

**Agreement No. CE 40/2018 (WS)**

**Ngau Tam Mei Water Treatment  
Works Extension -  
Feasibility Study**

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EIA Project Profile

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August 2020



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# 1 Basic Information

## 1.1 Project Title

1.1.1 The title of the Project is “Ngau Tam Mei Water Treatment Works (NTM WTW) Extension” (hereinafter referred to as “the Project”).

## 1.2 Purpose and Nature of the Project

1.2.1 The Project aims to increase the water treatment capacity of the existing NTM WTW from 230,000 m<sup>3</sup>/day to 440,000 m<sup>3</sup>/day to meet the anticipated increase in water demand from the planned developments in Yuen Long area<sup>1</sup>.

1.2.2 The Project comprises the following works:

- Increase the water treatment capacity of NTM WTW from 230,000 m<sup>3</sup>/day to 440,000 m<sup>3</sup>/day including the provision of additional water treatment facilities within the existing WTW compound;
- Construct an extension of Ngau Tam Mei Fresh Water Primary Service Reservoir (NTM FWPSR) of capacity 38,000 m<sup>3</sup> adjacent to the existing FWPSR;
- Lay 14 km fresh water trunk mains of diameters ranging from 1,600 mm to 2,000 mm for delivery of the treated water from NTM WTW to the NTM FWPSR and from the FWPSR to the existing fresh water distribution system near Tan Kwai Tsuen; and
- Modify the existing raw water tunnel junction (Chamber G) located near NTM WTW.

1.2.3 Layout of the existing NTM WTW is shown in **Annex 1**. The Project location plan is provided in **Annex 2**. Locations of the Project works with respect to the sensitive receivers are illustrated in **Annex 3** and **Annex 4**.

## 1.3 Project Proponent

1.3.1 Water Supplies Department (WSD)

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

### Location and Scale of Project

#### *Increase in Water Treatment Capacity of NTM WTW*

1.4.1 The existing NTM WTW is located on a disturbed rural land in Ngau Tam Mei (NTM) of the Yuen Long District. The areas adjoining the northern, eastern and southern sides of the NTM WTW are zoned as a Conservation Area. Lam Tsuen Country Park is located to the south of the WTW about 200m away. The existing NTM WTW was designed to handle 230,000 m<sup>3</sup>/day of raw water. The existing NTM WTW including its treatment facilities will be retained under this Project.

1.4.2 The proposed extension works will be built within the space available within the existing NTM WTW site boundary. No site formation is required for the NTM WTW extension. The initial proposal is to provide an extension capacity of up to 210,000 m<sup>3</sup>/day (subject to detailed design). Adding to the existing WTW capacity of 230,000 m<sup>3</sup>/day, the overall NTM WTW will provide a combined output capacity of up to 440,000 m<sup>3</sup>/day upon completion of the Project.

1.4.3 In the existing pumping stations within the existing NTM WTW site, spare pump bays have been reserved for extension. The pump upgrading works as part of the NTM WTW extension may

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<sup>1</sup> Locations of the planned developments include Yuen Long South (Stage 1 & 2), Hung Shui Kiu New Development Area, Wang Chau, Tan Kwai Tsuen and Long Bin, etc.

involve demolition of the existing pumps and / or installation of new water pumps to the existing pump bays or extension of the pumping stations within the NTM WTW site. The detailed arrangement of the uprating works and pump configurations will be subject to detailed design.

#### *Construction of NTM FWPSR Extension*

- 1.4.4 The existing NTM FWPSR is in a remote rural area to the southwest of NTM WTW in NTM of Yuen Long District. The reservoir is located about 150m away from a Conservation Area to the south as well as 150 m away from Lam Tsuen Country Park to the east (as illustrated in **Annex 3-1**). The eastern side of the reservoir is connected to a small road, which runs towards the NTM WTW. The western side of the FWPSR is connected to Ching Yau Road. The reservoir extension will be constructed within the reserved land next to the existing NTM FWPSR. The tentative size of the reservoir extension is 38,000 m<sup>3</sup> subject to detailed design. The site formation of the reserved reservoir extension area has already been completed. The proposed construction works will be carried out within the existing FWPSR site boundary.

#### *Laying of 14 km New Fresh Water Trunk Mains*

- 1.4.5 The new trunk mains will mainly run through existing roads in both the rural and urban areas of Yuen Long District. The tentative design diameter of the new trunk mains would vary between 1,600 mm to 2,000 mm subject to detailed design.
- 1.4.6 The new trunk mains will firstly be laid along an existing road between the NTM WTW and NTM FWPSR in rural areas of NTM. The northern part of this existing road (where the new trunk mains would be laid) runs along the boundary of the Conservation Area. This existing road (where the new trunk mains would be laid) then cuts through the Conservation Area as well as the border area of Lam Tsuen Country Park as illustrated in **Annex 3-1**.
- 1.4.7 The new trunk mains subsequently run from NTM FWPSR towards the east through Ching Yau Road in rural areas. A Conservation Area is located to the south of Ching Yau Road. A small section of the new trunk mains near San Tin Highway is deviated from existing road and cuts through the Conservation Area (as illustrated in **Annex 3-2**). The new trunk mains will then turn south and run through San Tam Road and then along Hung Mo Kiu crossing the Kam Tin River. Villages and low-density residential establishments are found nearby.
- 1.4.8 For connection to the existing fresh water distribution system near Tan Kwai Tsuen, the new trunk mains will run towards the west through Castle Peak Road (Yuen Long). It then turns to the southwest and runs along Long Ho Road and subsequently through Shap Pat Heung Road, Town Park Road South, Yuen Long Highway and eventually to the Tan Kwai Tsuen North (as illustrated in **Annex 3-3** and **Annex 3-4**). This section of new trunk mains will mainly run through the urbanised areas including Yuen Long Town. No changes to the existing Tan Kwai Tsuen Fresh Water Pumping Station or Tan Kwai Tsuen North Fresh Water Service Reservoir are proposed under this Project.

#### *Modification of Existing Raw Water Tunnel Junction (Chamber G)*

- 1.4.9 The existing raw water tunnel junction (Chamber G) is an underground facility located to the southeast of NTM WTW for distribution of raw water to various WTWs including NTM WTW. Location of the existing Chamber G is indicated by a blue circle in **Annex 2** and **Annex 3**. The tunnel junction modification would involve constructing by-pass tunnels and raw water mains underneath an existing WSD access tunnel to enhance the flow hydraulics. All the modification works will be carried out underground. Access to all these underground works will be through the existing tunnel portal located in the NTM WTW site boundary. Hence, no surface construction nor aboveground structures (including access road and shaft) will be required for modification of Chamber G. The preliminary layout of the proposed modification works (including the proposed raw water mains and new by-pass tunnels) is shown in **Annex 2** and **Annex 3**. Based on the preliminary design, the new tunnel diameter would be about 3,000 mm. The existing Chamber G is an underground Y-shaped chamber of about 220 m<sup>2</sup> on plan within

the Lam Tsuen Country Park. The proposed modification works are underground facilities, which fall within the Lam Tsuen Country Park and Conservation Area.

#### History of Site

- 1.4.10 The existing NTM WTW and NTM FWPSR were commissioned under Stage I works in 2000. Space has been reserved within the existing NTM WTW and NTM FWPSR site for future extension. Site formation has already been completed for the proposed extension areas during the Stage 1 works.
- 1.4.11 Chamber G was developed as part of the raw water supply system. This Project site was originally undisturbed before its existing use.
- 1.4.12 The proposed fresh water trunk mains will mostly be laid on the road network previously constructed for the developments nearby such as Yuen Long New Town. Yuen Long New Town was developed in the late 1970s and early 1980s. Land uses before the new town and road developments are mainly rural and village establishments.

### **1.5 Number and Type of Designated Project**

- 1.5.1 The proposed NTM WTW extension is a Designated Project (DP) listed in Schedule 2, Part I Item E.2 of the Environmental Impact Assessment Ordinance (EIAO), i.e. water treatment works with a capacity of more than 100,000 m<sup>3</sup> per day.
- 1.5.2 The new fresh water trunk mains between NTM WTW and NTM FWPSR would partly run through the Conservation Area and Lam Tsuen Country Park (refers to **Section 1.4.6** and **Annex 3-1**). The new trunk mains between NTM FWPSR and San Tin Highway would partly run through the Conservation Area (refers to **Section 1.4.7** and **Annex 3-2**). These water works are a DP listed in Schedule 2, Part I Item Q.1 of the EIAO, i.e. earthworks partly in a Conservation Area and a Country Park.
- 1.5.3 The modification works at Chamber G including the proposed raw water mains and by-pass tunnels are underground works, which would fall within the underground stratum of Lam Tsuen Country Park and Conservation Area (refers to **Section 1.4.9**). The works are a DP as listed in Schedule 2, Part I Item Q.1 of the EIAO, i.e. building works partly in a Conservation Area and a Country Park.

### **1.6 Name and Telephone Number of Contact Person**

Water Supplies Department  
New Works Branch  
Consultants Management Division

Contact Person: Ms. HO Chui Hang, Edith (Senior Engineer)  
Telephone Number: 2634 3688  
Fax Number: 2634 1800

## 2 Outline of Planning and Implementation Programme

### 2.1 Project Planning and Implementation

- 2.1.1 The Water Supplies Department (WSD) is the project proponent with overall responsibility for the planning, investigation, design, construction and operation of the Project.
- 2.1.2 It is targeted to commence the construction works of the Project in end 2022 for completion by end 2027, subject to funding approval.
- 2.1.3 WSD will engage consultants to carry out the investigation, design and construction supervision for the Project. Construction of the Project will be carried out by contractor(s) to be appointed by the WSD at a subsequent stage. WSD will operate and maintain the completed Project works.

### 2.2 Interfacing Projects

- 2.2.1 The known projects as listed below may also have interfaces and/or impacts on the Project planning and design.
- Agreement No. CE 13/2017 (CE) “Site Formation and Infrastructural Works for Remaining Phases of Public Housing Developments at Wang Chau, Yuen Long - Feasibility Study” undertaken by CEDD
  - Agreement No. CE 92/2017 (CE) “Site Formation and Infrastructure Works for Public Housing Development near Tan Kwai Tsuen, Yuen Long - Investigation, Design and Construction” undertaken by CEDD
  - Agreement No. CE75/2017 (CE) “Site Formation and Infrastructure Works for Public Housing Developments at Long Bin, Yuen Long - Investigation, Design and Construction” undertaken by CEDD
  - Agreement No. CE 42/2016 (CE) “Environmentally Friendly Transport Services in Hung Shui Kiu New Development Area and Adjacent Areas - Feasibility Study” undertaken by CEDD
  - Agreement No. CE 19/2015 (TP) “Preliminary Land Use Study for Lam Tei Quarry and the Adjoining Areas – Feasibility Study” undertaken by CEDD
  - Agreement No. CE 3/2015 (DS) “Yuen Long Effluent Polishing Plant – Investigation, Design and Construction” undertaken by DSD
  - Agreement No. CE 39/2018 (WS) “Strategic Cavern Areas to Accommodate Existing and Proposed Service Reservoirs in Lam Tei and Adjoining Areas – Feasibility Study” undertaken by WSD
  - Landslip Prevention and Mitigation Programme under CE 45/2014 (GE) undertaken by GEO
  - PWP Item No. B776CL – Site formation and infrastructure works for public housing developments at Kam Tin South, Yuen Long undertaken by CEDD
  - PWP Item No. 4178CD – Yuen Long Barrage Scheme undertaken by DSD
  - PWP Item No. 4161CD – Improvement of Yuen Long Town Nullah (Town Centre Section) undertaken by DSD
  - Yuen Long South (YLS Stages 1 & 2) Development
  - Hung Shui Kiu New Development Area (HSK NDA)
  - Preliminary Feasibility Study on Developing the New Territories North
  - Agreement No. CE 36/2018 (CE) Preliminary Technical Review on Potential Sites in Yuen Long Areas 13 and 14 for Housing Development - Feasibility Study

- Agreement No. CE 11/2018 (CE) - "Site Formation and Infrastructural Works for Proposed Public Housing Development near Tin Shui Wai - Feasibility Study"

## 3 Possible Impacts on the Environment

### 3.1 Construction Phase

#### Air Quality

- 3.1.1 Major air quality impact during the construction phase would be the dust nuisance generated from construction activities.
- 3.1.2 Since the major Project sites including the NTM WTW extension and NTM FWPSR extension areas have been formed, no major earthworks or site formation works will be required for this Project. The major dust generating activities will include excavation, materials handling, truck movements on unpaved roads and wind erosion from open stockpiling of dusty materials. The potential dust impact associated with these construction activities would be minimised by the adoption of good site practices and dust suppression measures.
- 3.1.3 The most dusty activities for construction of the new trunk mains would be excavation and backfilling works. Phasing of the water mains laying works will be developed to minimise the dust emissions at a given time. In view of the small construction scale, the dust impact from the mains laying works can be controlled by suitable good site practice and dust suppression measures.
- 3.1.4 There will also be gaseous emissions from construction traffic and Powered Mechanical Equipment (PME). The construction traffic control measures and good site practices will be recommended to minimise the air quality impact.

#### Noise

- 3.1.5 Airborne noise would be generated from the use of PME for excavation, concrete breaking, site clearance/demolition, construction of civil works, pipe laying, pipe jacking, backfilling and reinstatement works etc. Ground-borne noise may be generated from tunnel excavation using tunnel boring machines and use of other PME for modification of Chamber G. Adoption of suitable noise control measures will be required to minimise the potential impact.
- 3.1.6 There will also be construction traffic noise issue. The construction traffic routes, volume and frequency will be carefully planned and controlled to minimise the noise impact.

#### Water Quality

- 3.1.7 Construction site runoff and drainage arising from construction would likely be the major source causing water quality impact. Potential impacts may also be generated by discharge of construction materials, wastewater, sediment and spillage to the receiving waters in the downstream. In order to avoid the site runoff and pollutants from entering into the watercourses or storm drains, mitigation measures through construction design measures, good site practices and pollution control measures would be recommended.
- 3.1.8 Typically, the new water mains will be sterilized by chlorination prior to commissioning. The sterilization water would be dechlorinated with Total Residual Chlorine (TRC) level below 1 mg/L before discharge. The cleaning and flushing water would also be treated and desilted to the relevant discharge requirement stipulated in Technical Memorandum for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM-DSS) issued under the Water Pollution Control Ordinance (WPCO) before discharging into public sewer. The potential water quality impact associated with the potential chlorinated discharge will be addressed in the EIA. Mitigation measures such as appropriate treatment and monitoring requirements will be recommended.
- 3.1.9 The tunnel construction works at Chamber G may potentially induce ground water drawdown and dewatering of stream courses within the Country Park and Conservation Area. Ground

water control measures such as proper grouting and groundwater monitoring measures would be proposed for tunnel construction to mitigate this indirect impact upon the surface waters.

### Waste Management

- 3.1.10 Construction and demolition (C&D) materials would arise from tunnel construction, excavation, demolition of existing facilities. There will also be a certain amount of general refuse from the site workforce, and chemical waste from any maintenance of construction plant and equipment. It is encouraged to reduce waste generation by reusing or recycling suitable C&D materials including management of excavated material and construction waste disposal. Chemical waste may also arise from maintenance of construction plants and equipment. Good site practices and mitigation measures will be required to address the waste management implications of the Project.

### Ecology

#### *Recognised Sites / Species of Conservation Importance*

- 3.1.11 The northern section of the new trunk mains in NTM would cut through the Conservation Area (CA) and Lam Tsuen Country Park (CP), which are recognised sites of conservation importance. The estimated scale and locations of the new trunk mains are presented in **Section 1.4.5**, **Section 1.4.6**, **Section 1.4.7** and **Annex 3**. The section of the new trunk mains that are located within the CP area will be buried underground within an existing road. The NTM WTW site is also surrounded by a CA. The zoning of the CA is intended to protect and retain the existing natural landscape, ecological or topographical features of the area for conservation, educational and research purposes. The CA also serves to separate the sensitive Lam Tsuen CP from the adverse effects of development.
- 3.1.12 Designated in year 1979, Lam Tsuen CP encompasses 1,520 ha spanning in Tai Po, Fanling, and Yuen Long. The Lam Tsuen CP is divided into two parts, Tai To Yan, and Kai Kung Leng, near Fan Kam Road. The local plantations within Lam Tsuen CP are home to a host of wild animals such as mammals (Chinese Porcupine, *Hystrix brachyura*; Rhesus Macaque, *Macaca mulatta*), birds (Chinese Bulbul, *Pycnonotus sinensis*; Red-whiskered Bulbul, *Pycnonotus jocosus*), butterflies (Common Mormon, *Papilio polytes*; Red Helen, *Papilio helenus*; Great Orange Tip, *Hebomoia glaucippe glaucippe*).<sup>2</sup>
- 3.1.13 The rural areas in NTM e.g. near NTM FWPSR and the northern section of new water mains were previously found to support species of conservation importance including Incense Tree (*Aquilaria sinensis*), dragonflies (Ruby Darter, *Rhodothermis rufa*; and Orange-backed Threadtail, *Prodasineura croconota*), rare butterfly species (Common Dart, *Potanthus pseudomaesa*) and avifauna (Grey Heron, *Ardea cinerea*).<sup>3</sup> All these species were identified outside the Project sites.
- 3.1.14 Species of conservation importance were also previously recorded near the proposed water mains in Yuen Long Town including cultivated herb (Fishwort, *Houttuynia Cordata*), tree species (Silver-back Artocarpus, *Artocarpus Hypargyreus*), Dragonflies (Blue Chaser, *Potamarcha congener*), amphibian (Chinese Bullfrog, *Hoplobatrachus chinensis*), stream fauna (crab, *somanniathelphusa zanklon*), reptile (buff-striped keelback, *Amphiesma stolatum*) and mammal (Chinese noctule, *Nyctalus plancyi*).<sup>4</sup> All these species were identified outside the Project sites.

#### *Increase in Water Treatment Capacity of NTM WTW*

- 3.1.15 The site formation works for extension of the NTM WTW have been completed. The construction works for the proposed NTM WTW extension will be carried out within the boundary of the existing NTM WTW site, which comprises disturbed or developed lands including some

<sup>2</sup> Agriculture, Fisheries and Conservation Department, Country Park Outline:

[https://www.afcd.gov.hk/english/country/cou\\_vis/cou\\_vis\\_cou/cou\\_vis\\_cou\\_lt/cou\\_vis\\_cou\\_lt.html](https://www.afcd.gov.hk/english/country/cou_vis/cou_vis_cou/cou_vis_cou_lt/cou_vis_cou_lt.html)

<sup>3</sup> Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link, EIA Report, May 2009

<sup>4</sup> Housing Sites in Yuen Long South, EIA Report, July 2017

plantation areas with low ecological value. Areas to the west of NTM WTW mainly include developed areas (e.g. village houses, temporary shelters), fish ponds and agricultural lands. The areas adjoining the northern, eastern and southern sides of the NTM WTW are zoned as a CA and further south is Lam Tsuen CP. These CA and CP areas mainly comprise grassland / shrubland and secondary woodland. Modified watercourses and natural streams are scattered around the NTM WTW site in the CA and CP areas. All the identified watercourses and natural streams are outside the proposed extension works areas.

- 3.1.16 The proposed WTW extension works will directly affect the developed areas including some plantation areas within the existing NTM WTW site only. There would be indirect construction disturbance (e.g. from dust, noise, glare, and site runoff) to the habitats surrounding the existing NTM WTW site (e.g. grassland, shrubland, woodland, fishponds and natural streams) and their associated wildlife.

*Modification of Existing Raw Water Tunnel Junction (Chamber G)*

- 3.1.17 The modification works at Chamber G would involve underground or tunnel construction works within Lam Tsuen CP and CA. No surface construction nor aboveground works will be required for the modification works (refers to **Section 1.4.9**) Some natural stream courses are running across the proposed modification works inside the CP and CA. Access to the underground works will be through the existing tunnel portal within the existing NTM WTW site. No new access road, shaft and aboveground structures would be constructed in the CP and CA areas. The proposed modification works would potentially cause indirect impact to the CP and CA and the associated wildlife e.g. due to ground borne noise and vibration as well as groundwater drawdown from tunnelling and dewatering of surface waters (also see **Section 3.1.9**). No direct impact upon the Lam Tsuen CP and CA is expected. Baseline surveys including ground truthing and transect surveys will be carried out in the CP (covering the proposed modification works at Chamber G) under the EIA study to facilitate detailed assessment of potential environmental impacts including ecological and hydrogeological impacts within CP.

*Construction of NTM FWPSR Extension*

- 3.1.18 The site formation works for extension of the NTM FWPSR have been completed. The construction works for the proposed NTM FWPSR extension will be carried out within the boundary of the existing NTM FWPSR site, which comprises disturbed or developed lands with low ecological value. The habitats immediately surrounding the NTM FWPSR are plantation areas on cut or modified slopes whilst areas further away are mainly shrubland habitat. The proposed NTM FWPSR extension works are over 150m and 300m away from the CA and Lam Tsuen CP respectively. Some natural stream courses are found near the FWPSR extension site. No direct impact to the habitats outside the existing NTM FWPSR site would arise. Indirect impact upon the nearby habitats (plantations, shrubland and streams) and the associated wildlife may arise (e.g. due to noise, dust, glare and site runoff).

*Laying of 14 km New Fresh Water Trunk Mains*

- 3.1.19 The new trunk mains between the NTM WTW and NTM FWPSR will be laid along existing road only. A section of this existing road cuts through the CA as well as the border area of Lam Tsuen CP (refers to **Section 1.4.6** and **Annex 3-1**). Cut and cover method will be adopted for laying of the new trunk mains in CP. Around 90 m<sup>2</sup> of the CP area would be affected by the mains laying works. The affected habitat within the CP boundary would be developed land only (i.e. existing road). This Project would not alter the nature of this type of habitat. Habitats immediately around this local road includes plantation on modified or cut slopes, natural streams and shrubland. Areas further north are mainly developed areas (e.g. temporary shelters) and fish ponds. Baseline ecological survey will be carried out for the Project under the EIA study and the survey works will cover the proposed trunk mains within and near the CP. Alternative alignments of the proposed trunk mains to further avoid / minimize direct input on Lam Tsuen CP will be thoroughly considered and evaluated in the EIA stage.

- 3.1.20 The new trunk mains from NTM FWPSR will then run through Ching Yau Road towards the west. It is then deviated from existing road and cuts through a CA before approaching San Tam Road. The alignment that deviated from existing road would cut through plantation areas and shrubland. Habitats around this alignment mainly comprises plantations areas, shrubland, developed area (e.g. village establishment), stream courses and fish ponds.
- 3.1.21 The remaining sections of the new trunk mains from San Tam Road to Tan Kwai Tsuen North will mostly be buried within existing road networks. It will run through San Tam Road, Hung Mo Kiu (crossing the Kam Tin River), Castle Peak Road (Yuen Long), Long Ho Road, Shap Pat Heung Road (across Yuen Long Nullah), Town Park Road South and then across a modified watercourse to Long Tin Road, Yuen Long Highway and eventually to Tan Kwai Tsuen North. The section near Tan Kwai Tsuen North is deviated from existing road and cuts through small patches of grassland, secondary woodland, shrubland and plantation areas. Habitats around the alignment between San Tam Road to Tan Kwai Tsuen North mainly include developed areas, waste land, village areas, modified watercourses and fish ponds. Small patches of secondary woodland were identified near Tan Kwai Tsuen North and Shap Pat Heung Road.
- 3.1.22 In summary, most of the alignment between San Tam Road and Tan Kwai Tsuen North would cause direct impact to developed areas (i.e. existing roads) only. Other habitats that fall within the Project works areas and could be directly affected by the Project include small amounts of grassland, secondary woodland, shrubland, plantation areas near Tan Kwai Tsuen North and a small section of modified watercourse near Town Park Road South and Long Tin Road. Indirect construction impact (e.g. due to noise, dust, glare and site runoff) to the nearby habitats and wildlife may also arise.

#### Hazard to Life

- 3.1.23 Chlorine is used in the existing water treatment process for disinfection. The existing NTM WTW is a Potentially Hazardous Installation (PHI) due to its design storage of liquid chlorine drums. At the time of preparation of this Project Profile, liquid chlorine drums are stored on-site within the Chlorine Building of NTM WTW. WSD is in the process of implementing on-site chlorine generation (OSCG) to eliminate chlorine transport and storage. The Project will be implemented after the use of OSCG at the Tai Po WTW (for supplying sodium hypochlorite solution to Tai Po WTW) and decommissioning of the liquid chlorine store at the NTM WTW. It is expected that the OSCG project at Tai Po WTW and decommissioning of the liquid chlorine store at NTM WTW would be completed well before the commencement of construction works for NTM WTW extension.
- 3.1.24 However, hazard-to-life impact would arise in case the construction works for NTM WTW extension are carried out before the decommissioning of on-site liquid chlorine storage. In this case, hazard assessment study will need to be carried out to select appropriate safety and construction management measures to avoid construction disturbance to the liquid chlorine store and ensure that likelihood of chlorine release will not be increased during the construction period.
- 3.1.25 The proposed modification works at Chamber G would involve tunnelling works which will be arranged near the existing aqueduct tunnels. Drill-and-break or drill-and-split methods should be considered for the construction of the proposed tunnels and the proposed raw water mains (underneath an existing WSD tunnel) to avoid any potential adverse impact to the existing waterworks facilities. Alternative method such as tunnel boring machined (TBM) would also be considered for the tunnelling works. Suitable control measures and monitoring requirements will be proposed to minimize the vibration impact from the tunnelling works and other powered mechanical equipment (PME) upon the liquid chlorine store, if any, during the construction phase.

#### Landscape and Visual

- 3.1.26 The Project sites for the extension of NTM WTW and NTM FWPSR have already been formed

and reserved for the extension works. The new trunk mains will mainly be laid along existing roads. Limited landscape impact would be expected during the construction phase.

- 3.1.27 The construction of the NTM WTW extension and NTM FWPSR extension would mainly be visible to the rural developments or road users nearby. Short-term visual impact would therefore arise during the construction phase. Source of visual impacts may include excavation works, erection of new structures, installation of equipment, stockpile of construction materials and presence of construction equipment. Mitigation measures would be required to reduce the visual impact.
- 3.1.28 The construction works for the water mains will be carried out in a localised area and be constructed section by section. The visual disturbance from the water mains construction to the surroundings areas or nearby residents is expected to be small and temporary.
- 3.1.29 Existing trees are found within the NTM WTW and FWPSR extension areas and along the new water mains alignment. Tree survey will be carried out at the EIA stage to confirm the number of trees to be affected by the Project. According to *DEVB TC(W) 7/2015 – Tree Preservation*, important trees included registered Old & Valuable Trees (OVTs), or trees that meet one or more of the following criteria:
- trees of 100 years old or above;
  - trees of cultural, historical or memorable significance;
  - trees of precious or rare species;
  - trees of outstanding form; or
  - trees with trunk diameter equal to or exceeding 1.0 m (measured at 1.3 m above ground level), or with height/canopy spread equal to or exceeding 25 m.
- 3.1.30 With reference to the latest Register of OVT, there are two OVTs located alongside Castle Peak Road (Yuen Long) in vicinity of the proposed water mains, including LCSD YL/5 (*Eucalyptus citriodora* 檸檬桉) and LCSD YL/8 (*Ficus microcarpa* 榕樹 / 細葉榕). None of these OVTs are located within the Project site.
- 3.1.31 Apart from the two OVTs (LCSD YL/5 and LCSD YL/8), one important tree was identified near Yuen Long Highway in the EIA for Housing Sites in Yuen Long South (EIAO Register No.: AEIAR-215/2017) and further confirmed by site inspection. It is a *Ficus microcarpa* (榕樹 / 細葉榕), which is located outside the Project sites.
- 3.1.32 Three trees of significant size (Diameter at Breast Height > 800mm) were identified along San Tam Road. All of them are *Ficus microcarpa* (榕樹 / 細葉榕). The proposed water mains would have direct conflict with these three trees.

#### Cultural Heritage

- 3.1.33 The study area for cultural heritage impact assessment shall cover areas within 500m from the Project sites. There is no declared monument or graded historical building in the Project site boundaries. The closest historic building is Former Yuen Long Public Middle School (Grade 2), which is about 43 m away from the proposed water mains. As the water mains laying works would be constructed section by section in small scale and there is buffer area between the works and the historic building, the potential impact upon the historic building would be low.
- 3.1.34 NTM Site of Archaeological Interest (SAI) is located about 300 m from the Project works. No declared monuments and graded historic buildings are identified within 500 m from the NTM WTW.
- 3.1.35 With reference to the EIA Report for Housing Sites in Yuen Long South (YLS), some ancestral graves of the local villages are located within 500 m from the new trunk mains near Tan Kwai

Tsuen. The nearest grave is located about 60 m from the new trunk mains. The new trunk mains would also intercept an area with moderate archaeological potential as identified in the EIA Report for Housing Sites in YLS that would require further archaeological survey. Cultural heritage impact assessment will be carried out as part of the EIA to address the potential cultural heritage impact and propose mitigation measures required for the Project.

#### Land Contamination

- 3.1.36 The existing land use for any proposed pump replacement within the existing pumping station may include storage of chemicals such as lubrication oil, which are chemicals of concern under the Risk-Based Remediation Goals (RBRGs). Potential land contamination issue may be expected during the NTM WTW extension works. Key concern includes exposure of potentially contaminated materials to on-site construction workers. Land contamination assessment will be carried out to confirm the potential of land contamination. Land remediation measures will be recommended as necessary prior to commencement of the construction works.

### **3.2 Operational Phase**

#### Air Quality

- 3.2.1 No air emissions and thus no air quality impact would rise during the operational phase.

#### Noise

- 3.2.2 The major noise sources of the NTM WTW extension would likely be the new water pumps including pump motors, exhaust fans for ventilation systems and emergency generator set (if required). Detailed noise impact assessment will be carried out to determine the required noise abatement measures.

#### Water Quality

- 3.2.3 Any spent wash water will be blended with the raw water and recycled in the treatment process or properly disposed to sewage treatment works after suitable treatment as required. Standby treatment facilities and dual power supply will be provided to prevent the occurrence of overflow. Sewage generated from workforce will also be properly disposed following the existing practice. Discharge of wastewater or effluent into the environment is not expected.
- 3.2.4 In case sterilization of the water mains by chlorination is required during the operational phase for maintenance purpose, the sterilization water would be dechlorinated with TRC level below 1 mg/L before discharge. The cleaning and flushing water would also be treated and desilted to the relevant discharge requirement stipulated in TM-DSS issued under the WPCO before discharging into public sewer. The potential water quality impact associated with the potential chlorinated discharge will be addressed in the EIA. Mitigation measures such as appropriate treatment and monitoring requirements will be recommended.
- 3.2.5 Potential water quality impact from accidental spillage of chemicals used and handled in the WTW will be addressed in the EIA. Mitigation measures and precautionary measures to avoid accidental chemical spillage will be proposed in the EIA.

#### Waste

- 3.2.6 Sludge would be the major waste generated during operation of the water treatment process. Currently, sludge is dewatered for proper disposal to the landfill. The future sludge disposal arrangement may follow the current practice subject to detailed design. The handling, storage and disposal of chemical waste would follow *the Code of Practice on Packaging, Labelling and Storage of Chemical Wastes* published by EPD.

#### Ecology

- 3.2.7 No additional habitat loss would be induced by the Project operation. Indirect ecological impact

may arise from the operation of the extended NTM WTW (e.g. due to noise and glare) upon the nearby habitats (e.g. shrubland, grassland, watercourses and woodland) and the associated wildlife. Noise abatement and glare control will be adopted to minimise indirect ecological disturbances during operation.

#### Hazard to Life

- 3.2.8 WSD is in the process of implementing the OSCG for water treatment works. A new OSCG plant will be built and incorporated into the NTM WTW extension works. The Project will be carefully planned to ensure the use of OSCG and decommissioning of the liquid chlorine store before the commencement of the WTW extension works. It is therefore anticipated that the risk associated with chlorine transportation and storage would be eliminated during the operational phase. In case the liquid chlorine store would still be in operation after commissioning of the Project, detailed assessment will be conducted under the EIA to address the associated hazard impact.
- 3.2.9 The OSCG plant itself may have the potential hazard to life impact, e.g. generation of flammable hydrogen gas and some hazardous materials, e.g. sodium hypochlorite solution may be handled during the construction and operation phases of the project. Detailed hazard to life assessment will be carried out.

#### Landscape and Visual

- 3.2.10 The Project design will be properly planned and developed to well integrate the NTM WTW extension works into the surrounding buildings and landscape. Sufficient landscape areas, greening and new planting will be included in the design layout for visual screening and mitigation.
- 3.2.11 The works area for the new water mains will be cleaned and reinstated to its original conditions. There will be no permanent impacts in landscape and visual aspects during operation of the pipelines.

#### Cultural Heritage

- 3.2.12 Some cultural heritage resources are identified within / near the Project Site as indicated in **Section 4**. Cultural heritage impact assessment is required to address the potential impact and propose mitigation measures if necessary.

## 4 Major Elements of the Surrounding Environment

### 4.1 Existing Sensitive Receivers

#### Existing Environment within the Project Sites

- 4.1.1 The proposed extension of NTM WTW and NTM FWPSR will be carried out in developed or disturbed areas including some plantation area. The modification works for Chamber G in Lam Tsuen Country Park (CP) and Conservation Area (CA) will be carried out underground with no surface disturbance to the CP and CA area (refers to **Section 1.4.9**). A small section of new trunk mains in NTM near San Tam Road would be deviated from existing road and cut through plantation / shrubland areas where part of these plantation / shrubland areas is within a CA. Another small section of new trunk mains in Yuen Long Town near Town Park Road South would cut through a modified watercourse. A small section of new trunk mains near Tan Kwai Tsuen North would be deviated from existing road and cuts through a small amount of plantation, grassland, shrubland and woodland areas. A small section of the new trunk mains between NTM WTW and NTM FWPSR (which would be laid in an existing road) falls within the CP area (refers to **Section 1.4.6**). All the remaining sections of new trunk mains would be buried within existing roads.
- 4.1.2 In summary, only two Project locations are located within the CP area including (1) the modification of Chamber G (which are all underground works) and (2) a small section of new water mains between NTM WTW and NTM FWPSR. The potential impact on Lam Tsuen CP due to these Project works are discussed in **Section 3.1.17**, **Section 3.1.19** to **Section 3.1.22**.

#### Major Elements of the Surrounding Environment

- 4.1.3 The surrounding environment near the northern part of the Project sites (in NTM and San Tin) are mainly rural areas including plantation areas, grassland, shrubland, secondary woodland, village areas, temporary shelters, fishponds, agriculture areas, modified watercourses and natural streams. The surrounding environment in the southern part of the Project sites (in Yuen Long Town) are mainly urban areas including developed areas, waste lands, village areas, agriculture areas, modified watercourses and fish ponds as well as some small patches of grassland, secondary woodland, shrubland and plantation areas. Most of the fishponds identified near the Project sites are active. No fishponds are identified within the Project sites.

#### Recognised Sites of Conservation Importance and Ecological important Areas

- 4.1.4 Recognised sites of conservation importance include CA and Lam Tsuen Country Park (CP) identified at or near the Project sites in NTM. Brief descriptions of the CA and CP are given in **Section 3.1.11** and **Section 3.1.12**. Other ecologically important areas identified near the Project sites include some woodland habitats and natural streams and species of conservation importance in the vicinity of the Project Sites were identified in **Section 3.1.13** and **Section 3.1.14**. All natural streams are located outside the Project sites.

#### Major Sensitive Receivers at or near the Project Sites

- 4.1.5 The major sensitive receivers at or in the vicinity of the Project are listed in **Table 4-1** below. Locations of key sensitive receivers identified within 500 m from the Project sites are shown in **Annex 3** and **Annex 4**.

Table 4-1: Selected Major Sensitive Receivers at or near the Project Sites

TYPES	SELECTED MAJOR SENSITIVE RECEIVERS
Residential Developments	<ul style="list-style-type: none"> <li>■ Auden Green Mushroom Farm</li> <li>■ Village houses at NTM</li> <li>■ San Wai Tsuen</li> <li>■ Wah On Villa</li> <li>■ Merry Garden</li> <li>■ Pok Wai</li> <li>■ Elite Garden</li> <li>■ Mo Fan Heung</li> <li>■ Park Yoho</li> <li>■ Ha Ko Po Tsuen</li> <li>■ Harmonic Villa</li> <li>■ Tung Shing Lei</li> <li>■ Yeung Uk Tsuen</li> <li>■ Chuk San Tsuen</li> <li>■ Sheung Yau Tin Tsuen</li> <li>■ The Reach</li> <li>■ Tai Kei Leng</li> <li>■ Ma Tin Pok</li> <li>■ La Grove</li> <li>■ Lung Tin Tsuen</li> <li>■ Emerald Green</li> <li>■ Greenery Place</li> <li>■ Villa Art Deco</li> <li>■ Parkside Villa</li> <li>■ Scenic Gardens</li> <li>■ Park Royale</li> <li>■ Jasper Court</li> <li>■ Fui Sha Wan</li> <li>■ Tai Tao Tsuen</li> </ul>
Education Institutions	<ul style="list-style-type: none"> <li>■ Pok Wai Public School</li> <li>■ TWGHS C Y Ma Memorial College</li> <li>■ Po Leung Kuk Law's Foundation School</li> <li>■ Yuen Long Public Secondary School</li> <li>■ South Yuen Long Government Primary School</li> <li>■ Po Leung Kuk Law's Foundation School</li> <li>■ Ying Yin Catholic Kindergarten</li> </ul>
Government / Institute / Community	<ul style="list-style-type: none"> <li>■ SARDA Au Tau Youth Centre</li> <li>■ Ming Sum Home for the Aged</li> <li>■ The Church of Jesus Christ of Latter-days Saints</li> <li>■ Pok Oi Hospital</li> </ul>
Water Bodies	<ul style="list-style-type: none"> <li>■ Fish Ponds / Streams / Modified Watercourses</li> <li>■ Kam Tin River</li> <li>■ Yuen Long Nullah</li> </ul>
Areas of Conservation Value	<ul style="list-style-type: none"> <li>■ Lam Tsuen Country Park</li> <li>■ Conservation Area</li> </ul>

TYPES	SELECTED MAJOR SENSITIVE RECEIVERS
Cultural Heritage Resources (with reference to the information from Antiquities and Monuments Office)	Nearest Cultural Heritage Resources (numbers in brackets are ID in <b>Annex 4-1</b> ): <ul style="list-style-type: none"> <li>■ (1) NTM Site of Archaeological Interest</li> <li>■ (5) No. 62 San Wai Tsuen, Historic Building Grade 3</li> <li>■ (6) No. 71 San Wai Tsuen, Historic Building Grade 3</li> <li>■ (7) No. 70 San Wai Tsuen, Historic Building Grade 3</li> <li>■ (12) General House, Shum Ancestral Hall, Historic Buildings Grade 2</li> <li>■ (13) General House, Main Building, Historic Buildings Grade 2</li> <li>■ (14) General House, Hip Wai House, Historic Buildings Grade 2</li> <li>■ (15) Former Yuen Long Middle School, Historic Building Grade 2</li> <li>■ (16) Pun Uk, Historic Building Grade 1</li> <li>■ (17) No. 45 Tai Kei Leng, Main Building, Entrance Gate and Enclosure Wall, Historic Building Grade 3</li> <li>■ (18) No. 27 Tai Kei Leng, Historic Building Grade 3</li> <li>■ (19) No. 26 Tai Kei Leng, Historic Building Grade 3</li> <li>■ (20) Nos. 186 &amp; 188 Tai Kei Leng, Historic Building Grade 3</li> <li>■ (21) Ji Yeung Study Hall, Historic Building Grade 3</li> <li>■ (22) No. 112 Tai Kei Leng, Historic Building Grade 3</li> <li>■ (23) No. 119 Tai Kei Leng, Historic Building Grade 3</li> <li>■ (24) Siu Lo, Historic Building Grade 3</li> <li>■ (25) No. 173 Tai Kei Leng, Historic Building Grade 3</li> <li>■ (26) No. 21 Lung Tin Tsuen, Historic Building Grade 3</li> <li>■ (27) No. 22 Lung Tin Tsuen, Historic Building Grade 3</li> <li>■ (28) No. 23 Lung Tin Tsuen, Historic Building Grade 3</li> <li>■ (29) Lung Tin Study Hall, Historic Building Grade 2</li> </ul>
Cultural Heritage Resources (with reference to the approved EIA Report for Housing Sites in Yuen Long South)	<ul style="list-style-type: none"> <li>■ Ancestral graves of the local villages</li> <li>■ Area with moderate archaeological potential that requires further archaeological survey</li> </ul>

## 4.2 Planned Sensitive Receivers

4.2.1 The major planned sensitive receivers within 500 m from the Project site include:

- Public Housing Development near Tan Kwai Tsuen, Yuen Long
- Yuen Long South (YLS) Development
- Public Housing Development at Long Bin, Yuen Long

4.2.2 These planned developments are located near the new fresh water trunk mains.

## 5 Environmental Mitigation Measures and Implications

### 5.1 Construction Phase

- 5.1.1 Potential measures are outlined below to mitigate possible short-term adverse environmental effects. These measures will be further reviewed in the EIA study.

#### Air Quality

- 5.1.2 Good site practices and dust control measures including those set out in the Air Pollution Control (Construction Dust) Regulation of the Air Pollution Control Ordinance will be set out in the works contracts for implementation to control and mitigate dust impacts on the nearby Air Sensitive Receivers (ASRs) based on the EIA results.
- 5.1.3 Construction traffic management and good site practices will be developed to control air quality impact from construction traffic and plants. Ultra-low sulphur diesel fuel would be used for all diesel-operated plants and equipment on-site to minimise gas emission impact arising from the Project.

#### Noise

- 5.1.4 Proper phasing of construction works, control of works rates, use of quiet PME and noise barriers will be considered to reduce the noise impacts. Traffic noise mitigation measures would be recommended to alleviate noise impact of construction vehicles to nearby Noise Sensitive Receivers (NSRs) as required.
- 5.1.5 General good site practices, including the location of noisy machinery away from NSRs, the use of silencers, mufflers and acoustic shields on plant and equipment, regular maintenance of plant and equipment and reduction in number of machines used at any one time, control of work rate, prevention of plant idling, etc will be adopted to control noise impact.
- 5.1.6 The need for further mitigation measures, such as noise enclosures, would be identified during the EIA to control construction noise impact to meet the stipulated requirements.

#### Water Quality

- 5.1.7 Silt removal facilities will be provided to remove any silt before the discharge of site runoff during the construction of the Project. The good site practices and design of temporary on-site drainage and silt removal facilities will follow the guidelines stipulated in the Environmental Protection Department (EPD)'s Practice Note for Professional Persons, Construction Site Drainage (ProPECC PN 1/94). The guidelines and precautionary mitigation measures given in the Environment, Transport and Works Bureau Technical Circular (Works) No. 5/2005 "Protection of Natural Streams/Rivers from Adverse Impacts arising from Construction Works" will be followed where applicable to protect the inland watercourses at or near the Project area during the construction phase.
- 5.1.8 Groundwater control will be provided for tunnel construction to avoid groundwater drawdown and the associated effect on the surface watercourses.

#### Waste

- 5.1.9 A comprehensive C&D Material Management Plan (C&DMMP) will be drawn up at an early stage before construction, with a view to minimising the generation of C&D materials and enhancing the on-site and off-site reuse of excavated material, in particular the C&D materials from tunnel construction. Close liaison with the Fill Management Division of CEDD will be maintained in the investigation and design stage.
- 5.1.10 Other mitigation measures including the adoption of good housekeeping practices, and sorting and segregation of wastes for reuse and disposal will be developed under the EIA study.

### Ecology

- 5.1.11 Appropriate mitigation measures including avoidance, minimisation and compensation of the potential ecological impact will be developed and implemented in the EIA based on the ecological survey and impact assessment results. Direct ecological impact should be minimised by careful planning and design of the construction works limits and adoption of suitable measures to protect existing trees and species of conservation importance. Mitigation measures including avoidance, minimisation and compensation measures would be proposed as required in consultation with relevant government departments such as Agriculture, Fisheries and Conservation Department (AFCD).

### Hazard to life

- 5.1.12 Hazard to life assessment will be carried out as required to identify necessary design, safety and precautionary measures to minimise the potential impact.

### Landscape and Visual

- 5.1.13 Hoardings with beautification features will be erected at the Project site boundaries as far as practicable to minimise the visual impact of construction activities. Proper control over site cleanliness and stockpiling of materials will be exercised to alleviate visual intrusion. Design of noise barriers shall be visually unobtrusive through the use of transparent materials or greening measures.
- 5.1.14 Tree survey will be carried out at the EIA stage to confirm the number of trees to be affected by the Project. The Project works limits should be adjusted to preserve / protect existing trees *in-situ* and incorporate them into the landscape design as far as possible based on the tree survey results. Tree survey and preparation of tree preservation and removal proposal for this Project shall be undertaken in accordance with the *DEVB TC(W) 7/2015 – Tree Preservation*.

### Cultural Heritage

- 5.1.15 Cultural heritage impact assessment will be carried out during the EIA to address any potential cultural heritage impact and propose the mitigation measures required.

### Land Contamination

- 5.1.16 The presence and extent of land contamination, mainly in the existing NTM WTW site, will be investigated. Remediation measures if found necessary will be drawn up in accordance with EPD's relevant guidance notes and EPD's advice.

## **5.2 Operational Phase**

- 5.2.1 The identified operational environmental impacts could be permanent adverse effects, if uncontrolled. Potential measures are outlined below to mitigate potential environmental impacts. These measures will be further reviewed in the EIA study.

### Noise

- 5.2.2 Adoption of quiet plants and enclosing the plants within buildings will be recommended to minimise noise generated. Fixed plants, louvres and doors will be directed away from NSRs as necessary. Acoustic design of building walls and roofs, silencers for ventilation fans and acoustic louvres at critical locations will be recommended as required with reference to the EIA results. A regularly scheduled plant maintenance programme will be developed and implemented for the NTM WTW.

### Waste

- 5.2.3 Good housekeeping and practices will be adopted to minimise potential impacts from the waste generated, including the use of closed containers for transportation.

Ecology

- 5.2.4 The potential indirect ecological impact would be mitigated by employing suitable noise and glare control measures and good site practices.

Hazard to Life

- 5.2.5 Implementation of the OSCG will be recommended for both the existing NTM WTW and the future NTM WTW extension to eliminate the hazards associated with the chlorine storage and transport. Hazard assessment will be carried out to identify necessary design, safety and precautionary measures to minimise the potential impact.

Landscape and Visual

- 5.2.6 Greening, aesthetic design of buildings and structures, green roofs, landscaping features, etc. will be implemented to enhance the visual quality of above ground structures and achieve a harmonious design for these structures to blend with the surrounding environment. New planting will be maximised along the site edges and within the site layout for visual screening.

Cultural Heritage

- 5.2.7 Cultural heritage impact assessment will be carried out during the EIA to address any potential cultural heritage impact and propose the mitigation measures required during operational phase.

## 6 Use of Previously Approved EIA Reports

6.1.1 The approved EIA reports of projects that are relevant to this Project due to similarity in project nature are listed below.

**Table 6-1: Relevant Approved EIA Reports with Similarity in Project Nature**

REGISTER NO.	PROJECT TITLE	DATE OF APPROVAL	ASPECT OF RELEVANCE
AEIAR-082/2004	Siu Ho Wan WTW Extension (WSD)	15 December 2004	Air quality, noise, water quality, waste management, ecology landscape and visual, cultural heritage and hazard to life
AEIAR-158/2011	Integration of Siu Ho Wan and Silver Mine Bay WTW	13 January 2011	Air quality, noise, water quality, waste management, ecology landscape and visual, hazard to life
AEIAR-187/2015	In-situ Reprovisioning of Sha Tin WTW - South Works	28 January 2015	Air quality, noise, water quality, waste management, ecology landscape and visual, land contamination, cultural heritage and hazard to life

6.1.2 The approved EIA reports of projects that are relevant to this Project in terms of their locations are listed below.

**Table 6-2: Relevant Approved EIA Reports with Similarity in Project Location**

REGISTER NO.	PROJECT TITLE	DATE OF APPROVAL	ASPECT OF RELEVANCE
AEIAR-169/2009	Hong Kong Section of Guangzhou - Shenzhen - Hong Kong Express Rail Link (MTRC)	28 September 2009	Similar project location covering Ngau Tam Mei
AEIAR-215/2017	Housing Sites in Yuen Long South (CEDD)	30 November 2017	Similar project location covering Yuen Long Town

**END OF TEXT**

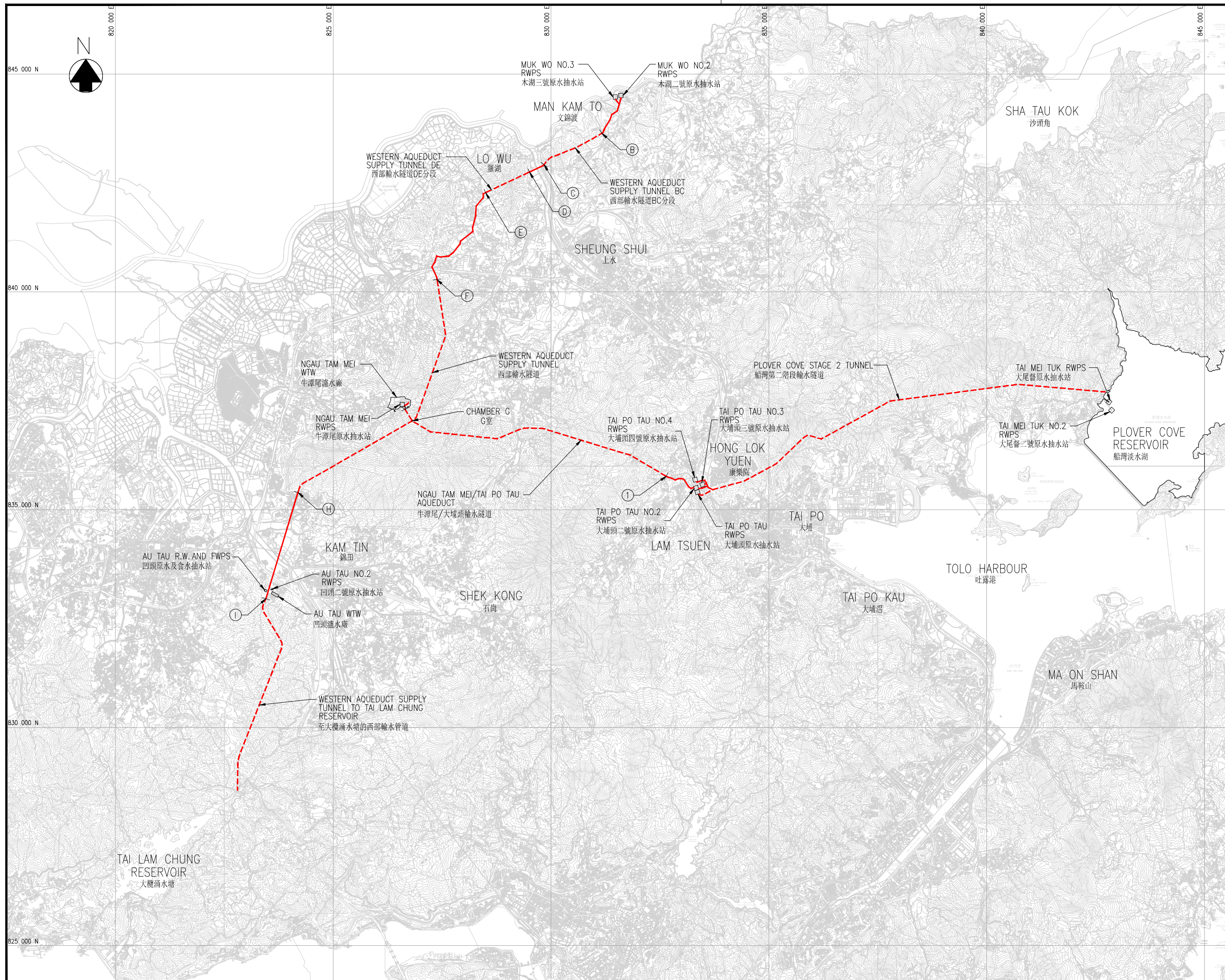
*(The English version of this Project Profile shall prevail wherever there is a discrepancy between the English version and the Chinese version)*



**ANNEX 1**

**LAYOUT OF EXISTING NGAU TAM MEI WATER TREATMENT WORKS**





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**LEGEND:**

- EXISTING RAW WATER TRUNK MAINS  
現有原水幹管
  - - - EXISTING WATER TUNNEL  
現有輸水隧道
  - B Tunnel Portal  
隧道入口
- ABBREVIATIONS: 縮寫:**
- FWPS FRESH WATER PUMPING STATION  
原水抽水站
  - RWPS RAW WATER PUMPING STATION  
食水抽水站
  - FWPSR FRESH WATER PRIMARY SERVICE RESERVOIR  
食水主配水庫
  - FWPSR WATER TREATMENT WORKS  
濾水廠

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial	CHW	BH	SZ	BH	
Date	02/19	02/19	02/19	02/19	02/19

Approved

Agreement No. CE 40/2018 (WS)

Contract Title  
NGAU TAM MEI WATER TREATMENT WORKS EXTENSION – FEASIBILITY STUDY

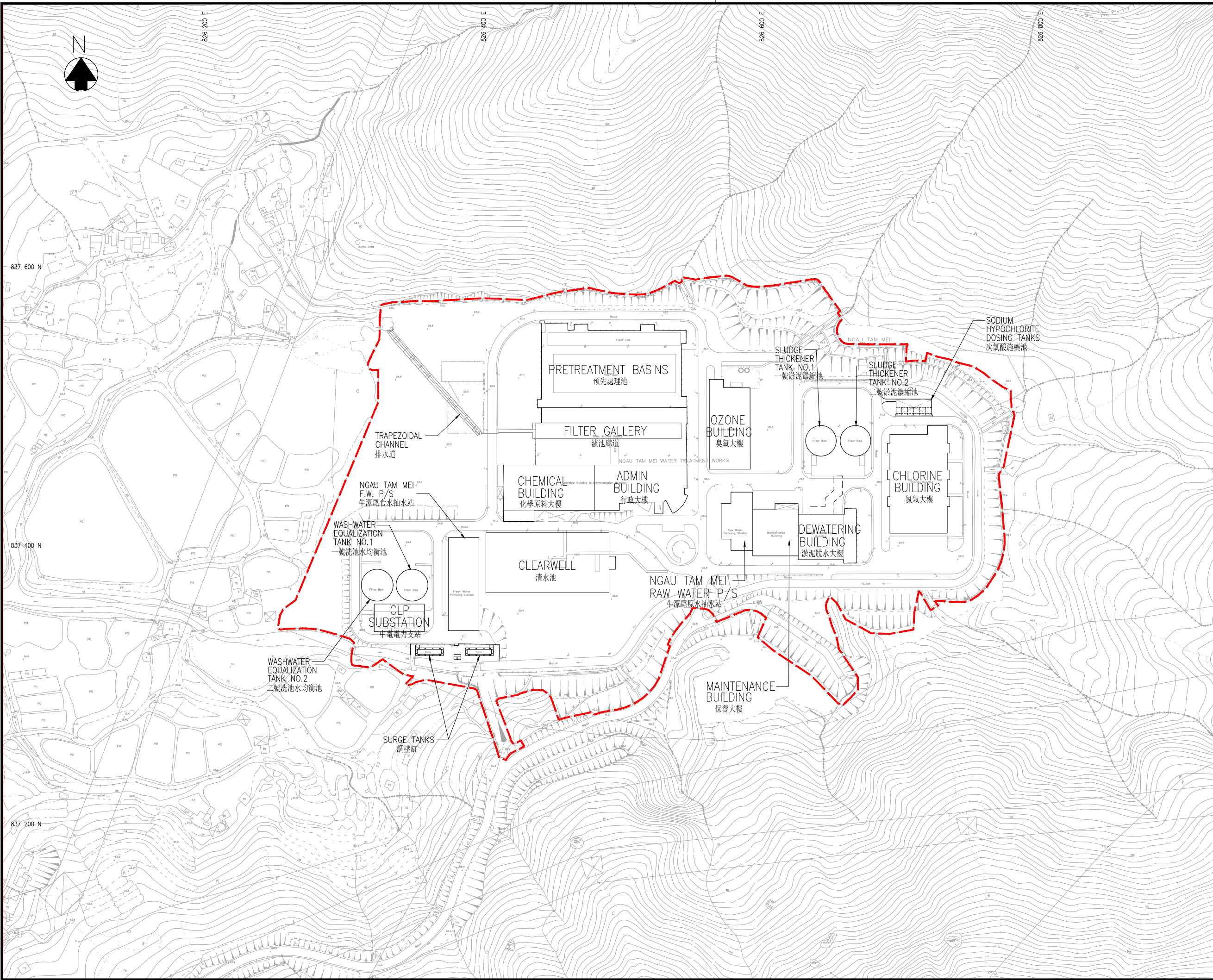
Drawing Title  
EXISTING RAW WATER TRANSFER SYSTEM OF NGAU TAM MEI WATER TREATMENT WORKS  
牛潭尾濾水廠的現有原水輸送系統

Drawing No. 401044/BV/PP/Annex 1-1  
附件 1-1

Scale A1 1 : 40000  
A3 1 : 80000



LEGEND:  
 - - - - - NGAU TAM MEI WATER TREATMENT WORKS BOUNDARY  
 牛潭尾濾水廠邊界



Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial	CHW	BH	SZ	BH	
Date	02/19	02/19	02/19	02/19	02/19

Approved

Agreement No. CE 40/2018 (WS)

Contract Title  
 NGAU TAM MEI WATER TREATMENT WORKS EXTENSION – FEASIBILITY STUDY

Drawing Title  
 LAYOUT OF NGAU TAM MEI WATER TREATMENT WORKS  
 現有牛潭尾濾水廠的平面圖

Drawing No. 401044/B&V/PP/Annex 1-2 附件 1-2	Revision -
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Scale  
 A1 1 : 1250  
 A3 1 : 2500



**ANNEX 2**  
**PROJECT LOCATION PLAN**





- Existing Facilities 現有設施**
- Boundary of Existing Ngau Tam Mei Water Treatment Works (NTMWTW) Site  
現有牛潭尾濾水廠邊界
  - Existing NTMWTW Facilities (Refers To Annex 1)**  
現有牛潭尾濾水廠設施 (見附件1)
  - Boundary of Existing Ngau Tam Mei Fresh Water Primary Service Reservoir (NTMFWPSR) Site  
現有牛潭尾食水主配水庫邊界
  - Existing NTMFWPSR 現有牛潭尾食水主配水庫
  - Existing Water Tunnel 現有輸水隧道
  - Indicative Location of Existing Chamber G  
現有G室指示位置

Existing Ngau Tam Mei Fresh Water Primary Service Reservoir  
現有牛潭尾食水主配水庫邊  
CAP.儲水量 40,000m<sup>3</sup>  
T.W.L.最高水位 104.000m APD  
I.L.最低水位 94.150m APD

**Ngau Tam Mei**  
牛潭尾

Existing Ngau Tam Mei Water Treatment Works  
現有牛潭尾濾水廠設施

ANNEX 2-2  
附件2-2

Location of Chamber G  
G室位置

San Wai Tsuen  
新圍村

Long Ha Tsuen  
朗廈村

Ching Yau Road  
清攸路

Ngau Tam Mei Fresh Water Primary Service Reservoir Extension  
牛潭尾食水主配水庫擴建

Mo Fan Tsuen  
模範村

Sha Po Tsuen  
沙埔村

Kam Tin River  
錦田河

San Tin Highway  
新田公路

Castle Peak Road  
青山公路

Au Tau  
凹頭

Yuen Long Park  
元朗公園

**Yuen Long**  
元朗

Yoho Town  
新時代廣場

Yeung Uk Tsuen  
楊屋村

San Hei Tsuen  
新起村

Tong Yan San Tsuen  
唐人新村

Shap Pat Heung Road  
十八鄉路

Yuen Long Highway  
元朗公路

Shap Pat Heung  
十八鄉

**The Project comprises the following works:**

本工程項目包括以下主要工作:

1 Increase in Water Treatment Capacity of Ngau Tam Mei Water Treatment Works (NTMWTW) 提升牛潭尾濾水廠的食水產量

Proposed NTMWTW Extension Area 牛潭尾濾水廠的擴展範圍

2 Construction of Ngau Tam Mei Fresh Water Primary Service Reservoir (NTMFWPSR) Extension 擴建牛潭尾食水主配水庫

Proposed NTMFWPSR Extension Area 牛潭尾食水主配水庫擴建範圍

3 Laying of 14 Km New Fresh Water Trunk Mains 敷設約14公里長的食水幹管

Proposed Water Mains 擬建食水幹管

4 Modification of Existing Raw Water Tunnel Junction (Chamber G) 現有原水輸水隧道交匯處 (G室)

Proposed Raw Water Mains 擬建原水幹管 (Underneath the Existing Access Tunnel) (在現有通路隧道下)

Proposed Tunnel (For Access And Raw Water Mains) 擬建隧道 (用於通路和原水幹管)

Proposed Raw Water Tunnels 擬建原水隧道

Revision	Date	Description	Initial
	Designed	Checked	Drawn
Initial	CHW	BH	SZ
Date	02/19	02/19	02/19

Approved

Agreement No. CE 40/2018 (WS)

Contract Title  
NGAU TAM MEI WATER TREATMENT WORKS EXTENSION - FEASIBILITY STUDY

Drawing Title  
PROJECT LOCATION PLAN (OVERVIEW)  
工程項目的位置圖

Drawing No. 401044/BV/PP/Annex 2 - 1 附件2-1	Revision -
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Scale A1 1 : 15000  
A3 1 : 30000



**Existing Facilities 現有設施**

 Boundary of Existing Ngau Tam Mei Water Treatment Works (NTMWTW) Site  
現有牛潭尾濾水廠邊界

**Existing NTMWTW Facilities (Refers To Annex 1)**  
現有牛潭尾濾水廠設施 (見附件1)

 Boundary of Existing Ngau Tam Mei Fresh Water Primary Service Reservoir (NTMFWPSR) Site  
現有牛潭尾食水主配水庫邊界

 Existing NTMFWPSR 現有牛潭尾食水主配水庫

 Existing Water Tunnel 現有輸水隧道

 Indicative Location of Existing Chamber G  
現有G室指示位置

Existing Ngau Tam Mei Water Treatment Works  
現有牛潭尾濾水廠

Chemical Building  
化學大樓

Sludge Treatment Facilities  
污泥處理設施

Treatment Building  
濾水大樓

濾水廠  
Water Treatment Works

Modification of Chlorine Building For Additional OSCG Plants  
改建氯氣大樓以增設現場氯氣生產設施

Washwater Equalization Tank  
沖洗水均衡池

Chlorine Contact Tank & Clear Water Tank  
氯氣接觸池及清水池

Location of Chamber G  
G室位置

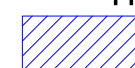





Existing Ngau Tam Mei Fresh Water Primary Service Reservoir  
現有牛潭尾食水主配水庫邊  
CAP.儲水量 40,000m<sup>3</sup>/  
T.W.L.最高水位 104.000m APD  
I.L.最低水位 94.150m APD

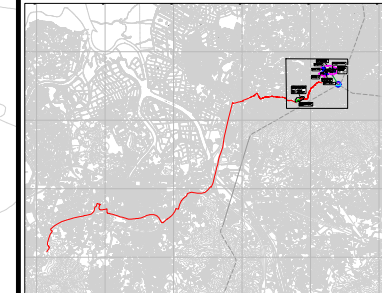
配水庫

Service Reservoir

Ngau Tam Mei Fresh Water Primary Service Reservoir Extension  
牛潭尾食水主配水庫擴建

The Project comprises the following works: 本工程項目包括以下主要工作:

- 1 Increase in Water Treatment Capacity of Ngau Tam Mei Water Treatment Works (NTMWTW) 提升牛潭尾濾水廠的食水產量  
 Proposed NTMWTW Extension Area 牛潭尾濾水廠的擴展範圍
- 2 Construction of Ngau Tam Mei Fresh Water Primary Service Reservoir (NTMFWPSR) Extension 擴建牛潭尾食水主配水庫  
 Proposed NTMFWPSR Extension Area 牛潭尾食水主配水庫擴建範圍
- 3 Laying of 14 Km New Fresh Water Trunk Mains 敷設約14公里長的食水幹管  
 Proposed Water Mains 擬建食水幹管
- 4 Modification of Existing Raw Water Tunnel Junction (Chamber G) 現有原水輸水隧道交匯處 (G室)  
 Proposed Raw Water Mains 擬建原水幹管  
 Proposed Tunnel (For Access And Raw Water Mains) 擬建隧道 (用於通路和原水幹管)  
 Proposed Raw Water Tunnels 擬建原水隧道



Revision	Date	Description	Initial
Initial	02/19	Designed	CHW
	02/19	Checked	BH
	02/19	Drawn	SZ
	02/19	Checked	BH

Approved

Agreement No. CE 40/2018 (WS)

Contract Title  
NGAU TAM MEI WATER TREATMENT WORKS EXTENSION - FEASIBILITY STUDY

Drawing Title  
PROJECT LOCATION PLAN (ZOOM IN)  
工程項目的位置圖 (放大)

Drawing No. 401044/BV/PP/Annex 2 - 2  
附件 2-2

Scale A1 1 : 5000  
A3 1 : 10000

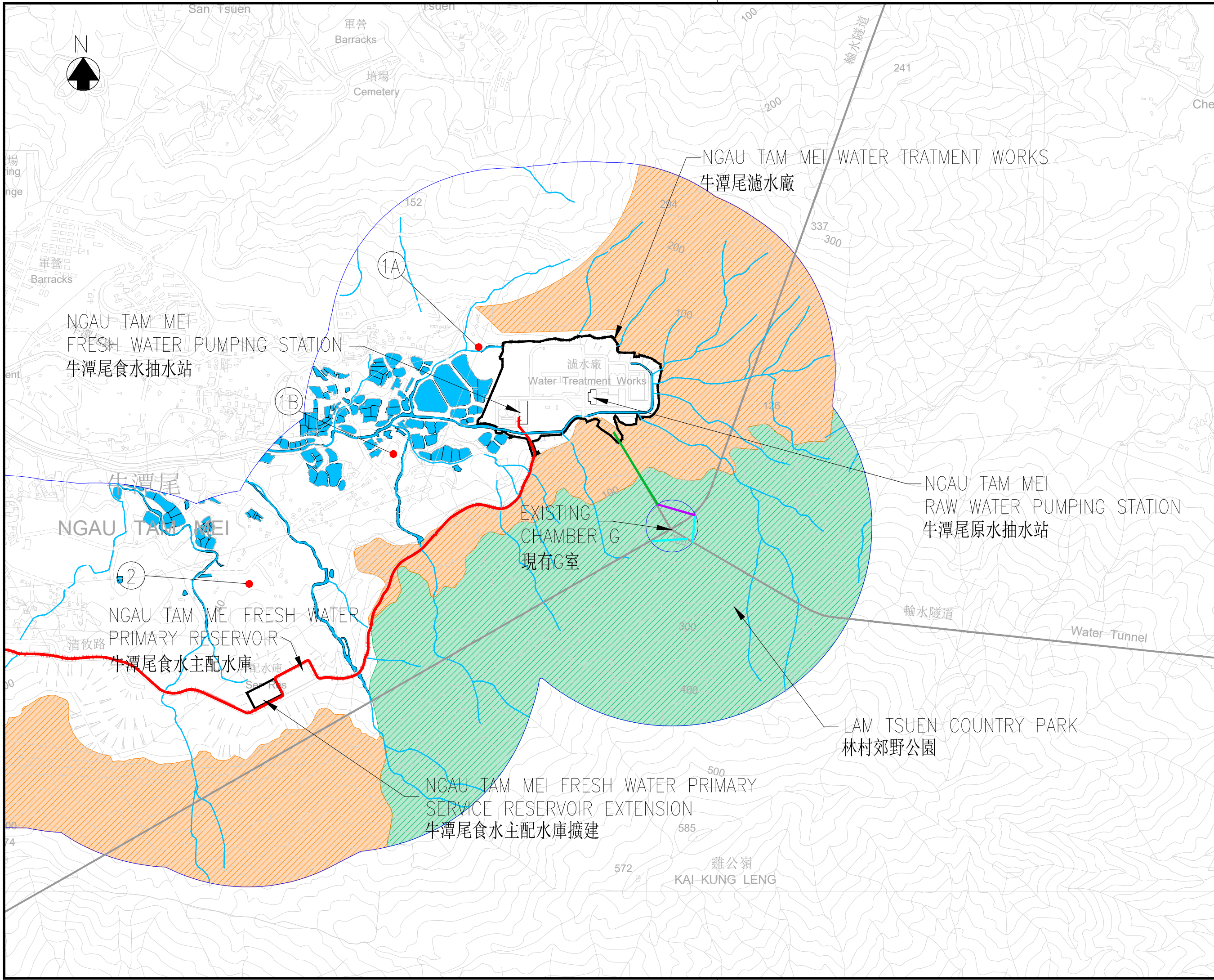


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博威工程顧問有限公司

**ANNEX 3**

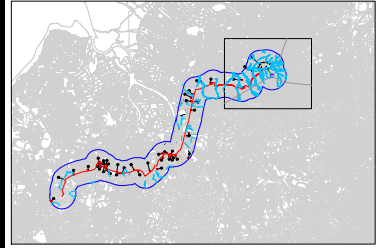
**MAJOR ENVIRONMENTAL SENSITIVE RECEIVERS**





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- LEGEND 圖例:**
- PROPOSED WATER MAINS  
擬建食水幹管
  - EXISTING RAW WATER TUNNEL  
現有原水隧道
  - 500M STUDY AREA  
500M 研究範圍
  - PROPOSED EXTENSION WORKS  
BOUNDARY 擬擴建工程邊界
  - PROPOSED RAW WATER MAINS  
(UNDERNEATH THE EXISTING  
ACCESS TUNNEL)  
擬建原水幹管 (在現有通路隧道下)
  - PROPOSED TUNNEL (FOR  
ACCESS AND RAW WATER MAINS)  
擬建隧道 (用於通路和原水幹管)
  - PROPOSED RAW WATER TUNNELS  
擬建原水隧道
  - WATER BODIES 水體
  - COUNTRY PARK 郊野公園
  - CONSERVATION AREA 自然保育區
  - AIR AND NOISE SENSITIVE RECEIVERS  
空氣及噪音敏感受體
  - ①A VILLAGE HOUSE AT NGAU TAM MEI  
牛潭尾的鄉村房屋
  - ①B AUDEN GREEN MUSHROOM FARM  
澳登磨菇農場
  - ② VILLAGE HOUSE AT NGAU TAM MEI  
牛潭尾的鄉村房屋



Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial		CHW	BH	SZ	BH
Date	02/19	02/19	02/19	02/19	02/19

Approved

Agreement No. CE 40/2018 (WS)

Contract Title  
NGAU TAM MEI WATER TREATMENT WORKS EXTENSION – FEASIBILITY STUDY

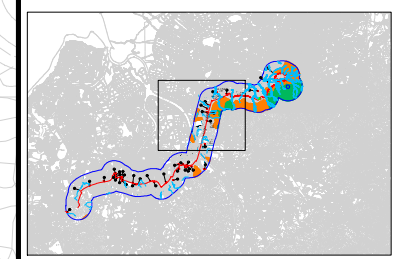
Drawing Title  
ENVIRONMENTAL SENSITIVE RECEIVERS (NGAU TAM MEI WATER TREATMENT WORKS, NGAU TAM MEI FRESH WATER TREATMENT WORKS, NGAU TAM MEI FRESH WATER PRIMARY SERVICE RESERVOIR EXTENSION AND MAINS)  
周圍環境的敏感受體 (牛潭尾濾水廠, 牛潭尾食水主配水庫擴建及水道)

Drawing No.	Revision
401044/BV/PP/ANNEX 3 – 1 附件 3-1	–

Scale A1 1 : 5000  
A3 1 : 10000



- LEGEND圖例:**
- PROPOSED WATER MAINS  
擬建食水幹管
  - 500M STUDY AREA  
500M 研究範圍
  - WATER BODIES 水體
  - COUNTRY PARK 郊野公園
  - CONSERVATION AREA 自然保育區
  - AIR AND NOISE SENSITIVE RECEIVERS  
空氣及噪音敏感受體
- ③ SAN WAI TSUEN 新圍村
  - ④ WAH ON VILLA 華安苑
  - ⑤ MERRY GARDEN 悅富豪苑
  - ⑥ POK WAI 壙圍
  - ⑦ ELITE GARDEN 雅麗花園
  - ⑧ PAK WAI PUBLIC SCHOOL 壙圍公立學校
  - ⑨ MO FAN HEUNG 模範鄉
  - ⑩ PARK YOHO (TOWER 1A) 峻巒 (1A座)



Revision	Date	Description	Initial
	Designed	Checked	Drawn
Initial	CHW	BH	SZ
Date	02/19	02/19	02/19

Approved

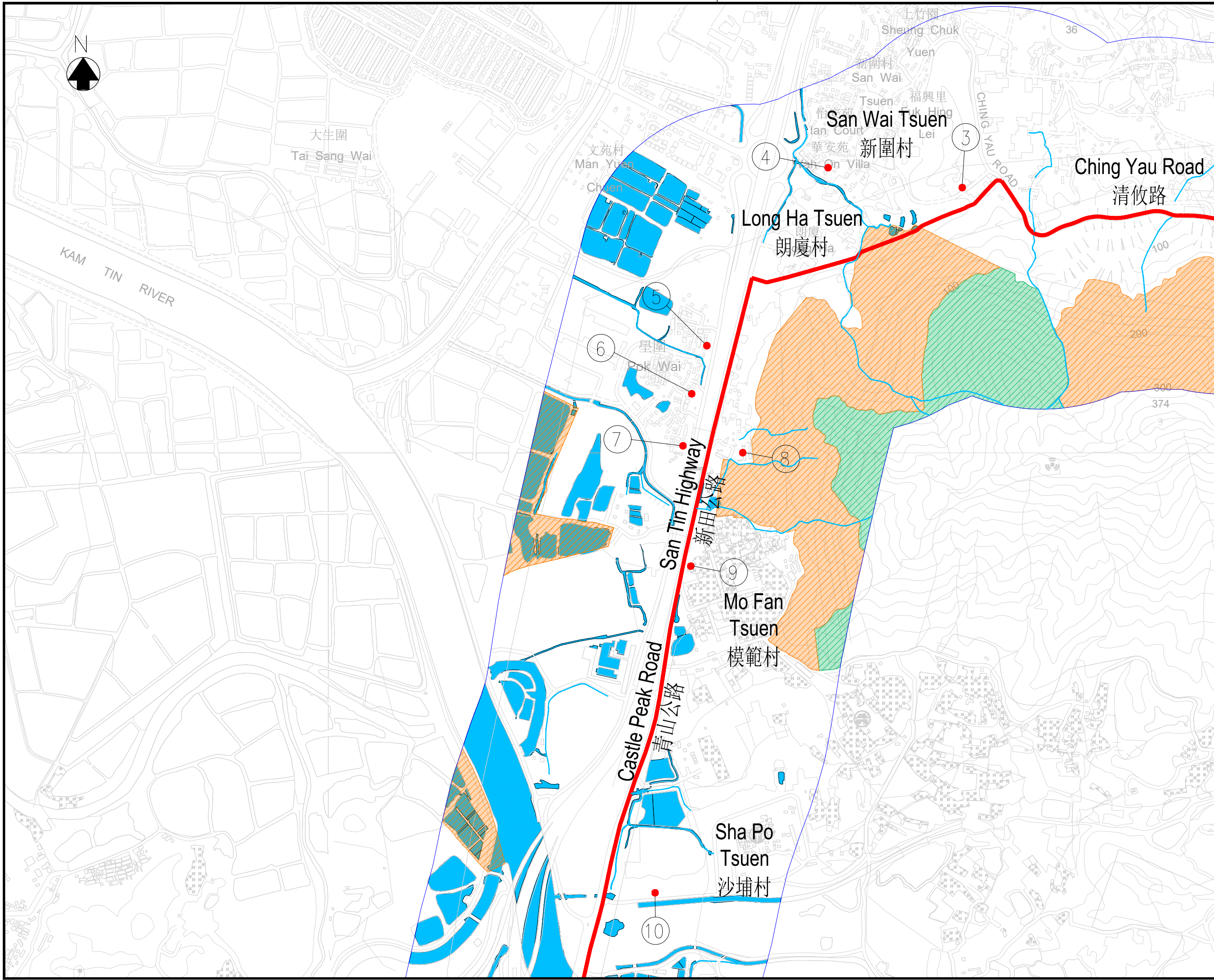
Agreement No. CE 40/2018 (WS)

Contract Title  
NGAU TAM MEI WATER TREATMENT WORKS EXTENSION – FEASIBILITY STUDY

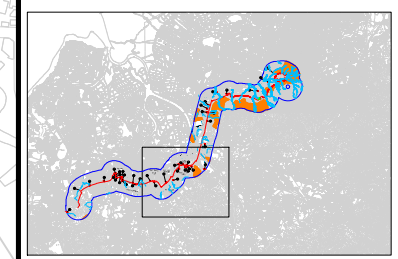
Drawing Title  
ENVIRONMENTAL SENSITIVE RECEIVERS (WATER MAINS)  
周圍環境的敏感受體 (水道)

Drawing No. 401044/BV/PP/ANNEX 3 – 2  
附件 3 – 2

Scale A1 1 : 5000  
A3 1 : 10000



- LEGEND 圖例:**
- PROPOSED WATER MAINS  
擬建食水幹管
  - 500M STUDY AREA  
500M 研究範圍
  - WATER BODIES 水體
  - CONSERVATION AREA  
保育區
  - AIR AND NOISE SENSITIVE RECEIVERS  
空氣及噪音敏感受體
- 11 HA KO PO TSUEN 下高埔村
  - 12 AU TAU YOUTH CENTRE  
香港戒毒會凹頭青少年中心
  - 13 TWGHS C Y MA MEMORIAL COLLEGE  
東華三院馮玉紀念中學
  - 14 THE CHURCH OF JESUS CHRIST OF  
LATTER-DAY SAINTS 耶穌基督後期聖徒教會
  - 15 HARMONIC VILLA (BLOCK A) 麗豪軒(A座)
  - 16 MING SUM HOME FOR THE AGED  
明志護老院
  - 17 TUNG SHING LEI 東成里
  - 18 POK OI HOSPITAL 博愛醫院
  - 19 YEUNG UK TSUEN 楊屋村
  - 20 CHUK SAN TSUEN 竹新村
  - 21 SHEUNG YAU TIN TSUEN 上牧田村
  - 22 THE REACH (TOWER 2) 尚悅 (2座)
  - 23 TAI KEI LENG 大旗嶺



Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial	CHW	BH	SZ	BH	
Date	02/19	02/19	02/19	02/19	

Approved

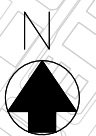
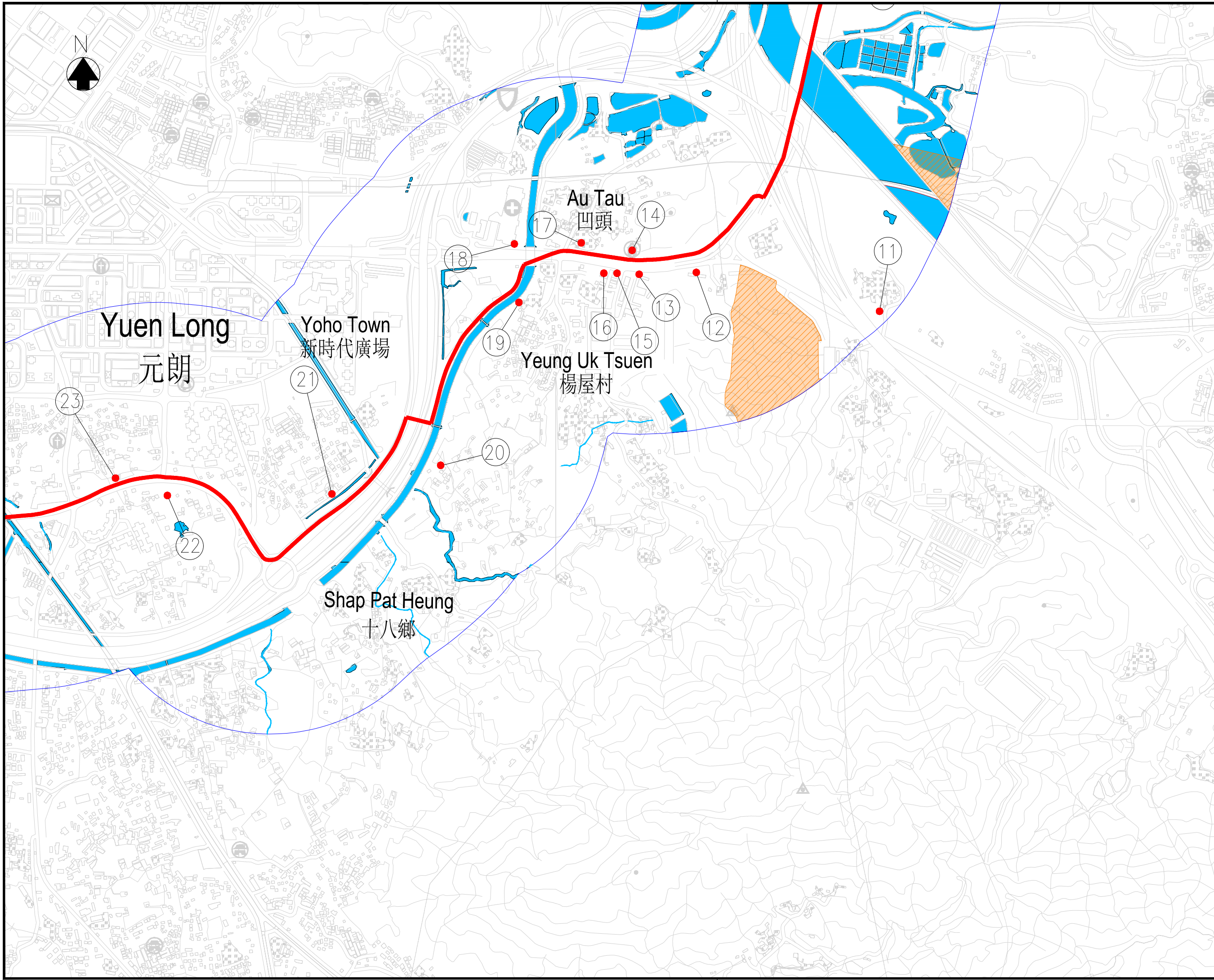
Agreement No.  
CE 40/2018 (WS)

Contract Title  
NGAU TAM MEI WATER TREATMENT  
WORKS EXTENSION – FEASIBILITY STUDY

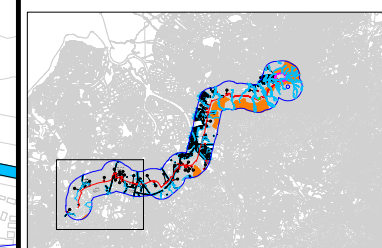
Drawing Title  
ENVIRONMENTAL SENSITIVE RECEIVERS  
(WATER MAINS)  
周圍環境的敏感受體  
(水道)

Drawing No. 401044/BV/PP/ANNEX 3 – 3 附件 3 – 3	Revision –
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Scale  
A1 1 : 5000  
A3 1 : 10000



- LEGEND圖例:**
- PROPOSED WATER MAINS  
擬建食水幹管
  - 500M STUDY AREA  
500M 研究範圍
  - WATER BODIES 水體
  - CONSERVATION AREA 自然保育區
  - AIR AND NOISE SENSITIVE RECEIVERS  
空氣及噪音敏感受體
  - 24 MA TIN POK 馬田壘
  - LA GROVE (BLOCK 1) 原築(1座)
  - 25 LUNG TIN TSUEN 龍田村
  - 26 SOUTH YUEN LONG GOVERNMENT  
PRIMARY SCHOOL 南元朗官立小學
  - 27 EMERALD GREEN (BLOCK 1)  
翡翠峰(1座)
  - 28 GREENERY PLACE 翠韻華庭
  - 29 VILLA ART DECO 藝典居
  - 30 PARKSIDE VILLA (BLOCK 6)  
柏麗豪園(6座)
  - 31 YUEN LONG PUBLIC SECONDARY  
SCHOOL 元朗公立中學
  - 32 PO LEUNG KUK LAW'S FOUNDATION  
SCHOOL 保良局羅氏信託學校
  - 33 SCENIC GARDENS (BLOCK 1)  
御景園(1座)
  - 34 PARK ROYALE (TOWER 1)  
御豪山莊(1座)
  - 35 JASPER COURT (BLOCK 10)  
瑋珊園(10座)
  - 36 FUI SHA WAI 灰沙圍
  - 37 TAI TAO TSUEN 大道村
  - 38 YING YIN CATHOLIC KINDERGARTEN  
天主教英賢幼稚園



Revision	Date	Description	Initial	
Initial	CHW	BH	SZ	BH
Date	02/19	02/19	02/19	02/19

Approved

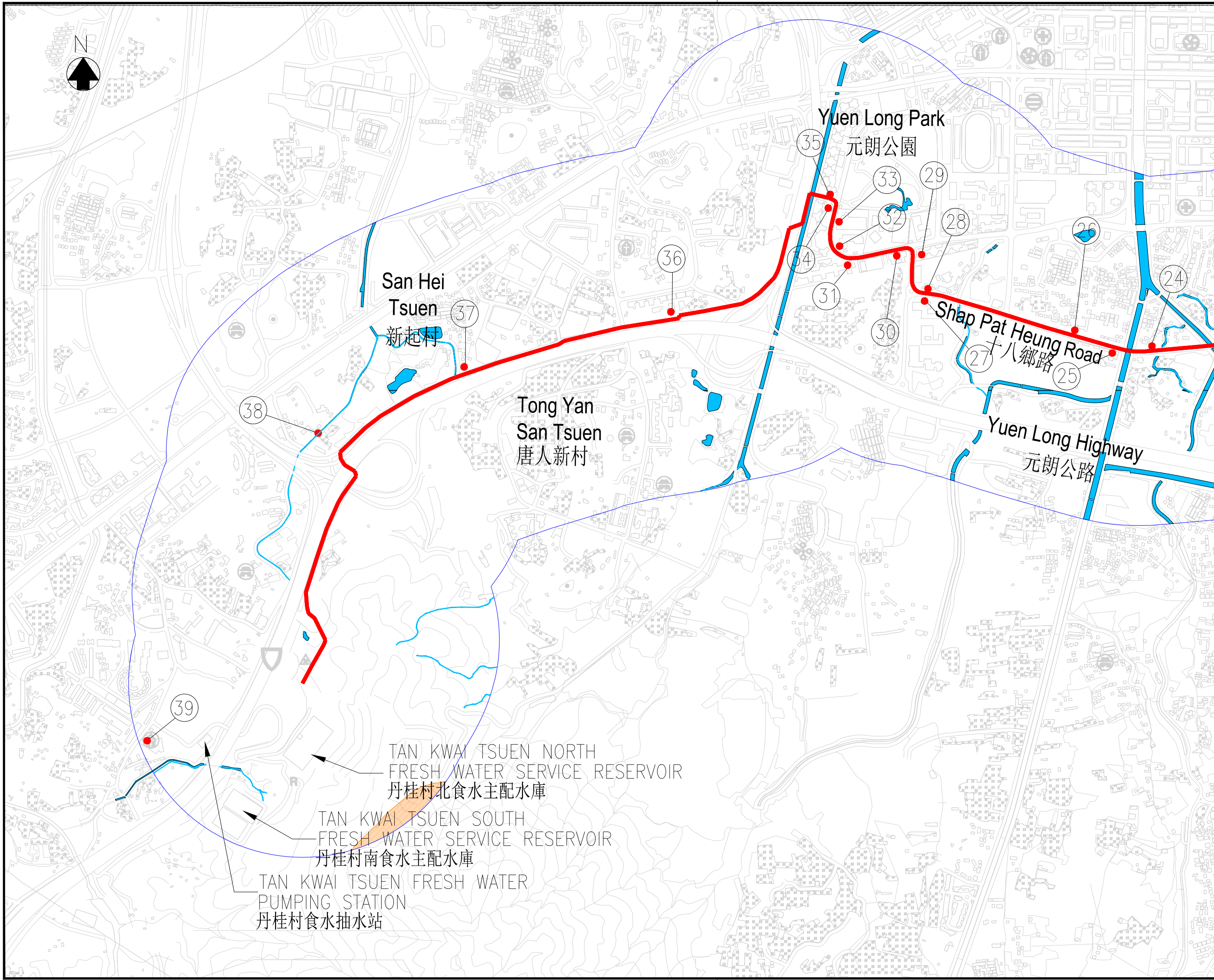
Agreement No. CE 40/2018 (WS)

Contract Title  
NGAU TAM MEI WATER TREATMENT WORKS EXTENSION – FEASIBILITY STUDY

Drawing Title  
ENVIRONMENTAL SENSITIVE RECEIVERS (WATER MAINS)  
周圍環境的敏感受體 (水道)

Drawing No. 401044/BV/PP/ANNEX 3 - 4 附件 3 - 4	Revision -
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Scale A1 1 : 50000  
A3 1 : 100000



TAN KWAI TSUEN NORTH FRESH WATER SERVICE RESERVOIR  
丹桂村北食水主配水庫

TAN KWAI TSUEN SOUTH FRESH WATER SERVICE RESERVOIR  
丹桂村南食水主配水庫

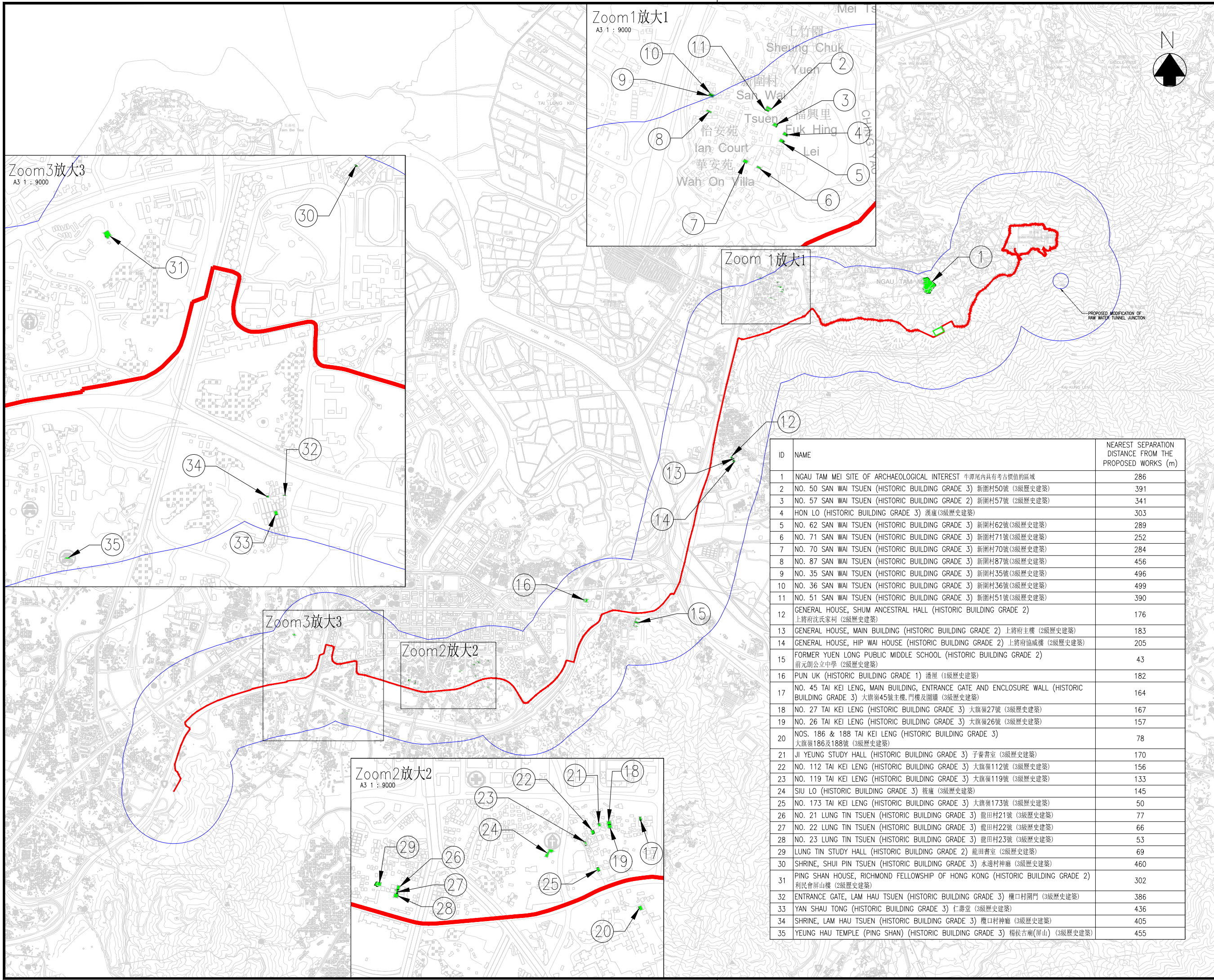
TAN KWAI TSUEN FRESH WATER PUMPING STATION  
丹桂村食水抽水站



**ANNEX 4**  
**CULTURAL HERITAGE RESOURCES**



- LEGEND圖例:**
- PROPOSED WATER MAINS  
擬建食水幹管
  - 500M STUDY AREA  
500M 研究範圍
  - CULTURAL HERITAGE RESOURCES  
文化遺產資源



ID	NAME	NEAREST SEPARATION DISTANCE FROM THE PROPOSED WORKS (m)
1	NGAU TAM MEI SITE OF ARCHAEOLOGICAL INTEREST 牛潭尾內具有考古價值的區域	286
2	NO. 50 SAN WAI TSUEN (HISTORIC BUILDING GRADE 3) 新圍村50號 (3級歷史建築)	391
3	NO. 57 SAN WAI TSUEN (HISTORIC BUILDING GRADE 2) 新圍村57號 (2級歷史建築)	341
4	HON LO (HISTORIC BUILDING GRADE 3) 漢廬 (3級歷史建築)	303
5	NO. 62 SAN WAI TSUEN (HISTORIC BUILDING GRADE 3) 新圍村62號 (3級歷史建築)	289
6	NO. 71 SAN WAI TSUEN (HISTORIC BUILDING GRADE 3) 新圍村71號 (3級歷史建築)	252
7	NO. 70 SAN WAI TSUEN (HISTORIC BUILDING GRADE 3) 新圍村70號 (3級歷史建築)	284
8	NO. 87 SAN WAI TSUEN (HISTORIC BUILDING GRADE 3) 新圍村87號 (3級歷史建築)	456
9	NO. 35 SAN WAI TSUEN (HISTORIC BUILDING GRADE 3) 新圍村35號 (3級歷史建築)	496
10	NO. 36 SAN WAI TSUEN (HISTORIC BUILDING GRADE 3) 新圍村36號 (3級歷史建築)	499
11	NO. 51 SAN WAI TSUEN (HISTORIC BUILDING GRADE 3) 新圍村51號 (3級歷史建築)	390
12	GENERAL HOUSE, SHUM ANCESTRAL HALL (HISTORIC BUILDING GRADE 2) 上將府沈氏家祠 (2級歷史建築)	176
13	GENERAL HOUSE, MAIN BUILDING (HISTORIC BUILDING GRADE 2) 上將府主樓 (2級歷史建築)	183
14	GENERAL HOUSE, HIP WAI HOUSE (HISTORIC BUILDING GRADE 2) 上將府協威樓 (2級歷史建築)	205
15	FORMER YUEN LONG PUBLIC MIDDLE SCHOOL (HISTORIC BUILDING GRADE 2) 前元朗公立中學 (2級歷史建築)	43
16	PUN UK (HISTORIC BUILDING GRADE 1) 潘屋 (1級歷史建築)	182
17	NO. 45 TAI KEI LENG, MAIN BUILDING, ENTRANCE GATE AND ENCLOSURE WALL (HISTORIC BUILDING GRADE 3) 大旗嶺45號主樓、門樓及圍牆 (3級歷史建築)	164
18	NO. 27 TAI KEI LENG (HISTORIC BUILDING GRADE 3) 大旗嶺27號 (3級歷史建築)	167
19	NO. 26 TAI KEI LENG (HISTORIC BUILDING GRADE 3) 大旗嶺26號 (3級歷史建築)	157
20	NOS. 186 & 188 TAI KEI LENG (HISTORIC BUILDING GRADE 3) 大旗嶺186及188號 (3級歷史建築)	78
21	JI YEUNG STUDY HALL (HISTORIC BUILDING GRADE 3) 子養書室 (3級歷史建築)	170
22	NO. 112 TAI KEI LENG (HISTORIC BUILDING GRADE 3) 大旗嶺112號 (3級歷史建築)	156
23	NO. 119 TAI KEI LENG (HISTORIC BUILDING GRADE 3) 大旗嶺119號 (3級歷史建築)	133
24	SIU LO (HISTORIC BUILDING GRADE 3) 筱廬 (3級歷史建築)	145
25	NO. 173 TAI KEI LENG (HISTORIC BUILDING GRADE 3) 大旗嶺173號 (3級歷史建築)	50
26	NO. 21 LUNG TIN TSUEN (HISTORIC BUILDING GRADE 3) 龍田村21號 (3級歷史建築)	77
27	NO. 22 LUNG TIN TSUEN (HISTORIC BUILDING GRADE 3) 龍田村22號 (3級歷史建築)	66
28	NO. 23 LUNG TIN TSUEN (HISTORIC BUILDING GRADE 3) 龍田村23號 (3級歷史建築)	53
29	LUNG TIN STUDY HALL (HISTORIC BUILDING GRADE 2) 龍田書室 (2級歷史建築)	69
30	SHRINE, SHUI PIN TSUEN (HISTORIC BUILDING GRADE 3) 水邊村神廟 (3級歷史建築)	460
31	PING SHAN HOUSE, RICHMOND FELLOWSHIP OF HONG KONG (HISTORIC BUILDING GRADE 2) 利民會屏山樓 (2級歷史建築)	302
32	ENTRANCE GATE, LAM HAU TSUEN (HISTORIC BUILDING GRADE 3) 樓口村圍門 (3級歷史建築)	386
33	YAN SHAU TONG (HISTORIC BUILDING GRADE 3) 仁壽堂 (3級歷史建築)	436
34	SHRINE, LAM HAU TSUEN (HISTORIC BUILDING GRADE 3) 樓口村神廟 (3級歷史建築)	405
35	YEUNG HAU TEMPLE (PING SHAN) (HISTORIC BUILDING GRADE 3) 楊侯古廟(屏山) (3級歷史建築)	455

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial		CHW	BH	SZ	BH
Date	02/19	02/19	02/19	02/19	02/19

Approved

Agreement No.  
CE 40/2018 (WS)

Contract Title  
NGAU TAM MEI WATER TREATMENT WORKS EXTENSION – FEASIBILITY STUDY

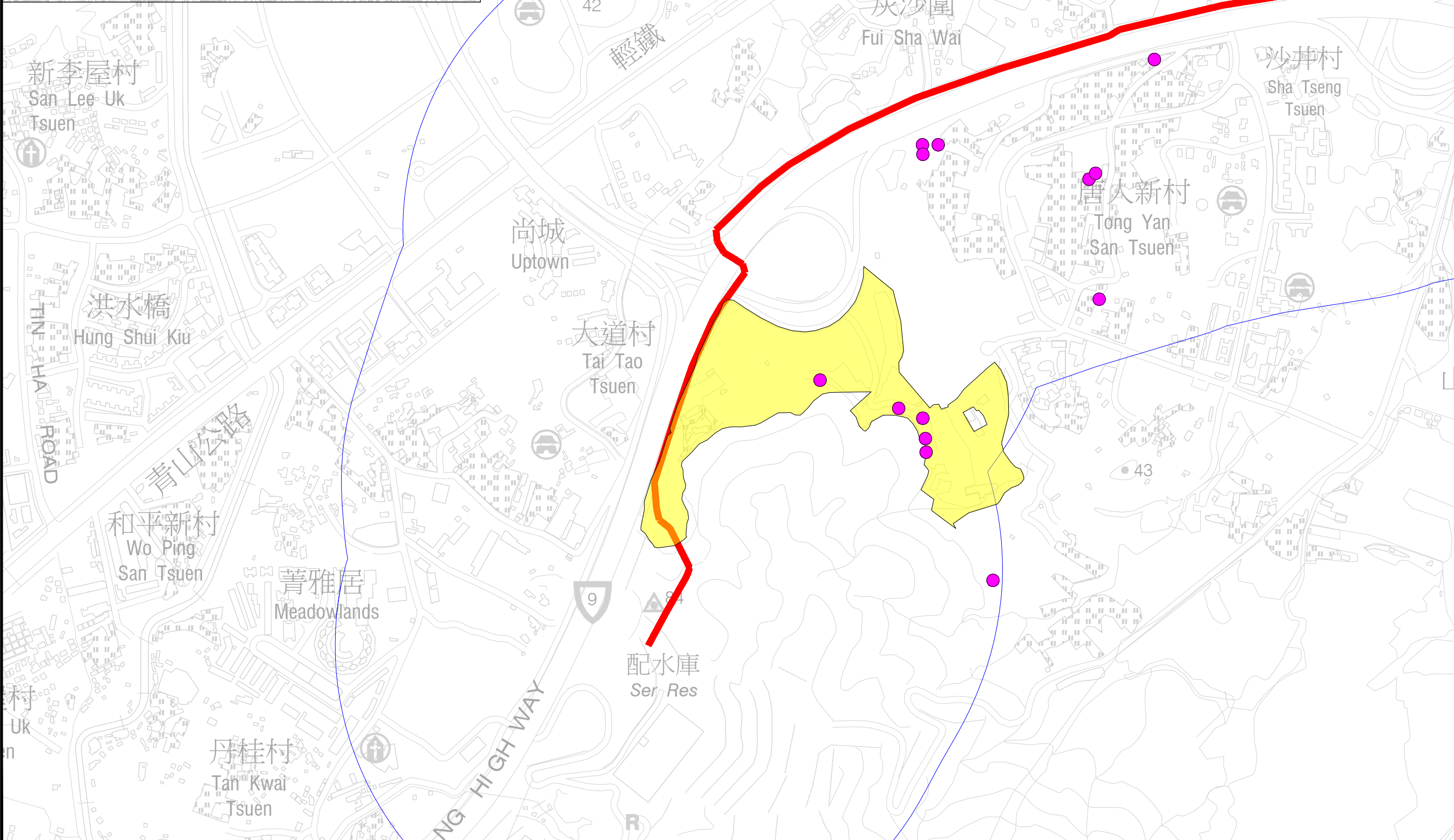
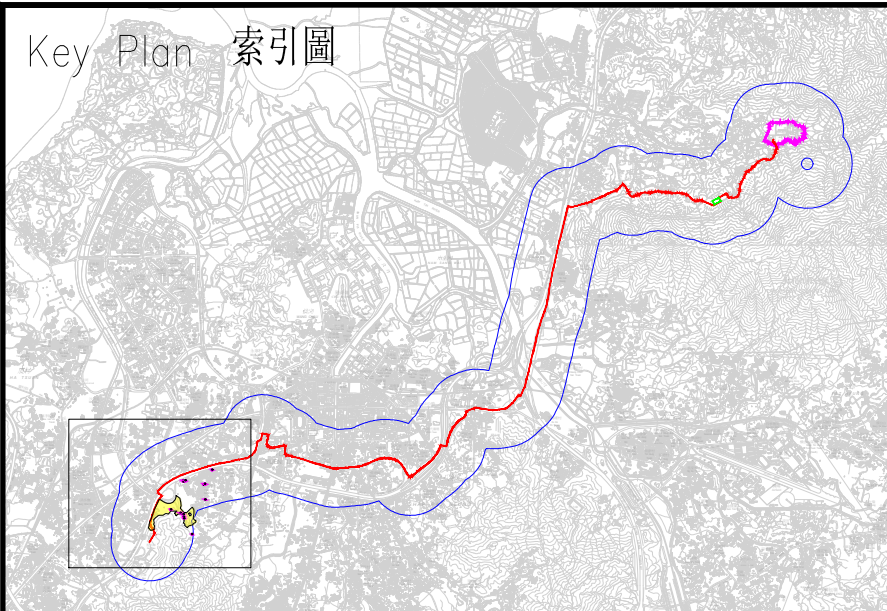
Drawing Title  
CULTURAL HERITAGE RESOURCES (SOURCE : AMO)  
文化遺產資源(資料來源: 古物古蹟辦事處)

Drawing No.	Revision
401044/BV/PP/ANNEX 4 - 1 附件 4 - 1	-

Scale  
A1 1 : 15000  
A3 1 : 30000



Key Plan 索引圖



- © Copyright by Black & Veatch Hong Kong Limited
- LEGEND:**
- PROPOSED WATER MAINS  
擬建食水幹管
  - 500M STUDY AREA  
500M 研究範圍
  - REQUIRED FURTHER ARCHAEOLOGICAL SURVEY  
需要進一步進行考古調查的區域
  - GRAVE  
(NEAREST DISTANCE FROM WORKS : 59m)  
墳墓  
(最近工程的距離: 50米)



Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial	CHW	BH	SZ	BH	
Date	02/19	02/19	02/19	02/19	

Approved

Agreement No. CE 40/2018 (WS)

Contract Title  
NGAU TAM MEI WATER TREATMENT WORKS EXTENSION – FEASIBILITY STUDY

Drawing Title  
CULTURAL HERITAGE (SOURCE : APPROVED EIA AEIAR-215/2017 – HOUSING SITES IN YUEN LONG SOUTH)  
文化遺產資源 (資料來源: AEIAR-215/2017 – 元朗南房屋用地)

Drawing No. 401044/BV/PP/ANNEX 4 – 2 附件 4 – 2	Revision –
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Scale A1 1 : 15000  
A3 1 : 30000

