
Appendix H
Revised Water Supply Impact Assessment

**Proposed Land Sharing Pilot Scheme for a Site at
Various Lots in D.D. 115, Tung Shing Lei, Yuen Long**

**Water Supply Impact Assessment
June 2024**

AECOM Asia Co. Ltd.

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1. INTRODUCTION

1.1 Background

- 1.1.1 The Application Site is located at various lots in D.D. 115, Tung Shing Lei, Yuen Long. The Application Site is currently zoned “Residential (Group D)” “R(D)” on the approved Nam Sang Wai Outline Zoning Plan No. S/YL-NSW/8 and covers a site area of approximately 57,055m².
- 1.1.2 The site location plan for the Proposed Development is shown in **Figure 1**. AECOM Asia Co. Ltd. (AECOM) has been commissioned to carry out a Water Supply Impact Assessment (WSIA) to review the water supply for the Proposed Development and provide mitigation measures, if necessary.

1.2 Objective of this Submission

- 1.2.1 The Water Supply Impact Assessment assess the existing and water supply system, estimate the water demand of the Proposed Development, and suggest mitigation measures required to the existing water supply network.
- 1.2.2 The main objectives of this assessment include the followings:
- Identify the scope of the development
 - Identify the existing and planned water supply network in the vicinity of the development
 - Outline the methodology adopted in this assessment
 - Determine the water demand of the development
 - Recommend mitigation measures or upgrade works where appropriate due to the development.

2. DEVELOPMENT PROPOSAL

2.1 The Proposed Development

- 2.1.1 The Application Site has an area of approximately 57,055m² with a Domestic Gross Floor Area (GFA) of about 143,579m². The indicative development schedule is summarized in **Table 1** below for technical assessment purpose. The design year of population intake for both Public Housing and Private Housing is 2031.
- 2.1.2 10% increase in design numbers of population had been assumed in the water demand generation estimation for the proposed Public Housing development.

Table 1 - Development Schedule

Site Area (m ²)	~ 45,676
Proposed Domestic GFA (m ²)	~ 143,579
Public Housing Portion (m ²)	~ 93,400
Private Housing Portion (m ²)	~ 50,179
No. of Units	3,129
Public Housing Portion ⁽¹⁾	1,868
Private Housing Portion	1,261
Person-per-flat Ratio	
Public Housing Portion	2.8
Private Housing Portion	2.5
Residential Population	8,384
Public Housing Portion ⁽¹⁾	5,231
Private Housing Portion	3,153
GIC GFA (m ²)	~ 4,670
GIC Employee Density (Person/m ²) ⁽²⁾	0.033
GIC Employees	155
Clubhouse GFA (m ²)	~ 2,250
Clubhouse F&B Employee Density (Person/m ²) ⁽³⁾	0.051
Clubhouse F&B Employees	23
Clubhouse Personal Service Employee Density (Person/m ²) ⁽²⁾	0.033
Clubhouse Personal Service Employees	60
Retail GFA (m ²)	~ 2,445
Public Housing Portion (m ²)	~ 1,200
Private Housing Portion (m ²)	~ 1,245
Retail Employee Density (person/m ²) ⁽³⁾	0.051
Retail Employees	133
Kindergarten GFA (m ²) ⁽⁴⁾	1,000
No. of Student	160
No. of Staff and Teacher	11

Remark for Table 1:

- (1) As per Housing Department's comment, for Public Housing, 10% increase in the number of units (3,153) and population (5,231) will be included for assessment purpose.
- (2) A density of 3.3 employees per 100 m² GFA (for Community, Social & Personal Services) is adopted in accordance with the results of the "Commercial and Industrial Floor Space Utilization Survey" conducted by the Planning Department in 2004/2005.
- (3) A density of 5.1 employees per 100 m² GFA (for Restaurants, Private Commercial) is adopted in accordance with the results of the "Commercial and Industrial Floor Space Utilization Survey" conducted by the Planning Department in 2004/2005.
- (4) It is anticipated that the kindergarten area is 1,000 m². For assessment purpose, 8 classes are assumed in the kindergarten. A maximum of 160 students (max class size 20) and 20 staff and teacher (Staff and teacher to student ratio 1:8) are adopted in accordance with Operation Manual for Pre-primary Institutions published by Education Bureau and Social Welfare Department.

3. WATER SUPPLY SYSTEM OF THE APPLICATION SITE

3.1 Existing Water Supply System

- 3.1.1 Layout of the existing water supply system in vicinity of the Application Site is shown on **Figure 3**. The area falls within the supply zone of Au Tau Water Treatment Works (ATWTW) via Au Tau Fresh Water Reservoir. The output of ATWTW is 250 MLD.
- 3.1.2 The Application Site locates within the supply zone of the Au Tau Fresh Water Service Reservoir (ATFWSR). The storage capacity of ATFWSR is about 25,384m³. The ATFWSR is located at about 1.5 km away to the south-east of the Application Site. A 900mm distribution main is running underneath Yau Shin Street in close vicinity of Castle Peak Road. There are also a few 80mm and 50mm mains within the site. In vicinity of the Application Site, no flushing water main can be identified.

4. WATER SUPPLY STUDY

4.1 Water Demand

4.1.1 Assumptions are made for the mean daily unit fresh and flushing water demands for various classes of consumer for this assessment. For planning purpose, R1 residential type for public housing development, R2 residential type for private housing development, school type, community, social & personal services type have been used for different users in the estimation; and service trades approach had been adopted for retail population. A summary table of the mean daily unit demands is shown in **Table 2**. The calculation can be found in **Appendix W1**. It is anticipated that population intake will commence in 2031.

Table 2 – Estimated Water Demand

Supply	Flow Type	Unit Demand (L/h/d)		Total Demand (m³/d)
		Domestic	Non-Domestic	
Fresh Water	R1	230	-	1,203
Flushing Water	R1	70	-	366
Fresh Water	R2	300	-	946
Flushing Water	R2	70	-	221
Fresh Water	Service Trades	-	40	335
Fresh Water	School	-	25	5
Flushing Water	School	-	25	5
Fresh Water	GIC	-	280	43
Total Fresh Water Demand:				2,532
Total Flush Water Demand:				592
Total Water Demand:				3,166

Remark for Table 2:

(1) Refer to Table 1 for the design population calculation.

4.2 Hydraulic Review of Existing Water Mains

- 4.2.1 The capacity of ATFWSR is 25,384 m³ and the estimated water consumption of the Proposed Development is 2,554 m³/d (including 10% increase in design numbers of population), which is approximately 10% of the FWSR capacity. Therefore, the proposed development would not post any significant impact to ATFWSR.
- 4.2.2 An existing 900 mm diameter distribution main is running underneath Yau Shin Street near Castle Peak Road. The required water consumption is equivalent to 2.40% of the existing 900mm distribution main. The hydraulic checking for the existing water mains is shown in **Appendix W1**.

4.3 Proposed Water Supply System

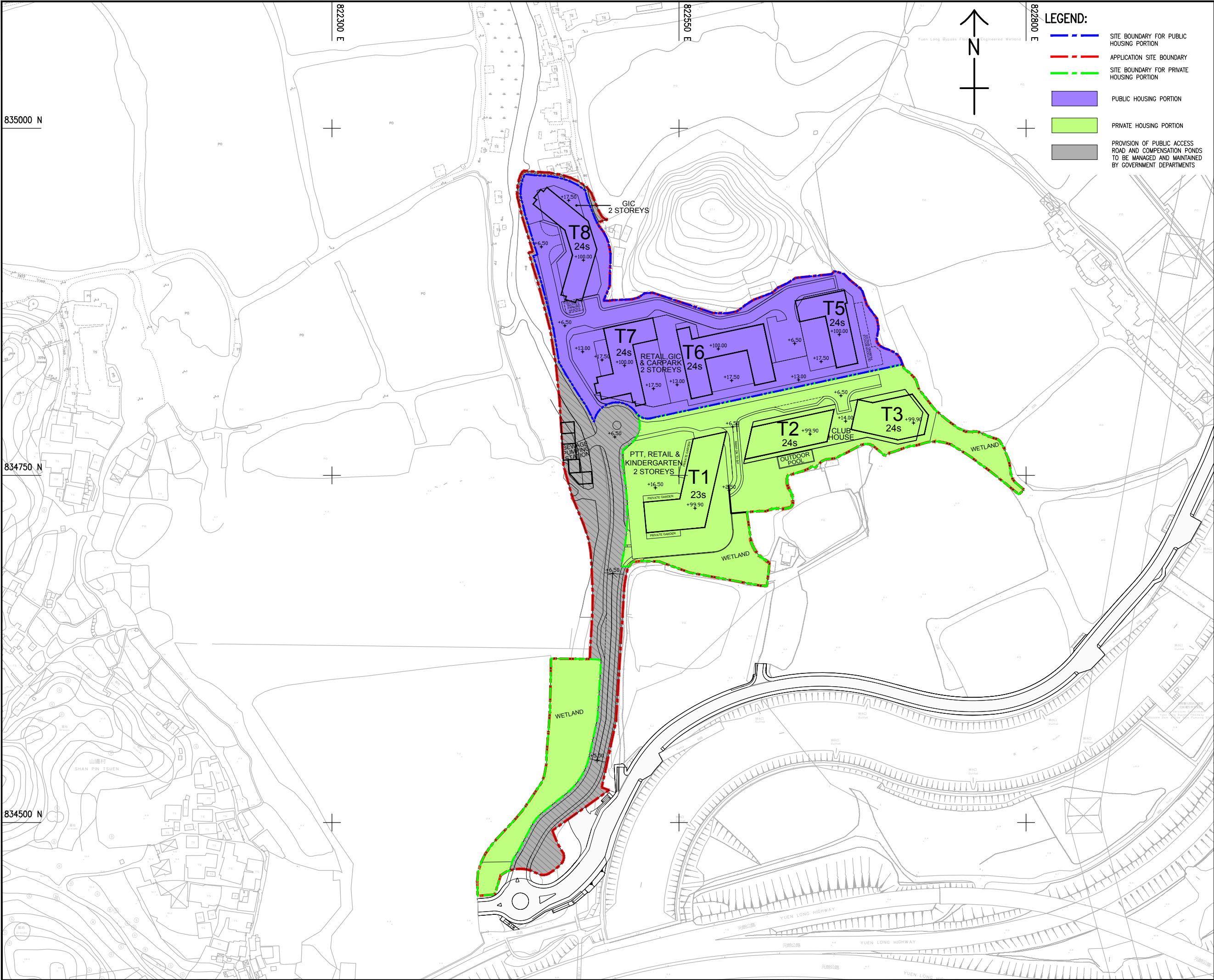
- 4.3.1 To provide water supply to the Proposed Development, a new 400mm diameter watermain is required to be branched off from the existing fresh water mains for supply of fresh water. The proposed connection to effect water supply to the Proposed Development is shown on **Figure 4**. The hydraulic calculation is shown in **Appendix W1**. The existing DN100 salt water main at Wong Uk Tsuen to be used for supplying flushing water to the proposed development is shown on **Figure 5**.
- 4.3.2 The hydraulic capacity of the proposed water supply arrangement was checked for the normal case and fire-fighting case. **Appendix W1** refers.
- 4.3.3 The existing distribution mains within the Application Site are proposed to be abandoned. Please refer to **Figure 3** for the proposed abandonment of water mains.
- 4.3.4 The water supply connections point for the Application Site should be subject to the detail design at later stage and comment from WSD.
- 4.3.5 Since the Application Site is located at low elevation, no additional pumping facilities will be required for the water supply to the Proposed Development. However, new reticulation system within the Application Site will be required. There should be separate reticulation system for potable and flushing water supply, and with separate connection points to the existing system.

5. CONCLUSION

- 5.1 The Proposed Development is located at the water supply zone of Au Tau Fresh Water Service Reservoir (ATFWSR) and there is existing salt water supply at Wong Uk Tsuen.
- 5.2 Based on the above assessment, the existing 900mm diameter fresh water distribution main running underneath Yau Shin Street near Castle Peak Road is adequate to meet the fresh water demand required for the Application Site. It is proposed that a new 400mm diameter fresh water main to connect the existing water supply system. It is also proposed to use the DN100 salt water main at Wong Uk Tsuen for supplying flushing water to the Proposed Development. As such, the Proposed Development is considered to be acceptable in water supply terms.”

Figures

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Project Management Initials:
10/04/2024
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PROJECT
PROPOSED RESIDENTIAL DEVELOPMENT IN VARIOUS LOTS (TO BE KNOWN AS LOT 1696) IN D.D. 115 AT TUNG SHING LEI, YUEN LONG

CLIENT

CONSULTANT
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NO.	DATE	DESCRIPTION	CHK.

STATUS

SCALE
A3 1 : 2500

DIMENSION UNIT
METRES

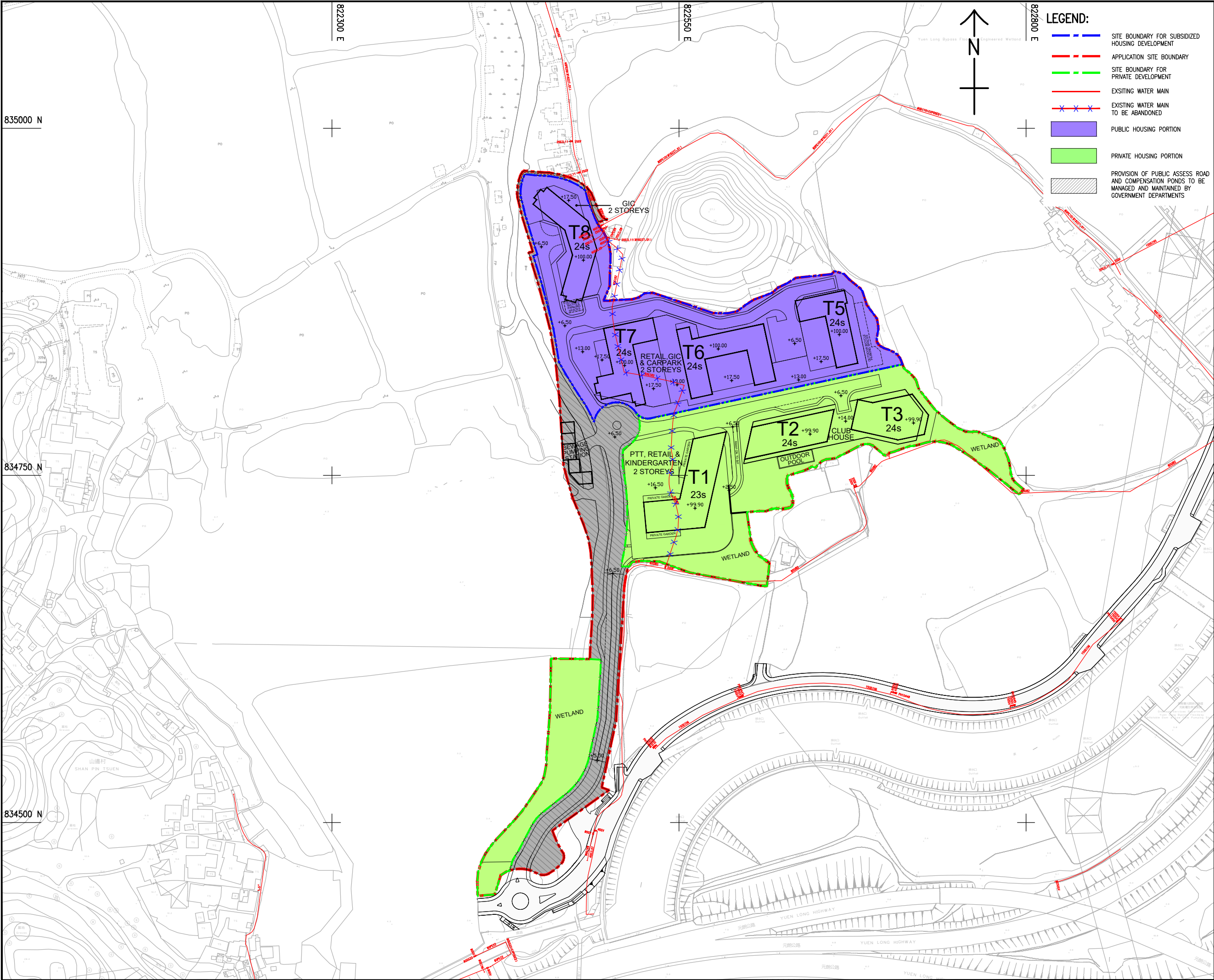
KEY PLAN

PROJECT NO.
60597457

SHEET TITLE
PROPOSED MASTER LAYOUT PLAN

SHEET NUMBER
60597457/WSIA2/FIGURE 2

ISO A1 594mm x 841mm
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Designer:
Project Management Initials:



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PROJECT
PROPOSED RESIDENTIAL
DEVELOPMENT IN VARIOUS
LOTS (TO BE KNOWN AS LOT
1696) IN D.D. 115 AT
TUNG SHING LEI, YUEN LONG

CLIENT
YUE LONG

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ISSUE/REVISION
001

NO.	DATE	DESCRIPTION	CHK.

STATUS
001

SCALE
1:2500
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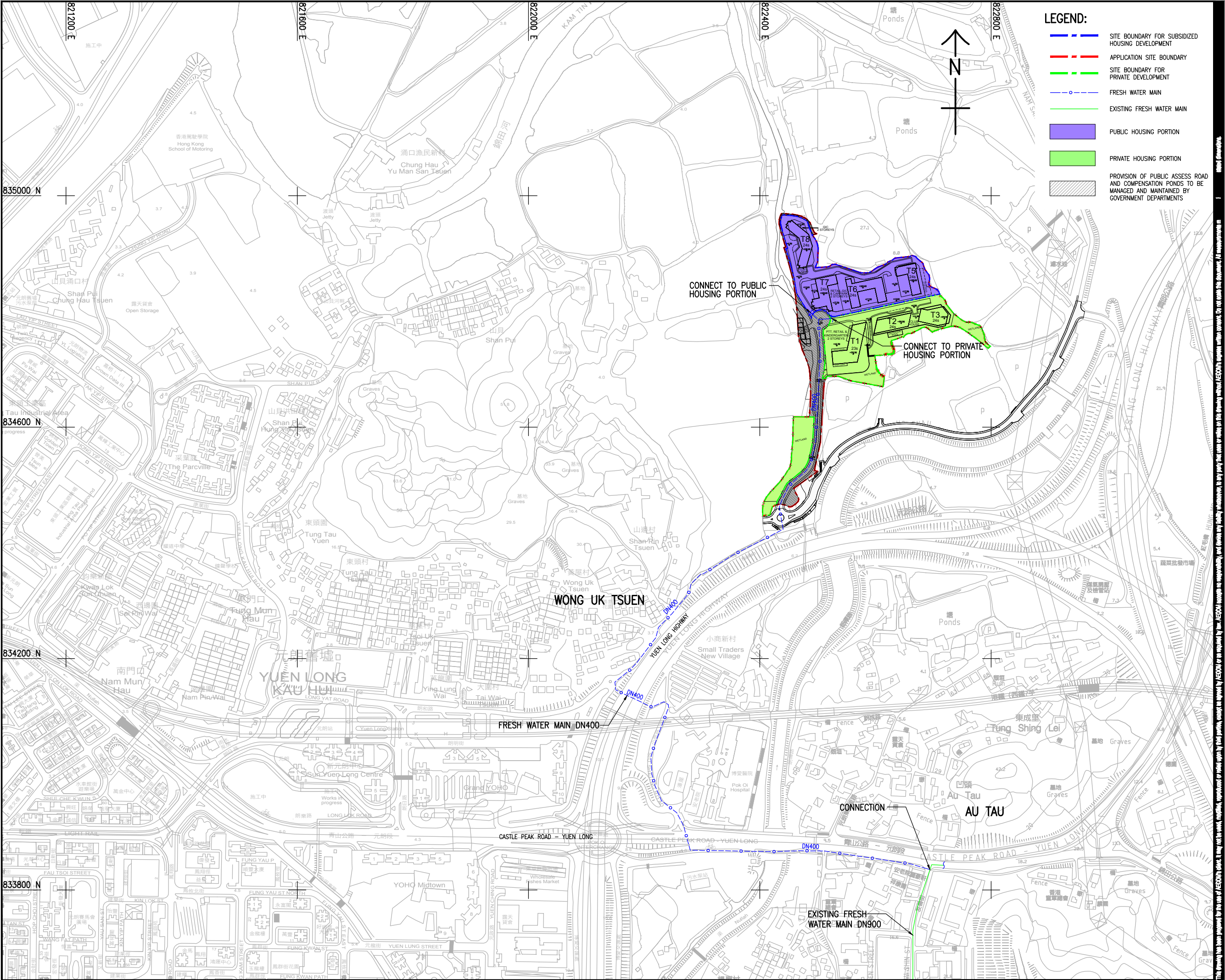
KEY PLAN
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PROJECT NO.
60597457
CONTRACT NO.
1696

SHEET TITLE
EXISTING WATER SUPPLY LAYOUT

SHEET NUMBER
60597457/WSIA2/FIGURE 3

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- LEGEND:**
- SITE BOUNDARY FOR SUBSIDIZED HOUSING DEVELOPMENT
 - APPLICATION SITE BOUNDARY
 - SITE BOUNDARY FOR PRIVATE DEVELOPMENT
 - FRESH WATER MAIN
 - EXISTING FRESH WATER MAIN
 - PUBLIC HOUSING PORTION
 - PRIVATE HOUSING PORTION
 - PROVISION OF PUBLIC ACCESS ROAD AND COMPENSATION PONDS TO BE MANAGED AND MAINTAINED BY GOVERNMENT DEPARTMENTS

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PROJECT

PROPOSED RESIDENTIAL DEVELOPMENT IN VARIOUS LOTS (TO BE KNOWN AS LOT 1696) IN D.D. 115 AT TUNG SHING LEI, YUEN LONG

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KEY PLAN

PROJECT NO.

60597457

CONTRACT NO.

SHEET TITLE

PROPOSED FRESH WATER EXTERNAL LAYOUT

SHEET NUMBER

60597457/WSIA2/FIGURE 4

60597457/WSIA2/FIGURE 5

Appendix W1

Water Demand & Hydraulic Calculation

Development Type		GFA (m ²)	Avg. Unit Size (m ²)	No. of Units ⁽²⁾	Person/Unit	Person/m ²	Population ⁽²⁾	Fresh Water UDD (L/head/day)	Daily Fresh Water Demand (m ³ /day)	Flush Water UDD (L/head/day)	Daily Flush Water Demand (m ³ /day)
Private Residential		50,179	39.79	1,261	2.5	0.063	3,153	300	946	70	221
Public Housing ⁽²⁾		93,400	50.00	1,868	2.8	0.056	5,231	230	1,203	70	366
Kindergarten ⁽¹⁾		1,000		/			180	25	5	25	5
GIC		4,670		/			154	280	43	/	/
Child Care Centre (CCC)		0		/			0	280	0	/	/
		Total Residential Population					8,384				
Retails:	Service Trades for a Population of	8,384			/			40	335	/	
							Total Fresh Water Demand (m ³ /day)	2,532	Total Flush Water Demand (m ³ /day)	591	

Note 2: Assuming 10% increase of Public Housing numbers of units and population as per Housing Department's comment.

Fresh Water:	Nominal Diameter of existing fresh water mains =	900	mm	WSD Manual of Mainlaying Practice CI 1.2.1
	=	0.9	m	
	Pipe Area =	0.636	m ²	
	Assuming that the flow velocity of watermain =	3.0	m/s	
	The flow capacity of watermain =	1.909	m ³ /s	
The water demand of the proposed development is equivalent to		1.89%	of the existing water main	
	Estimated Fresh Water Demand for Proposed Development =	2,532	m ³ /day	
	=	0.029	m ³ /s	
	Peaking Factor for Fresh Water Distribution Mains =	3		
	Required Peak Flow Rate for Proposed Development =	0.088	m ³ /s	
To supply water for the Proposed Development,				
	Nominal Diameter of Proposed Pipe Size =	400	mm	
	=	0.4	m	
	Pipe Area =	0.126	m ²	
	Assuming that the flow velocity of watermain =	2.0	m/s	WSD Manual of Mainlaying Practice CI 1.2.1
	The flow capacity of watermain =	0.251	m ³ /s	
	Factor of Safety =	2.86		
	=>	OK		

Proposed Land Sharing Pilot Scheme Development at Various Lots in DD115, Tung Shing Lei, Yuen Long				7/21/2023	
WSIA - Water Demand Estimation for Fresh Water					
Hydraulic Analysis by Flow Velocity under Fire-fighting Case					
Fresh Water:	Nominal Diameter of existing fresh water mains =	900	mm	WSD Manual of Mainlaying Practice Cl 1.2.1	
	=	0.9	m		
	Pipe Area =	0.636	m ²		
	Assuming that the flow velocity of watermain =	3.0	m/s		
	The flow capacity of watermain =	1.909	m ³ /s		
	Fire-fighting Requirement =	6,000	m ³ /day		
	The water demand of the proposed development is equivalent to 5.53% of the existing water main				
	Estimated Fresh Water Demand for Proposed Development =	2,532	m ³ /day	WSD Manual of Mainlaying Practice Cl 1.2.1	
	=	0.029	m ³ /s		
	Peaking Factor for Fresh Water Distribution Mains =	3			
	Additional Flow under Fire-fighting Case =	0.069	m ³ /s		
	Required Peak Flow Rate for Proposed Development under Fire-fighting Case =	0.157	m ³ /s		
	To supply water for the Proposed Development under Fire-fighting Case,				
	Nominal Diameter of Proposed Pipe Size =	400	mm		
	=	0.4	m	WSD Manual of Mainlaying Practice Cl 1.2.1	
	Pipe Area =	0.126	m ²		
	Assuming that the flow velocity of watermain =	2.0	m/s		
	The flow capacity of watermain =	0.251	m ³ /s		
	Factor of Safety =	1.60			
	=>	OK			