Appendix H – Water Supply Impact Assessment

Water Supply Impact Assessment

(May 2025)

AECOM



Water Supply Impact Assessment Section 16 Planning Application for Proposed Amendments to an Approved Comprehensive Residential Development Scheme and Minor Relaxation of Gross Floor Area and Building Height Restrictions at Various Lots in D.D. 385 and Adjoining Government Land, Tai Lam Chung, Tuen Mun

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Water Supply Impact Assessment Section 16 Planning Application for



Proposed Amendments to an Approved Comprehensive Residential Development Scheme and Minor Relaxation of Gross Floor Area and Building Height Restrictions at Various Lots in D.D. 385 and Adjoining Government Land, Tai Lam Chung, Tuen Mun

DRAWINGS

WSIA/401	Location Plan
WSIA/402	Master Layout Plan
WSIA/403	Location Plan of Fresh Water Service Reservoir
WSIA/404	Existing Fresh Water Record Plan
WSIA/405	Fresh Water Connection Layout Plan
WSIA/406	Existing Flushing Water Record Plan
WSIA/407	Flushing Water Connection Layout Plan

APPENDICES

APPENDIX A	Hydraulic	Review	for	Existing	and	Proposed	Watermains	located

underneath Tai Lam Chung Road

APPENDIX B Hydraulic Review for Existing and Proposed Water Main for Village

Housing Sites

APPENDIX C Water Main Record Plan

APPENDIX D Approved Gazette Plan for Luen Hong Lane



1 INTRODUCTION

1.1 Background

- 1.1.1 AECOM Asia Company Limited was commissioned to be the engineering consultant for Water Supply Impact Assessment (WSIA) to support the proposed residential development at Tai Lam Chung, Tuen Mun.
- 1.1.2 The Application Site situates at the east of Tai Lam Chung Nullah, adjacent to Hong Kong Customs College. The location of the Application Site is shown in **Drawing No. WSIA/401**.
- 1.1.3 The Application Site comprises the proposed development and site formation works for three village housing sites and provision of public facilities. The Master Layout Plan is shown in **Drawing No. WSIA/402.**
- 1.1.4 This WSIA report forms part of the technical supporting documents for the proposed development under Section 16 Application of the Town Planning Ordinance.

1.2 Purposes of this Submission

- 1.2.1 This report outlines the assessment results of the potential water supply impact caused by the proposed development. The main objectives of this assessment include the followings:
 - a) Review the existing water supply system;
 - b) Estimate the water demand according to the development schedule of the proposed development;
 - c) Outline the methodology adopted in this assessment;
 - d) Identify any potential impact on the current water supply system due to future water supply demand from the proposed development;
 - e) Propose water supply mitigation measures where appropriate to mitigate the potential water supply impact;
 - f) Discuss the responsibility of the maintenance aspects of the proposed water supply system.



2 EXISTING CONDITION AT THE SITE

2.1.1 There is no saltwater supply in the vicinity of the Application Site, flushing water is currently supplied by Temporary Mains Fresh water (TMF) mains. The source of portable water and flushing water were from Siu Lam and Siu Lam No. 2 Fresh Water Service Reservoirs (FWSR). The location is shown in **Drawing No. WSIA/403.**

2.2 Fresh Water Supply System

2.2.1 The existing fresh water supply system in the vicinity of the Application Site is shown in **Drawing No. WSIA/404**.

Proposed Development Site

2.2.2 There is an existing 250mm fresh water main along the Tai Lam Chung Road, which tee-off from an existing 400mm fresh water main along Castle Peak Road – Tai Lam.

Village Housing Site

2.2.3 There are existing 80mm to 150mm fresh water mains across the village housing sites.

2.3 Flushing Water Supply System

2.3.1 The existing flushing water supply system in the vicinity of the Application Site is shown in **Drawing No. WSIA/406**.

Proposed Development Site

2.3.2 There is an existing 150mm TMF mains along Tai Lam Chung Road, which tee-off from an existing 200mm TMF mains along Castle Peak Road - Tai Lam.

Village Housing Site

2.3.3 There are no existing flushing water mains across the village housing sites.



3 DEVELOPMENT PROPOSAL

3.1 Overview of Development Proposal

3.1.1 The proposed development comprises 7 residential towers and 17 houses, two club houses, landscaped open spaces, commercial and retail areas, and covered transport layby. The development schedule is shown in **Table 3-1**.

Table 3-1 Development Schedule

Total Application Site Area (m²) (about) (1)	61,127
Development Site Area (m²) (about)	46,493
No. of Residential Blocks	24
• Towers	7
Houses	17
No. of Units	2,670
Tower Units	2,653
House Units	17
Retail / Commercial (2)	2,000
Clubhouse GFA (m²) (about)	3,500

Remarks:

- (1) Application Site is formulated largely based on the Pink, Purple, Orange and part of Green Areas of the draft land grant plan under lot to be known as TMTL No. 417 currently under process
 - Pink Area: Residential Portion (about 46,493m²)
 - Purple Area: Formation Site for Village Housing; Orange Area: Site for Provision of Public Facilities; Green Area: Provision / Modification of Village Road, Pedestrian Access to Wong Uk Tsuen and Pedestrian Route to Burial Ground (about 14,634m² in total)
- (2) Include retail / commercial uses for 'Shop and Services', 'Eating Place, 'School' (nursery / kindergarten / language, computer, commercial or tutorial schools / technical institutes / other types of schools providing interests and hobby related courses for subjects such as arts, ballet and etc.), 'Place of Entertainment' and 'Place of Recreation, Sports or Culture' uses at the retail / commercial portion

3.2 Village Housing Sites

- 3.2.1 There are also three village housing sites within the Application Site boundary. The location of the village housing sites is shown in **Drawing No. WSIA/402.**
- 3.2.2 According to the lease conditions, the applicant is responsible for the site formation of the village housing sites.



4 ASSESSMENT METHODOLOGY AND ASSUMPTION

4.1 Water Demand

4.1.1 A summary of the unit daily demand (UDD) used for different development types is shown in **Table 4-1** below.

Table 4-1 – Unit Demand

Development Type Flow Type		Fresh Water UDD (L/head/day)	Flushing Water UDD (L/head/day)
	Traditional Village	300	106
Domestic	Private Residential – R2	300	106
	Private Residential – R3/R4	390	106
Non-domestic	Service Trades	35	/

4.2 Design Population

4.2.1 A summary of design population is shown in **Table 4-2** below.

Table 4-2 – Summary of Design Population

Development Type	No. of Units	PPF ⁽¹⁾	Population	Total	
Proposed Development					
Tower Units	2653	2.8	7,429	7 407	
House Unit	17	4	68	7,497	
Village Housing Sites					
Traditional Village	240	2.8	672	672	

Remarks:

4.3 Peaking Factors

- 4.3.1 The peak demand factors below shall be adopted for design:
 - Peak flow rate in fresh water distribution mains = 3 x mean daily demand (MDD)
 - Peak flow in flushing water distribution mains = 2 x mean daily demand (MDD)

⁽¹⁾ Assuming a Person-Per-Flat ratio of 2.8 for tower units and traditional village as per the 2021 Population Census under District Council Constituency Areas; Assuming a Person-Per-Flat ratio of 4 for house units for conservative approach.



4.4 Fire-fighting

4.4.1 Water supply for fire-fighting service has been considered in this WSIA. Fire-fighting requirement for residential zone is 6,000m³/day with discharge pressure of 17m head. The fire hydrant should be of standard pattern with minimum output pressure of not less than 25 psi. With multiple hydrants operating at the same time, total output of not less than 4,000L/min shall last for 60 minutes. **Table 4-4** summarizes the fire-fighting requirements.

Table 4-4 – Fire Fighting Requirements

Requirements	Minimum Values
Minimum fresh water supply	6,000 m ³ /day
Discharge pressure	17m
Minimum output not less than 25 psi	4,000 L/min (5,760m³/day)
	which lasts for an hour
	(i.e., 4,000x60 = 240,000L/hour/day or 240m³/hour/day)

≤ 3 m/s

4.5 Design Velocity and Head of Flow

4.5.1 The desirable flow velocities for hydraulic checking are as follows:

Maximum velocity (under peak flow condition)

>DN700

Fresh water mains:

	>B14700	_ 0 111/0				
	DN700 – DN525	≤ 2.5 m/s				
	DN450 – DN375	≤ 2 m/s				
	DN300 - DN200	≤1.5 m/s				
Flushing water mains:						
	≥DN1000	≤ 3 m/s				
	≥DN1000 DN900 – DN800	≤ 3 m/s ≤ 2.5 m/s				
	DN900 – DN800	≤ 2.5 m/s				



Minimum velocity (under peak flow condition)

Fresh water mains: ≥ 0.9 m/s

Flushing water mains: ≥ 0.9 m/s

- 4.5.2 The pipeline shall have a minimum gradient of 1:400. Pipes shall be laid at a minimum separation of 300 mm away from existing utilities and underground structures.
- 4.5.3 The adopted minimum residual heads at extremity of the fresh water and flushing water supply system for the proposed development and village housing sites are as follow:

Fresh water: 30m

Flushing water: 15m

4.6 Estimation of Development Water Demand

Proposed Development Site

4.6.1 By adopting the aforementioned design parameters, the fresh water demand and flushing water demand required by the proposed development are estimated to be 2,771 m³/day and 876 m³/day respectively upon full occupation. The water demand estimation is calculated in **Table 4-5** below.

Table 4-5 – Water Demand Estimation of the Proposed Development

Development	Flow Type Do	Population	Fresh Water UDD	Flushing Water UDD	Water Dema	and (m ³ /day)
Туре	Flow Type		(L/head/day)	(L/head/day)	Fresh Water	Flushing Water
Domestic	Private Residential – R2	7,429	300	106	2,229	788
Domestic	Private Residential – R3/R4	68	390	106	27	8
Non-domestic	Service Trade	7,497	35	-	263	-
Required water demand					2,519	796
Total demand (with 10% contingency)					<u>2,771</u>	<u>876</u>

<u>Remarks:</u>

Daily water demand does not include water demand for fire-fighting. Service trade adopted 100% of domestic population.

Village Housing Site

4.6.2 The fresh water demand and flushing water demand required by the village housing sites are estimated to be 226 m³/day and 72 m³/day respectively upon full occupation. The water demand estimation is calculated in **Table 4-6** below.



Table 4-6 – Water Demand Estimation of the Village Housing Sites

Development	ent Flow Type Pop	Population	Fresh Water UDD	Flushing Water UDD	Water Dem	nand (m³/d)
Туре			(L/head/day)	(L/head/day)	Fresh Water	Flushing Water
Domestic	Village	672	300	106	202	72
Non-domestic	Service Trade	672	35	-	24	-
Required water demand					226	72

Remarks:

Daily water demand does not include water demand for fire-fighting. Service trade adopted 100% of domestic population.

4.6.3 Since the village housing arrangement plan is currently unavailable, each pipe tee-off size is conservatively estimated to handle 50% of the total water demand for each village housing site. The calculation of pipe size estimation is shown in **Appendix B**.

5 POTENTIAL WATER SUPPLY IMPACTS AND MITIGATION MEASURES

5.1 Fresh Water Supply System for the Proposed Development Site

- 5.1.1 As mentioned in **Section 2.2** there are existing fresh water supply in the vicinity of the Application Site. At the west of the site, a 300mm fresh water main is proposed to tee-off from the existing 400mm fresh water main along Tai Lam Chung Road to supply fresh water to the Proposed Development. The proposed 300mm fresh water main is approximately 320m in length.
- 5.1.2 The proposed fresh water supply alignment is shown in **Drawing No. WSIA/405.** The hydraulic review of existing water mains and the proposed water mains are shown in **Appendix A**.
- 5.1.3 The size of the proposed fresh water supply system within the site and associated fittings will be further developed in detailed design stage.

5.2 Flushing Water Supply System for the Proposed Development Site

- 5.2.1 As mentioned in **Section 2.3**, since there is no saltwater supply in the vicinity of the Application Site, flushing water is supplied by TMF mains in the vicinity of the Proposed Development.
- 5.2.2 At the west of the site, a 150mm flushing water main is proposed to tee-off from the existing 150mm TMF mains along Luen Hong Lane to supply flushing water to the Proposed Development. The proposed 150mm flushing water main is approximately 70m in length.
- 5.2.3 The proposed flushing water supply alignment is shown in **Drawing No. WSIA/407.** The hydraulic review of existing water mains and the proposed water mains are shown in **Appendix A**.
- 5.2.4 The size of the proposed flushing water supply system within the site and associated fittings will be further developed in the detailed design stage.



5.3 Water Supply System for Village Housing Sites

Fresh Water Supply System

5.3.1 As mentioned in **Section 2.2**, there are existing 80mm to 150mm fresh water mains across the village housing sites. It is proposed to tee-off a 50mm fresh water main to supply fresh water demand, not exceeding 25m³/day in total. The proposed fresh water supply alignment is shown in Drawing No. **WSIA/405.**

Flushing Water Supply System

- 5.3.2 As mentioned in **Section 2.3**, there are no existing flushing water mains across the village housing sites. It is proposed to extend the flushing water mains along Luen Hong Lane to the proposed village housing sites and provide a 25mm connection tee for the flushing water supply. The proposed flushing water supply alignment is shown in **Drawing No. WSIA/407**.
- 5.3.3 The hydraulic review of existing water mains and the proposed water mains for village housing sites are shown in **Appendix B**.

5.4 Proposed Fire-Fighting System

- 5.4.1 The provision of fire hydrants and fire mains is in accordance with the relevant stipulations in "Technical Circular No. 4/2010: Fire Mains and Hydrants on New Trunk Roads and Elevated Highway Structures" published by Highway Department (HyD). The average spacing of fire hydrants to at-grade trunk road shall be at a distance of 100m. The detailed arrangement will be submitted to Fire Services Department (FSD) for approval during detailed design stage.
- 5.4.2 The provision of fire-fighting requirements are mentioned in **Section 4.4**. The water supply with discharge pressure of 1.7bar (17m head) and flow of 4,000L/min that lasts for one hour will be provided.
- 5.4.3 A 150mm tee-off separate connection is provided for the fire-fighting water connection. The proposed tee-off is shown in **Drawing No. WSIA/405.**

5.5 Waterworks Impact Assessment

5.5.1 According to the Water Main Record Plan provided by the Water Supplies Department (WSD) (**Appendix C**), sections of the WSD Access Road and certain water mains are located within the boundary of the Development Site.

WSD Access Road

5.5.2 A future village access will be constructed as shown in the approved gazette plan in **Appendix D.** This future village access will ensure the proper access for the WSD.

Water Mains

5.5.3 Certain water mains fall within the Development Boundary and currently supply water to an existing public toilet. The public toilet will be relocated, and the water mains within the Development Site will be demolished after the existing public toilet is relocated.



- 5.5.4 The details of the demolition will be designed at a later stage. The demolition of water mains will be carried out in accordance with WSD's standards and procedures to minimize any potential impact on water supply services.
- 5.5.5 Due to the planned realignment of future village access, some of the existing water mains will need to be diverted to accommodate the new alignment. The proposed diversion works are shown in **Drawing No. WSIA/405**.

6 MAINTENANCE RESPONSIBILITY

Proposed Development Site

- 6.1.1 The Applicant will be responsible for construction of all proposed water supply facilities within the development site boundary including all internal water mains, water supply lead-in valves and those proposed water distribution pipes.
- 6.1.2 The Applicant will be responsible for the maintenance of all necessary water supply facilities within the private development portion.

Village Housing Site

- 6.1.3 The Government will be responsible for the construction and maintenance of waterworks connecting to the three village housing sites that are located outside the boundaries of the village housing sites.
- 6.1.4 The Applicant will be responsible for providing reserved water supply tees for both fresh water and flushing water use, respectively, for each village housing site for future connection.

Waterworks Facilities

- 6.1.5 The Applicant is responsible for the construction of all necessary diversion or abandonment works for existing water mains. The proposed works are indicated in Drawing No. **WSIA/405** and **407**.
- 6.1.6 The Government will be responsible for the maintenance of all necessary water supply facilities outside the private development portion.

7 CONCLUSION

- 7.1.1 The Application Site is located at the Eastern side of Tai Lam Chung Nullah adjacent to Hong Kong Customs College. The location plan can be referred to **Drawing No. WSIA/401.**
- 7.1.2 The Application Site comprises the proposed development and site formation works for three village housing sites and provision of various public facilities.
- 7.1.3 The proposed development comprises 7 residential towers and 17 houses, two club houses, landscaped open spaces, commercial and retail areas.
- 7.1.4 Approximately 2,771 m³/day of fresh water demand and 876 m³/day of flushing water demand will be required by the proposed development.

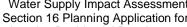
Water Supply Impact Assessment Section 16 Planning Application for



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- 7.1.5 Approximately 226 m³/day of fresh water demand and 72 m³/day of flushing water demand will be required by the three village housing sites.
- 7.1.6 It is concluded that the proposed development will generate additional water demand. After implementation of the proposed watermains for the proposed development, the proposed development would be acceptable in water supply terms.

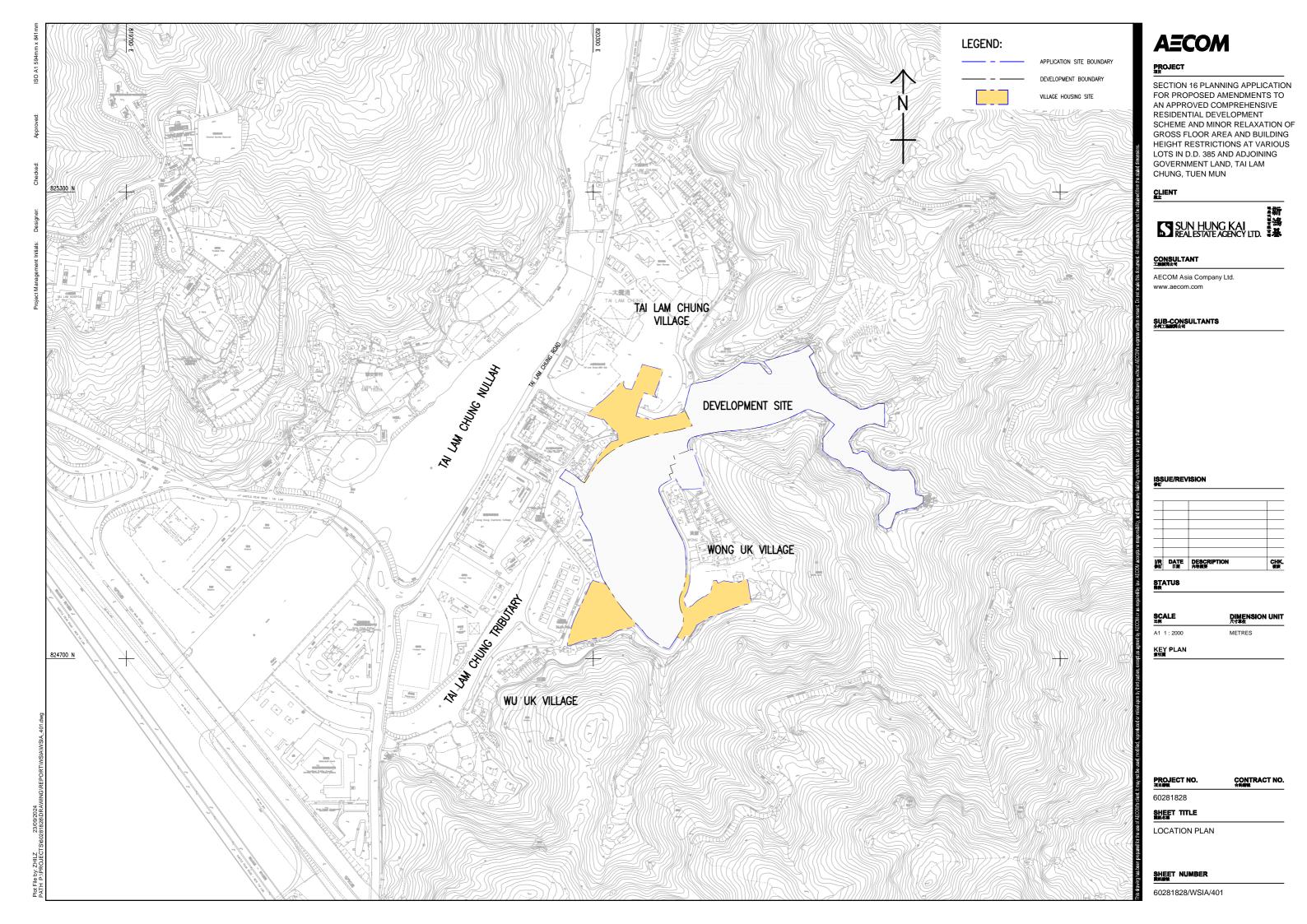
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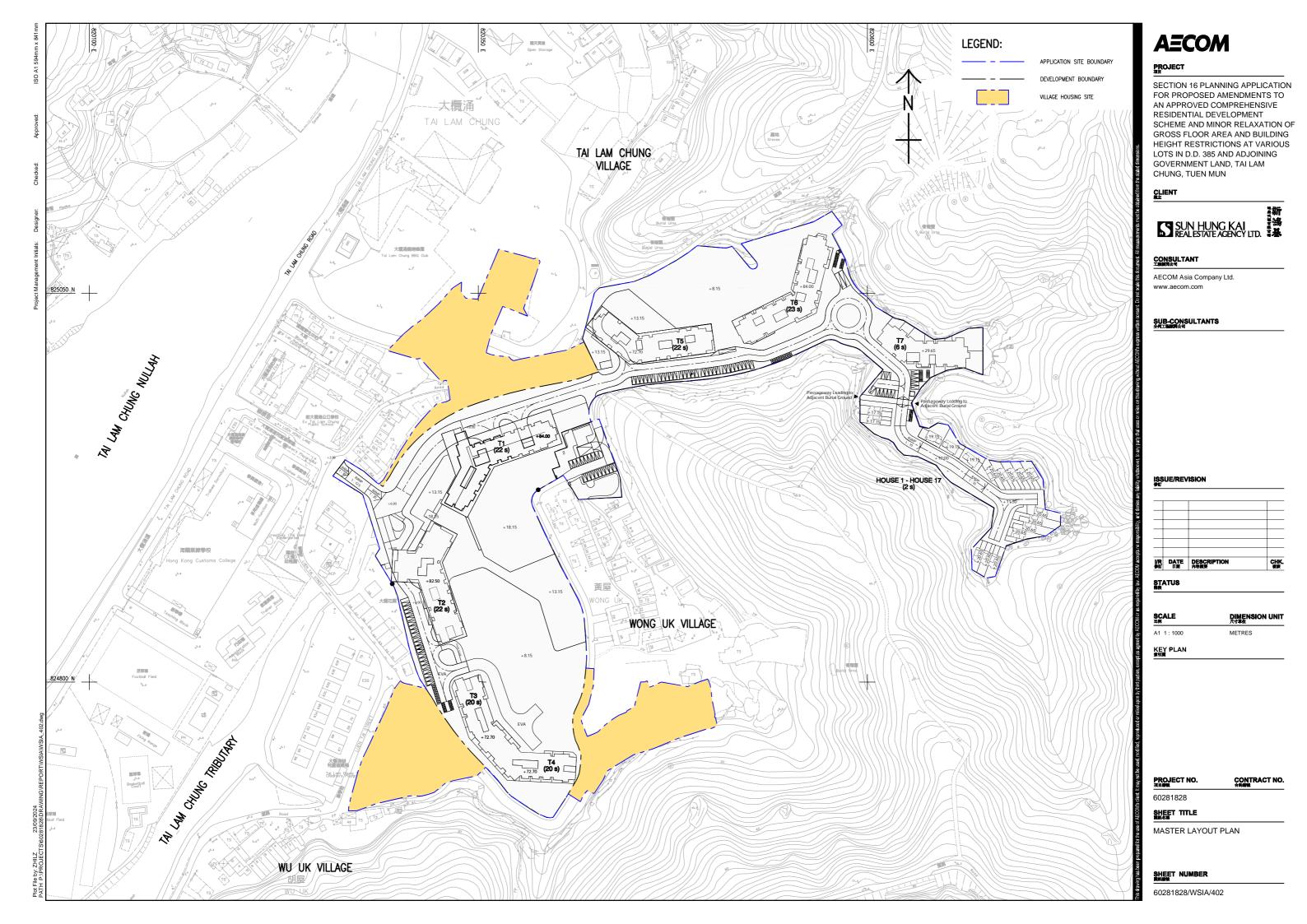


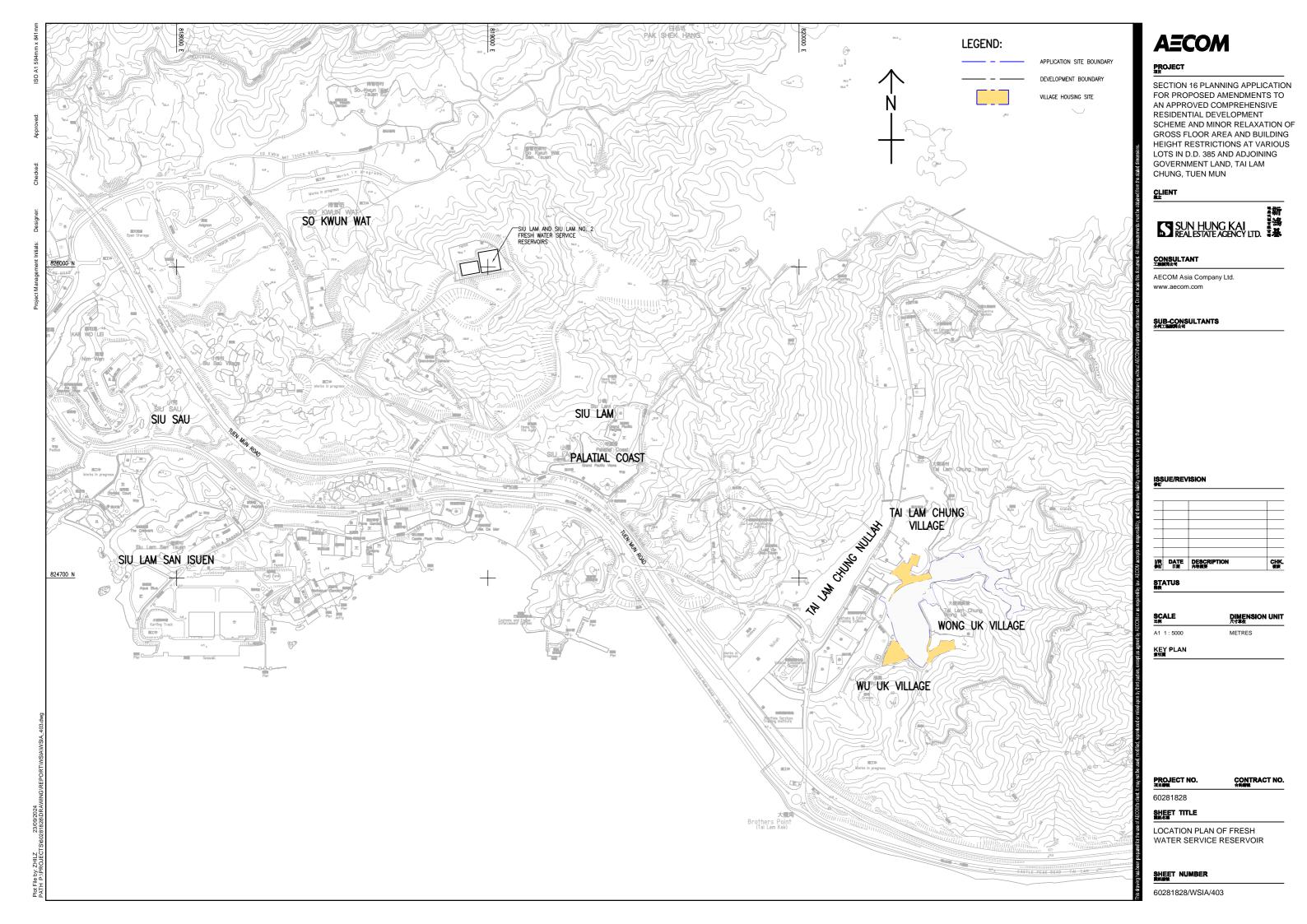


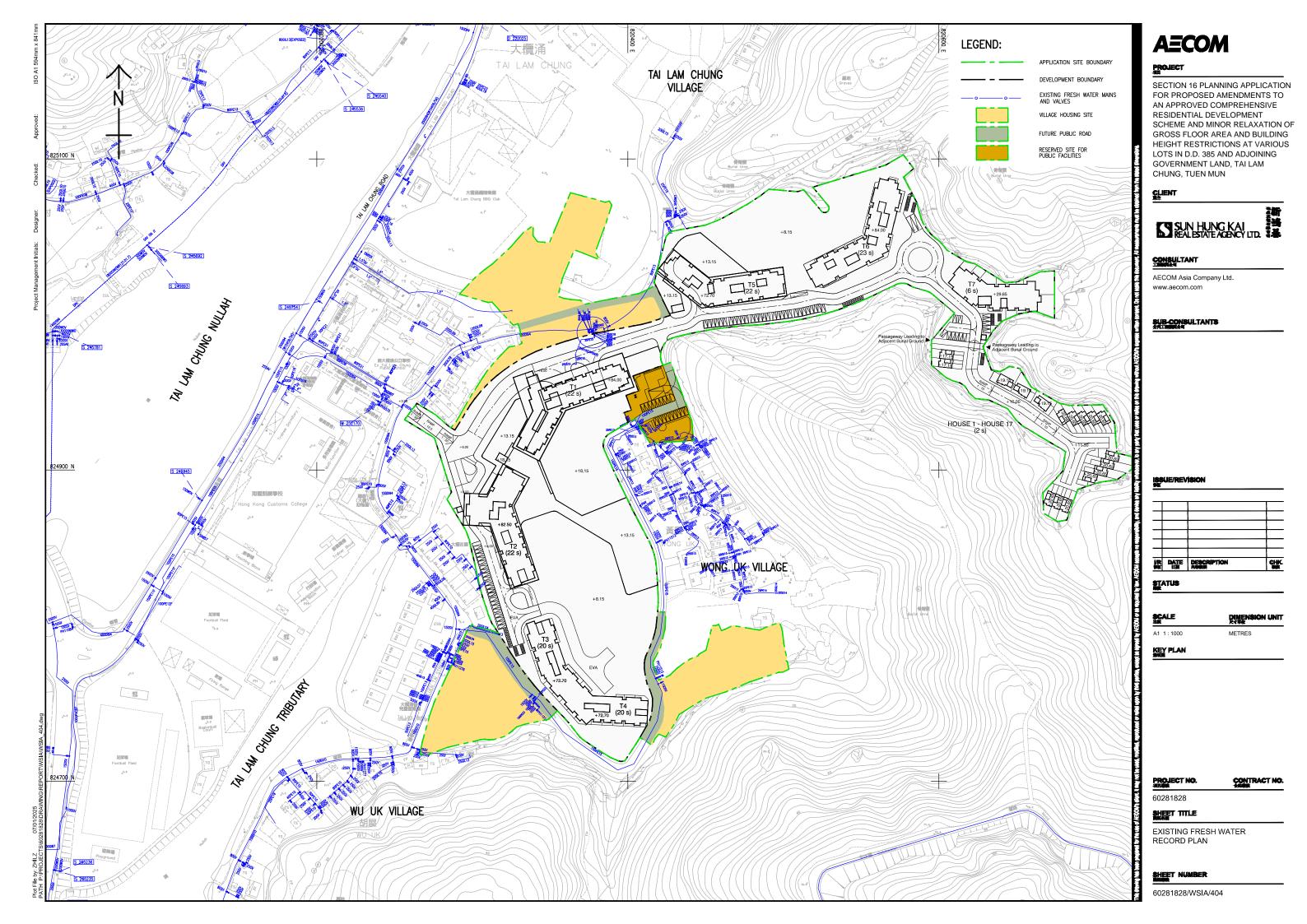
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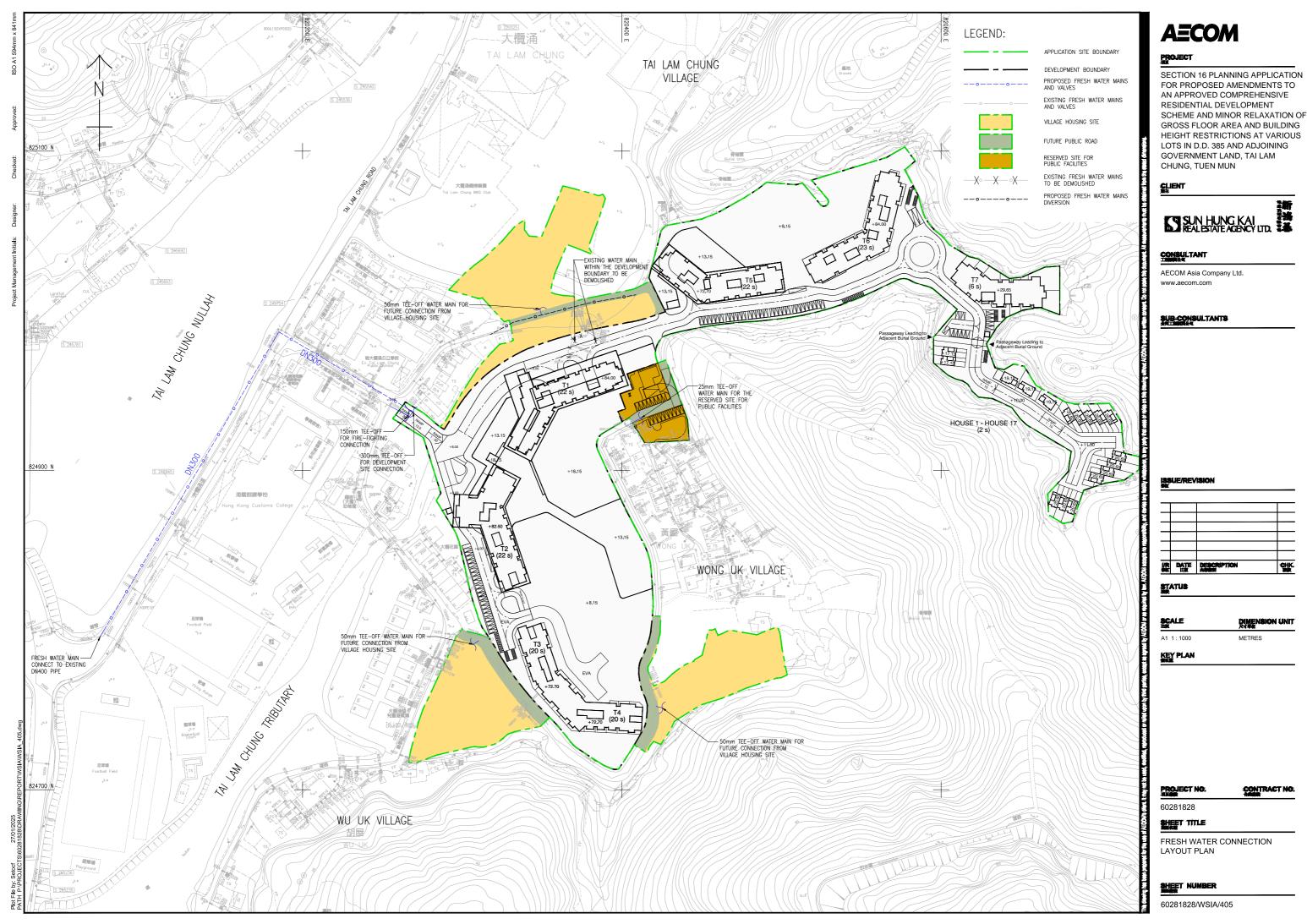
Drawings

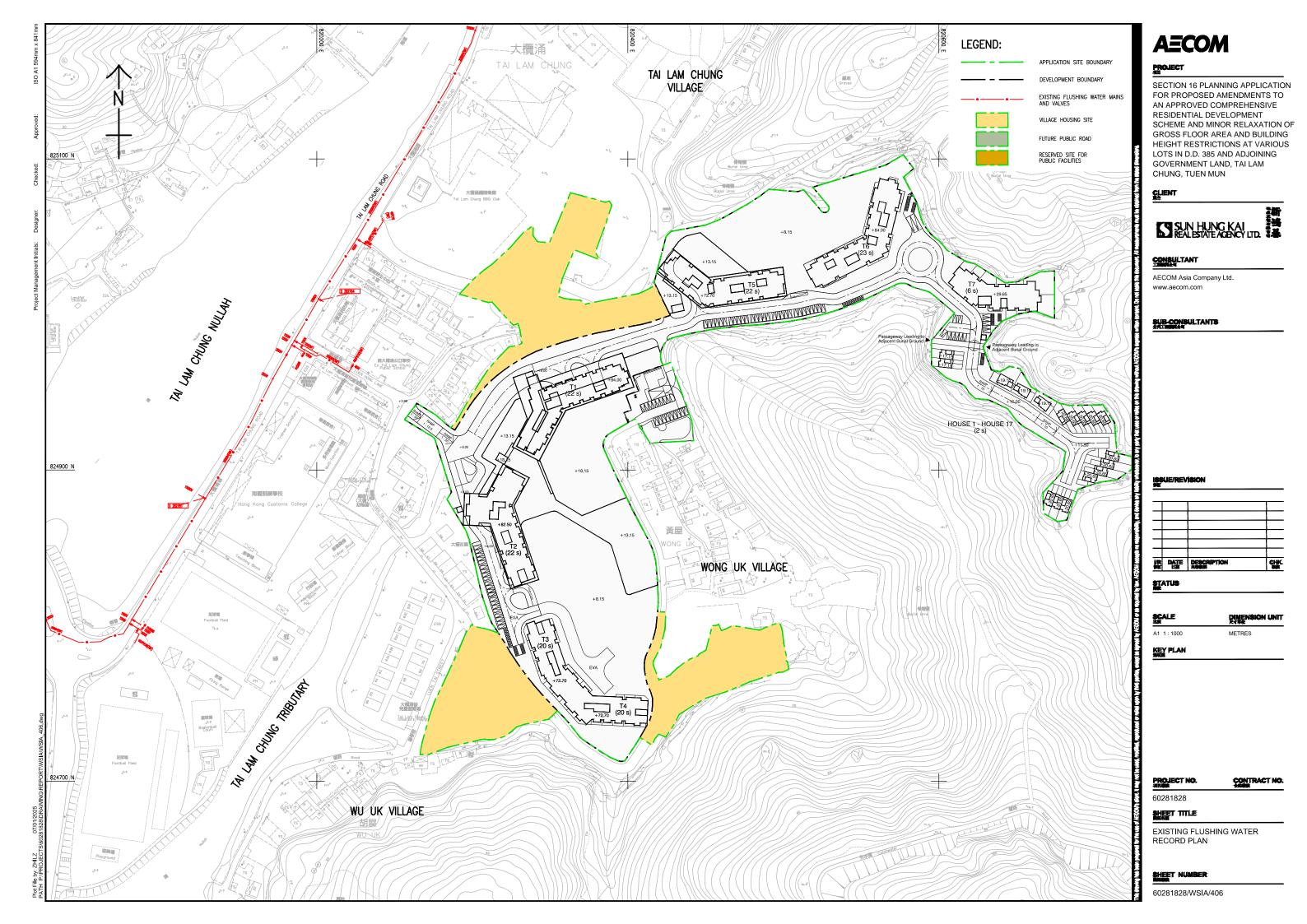


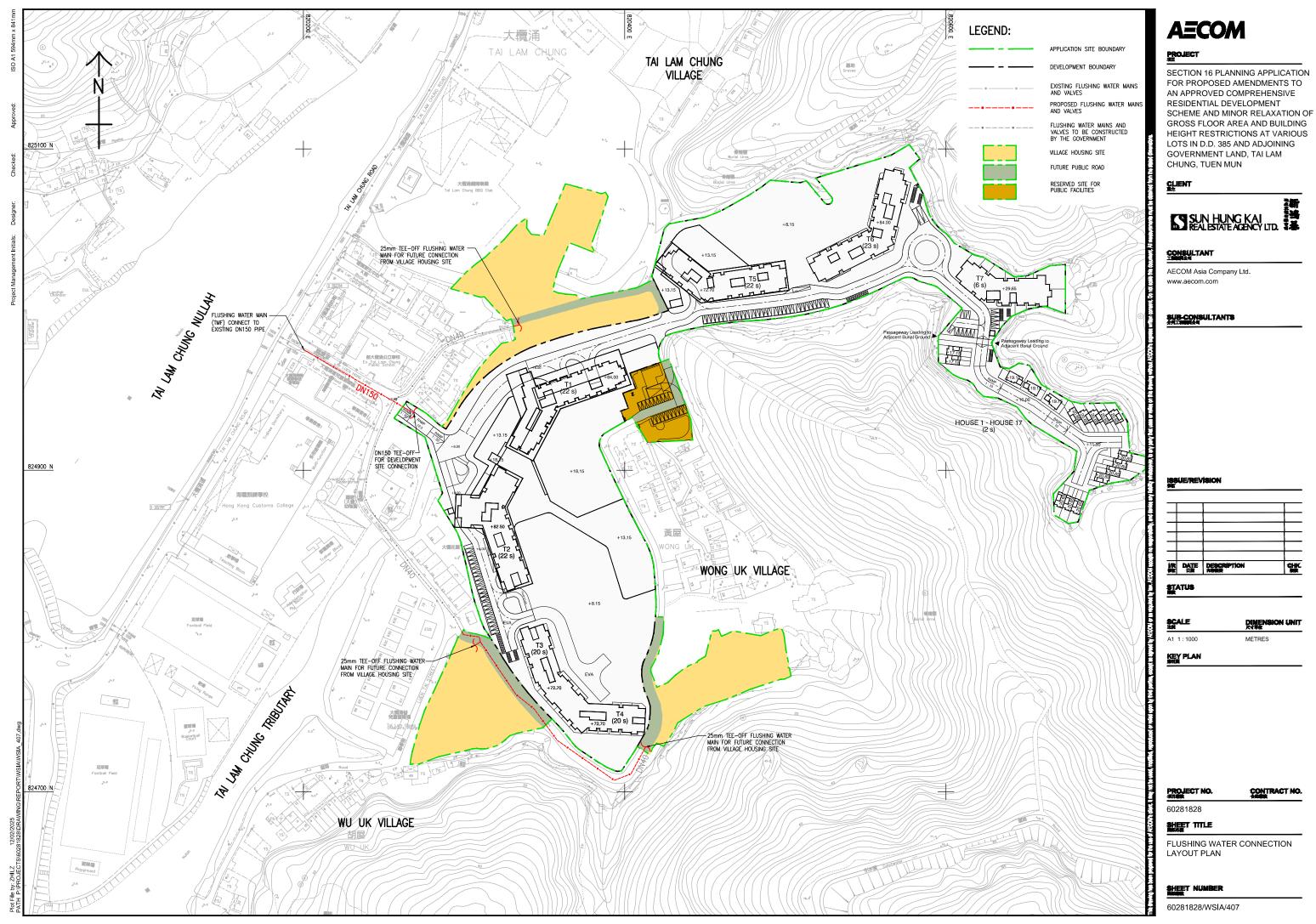




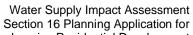








FOR PROPOSED AMENDMENTS TO





Appendix A

Hydraulic Review for Existing and Proposed Watermains located underneath Tai Lam Chung Road

Annex A - Hydraulic Review for Existing and Proposed Watermains located underneath Tai Lam Chung Road

Fresh Water Main

Hydraulic Review for Existing DN400					
Estimated Fresh Water Demand	2771.0	m ³ /day			
Estimated Flesh Water Demand	0.0321	m ³ /s			
Peak factor for distribution main	3				
Peak Flow rate	0.0962	m ³ /s			
Size of Existing water main	400	mm			
Cross Section Area	0.126	m^2			
Peak Flow Velocity of water main	2	m/s			
Capacity of water main	0.2513	m ³ /s			
The percentage of watermain occupied by the development site's fresh water demand	38.28	%			

Fresh water demand utilizes about 38.28% of the existing water main capacity.

Hydraulic Review for Proposed DN300				
Estimated Fresh Water Demand	2771.0	m ³ /day		
LStilllated Flesh Water Demand	0.0321	m ³ /s		
Peak factor for distribution main	3			
Peak Flow rate	0.0962	m ³ /s		
Size of Proposed water main	300	mm		
Cross Section Area	0.071	m ²		
Proposed Flow Velocity of water main	1.36	m/s		

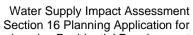
Annex A - Hydraulic Review for Existing and Proposed Watermains located underneath Tai Lam Chung Road

Flushing Water Main

Hydraulic Review for Existing DN150		
Estimated Flushing Water Demand	876.0	m ³ /day
	0.0101	m ³ /s
Peak factor for distribution main	2	
Peak Flow rate	0.0203	m ³ /s
Size of Existing water main	150	mm
Cross Section Area	0.018	m^2
Peak Flow Velocity of water main	1.5	m/s
Capacity of water main	0.0265	m ³ /s
The percentage of watermain occupied by the development site's flushing water demand	76.50	%

Flushing water demand utilizes about 76.5% of the existing water main capacity.

Hydraulic Review for Proposed DN150		
Estimated Flushing Water Demand	876.0	m ³ /day
	0.0101	m ³ /s
Peak factor for distribution main	2	
Peak Flow rate	0.0203	m ³ /s
Size of Proposed water main	150	mm
Cross Section Area	0.018	m ²
Proposed Flow Velocity of water main	1.15	m/s





Appendix B

Hydraulic Review for Existing and Proposed Water Main for Village Housing Sites

Annex B - Hydraulic Review for Existing and Proposed Water Main for Village Housing Sites

Fresh Water Main

Hydraulic Review for Existing DN100		
Estimated Fresh Water Demand	226.0	m ³ /day
	0.0026	m ³ /s
Peak factor for distribution main	3	
Peak Flow rate	0.0078	m ³ /s
Size of Existing water main	100	mm
Cross Section Area	0.008	m^2
Peak Flow Velocity of water main	1.5	m/s
Capacity of water main	0.0118	m ³ /s
The percentage of watermain occupied by the development site's fresh water demand	66.61	%

Fresh water demand utilizes about 66.61% of the existing water main capacity.

Hydraulic Review for Proposed DN50 connnection tee		
Estimated Fresh Water Demand	113.0	m ³ /day
	0.0013	m ³ /s
Peak factor for distribution main	3	
Peak Flow rate	0.0039	m ³ /s
Size of Proposed water main	50	mm
Cross Section Area	0.0020	m ²
Proposed Flow Velocity of water main	2.00	m/s

Annex B - 1/27/2025

Hydraulic Review for Existing and Proposed Water Main for Village Housing Sites

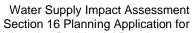
Flushing Water Main

Hydraulic Review for Existing DN150		
Estimated Flushing Water Demand	72.0	m ³ /day
	0.0008	m ³ /s
Peak factor for distribution main	2	
Peak Flow rate	0.0017	m ³ /s
Size of Existing water main	150	mm
Cross Section Area	0.018	m^2
Peak Flow Velocity of water main	1.5	m/s
Capacity of water main	0.0265	m ³ /s
The percentage of watermain occupied by the development site's flushing water demand	6.29	%

Flushing water demand utilizes about 6.29% of the existing water main capacity.

Hydraulic Review for Proposed DN40 connnection tee		
Estimated Flushing Water Demand	72.0	m ³ /day
	0.0008	m ³ /s
Peak factor for distribution main	2	
Peak Flow rate	0.0017	m ³ /s
Size of Proposed water main	40	mm
Cross Section Area	0.00126	m ²
Proposed Flow Velocity of water main	1.33	m/s

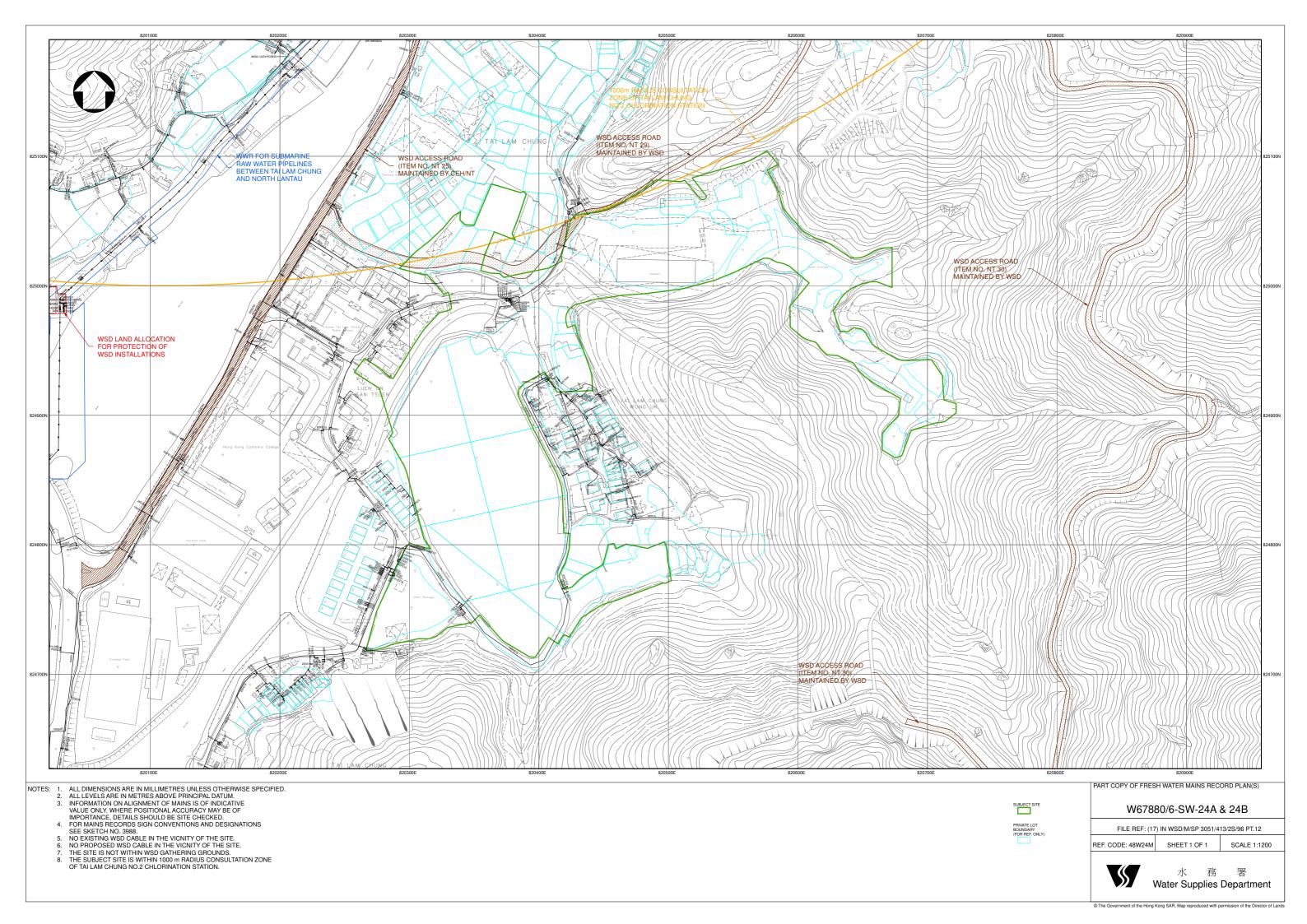
Hydraulic Review for Proposed DN25 connnection tee		
Estimated Flushing Water Demand	36.0	m ³ /day
	0.0004	m ³ /s
Peak factor for distribution main	2	
Peak Flow rate	0.0008	m ³ /s
Size of Proposed water main	25	mm
Cross Section Area	0.00049	m^2
Proposed Flow Velocity of water main	1.70	m/s





Appendix C

Water Main Record Plan

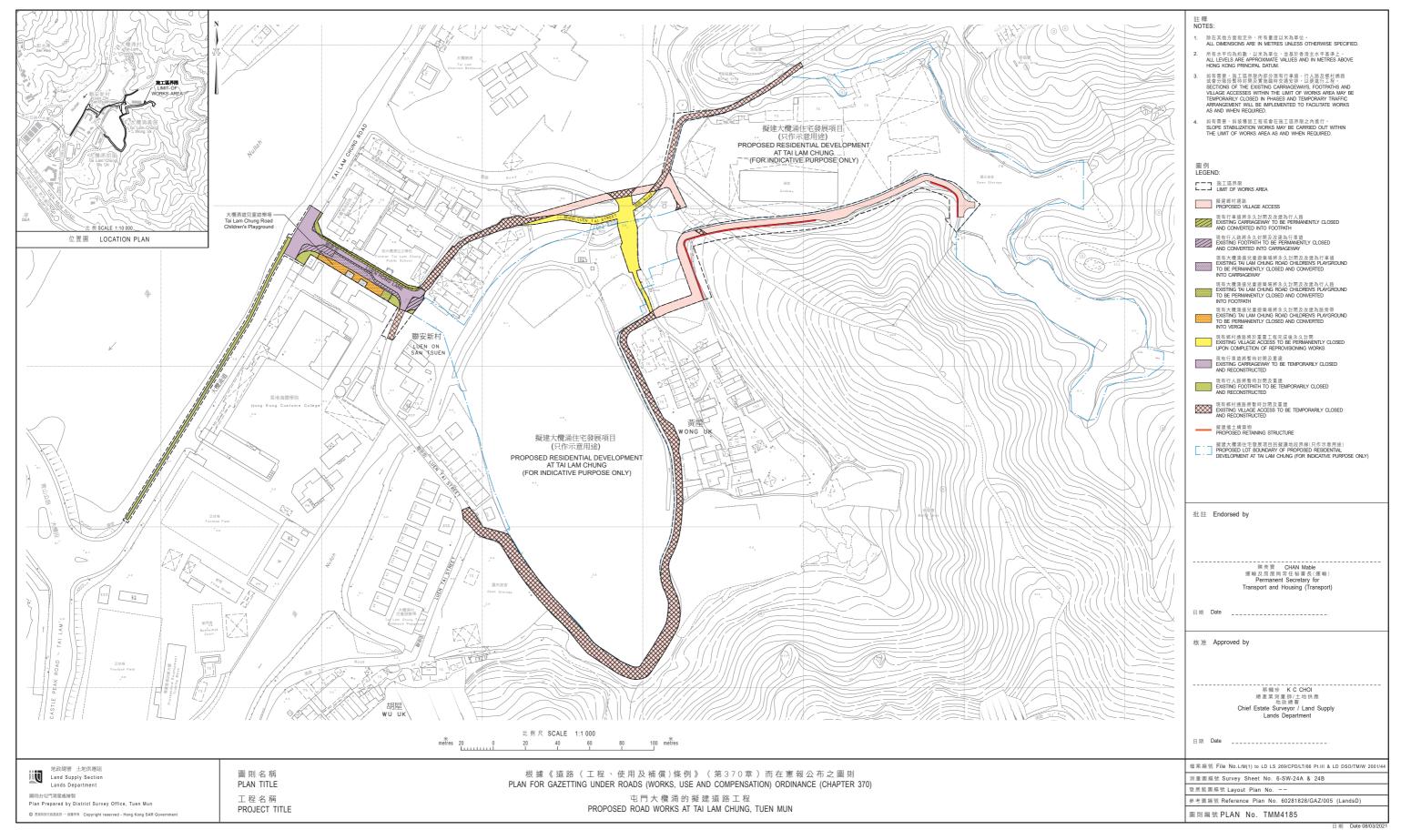




Appendix D

Approved Gazette Plan for Luen Hong Lane

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