

Project Profile

for

Provision of Trunk Sewer to 3 Villages:
Ta Tit Yan, Yuen Tun Ha and Lo Lau Uk in Tai Po

January 2018



Drainage Services Department
The Government of the Hong Kong Special Administrative Region

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1. BASIC INFORMATION

1.1 Project Title

The title of this project is “Provision of Trunk Sewer to 3 Villages : Ta Tit Yan, Yuen Tun Ha and Lo Lau Uk in Tai Po” (hereinafter referred to as the “Project”).

1.2 Purpose and Nature of the Project

1.2.1 The purpose of the Project is to extend the existing gravity trunk sewer near San Uk Ka village along Wun Yiu Road to the entrance of the Ta Tit Yan village for further sewer connection of three villages (Ta Tit Yan, Yuen Tun Ha and Lo Lau Uk (non-recognized village)) in Tai Po District.

1.2.2 Although the water quality of Tolo Harbour has improved significantly in the past years, the regional Water Quality Objectives (WQOs) are yet to be achieved totally. Providing further village connections to the regional sewerage are required to minimize water pollution and to assist in reaching the WQOs.

1.2.3 The three villages, one of them is non-recognized, have an estimated combined population of about 1000. The villages are in close proximity to existing sewered areas. The local community expressed strong desire and support for this sewer extension works.

1.3 Name of Project Proponent

Sewerage Projects Division, Drainage Services Department (DSD) of the Government of the Hong Kong Special Administrative Region.

1.4 Location and Scale of Project

1.4.1. The proposed site of the Project is at Wun Yiu Road which is located at the western part of Tai Po District. The Project site is adjacent to and partly within a Water Services Department (WSD)’s Water Gathering Ground (WGG) and its associated catch waters. Majority of the proposed sewer pipes will be laid along the existing carriageway or adjacent footpaths/areas, where available, by traditional open trench or trenchless method. A section of about 350 m long proposed sewer will fall within the Tai Mo Shan Country Park. Four other sections of proposed sewer ranging from approximately 6 to 22 m long will be laid across and above four

watercourses in exposed manner including the Tai Po River (which is an Ecologically Important Stream (EIS)) near Wun Yiu (hereafter referred as “Wun Yiu EIS”).

1.4.2. The proposed works of the project comprise:-

- (i) laying about 1km long, approximate 250mm diameter public trunk sewer from San Uk Ka to Ta Tit Yan (which can be connected to Yuen Tun Ha and Lo Lau Uk);
- (ii) construction of the associated sewer manholes and facilities;
- (iii) installation of one small pre-cast or prefabricated pipe support for supporting the proposed long span sewer pipe crossing the Wun Yiu EIS (i.e.: WSR4); and
- (iv) provision of leakage prevention system for the pipe sections crossing four existing watercourses to avoid potential pollution.

1.4.3. The location and preliminary layout of the Project are shown in **Figure 1**.

1.5 Rationale for Site Selection

The purpose of this proposed sewer is to serve the said three villages, which is currently unsewered, with a view to reduce the pollution loading entering into the WGG or the Tolo Harbour and to improve the environment of the villages. The scope of the proposed sewerage works has also been limited to the laying of the sewer from the nearest public sewerage to the entrance of the Ta Tit Yan Village mostly within the extent of Wun Yiu Road to minimize its potential environmental impacts. The recommended sewerage works are considered necessary and unavoidable for the purpose of improving the regional WQOs.

1.6 Number and Type of Designated Project

This is a Designated Project under Item Q.1, Part 1 of Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499), as part of this Project covering about 350 m long of the sewer is within the Tai Mo Shan Country Park.

1.7 Name and Telephone Number of Contact Person

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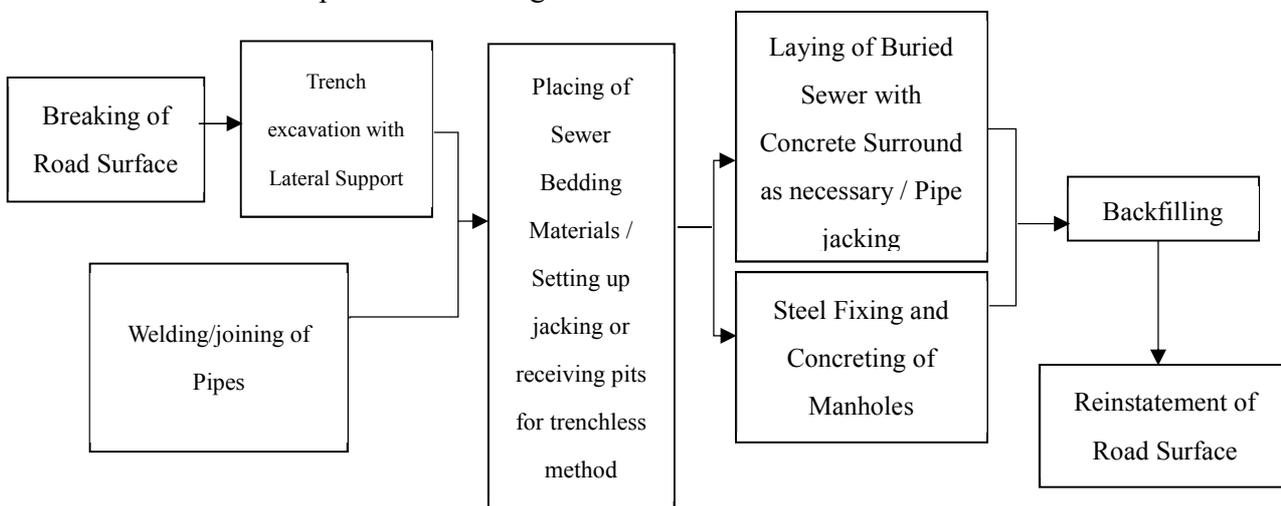
2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

- 2.1 Environmental Protection Department (EPD) is the client department and DSD is the works agent responsible for the planning, design and construction supervision of the Project. The completed works will be handed over to the Mainland North Division of DSD for operation and maintenance.
- 2.2 Planning and design of this Project has been in progress since April 2016. Construction is scheduled to commence in 2019 for completion by 2021.
- 2.3 There is no proposed interface works within or in the vicinity of the Project site boundary.

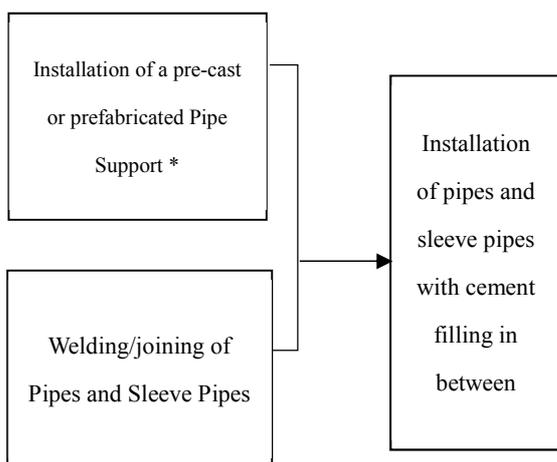
3. POSSIBLE IMPACTS ON THE ENVIRONMENT

3.1 Outline of Processes Involved

The proposed sewer pipe laying will be mainly constructed by traditional open trench or trenchless method as shown in the process flow diagram below:



The proposed sewer pipe crossing the four watercourses will be laid spanning across the individual watercourses. The sewer in question will be installed inside a sleeve steel pipe for support and leaking prevention purpose. The sewer crossing the Wun Yiu EIS will be further supported by a small pre-cast or prefabricated pipe support to be installed at the existing rock surface above water due to the long pipe span about 22m. The process flow diagram is as below:-



Note: * this process is for the exposed sewer pipe crossing the Wun Yiu EIS only

3.2 Possible Environmental Impacts during Construction Stage

3.2.1 Air Quality

Dust will be generated from construction activities such as road breaking, excavation and backfilling.

3.2.2 Noise

Noise will be generated from powered mechanical equipment during construction activities such as road breaking and excavation works. A review of the potential noise impact is shown in **Appendix A**.

3.2.3 Water Quality

Potential impacts will be arisen from surface runoff and erosion of exposed soil and stockpiles during storm events and sewage generated from construction workforce. Muddy water may also be generated from the construction activities such as dust suppression sprays, dewatering during excavation and washing of construction equipment and vehicles.

3.2.4 Land Contamination

The land use of the Project site has been village residential area and agriculture over a number of years according to the historical aerial photos taken in Year 1963, 1973, 1983, 1995, 2001 and 2015 (as attached in **Appendix B**). The past land uses are Green Belt or Country Park according to Statutory Plan by Town Planning Board. Based on historical aerial photos, land use history (i.e. used for village residential area and agriculture) and site inspection, no industrial or commercial operations has been carried out around the site in the past. It is therefore concluded that ground contamination by hazardous substances within the proposed work boundary is highly unlikely.

3.2.5 Waste Management

3.2.5.1 The construction activities to be carried out for the proposed Project will generate a variety of wastes that can be divided into distinct categories based on their composition and ultimate method of disposal. The identified waste types include:

- (i) construction and demolition (C&D) materials (For inert C&D materials, excavated spoil (soil and rock), unusable concrete and grout will be generated. For non-inert C&D materials, timber, metal scraps, vegetation and packaging waste will be generated);

- (ii) chemical wastes generated by general site practices (e.g.: vehicle and plant maintenance/servicing); and
- (iii) general refuse from workers.

3.2.5.2 Based on historical aerial photos, land use history (i.e. used for village residential area and agriculture) and site inspection, it is concluded that excavated sediment within work boundary is highly unlikely.

3.2.6 Ecology

3.2.6.1 No direct impact on ecology is expected during construction stage as the proposed sewer alignment is mostly along existing Wun Yiu Road where the area has already been disturbed. Potential indirect impacts such as disturbance to nearby habitats and wildlife utilizing these habitats will be caused by increased human activities/ disturbance during construction stage. Despite the fact that approximately 350m of the Wun Yiu Road runs through Tai Mo Shan Country Park and hence part of the sewer will be located within the Country Park area, the existing condition of the surrounding environment is already disturbed by traffic and human activities. Moreover, the proposed sewer pipes will be laid within the existing carriageway or adjacent footpaths/areas and no haul road will be constructed, thus the potential indirect impacts on ecology is considered minimal with the implementation of good site practice and standard measures to minimize surface runoff.

3.2.6.2 The sewer alignment will cross above four watercourses (Water Sensitive Receivers (WSRs) as shown in **Figure 1**) including Wun Yiu EIS. Wun Yiu EIS is listed as EIS by Agriculture, Fisheries and Conservation Department (AFCD). The ecological importance of the Wun Yiu EIS lies in the presence of a rare freshwater fish, *Pseudobagrus trilineatus* (as shown in below **Photo 3.1**), which is a nocturnal species recorded in Hong Kong besides Sai Kung. *Pseudobagrus trilineatus* is one of the Bagridae in Hong Kong. It was firstly recorded at a marsh in Sai Kung in 1997. Regional distribution is restricted to tributaries of Dongjiang in Guangdong Province. It has been identified as the key species of conservation concern by AFCD and listed as “Near Threatened” by the Red List of China’s Vertebrates (2016). *Pseudobagrus trilineatus*, which has been regularly sighted along the Wun Yiu EIS and the nearby streams, inhabits muddy bottoms of streams and ponds. It feeds on small fish, worms, crustaceans and aquatic insects.



Photo 3.1 *Pseudobagrus trilineatus*

(Reference: Lee, V. L. F., Lam, S. K. S., Ng, F. K. Y., Chan, T. K. T. and Young, M. L. C. (2004). *Field Guide to the Freshwater Fish of Hong Kong*. Agriculture, Fisheries and Conservation Department, Friends of the Country Parks and Cosmos Books Ltd., Hong Kong)

3.2.6.3 The proposed sewer pipes crossing the watercourses will be laid in an exposed manner and well above the water surface which are at levels similar to the bridge deck levels with leakage prevention measures which is pipe-in-pipe installation with filling of cement grout in between. Thus, it will not cause disruption to the water movement in these watercourses as the proposed works will not involve any dredging operation, river training and diversion.

3.2.6.4 However, the proposed sewer pipe across the Wun Yiu EIS and connecting manholes MH2 and MH3 cannot be stood by itself due to the long pipe span (i.e.: approximate 22m). In order to overcome the long span issue with minimal impact to the ecology, three construction methods without touching the water body, as shown in below **Table 3.1**, are considered. To avoid substantial foundation supports at both sides of the stream bank posing more environmental risk due to the increased scale of construction works and considering the safety of the existing vehicle bridge, Option 2 proposing one small scale pre-cast or prefabricated pipe support on exposed dry rock surface (see **Figure 5** and **Figure 6**) is preferable.

3.2.6.5 In Option 2, both the size of the proposed pipe support and the scale of the construction works involved will be rather small. Moreover, the existing condition of the surrounding environment is already disturbed by traffic and human activities. The water body will be totally untouched during the construction stage, therefore with appropriate control measures imposed, there will unlikely be significant adverse impact to the aquatic ecosystem induced by the proposed construction works. Apart from the above, special requirement restricting the future contractor to ensure not disturbing the stream course water body during the future works will be imposed.

Table 3.1 Option Evaluation for the Proposed Sewer Pipe across the Wun Yiu EIS

	Option 1	Option 2	Option 3
Description	Pipe span over the Wun Yiu EIS without any supports	Pipe span over the Wun Yiu EIS with one pre-cast support installed on the exposed dry rock surface	Pipe to be fixed to the existing vehicle bridge
Advantages	Not touching the water body	Not touching the water body	Not touching the water body
Disadvantages	<p>(i) Unknown structural strength of the existing vehicle bridge According to site inspection, it was observed that the vehicle bridge is supported by 4 original concrete columns unilaterally and 1 steel I beam support seems being added at later stage as reinforcement. It is not a good choice to add new loading to it considering the uncertain structural stability of the bridge.</p> <p>(ii) Unknown management and maintenance parties after consulting Tai Po District Office and Highways Department</p> <p>(iii) Substantial foundation supports at both sides of the stream bank posing more environmental risk due to the increased scale of construction works</p> <p>(iv) Visual impact due to the massive exposed</p>	There will be small scale construction works within the Wun Yiu EIS.	<p>(i) Unknown structural strength of the existing vehicle bridge According to site inspection, it was observed that the vehicle bridge is supported by 4 original concrete columns unilaterally and 1 steel I beam support seems being added at later stage as reinforcement. It is not a good choice to add new loading to it considering the uncertain structural stability of the bridge.</p> <p>(ii) Unknown management and maintenance parties after consulting Tai Po District Office and Highways Department</p>

	structure		
Mitigation Measures	<ul style="list-style-type: none"> (i) Implementation of good site practice and standard measures to minimize surface runoff (ii) Imposing special requirement restricting the future contractor to ensure not disturbing the stream course water body during the future works (iii) Extra mitigation measures required for constructing the massive pipe supporting structures at the two river edges 	<ul style="list-style-type: none"> (i) Implementation of good site practice and standard measures to minimize surface runoff (ii) Imposing special requirement restricting the future contractor to ensure not disturbing the stream course water body during the future works 	<ul style="list-style-type: none"> (i) Implementation of good site practice and standard measures to minimize surface runoff (ii) Imposing special requirement restricting the future contractor to ensure not disturbing the stream course water body during the future works
Conclusion	Not Preferable	<u>Preferable</u>	Not Preferable

3.2.7 Landscape and Visual

Majority of the works will be constructed within the existing carriageway or adjacent footpaths/areas. According to the site visits conducted, no trees will be affected. The proposed small size sewer pipes crossing the watercourses will be laid in an exposed manner, placed adjacent and along the edge of the vehicles bridges which are at levels similar to the bridge deck levels. Thus, the visual impact caused should be minimal. In addition, potential visual impact during construction may arise from the construction plant, materials and site traffic; however, the impact is only temporary.

3.2.8 Cultural Heritage

There is no heritage site partly or wholly within the project site boundary (inclusive of works area). There is also no heritage site within 50m of the project site boundary (inclusive of works area). Thus, Antiquities and Monuments Office confirmed that an Heritage Impact Assessment is not required. Two identified declared monuments, namely Pottery Kilns at Wun Yiu Village and Fan Sin Temple, are located approximately 850m and 800m from the Project site. Owing to large separation distance and majority of the works will be constructed within the existing carriageway or adjacent footpaths/areas, no impacts on monuments or historic buildings are expected during the construction stage.

3.2.9 Disruption of Water Movement

3.2.9.1 The proposed sewer pipes crossing the watercourses will be laid in an exposed manner and well above the water surface which are at levels similar to the bridge deck levels. Thus, it will not cause disruption to the water movement in these watercourses as the proposed works will not involve any dredging operation, river training and diversion.

3.2.9.2 However, the proposed sewer pipe across the Wun Yiu EIS and connecting manholes MH2 and MH3 cannot be stood by itself due to the long pipe span (i.e.: approximate 22m). In order to overcome the long span issue with minimal impact to the ecology, three construction methods without touching the water body, as shown in below **Table 3.1**, are proposed. To avoid substantial foundation supports at both sides of the stream bank posing more environmental risk due to the increased scale of construction works and considering the safety of the existing vehicle bridge, Option 2 proposing one small scale pre-cast or prefabricated pipe support on exposed dry rock surface (see **Figure 5** and **Figure 6**) is preferable. In Option 2, both the size of the proposed pipe support and the scale of the construction works involved will be rather small. Moreover, the existing condition of the surrounding environment is already disturbed by traffic and human activities. The water body will be totally untouched during the construction stage, therefore with appropriate control measures imposed, there will unlikely be any disturbance to the water movement. Apart from the above, special requirement restricting the future contractor to ensure not disturbing the stream course water body during the future works will be imposed.

3.2.10 Traffic Generation

Additional traffic flow will be generated due to the construction activities; however, it will be minor and transient.

3.3 Possible Environmental Impacts during Operation Stage

Adverse environmental impacts are not anticipated during operation stage. As the Project will reduce the pollution loading entering into Tolo Harbour and enhance the water quality of Tolo Harbour, there will be positive environmental effects after operation of the system. In addition, with the provision of appropriate leakage prevention system, water pollution to the nearby catch waters, WGG, watercourses and the Country Park is not anticipated due to the operation of the sewer system.

4 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

- 4.1 The proposed site is located at Wun Yiu Road, Tai Po. It is an existing carriageway leading to Ta Tit Yan, Yuen Tun Ha and Lo Lau Uk villages, and part of this carriageway falls within the Tai Mo Shan Country Park boundary. Photos showing the existing site condition are shown in **Figure 2**, **Figure 3** and **Figure 4**.
- 4.2 There are man-made slopes located along the eastern and western boundaries of this carriageway. Bush and grass are scattered on these slopes. The Project site is also adjacent to and partly within a WSD's WGG and the proposed sewer pipes will cross four watercourses including Wun Yiu EIS as shown in **Figure 1**. The ecological importance of the Wun Yiu EIS lies in the presence of a rare freshwater fish, *Pseudobagrus trilineatus* (as shown in **Photo 3.1**), which is a nocturnal species recorded in Hong Kong other than Sai Kung.
- 4.3 The nearest identified noise and air sensitive receivers are Tai Mo Shan Country Park and village type residential premises at Ta Tit Yan Village located 27 m to the proposed sewer, some temporary structures located 30 m and 50 m to the proposed sewer. There is no other planned noise and air sensitive receiver in the vicinity of the Project. The Tai Mo Shan Country Park is also an ecological sensitive receiver. See **Figure 1**.
- 4.4 Majority of the works will be constructed within the existing carriageway or adjacent footpaths/areas which is a disturbed ground, and there are traffic flows at this road to the above said villages. No haul road will be constructed. Tree felling is not anticipated for implementing the proposed project works, and there is no heritage sensitive receiver identified in the surrounding environment within 50m distance. Therefore, landscape and cultural heritage impacts are not anticipated.
- 4.5 Owing to the small scale of works, which requires only a few items of small to medium size of power mechanical equipment, and limit numbers of construction vehicles, the air and noise impacts, and the human disturbance during construction stage will be minimal. The existing condition of the surrounding environment is already disturbed by traffic and human activities and majority of the works will be constructed within the existing carriageway or adjacent footpaths/areas. Thus, the Project will not affect the present setting of the Country Park. Prior consent from the Country & Marine Parks Authority (CMPA) will be sought before the commencement of the proposed works within Tai Mo Shan Country Park.

5 ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS

5.1 Construction Stage

5.1.1 Air Quality

No adverse impact on air quality is expected during construction stage considering the small scale of works involved. The extent of dust generation from the construction works is expected to be minor and no adverse impact induced with the implementation of standard dust suppression measures as stipulated in the Air Pollution Control (Construction Dust) Regulation (Cap. 311R) of Air Pollution Control Ordinance (APCO) (Cap. 311). These measures will be incorporated into the specifications for the works contract including, but not limited to: -

- (i) wet by water spraying on any dusty materials before loading and unloading, stockpile of dusty materials, area where demolition work is carried out and area where excavation or earth moving activities are carried out;
- (ii) cover or shelter any stockpile of dusty materials;
- (iii) properly treat any exposed earth such as by compacting or hydro seeding; and
- (iv) cover any dusty load on vehicles before they leave the site.

5.1.2 Noise

A review of the potential noise impact is shown in **Appendix A**. Standard mitigation measures including adopting temporary movable noise barrier, quiet mechanical equipment, good scheduling of works and site practices will be recommended as appropriate to minimize construction noise impact and thus the predicted noise level will comply with the daytime noise criterion of 75dB(A) for domestic premises.

5.1.3 Water Quality

5.1.3.1 The construction activities in the Project include road breaking, excavation and backfilling. Protection of natural watercourses will be in compliance with Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TC(W)) No. 5/2005 《Protection of natural streams/rivers from adverse impacts arising from construction works》. Necessary silt removal facilities will be provided during construction stage so as to remove any silt before discharge of site runoff into nearby stormwater drains. Standard mitigation measures will be provided prior to the commencement of excavation. The design of temporary on-site

drainage and silt removal facilities will comply with the guidelines stipulated in EPD's Practice Note for Professional Persons, Construction Site Drainage (ProPECC PN 1/94). Good site practices following the guidelines laid down by WSD on working near/within WGG, attached in **Appendix C**, will also be adopted to protect the WGG from water pollution.

5.1.3.2 The above mitigation measures will be incorporated into the specifications of the works contract as appropriate. With the adoption of such mitigation measures, no adverse impact on water quality in the catch waters, WGG and the four watercourses including the Wun Yiu EIS (as shown in **Figure 1** and **Figure 3**) is expected during construction stage. The below good site practices, including but not limited to, are recommended during the construction stage of the Project.

- (i) water quality monitoring of the Wun Yiu EIS should be carried out before, during and after the construction of the proposed pipe support and any other construction works adjacent to the Wun Yiu EIS. An event and action plan should be provided for relevant parties to take immediate action in case any deterioration in water quality is observed in the monitoring events;
- (ii) the proposed works site inside or in the proximity of natural rivers and streams should be temporarily isolated, such as placing of sandbags or silt curtains with lead edge at bottom and properly supported props, to prevent adverse impacts on the stream water qualities;
- (iii) the natural bottom and existing flow in the river should be preserved to avoid disturbance to the river habitats. No access track on riverbed should be allowed;
- (iv) stockpiling of construction materials including cement, if necessary, should be properly covered and located away from any natural stream/river;
- (v) construction debris and spoil should be covered up and/or properly disposed of as soon as possible to avoid being washed into nearby rivers/streams by rain;
- (vi) construction effluent including those from cement grouting, site run-off and sewage should be properly collected and/or treated. Wastewater from a construction site should be managed with the following approach in descending order: (1) minimisation of wastewater generation; (2) reuse and recycle; (3) treatment. Proper locations for discharge outlets of wastewater treatment facilities well away from the natural streams/rivers should be identified;
- (vii) adequate lateral support may need to be erected in order to prevent soil/mud from slipping into the stream/river, but without unduly impeding the flow during heavy rain;
- (viii) supervisory staff should be assigned to station on site to closely supervise and monitor the works;
- (ix) temporary drains with silt traps shall be constructed at the boundary of the site prior to

- the commencement of any earthworks and maintained regularly;
- (x) regular cleaning of the silt traps shall be carried out to ensure that they function properly at all time;
 - (xi) all excavated or filled surfaces which have the risk of erosion shall be protected from erosion at all time;
 - (xii) any construction plant which causes pollution due to leakage of oil or fuel shall be removed off site immediately;

5.1.4 Land Contamination

The Project site is expected to be uncontaminated in consideration of current and historical land use. Thus, no decontamination work is required for the Project site. In addition, to avoid land contamination during the construction stage, proper waste management will be implemented as stipulated in the following section.

5.1.5 Waste Management

5.1.5.1 C&D materials will be generated from excavation works for pipe laying. As the sewer will be laid in shallow depth below ground surface, the quantities of C&D materials are expected to be minimal (i.e. around 1,480m³ by estimation according to the preliminary design) and most of them are inert (approximately 90% of the total quantity). Consideration will be taken during design stage to minimize the generation of inert C&D materials by maximizing its re-use as backfill materials on site. The Contractor will be required to sort all C&D materials into inert and non-inert categories. The inert C&D materials will be reused on site as far as practicable or disposed at public fill reception facilities (PFRF). The non-inert C&D materials will be transferred to recycling facilities or landfills as the last resort. The transfer of C&D materials will be subject to trip ticket system as stipulated in Development Bureau Technical Circular (Works) (DEVB TC(W)) No. 6/2010 《Trip Ticket System for Disposal of Construction & Demolition Materials》 to prevent unauthorized disposal.

5.1.5.2 Plant and vehicle maintenance will likely be the primary source of chemical wastes during the construction period. The majority of chemical waste produced is therefore expected to consist of waste oils and solvents. The volume of chemical waste will depend upon the total number of plant / vehicles and how much maintenance is actually carried out on site. However, it is unlikely that volumes of chemical wastes will exceed 450 litres / month considering the small scale of proposed works. Chemical waste will be disposed of via a licensed waste collector and to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and

can supply the necessary storage container. Typical wastes may include the following: -

- (i) solid wastes (empty fuel/lubricant drums, used oil/air filters, scarp batteries, vehicle parts); and
- (ii) liquid wastes (waste oils/grease, spent solvents/detergents and possibly spent acid/alkali from batteries maintenance).

5.1.5.3 The construction workforce will generate general refuse such as food scraps, waste paper, and empty containers. The work sites may also attract pests and vermin, in addition to creating odour nuisance. Rapid and effective collection of site wastes will be required to prevent waste materials being blown around by wind or flushed into the watercourses. The waste storage area should be well maintained and cleaned regularly so as to prevent attracting pests and vermin and creating any odour nuisance to the work sites. Disposal of refuse at sites other than approved waste transfer or disposal facilities shall be prohibited. The maximum number of construction worker to be employed and worked concurrently is estimated to be approximately 20 workers. Based on a general rate of 0.65kg per worker per day (referenced from the IWMF EIA report EIA-201/2011), the maximum daily arising of general refuse during the construction period will be approximately 13kg.

5.1.5.4 The following legislation related to the handling, treatment and disposal of wastes in the Hong Kong and has been used in reviewing potential impacts: -

- (i) Waste Disposal Ordinance (Cap. 354);
- (ii) Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C);
- (iii) Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N);
- (iv) Public Health and Municipal Services Ordinance (Cap. 132) – Public Cleansing and Prevention of Nuisances Regulation (Cap. 132BK);
- (v) Land (Miscellaneous Provisions) Ordinance (Cap. 28);
- (vi) Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes;
- (vii) ETWB TC(W) No. 19/2005 Environmental Management on Construction Sites; and
- (viii) DEVB TC(W) No. 6/2010 Trip Ticket System for Disposal of Construction & Demolition Materials etc.

5.1.5.5 The generation of wastes is considered to be small and is not envisaged to have any adverse impact on the capacity of landfills and public fill reception facilities (refer to **Table 5.1** for the estimated quantities). Thus, adverse environmental impacts are not expected.

Table 5.1 Summary of the Estimated Quantities of Waste during Construction Stage

Types of waste	Estimated Quantities to be		
	Generated	Reused	Disposed
Inert C&D materials	1,332m ³	1,332m ³	0
Non-inert C&D materials	148m ³	0	148m ³
Chemical waste	Less than 450 litres / month	0	Less than 450 litres / month
General refuse	13kg/d	0	13kg/d

Note: total amounts of waste will be determined by the contractor's working practices / site procedures.

5.1.5.6 Although the amount of construction wastes generated is expected to be small, the following site practices will be implemented and incorporated into the contract specification in order to minimize the potential impacts caused by handling of wastes: -

- (i) remove the surplus materials off site as soon as practicable to minimize temporary stockpiling on the site;
- (ii) stockpiled materials should be properly covered and stored within the paved area of Wun Yiu Road;
- (iii) reusable materials should be properly stockpiled in dry and covered conditions to avoid contamination by other materials;
- (iv) identify and provide sufficient space for temporary storage of materials to facilitate collection and/or sorting on site;
- (v) maintain plants and vehicles in good condition;
- (vi) containers used for storage of chemical wastes will:
 - be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;
 - have a capacity of less than 450L unless the specifications have been approved by the EPD; and
 - display a label in English and Chinese in accordance with instructions.
- (vii) general refuse should be stored in enclosed bins or compaction units separately from construction and chemical wastes;
- (viii) the waste storage area should be well maintained and cleaned regularly;
- (ix) collect the site waste effectively; and
- (x) the Contractor is required to prepare and implement an Environmental Management Plan.

5.1.6 Ecology

5.1.6.1 In order to avoid and minimize the ecological impacts during construction stage, the following measures will be implemented: -

- (i) water quality monitoring of the Wun Yiu EIS should be carried out before, during and after the construction of the proposed pipe support and any other construction works adjacent to the Wun Yiu EIS. An event and action plan should be provided for relevant parties to take immediate action in case any deterioration in water quality is observed in the monitoring events;
- (ii) ecological monitoring of the Wun Yiu EIS should be carried out before, during and after the construction of the proposed pipe support and any other construction works adjacent to the Wun Yiu EIS. The construction process should be supervised by qualified ecologist all the time to ensure that no major impact to the aquatic ecosystem. The details should be agreed with AFCD and EPD before construction;
- (iii) the proposed pipe support in the Wun Yiu EIS will be constructed on exposed dry rock surface (instead of the riverbed) above the existing stream course water body. All the construction works involved will be above the water body. Therefore, the water body will be totally untouched during the construction stage;
- (iv) both the size of the proposed pipe support and the scale of the construction works (see **Figure 5** and **Figure 6**) involved in the Wun Yiu EIS will be rather small;
- (v) in consideration of the available literature on breeding season of freshwater fish in Hong Kong, no construction works inside the extent of the Wun Yiu EIS will be allowed in spring and the wet season;
- (vi) only hand-held tools should be used inside the extent of the Wun Yiu EIS;
- (vii) special requirement restricting the future contractor to ensure not disturbing the stream course water body during the future works will be imposed;
- (viii) the proposed works site inside or in the proximity of natural rivers and streams should be temporarily isolated, such as placing of sandbags or silt curtains with lead edge at bottom and properly supported props, to prevent adverse impacts on the stream water qualities;
- (ix) the natural bottom and existing flow in the river should be preserved to avoid disturbance to the river habitats. No access track on riverbed should be allowed;
- (x) stockpiling of construction materials including cement, if necessary, should be properly covered and located away from any natural stream/river;
- (xi) construction debris and spoil should be covered up and/or properly disposed of as soon as possible to avoid being washed into nearby rivers/streams by rain;
- (xii) construction effluent including those from cement grouting, site run-off and sewage

- should be properly collected and/or treated. Wastewater from a construction site should be managed with the following approach in descending order: (1) minimisation of wastewater generation; (2) reuse and recycle; (3) treatment. Proper locations for discharge outlets of wastewater treatment facilities well away from the natural streams/ rivers should be identified;
- (xiii) adequate lateral support may need to be erected in order to prevent soil/mud from slipping into the stream/river, but without unduly impeding the flow during heavy rain;
 - (xiv) supervisory staff should be assigned to station on site to closely supervise and monitor the works;
 - (xv) removal of existing vegetation alongside the riverbanks should be avoided or minimised. When disturbance to vegetation is unavoidable, all disturbed areas should be hydroseeded or planted with suitable vegetation to blend in with the natural environment upon completion of works;
 - (xvi) standard good site practice (e.g. hoarding of works areas, placement of equipment or stockpile at designated area, etc.) should be implemented in construction stage to minimize potential disturbance impact;
 - (xvii) practical dust and noise control measures (e.g. regular watering, use of quiet mechanical plant, temporary noise barrier, etc.) should be implemented during construction stage; and
 - (xviii) effective site run-off control measures (e.g. provision of surface drainage system, use of sand/silt traps, etc.) should be provided during the construction stage to minimize impacts on adjacent water bodies.

5.1.7 Landscape and Visual

No tree will be affected and therefore no mitigation measure is necessary. Visual impacts from construction activities will be of very short durations. Proper control over site cleanliness and stockpiling of materials will be exercised to alleviate visual intrusion.

5.1.8 Cultural Heritage

No cultural heritage impact is expected during the construction stage, and therefore no mitigation measure is necessary.

5.1.9 Disruption of Water Movement

The proposed sewer pipes crossing the watercourses will be laid in an exposed manner and well above the water surface which are at levels similar to the bridge deck levels. Thus, it will not cause disruption

to the water movement in these watercourses as the proposed works will not involve any dredging operation, river training and diversion. However, the proposed sewer pipe across the Wun Yiu EIS and connecting manholes MH2 and MH3 cannot be stood by itself due to the long pipe span (i.e.: approximate 22m). In order to overcome the long span issue with minimal impact to the ecology, three construction methods without touching the water body, as shown in below **Table 3.1**, are proposed. To avoid substantial foundation supports at both sides of the stream bank posing more environmental risk due to the increased scale of construction works and considering the safety of the existing vehicle bridge, Option 2 proposing one small scale pre-cast or prefabricated pipe support on exposed dry rock surface (see **Figure 5** and **Figure 6**) is preferable. In Option 2, both the size of the proposed pipe support and the scale of the construction works involved will be rather small. Moreover, the existing condition of the surrounding environment is already disturbed by traffic and human activities. The water body will be totally untouched during the construction stage, therefore with appropriate control measures imposed, there will unlikely be any disturbance to the water movement. Apart from the above, special requirement restricting the future contractor to ensure not disturbing the stream course water body during the future works will be imposed.

5.1.10 Traffic Generation

Insignificant traffic impact is expected during the construction stage, and therefore good practices on temporary traffic arrangement will be implemented.

5.2 Operation Stage

The only concerned area in operation stage is water pollution due to the potential leakage of sewer pipe. To protect the nearby catch waters, WGG, watercourses and the Tai Mo Shan Country Park, buried pipes and exposed pipes will be protected by concrete surround and/or sleeve pipes as considered necessary.

5.3 Summary of the Potential Environmental Impacts and Mitigation Measures

The potential environmental impacts and mitigation measures during the construction and operation stages are summarized in below **Table 5.2**.

Table 5.2 Summary of the Potential Environmental Impacts and Mitigation Measures

Project Stage	Potential Environmental Impact	Mitigation Measures	Relevant Section
Construction	No adverse air quality impact	Implement standard dust suppression measures as stipulated in APCO	5.1.1
	No adverse noise impact	(1) Erect temporary movable noise barrier (2) Deploy quiet mechanical equipment (3) Adopt good scheduling of works and site practices (4) Comply with ProPECC PN 2/93 and NCO	5.1.2
	No adverse water quality impact	(1) Adopt necessary silt removal facilities (2) Construct temporary on-site drainage system (3) Adopt good site practices (4) Comply with ProPECC PN 1/94, relevant technical circulars and guidelines (5) Monitor the water quality in the Wun Yiu EIS	5.1.3
	No land contamination	N.A.	5.1.4
	No adverse waste impact	(1) Sort C&D materials on site (2) Reuse inert C&D materials for backfilling (3) Dispose non-inert C&D materials and general refuse to PFRF and landfills through trip ticket system (4) Comply with relevant technical circulars and regulations	5.1.5
	Insignificant adverse ecological impact	(1) Confine works area to existing roads or on the exposed dry rock surface in the Wun Yiu EIS (2) Adopt good site practices (3) Implement practical dust, noise and site run-off control measures (4) Monitor the ecological and water quality in the Wun Yiu EIS	5.1.6
	Insignificant landscape and visual impact	Carry out proper control over site cleanliness and stockpiling of materials	5.1.7
	No cultural heritage impact	N.A.	5.1.8
	No disruption of water movement	N.A.	5.1.9
	Insignificant traffic impact	Implement good practices on temporary traffic arrangement	5.1.10
Operation	No air quality impact	N.A.	N.A.
	No noise impact	N.A.	N.A.

	Install the sewer pipes spanning the individual watercourses inside a sleeve steel pipe for leaking prevention purpose.		5.2
Insignificant water quality impact			
No land contamination		N.A.	N.A.
No waste impact		N.A.	N.A.
No ecological impact		N.A.	N.A.
No landscape and visual impact		N.A.	N.A.
No cultural heritage impact		N.A.	N.A.
No disruption of water movement		N.A.	N.A.
No traffic impact		N.A.	N.A.

6 CONCLUSION

- 6.1 The Project only involves small scale sewerage installation. The environmental impacts will be minimal and short-term during construction stage and therefore significant impact is not anticipated.
- 6.2 As the Project will reduce the pollution and enhance the water quality of nearby watercourses and Tolo Harbour, it will have positive environmental effects after operation of the system. Adverse environmental impact during operation stage is also not anticipated with the leakage prevention system implemented.
- 6.3 The local community expressed strong desire and support for this sewer extension works.

7 USE OF PREVIOUSLY APPROVED EIA REPORTS

There is no previously approved EIA study for the proposed Project or conducted in the vicinity of the Project area.

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Figures

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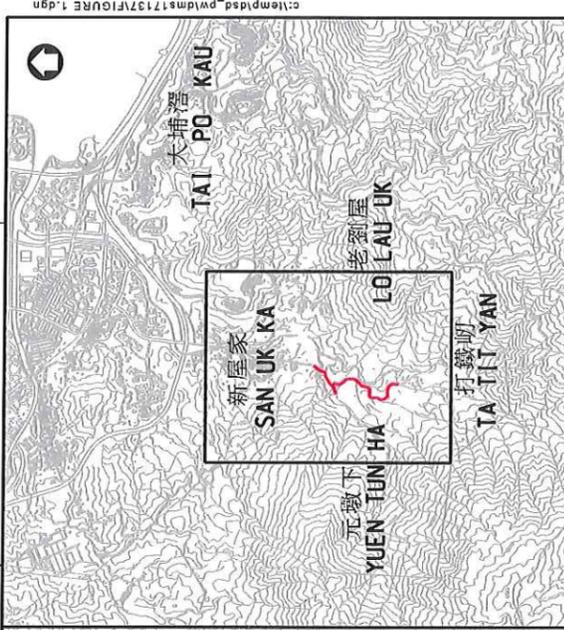


NSR2

NSR3

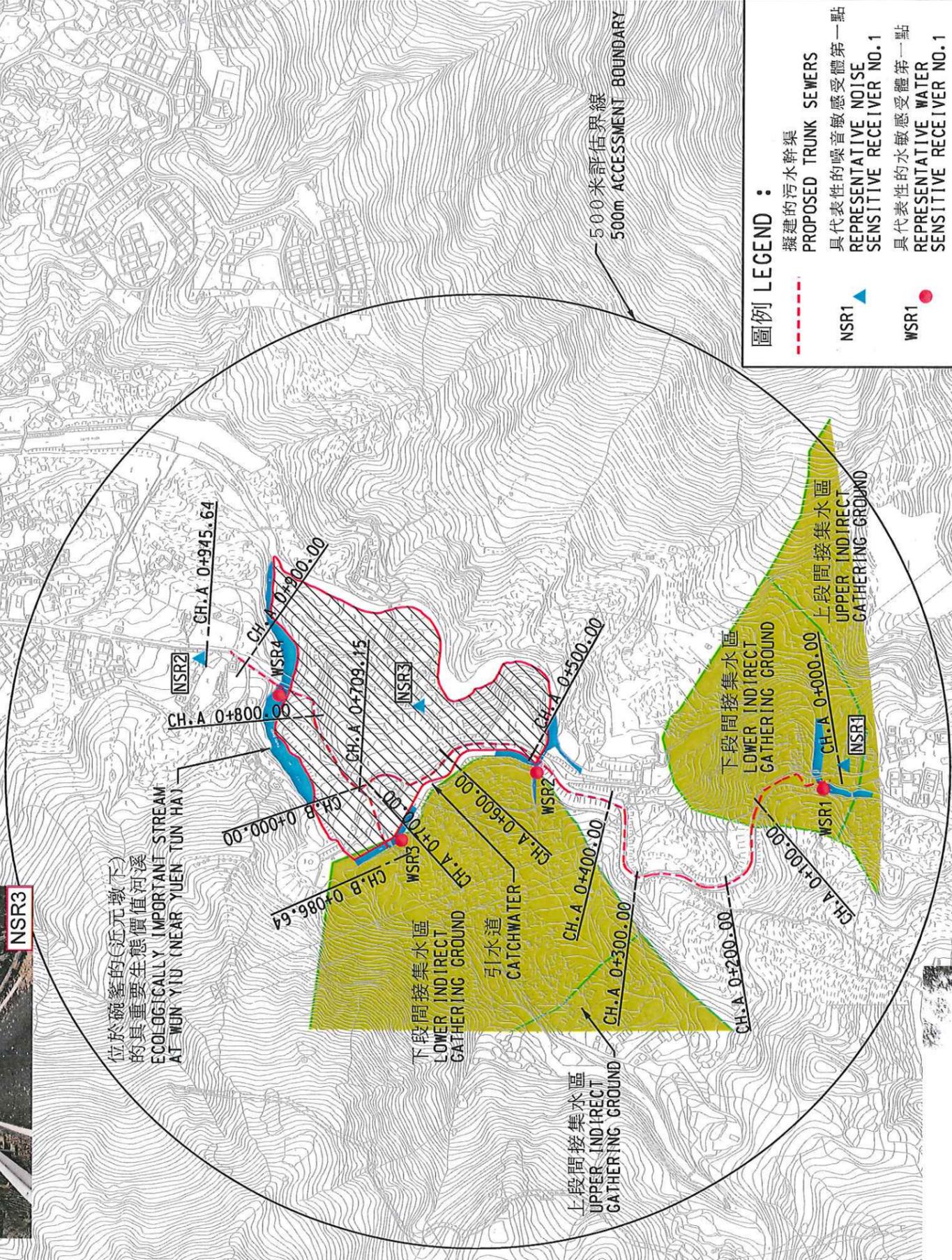


NSR1



位置圖 LOCATION PLAN
比例 SCALE 1 : 50 000

位於碗窑的(近元墩(下))
的具重要生態價值河溪
ECOLOGICALLY IMPORTANT STREAM
AT WUN YIU (NEAR YUEN TUN HA)

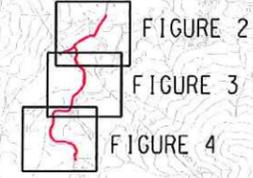
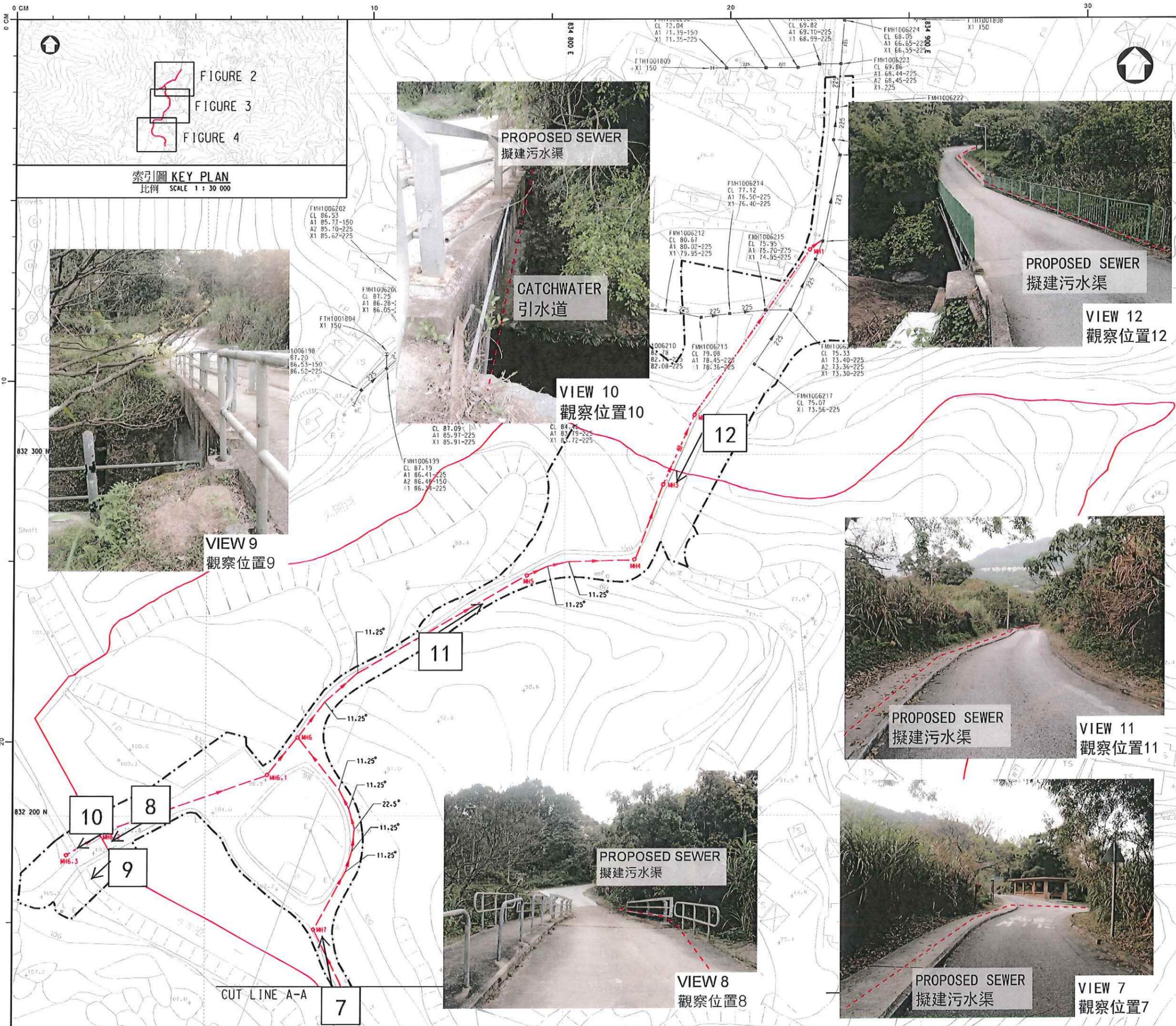


圖例 LEGEND :

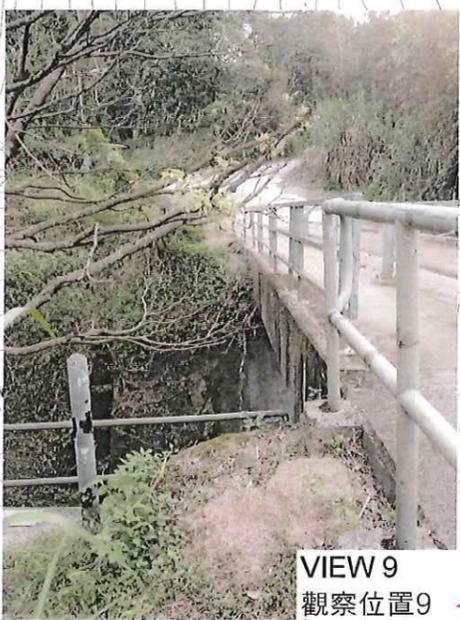
- 擬建的污水幹渠 PROPOSED TRUNK SEWERS
- NSR1 具代表性的噪音敏感受體第一點 REPRESENTATIVE NOISE SENSITIVE RECEIVER NO.1
- WSR1 具代表性的水敏感受體第一點 REPRESENTATIVE WATER SENSITIVE RECEIVER NO.1
- 法定古蹟 DECLARED MONUMENTS
- 郊野公園 COUNTRY PARK
- 集水區 (部份顯示) WATER GATHERING GROUND (PARTLY SHOWN)
- 河道/水道/引水道 (部份顯示) RIVER/CHANNEL/CATCHWATER (PARTLY SHOWN)

圖則名稱 drawing title
擬建污水幹渠連接大埔三條鄉村一打鐵坳、元墩下及老劉屋
PROVISION OF TRUNK SEWER TO 3 VILLAGES:
TA TIT YAN, YUEN TUN HA AND LO LAU UK IN TAI PO
工程項目的地點及具代表性敏感受體地點
LOCATION OF PROJECT SITE AND REPRESENTATIVE
SENSITIVE RECEIVERS

繪畫 drawn	T. M. SIU	日期 date	16 JAN 2018
核對 checked	Y. HU	圖則編號 drawing no.	圖一 FIGURE 1
批核 approved	W. W. LAU	日期 date	16 JAN 2018
部門 office	污水工程部 SEWERAGE PROJECTS DIVISION	簡簽 initial	AS SHOWN
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索引圖 KEY PLAN
比例 SCALE 1 : 30 000



- 註 NOTES :
- 圖例 LEGEND :
- 擬建污水沙井
PROPOSED SEWER MANHOLE
 - 擬建污水渠 (明挖敷管)
PROPOSED GRAVITY SEWER BY TRENCH EXCAVATION
 - 擬建污水渠 (無坑敷管)
PROPOSED GRAVITY SEWER BY TRENCHLESS METHOD
 - 擬建污水渠 (明敷喉管)
PROPOSED GRAVITY SEWER IN EXPOSED MANNER
 - 擬建預制件污水渠支撐
PROPOSED PRE-CAST OR PRE-FABRICATED PIPE SUPPORT
 - 現有污水渠及沙井
EXISTING SEWER AND MANHOLE
 - 施工範圍
WORKS AREA
 - 郊野公園
COUNTRY PARK

版 no.	日期 date	修改項目 description	簡簽 initial
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批核 approved		W. W. LAU	16 JAN 2018

合約編號 contract no.

檔案編號 file no. SP 7/1/129/17

工程編號 project no.

合約名稱 contract
擬建污水幹渠連接大埔三條鄉村—打鐵坳、元墩下及老劉屋
PROVISION OF TRUNK SEWER TO 3 VILLAGES: TA TIT YAN, YUEN TUN HA AND LO LAU UK IN TAI PO

圖則名稱 drawing title

實地照片 SITE PHOTOS

全三張其一 (SHEET 1 OF 3)

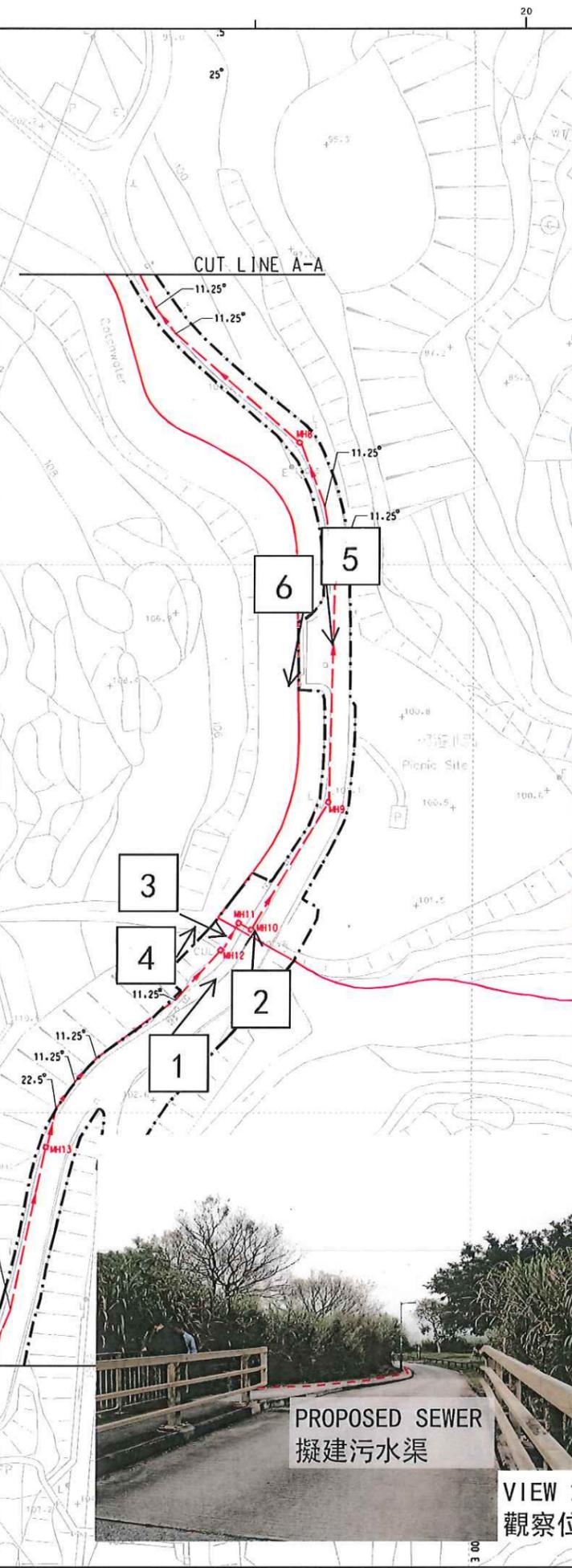
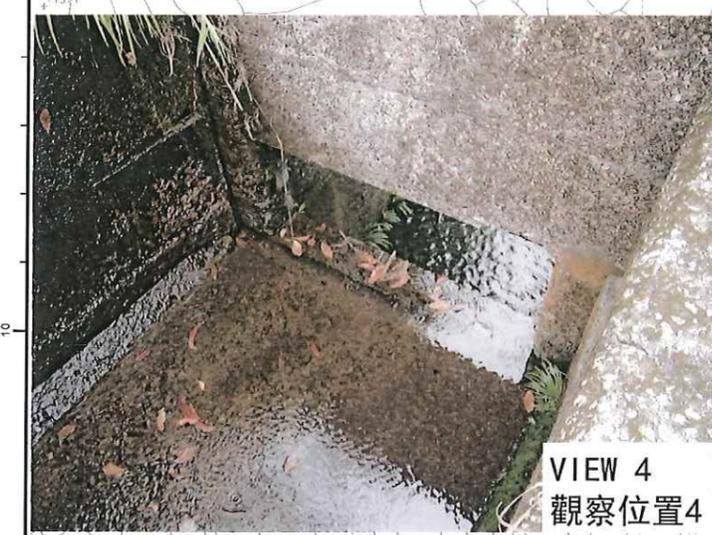
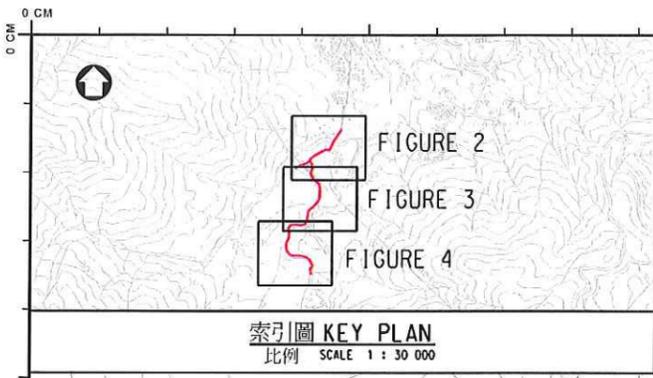
圖則編號 drawing no. 圖二 FIGURE 2

比例 scale 1 : 1000 OR AS SHOWN

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DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION



- 註 NOTES :
- 圖例 LEGEND :
- 擬建污水沙井
PROPOSED SEWER MANHOLE
 - ▶— 擬建污水渠 (明挖敷管)
PROPOSED GRAVITY SEWER BY TRENCH EXCAVATION
 - - -▶- - - 擬建污水渠 (明敷喉管)
PROPOSED GRAVITY SEWER IN EXPOSED MANNER
 - 施工範圍
WORKS AREA
 - 郊野公園
COUNTRY PARK

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批核 approved		W. W. LAU	16 JAN 2018

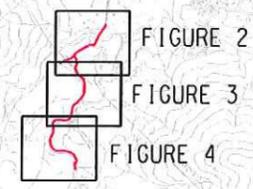
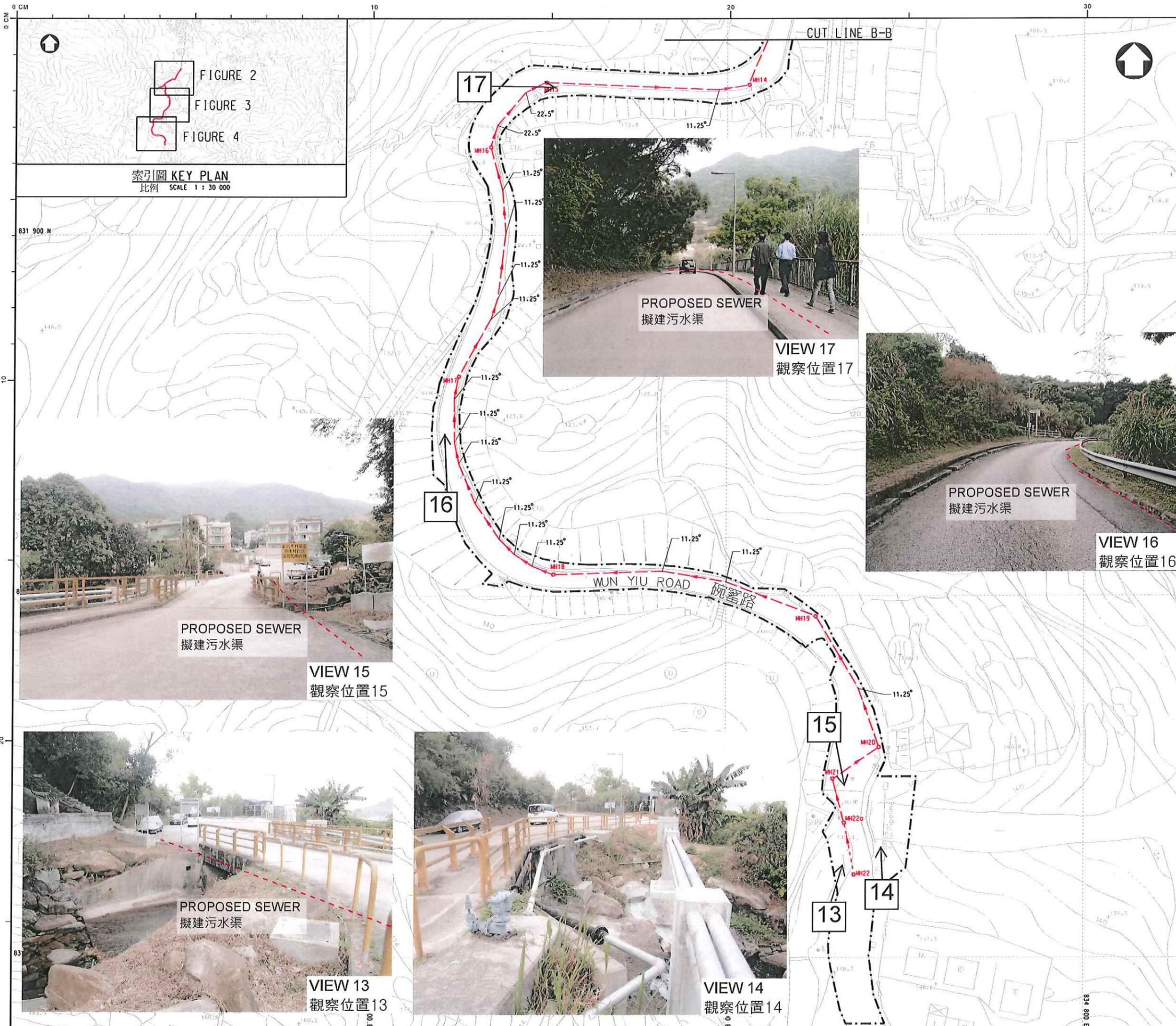
合約編號 contract no.	
檔案編號 file no.	SP 7/1/129/17
工程編號 project no.	
合約名稱 contract	擬建污水幹渠連接大埔三條鄉村—打鐵坳、元墩下及老劉屋 PROVISION OF TRUNK SEWER TO 3 VILLAGES: TA TIT YAN, YUEN TUN HA AND LO LAU UK IN TAI PO

圖則名稱 drawing title	實地照片 SITE PHOTOS
全三張其二 (SHEET 2 OF 3)	圖則編號 drawing no.
圖三 FIGURE 3	比例 scale 1 : 1000 OR AS SHOWN

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索引圖 KEY PLAN
比例 SCALE 1 : 30 000

註 NOTES :

圖例 LEGEND :

- 擬建污水沙井
PROPOSED SEWER MANHOLE
- ▶— 擬建污水渠 (明挖敷管)
PROPOSED GRAVITY SEWER BY TRENCH EXCAVATION
- - -▶- - - 擬建污水渠 (明敷喉管)
PROPOSED GRAVITY SEWER IN EXPOSED MANNER
- 施工範圍
WORKS AREA

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批核/ approved		W. W. LAU	16 JAN 2018

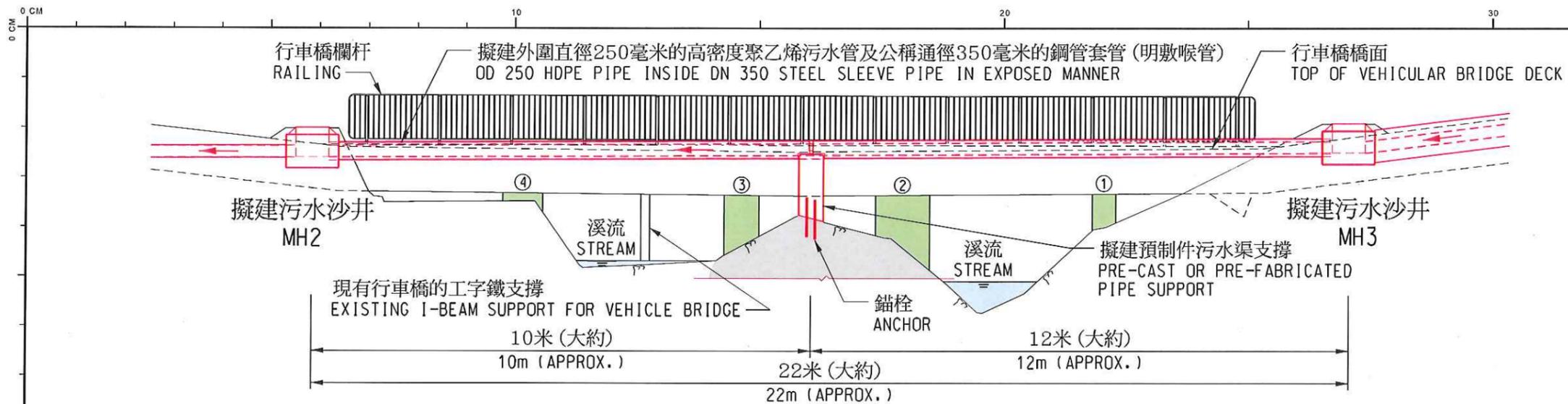
合約編號 contract no.	
檔案編號 file no.	SP 7/1/129/17
工程編號 project no.	
合約名稱 contract	擬建污水幹渠連接大埔三條鄉村一打鐵坳、元墩下及老劉屋 PROVISION OF TRUNK SEWER TO 3 VILLAGES: TA TIT YAN, YUEN TUN HA AND LO LAU UK IN TAI PO

圖則名稱 drawing title	實地照片 SITE PHOTOS	
全三張其三 (SHEET 3 OF 3)	圖則編號 drawing no.	比例 scale
圖四 FIGURE 4		1 : 1000 OR AS SHOWN

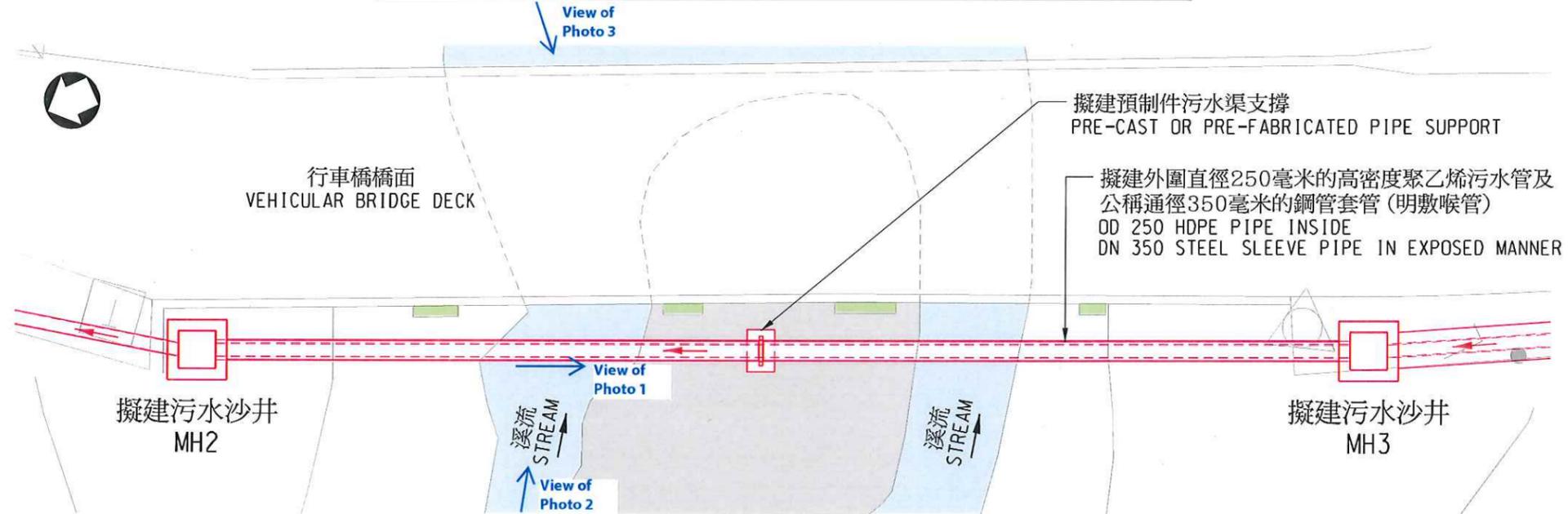
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擬建污水渠橫跨碗窰河溪的斷面圖
ELEVATION VIEW OF SEWER SPANNING OVER THE WUN YIU EIS



擬建污水渠橫跨碗窰河溪的平面圖
PLAN ELEVATION VIEW OF SEWER SPANNING OVER THE WUN YIU EIS



註 NOTES :

圖例 LEGEND :

現有公共喉管/
行車橋的石屎支撐
EXISTING CONCRETE SUPPORT
FOR PIPE / VEHICLE BRIDGE

版 no.	日期 date	修改項目 description	簡簽 initial
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合約編號 contract no.	
檔案編號 file no.	SP 7/1/129/17
工程編號 project no.	
合約名稱 contract	擬建污水幹渠連接大埔三條鄉村—打鐵坳、元墩下及老劉屋 PROVISION OF TRUNK SEWER TO 3 VILLAGES: TA TIT YAN, YUEN TUN HA AND LO LAU UK IN TAI PO

圖則名稱 drawing title	擬建污水渠橫跨碗窰河溪的一般安排 GENERAL ARRANGEMENT OF SEWER SPANNING OVER THE WUN YIU EIS
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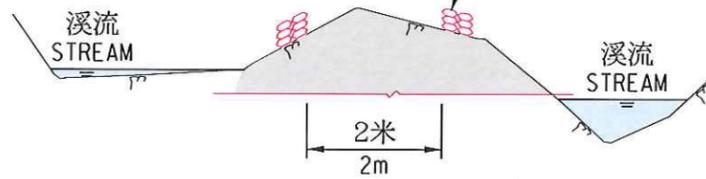
圖則編號 drawing no.	比例 scale
圖五 FIGURE 5	1 : 100

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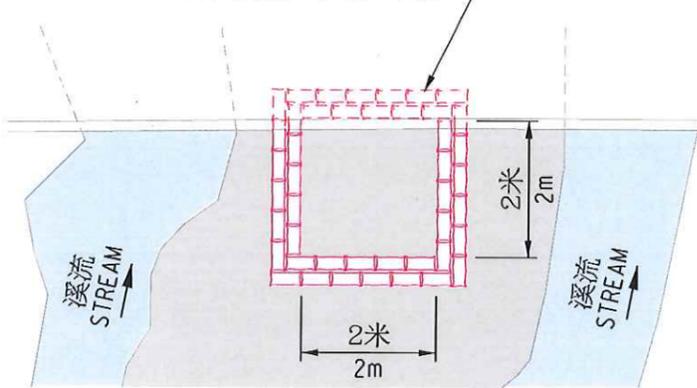
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DRAINAGE SERVICES DEPARTMENT
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HONG KONG
SPECIAL ADMINISTRATIVE REGION

放置至少兩層沙包以分隔
一個2米乘2米的工作範圍
AT LEAST TWO LAYERS OF SAND BAGS TO
ENCLOSE A 2000x2000 WORKS AREA



剖面圖
SECTION

放置至少兩層沙包以分隔
一個2米乘2米的工作範圍
AT LEAST TWO LAYERS OF SAND BAGS TO
ENCLOSE A 2000x2000 WORKS AREA

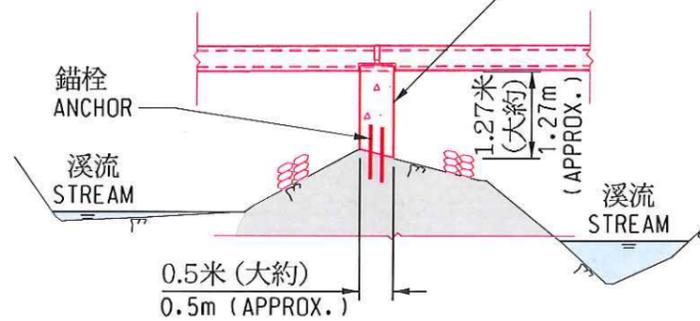


平面圖
PLAN

STEP 1

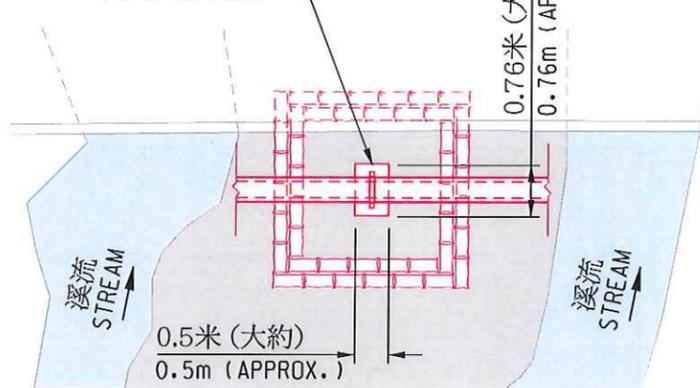
- (A) 放置至少兩層沙包以分隔一個2米乘2米的工作範圍
PLACE AT LEAST TWO LAYERS OF SAND BAGS
TO ENCLOSE A 2000x2000 WORKS AREA

擬建預制件污水渠支撐
PRE-CAST OR PRE-FABRICATED
PIPE SUPPORT



剖面圖
SECTION

擬建預制件污水渠支撐
PRE-CAST OR PRE-FABRICATED
PIPE SUPPORT

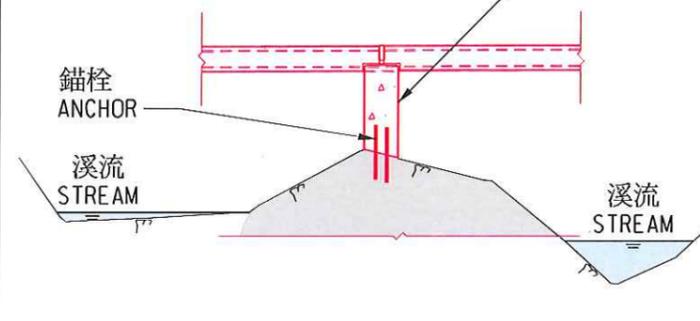


平面圖
PLAN

STEP 2

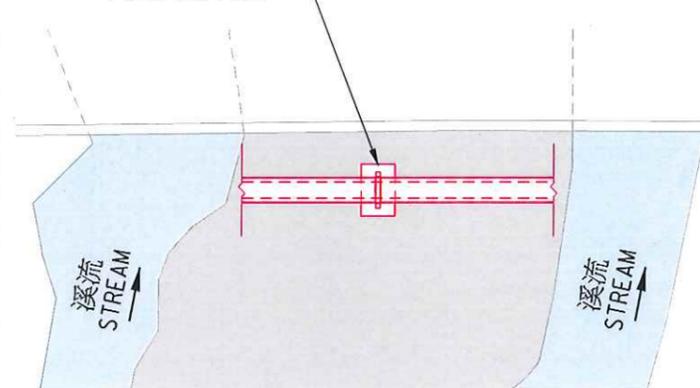
- (A) 用手提電動錘鑽和錨栓安裝固定污水渠支撐預制件。持續用可移動隔音屏障圍封施工範圍以防止碎石彈出及隔音。過程中要嚴格執行文中第5.1.3和5.1.6章節所列明的預防措施或其他由工程師發出的指示
INSTALL THE PIPE SUPPORT BY ANCHOR BOLTS AND HAND-HELD ELECTRIC HAMMER DRILL WITH PROPER PRECAUTION MEASURES INCLUDING BUT NOT LIMITED TO THOSE LISTED UNDER SECTION 5.1.3 AND 5.1.6 OR ANY OTHERS AS INSTRUCTED BY ENGINEER. ADOPTING MOVABLE NOISE BARRIER TO AVOID DROPPING OF CRUSHED STONE AND MITIGATE NOISE IMPACT ALL THE TIME
- (B) 用螺栓和螺母安裝擬建污水渠並固定到支撐
INSTALL AND FIX PIPE TO THE PIPE SUPPORT BY BOLTS AND NUTS

擬建預制件污水渠支撐
PRE-CAST OR PRE-FABRICATED
PIPE SUPPORT



剖面圖
SECTION

擬建預制件污水渠支撐
PRE-CAST OR PRE-FABRICATED
PIPE SUPPORT



平面圖
PLAN

STEP 3

- (A) 清理工作範圍
CLEAN THE ROCK SURFACE
- (B) 移走沙包
REMOVE THE SAND BAGS

註 NOTES:

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修訂 REVISION			
		姓名 name	日期 date
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核對 checked		Y. HU	16 JAN 2018
批核 approved		W. W. LAU	16 JAN 2018

合約編號 contract no.
檔案編號 file no. SP 7/1/129/17
工程編號 project no.
合約名稱 contract
擬建污水幹渠連接大埔三條鄉村—打鐵坳、元墩下及老劉屋
PROVISION OF TRUNK SEWER TO 3 VILLAGES: TA TIT YAN, YUEN TUN HA AND LO LAU UK IN TAI PO

圖則名稱 drawing title
在碗窰河溪內安裝擬建預制件污水渠支撐的施工次序
CONSTRUCTION SEQUENCE FOR PRE-CAST OR PRE-FABRICATED PIPE SUPPORT AT THE WUN YIU EIS

圖則編號 drawing no.	比例 scale
圖六 FIGURE 6	1 : 100

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HONG KONG
SPECIAL ADMINISTRATIVE REGION

Appendix A

Review of Potential Noise Impact

Appendix A – Review of Potential Noise Impact

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1. NOISE IMPACT

1.1 Introduction

This section presents the review on noise impact during construction stage of the Project. Potential noise impacts at the noise sensitive receivers are reviewed and appropriate noise mitigation measures, if required, are recommended.

1.2 Relevant Environmental Legislation and Standards

1.2.1 General

1.2.1.1 The principal legislation relating to the control of construction noise is the Noise Control Ordinance (Cap. 400) (hereafter named as NCO). The technical memoranda (TMs) issued under the NCO to stipulate control approaches and criteria, and that which may be relevant to the Project is Technical Memorandum on Noise from Construction Work other than Percussive Piling (CW-TM).

1.2.1.2 Apart from the above, the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM), issued under the Environmental Impact Assessment Ordinance (Cap. 499) (hereafter named as EIAO), also provides guidelines and noise criteria for evaluating construction noise impacts.

1.2.2 Construction Noise

1.2.2.1 Noise impact on general construction activities during normal working hours (i.e. 0700 to 1900 hours on any day not being a Sunday or public holiday) is controlled by the Criteria for Evaluating Noise Impact stated in Table 1B in Annex 5 of the EIAO-TM. The noise limit is Leq(30 minutes) 75 dB(A) for domestic premises, hotels and hostels. The above standard applies to uses which rely on opened windows for ventilation. A Construction Noise Permit is required under the NCO in case the construction works are to be carried out during nighttime (1900 – 0700), Sundays and public holidays.

1.2.2.2 Both the CW-TM and the EIAO-TM acknowledge the potential noise sensitivity of areas designated as Country Parks. However, the CW-TM does not identify Country Parks themselves as noise sensitivity receivers. Furthermore, while the EIAO-TM provides general construction noise limits at residences and schools during normal working hours, it provides

no such limit for Country Parks. The review of potential noise impact at the Country Park will be addressed qualitatively in **Section 1.5**.

1.2.3 Noise Sensitive Receivers (NSRs)

1.2.3.1 Representative NSRs within 300m from the project boundary were identified in accordance with Section 3 of Annex 13 of the EIAO-TM.

1.2.3.2 The representative NSRs are summarized in **Table 1.1** and locations of the representative NSRs are shown in **Figure 1** of the project profile.

Table 1.1 – Summary of Representative Noise Review Points

ID	Description	Use	Distance (m)
NSR1	Ta Tit Yan Village	Residential	27
NSR2	Temporary Structures	Residential	30
NSR3	Temporary Structures	Residential	50
NSR4	Tai Mo Shan Country Park	Country Park	Not Applicable*

Note: * *The proposed works fall partially within Tai Mo Shan Country Park.*

1.3 **Review Methodologies**

1.3.1 The methodology outlined in the CW-TM is used to review the impact of general construction works. Sound Power Levels (SWLs) for items of Powered Mechanical Equipment (PME) were referenced from Table 3 of this TM. Where no SWL was given in the CW-TM, reference will be made to previous similar studies in Hong Kong.

1.3.2 The review was based on the SWL of PME to be used for each construction stage. Each construction stage will not be carried out concurrently. There will not be more than one work front of construction works carried out concurrently within 300m along the alignment. It is assumed that some PMEs of each construction stage will be operated concurrently at any time to present the worst case scenario.

1.3.3 The SWL for items of PME is given in Table 3 of CW-TM or other relevant guidelines. The correction factors to obtain the Predicted Noise Level (PNL) from SWL at NSRs of given distances can be referred to Table 5 of CW-TM. The barrier corrections, distance attenuation and façade correction are also considered in this Review.

1.4 Identification of Environmental Impacts

The potential construction noise impact may arise from the following construction activities involving the use of PME including generators, excavators, pokers, lorry, etc. The construction plant inventory and their corresponding SWL for all construction stages relevant to this Project are summarized in **Annex 1**. The assumptions of on-time percentage and the number of PME are expected to be practical in completing the works within the schedule. The construction plant inventory would be reasonable, realistic and practicable with a view to meeting the construction programme. The review of potential noise impact was conducted based on the construction plant inventory. Mitigation measures, if required, will be formulated and the residual construction noise impact will be reviewed.

1.5 Prediction and Evaluation of Environmental Impacts

1.5.1 For normal daytime working hours, exceedance of the construction noise criteria of 75dB(A) at NSRs of domestic premises is not predicted. Details of construction plant inventory and noise level calculation are enclosed in **Annex 1** and **Annex 2**. A brief summary is shown in **Table 1.2**.

Table 1.2 – Summary of Mitigated Construction Noise Levels

ID	Predicted Maximum Mitigated Construction Noise Levels during Normal Daytime Working Hour, dB(A)	Noise Criteria, dB(A)	Compliance (Y/N)
NSR1	75	75	Y
NSR2	74	75	Y
NSR3	70	75	Y

1.5.2 For the NSR of Tai Mo Shan Country Park, the EIAO-TM provides no such limit for Country Parks and the proposed works falls partially within this NSR (see **Figure 1**). The visitors to the Country Park will potentially be impacted by the proposed construction works. However, insurmountable construction noise impact will not be envisaged taking into account the transient nature of them.

1.6 Mitigation of Noise Impacts

1.6.1 Standard mitigation measures such as adopting quiet mechanical equipment and movable noise barriers have been recommended to mitigate construction noise impacts at the affected NSR during normal daytime working hours. PMEs will be orientated and located at a certain

distance further away from the work front nearest to the NSRs to minimize the noise impact to nearby NSRs.

1.6.2 The guidelines stipulated in EPD's Practice Note for Professional Persons, Noise from Construction Activities – Non-statutory Controls (ProPECC PN 2/93) will be followed.

1.6.3 Although no adverse noise impact is anticipated during construction, good site practices including but not limited to those listed below are recommended during the construction stage of the Project and will be incorporated into the contract specification: -

- (i) material stockpiles and other structures should be effectively utilized, wherever practicable, for screening noise from on-site construction activities;
- (ii) only well-maintained plant should be operated on-site and serviced regularly during the construction stage;
- (iii) silencers or mufflers on construction equipment, if applicable, should be utilized and should be properly maintained during the construction stage;
- (iv) powered mechanical equipment that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; and
- (v) plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby noise sensitive receivers.

1.7 Conclusion

The noise impacts during construction period of the Project were reviewed and results showed that the mitigated construction noise level predicted at representative NSRs of domestic premises will comply with the noise criteria. For the NSR of Tai Mo Shan Country Park, the EIAO-TM provides no such limit for Country Parks and the proposed works falls partially within this NSR (see **Figure 1**). The visitors to the Country Park will potentially be impacted by the proposed construction works. The review of potential noise impact at the Country Park was addressed qualitatively and concluded that insurmountable construction noise impact will not be envisaged taking into account the transient nature of them. Thus, no adverse noise impact from the Project during the construction period will be expected.

>End of the Text<

Annex 1

Construction Plant Inventory

Activity A - Breaking of Road Surface

Powered Mechanical Equipment	TM Code / Other Reference ⁽¹⁾	No. of Items	SWL/Item dB(A)	Assume Percentage of On-time Usage	Barrier dB(A)	Total Sound Power Level dB(A) ⁽²⁾	
Breaker, mini-robot mounted	BS5228 C.8, item 12	1	106	70%	-5	99	NA
Dump Truck with grab ≤ 38ton	*	1	105	30%		NA	100
Total						99	100
Max						100	

Activity B - Trench Excavation with Lateral Support

Powered Mechanical Equipment	TM Code / Other Reference ⁽¹⁾	No. of Items	SWL/Item dB(A)	Assume Percentage of On-time Usage	Barrier dB(A)	Total Sound Power Level dB(A) ⁽²⁾	
Excavator, mini-robot mounted	*	1	94	100%	NA	94	NA
Generator, supersilenced, 70dB(A) at 7m	CNP103	1	95	100%	NA	95	NA
Water Pump (electric)	CNP281	1	88	100%	NA	88	NA
Dump Truck with grab ≤ 38ton	*	1	105	30%		NA	100
Total						98	100
Max						100	

Activity C - Welding/joining of Pipes and Sleeve Pipes / Installation of a pre-cast or prefabricated Pipe Support

Powered Mechanical Equipment	TM Code / Other Reference ⁽¹⁾	No. of Items	SWL/Item dB(A)	Assume Percentage of On-time Usage	Barrier dB(A)	Total Sound Power Level dB(A) ⁽²⁾	
Saw, chain, hand-held	CNP 202	1	114	30%	NA		109
Generator, supersilenced, 70dB(A) at 7m	CNP103	1	95	100%	NA		95
Total							109
Max						109	

Activity D - Placing of Sewer Bedding Materials / Setting up jacking or receiving pits for trenchless method

Powered Mechanical Equipment	TM Code / Other Reference ⁽¹⁾	No. of Items	SWL/Item dB(A)	Assume Percentage of On-time Usage	Barrier dB(A)	Total Sound Power Level dB(A) ⁽²⁾	
Generator, supersilenced, 70dB(A) at 7m	CNP103	1	95	100%	NA		95
Poker, vibratory, hand-held (electric)	*	1	102	100%	-5		97
Concrete lorry mixer	CNP044	1	109	100%	NA		109
Total							109
Max						109	

Activity E - Laying of Buried Sewer with Concrete Surround as necessary / Pipe Jacking / Installation of pipes and sleeve pipes with cement filling in between

Powered Mechanical Equipment	TM Code / Other Reference ⁽¹⁾	No. of Items	SWL/Item dB(A)	Assume Percentage of On-time Usage	Barrier dB(A)	Total Sound Power Level dB(A) ⁽²⁾		
Excavator, mini-robot mounted	*	1	94	100%	NA	94	NA	NA
Lorry, with crane/grab ≤ 38ton	*	1	105	30%	NA	NA	100	NA
Generator, supersilenced, 70dB(A) at 7m	CNP103	1	95	100%	NA	NA	NA	95
Poker, vibratory, hand-held (electric)	*	1	102	100%	-5	NA	NA	97
Concrete lorry mixer	CNP044	1	109	100%	NA	NA	NA	109
Total						94	100	109
Max						109		

Activity F - Steel Fixing and Concreting of Manholes

Powered Mechanical Equipment	TM Code / Other Reference ⁽¹⁾	No. of Items	SWL/Item dB(A)	Assume Percentage of On-time Usage	Barrier dB(A)	Total Sound Power Level dB(A) ⁽²⁾	
Lorry, with crane/grab ≤ 38ton	*	1	105	30%	NA	100	NA
Generator, supersilenced, 70dB(A) at 7m	CNP103	1	95	100%	NA	NA	95
Poker, vibratory, hand-held (electric)	*	1	102	100%	-5	NA	97
Concrete lorry mixer	CNP044	1	109	100%	NA	NA	109
Total						100	109
Max						109	

Activity G - Backfilling

Powered Mechanical Equipment	TM Code / Other Reference ⁽¹⁾	No. of Items	SWL/Item dB(A)	Assume Percentage of On-time Usage	Barrier dB(A)	Total Sound Power Level dB(A) ⁽²⁾	
Generator, supersilenced, 70dB(A) at 7m	CNP103	1	95	100%	NA	95	NA
Dump Truck with grab ≤ 38ton	*	1	105	30%	NA	NA	100
Excavator, mini-robot mounted	*	1	94	100%	-5	NA	89
Compactor, vibratory	CNP050	1	105	100%	-5	100	NA
Total						101	100
Max						101	

Activity H - Reinstatement of Road Surface

Powered Mechanical Equipment	TM Code / Other Reference ⁽¹⁾	No. of Items	SWL/Item dB(A)	Assume Percentage of On-time Usage	Barrier dB(A)	Total Sound Power Level dB(A) ⁽²⁾		
Lorry ≤ 38ton	*	1	105	30%	NA	100	NA	NA
Road roller	BS5228 C.8, item 25	1	96	70%	-5	NA	89	NA
Asphalt Paver	BS5228 C.8, item 24	1	101	70%	-5	NA	NA	94
Total						100	89	94
Max						100		

Note:

(1) * Sound Power Levels (SWL) of Other Commonly Used PME

Reference: http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf

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

(2) It is assumed that some PMEs of each construction stage would be operated concurrently at any time to present the worst case scenario.

Annex 2
Construction Noise Review

ID	Description	NSR Type	Approximate Notional Source Distance (m)	Distance Correction, dB(A) ⁽¹⁾	Façade Correction, dB(A) ⁽²⁾	Sound Power Level, dB(A)								Predicted Maximum Construction Noise Level, dB(A)	Noise Criteria, dB(A)	Noise Exceedance, dB(A)
						Activity A - Breaking of Road Surface	Activity B - Trench Excavation with Lateral Support	Activity C - Welding/joining of Pipes and Sleeve Pipes / Installation of a pre-cast or prefabricated Pipe Support	Activity D - Placing of Sewer Bedding Materials / Setting up jacking or receiving pits for trenchless method	Activity E - Laying of Buried Sewer with Concrete Surround as necessary / Pipe Jacking / Installation of pipes and sleeve pipes with cement filling in between	Activity F - Steel Fixing and Concreting of Manholes	Activity G - Backfilling	Activity H - Reinstatement of Road Surface			
						100	100	109	109	109	109	101	100			
NSR1	Ta Tit Yan Village	Residential	27	-37	3	66	66	75	75	75	75	67	66	75	75	0
NSR2	Temporary Structures	Residential	30	-38	3	65	65	74	74	74	74	66	65	74	75	0
NSR3	Temporary Structures	Residential	50	-42	3	61	61	70	70	70	70	62	61	70	75	0

Note:

(1) Refer to Table 5 of CW-TM and Approximate Notional Source Distance

(2) Correction for building façade reflection of 3 dB(A) is applied

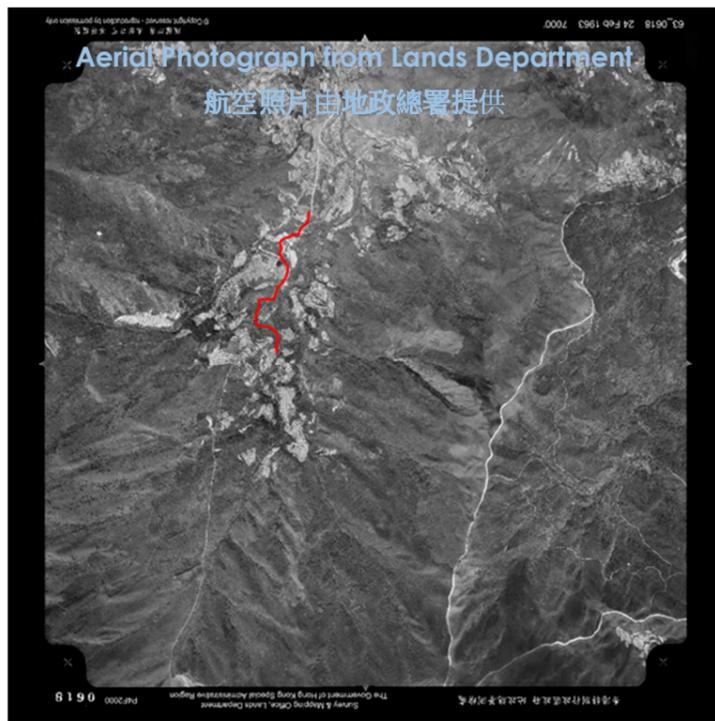
Appendix B

Aerial Photos

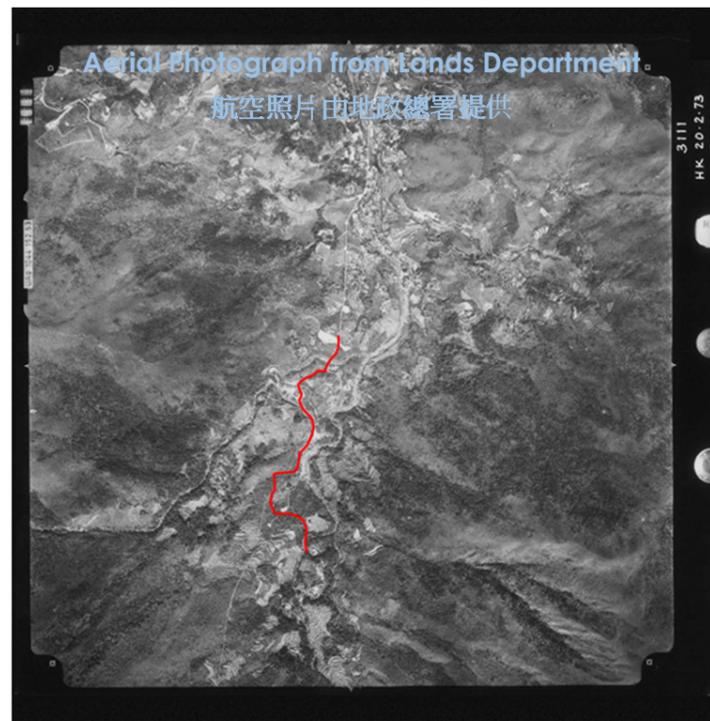
— Project Site Boundary (Indicative Only) 工程地盤範圍 (僅供參考)

┌ Land use for Green Belt 土地用途為綠化地帶

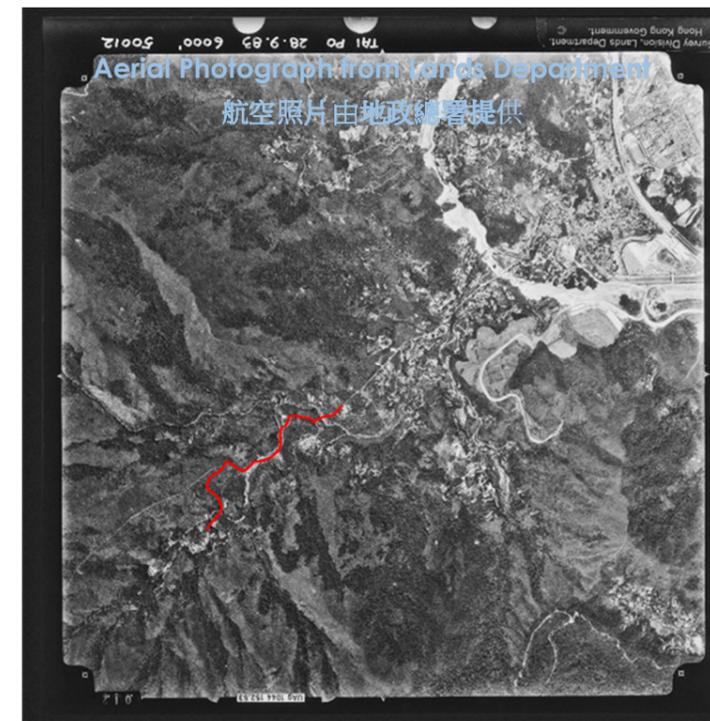
└ Land use for Country Park 土地用途為郊野公園



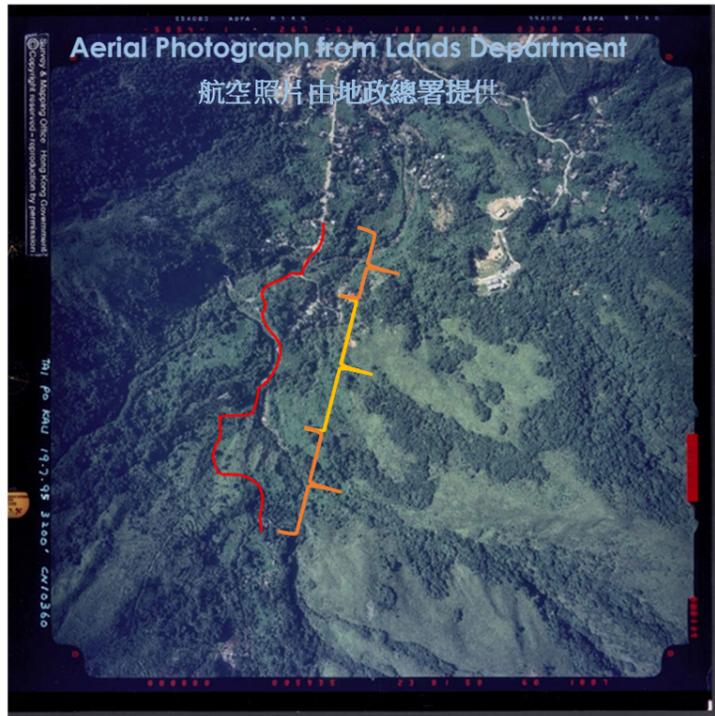
Aerial Photo 1 – Year 1963 航空照片一 – 1963年



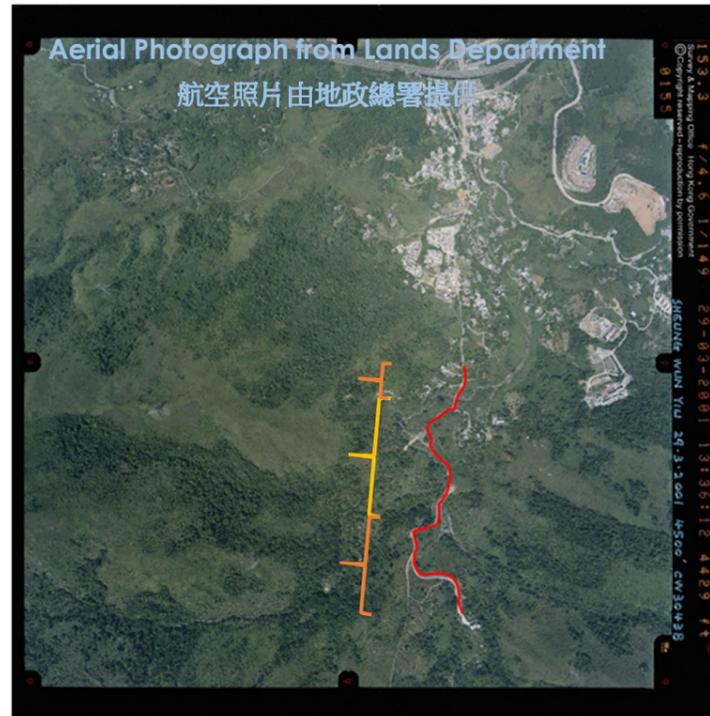
Aerial Photo 2 – Year 1973 航空照片二 – 1973年



Aerial Photo 3 – Year 1983 航空照片三 – 1983年



Aerial Photo 4 – Year 1995 航空照片四 – 1995年



Aerial Photo 5 – Year 2001 航空照片五 – 2001年



Aerial Photo 6 – Year 2015 航空照片六 – 2015年

Appendix C

Conditions for Working within Gathering Grounds by WSD

Conditions for Working within Gathering Grounds

- (a) Adequate measures shall be taken to ensure that no pollution or siltation occurs to the gathering grounds.
- (b) No earth, building materials, fuel, oil or toxic materials and other materials which may cause contamination to the gathering grounds are allowed to be stockpiled or stored on site.
- (c) All surplus spoil shall be removed from gathering grounds as soon as possible.
- (d) Temporary drains with silt traps shall be constructed at the boundary of the site prior to the commencement of any earthworks.
- (e) Regular cleaning of the silt traps shall be carried out to ensure that they function properly at all time.
- (f) All excavated or filled surfaces which have the risk of erosion shall be protected from erosion at all time.
- (g) Facilities for washing the wheels of vehicles before leaving the site shall be provided.
- (h) Any construction plant which causes pollution to the gathering grounds due to leakage of oil or fuel shall be removed off site immediately.
- (i) Any soil contamination with fuel leaked from plant shall be removed off site and the voids arising from removal of contaminated soil shall be replaced by suitable material to the approval of the Director of Water Supplies.
- (j) Provision of temporary toilet facilities is to be subject to the approval of the Director of Water Supplies.
- (k) All waterworks access roads must be maintained unobstructed at all time.
- (l) Site formation plans shall be submitted to W.S.D. for approval prior to commencement of work.
- (m) No structure or temporary works shall be erected in the catchwaters without prior approval of W.S.D.
- (n) The Contractor shall be responsible for cleaning frequently any waterworks roads and associated drainage works of mud and debris.
- (o) The Contractor shall limit the gross weight of the vehicles imposed on the waterworks access to 5 tonnes and the axle load to 3 tonnes. He shall apply to W.S.D. with details of his vehicles for using the access.
- (p) The approval for using the access may be withdrawn on written notice to the Contractor by W.S.D. at their absolute discretion.
- (q) The Contractor shall recover immediately his vehicle which fell into the catchwater or stream bed or pay to Government on demand the cost of recovery that may be necessary through the occurrence of any incident caused by the Contractor.
- (r) The Contractor shall carry out repair or reinstatement works to the satisfaction of W.S.D. or pay to Government on demand the cost of repair and reinstatement to any waterworks installations that shall or may be necessary at any time as a result of damage caused by the Contractor or others under his charge.
- (s) The Contractor shall enter and remain on and use the access at his own risk and he shall indemnify the Government of Hong Kong from all claims, costs, damages and expense arising from the use of the access.
- (t) No excavation with depth more than 2m shall be permitted within 120m from the centerline of WSD water tunnels without the prior approval of WSD.