Appendix J

Water Supply Impact Assessment

Section 12A Planning Application for Proposed Amendments to the Sha Tin Outline Zoning Plan to Rezone "Open Space" Zone to "Other Specified Use" annotated "Hotel Development" Zone in Support of Proposed Hotel Development at Various Lots in D.D. 184 and Adjoining Government Land, Sha Tin, New Territories

Water Supply Impact Assessment

June 2026

Delivering a better world

Prepared by:

AECOM Asia Company Limited
[redacted]

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1. Introduction

1.1 Background

1.1.1 AECOM Asia Company Limited (AECOM) has been commissioned by the Applicant to conduct a Water Supply Impact Assessment (WSIA) in support of a Section 12A Application under the Town Planning Ordinance (Cap. 131), to rezone the Application Site from "Open Space" ("O") to "Other Specified Use" annotated "Hotel Development" on the draft Sha Tin Outline Zoning Plan (OZP) No. S/ST/39.

1.1.2 The Application Site is bounded by Shing Mun River (SMR) to the north, Tai Chung Kiu Road to the south and Lion Rock Tunnel Road to the west. The location of the Application Site is indicated in **Figure 1**.

1.1.3 The subject planning application aims to make better use of the valuable land resources of the Application Site to facilitate a proposed hotel development (the Proposed Development) with an active public realm that contains retail/F&B, recreational elements and the preserved Main Building of Ng Yuen.

1.2 Objective of this Submission

1.2.1 This report outlines the assessment results of the potential water supply impact caused by the Proposed Development at the Application Site. The main objectives of this assessment include the followings:

(i) Review the existing water supply condition.

(ii) Outline the methodology adopted in this assessment.

(iii) Determine the water demand arising from the Proposed Development.

(iv) Assess the impact of the water demand arisen from the Proposed Development to the existing water supply system.

(v) Propose water supply mitigation measures where appropriate to mitigate the potential water supply impacts.

(vi) Discuss the responsibility of the construction and maintenance aspects of the proposed water supply system.

1.3 Nomenclature

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

ADWF	Average Dry Weather Flow
AECOM	AECOM Asia Company Limited
CIFSUS	Commercial and Industrial Floor Space Utilization Survey (PlanD)
EPD	Environmental Protection Department
F&B	Food and Beverage
FSD	Fire Services Department
GESF	Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0 (EPD)
GFA	Gross Floor Area
PPoF	People Per Unit
mPD	Metres above Principal Datum
PlanD	Planning Department
UFF	Unit Flow Factor
UDD	Unit Daily Demand
SMR	Shing Mun River
WSD	Water Supplies Department
WSIA	Water Supply Impact Assessment

Table 1 – Nomenclature

2. Development Proposal

2.1 The Proposed Development

2.1.1 The Application Site has an area of approximately 4,561.5m^2 with a total Gross Floor Area (GFA) of about 18,246m^2.

2.1.2 The Master Layout Plan (MLP) of the Application Site is shown in **Figure 2**. The details of the Proposed Development schedule are summarized in **Table 2** below.

Development Parameters	Proposed Development
Application Site Area (m^2) (about)	4,561.5 (1)
Total Non-domestic GFA (m^2) (about)	18,246 (2)
• Hotel	17,446
• Commercial Use (3)	800
Total Non-domestic Plot Ratio	About 4.0
Maximum Building Height (to the main roof)	Not more than 68mPD
No. of Storeys	14
Site Coverage	
• Height not exceeding 15m	Not more than 100%
• Height Over 15m	Not more than 62.5%
No. of Hotel Rooms	443
No. of Blocks	2

Table 2 – Key Development Parameters

Remarks:
(1) Subject to detailed land survey at subsequent detailed design and land grant stage.
(2) Excluding GFA to be exempted under Building (Planning) Regulation such as back-of-house area to support the hotel, E/M plant rooms, car parking area, sky garden, etc.
(3) Includes 'Shop and Services', 'Eating Place', 'Place of Entertainment' and 'Place of Recreation, Sports or Culture' uses at the commercial portion.

3. Assessment Methodology

3.1 Unit Demand

3.1.1 Assumptions have been made for the fresh water and flushing water unit daily demand (UDD) for the Proposed Development. The UDD is used for estimating the water demand to support the development.

3.1.2 The unit flow factors adopted for water demand estimation and calculation are summarized in **Table 3**.

Development Types	Flow Type	Fresh Water UDD	Flushing Water UDD
Domestic	Residential R2	1 m^3/room/day	0.36 m^3/room/day
Non-domestic	Service Trades	45 L/head/day (1)	50 L/head/day (2)

Table 3 – Unit Water Daily Demand

Remarks:

(1) According to DI 1309 Table 2, the unit daily demand for service trades in Shatin is adopted.

(2) According to GESF Appendix III Section 3(a), the flushing water consumption for employees is 0.05m^3/p/day.

3.2 Design Population

3.2.1 For the no. of hotel guests, it is assumed that the design ratio is 2 persons per room.

3.2.2 For the non-domestic population, the worker density adopted for business use is based on the Commercial and Industrial Floor Space Utilization Survey (CIFSUS) published by the Planning Department (PlanD).

3.2.3 A summary of design population is summarized in **Table 4** below.

Design no. of hotel guests

No. of Hotel Rooms	Design Ratio	Design No. of Guests
443	2 persons per room	886

Design Non-Domestic Population

Commercial Activities	Workers per GFA (in 100 m^2)	Proposed GFA (m^2) (1)	No. of Employees
Retail (F&B)	5.1	400	21
Retail (Non-F&B)	3.5	400	14
		Total	35

Table 4 – Design Population

Remarks:

(1) For assessment purposes, it is assumed that 50% of the retail GFA is allocated to Food and Beverage (F&B) use, while the remaining 50% is allocated to non-F&B use, as a conservative approach.

3.3 Peaking Factors

3.3.1 The peaking demand factors below shall be adopted for design according to WSD DI 1309:

- Peak flow rate in fresh water distribution mains = 3 x mean daily demand (MDD)
- Peak flow rate in flushing water distribution mains = 2 x mean daily demand (MDD)

3.4 Fire-fighting

3.4.1 Water supply for fire-fighting service has been considered in this WSIA. Fire-fighting requirement for residential zone is 6,000m^3/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 5** summarizes the fire-fighting requirements.

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

Table 5 – Fire Fighting Requirements

3.5 Design Velocity and Head of Flow

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

Maximum velocity (under peak flow condition)

Fresh water mains:

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

Flushing 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 condition)

Fresh water mains:	≥ 0.9 m/s
Flushing water mains:	≥ 0.9 m/s

3.5.2 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.

3.5.3 The adopted minimum residual heads at extremity of the fresh water and flushing water supply system for the Proposed Development are as follow:

- Fresh water: 20m
- Flushing water: 15m

4. Potential Water Supply Impacts and Mitigation Measures

4.1 Review of Existing Water Supply System

Fresh Water Supply System

4.1.1 According to record plans obtained from the WSD, there is an existing DN50 fresh water distribution mains at the western side of the Application Site which tees-off from the existing DN600 fresh water main located beneath Tai Chung Kiu Road, as shown in **Figure 3**.

Flushing Water Supply System

4.1.2 There is an existing DN700 flushing water mains located beneath Tai Chung Kiu Road at southeast side of the Application Site, as shown in **Figure 5**. An OD90 tee-off has been installed from this DN700 flushing to the western side of the Application Site.

4.2 Estimation of Development Water Demand

4.2.1 The water demand of the Development is estimated based on the aforementioned design parameters. The water demand estimation is calculated in **Table 6** below.

Development Types	Water Demand (m^3/day)	
	Fresh Water	Flushing Water
Domestic	443	160
Non-domestic	40	2
Total:	**483**	**162**

Table 6 – Water Demand Estimations

Remarks:
(1) Daily water demand does not include water demand for fire-fighting.

4.2.2 The fresh water demand and flushing water demand required by the Proposed Development are estimated to be 483 m^3/day and 162 m^3/day respectively upon full occupation.

4.3 Proposed Water Supply System

Fresh Water Supply System

4.3.1 The hydraulic review of fresh water mains is shown in **Annex 1**. The results indicate that the existing DN600 fresh water main beneath Tai Chung Kiu Road can accommodate the water demand of the Proposed Development.

4.3.2 It is proposed to tee off a proposed DN150 fresh water main from the existing DN600 main along Tai Chung Kiu Road and connect to the eastern side of the Application Site to serve the Proposed Development. The proposed alignment is shown in **Figure 4**.

Flushing Water Supply System

4.3.3 The hydraulic review of flushing water mains is shown in **Annex 2**. The results indicate that the existing DN700 flushing water main beneath Tai Chung Kiu Road is capable of accommodating the water demand of the Proposed Development.

4.3.4 It is proposed to tee off a proposed DN80 flushing water main from the existing DN700 main along Tai Chung Kiu Road and connect to the eastern side of the Application Site to serve the Proposed Development. The proposed alignment is shown in **Figure 6**.

4.3.5 The size of the proposed water supply systems, including both fresh water and flushing water within the site and associated fittings, will be further developed in the detailed design stage.

4.4 Proposed Fire-Fighting System

4.4.1 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.

4.4.2 The provision of fire-fighting requirements is mentioned in Section 3.4. 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. Maintenance Responsibility

5.1.1 The Proposed Development will be responsible for construction and maintenance of all proposed water supply facilities within the Application Site boundary including all internal water mains, water supply lead-in valves and those proposed water distribution pipes.

5.1.2 The Proposed Development will be responsible for construction of all necessary connection works to the public water supply systems outside the Application Site boundary.

5.1.3 The water supply systems outside the site boundary are proposed to be handed over to WSD for future maintenance.

6. Conclusion

6.1.1 This WSIA report serves as a supporting document for rezoning the Application Site from "Open Space" Zone to "Other Specified Use" annotated "Hotel Development" Zone to facilitate a proposed hotel development. The WSIA has been carried out to assess the potential water supply impact due to the Proposed Development.

6.1.2 The fresh water demand and flushing water demand required by the Proposed Development are estimated to be 483 m^3/day and 162 m^3/day respectively upon full occupation.

6.1.3 It is proposed to tee off a proposed DN150 fresh water main from the existing DN600 main along Tai Chung Kiu Road, and tee off a proposed DN80 flushing water main from the existing DN700 main along Tai Chung Kiu Road, to connect to the eastern side of the Application Site.

6.1.4 The proposed water supply systems are as shown in **Figure 4** and **Figure 6**. With the implementation of the proposed water supply arrangement, no insurmountable water supply impacts are anticipated.

End of Report

Figures

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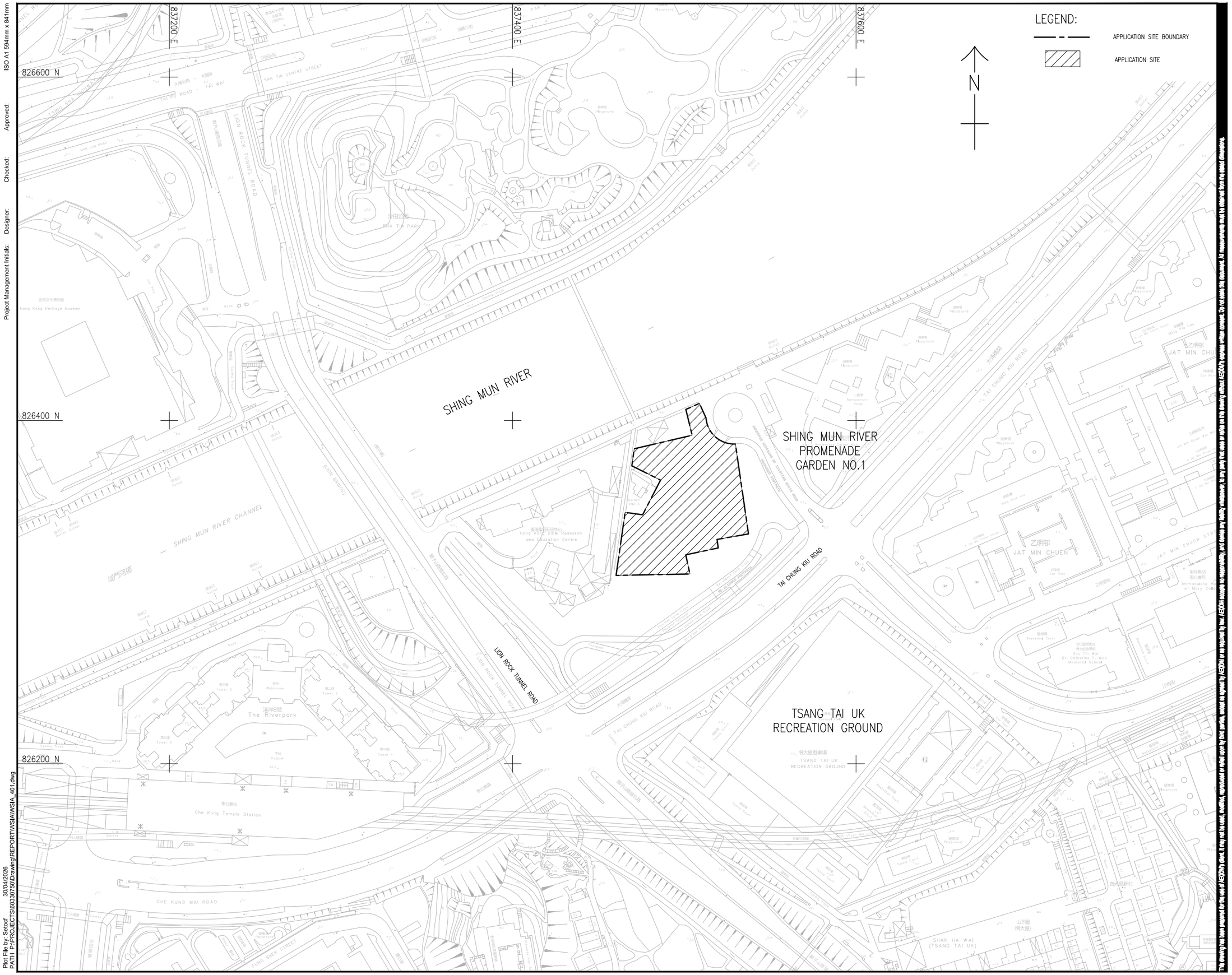

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AECOM Asia Company Ltd.

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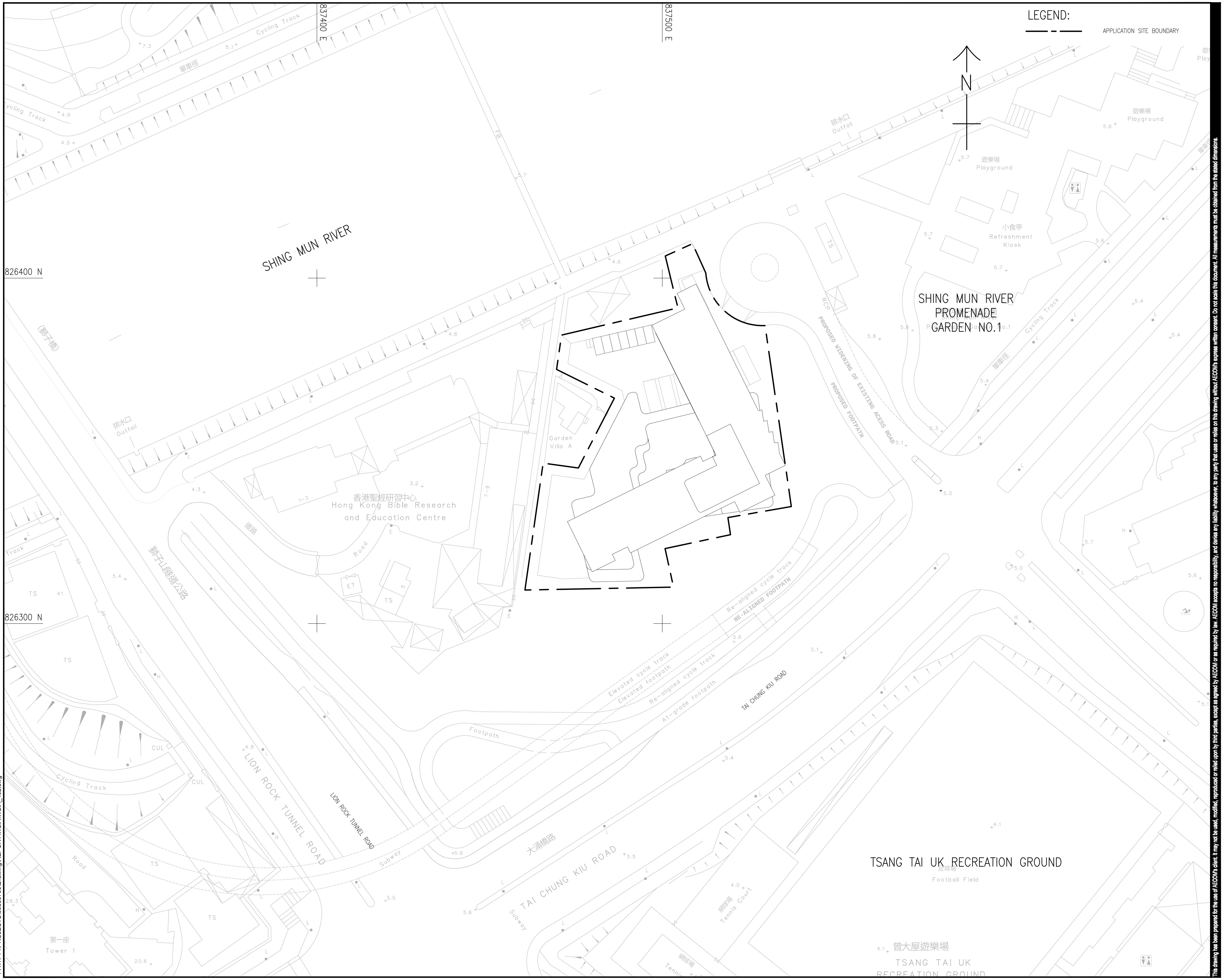

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CLIENT
業主

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
[redacted]

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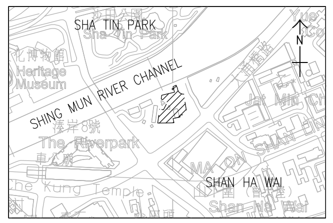

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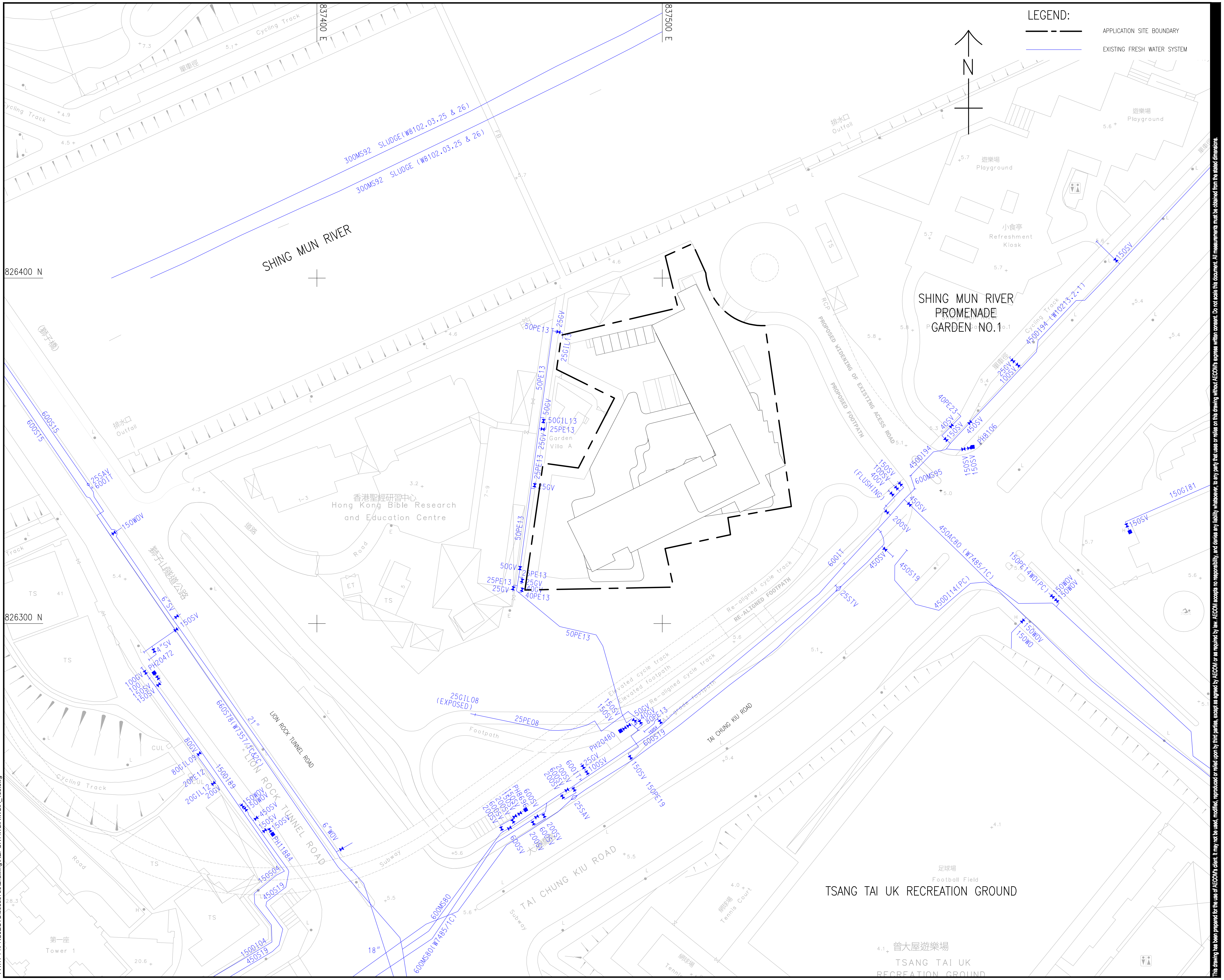

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AECOM Asia Company Ltd.
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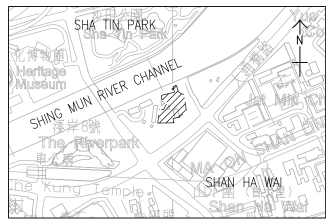

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EXISTING FRESH WATER DISTRIBUTION LAYOUT PLAN

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60330750/FIGURE 3

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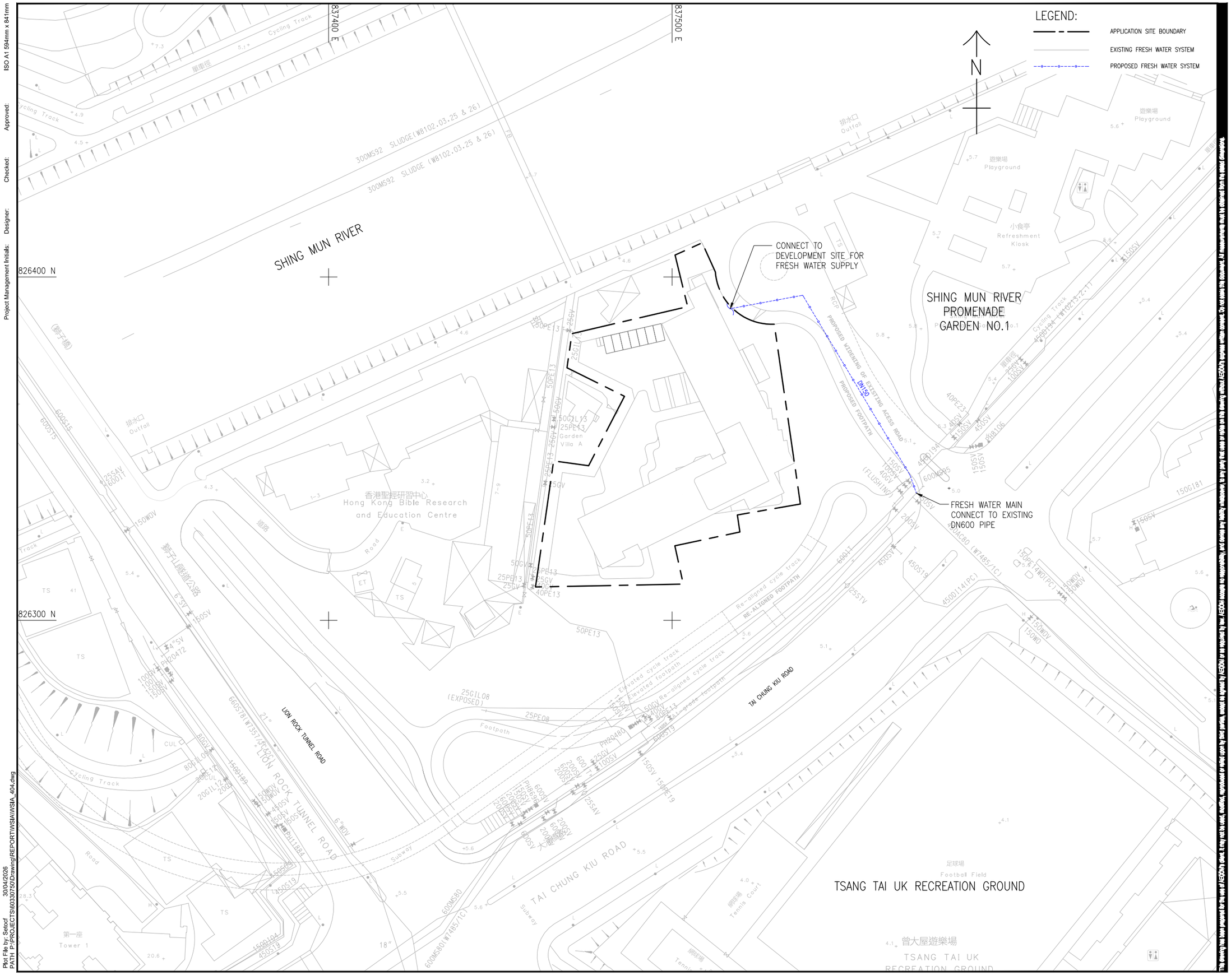

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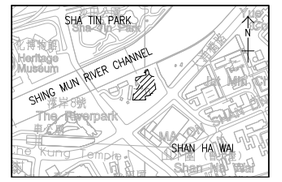

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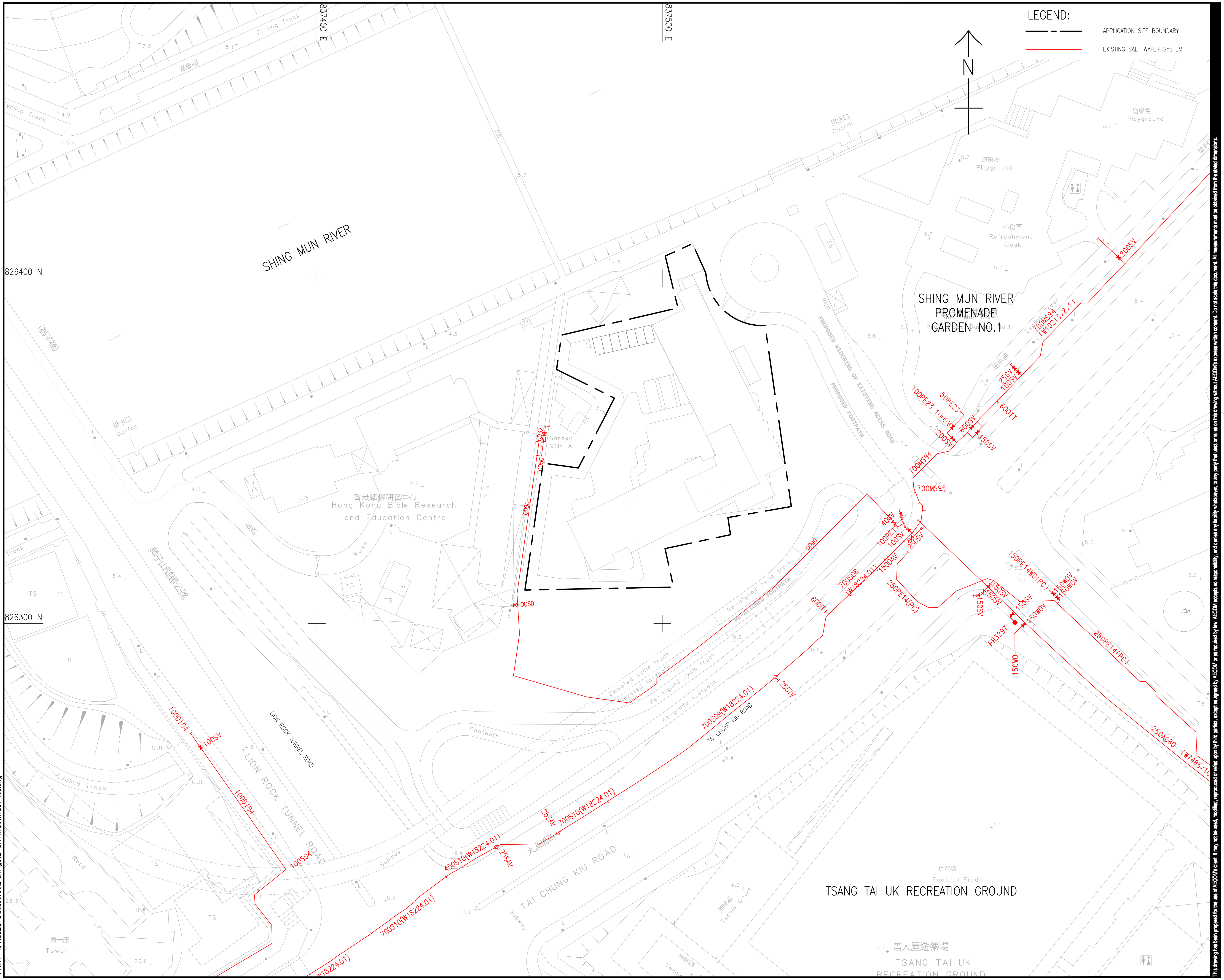

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CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
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EXISTING SALT WATER DISTRIBUTION LAYOUT PLAN

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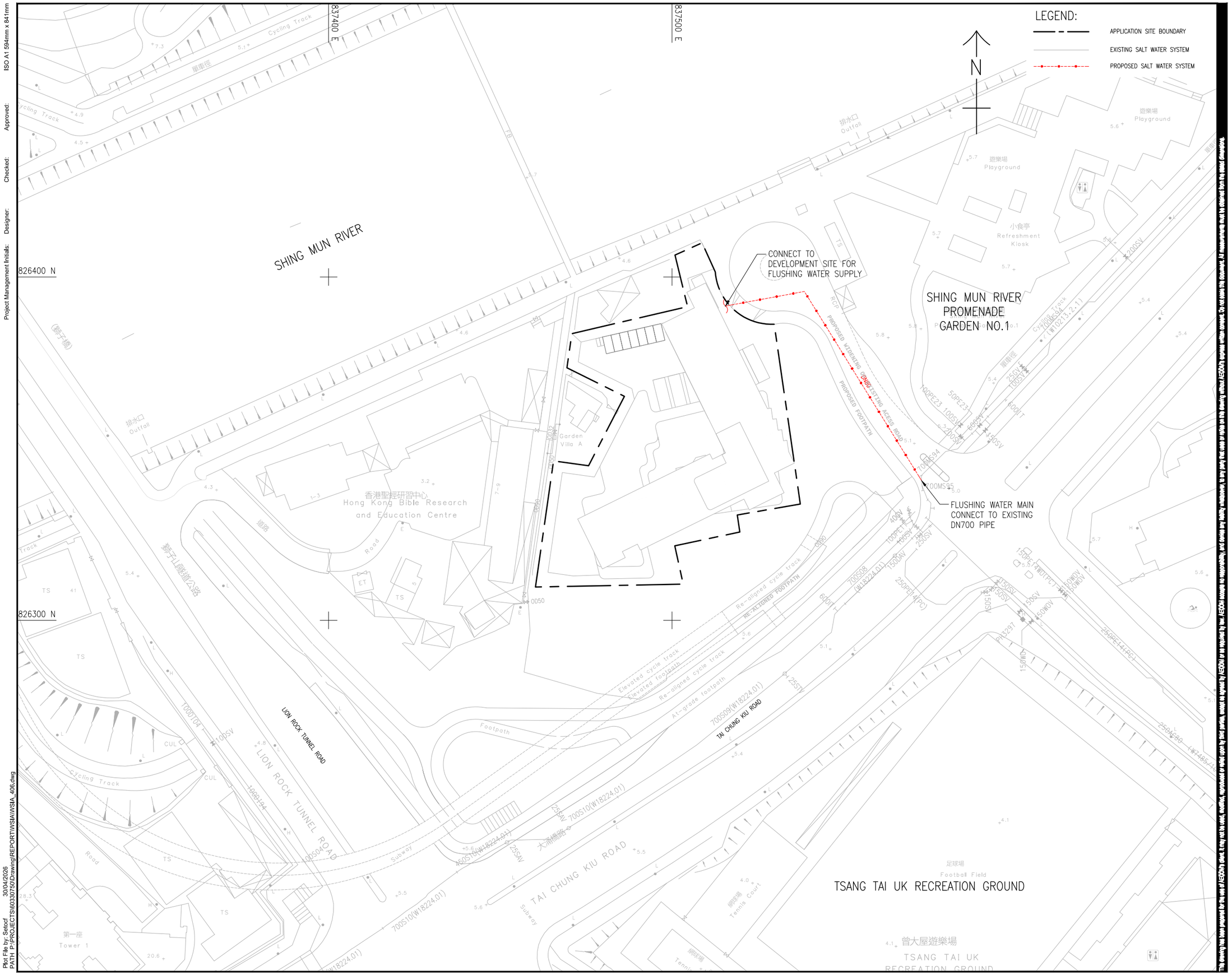

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CONSULTANT

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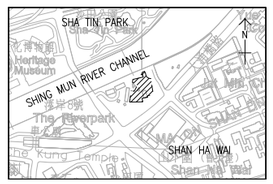

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PROPOSED SALT WATER DISTRIBUTION LAYOUT PLAN

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60330750/FIGURE 6

Annex 1

Estimation of Fresh and Flushing Water Demands

Summary of Development Schedule and Water Demand:

Supply	Flow Type	Population	No. of rooms	Unit Demand			Total Demand	
				Domestic	Service Trade	Retail	Fresh Water	Flushing Water
				m^3/room/day	L/head/day	L/head/day	m^3/d	m^3/d
Fresh	Residential (R2)	886	443	1	-	-	443	-
	Retail (F&B and non F&B) (1)	886		-	45	-	40	-
Flush	Residential (R2)	886		0.36	-	-	-	160
	Retail (F&B and non F&B) (2)	35		-	-	50	-	2
						Required water demand	483	162

Remarks:

(1) Fresh water supply allowance of commercial employees has been added for service trade use which based on domestic poplation of individual site.

(2) Flushing water demand estimation is adopting 0.050m^3/person/day for commercial employees (retail and clubhouse), according to GESF Appendix III.

Annex 2

Hydraulic Review of Fresh Water Mains

Annex 2 - Hydraulic Review of Proposed Fresh Water Main

Proposed Fresh Water Main

Hydraulic Review for Existing DN600		
Estimated Fresh Water Demand	483	m^3/day
	0.0056	m^3/s
Peak factor for distribution main	3	
Peak Flow rate	0.0168	m^3/s
Size of proposed water main	600	mm
Cross Section Area	0.270	m^2
Peak Flow Velocity of water main (assumed)	2	m/s
Capacity of water main	0.5394	m^3/s
The percentage of watermain occupied by the development site's flush water demand	3.11	%

Flush water demand utilizes about 3.11% of the existing water main capacity.

Hydraulic Review for Proposed DN150		
Estimated Fresh Water Demand	483.0	m^3/day
	0.0056	m^3/s
Peak factor for distribution main	3	
Peak Flow rate	0.0168	m^3/s
Size of Proposed water main	150	mm
Cross Section Area	0.0150	m^2
Required Peak Flow Velocity of water main	1.121	m/s

Annex 3

Hydraulic Review of Flushing Water Mains

Annex 3 - Hydraulic Review of Proposed Flushing Water Main

Proposed Flushing Water Main

Hydraulic Review for Existing DN700		
Estimated Flush Water Demand	162	m^3/day
	0.0019	m^3/s
Peak factor for distribution main	2	
Peak Flow rate	0.0038	m^3/s
Size of proposed water main	700	mm
Cross Section Area	0.365	m^2
Peak Flow Velocity of water main (assumed)	2	m/s
Capacity of water main	0.7306	m^3/s
The percentage of watermain occupied by the development site's flush water demand	0.51	%

Flush water demand utilizes about 0.51% of the existing water main capacity.

Hydraulic Review for Proposed DN80		
Estimated Flush Water Demand	162	m^3/day
	0.0019	m^3/s
Peak factor for distribution main	2	
Peak Flow rate	0.0038	m^3/s
Size of Proposed water main	80	mm
Cross Section Area	0.0050	m^2
Required Peak Flow Velocity of water main	0.746	m/s