
Appendix I

Water Supply Impact Assessment

Section 16 Planning Application for Proposed Commercial Use at Phase IIa Development of an Approved Master Layout Plan (MLP) with Minor Relaxation of Plot Ratio Restriction (Proposed Amendments to the Approved MLP for Comprehensive Residential, Commercial, Social Welfare Facility and Public Vehicle Park Development; with Minor Relaxation of Plot Ratio Restriction Approved at Phase III)

Water Supply Impact Assessment

May 2026

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1. Introduction

1.1 Background

- 1.1.1 AECOM Asia Company Limited (AECOM) was commissioned by the project proponent to act as the engineering consultant to conduct a Water Supply Impact Assessment (WSIA) to support the Proposed Commercial Development to the south of Castle Peak Road, Yuen Long, New Territories.
- 1.1.2 This planning application is submitted for proposed commercial development in Phase IIa of a Comprehensive Commercial/Residential Development at the “Comprehensive Development Area” (“CDA”) to the immediate south of Castle Peak Road in Area 12, Yuen Long. The location plan is shown in **WSIA/Figure 1**.
- 1.1.3 The Application Site is zoned “CDA” under the Draft Yuen Long Outline Zoning Plan (OZP) No. S/YL/28 and is the subject of various previously approved planning applications for comprehensive commercial/residential development between 1995 and 2023. Due to multiple ownership involved, a phased development approach has all along been adopted for the various development proposals approved therein.
- 1.1.4 According to the latest planning application No. A/YL/298 for proposed subsidized sale flats (SSF) and social welfare facility (SWF) development approved on 31.3.2023 (hereafter referred to as the “Approved CDA Development”) for the subject “CDA” site, the Approved CDA Development is divided into three phases, including Phase I (i.e. the completed commercial/residential development known as the completed YOHO Midtown at the northern and eastern portions), Phases IIa & IIb (i.e. the approved hotel and flats development at the northwestern portion), and Phase III (i.e. the proposed SSF and SWF under the approved application at the southwestern portion).
- 1.1.5 It should be emphasized that the subject matter of the current planning application is the proposed change in Phase IIa to commercial development only. No change is proposed for Phases I, IIb and III developments within the same “CDA” zone. Under the Approved CDA Development, Phase IIa was proposed for hotel development. However, in order to contribute to achieving home-job balance and creating a mixed-use neighbourhood in Yuen Long District, Phase IIa is now proposed to be a commercial/office development with supporting commercial/retail facilities.
- 1.1.6 Existing water supply network is available to serve Phase IIa development. This WSIA assesses the water supply impact due to the change in development and recommends corresponding mitigation measure if required.

1.2 Objective of this Submission

- 1.2.1 This report outlines the assessment results of the potential water supply impacts caused by the proposed development at Phase IIa of the Application Site. The main objectives of this assessment include the following:
 - (i) Review the existing water supply condition;
 - (ii) Outline the methodology adopted in this assessment;
 - (iii) Identify any potential impacts on the current water supply system due to the additional water supply demand from the proposed development in Phase IIa;
 - (iv) Propose water supply mitigation measures where appropriate to mitigate the potential water supply impacts.

1.3 Nomenclature

1.3.1 The following abbreviations and shortened expressions in **Table 1** are adopted in this report.

AECOM	AECOM Asia Company Limited
EPD	Environmental Protection Department
GESF	Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0 (EPD)
GFA	Gross Floor Area
HKPSG	Hong Kong Planning Standards and Guidelines
MDD	Mean Daily Demand
MLD	Million Litres per Day
mPD	Metres above Principal Datum
PlanD	Planning Department
UDD	Unit Daily Demand
WSD	Water Supplies Department
WSIA	Water Supply Impact Assessment

Table 1 – Nomenclature

2. Development Proposal

2.1 The Proposed Development

- 2.1.1 The Phase IIa development site area is approximately 1,230m² with a proposed non-domestic Gross Floor Area (GFA) of not more than 12,207m², comprising a commercial/office space of about 11,607m² and commercial/retail area of about 600m². The tentative intake year for Phase IIa development is 2030. The proposed development is bound by Castle Peak Road – Yuen Long to the North and Yau Tin East Road to the South.
- 2.1.2 The Master Layout Plan (MLP) of the Proposed Development is shown in **WSIA/Figure 2** and the proposed development schedule is summarised in **Table 2** below.

Development Parameters ⁽¹⁾	Phase IIa
Development Site Area	About 1,230m ²
Total Non-domestic GFA for Proposed Commercial Development ⁽²⁾	Not more than 12,207m ²
- Commercial/Office	About 11,607m ²
- Commercial/Retail	About 600m ²
Total Non-domestic Plot Ratio	About 9.93
Maximum Site Coverage	Not exceeding 24m: Not more than 92% Above 24m: Not more than 65%
Maximum Building Height (to the main roof)	Not more than 145mPD
Total No. of Storeys ⁽³⁾	29 storeys
No. of Blocks	1

Table 2 – Development Schedule

Remarks:

- (1) Development parameters shown on this indicative development schedule are for Phase IIa development only (i.e. subject matter of the current planning application).
- (2) Including 'Office', 'Eating Place', 'Place of Entertainment', 'Place of Recreation, Sports or Culture', 'School' (kindergarten, nursery, language, computer, commercial and tutorial schools, art school, ballet and other types of schools providing interest / hobby related courses) and 'Shop and Services'.
- (3) Including 23 commercial / office storeys + 2 commercial / retail storeys (including M/F) + 4 storeys for E&M, carpark and entrance lobby; excluding 1 refuge floor and transfer plate.

3. Existing and Planned Water Supply System

3.1 Existing Water Supply System

- 3.1.1 According to WSD's information provided, the Application Site falls within the Au Tau Fresh Water Primary Service Reservoir (AT FWPSR) and Ngau Tam Mei Fresh Water Primary Service Reservoir (NTM FWPSR) fresh water supply zone. The existing storage capacities of AT FWPSR and NTM FWPSR are 100,548m³ and 40,750m³ respectively.
- 3.1.2 Furthermore, the Application Site falls within the Tan Kwai Tsuen Salt Water Reservoir (TKT SWSR) and Lok On Pai Salt Water Pumping Station (LOP SWPS) salt water supply zone. The design pumping capacity of LOP SWPS is 83,000m³/d at 94m head.
- 3.1.3 There is an existing DN1400 freshwater main located at the north side of the Phase IIa adjacent to Castle Peak Road, and an existing DN80 freshwater distribution main to the south at Yau Tin East Road. The existing fresh water supply network in proximity to Phase IIa is shown in **WSIA/Figure 3**.
- 3.1.4 For flushing water supply, there is an existing DN200 salt water main located at the south side of Phase IIa at Fung Yau Street. The existing flushing water supply network in proximity to Phase IIa is shown in **WSIA/Figure 4**.

3.2 Planned Water Supply System

- 3.2.1 The Ngau Tam Mei Fresh Water Primary Service Reservoir is planned for expansion to 94,750m³ by 2031.
- 3.2.2 The source of flushing water supply to the Application Site will change to Wang Chau Reclaimed Water Service Reservoir, which is planned for commissioning in early 2032 with a capacity of 40,000m³.
- 3.2.3 According to the approved WSIA under planning application no. A/YL/298, a DN150 fresh water main is tee-off from the existing DN300 fresh water main at Fung Yau Street East, and an additional DN50 fresh water main is tee-off from the existing DN80 fresh water main at Yau Tin East Road to serve the fresh water demand of Phase III.
- 3.2.4 According to the approved WSIA under planning application no. A/YL/298, a DN100 salt water main is tee-off from the existing DN200 salt water main at Fung Yau Street to serve the flushing water demand of Phase III.
- 3.2.5 The works described in 3.2.3 and 3.2.4 are constructed by Phase III development and is expected to complete by 2030, which matches the tentative intake year of Phase IIa.

4. Assessment Methodology

4.1 Unit Demand

- 4.1.1 Assumptions are made with reference to the Guidelines for Estimation Sewage Flows for Sewage Infrastructure Planning (GESF) published by the Environmental Protection Department (EPD) for the unit water demand for commercial usage of Phase IIa.
- 4.1.2 A summary of the unit daily demand (UDD) used for different development types is shown in **Table 3** below. Details of calculations and references refer to **Appendix 1**.

Development Type	Flow Type	Fresh Water UDD (m ³ /employee/day)	Flushing Water UDD (m ³ /employee/day)
Commercial / Office	General	0.19	0.09
Retail (non-F&B)	J4	0.23	0.05
Food and Beverage (F&B)	J10	1.205	0.375

Table 3 – Unit Demand

4.2 Design Population

- 4.2.1 For the non-domestic population, the worker density adopted for business use is made reference to Hong Kong Planning Standards and Guidelines (HKPSG) Chapter 5 Table 2 published by the Planning Department (PlanD). A summary of design population can be found in **Table 4** below.

Development Type	GFA (m ²)	Worker Density (m ² GFA per worker)	Total no. of Workers
Commercial / Office	11,607	25	465
Retail (non-F&B)	300 ⁽¹⁾	25	12
F&B	300 ⁽¹⁾	25	12

Table 4 – Design Population

Remarks:

- (1) Assume commercial/retail GFA comprises of 50% F&B and 50% non-F&B.

4.3 Peaking Factors

- 4.3.1 The peak demand factors below shall be adopted in this design.
- Peak flow rate in fresh water distribution mains = 3 x main daily demand (MDD)
 - Peak flow in salt water distribution mains = 2 x mean daily demand (MDD)
 - Peak flow rate in fresh water trunk mains = 1.5 x mean daily remand (MDD)
 - Peak flow rate in salt water trunk mains = 1.2 x mean daily demand (MDD)

4.4 Design Velocity and Head of Flow

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

Maximum velocity (under peak flow conditions)

Fresh water mains:

>DN700	≤ 3 m/s
DN700 – DN525	≤ 2.5 m/s
DN450 – DN375	≤ 2 m/s
DN300 – DN200	≤ 1.5 m/s

Salt water mains:

≥DN1000	≤ 3 m/s
DN900 – DN800	≤ 2.5 m/s
DN700 – DN525	≤ 2 m/s
DN450 – DN300	≤ 1.5 m/s

Minimum velocity (under peak flow conditions)

Fresh water mains: ≥ 0.9 m/s

Salt water mains: ≥ 0.9 m/s

4.4.2 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 Residual Heads

4.5.1 The adopted minimum residual heads at extremity of the fresh water and salt water supply system for the proposed development are as follows:

- Fresh water: 20m
- Salt water: 15m

5. Water Demand Estimations

5.1 Water Demand Estimations

5.1.1 By adopting the aforementioned design parameters, the fresh water demand and salt water demand by Phase IIa development are estimated to be 105.6m³/day and 47.0m³/day respectively. The estimation results are summarised in **Table 5** below. Detailed estimations of water demand are in **Appendix 1**.

Development Type	Flow Type	Fresh Water Demand (m ³ /day)	Flushing Water Demand (m ³ /day)
Non-domestic	Commercial / Office	88.4	41.9
Non-domestic	Retail (J4)	2.8	0.6
Non-domestic	F&B (J10)	14.5	4.5
Total Demand		105.6	47.0

Table 5 – Water Demand Estimations

6. Potential Water Supply Impacts and Mitigation Measures

6.1 Potential Water Supply Impacts

6.1.1 The water demand from the Proposed Development is 105.6m³/day and 47.0m³/day for fresh water and flushing water respectively. The utilisation of the existing water supply system due to Phase IIa development is summarised in **Table 6**. Given the low utilisation rate, adverse impact on water supply is not anticipated.

Reservoir	Capacity (m ³)	Total Water Mean Daily Demand from Phase IIa (m ³)	Utilisation (%)
Au Tau Fresh Water Primary Service Reservoir	100,548	105.6	0.11
Ngau Tam Mei Fresh Water Primary Service Reservoir	40,750 (current)	105.6	0.26
	94,750 (after upgrading by 2031)	105.6	0.11
Lok On Pai Salt Water Pumping Station	83,000	47.0	0.06
Wang Chau Reclaimed Water Service Reservoir (to replace Lok On Pai Salt Water Pumping Station in 2032)	40,000	47.0	0.12

Table 6 – Summary of Reservoir Utilisation

6.1.2 The hydraulic calculation of the proposed and existing pipes refers to **Appendix 1**.

6.2 Proposed Lead-Ins

- 6.2.1 New fresh water and flushing water lead-ins to Application Site shall be constructed for potable and flushing uses.
- 6.2.2 For fresh water demand, under the approved WSIA under application No. A/YL/298, a DN50 is proposed to tee-off from the existing DN80 at Yau Tin East Road to serve the GIC portion of Phase III development, with a peak flow of 0.29L/s. To cater for the fresh water demand of Phase IIa, another DN50 tee-off is proposed from the existing DN80 fresh water main. The hydraulic calculations of the proposed and existing pipes can be found in **Appendix 1**, and the proposed fresh water supply layout plan refers to **WSIA/Figure 5**.
- 6.2.3 Under the approved WSIA under application No. A/YL/298, a DN100 tee-off from an existing DN200 flushing water main at Fung Yau Street East is proposed to serve the flushing water demand of Phase III development, with a peak flow of 3.7L/s. To also cater for the flushing water demand of Phase IIa development, a further DN40 tee-off of the DN100 by Phase III development is proposed. The hydraulic calculations of the proposed and existing pipes can be found in **Appendix 1**, and the proposed flushing water supply layout plan refers to **WSIA/Figure 6**.

7. Maintenance Responsibility

7.1 Proposed Water Supply Lead-in

- 7.1.1 The development is responsible for the construction and maintenance of all water supply facilities within the Phase IIa Site Boundary, including all internal watermains and water supply lead-in valves.

7.2 Proposed External Water Supply Mains

- 7.2.1 The development is responsible for the construction of tee-off of the existing water mains. WSD is responsible for the future maintenance of the proposed external water supply network after construction.

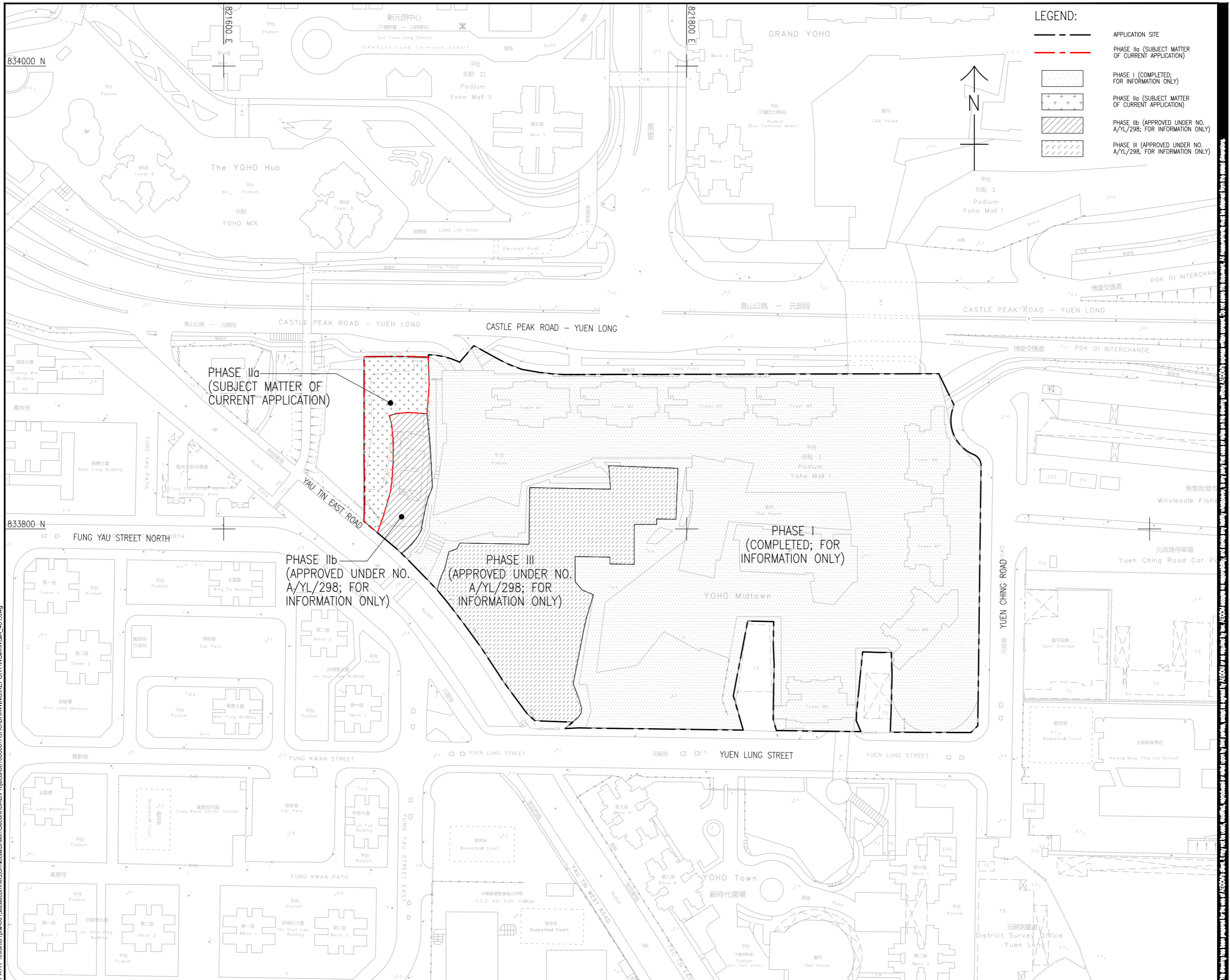
8. Conclusion

- 8.1.1 Under this planning application, the MLP for Phase IIa is amended, and the water supply impacts arising from Phase IIa development is assessed under this WSIA.
- 8.1.2 Approximately 105.6m³/day of fresh water demand and 47.0m³/day of flushing water demand will be generated by the proposed commercial development of Phase IIa.
- 8.1.3 The Phase IIa development will generate additional water demand which will be supplied with reclaimed water for flushing from the proposed Wang Chau Reclaimed Water Service Reservoir via the existing salt water network in early 2030, whilst fresh water will be supplied by Au Tau Fresh Water Service Reservoir.
- 8.1.4 The hydraulic calculation of the proposed pipes can be found in **Appendix 1**, no impact on the existing water supply system is envisaged.

End of Report

Figures

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- PHASE I (COMPLETED; FOR INFORMATION ONLY)
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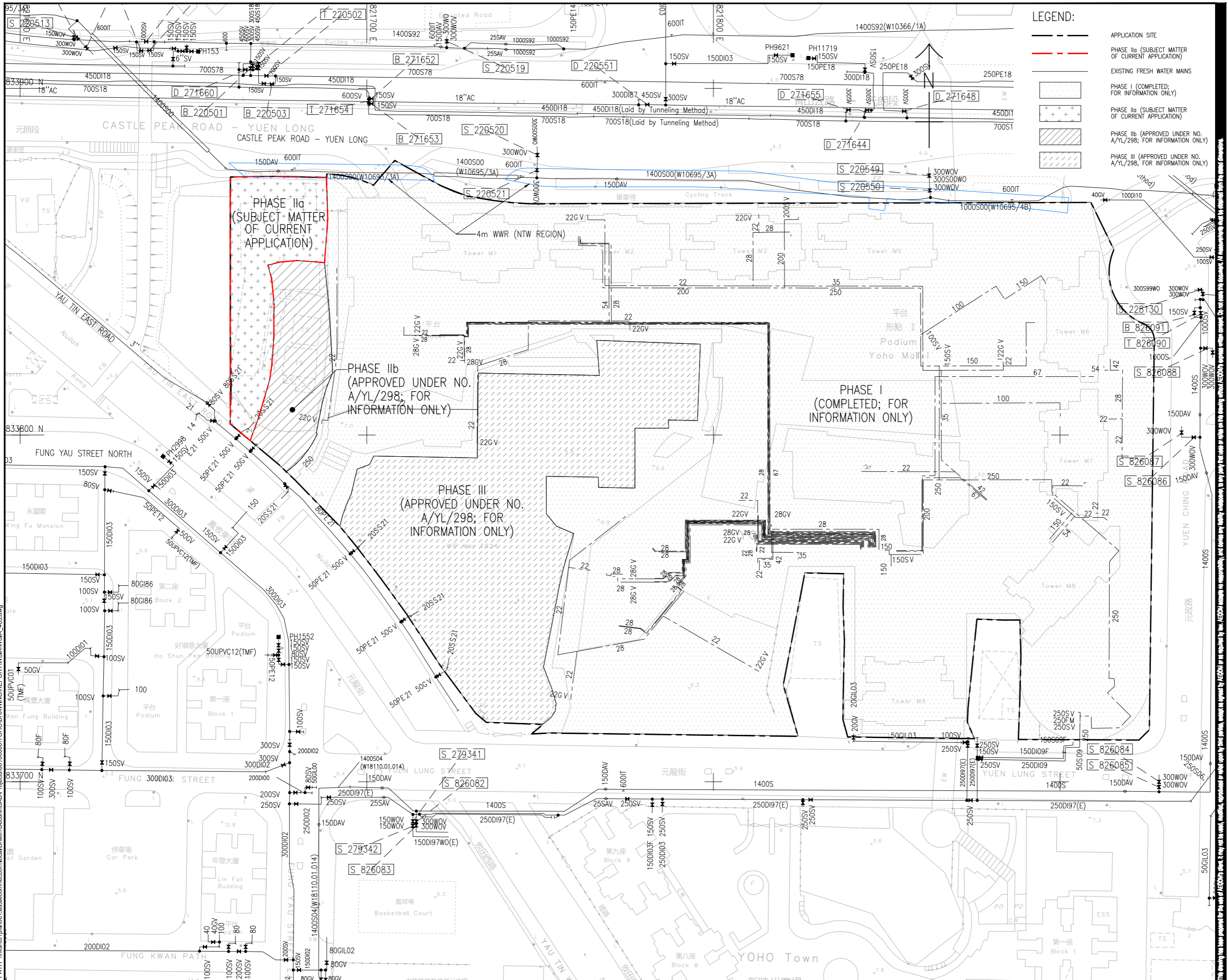
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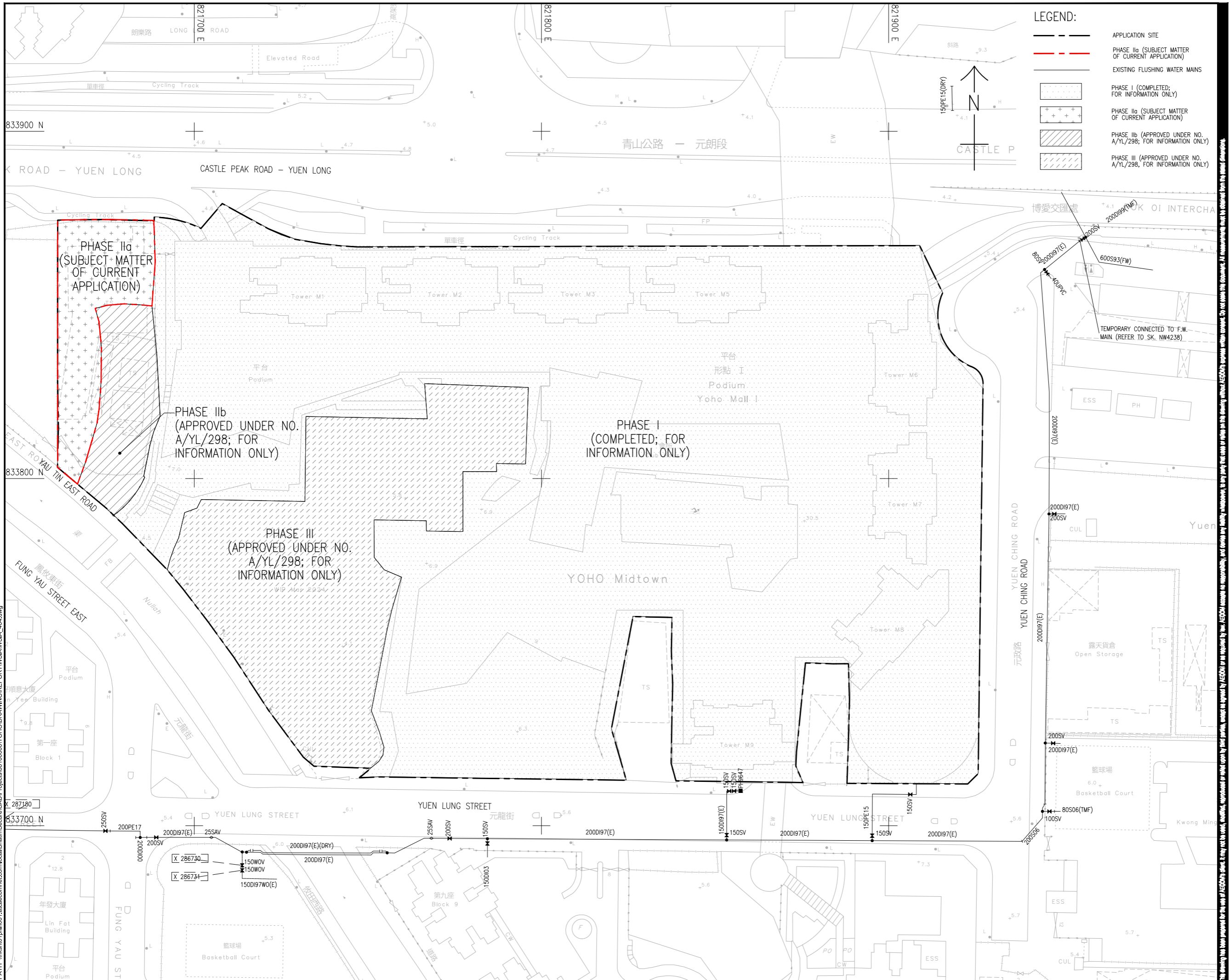
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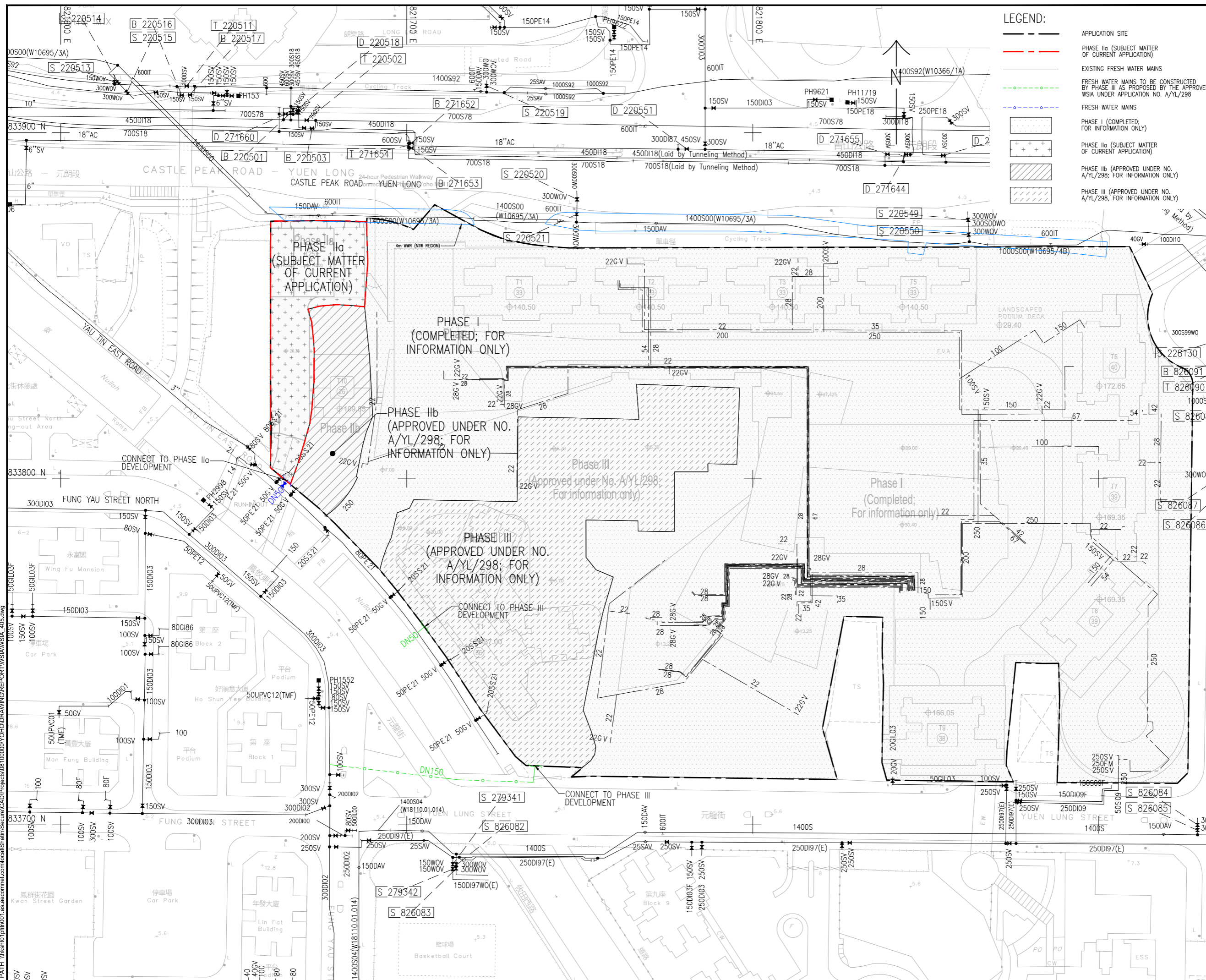
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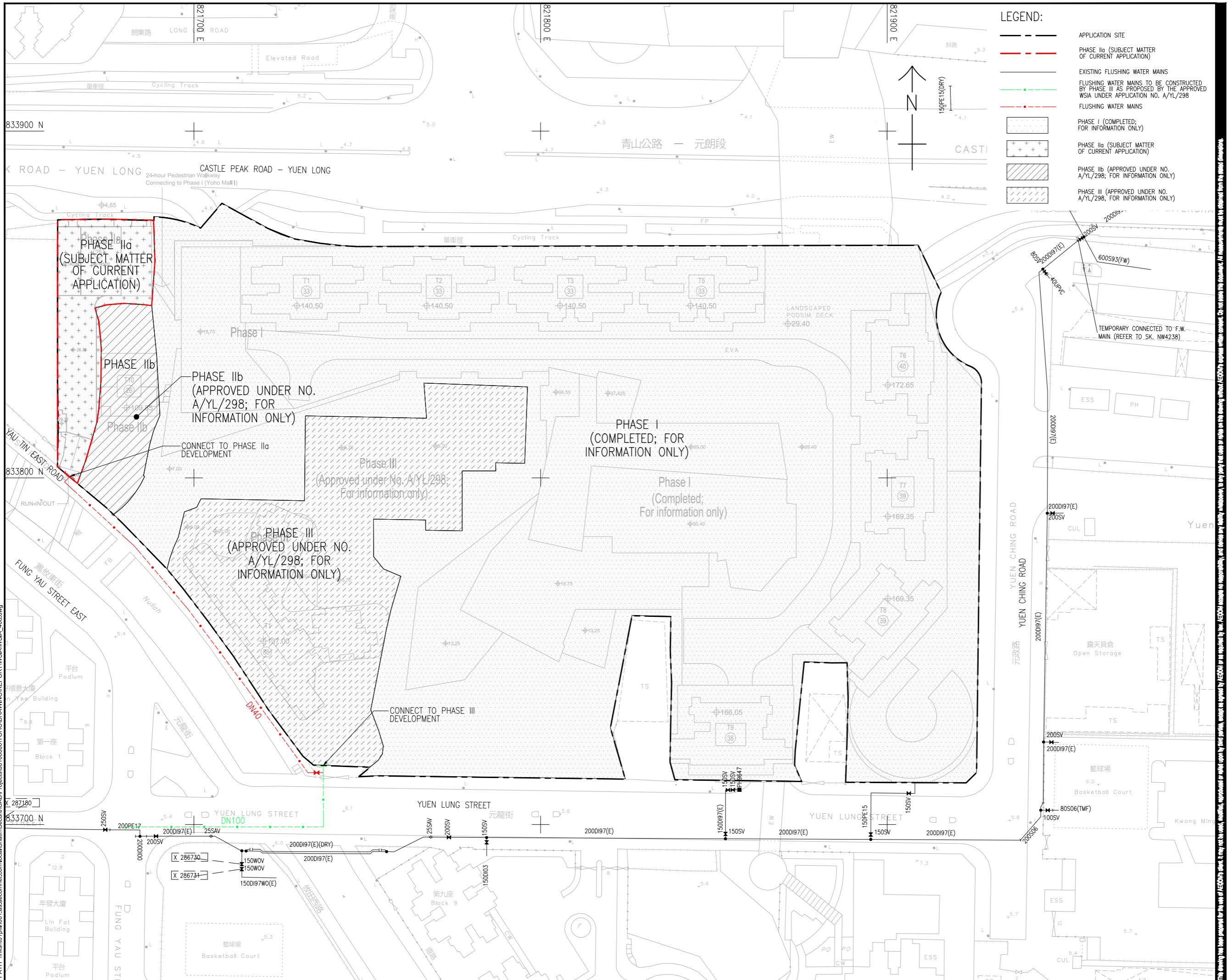
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PROPOSED FLUSHING WATER MAINS LAYOUT PLAN

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Appendix 1

Water Demand and Hydraulic Calculation

Estimation of Fresh Water Demand

Type	GFA	Worker Density	Employee	Unit Daily Demand	Flow in MDD	Peaking	Peak Flow
	(m ²)	(m ² per employee)		(m ³ /p/day)	(m ³ /day)	Factor	(l/s)
Commercial / Office (General)	11607	25	465	0.19 ⁽¹⁾	88.4	3	3.07
Retail (J4)	300	25	12	0.23 ⁽²⁾	2.8	3	0.10
F&B (J10)	300	25	12	1.205 ⁽³⁾	14.5	3	0.50
Total Phase IIa					105.6	3	3.67

Notes:

(1) According to GESF Appendix III Section 4(d), the fresh water consumption for employees is 0.03m³/p/day. Additionally, referencing GESF table V(a), Appendix V Section (a), (g) and Annex 1 of Appendix VII for freshwater consumption data of commercial activities, the per-employee fresh water consumption rate for general commercial activities is 0.16m³/p/day. This yields a total fresh water demand of 0.03 + 0.16 = 0.19m³/p/day.

(2) According to GESF Table T-2, the UFF of J4 is 0.28m³/p/day. Subtracting 0.05m³/p/day of flushing water consumption for employees according to GESF Appendix III Section 3(a), the fresh water consumption is 0.23m³/p/day.

(3) According to GESF Appendix V Section (b), the fresh water consumption of J10 ranged from 1.130 to 1.280m³/p/day. An average of 1.205m³/p/day is adopted for assessment.

Fresh water demand from Phase III development for GIC use = 0.29 l/s peak flow
(extracted from approved WSIA under Application No. A/YL/298)

Checking of Existing Watermain Utilization

Watermain	Inner Diameter	Area	Fresh water demand considered	Peak Flow	Velocity Limit	Existing Capacity	Utilization
	(mm)	(m ²)		(l/s)	(m/s)	(l/s)	%
Existing DN80 at Yau Tin East Road	80	0.0050	Phase IIa + Phase III GIC	3.95	1.5	7.5	52.4%

Checking of Proposed Watermain Velocity

Watermain	Inner Diameter	Area	Fresh water demand considered	Peak Flow	Flow Velocity
	(mm)	(m ²)		(l/s)	(m/s)
Proposed DN50 tee to Phase IIa development	50	0.0020	Phase IIa	3.67	1.87

Estimation of Flushing Water Demand

Type	GFA	Worker Density	Employee	Unit Daily Demand	Flow in ADWF	Peaking	Peak Flow
	(m ²)	(m ² per employee)		(m ³ /p/day)	(m ³ /day)	Factor	(l/s)
Commercial / Office (General)	11607	25	465	0.09 ⁽¹⁾	41.9	2	0.97
Retail (J4)	300	25	12	0.05 ⁽¹⁾	0.6	2	0.01
F&B (J10)	300	25	12	0.375 ⁽²⁾	4.5	2	0.10
Total Phase IIa					47.0	2	1.09

Notes:

(1) According to GESF Appendix III Section 3(d), the flushing water consumption for employees is 0.05m³/p/day. Additionally, the UFF for general commercial activities in accordance with GESF Table T-2 is 0.20m³/p/day, subtracting a freshwater demand of 0.16m³/p/day, the flushing water demand of general commercial activities is 0.04m³/p/day. This yields a total flushing water demand of 0.05 + 0.04 = 0.09m³/p/day.

(2) According to GESF Table T-2, the UFF of J10 is 1.58m³/p/day. Subtracting 1.205m³/p/day of fresh water consumption for J10 according to GESF Appendix V Section (b), the flushing water consumption is 0.375m³/p/day.

Flushing water demand from Phase III development = 3.7 l/s peak flow
(extracted from approved WSIA under Application No. A/YL/298)

Checking of Existing Watermain Utilization

Watermain	Inner Diameter	Area	Flushing water demand considered	Peak Flow	Velocity Limit	Existing Capacity	Utilization
	(mm)	(m ²)		(l/s)	(m/s)		
Existing DN200 at Fung Yau Street	200	0.0314	Phase IIa + Phase III	4.79	1.5	47.1	10.2%
DN100 tee-off from existing DN200 at Yuen Lung Street constructed	100	0.0079	Phase IIa + Phase III	4.79	1.5	11.8	40.6%

Checking of Proposed Watermain Velocity

Watermain	Inner Diameter	Area	Flushing water demand considered	Peak Flow	Flow Velocity
	(mm)	(m ²)		(l/s)	(m/s)
Proposed DN40 tee-off from DN100 at Yau Tin East Road	40	0.0013	Phase IIa	1.09	0.86

