.8 m³/day of fresh water and 134.0 m³/day of flushing water.
- 2.3.2 For freshwater, the total MMD of the Proposed Development is 1,909.9 m³/day, which is equivalent to about 13.0% of the capacity of the FWSR. Given that the contribution is not significant, the Proposed Development would unlikely pose any adverse impact to existing water service reservoirs.
- 2.3.3 For flushing water supply, as advised by WSD, the Proposed Development should connect to the salt water supply instead of fresh water supply. The total MDD of the Proposed Development is 573.8 m³/day, which is equivalent to about 1.5% of the capacity of the existing Tai Po SWPS. In addition, the maximum average daily output is only 32MLD. Therefore, there is ample spare capacity and the Proposed Development would unlikely pose any significant impact to existing saltwater pumping station.



2.4 Proposed Water Supply System

Freshwater Supply System

- 2.4.1 The existing freshwater supply system serving Site A and Site B is shown in **Figure 2**. There is an existing Ø600 mm water main to the west of Site A along Lo Fai Road near the location of main entrance, and an existing Ø450 mm water main to the south of Site B along Ting Kok Road. To supply freshwater to the sites, it is proposed to lay new connections to the existing water mains. A Ø150 mm and a Ø100 mm internal dia. water pipes are proposed for fresh water supply for Site A and Site B respectively. **Figure 3** and **Figure 4** show the proposed freshwater supply schemes.
- 2.4.2 According to Table 2a and 2b in **Appendix 1**, the existing Ø450 mm water main to the south of Site A & B, as well as the proposed Ø150 mm (connecting Site A and the existing Ø450 mm water main) and Ø100 mm water main (connecting Site B and the existing Ø450 mm water main) will have adequate capacity to serve Site A and Site B respectively.
- 2.4.3 A pair of strainers on both distribution main and by-pass watermain is proposed before the connection point to the subject site to enhance the freshwater quality supply.

Saltwater Supply System

- 2.4.4 The existing saltwater supply system nearby Site A is shown in **Figure 5** (It is noted that there is no salt water supply system nearby Site B). There is an existing Ø200 mm water main to the west of Site A at Ting Lok Road immediately adjacent to Tai Po East Fresh Water Pumping Station. It is proposed to build a new connection from this existing saltwater main to both Site A and Site B. A Ø200 mm water main is proposed to connect from the abovementioned existing Ø200 mm water main to across Lo Fai Road. For Site A, a Ø80 mm water main will be branched (after crossing Lo Fai Road) from the proposed Ø200 water main to the site. For Site B, a Ø200 mm water main (of over 500m) will be branched from the proposed Ø200 water main and constructed along the kerbside of Ting Kok Road. **Figure 5** and **Figure 6** show the proposed saltwater supply schemes.
- 2.4.5 According to Table 2a and 2b in **Appendix 1**, the existing Ø200 mm water main located immediately adjacent to Tai Po East Fresh Water Pumping Station, the proposed Ø200 mm water main (crossing Lo Fai Road), the proposed Ø80 mm water main (connecting Site A) and Ø50 mm (connecting Site B) water main have adequate capacity to serve Site A and Site B respectively.
- 2.4.6 For both freshwater and saltwater system, no upgrading works of the existing pumping stations, service reservoirs and water mains is necessary.
- 2.4.7 The proposed water pipe will be aligned along the internal access road within the sites. For Site B, the pipe will have to cross Ting Kok Road before reaching the site. Alignment of proposed connection for both sites are already the shortest path to existing water supply system to minimise cost and time of construction. Open cut method for pipe laying purpose should be adopted as far as practicable. Other method may be considered in case open cut is not allowed. Total closure of road is not expected for the construction of the water supply system. Details of the internal water supply system for fresh and flushing water supply and the proposed connection to the public water supply system would be finalized in the detailed design stage.



3. OVERALL CONCLUSION

- 3.1.1 The potential water supply impacts have been quantitatively addressed.
- 3.1.2 The existing FWSR have adequate capacity to cater the demand of the Proposed Development. The saltwater demand of the Proposed Development is about 1.38% of the design output of the existing SWPS. No adverse water supply impact is anticipated due to the Proposed Development.
- 3.1.3 Connections will be made to the existing water mains to serve the Proposed Development. Based on the assessment, the existing and proposed water main are adequate to serve both Site A and Site B. No upgrading works of the existing pumping stations, service reservoirs and water mains are recommended.

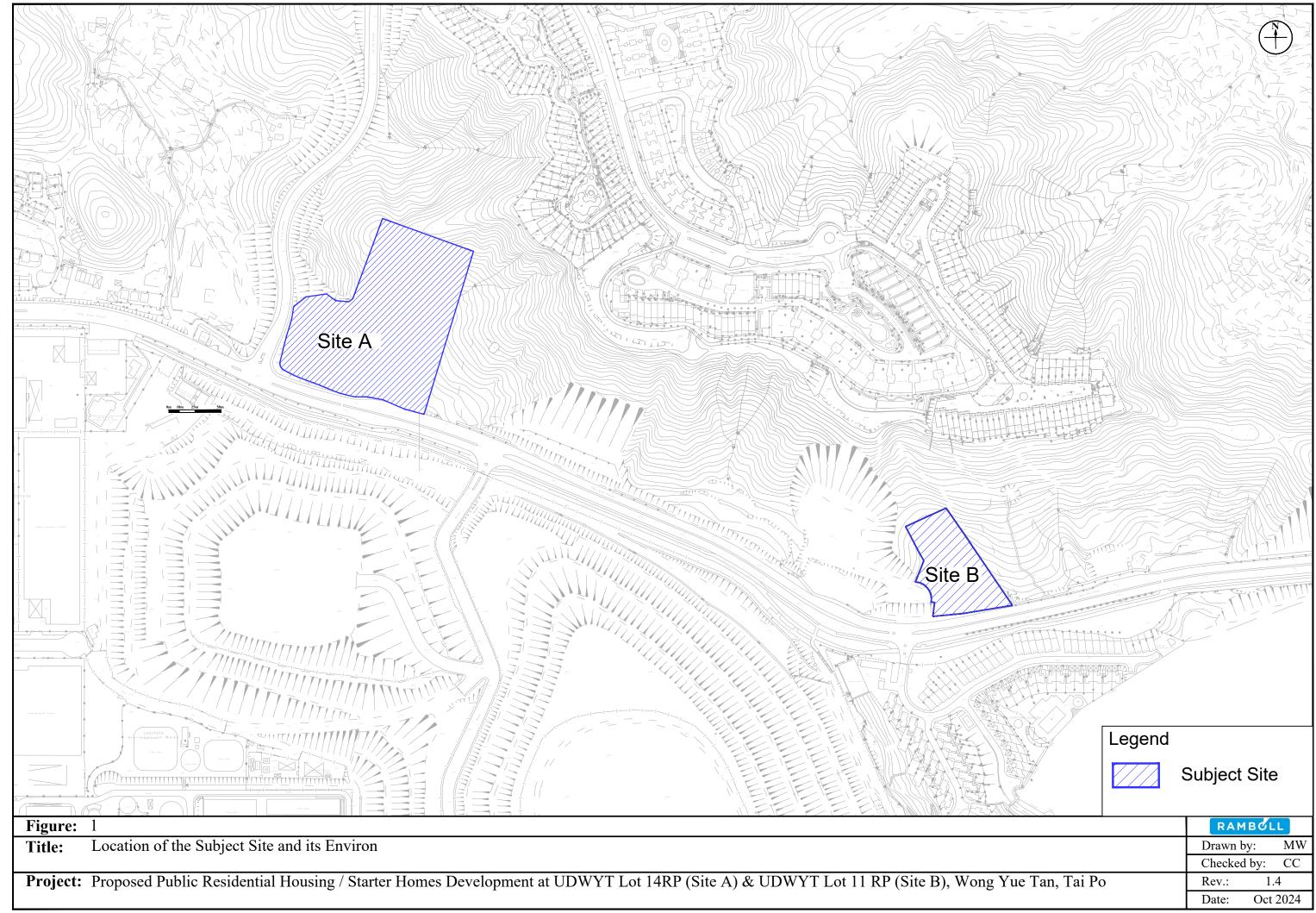


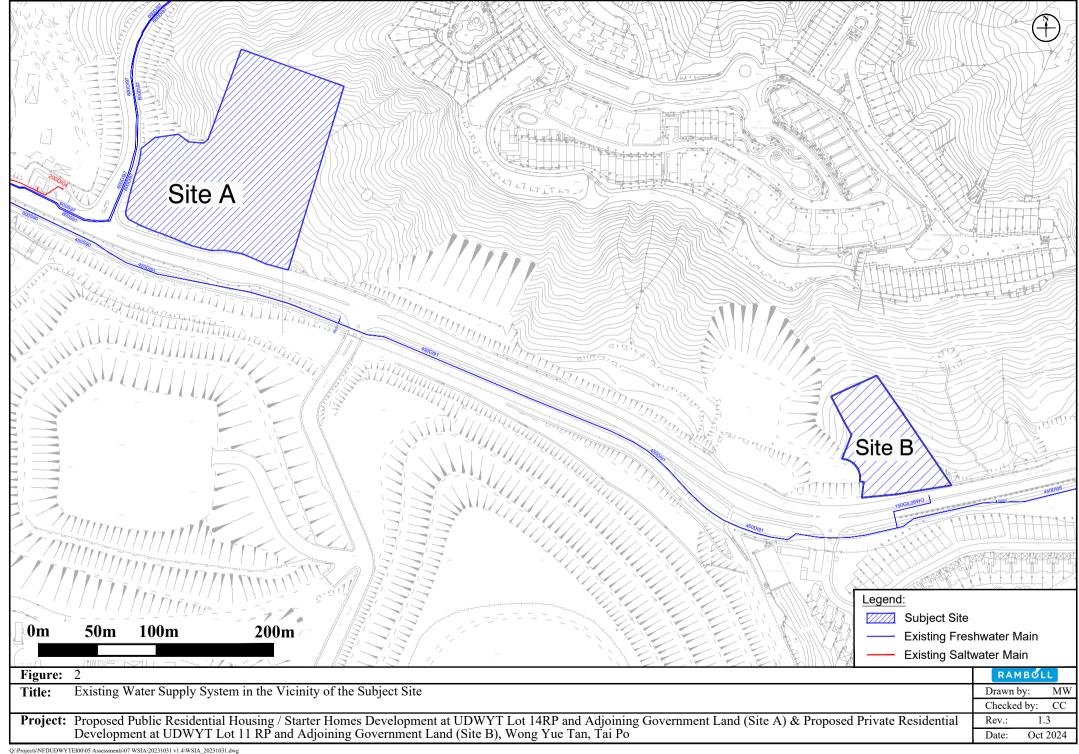
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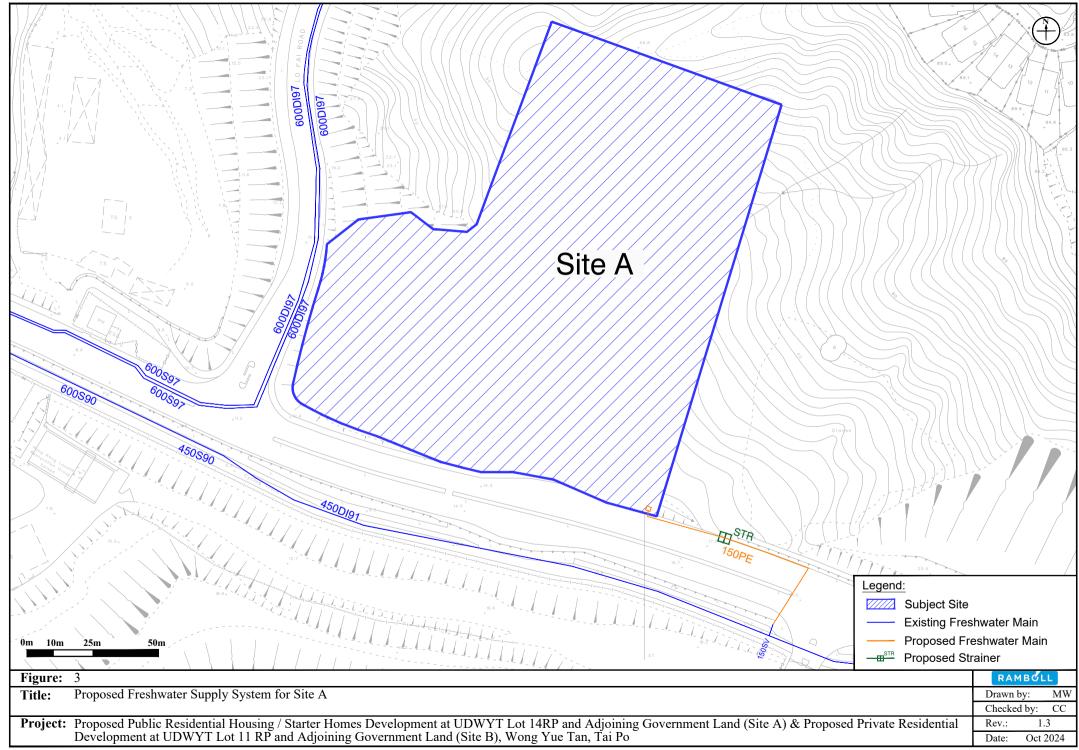
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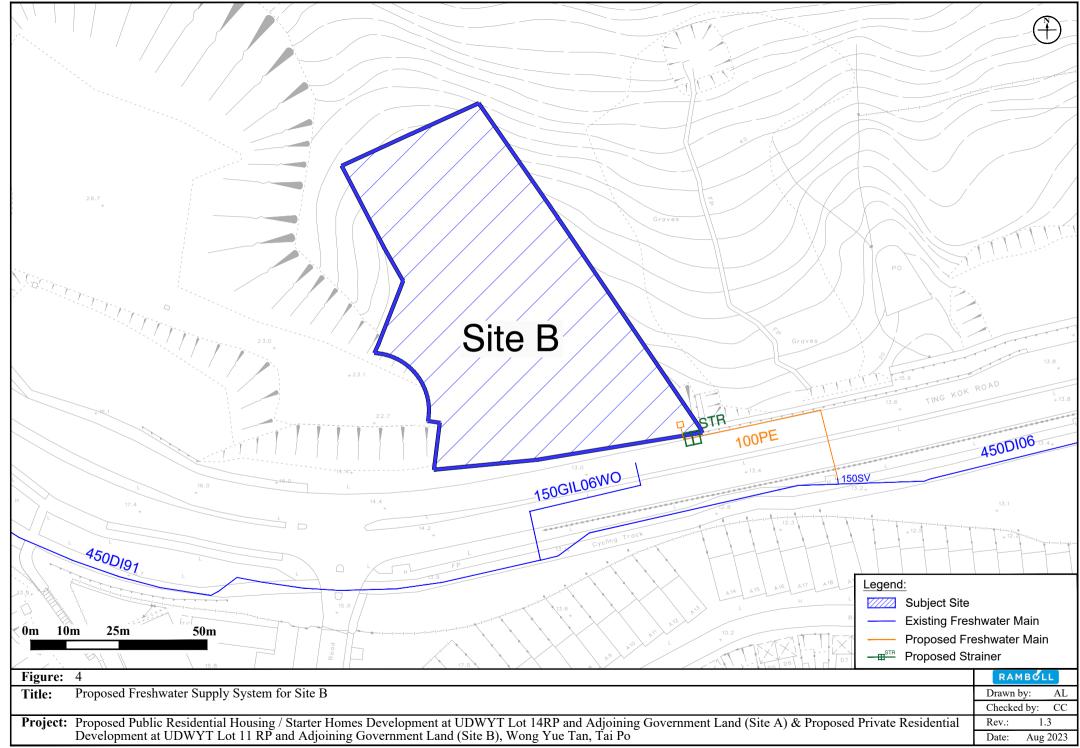
Figures

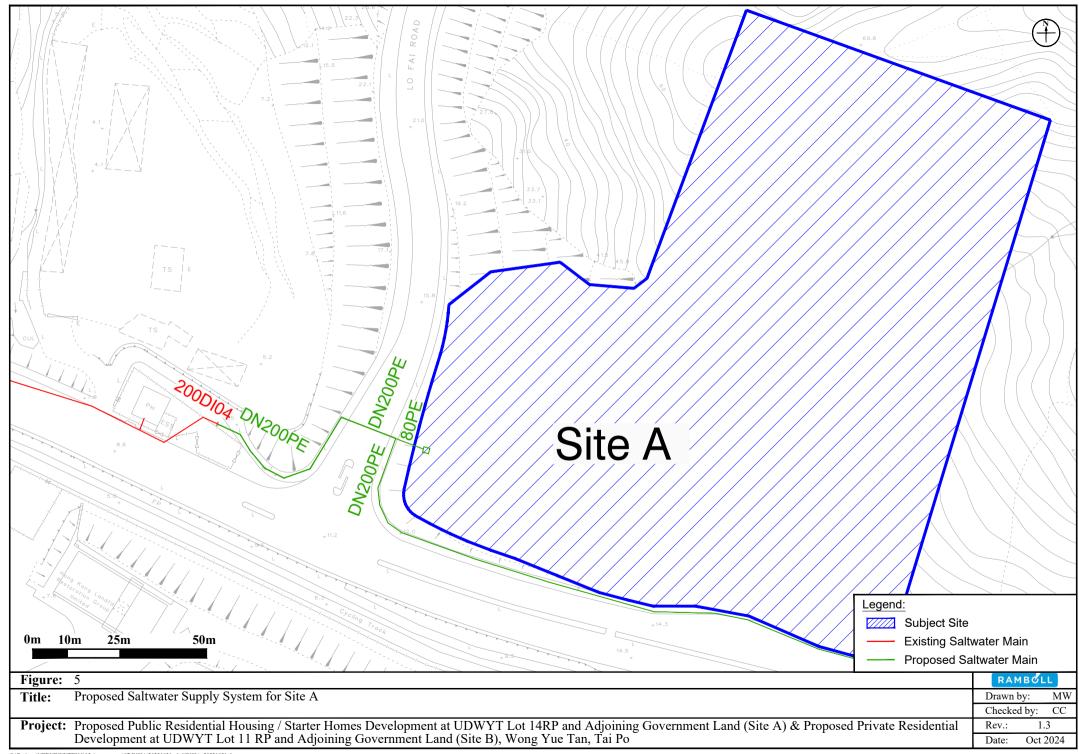


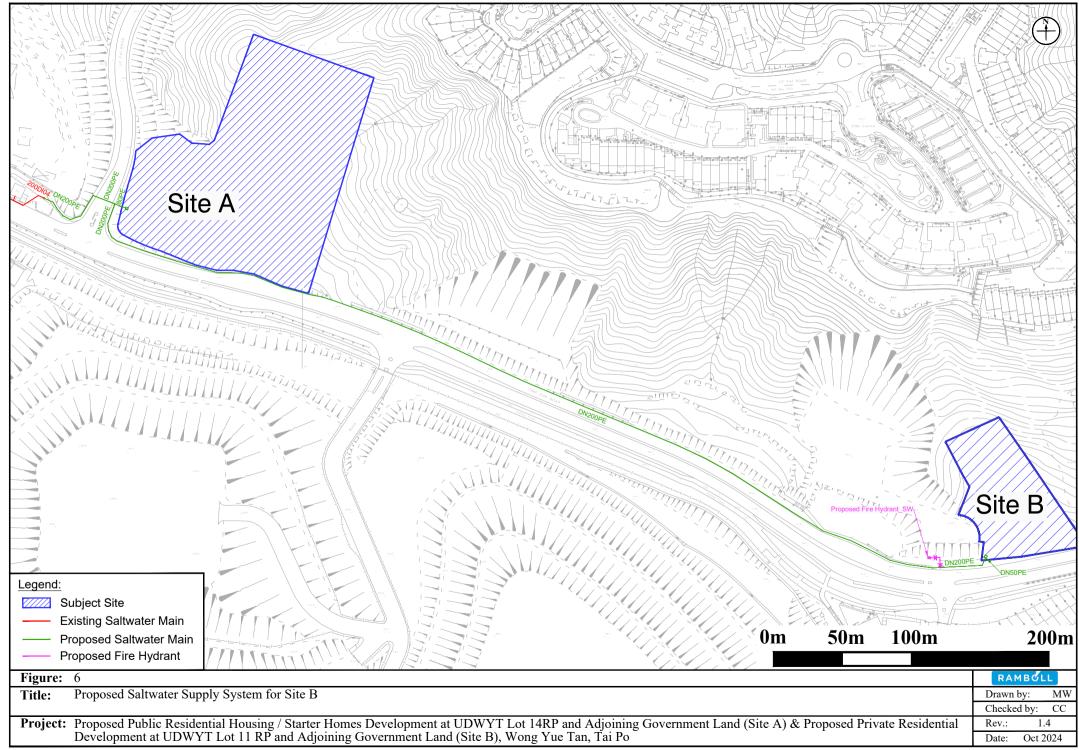














Proposed Public Residential Housing / Starter Homes Development at UDWYT Lot 14RP and Adjoining Government Land (Site A) & Proposed Private Residential Development at UDWYT Lot 11 RP and Adjoining Government Land (Site B), Wong Yue Tan, Tai Po

Table 1a Future Water Demands of Site A

			Freshw	ater	Flushing	Water	
		Type of Use	Population (head)	Daily Unit Demand (1) (m³/head/day)	Daily Demand (m³/day)	Daily Unit Demand (1) (m³/head/day)	Daily Demand (m³/day)
	Residential Development	Residential Density Zone R2	3973	0.350	1390.55	0.104	413.19
Future (Site A)	GIC	GIC	106	0.250	26.50	0.104	11.02
	GIC Residents	Residential Density Zone R1	150	0.280	42.00	0.104	15.60
	•				1459.1		439.8

Table 1b Future Water Demands of Site B

			Freshwater			Flushing	Water	
		Type of Use	Population (head)	Daily Unit Demand (1) (m³/head/day)	Daily Demand (m³/day)	Daily Unit Demand (1) (m³/head/day)	Daily Demand (m³/day)	
Future (Site B)	Residential Development	Residential Density Zone R2	1288	0.350	450.80	0.104	133.95	
					450.8		134.0	

Remarks:

(1) Water Supplies Department Departmental Instruction 1309. Service Trade of 0.050 m³/head/day (Tai Po) adopted.

Proposed Public Residential Housing / Starter Homes Development at UDWYT Lot 14RP and Adjoining Government Land (Site A) & Proposed Private Residential Development at UDWYT Lot 11 RP and Adjoining Government Land (Site B), Wong Yue Tan, Tai Po

Water Main Assessment of the Proposed Water Supply Systems

Table 2a Hydraulic Capacity of the Existing Water Main

	Segment	Diameter (mm)	Material	Peak factor		Factored Q (cu. m/s)	Area (m²)	Velocity of Water Main (m/s) (2)	Flow Rate of Water Main (m ³ /s)	% of water main occupied by the Proposed Site
Fresh Water	Water mains along Ting Kok Road (Site A& B)	450	DI	3	1909.9	0.066	0.159	1.50	0.239	28%
Salt Water	Water main near Tai Po East Fresh Water Pumping Station (Site A& B)	200	DI	2	573.8	0.013	0.031	1.50	0.047	28%

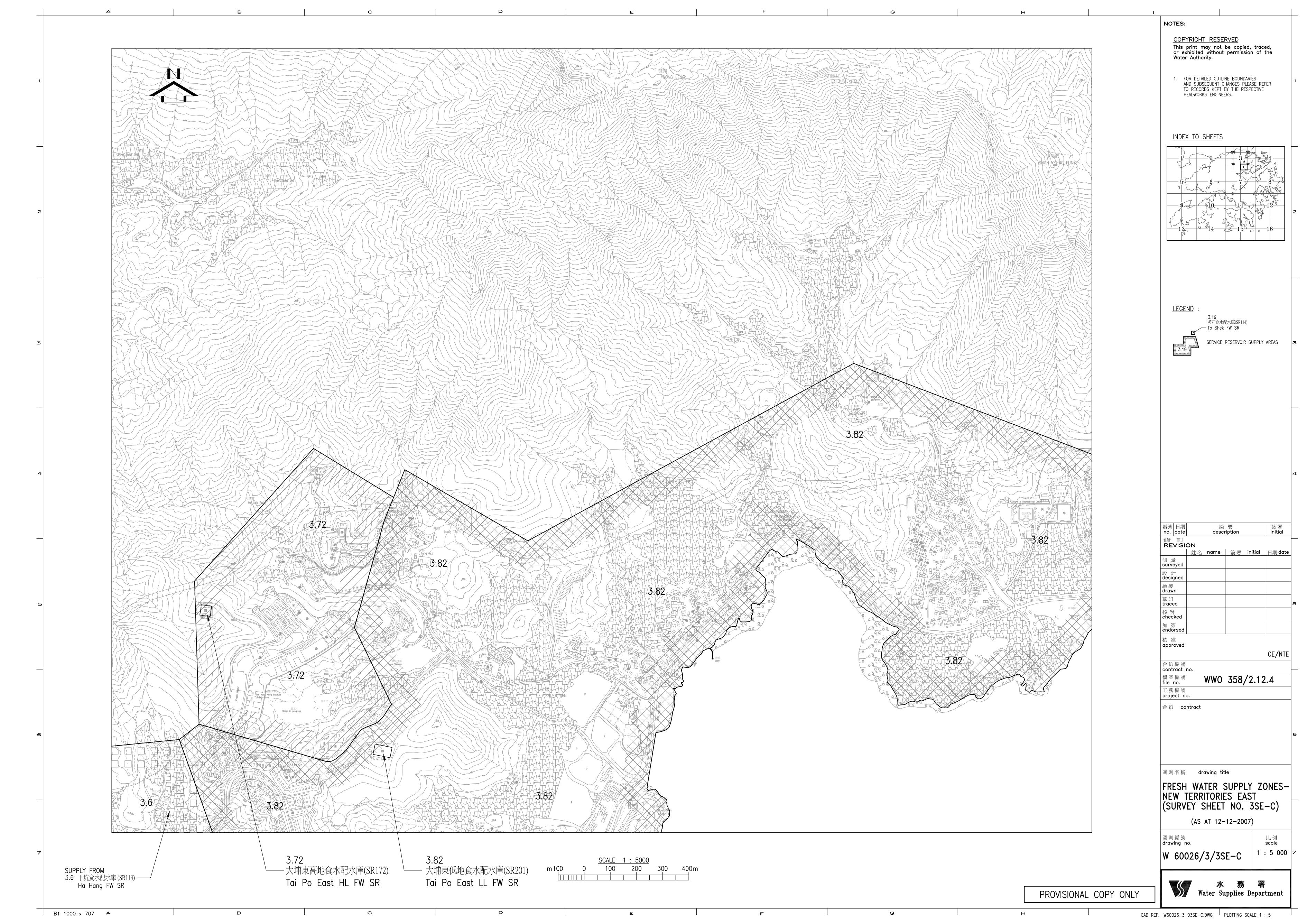
Table 2b Hydraulic Capacity of the Proposed Water Main

	Segment	Diameter (mm)	Material	Peak factor	Demand, Q (cu. m/day)	Factored Q (cu. m/s)	Area (m²)	Velocity of Distribution Main (m/s) (2)	Flow Rate of Water Main (m ³ /s)	% of water main occupied by the Proposed Site
Fresh Water	New connection to Water mains along Lo Fai Road (Site A)	150	PE	3	1459.1	0.051	0.018	2.87	0.051	100%
	New connection to Water mains along along Ting Kok Road (Site B)	100	PE	3	450.8	0.016	0.008	1.99	0.016	100%
	New Connection to Water main crossing Lo Fai Road along Ting Kok Road (Site A & Site B)	200	PE	2	573.8	0.013	0.031	0.42	0.013	100%
Salt Water	New Connection to Water main (Site A)	80	PE	2	439.8	0.010	0.005	2.03	0.010	100%
	New Connection to Water main (Site B)	50	PE	2	134.0	0.003	0.002	1.58	0.003	100%

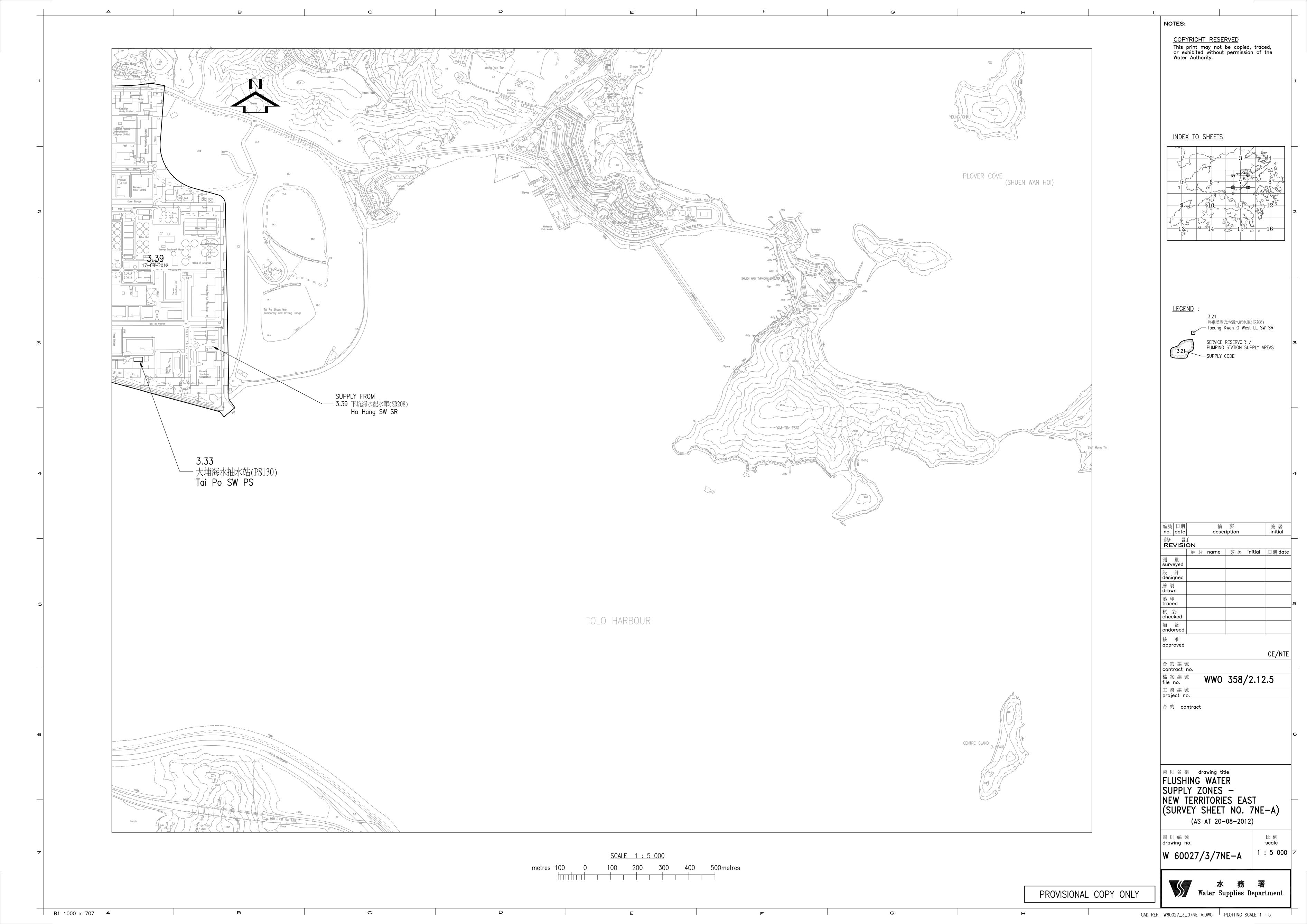
⁽¹⁾ Peak factor for distribution mains refers to Departmental Instruction No. 1309 from WSD

 $^{^{(2)}}$ Mean velocity of water mains assumed as 1.5 m/s; Velocity of distribution mains should be less than 3 m/s

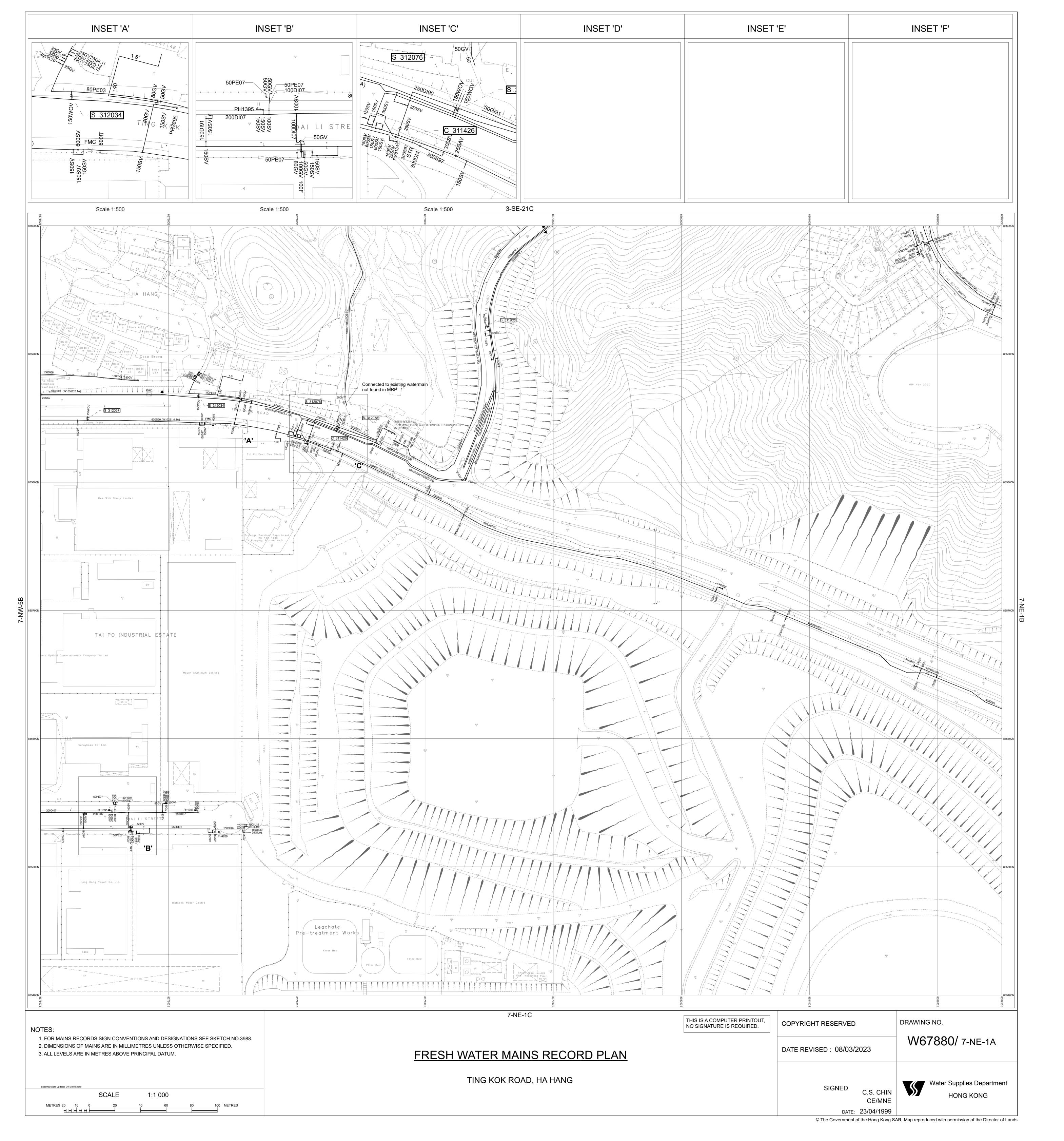


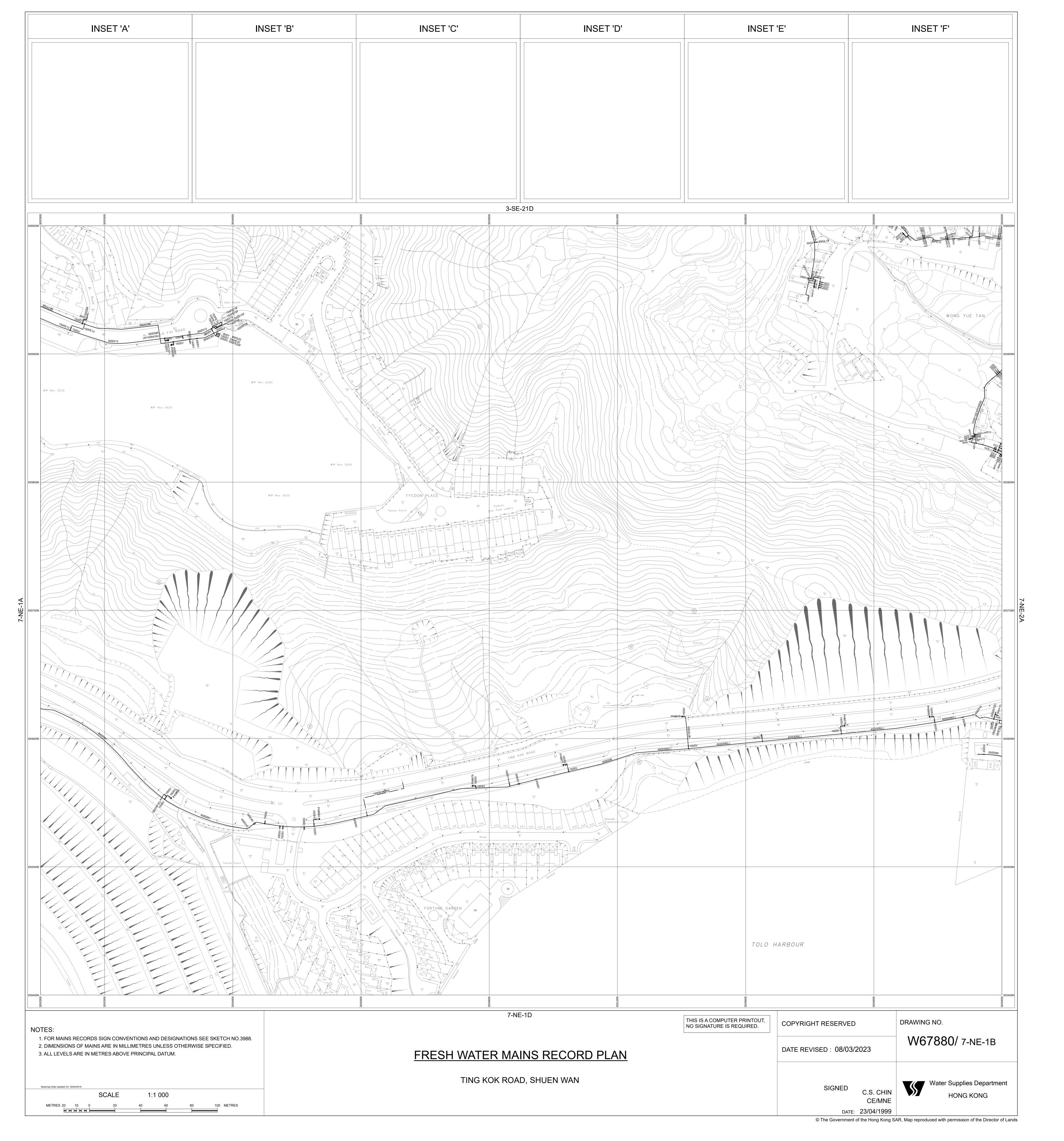


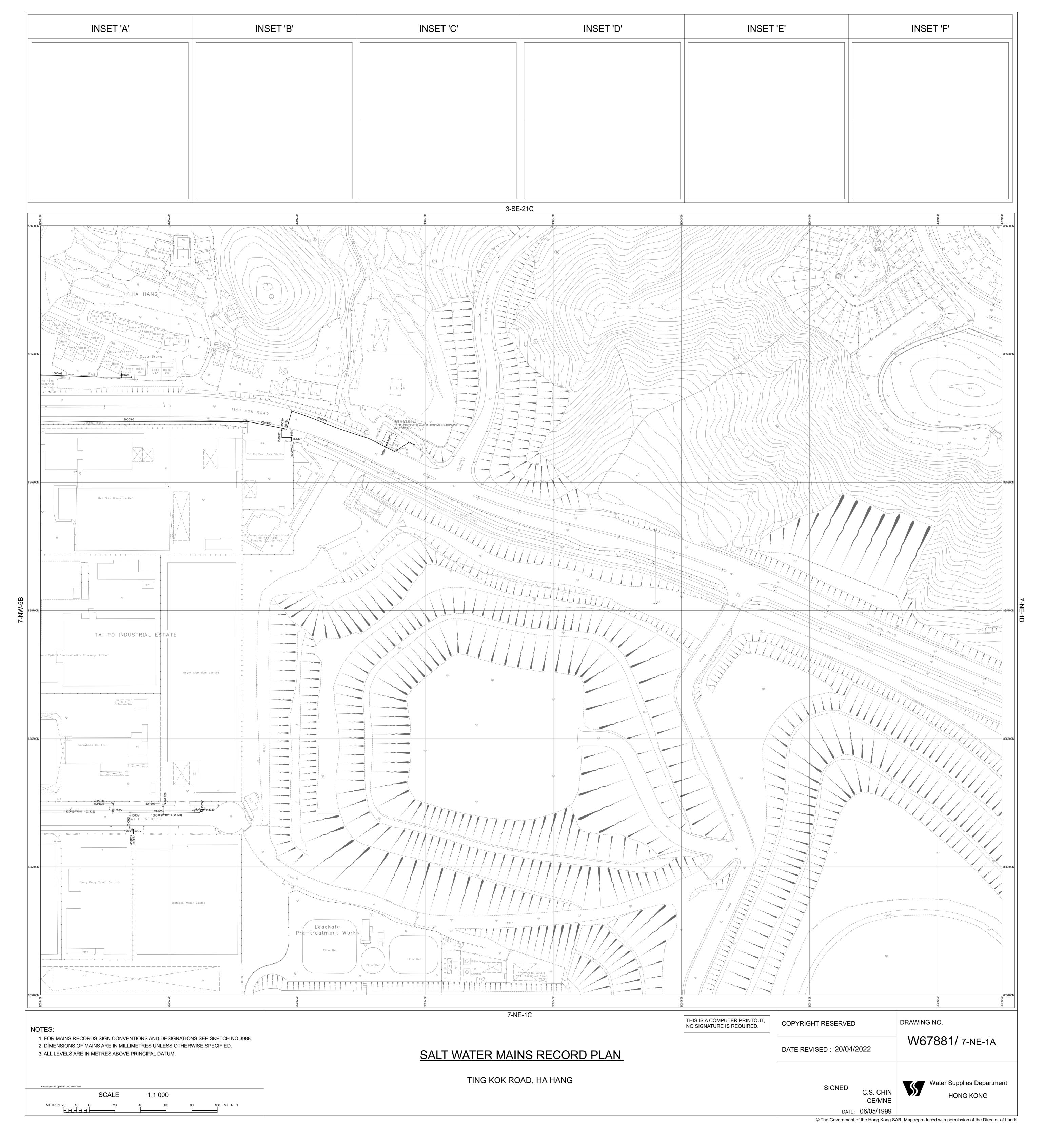












Andrew Lok

From: cy_lau@wsd.gov.hk

Sent: Friday, April 28, 2023 12:07 PM

To: Andrew Lok

Calvin Chiu; emily_cy_lee@wsd.gov.hk; Miko Wan; victoria_wh_suen@wsd.gov.hk;

y_lao@wsd.gov.hk

Subject: Fw: Water Supply Impact Assessment for a Proposed Public Residential Housing /

Starter Homes Development at UDWYT Lot 14RP (Site A) & UDWYT Lot 11 RP (Site

B), Wong Yue Tan, Tai Po - Enquiry for Existing Water Supply Network

Some people who received this message don't often get email from cy_lau@wsd.gov.hk. Learn why this is important

Dear Andrew,

Please note that the design reliable output of Tai Po SWPS is 38 MLD and the maximum average daily output is around 32MLD between April 2019 and Feb 2023. Thanks.

Regards, Anthony CY Lau E/NTE(HW1), WSD Tel. No. 2152 5610

---- Forwarded by CY LAU/WSD/HKSARG on 28-04-2023 12:01 ----

From: Andrew Lok <ANDREWLOK@ramboll.com>
To: "cy lau@wsd.gov.hk" <cy lau@wsd.gov.hk>

Cc: Calvin Chiu Cci Ca

"victoria_wh_suen@wsd.gov.hk" <victoria_wh_suen@wsd.gov.hk>

Date: 27-04-2023 15:41

Subject: RE: Water Supply Impact Assessment for a Proposed Public Residential Housing / Starter Homes Development at UDWYT Lot 14RP (Site A) & UDWYT Lot 11 RP (Site B), Wong Yue Tan, Tai Po - Enquiry for Existing Water Supply Network

Dear Anthony,

Thank you for the previous email. Could you provide the capacity of the Tai Po SWPS?

Kind regards

Andrew Lok

Graduate Environmental Consultant
D +852 3465 2820

andrewlok@ramboll.com

Ramboll Hong Kong Limited

From: cy_lau@wsd.gov.hk <cy_lau@wsd.gov.hk>

Sent: Wednesday, April 26, 2023 7:00 PM **To:** Andrew Lok <ANDREWLOK@ramboll.com>

Cc: Calvin Chiu <cchiu@ramboll.com>; emily_cy_lee@wsd.gov.hk; Miko Wan <MIKOWAN@ramboll.com>;

victoria_wh_suen@wsd.gov.hk

Subject: RE: Water Supply Impact Assessment for a Proposed Public Residential Housing / Starter Homes Development at UDWYT Lot 14RP (Site A) & UDWYT Lot 11 RP (Site B), Wong Yue Tan, Tai Po - Enquiry for Existing Water Supply Network

Dear Andrew,

The design capacity of Tai Po East Low Level Fresh Water Service Reservoir is 14600m3. The inflow data for the concerned FWSR is as follows:-

As for the SWSR, please note that the salt water supply system is operated as a balanced tank system and there are no data for consumption for individual SWSRs. The daily pumping data for Tai Po SWPS is instead provided for your information please. Thanks.

Regards, Anthony CY Lau E/NTE(HW1), WSD Tel. No. 2152 5610

From: Andrew Lok < ANDREWLOK@ramboll.com >

To: "cy lau@wsd.gov.hk" <cy lau@wsd.gov.hk>, "victoria wh suen@wsd.gov.hk" <victoria wh suen@wsd.gov.hk>, "emily cy lee@wsd.gov.hk"

<emily cy lee@wsd.gov.hk>

Cc: Calvin Chiu < cchiu@ramboll.com >, Miko Wan < MIKOWAN@ramboll.com >

Date: 25-04-2023 16:43

Subject: RE: Water Supply Impact Assessment for a Proposed Public Residential Housing / Starter Homes Development at UDWYT Lot 14RP (Site A) & UDWYT Lot 11 RP (Site B), Wong Yue Tan, Tai Po - Enquiry for Existing Water Supply Network

Dear Mr. LAU, Ms. LEE and Ms. SUEN,

Thank you for providing information for item 1-3. We would like to request information for item 4-5:

- 4. The designed capacity, average water demand (daily consumption) and the spare capacity of the Fresh & Saltwater Service Reservoirs
- 5. Any planned development within the supply zone of Fresh & Saltwater Service Reservoirs serving the Subject Site that needs to be accounted in the future and their fresh & saltwater demand

Due to the urgency of the project, we would be much appreciated if you could provide the requested information at your earliest convenience.

Should you have any query, please do not hesitate to contact the undersigned or Mr. Calvin Chiu at 3465 2811 (email: cchiu@ramboll.com). We sincerely seek your feedback on this matter. Thank you in advance for any assistance you can provide.

Kind regards

Andrew Lok

Graduate Environmental Consultant
D +852 3465 2820

andrewlok@ramboll.com

Ramboll Hong Kong Limited

From: emily cy lee@wsd.gov.hk <emily cy lee@wsd.gov.hk>

Sent: Tuesday, April 4, 2023 11:33 AM

To: Andrew Lok < ANDREWLOK@ramboll.com >

Cc: Calvin Chiu <cchiu@ramboll.com>; Miko Wan <MIKOWAN@ramboll.com>; cy lau@wsd.gov.hk;

victoria wh suen@wsd.gov.hk

Subject: RE: Water Supply Impact Assessment for a Proposed Public Residential Housing / Starter Homes Development at UDWYT Lot 14RP (Site A) & UDWYT Lot 11 RP (Site B), Wong Yue Tan, Tai Po - Enquiry for Existing Water Supply Network

Dear Andrew,

I refer to your email dated 09-03-2023 15:19 regarding captioned subject.