

# Yuen Long Kau Hui No. 2 Sewage Pumping Station

## Project Profile

[382703/018/Issue 4]

Report Authorized For  
Issue By:



For and on Behalf of  
Black & Veatch Hong Kong Limited

Black & Veatch Hong Kong Limited  
25/F, Millennium City 6  
392 Kwun Tong Road  
Kowloon

Drainage Services Department  
Sewerage Projects Division  
44/F, Revenue Tower  
5 Gloucester Road  
Wanchai, Hong Kong

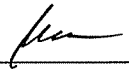
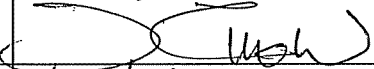
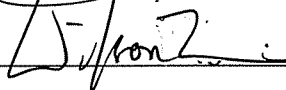
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	Name	Signature	Date
Prepared	M. Chua		10/08
Checked	C.S. Chow		10/08
Reviewed	S.H. Tsui		10/08

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## 1. BASIC INFORMATION

### 1.1 Project Title

1.1.1 The title of the proposed project is “Yuen Long Kau Hui No. 2 Sewage Pumping Station” hereinafter referred to as the Project.

### 1.2 Purpose and Nature of the Project

1.2.1 In June 1990, Environmental Protection Department (EPD) commissioned a consultancy study entitled “Yuen Long and Kam Tin Sewerage Master Plan Study” (SMP) to develop a Sewerage Master Plan for the provision of adequate sewerage and sewage treatment and disposal facilities in Yuen Long and Kam Tin areas. The study was completed in March 1992. The study revealed that sewage generated from the unsewered areas was only partially treated mostly by septic tanks with soakaway systems, and discharged directly into streams and nullahs, resulting in serious water pollution.

1.2.2 The Project is part of the on-going implementation of the SMP to convey sewage collected from the unsewered villages at Wang Chau (including Lam Uk Tsuen, Yuk Yat Garden, Yeung Uk Tsuen, Chung Sam Wai, Tung Tau Wai, Tung Tau Wai San Tsuen, Fuk Hing Tsuen, Sai Tau Wai, Ting Fook Villas and Yeung Uk San Tsuen) and Kau Hui to Yuen Long Sewage Treatment Works for treatment and disposal.

1.2.3 As the spare capacity of the existing Yuen Long Kau Hui Sewage Pumping Station is not sufficient to accommodate the additional sewage flow from Wang Chau and it is not preferable to disturb the normal operation of the existing Yuen Long Kau Hui Sewage Pumping Station, a new sewage pumping station (the Project) is therefore proposed. The Project will be constructed within the DSD’s pumping stations compound at Tung Tau Industrial Area, Yuen Long.

### 1.3 Name of the Project Proponent

1.3.1 The Sewerage Projects Division of Drainage Services Department (DSD) is the project proponent of this designated project.

### 1.4 Location and Scale of the Project and History of Site

1.4.1 The Project is located in Tung Tau Industrial Area, Yuen Long. It is approximately 63 m to the south of Shan Pui Chung Hau Tsuen. *Figure 1* shows the general location of the Project. *Figure 2* shows the existing condition of the site.

- 1.4.2 The Project comprises an underground covered inlet chamber, mechanical screen, wet well with three submersible pumps (two duty pumps and one standby pump), an underground flow meter & valve chamber, control panel & switchboard, ventilation systems and odour control facilities. The pumping station will be fully enclosed by a single-storey concrete structure. The pumping station building is about 16.8 m in length, 11.1 m in width and 5.6 m in height. The total site area is about 190 m<sup>2</sup>. **Figures 3 to 7** show the layout and sections of the proposed pumping station.
- 1.4.3 The average dry weather flow (ADWF) of the pumping station is approximately 5,900 m<sup>3</sup>/day with a design peak pumping capacity of about 20,650 m<sup>3</sup>/day.
- 1.4.4 Access to the pumping station will be via Hong Yip Street at Tung Tau Industrial Area.
- 1.4.5 The Project will be built within the DSD pumping stations compound at Tung Tau Industrial Area, Yuen Long. The existing DSD compound currently houses:
- Yuen Long Kau Hui Sewage Pumping Station (designated project<sup>1</sup> with an environmental permit obtained (EP-051/2000) for its construction and operation);
  - Yuen Long Kau Hui Floodwater Pumping Station; and
  - Yuen Long Kau Hui Low Flow Pumping Station and Inflatable Dam.
- 1.4.6 The Project site was largely situated on Shan Pui River before it was channelised. The site was vacant until the construction of the DSD pumping station compound for the Kau Hui Development Engineering Works in Area 16 under PWP Item No. 278CL.

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<sup>1</sup> Title of designated project: Sewage pumping station at Tung Tau Industrial Area, Yuen Long

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## 1.5 Number and Type of Designated Project covered by the Project Profile

- 1.5.1 The Project is a designated project under F.3(b)(i) of Part 1, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO), since the sewage pumping station has an installed (peak) capacity of more than 2,000 m<sup>3</sup> per day and a boundary of which is less than 150 m from an existing or planned residential area.
- 1.5.2 This Project Profile has been prepared to seek permission from the Director of Environmental Protection under Section 5(11) of the EIAO to apply directly for an Environmental Permit. The predicted impacts from the implementation of the proposed Project is not expected to be adverse and sufficient information is provided in this Project Profile on mitigation measures to meet the requirements under the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).

## 1.6 Name and Telephone Number of Contact Person

Drainage Services Department  
Sewerage Projects Division  
44<sup>th</sup> Floor, Revenue Tower  
5 Gloucester Road  
Wan Chai, Hong Kong

Contact person : Ir. S.C. Lau (Engineer / Sewerage Projects Division)  
Telephone : 2594 7454  
Fax. : 2827 8700  
Email : [edwinlau@dsd.gov.hk](mailto:edwinlau@dsd.gov.hk)

## **2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME**

### **2.1 Project Planning and Implementation**

2.1.1 The Consultant of Agreement No. CE 13/2006 (DS) has been employed by Sewerage Projects Division of DSD to carry out the preliminary design of the Project. The Electrical & Mechanical Projects (EM&P) Division of DSD will carry out the E&M design of the pumping station. Contractor will be employed to construct the Project under the supervision of the Consultant and E&MP Division of DSD. The Sewage Treatment 1 Division of DSD will operate and maintain the proposed sewage pumping station.

### **2.2 Project Timetable**

2.2.1 The Project is programmed to commence construction in 2009 for completion by 2013. The tentative implementation programme is as below:

- Detailed design – up to 1/2009
- Tender – 3/2009
- Construction and commissioning – 7/2009 to 6/2013
- Operation and maintenance – 6/2013 onwards

### **2.3 Interactions with Broader Programme or Other Projects**

2.3.1 The construction of the associated gravity sewers and rising mains to the proposed pumping station will likely coincide with the construction of the pumping station. However, the works are generally small-scaled works and will be shielded by the existing pumping station structures. Apart from this, there are no other major projects in the vicinity of the Project with overlapping implementation programmes that will have significant environmental impacts due to cumulative effects.



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### 3. POSSIBLE IMPACTS ON THE ENVIRONMENT

#### 3.1 Outline of Processes Involved

- 3.1.1 Sewage collected from the villages at Wang Chau will be conveyed to the proposed pumping station via gravity sewers. Sewage entering the pumping station will first pass through a screening chamber where a mechanical screen will be installed to remove large objects in the sewage to avoid damaging the pumps. The screened sewage will then enter into a wet well where the sewage will be pumped by centrifugal submersible pumps out of the pumping station to the Yuen Long Sewage Treatment Works via a rising main.
- 3.1.2 The proposed pumping station comprises an underground covered inlet chamber, two mechanical screens (one duty and one standby), wet well with three submersible pumps (two duty pumps and one standby pump), an underground flow meter & valve chamber, control panel & switchboard, ventilation systems and a deodorizing system. The pumping station will be fully enclosed by a single-storey concrete structure.
- 3.1.3 The proposed pumping station would impose environmental impacts during its construction and operation phases as described below.

#### 3.2 Possible Environmental Impacts during Construction Phase

##### *Noise*

- 3.2.1 Potential noise impact is expected during construction of the pumping station. The major source of construction noise is associated with the use of powered mechanical equipment. No construction work during restricted hours is expected. An assessment of the construction noise impact is provided in *Annex A*.
- 3.2.2 The predicted construction noise levels are tabulated below in *Table 3.1*. No overlapping of construction activities is expected. According to the predicted results, exceedance of the EIAO-TM daytime construction noise standard of 75 dB(A) is expected at NSR1.

**Table 3.1**  
**Predicted Construction Noise Levels**

Construction Activities	Predicted Construction Noise Level, dB(A)		
	NSR1	NSR2	NSR3
Surface Breaking	<b>82</b>	70	72
Excavation	<b>77</b>	65	67
Construction of Substructure	<b>77</b>	66	68
Backfilling and Extraction of Piles	<b>78</b>	66	68
Construction of Superstructure	<b>77</b>	66	68
E&M Installations	74	62	64
Finishing and Landscaping Works	<b>76</b>	64	66

Notes:

Numbers in **BOLD** denote exceedance of EIAO-TM daytime construction noise standard of 75 dB(A) for residential premises.

### *Air Quality*

3.2.3 Dust may be generated during construction which would have the potential to impact nearby air quality sensitive receivers, in particular during excavation or handling and transportation of construction and demolition materials. However, given the small Project area it is expected that only a small amount of construction and demolition materials would be generated (about 2,300 m<sup>3</sup>). This equates to about one dump truck trip per day. Hence, adverse air quality impact during construction phase is not expected. Dust suppression measures as recommended in the Air Pollution Control (Construction Dust) Regulation is expected to be effective in controlling dust on site.

### *Water Quality*

3.2.4 The potential water quality impacts during the construction phase of the pumping station include construction site surface runoff laden with sediment, concrete or other chemicals entering into nearby drainage system and water sensitive receivers. The recommended best management practices as stipulated in ProPECC PN 1/94 – “Construction Site Drainage” is expected to avoid and minimise the potential water quality impact.

### ***Waste Management***

- 3.2.5 It is expected that about 2,300 m<sup>3</sup> of construction and demolition (C&D) materials will be generated. Most of the C&D materials are suitable for reuse as public fill. In addition, small amount of C&D waste such as wood / metal scraps, packaging materials and general refuse will be generated. Small amount of chemical waste may also be generated.

### ***Landscape and Visual***

- 3.2.6 As the proposed pumping station will be built entirely within the existing concrete paved DSD compound, the magnitude of landscape impact on the landscape resources and landscape character caused by the Project will be negligible. The proposed pumping station is located in a highly disturbed area and adjacent to the Tung Tau Industrial Area. No trees or amenity planting will be affected. The visual impact arising during construction phase is expected to be localised and transient.

### ***Ecology***

- 3.2.7 Although the Project is within the Deep Bay Wetland Buffer Area (WBA), there will be no net loss of wetland or its function. The entire Project area is concrete paved. There are no other ecological sensitive areas in the vicinity of the Project. No adverse ecological impact is expected during the construction phase.

### ***Cultural Heritage***

- 3.2.8 No cultural heritage impact is expected during the construction phase.

## **3.3 Possible Environmental Impacts during Operational Phase**

### ***Noise***

- 3.3.1 The submersible pumps, mechanical screens and ventilation fans are the potential noise sources during operation of the pumping station. The predicted operational noise levels generated from the Project are provided in **Annex B1**. The predicted cumulative operational noise levels from the other pumping stations in the DSD compound to the closest NSR (NSR1) are provided in **Annex B2**. The results indicated that the very worst case operational noise level will be within the noise standard specified in the EIAO-TM.

### *Air Quality*

- 3.3.2 The screening hall and wet well of the pumping station and the screenings would be the major sources of odour nuisance.

### *Water Quality*

- 3.3.3 The pumping station is designed to convey sewage collected from the villages of Wang Chau and Kau Hui to the existing Yuen Long Sewage Treatment Works for treatment and disposal. Implementation of the Project will enhance the water quality of the surrounding environment, and will not cause any adverse impacts during normal operation. Under emergency situations such as prolonged power failure or pump failure, sewage bypass into nearby stormwater drainage system discharging into Shan Pui River may occur. With the implementation of the preventive measures as listed in *Section 5*, the chance of sewage bypass will be extremely low.

### *Waste Management*

- 3.3.4 Mechanical screens will be installed at the screening hall to prevent large solid materials in the influent from entering the pumps and causing damage. A small quantity of screenings will be generated.

### *Landscape and Visual*

- 3.3.5 As the works will be within the existing DSD pumping stations compound and no trees will be affected, the landscape impact during operation phase will be negligible.
- 3.3.6 The potential visual impact during operation phase is the presence of a low-rise building within an existing pumping stations compound. Minor adverse visual impact is envisaged.

### *Ecology*

- 3.3.7 No ecological impact is expected during operation phase.

### *Cultural Heritage*

- 3.3.8 No cultural heritage impact is expected during operation phase.

#### 4. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

##### 4.1 Existing and Planned Sensitive Receivers and Sensitive Parts of the Natural Environment

4.1.1 The locations of the representative noise, air quality and water quality sensitive receivers are shown in **Figure 8**. The Project is located in a zone annotated as “Other Specified Uses (OU) – Pumping Station” under the Nam Sang Wai Outline Zoning Plan – S/YL-NSW/8.

4.1.2 There are no planned sensitive receivers located near the Project and there are no rezoning applications (or Section 16 application) in the vicinity of the Project.

4.1.3 The closest residential sensitive receivers are the low-rise village houses at Shan Pui Chung Hau Tsuen approximately 63 m to the north of the Project. The village of Tung Tau Wai and the residential development of The Parcville lie further away (more than 200 m) from the Project. There are no schools within 300 m of the Project. The identified noise and air quality sensitive receivers are listed in **Tables 4.1** and **4.2** respectively.

**Table 4.1**  
**Representative Noise Sensitive Receivers (NSRs)**

Noise Sensitive Receiver	Description	Number of Floors	Approximate Distance from the Nearest Site Boundary (m)
NSR1	Village house at Shan Pui Chung Hau Tsuen	1	63
NSR2	Block 12, The Parcville	16	250
NSR3	Village house at Tung Tau Wai	3	205

**Table 4.2**  
**Representative Air Quality Sensitive Receivers (ASRs)**

Air Sensitive Receiver	Description	Number of Floors	Approximate Distance from the Nearest Site Boundary (m)
ASR1	Village house at Shan Pui Chung Hau Tsuen	1	63
ASR2	Block 12, The Parcville	16	250
ASR3	Village house at Tung Tau Wai	3	205
ASR4	Kerry Godown	29	30
ASR5	Tak Yip Street Playground	-	175

- 
- 4.1.4 The water sensitive receivers near the Project (**Figure 8**) consist of the concrete lined section of Shan Pui River (WSR1) and the small stream flowing adjacent Shan Pui Chung Hau Tsuen (WSR2). Water quality of both water courses is observed to be poor with strong odour and floating refuse.
- 4.1.5 The Project area is entirely concrete paved. The nearby area is highly disturbed by nearby village development and industrial establishments. Although the Project is within the Deep Bay Wetland Buffer Area (WBA), the works and surrounding areas are highly disturbed with very low ecological value. Apart from the WBA, there are no sites of conservation importance or important habitats near the Project area.
- 4.1.6 According to the 1963 aerial photograph, the Project site was largely situated on Shan Pui River before it was channelised. It was also surrounded by several fish ponds. No archaeological potential is therefore expected. The closest built heritage resources are the I Shing Temple (declared monument) and Yu Yuen (Grade I historic building) located at Tung Tau Wai, Wang Chau. Both are located well over 300 m from the Project and shielded by the existing pumping stations and village houses.
- 4.1.7 The Project site is not considered to be in an area of high visual value and presently has very little existing vegetation or landscape features. The DSD pumping station compound, nearby industrial buildings and roadside plantings dominate the landscape and visual character of the area. No trees will be affected by the Project.

## 4.2 Major Elements of the Surrounding Environment

- 4.2.1 The Project is located directly adjacent to the Tung Tau Industrial Area with the Yuen Long Industrial Estate about 200 m to its north. The Project area is concrete paved and currently serves as an internal access road of the pumping station compound and is not considered sensitive with regard to existing ecology or landscape resources. The surrounding area is highly disturbed by village development and industrial establishments (godown, KMB bus depot). **Figure 2** shows the existing conditions of the site.
- 4.2.2 The location of the Project is entirely within the DSD pumping stations compound in Tung Tau Industrial Area, Yuen Long. Cumulative impacts arising from the operation of the other pumping stations within the DSD compound have been included in the assessment.

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## 5. ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATION

### 5.1 General

5.1.1 Construction clauses will be included in the works contracts to ensure the recommended mitigation measures are properly implemented.

5.1.2 The contractor will be required to prepare and implement an Environmental Management Plan (EMP) in accordance with ETWB TC(W) No. 19/2005 – “Environmental Management on Construction Sites”. The EMP should provide details on the approach which the contractor plans to adopt in managing and controlling potential environmental impacts from construction activities of the Project, and to ensure their adherence to all the environmental requirements.

5.1.3 The recommended mitigation measures to be implemented during the detailed design, construction and operation phases of the Project are listed below and included in the Project Implementation Schedule (*Annex C*).

### 5.2 Mitigation Measures during Construction Phase

#### *Noise*

5.2.1 The contractor will be required to use quiet powered mechanical equipment during construction.

5.2.2 The mitigated construction noise levels are shown in *Table 5.1*. Details of the calculations and the sound power level of the quiet powered mechanical equipment are shown in *Annex A*. As shown in *Table 5.1* with the implementation of quiet equipment, construction noise level will be within the EIAO-TM daytime noise standard of 75 dB(A).

**Table 5.1**  
**Predicted Construction Noise Levels (Mitigated)**

Works	Predicted Construction Noise Level, dB(A)		
	NSR1	NSR2	NSR3
Surface Breaking	70	59	60
Excavation	67	56	58
Construction of Substructure	73	61	63
Backfilling and Extraction of Piles	70	58	60
Construction of Superstructure	73	61	63
E&M Installations	67	56	57
Finishing and Landscaping Works	69	57	59

5.2.3 In addition to quiet powered mechanical equipment, the contractor will be required to adopt the following good site practices during the construction phase.

- Only well-maintained plant should be operated on-site and plant should be serviced regularly;
- Silencers or mufflers on construction plant should be utilised;
- Mobile plant should be sited as far away from sensitive receivers as possible;
- Machines and plant that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum;
- Plant known to emit noise strongly in one direction should, where possible, be orientated so that noise is directed away from the nearby sensitive receivers; and
- Material stockpiles and other structures such as site hoarding should be effectively utilized to screen noise from on-site construction activities.



### *Air Quality*

- 5.2.4 The effect of dust generated from the construction works is expected to be insignificant with the implementation of proper mitigation measures. The impacts will be minimized by measures such as regularly water spraying of exposed surface, and providing wheel-washing facilities.
- 5.2.5 The contractor will be required to comply with the control measures stipulated in the Air Pollution Control (Construction Dust) Regulation and implement all the required mitigation measures.
- 5.2.6 With the implementation of these measures, dust levels would be controlled to within the acceptable levels. There are no concurrent construction works within 500m from the project site boundary which would have cumulative dust impact.

### *Water Quality*

- 5.2.7 The construction activities of the Project will include excavation, earthworks, and general building works. The contractor will be required to provide silt removing facility so as to remove any silt before discharge of site runoff into nearby stormwater drains. The design of temporary on-site drainage and silt removing facilities will follow the guidelines stipulated in EPD's ProPECC PN 1/94 – "Construction Site Drainage".
- 5.2.8 With the implementation of these measures, water quality would be controlled to within the acceptable levels.

### *Waste Management*

- 5.2.9 The contractor will be required to sort all C&D materials and waste into different categories for reuse on site, recycling and disposal at designated public fill reception facilities or landfills. Suitable excavated materials will be reuse on-site as backfill as far as possible. Disposal of C&D materials will be managed through the trip-ticket system as stipulated in ETWB TCW No. 31/2004.
- 5.2.10 All chemical wastes from equipment maintenance will be handled, stored and disposed of in accordance with the requirements of the Waste Disposal (Chemical Waste) Regulation.
- 5.2.11 The contractor will be required to incorporate the waste management measures into the contractor's on-site Waste Management Plan. With proper implementation of the recommended waste management measures, no adverse waste impact during the construction phase is expected.

### *Landscape and Visual*

- 5.2.12 The contractor will be required to maintain site cleanliness and tidiness and to properly manage construction waste in the construction works area to reduce the visual impact of the construction site to a minimum. With the implementation of these measures, adverse landscape and visual impacts during construction is not expected.

### *Ecology*

- 5.2.13 As no ecological impact is expected during construction phase, no mitigation measure is necessary.

### *Cultural Heritage*

- 5.2.14 As no cultural heritage impact is expected during construction phase, no mitigation measure is necessary.

## **5.3 Mitigation Measures during Operational Phase**

### *Noise*

- 5.3.1 To minimize potential noise impacts during the operation of the Project, all the submersible pumps and mechanical screens will be fully enclosed within the structure of the pumping station. The pumps will be located underground at a depth of about 12 m. The concrete structure of the proposed pumping station will shield most of the noise generated by the submersible pumps and mechanical screens.
- 5.3.2 The ventilation exhaust outlet of the deodorizer unit will be located on the rooftop and orientated to face away from the noise sensitive receivers of Shan Pui Chung Hau Tsuen, i.e. facing west or south of the pumping station towards Tung Tau Industrial Area. In addition, concrete parapet (planter) wall of 1.1 m tall will be provided along the boundary of the roof to provide further shielding effect.
- 5.3.3 All the ventilation fans mounted on the façade wall will be orientated to face away from the noise sensitive receivers of Shan Pui Chung Hau Tsuen. The location of the fans will also take into account additional shielding effect provided by the building structures.
- 5.3.4 Any openings facing the noise sensitive receivers of Shan Pui Chung Hau Tsuen will be fitted with acoustic louvers.

- 5.3.5 According to the operational noise assessment (*Annex B*), the predicted noise level will be within the noise criteria specified in the EIAO-TM.

#### *Air Quality*

- 5.3.6 To minimize the potential odour impact, the screening hall and wet well will be located underground, and enclosed by a reinforced concrete structure. In addition, a deodorization unit with a forced ventilation system and using activated carbon with a H<sub>2</sub>S removal efficiency of 99.5% will be installed to remove the odour such that the odour level measured at the nearest ASR of the pumping station will not exceed 5 odour units (based on an averaging time of 5 seconds). The exhaust outlet of the proposed deodorization unit will be located in a direction away from the nearby sensitive receivers as far as practicable, i.e. facing west or south of the pumping station.
- 5.3.7 The screenings of sewage at the screening hall of the pumping station will be properly packed and handled within the pumping station structure to avoid odour nuisance. The screenings will then be transported to designated landfills for disposal as soon as possible.
- 5.3.8 The existing floodwater and low flow pumping stations are used to pump stormwater, therefore no odour impact is expected from these two stormwater pumping stations. As advised by DSD, the existing sewage pumping station has installed a deodourizer with a H<sub>2</sub>S removal efficiency of 99.5% in addition to the fully enclosed structure design. With such measures in place, cumulative odour impact from both sewage pumping stations is not expected.
- 5.3.9 Apart from the existing sewage pumping station, there are no other similar odour emission sources within 500 m from the proposed Project.

#### *Water Quality*

- 5.3.10 To minimize the chance of sewage bypass, standby pump and mechanical screen will be provided to cater for breakdown and maintenance of the pump and mechanical screen. In order to minimise the chance of power failure, backup power supply in the form of dual power supply or automatic operated emergency generator will be provided. In addition, a Supervisory Control and Data Acquisition (SCADA) system will also be provided in order to transmit signals showing irregularity or any operational problem of the pumping station to the existing Yuen Long Sewage Treatment Works or other manned pumping station for active monitoring such that immediate actions can be taken in case of emergency. Design will also allow sewage to be diverted to the existing sewage pumping station if necessary to further minimize the chance of sewage bypass.

5.3.11 With these measures incorporated into the design of the pumping station, the chance of emergency sewage bypass is expected to be extremely remote.

#### ***Waste Management***

5.3.12 The screenings of sewage at the screening hall of the pumping station will be properly packed in plastic bags within the pumping station structure. The screenings will then be transported to designated landfills for disposal as soon as possible.

#### ***Landscape and Visual***

5.3.13 Architectural aspects of the proposed sewage pumping station including colour scheme and façade treatment will be carefully designed taking into account the features of surrounding land and design of the other existing pumping stations building to make the new structure form part of the compound hence minimizing any potential visual impact.

5.3.14 A ‘green roof’ design with ground covers, climbers and shrub plantings will be provided on the roof of the proposed pumping station. In addition, peripheral tree and shrub planting along the eastern and north-eastern parts of the DSD compound will be implemented for landscape enhancement. The planting will soften the built form of the proposed structure. DSD will undertake the management and maintenance of these landscaping measures.

5.3.15 The landscape plan for the proposed pumping station is shown in **Figure 9**. The conceptual design is shown in **Figures 10 and 11**. A photomontage of the Project is shown in **Figure 12**.

#### ***Ecology***

5.3.16 As no ecological impact is expected during operation phase, no mitigation measure is necessary.

#### ***Cultural Heritage***

5.3.17 No cultural heritage impact is expected during operation phase, no mitigation measure is necessary.

## 5.4 Possible Severity, Distribution and Duration of Environmental Impacts

5.4.1 At present, sewage generated from the unsewered villages in Wang Chau and Kau Hui was only partially treated mostly by septic tanks and soakaway systems, and directly discharged into nearby watercourses, resulting in serious water pollution.

5.4.2 To improve the water quality in the area, proper sewerage network system will need to be provided or upgraded in phases, which will result in various degrees of environmental impacts during its construction and operation. The associated environmental impacts are expected to be small scale, localised and temporary. With the implementation of the recommended mitigation measures, no adverse residual impacts are expected from this Project. In the long term, the environmental and hygiene conditions in the area will gradually improve as a result of the implementation of the Project.

## 5.5 History of Similar Projects

5.5.1 Other similar capacity sewage pumping stations under the EIAO (through direct application of environmental permit) have been reviewed.

**Table 5.2**  
**Previous Direct Application for Environmental Permit for Sewage Pumping Station**

EIAO Reference	Designated Project Title	Pumping Station Capacity (m <sup>3</sup> /day)	Closest Sensitive Receiver
DIR-020/1999	Sewage Pumping Station at Tung Tau Industrial Area*	5,260 m <sup>3</sup>	35 m
DIR-057/2001	Sai Kung Area 4 Sewage Pumping Station	7,500 m <sup>3</sup>	34 m
DIR-067/2002	Lam Tsuen Valley Sewage Pumping Station	5,600 m <sup>3</sup>	150 m
DIR-138/2006	Ma On Shan Area 108 Pumping Station	14,500 m <sup>3</sup>	75 m
DIR-140/2006	Tsing Lung Tau Pumping Station	4,000 m <sup>3</sup>	25 m
DIR-161/2007	Tai Po Tai Wo Road Sewage Pumping Station	12,100 m <sup>3</sup>	29 m

Notes:

\* This is the existing Yuen Long Kau Hui Sewage Pumping Station.

## **5.6 Public Consultation to Date**

5.6.1 The following parties were consulted during the course of the Study.

- Village representatives of Wang Chau;
- Ping Shan Heung Rural Committee; and
- Environmental Improvement Committee of Yuen Long District Council.

5.6.2 The Project was supported by the above parties.

## **6. USE OF PREVIOUS APPROVED EIA REPORTS**

6.1 Reference has been made to the Project Profile for the existing Yuen Long Kau Hui Sewage Pumping Station (EIAO registry no.: DIR-020/1999) whereby permission was granted with conditions to apply directly for an Environmental Permit. An Environmental Permit was obtained (ref. EP-051/2000) on 1 February 2000.

**END OF TEXT**

## **ANNEXES**

**Annex A**  
**Construction Noise Calculations**



## **Annex A**

### **Equipment List and Associated Sound Power Level for Construction Activities (unmitigated)**

#### **Construction of Sewage Pumping Station**

##### **1. Surface Breaking**

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Excavator mounted hydraulic breaker	028	122	1	123
Dump truck	067	117	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

##### **2. Excavation**

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Excavator	081	112	1	118
Dump truck	067	117	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

##### **3. Construction of Substructure**

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Crane	048	112	1	119
Concrete lorry mixer	044	109	1	
Concrete pump	047	109	1	
Poker, vibratory	170	113	1	
Bar bender and cutter	021	90	1	
Chipper, hand-held	043	112	1	
Saw, circular, wood	201	108	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

##### **4. Backfilling and Extraction of Piles**

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Excavator	081	112	1	119
Dump truck	067	117	1	
Vibratory compactor	050	105	1	
Crane	048	112	1	
Vibratory sheet pile extractor	163	90	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

##### **5. Construction of Superstructure**

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Crane	048	112	1	119
Concrete lorry mixer	044	109	1	
Concrete pump	047	109	1	
Poker, vibratory	170	113	1	
Bar bender and cutter	021	90	1	
Chipper, hand-held	043	112	1	
Saw, circular, wood	201	108	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

##### **6. E&M Installations**

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Crane	048	112	1	115
Lorry	141	112	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

##### **7. Finishing and Landscaping Works**

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Excavator	081	112	1	117
Crane	048	112	1	
Lorry	141	112	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

PME = Powered Mechanical Equipment

SWL = Sound Power Level

TM = Technical Memorandum on Noise from Construction Work other than Percussive Piling

BS = BS 5228

## Annex A

### Equipment List and Associated Sound Power Levels for the Construction Activities (Level 1 Mitigation - Use of Quiet Plant)

#### Construction of Sewage Pumping Station

##### 1. Surface Breaking

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Excavator mounted hydraulic breaker	C.8-13	110	1	112
Dump truck	C.9-39	103	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

##### 2. Excavation

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Excavator	C.3-97	105	1	109
Dump truck	C.9-39	103	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

##### 3. Construction of Substructure

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Crane	C.7-112	102	1	114
Concrete lorry mixer	C.6-23	100	1	
Concrete pump	C.6-36	106	1	
Poker, vibratory	C.6-40	98	1	
Bar bender and cutter	021	90	1	
Chipper, hand-held	C.6-45	111	1	
Saw, circular, wood	C.7-78	106	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

##### 4. Backfilling and Extraction of Piles

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Excavator	C.3-97	105	1	111
Dump truck	C.9-39	103	1	
Vibratory compactor	050	105	1	
Crane	C.7-112	102	1	
Vibratory sheet pile extractor	163	90	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

##### 5. Construction of Superstructure

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Crane	C.7-112	102	1	114
Concrete lorry mixer	C.6-23	100	1	
Concrete pump	C.6-36	106	1	
Poker, vibratory	C.6-40	98	1	
Bar bender and cutter	021	90	1	
Chipper, hand-held	C.6-45	111	1	
Saw, circular, wood	C.7-78	106	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

##### 6. E&M Installations

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Crane	C.7-112	102	1	109
Lorry (gross vehicle weight less than 38 tonne)	*	105	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

##### 7. Finishing and Landscaping Works

Type of PME	TM Code / BS Ref.	SWL - dB(A)	No. of Units	Total SWL - dB(A)
Excavator	C.3-97	105	1	110
Crane	C.7-112	102	1	
Lorry (gross vehicle weight less than 38 tonne)	*	105	1	
Generator, silenced	102	100	1	
Air compressor	002	102	1	

PME = Powered Mechanical Equipment

SWL = Sound Power Level

TM = Technical Memorandum on Noise from Construction Work other than Percussive Piling

BS = BS 5228

\* = Sound power levels of other commonly used PME

\* (source: EPD website [http://www.epd.gov.hk/epd/english/application\\_for\\_licenses/guidance/files/OthersSWLe.pdf](http://www.epd.gov.hk/epd/english/application_for_licenses/guidance/files/OthersSWLe.pdf))

**Annex A**

**Table of Predicted (unmitigated and mitigated) Construction Noise Levels at Representative NSRs**

RNSR ID	Construction Works Involved	Distance of RNSR from Notional Point, m	Unmitigated Sound Power Level, dB(A)	Predicted Noise Level (unmitigated), dB(A)	Mitigated 1 Sound Power Level, dB(A)	Predicted Noise Level (Mitigated 1), dB(A)
NSR 1	1 : Surface Breaking	66	123	82	112	70
	2 : Excavation	66	118	77	109	67
	3 : Construction of Substructure	66	119	77	114	73
	4 : Backfilling and Extraction of Piles	66	119	78	111	70
	5 : Construction of Superstructure	66	119	77	114	73
	6 : E&M Installations	66	115	74	109	67
	7 : Finishing and Landscaping works	66	117	76	110	69
NSR 2	1 : Surface Breaking	250	123	70	112	59
	2 : Excavation	250	118	65	109	56
	3 : Construction of Substructure	250	119	66	114	61
	4 : Backfilling and Extraction of Piles	250	119	66	111	58
	5 : Construction of Superstructure	250	119	66	114	61
	6 : E&M Installations	250	115	62	109	56
	7 : Finishing and Landscaping works	250	117	64	110	57
NSR 3	1 : Surface Breaking	205	123	72	112	60
	2 : Excavation	205	118	67	109	58
	3 : Construction of Substructure	205	119	68	114	63
	4 : Backfilling and Extraction of Piles	205	119	68	111	60
	5 : Construction of Superstructure	205	119	68	114	63
	6 : E&M Installations	205	115	64	109	57
	7 : Finishing and Landscaping works	205	117	66	110	59

**NOTES:**

Level 1 Mitigation : Use of Quiet Equipment

3 dB(A) façade correction has been included in the Predicted Noise Level

EIAO-TM daytime construction noise criteria: residential premises 75 dB(A)

**Annex B**  
**Operational Noise Calculations**

## ANNEX B OPERATIONAL NOISE ASSESSMENT

### **B1. INTRODUCTION**

#### **B1.1 Introduction**

B1.1.1 The Project involves constructing a new sewage pumping station within the existing DSD pumping station compound at Tung Tau Industrial Area in Yuen Long Kau Hui.

B1.1.2 The existing DSD compound currently houses:

- Yuen Long Kau Hui Sewage Pumping Station (designated project with an environmental permit obtained (EP-051/2000) for its construction and operation<sup>1</sup>);
- Yuen Long Kau Hui Floodwater Pumping Station; and
- Yuen Long Kau Hui Low Flow Pumping Station and Inflatable Dam.

B1.1.3 This section provides an assessment of the operational (fixed) noise impact from the proposed sewage pumping station as well as cumulative noise impact from the other pumping stations within the DSD compound on nearby noise sensitive receivers.

#### **B1.2 Background Information**

B1.2.1 The existing Kau Hui Sewage Pumping Station within the DSD compound is a designated project under the EIA Ordinance. Permission was granted with conditions in September 1999 to directly apply for an Environmental Permit (DIR-020/1999). A detailed noise calculation of the fixed noise within the DSD compound was submitted in 25 November 1999 in compliance with the condition of approval for direct application.

B1.2.2 This assessment has made reference to this submission wherever applicable.

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<sup>1</sup> Title of designated project: "Sewage pumping station at Tung Tau Industrial Area, Yuen Long". Permission was granted in September 1999 to directly apply for an Environmental Permit (DIR-020/1999).

## B2. OPERATIONAL NOISE ASSESSMENT

### B2.1 Noise Sensitive Receivers

B2.1.1 The closest Noise Sensitive Receiver (NSR) is the village of Shan Pui Chung Hau Tsuen. A village house (NSR1) at the eastern portion of the village is selected as the worst affected NSR as it will have a direct view of the proposed sewage pumping station.

B2.1.2 NSRs at the western portion of the village will have no direct view of the proposed sewage pumping station as it will be totally shielded by the other pumping stations within the compound, therefore are not considered as the worst affected NSR.

### B2.2 Assessment Criteria

B2.2.1 According to the Technical Memorandum on EIA Process (EIAO-TM), the criteria for planned fixed noise source should be (a) 5 dB(A) below the appropriate Acceptable Noise Levels (ANL) as shown in the *Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites* (TM-IND) or (b) the prevailing background noise levels (for quiet areas with level 5 dB(A) below the ANL).

B2.2.2 In accordance with TM-IND, the Area Sensitivity Rating (ASR) for the NSR is considered to be “B” as the NSR is located within 250 m of Yuen Long Industrial Estate which is zoned as OU (Industrial Estate) under the latest Yuen Long Outline Zoning Plan (S/YL/17). The NSR is also directly affected by the industrial establishments at the adjacent Tung Tau Industrial Area and the nearby container trailer and lorry parking area. The TM-IND and EIAO-TM noise standards are tabulated in **Table B1** below.

**Table B1**  
**Fixed Noise Standards**

Time Period	ANL for ASR “B” under TM-IND, dB(A)	EIAO-TM Fixed Noise Standard*, dB(A)
Day (0700 – 1900 hours)	65	60
Evening (1900 – 2300 hours)		
Night (2300 – 0700 hours)	55	50

Note:

\* 5 dB(A) below the appropriate ANL under Table 2 of TM-IND for area sensitivity rating of “B”.

B2.2.3 Noise measurement was undertaken during the most sensitive night-time period to determine the prevailing background noise level at the NSR. The location of the measurement is shown in *Plate 1*. The background noise levels are tabulated in *Table B2* below. The dominant noise source consist mainly of traffic noise along nearby roads and from the nearby container trailer and lorry parking area, noise from industrial establishments in Tung Tau Industrial Area and Yuen Long Industrial Estate as well as villagers' activities.

**Table B2**  
**Noise Measurement Results at Shan Pui Chung Hau Tsuen**

Time Period	Measured Noise Levels, Leq <sub>(30 minutes)</sub> dB(A)
2300 – 0700 hours	46 – 51 dB(A)

B2.2.4 As the lowest prevailing background noise level is more than 5 dB(A) lower than the ANL, the night-time background noise level is used as required under the EIAO-TM. Based on the noise measurement result, the applicable noise standard for operational noise assessment of the proposed sewage pumping station is therefore 46 dB(A).

B2.2.5 In any event, the Area Sensitivity Rating assumed in this Project Profile is for indicative assessment only given that the details of the plant layout are not yet finalized and the building layout is only provisional. It should be noted that fixed noise sources are controlled under section 13 of the NCO. At the time of investigation, the Noise Control Authority shall determine noise impact from concerned fixed noise sources on the basis of prevailing legislation and practices being in force, and taking account of contemporary conditions/situations of adjoining land uses. Nothing in this Project Profile shall bind the Noise Control Authority in the context of law enforcement against all the fixed noise sources being assessed.

### **B2.3 Assessment Methodology and Assumptions**

B2.3.1 Assessment of potential impact due to fixed noise sources has been carried out according to standard acoustic principles with reference to the TM-IND and the noise calculation submitted in compliance with the condition of approval of DIR-020/1999 as well as other reports approved under the EIA Ordinance. Where applicable, reference has also been made to the Operation and Maintenance (O&M) Manual of the existing Kau Hui sewage pumping station which lists out the details and specifications of the installed equipment.

## *Noise Sources*

### *Proposed Sewage Pumping Station*

#### Submersible pumps

- B2.3.2 Three submersible pumps will be provided for the proposed sewage pumping station. Only two duty pumps will be in operation at any one time, the remaining one will act as standby. All the pumps will be located at about 12 m underground and will be fully enclosed by a reinforced concrete building.

#### Mechanical screens

- B2.3.3 Two mechanical screens will be provided for the proposed sewage pumping station. Only one screen will be in operation at any one time, the remaining one will act as standby only. All the screens will be fully enclosed by the pumping station structure.

#### Ventilation fans

- B2.3.4 A total of six ventilation fans will be provided for the proposed sewage pumping station with four fans operating and two fans serving as standby.
- B2.3.5 Two fans (1 duty & 1 standby) will be provided for the deodorizer unit. It will be fully enclosed and located within the pumping station structure. An opening will be located on the rooftop to serve as exhaust outlet. It will be orientated to face away from the NSR (i.e. facing west or south towards Tung Tau Industrial Area).
- B2.3.6 The remaining four ventilation fans will be installed on the façade wall of the proposed pumping station to provide general ventilation during man entry to the sewage pumping station. Three fans will be operated at any one time while the remaining one will act as standby only. It is noted from DSD that entry to the pumping station during night-time period is very seldom and for emergency situation only. Notwithstanding, the operational noise assessment assumed the fans will be in operation during night-time to predict a very worst case scenario. These four fans will be installed at openings facing away from the NSR (i.e. will not be visible by the NSR). The location of the fans will also take into account additional shielding effect provided by the building structures.



Sound Power Level of Equipment

- B2.3.7 The sound power level of the equipment has made reference to the 'Project Profile for Tai Po Tai Wo Road Sewage Pumping Station' (DIR-161/2007) as shown in **Table B3** below.

**Table B3**  
**Summary of the Equipment in the Proposed Sewage Pumping Station**

Equipment	Numbers	Sound Power Level*, dB(A)
Submersible pump	2 duty + 1 standby	85
Ventilation fan	4 duty + 2 standby	73
Mechanical screen	1 duty + 1 standby	89

\* Information extracted from the Project Profile for Tai Po Tai Wo Road Sewage Pumping Station (DIR-161/2007)

*Existing Kau Hui Sewage Pumping Station*

- B2.3.8 A detailed noise calculation for the existing Kau Hui sewage pumping station was submitted in November 1999 in compliance with the condition of approval for direct application (DIR-020/1999). It is noted that at the time of assessment information regarding the type and power rating of the ventilation fans were not available, hence the fan with the highest noise level was used in the assessment for a very worst case scenario.
- B2.3.9 Reference has also been made to the O&M Manual for the existing Kau Hui sewage pumping station which lists out the details and specifications of the installed fans. However, it was noted that the installed equipment has a substantially lower noise level. To cater for possible wear and tear of the equipment, a conservative assumption following the sound power level listed in Tai Po Tai Wo Road Sewage Pumping Station has been adopted in this assessment.

**Table B4**  
**Summary of the Equipment in the Existing Sewage Pumping Station**

Equipment	Numbers	Sound Power Level*, dB(A)
Submersible pump	2 duty + 1 standby	85
Ventilation fan	4 duty	73
Mechanical screen	1 duty + 1 standby	89

\* Information extracted from the Project Profile for Tai Po Tai Wo Road Sewage Pumping Station (DIR-161/2007)

B2.3.10 As shown in *Plate 2*, the existing Kau Hui sewage pumping station will be completed shielded from the view of the NSR by the adjacent floodwater pumping station. The cumulative noise impact effect from the existing sewage pumping station is therefore expected to be very minimal.

*Existing Yuen Long Kau Hui Floodwater Pumping Station*

B2.3.11 The existing Yuen Long Kau Hui Floodwater Pumping Station will only be operated at time of heavy rainstorm and when flooding is eminent at the existing low-lying areas. A measured noise level of 64.7 dB(A) at 1 m was used in the noise submission for DIR-020/1999. A corrected sound power level of 73 dB(A) is thus assumed at the building boundary of the floodwater pumping station.

*Existing Yuen Long Kau Hui Low Flow Pumping Station*

B2.3.12 The function of the existing Yuen Long Kau Hui Low Flow Pumping Station is to prevent the polluted tidal water at the downstream of the inflatable dam from entering the upstream of the Yuen Long Nullah. It will be operated only at time during low flow. This means that the floodwater and low flow pumping stations will not be operated simultaneously most of the times. The floodwater pumping station is included in the cumulative noise assessment instead of the low flow pumping station as it is closer to the worst affected NSR.

*Other Assumptions*

B2.3.13 The following assumptions are applied to the noise assessment:

- The location of the noise source is assumed to be at the boundary of each of the pumping station closest to the NSR to simulate a worst case scenario.
- A +3 dB(A) correction is included in the assessment to take into account façade correction.
- As tonal characteristic of the noise is not available, a worst case assumption of +6 dB(A) is included for the correction of tonality. As the noise is not considered to be impulsive or intermittent in character, no correction for impulsiveness or intermittency is made.
- A noise reduction of -20 dB(A) is assumed for the fully enclosed building design. A correction of -10 dB(A) is assumed for the 1.1 m tall concrete parapet (planter) wall along the boundary wall of the roof or screening effect by building structures.

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**B3. OPERATIONAL NOISE ASSESSMENT RESULTS****B3.1 Operational Noise from the Proposed Sewage Pumping Station**

B3.1.1 The predicted operational noise from the proposed sewage pumping station is shown in *Annex B1*. The predicted result at the worst affected NSR will be within the derived night-time noise standard of 46 dB(A).

**B3.2 Cumulative Operational Noise**

B3.2.1 The predicted cumulative operational noise from the proposed sewage pumping station and other pumping stations within the DSD compound is shown in *Annex B2*. The predicted result at the worst affected NSR will also be within the derived night-time noise standard of 46 dB(A).

**B4. NOISE REDUCTION MEASURES****B4.1 Noise Reduction Design Measures to be incorporated into the Design and Contract Specifications**

B4.1.1 To minimise noise nuisance during operation of the proposed sewage pumping station, the following noise reduction measures will be adopted in the design. DSD will implement these measures as part of the detailed design and specifications of the E&M contracts.

- All the pumps and mechanical screens shall be fully enclosed within the sewage pumping station structure.
- The ventilation exhaust outlet of the deodorizer unit shall be located on the rooftop and orientated to face away from the NSR of Shan Pui Chung Hau Tsuen (i.e. facing west or south towards Tung Tau Industrial Area). Concrete parapet wall of 1.1m tall shall be provided along the boundary wall of the pumping station roof.
- All the ventilation fans mounted on the facade wall shall be orientated to face away from the NSR of Shan Pui Chung Hau Tsuen. The location of the fans shall also take into account potential shielding effect provided by the building structures.
- Any openings facing the NSR of Shan Pui Chung Hau Tsuen shall be fitted with acoustic louvers.

**B5. CONCLUSION**

B5.1.1 The predicted operational noise level at the worst affected NSR under the very worst case scenario by the proposed sewage pumping station and the other nearby pumping stations within the DSD compound is expected to comply with the derived noise standard.

**END OF TEXT**

## ANNEX B1

### Operational Noise Assessment of Proposed Yuen Long Kau Hui No. 2 Sewage Pumping Station

NSR	Equipment	No. of Items	Sound Power Level, dB(A) NOTE 4	Total Sound Power Level, dB(A)	Screening / Barrier / Enclosure Reduction, dB(A) NOTE 5	Distance, m NOTE 6	Distance Attenuation, dB(A)	Tonality Correction, dB(A) NOTE 7	Impulsiveness Correction, dB(A) NOTE 7	Intermittency Correction, dB(A) NOTE 7	Façade Correction, dB(A)	Sound Pressure Level at NSR, dB(A)	Predicted Operational Noise Level, dB(A)	Noise Standard, dB(A) NOTE 8	Exceed Noise Standard
NSR 1	Submersible pump <sup>NOTE 1</sup>	2	85	88	20	63	44	6	0	0	3	33	38	46	No
	Ventilation fan <sup>NOTE 2</sup>	4	73	79	10	63	44	6	0	0	3	34			
	Mechanical screen <sup>NOTE 3</sup>	1	89	89	20	63	44	6	0	0	3	34			

Notes:

- Three pumps are proposed for the Yuen Long Kau Hui No. 2 Sewage Pumping Station. Only two pumps will be in operation at any one time, the remaining pump will act as standby only.  
All the pumps will be located underground and fully enclosed within the structure of the pumping station.
- Six ventilation fans are proposed for the Yuen Long Kau Hui No. 2 Sewage Pumping Station. Only four fans will be in operation at any one time, the remaining two will act as standby only.  
All the fans will be orientated away from the NSR (i.e. not visible by the NSR).
- Two mechanical screens are proposed. Only one screen will be in operation at any one time, the remaining one will act as standby only. All the screens will be fully enclosed within the structure of the pumping station.
- Sound Power Level of equipment derived from the Project Profile for Tai Po Tai Wo Road Sewage Pumping Station (EIAO Register No. DIR-161/2007).
- A 20 dB(A) reduction is assumed from acoustic shielding due to the fully enclosed building design.  
A 10 dB(A) reduction is assumed from acoustic shielding due to the 1.1m tall concrete parapet wall along the boundary of the roof. In addition, all the ventilation fans will be located facing away from NSR 1 (i.e. the NSR will have no direct view of the fans) and screened by the building structure.
- Distance assumed at the boundary of the pumping station closest to the NSR to simulate worst case scenario.
- A worst case assumption of +6 dB(A) tonality correction is applied. As the noise from the equipment is not considered to be impulsive or intermittency in character, no correction is applied for these corrections.
- The prevailing background (night-time) noise level at the NSR is used as the noise standard.

## ANNEX B2

### Cumulative Operational Noise Assessment at NSR 1

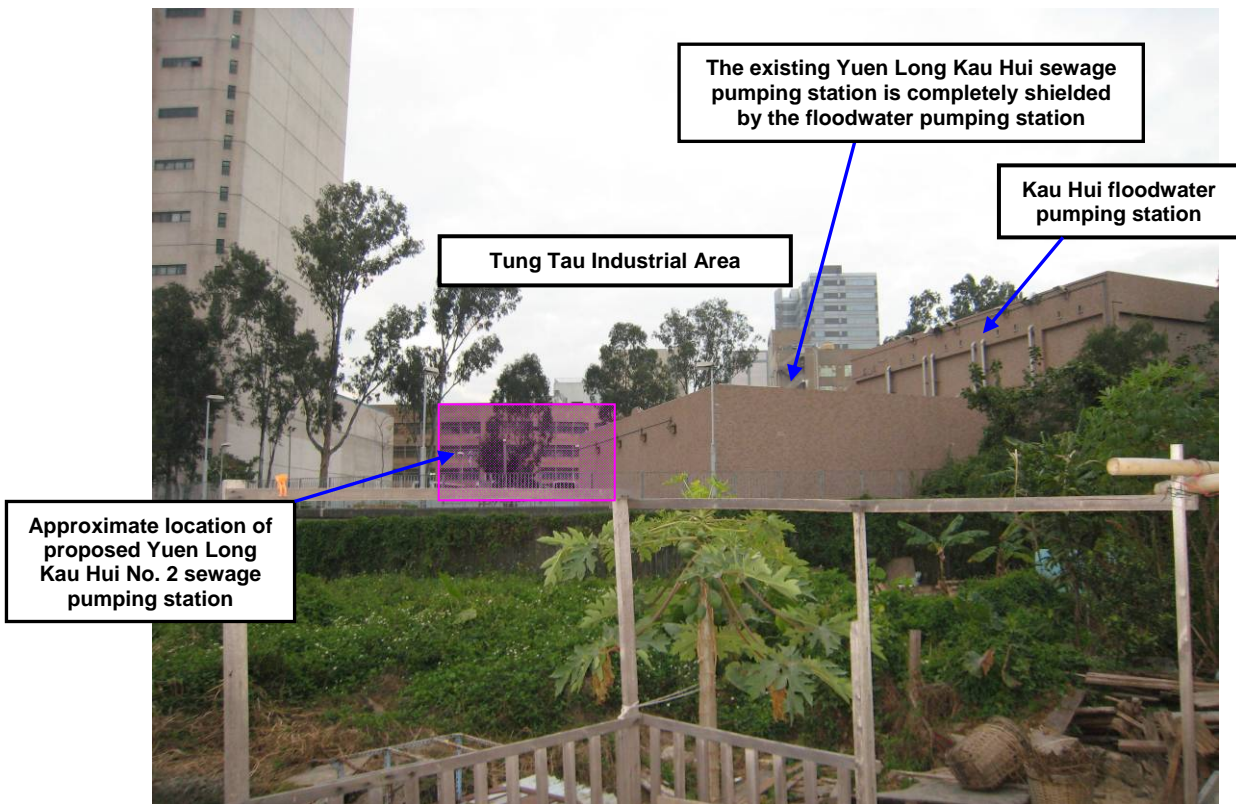
Pumping Station	Equipment	No. of Items	Sound Power Level, dB(A) NOTE 4	Total Sound Power Level, dB(A)	Screening / Barrier / Enclosure Reduction, dB(A) NOTE 5	Distance, m NOTE 6	Distance Attenuation, dB(A)	Tonality Correction, dB(A) NOTE 7	Impulsiveness Correction, dB(A) NOTE 7	Intermittency Correction, dB(A) NOTE 7	Façade Correction, dB(A)	Sound Pressure Level at NSR, dB(A)	Predicted Operational Noise Level, dB(A)	Predicted Cumulative Operational Noise Level, dB(A)	Noise Standard, dB(A) NOTE 8	Exceed Noise Standard
Proposed Yuen Long Kau Hui No. 2 Sewage Pumping Station	Submersible pump <sup>NOTE 1</sup>	2	85	88	20	63	44	6	0	0	3	33	38	45	46	No
	Ventilation fan <sup>NOTE 2</sup>	4	73	79	10	63	44	6	0	0	3	34				
	Mechanical screen <sup>NOTE 3</sup>	1	89	89	20	63	44	6	0	0	3	34				
Existing Kau Hui Sewage Pumping Station *	Submersible pump	2	85	88	20	70	45	6	0	0	3	32	38			
	Ventilation fan	4	73	79	10	70	45	6	0	0	3	33				
	Mechanical screen	1	89	89	20	70	45	6	0	0	3	33				
Existing Floodwater Pumping Station <sup>®</sup>	--	--	73	73	0	40	40	6	0	0	3	42	42			

#### Notes:

- Three pumps are proposed for the Yuen Long Kau Hui No. 2 Sewage Pumping Station. Only two pumps will be in operation at any one time, the remaining pump will act as standby only. All the pumps will be located underground and fully enclosed within the structure of the pumping station.
  - Six ventilation fans are proposed for the Yuen Long Kau Hui No. 2 Sewage Pumping Station. Only four fans will be in operation at any one time, the remaining two will act as standby only. All the fans will be orientated away from the NSR (i.e. not visible by the NSR).
  - Two mechanical screens are proposed. Only one screen will be in operation at any one time, the remaining one will act as standby only. All the screens will be fully enclosed within the structure of the pumping station.
  - Sound Power Level of equipment derived from the Project Profile for Tai Po Tai Wo Road Sewage Pumping Station (EIAO Register No. DIR-161/2007).
  - A 20 dB(A) reduction is assumed from acoustic shielding due to the fully enclosed building design.  
A 10 dB(A) reduction is assumed from acoustic shielding due to the 1.1m tall concrete parapet wall along the boundary of the roof. In addition, all the ventilation fans will be located facing away from NSR 1 (i.e. the NSR will have no direct view of the fans) and screened by the building structure.
  - Distance assumed at the boundary of the pumping station closest to the NSR to simulate worst case scenario.
  - A worst case assumption of +6 dB(A) tonality correction is applied. As the noise from the equipment is not considered to be impulsive or intermittency in character, no correction is applied for these corrections.
  - The prevailing background (night-time) noise level at the NSR is used as the noise standard.
- \* The existing Kau Hui sewage pumping station is completely shielded from view of the NSR by the adjacent floodwater pumping station.
- <sup>®</sup> Noise level of the floodwater pumping station derived from Sewage Pumping Station at Tung Tau Industrial Area, Yuen Long Project Profile (EIAO Register No. DIR-020/1999).



**PLATE 1 : Background Noise Measurement Location**



**PLATE 2 : View from NSR towards DSD's Pumping Station Compound**

**Annex C**  
**Project Implementation Schedule**



**ANNEX C**  
**PROJECT IMPLEMENTATION SCHEDULE**

PP* Ref	EM&A Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures and Main Concerns to Address	Who to implement the measure ?	Location of the measure	When to implement the measure	What requirements or standards for the measure to achieve ?
		<b>General</b>					
5.1.1	N/A	Construction clauses will be included in the works contracts to ensure the recommended mitigation measures are properly implemented.	To ensure contractor will take cognizance of all the recommended mitigation measures	Detailed design engineer	Project site	Detailed design stage and Tender stage	Recommended Pollution Control Clauses for Construction Contracts
5.1.2	N/A	The contractor will be required to prepare and implement an Environmental Management Plan (EMP) in accordance with ETWB TC(W) No. 19/2005 – “Environmental Management on Construction Sites”. The EMP should provide details on the approach which the contractor plans to adopt in managing and controlling potential environmental impacts from construction activities of the Project, and to ensure their adherence to all the environmental requirements.	To ensure contractor adherence to all the environmental requirements	Contractor	Project site	Construction stage	ETWB TC(W) No. 19/2005 EIAO-TM
		<b>Construction Phase</b>					
		<b>Noise</b>					
5.2.1	N/A	The contractor will be required to use quiet powered mechanical equipment during construction.	To mitigate construction noise impact	Contractor	Project site	Construction stage	EIAO-TM
5.2.3	N/A	In addition to quiet powered mechanical equipment, the contractor will be required to adopt the following good site practices during the construction phase. <ul style="list-style-type: none"> <li>• Only well-maintained plant should be operated on-site and plant should be serviced regularly;</li> <li>• Silencers or mufflers on construction plant should be</li> </ul>	To mitigate construction noise impact	Contractor	Project site	Construction stage	EIAO-TM

PP* Ref	EM&A Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures and Main Concerns to Address	Who to implement the measure ?	Location of the measure	When to implement the measure	What requirements or standards for the measure to achieve ?
		utilised; <ul style="list-style-type: none"> <li>• Mobile plant should be sited as far away from sensitive receivers as possible;</li> <li>• Machines and plant that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum;</li> <li>• Plant known to emit noise strongly in one direction should, where possible, be orientated so that noise is directed away from the nearby sensitive receivers; and</li> <li>• Material stockpiles and other structures such as site hoarding should be effectively utilized to screen noise from on-site construction activities.</li> </ul>					
		<i>Air Quality</i>					
5.2.4	N/A	The effect of dust generated from the construction works is expected to be insignificant with the implementation of proper mitigation measures. The impacts will be minimized by measures such as regularly water spraying of exposed surface, and providing wheel-washing facilities.	To prevent dust nuisance on sensitive receivers during construction	Contractor	Project site	Construction stage	Air Pollution Control (Construction Dust) Regulation EIAO-TM
5.2.5	N/A	The contractor will be required to comply with the control measures stipulated in the Air Pollution Control (Construction Dust) Regulation and implement all the required mitigation measures.	To prevent dust nuisance on sensitive receivers during construction	Contractor	Project site	Construction stage	Air Pollution Control (Construction Dust) Regulation EIAO-TM
		<i>Water Quality</i>					
5.2.7	N/A	The construction activities of the Project will include excavation, earthworks, and general building works. The	To prevent water quality impact to nearby watercourses during	Contractor	Project site	Construction stage	ProPECC PN 1/94

PP* Ref	EM&A Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures and Main Concerns to Address	Who to implement the measure ?	Location of the measure	When to implement the measure	What requirements or standards for the measure to achieve ?
		contractor will be required to provide silt removing facility so as to remove any silt before discharge of site runoff into nearby stormwater drains. The design of temporary on-site drainage and silt removing facilities will follow the guidelines stipulated in EPD's ProPECC PN 1/94 – "Construction Site Drainage".	construction				EIAO-TM
		<b>Waste Management</b>					
5.2.9	N/A	The contractor will be required to sort all C&D materials and waste into different categories for reuse on site, recycling and disposal at designated public fill reception facilities or landfills. Suitable excavated materials will be reuse on-site as backfill as far as possible. Disposal of C&D materials will be managed through the trip-ticket system as stipulated in ETWB TCW No. 31/2004.	To properly manage the C&D materials generated during construction	Contractor	Project site	Construction stage	ETWB TC(W) No. 31/2004 EIAO-TM
5.2.10	N/A	All chemical wastes from equipment maintenance will be handled, stored and disposed of in accordance with the requirements of the Waste Disposal (Chemical Waste) Regulation.	To properly manage the chemical waste generated during construction	Contractor	Project site	Construction stage	Waste Disposal (Chemical Waste) Regulation EIAO-TM
5.2.11	N/A	The contractor will be required to incorporate the waste management measures into the contractor's on-site Waste Management Plan.	To ensure the Contractor will properly manage the waste generated during construction	Contractor	Project site	Construction stage	EIAO-TM
		<b>Landscape and Visual</b>					
5.2.12	N/A	The contractor will be required to maintain site cleanliness and tidiness and to properly manage construction waste in the construction works area to reduce the visual impact of the construction site to a minimum.	To minimize landscape and visual impact from the construction site	Contractor	Project site	Construction stage	EIAO-TM

PP* Ref	EM&A Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures and Main Concerns to Address	Who to implement the measure ?	Location of the measure	When to implement the measure	What requirements or standards for the measure to achieve ?
		<b>Operational Phase</b>					
		<i>Noise</i>					
5.3.1	N/A	To minimize potential noise impacts during the operation of the Project, all the submersible pumps and mechanical screens will be fully enclosed within the structure of the pumping station. The pumps will be located underground at a depth of about 12 m. The concrete structure of the proposed pumping station will shield most of the noise generated by the submersible pumps and mechanical screens.	To mitigate operational noise impact during operation of the pumping station	Detailed design engineer / Project Proponent	Project site	Detailed design stage / Operation stage	Noise Control Ordinance EIAO-TM
5.3.2	N/A	The ventilation exhaust outlet of the deodorizer unit will be located on the rooftop and orientated to face away from the noise sensitive receivers of Shan Pui Chung Hau Tsuen, i.e. facing west or south of the pumping station towards Tung Tau Industrial Area. In addition, concrete parapet (planter) wall of 1.1 m tall will be provided along the boundary of the roof to provide further shielding effect.	To mitigate operational noise impact during operation of the pumping station	Detailed design engineer / Project Proponent	Project site	Detailed design stage / Operation stage	Noise Control Ordinance EIAO-TM
5.3.3	N/A	All the ventilation fans mounted on the façade wall will be orientated to face away from the noise sensitive receivers of Shan Pui Chung Hau Tsuen. The location of the fans will also take into account additional shielding effect provided by the building structures.	To mitigate operational noise impact during operation of the pumping station	Detailed design engineer / Project Proponent	Project site	Detailed design stage / Operation stage	Noise Control Ordinance EIAO-TM
5.3.4	N/A	Any openings facing the noise sensitive receivers of Shan Pui Chung Hau Tsuen will be fitted with acoustic louvers.	To mitigate operational noise impact during operation of the pumping station	Detailed design engineer / Project Proponent	Project site	Detailed design stage / Operation stage	Noise Control Ordinance EIAO-TM
		<i>Air Quality</i>					

PP* Ref	EM&A Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures and Main Concerns to Address	Who to implement the measure ?	Location of the measure	When to implement the measure	What requirements or standards for the measure to achieve ?
5.3.6	N/A	To minimize the potential odour impact, the screening hall and wet well will be located underground, and enclosed by a reinforced concrete structure. In addition, a deodourization unit with a forced ventilation system and using activated carbon with a H <sub>2</sub> S removal efficiency of 99.5% will be installed to remove the odour such that the odour level measured at the nearest ASR of the pumping station will not exceed 5 odour units (based on an averaging time of 5 seconds). The exhaust outlet of the proposed deodorization unit will be located in a direction away from the nearby sensitive receivers as far as practicable, i.e. facing west or south of the pumping station.	To prevent odour nuisance on sensitive receivers during operation of the pumping station	Detailed design engineer / Project Proponent	Project site	Detailed design stage / Operation stage	EIAO-TM
5.3.7	N/A	The screenings of sewage at the screening hall of the pumping station will be properly packed and handled within the pumping station structure to avoid odour nuisance. The screenings will then be transported to designated landfills for disposal as soon as possible.	To prevent odour nuisance on sensitive receivers during operation of the pumping station	Project Proponent	Project site	Operation stage	EIAO-TM
		<b>Water Quality</b>					
5.3.10	N/A	To minimize the chance of sewage bypass, standby pump and mechanical screen will be provided to cater for breakdown and maintenance of the pump and mechanical screen. In order to minimise the chance of power failure, backup power supply in the form of dual power supply or automatic operated emergency generator will be provided. In addition, a Supervisory Control and Data Acquisition (SCADA) system will also be provided in order to transmit signals showing irregularity or any operational problem of the pumping station to the existing Yuen Long Sewage Treatment Works or other manned pumping station for	To prevent water quality impact due to sewage bypass during operation of the pumping station	Detailed design engineer / Project Proponent	Project site	Detailed design stage / Operation stage	Water Pollution Control Ordinance EIAO-TM

PP* Ref	EM&A Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures and Main Concerns to Address	Who to implement the measure ?	Location of the measure	When to implement the measure	What requirements or standards for the measure to achieve ?
		active monitoring such that immediate actions can be taken in case of emergency. Design will also allow sewage to be diverted to the existing sewage pumping station if necessary to further minimize the chance of sewage bypass.					
		<b>Waste Management</b>					
5.3.12	N/A	The screenings of sewage at the screening hall of the pumping station will be properly packed in plastic bags within the pumping station structure. The screenings will then be transported to designated landfills for disposal as soon as possible.	To ensure all waste are being properly managed during operation of the pumping station	Project Proponent	Project site	Operation stage	Waste Disposal Ordinance EIAO-TM
		<b>Landscape and Visual</b>					
5.3.13	N/A	Architectural aspects of the proposed sewage pumping station including colour scheme and façade treatment will be carefully designed taking into account the features of surrounding land and design of the other existing pumping stations building to make the new structure form part of the compound hence minimizing any potential visual impact.	To minimise landscape and visual impact from the operation of the pumping station	Detailed design engineer / Project Proponent	Project site	Detailed design stage / Operation stage	EIAO-TM
5.3.14	N/A	A 'green roof' design with climbers and shrub plantings will be provided on the roof of the proposed pumping station. In addition, peripheral tree and shrub planting along the eastern part of the DSD compound will be implemented for landscape enhancement. The planting will soften the built form of the proposed structure. DSD will undertake the management and maintenance of these landscaping measures.	To minimise landscape and visual impact from the operation of the pumping station	Detailed design engineer / Project Proponent	Project site	Detailed design stage / Operation stage	EIAO-TM

\* PP = Project Profile

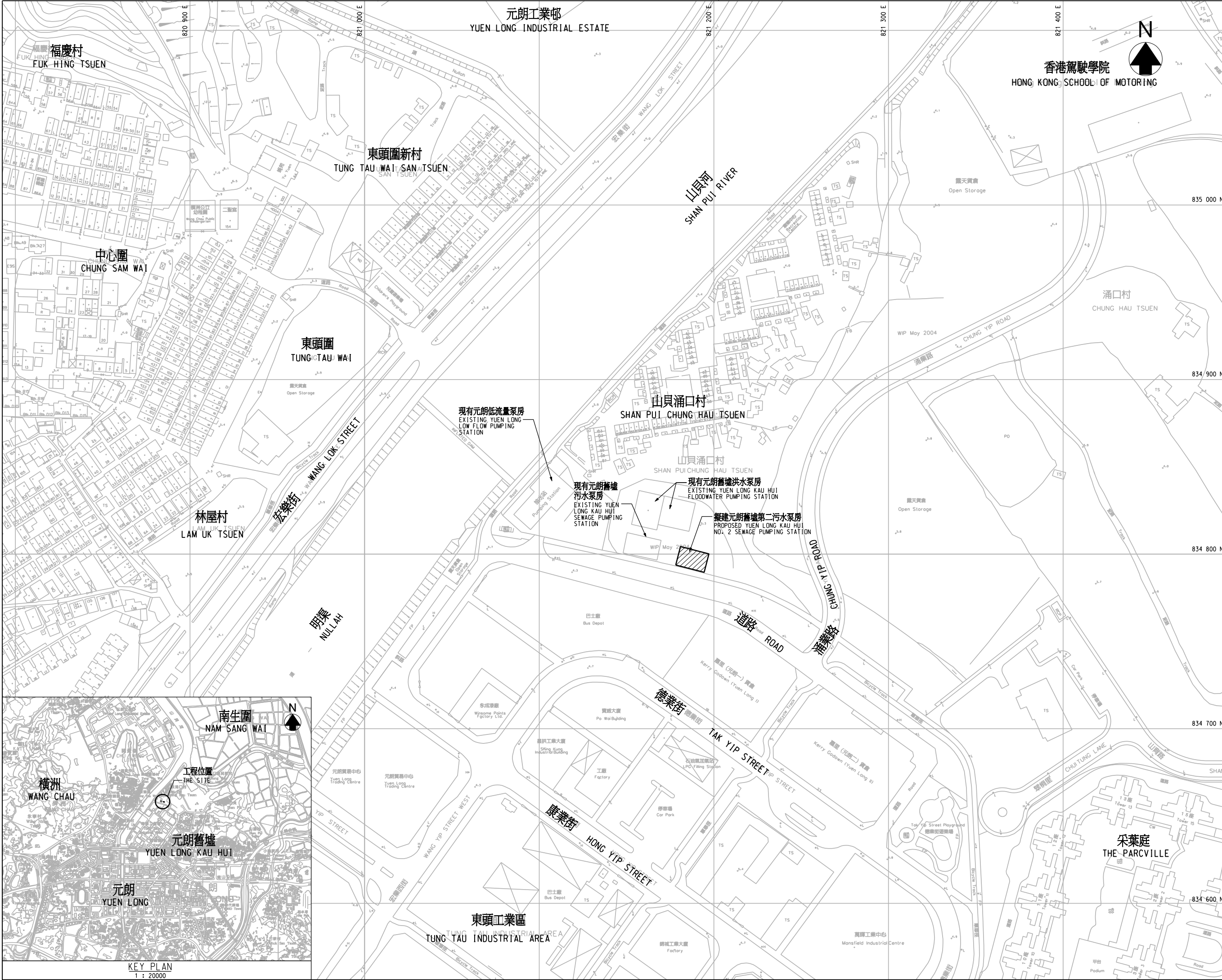
## **FIGURES**

圖例:  
LEGEND:

地盤界線  
SITE BOUNDARY



香港駕駛學院  
HONG KONG SCHOOL OF MOTORING



Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	MC	CSC	SZ	CSC	
Date	11/07	11/07	11/07	11/07	
Approved					

Contract no.  
CE 13/2006 (DS)

Contract title  
YUEN LONG AND KAM TIN SEWERAGE  
STAGE 2 AND STAGE 3  
DESIGN AND CONSTRUCTION  
元朗及錦田污水收集系統  
第二階段及第三階段工程

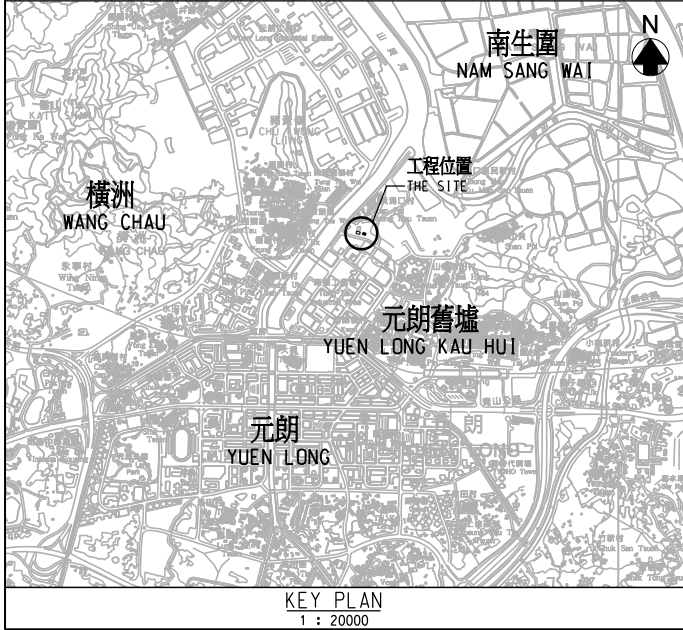
Drawing title  
元朗舊墟第二污水泵房位置圖  
GENERAL LOCATION PLAN OF  
PROPOSED YUEN LONG KAU HUI  
NO.2 SEWAGE PUMPING STATION

Drawing no. 圖一  
FIGURE 1

Scale A3 1:2000

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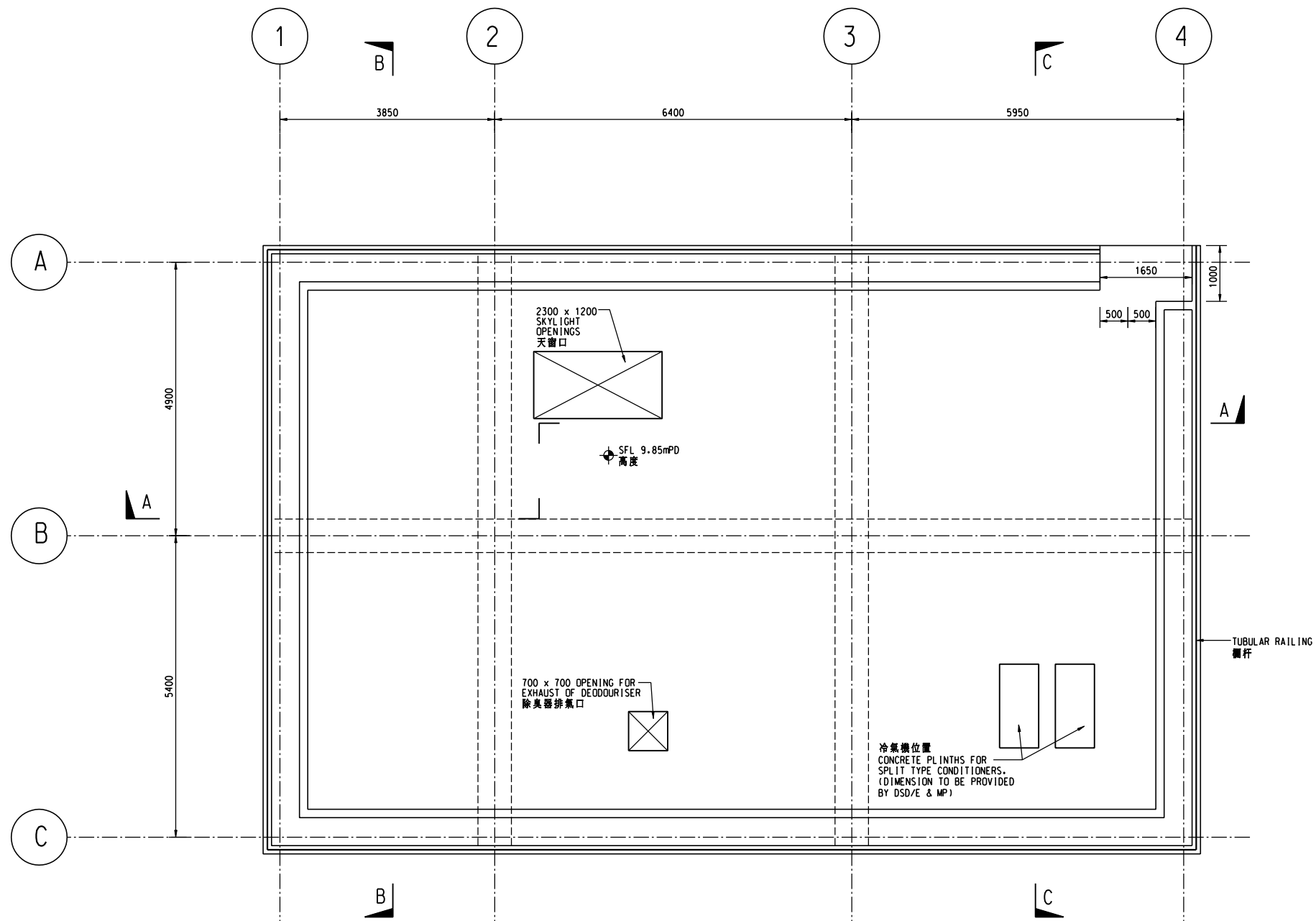






擬建污水泵房位置  
Proposed Sewage Pumping Station Site





ROOF PLAN  
屋頂平面圖

Revision	Date	Description	Initial
B	08/08	LAYOUT REVISION	HCL
A	06/08	LAYOUT REVISION	HCL
	Designed	Checked	Drawn
Initial	WCW	YSY	ZL
Date	11/07	11/07	11/07

Approved

**PRELIMINARY**

Contract no.  
CE 13/2006 (DS)

Contract title  
YUEN LONG AND KAM TIN SEWAGE STAGE 2 AND STAGE 3 DESIGN AND CONSTRUCTION  
元朗及錦田污水收集系統第二階段及第三階段工程

Drawing title  
YUEN LONG KAU HUI NO.2 SEWAGE PUMPING STATION FLOOR PLANS & SECTIONAL PLANS (SHEET 1 OF 3)  
元朗舊墟第二污水泵房地面平面圖及橫切面圖 (1/3)

Drawing no.  
圖三  
FIGURE 3

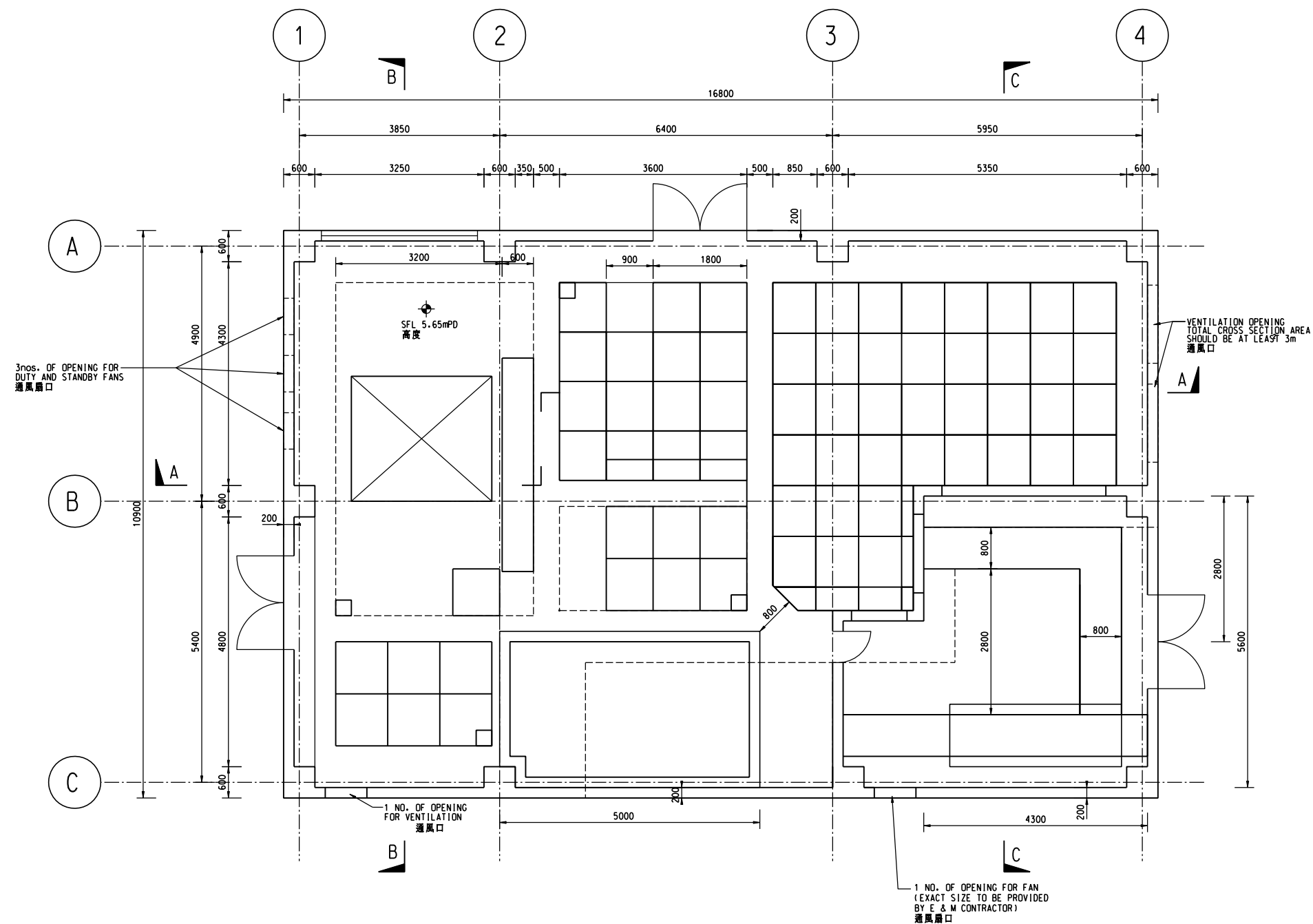
Revision  
B

Scale  
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GROUND FLOOR PLAN  
地面平面圖

Revision	Date	Description	Initial
B	08/08	LAYOUT REVISION	HCL
A	06/08	LAYOUT REVISION	HCL
Initial	Designed	Checked	Drawn
	WCW	YSY	ZL
Date	11/07	11/07	11/07

Approved

**PRELIMINARY**

Contract no.  
CE 13/2006 (DS)

Contract title  
YUEN LONG AND KAM TIN SEWERAGE  
STAGE 2 AND STAGE 3  
DESIGN AND CONSTRUCTION  
元朗及錦田污水收集系統  
第二階段及第三階段工程

Drawing title  
YUEN LONG KAU HUI NO.2  
SEWAGE PUMPING  
STATION FLOOR PLANS &  
SECTIONAL PLANS  
(SHEET 2 OF 3)  
元朗舊墟第二污水泵房地面平面圖  
及橫切面圖 (2/3)

Drawing no.  
圖四  
FIGURE 4

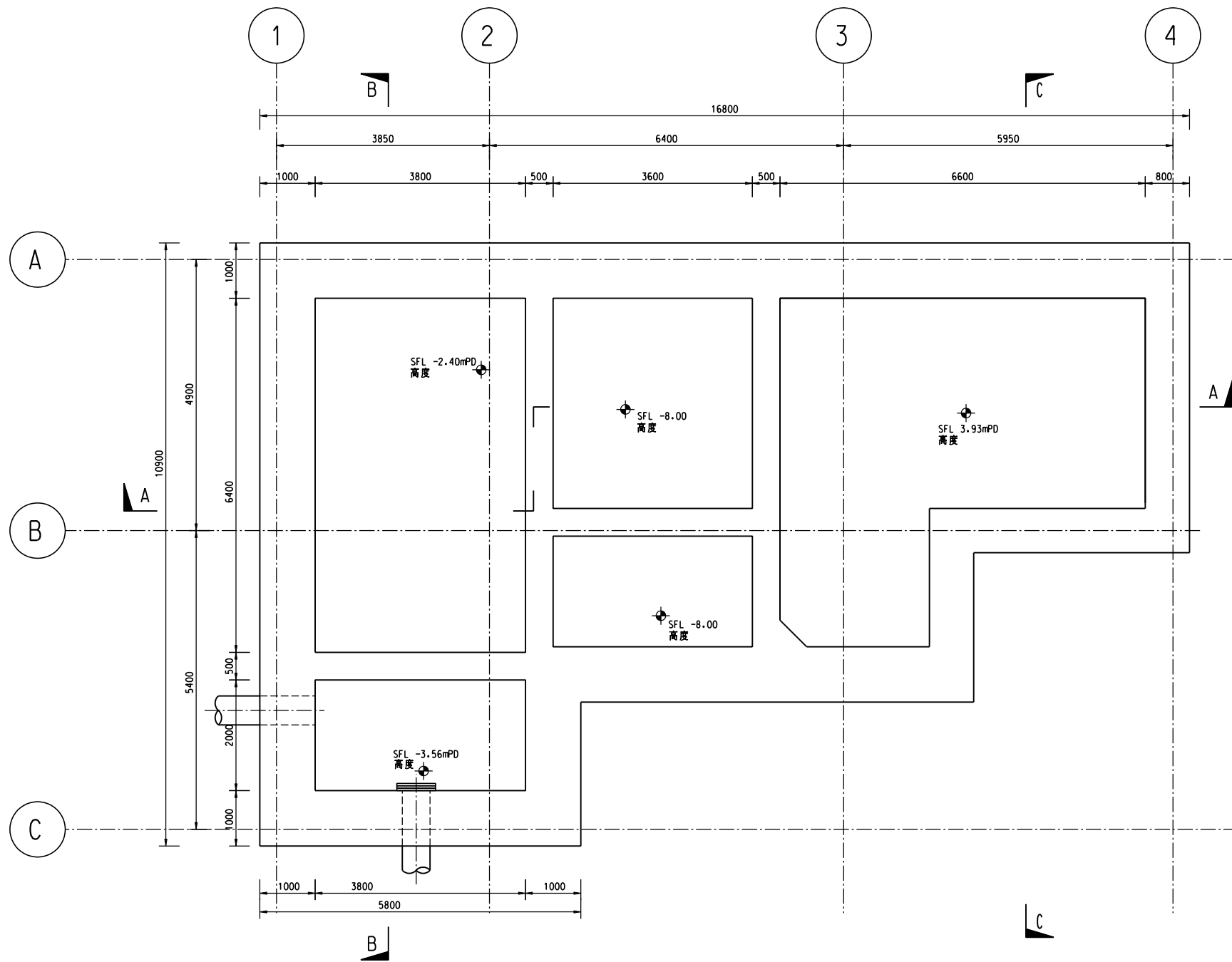
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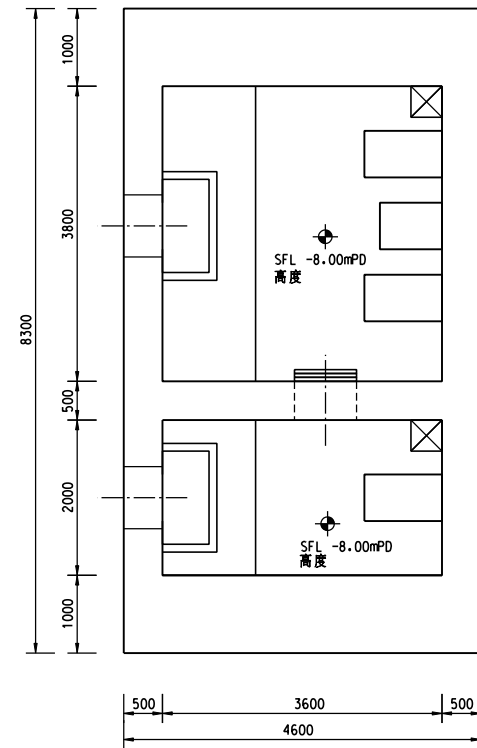
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BASEMENT PLAN AT LEVEL +4.00mPD  
在高度+4.00mPD的地下室平面圖



BASEMENT PLAN AT LEVEL -5.50mPD  
在高度-5.50mPD的地下室平面圖

Revision	Date	Description	Initial
B	08/08	LAYOUT REVISION	HCL
A	06/08	LAYOUT REVISION	HCL
	Designed	Checked	Drawn
Initial	WCW	YSY	ZL
Date	11/07	11/07	11/07

Approved  
**PRELIMINARY**

Contract no.  
CE 13/2006 (DS)

Contract title  
YUEN LONG AND KAM TIN SEWAGE PUMPING STAGE 2 AND STAGE 3 DESIGN AND CONSTRUCTION  
元朗及錦田污水收集系統第二階段及第三階段工程

Drawing title  
YUEN LONG KAU HUI NO.2 SEWAGE PUMPING STATION FLOOR PLANS & SECTIONAL PLANS (SHEET 3 OF 3)  
元朗舊墟第二污水泵房地面平面圖及橫切面圖 (3/3)

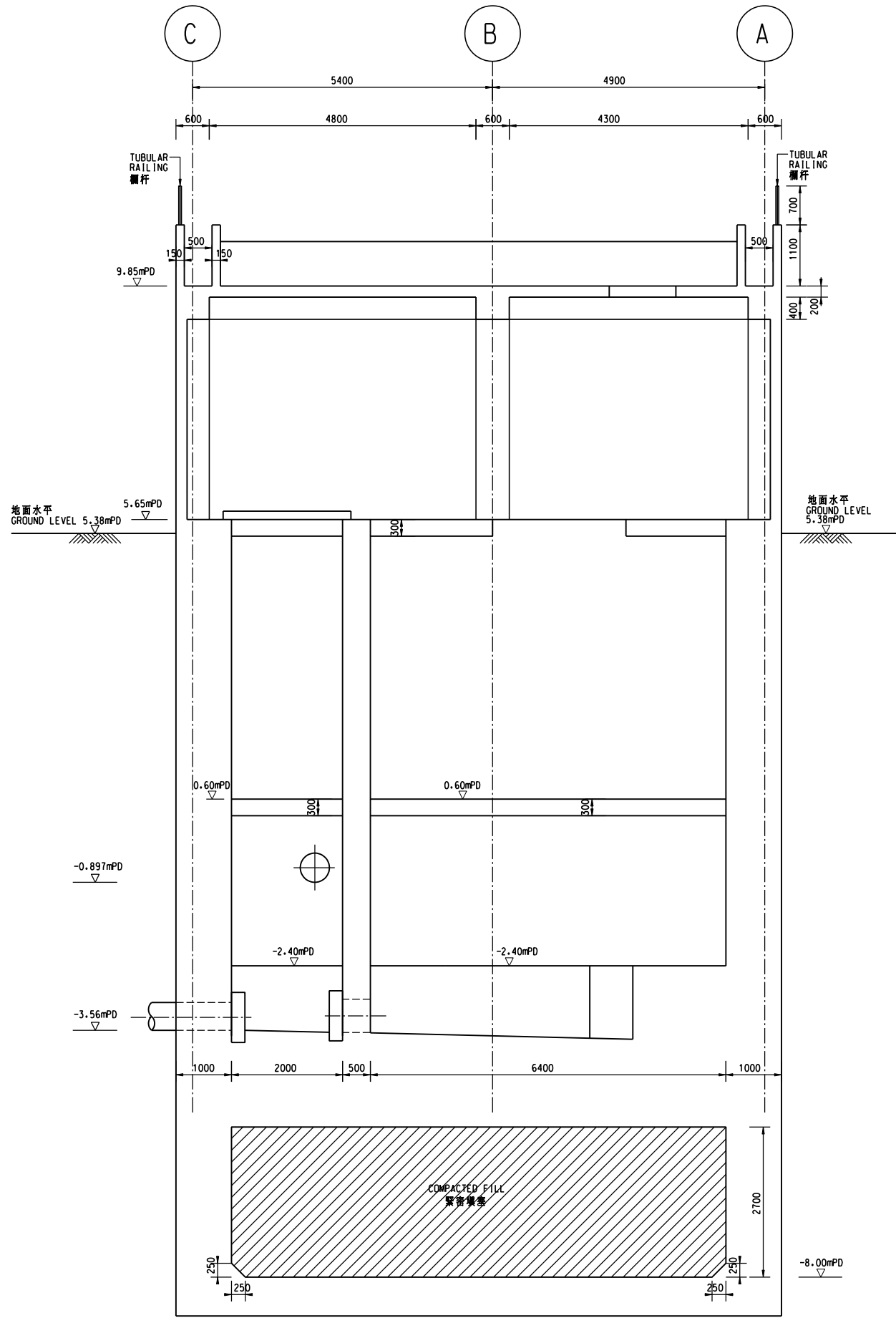
Drawing no.  
圖五  
FIGURE 5

Revision  
B

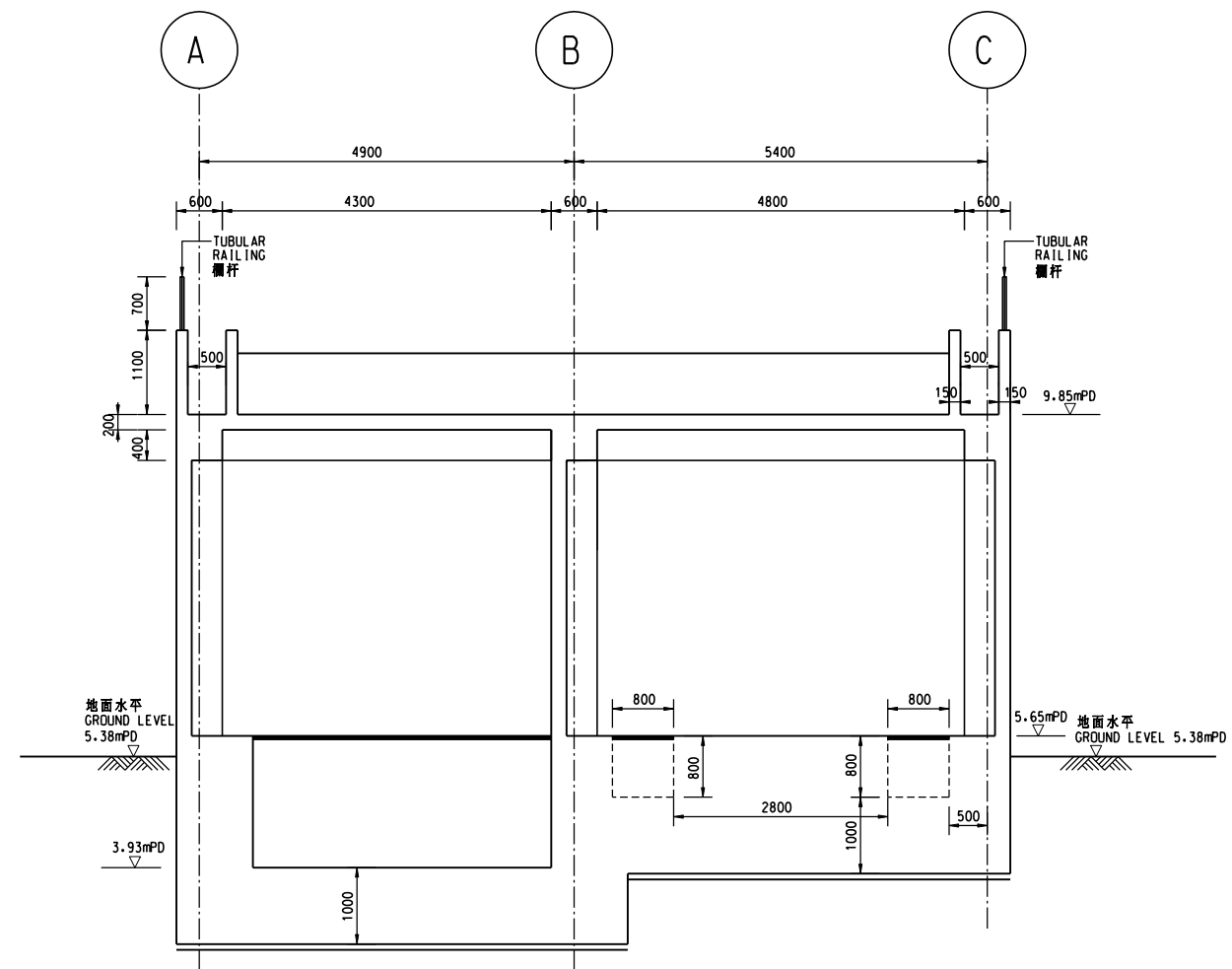
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**PROVISIONAL**  
**SUBJECT TO AMENDMENT**



SECTION B-B  
剖面 B-B



SECTION C-C  
剖面 C-C

B	08/08	LAYOUT REVISION	HCL
A	06/08	LAYOUT REVISION	HCL
Revision	Date	Description	Initial
	Designed	Checked	Drawn
Initial	WCW	YSY	ZL
Date	11/07	11/07	11/07

Approved

**PRELIMINARY**

Contract no.  
CE 13/2006 (DS)

Contract title  
YUEN LONG AND KAM TIN SEWERAGE  
STAGE 2 AND STAGE 3  
DESIGN AND CONSTRUCTION  
元朗及錦田污水收集系統  
第二階段及第三階段工程

Drawing title  
YUEN LONG KAU HUI NO.2  
SEWERAGE PUMPING STATION  
SECTION  
(SHEET 1 OF 2)  
元朗舊墟第二污水泵房橫切面圖 (1/2)

Drawing no. **圖六**  
FIGURE 6

Revision  
B

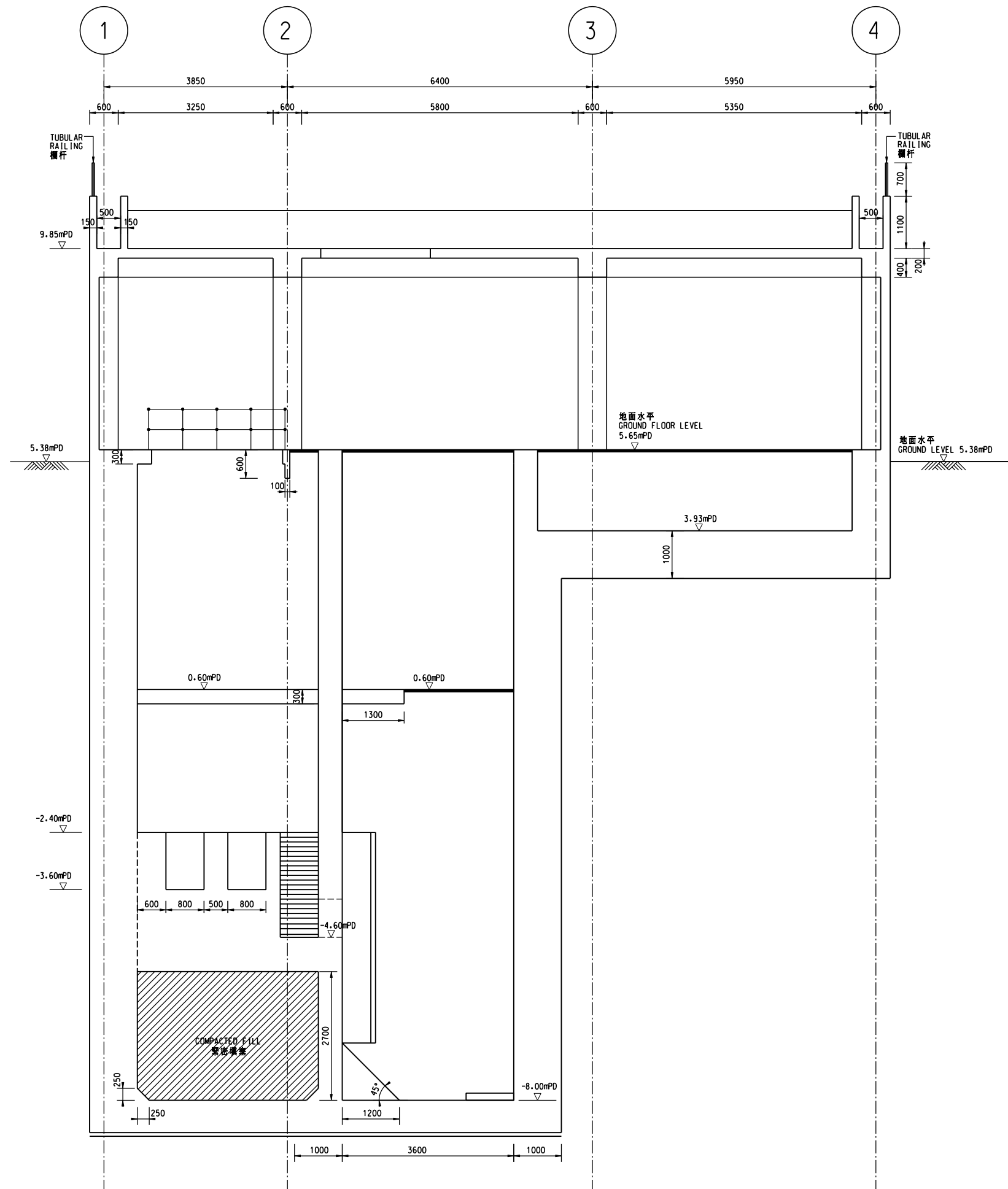
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SECTION A-A  
剖面 A-A

B	08/08	LAYOUT REVISION	HCL
A	06/08	LAYOUT REVISION	HCL
Revision	Date	Description	Initial
	Designed	Checked	Drawn
Initial	WCW	YSY	ZL
Date	11/07	11/07	11/07

Approved

**PRELIMINARY**

Contract no.  
CE 13/2006 (DS)

Contract title  
YUEN LONG AND KAM TIN SEWERAGE  
STAGE 2 AND STAGE 3  
DESIGN AND CONSTRUCTION  
元朗及錦田污水收集系統  
第二階段及第三階段工程

Drawing title  
YUEN LONG KAU HUI NO.2  
SEWAGE PUMPING STATION  
SECTION  
(SHEET 2 OF 2)  
元朗舊墟第二污水泵房橫切面圖 (2/2)

Drawing no. 圖七  
FIGURE 7

Revision  
B

Scale  
A1 1:50, A3 1:100

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**SUBJECT TO AMENDMENT**

圖例:  
LEGEND:

- 地盤界線  
SITE BOUNDARY
- ASR1 空氣敏感受體  
AIR SENSITIVE RECEIVER
- NSR1 噪音敏感受體  
NOISE SENSITIVE RECEIVER
- WSR1 水質敏感受體  
WATER SENSITIVE RECEIVER

Revision	Date	Description	Initial
Initial	Designed	Checked	Drawn
Initial	MC	CSC	SZ
Date	05/08	05/08	05/08
Approved			

Contract no. CE 13/2006 (DS)

Contract title  
YUEN LONG AND KAM TIN SEWERAGE  
STAGE 2 AND STAGE 3  
DESIGN AND CONSTRUCTION  
元朗及錦田污水收集系統  
第二階段及第三階段工程

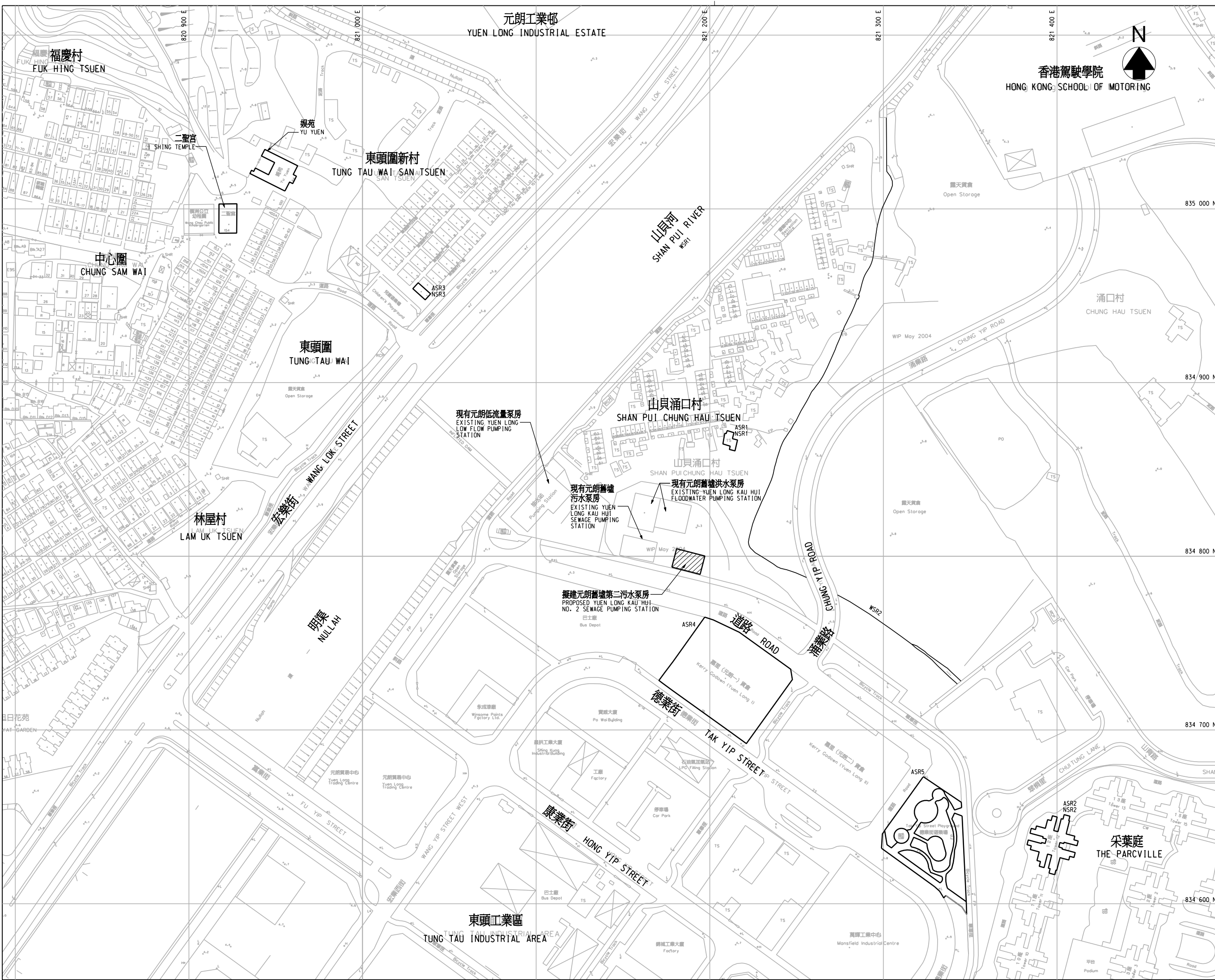
Drawing title  
敏感受體位置圖  
LOCATION OF SENSITIVE  
RECEIVERS

Drawing no. 圖八  
FIGURE 8

Scale A3 1:2000



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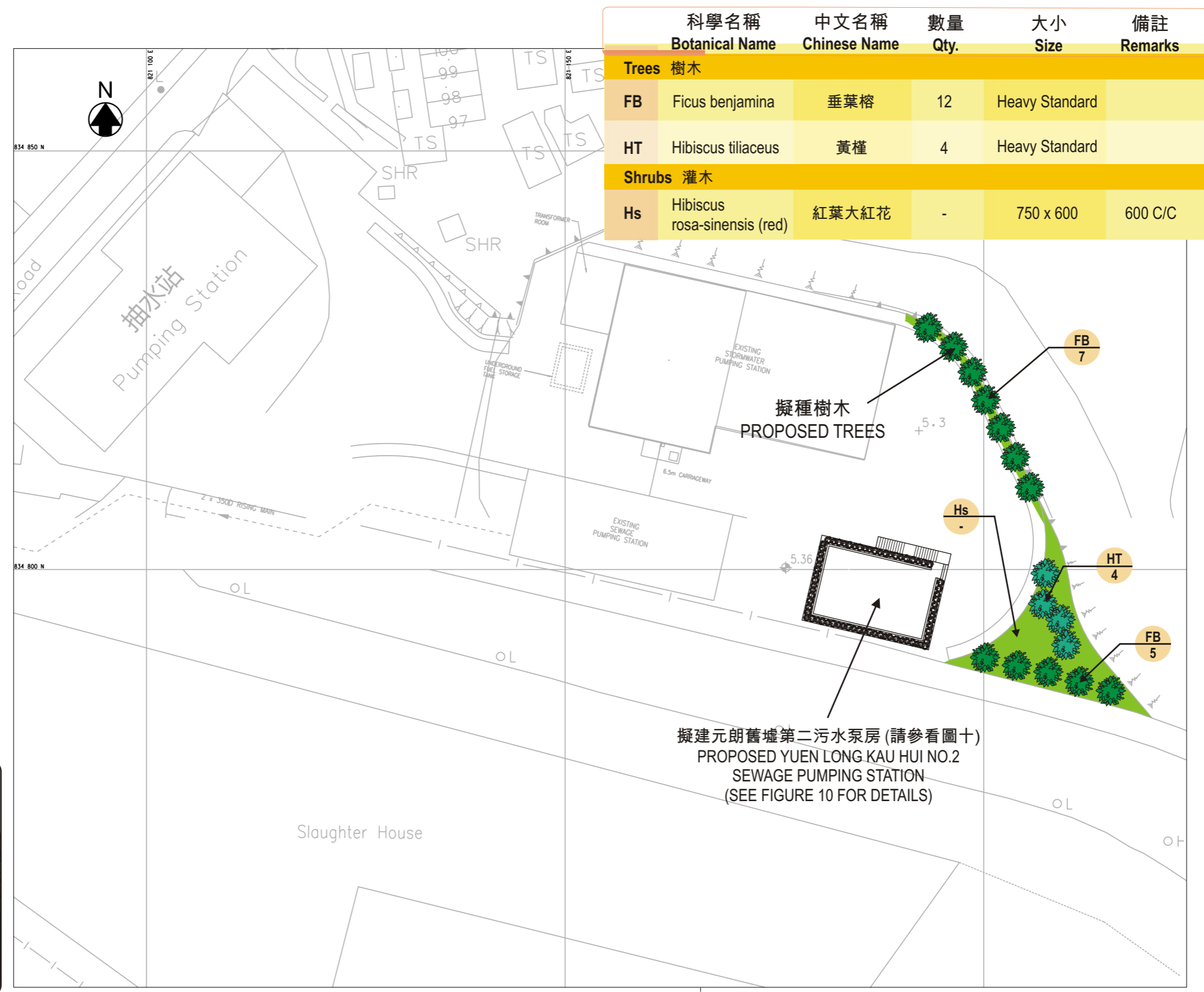
Ficus benjamina (垂葉榕)



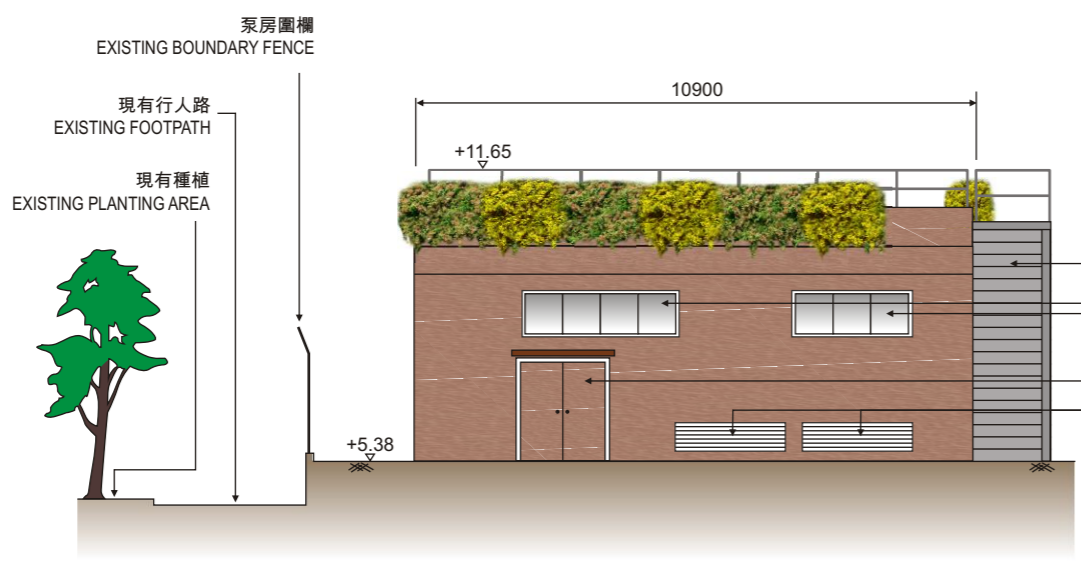
Hibiscus tiliaceus (黃槿)



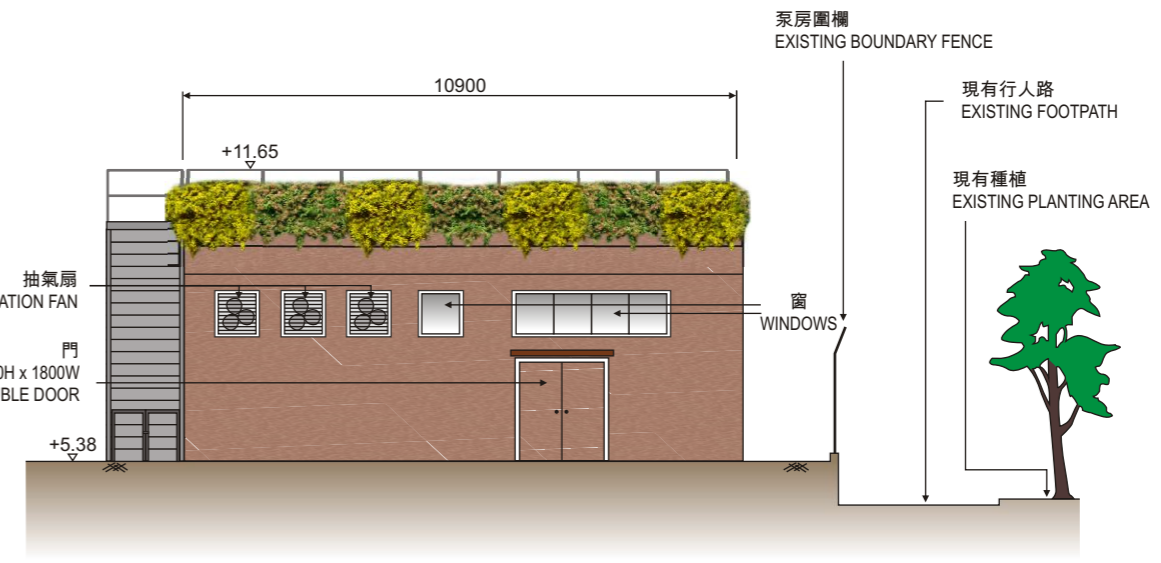
Hibiscus rosa-sinensis (紅葉大紅花)



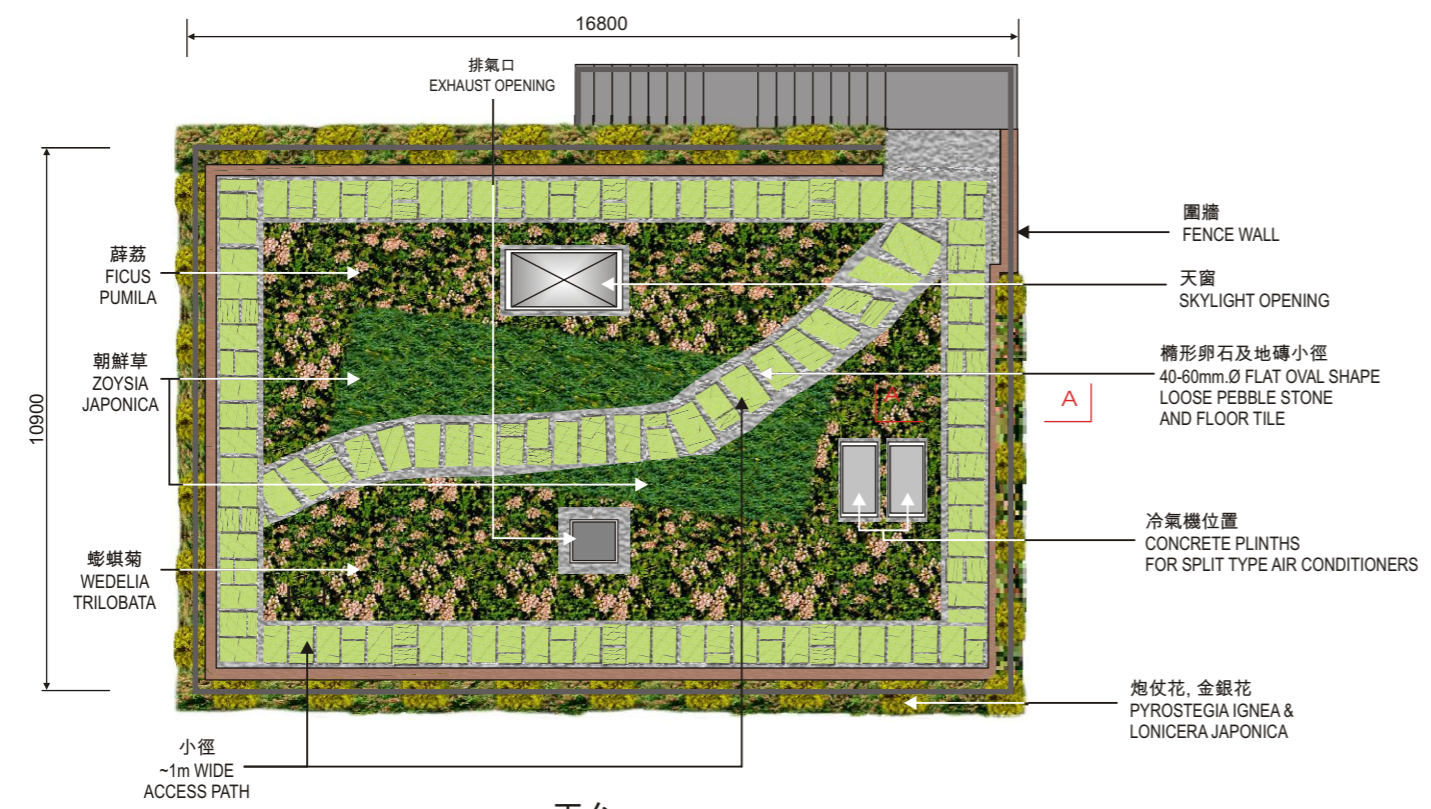




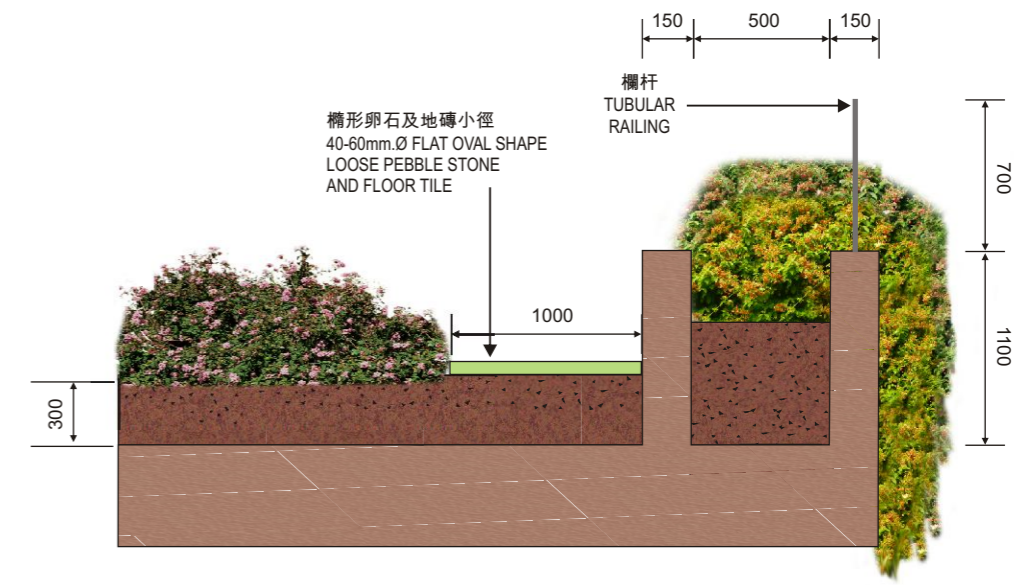
東面立視圖  
EASTERN ELEVATION



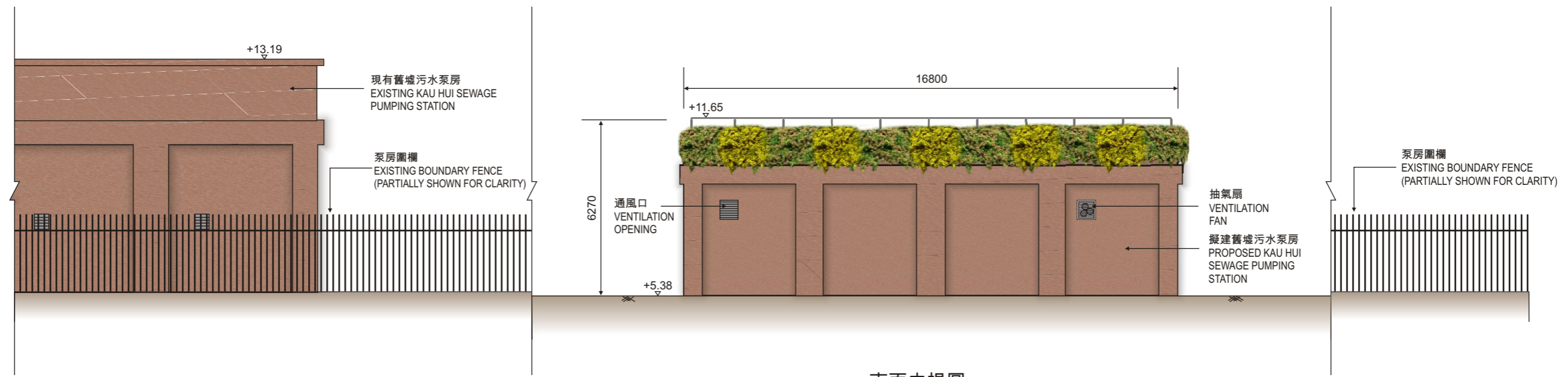
西面立視圖  
WESTERN ELEVATION



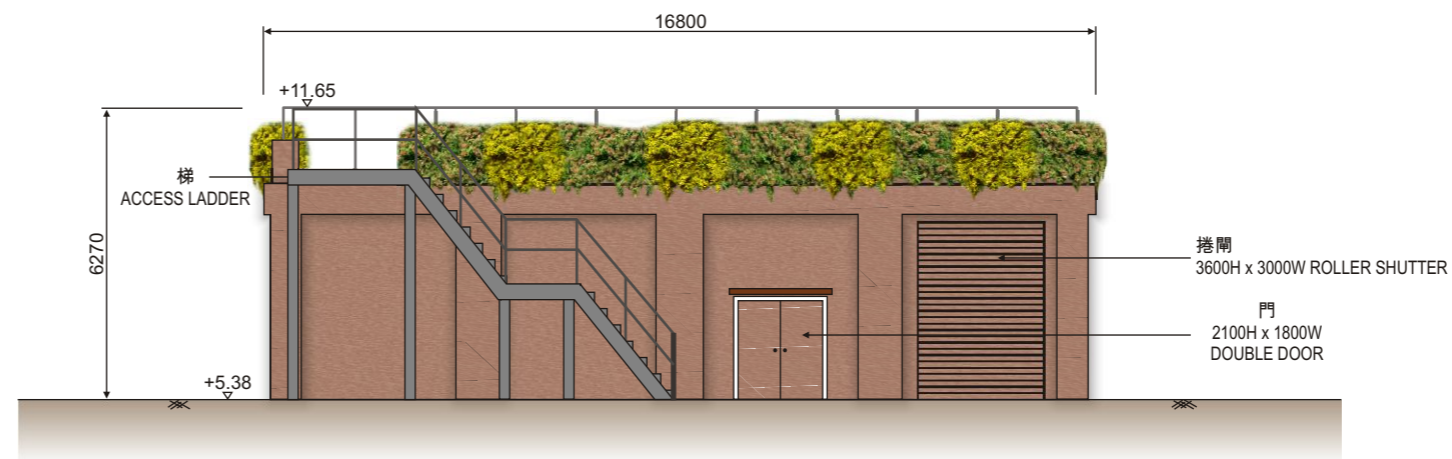
天台  
ROOF



切面A-A  
SECTION A-A



南面立視圖  
SOUTHERN ELEVATION



北面立視圖  
NORTHERN ELEVATION





工程前  
BEFORE



工程後  
AFTER (WITHOUT LANDSCAPE PLANTING)



工程後  
AFTER (WITH LANDSCAPE PLANTING)