For discussion
on 23 April 2018

Legislative Council
Panel on Environmental Affairs

Rehabilitation of Underground Sewers and Upgrading of Central and East Kowloon Sewerage

PURPOSE

This paper seeks Members' views on our proposals to upgrade the following sewerage items to Category A for rehabilitating some of the ageing underground sewers in different regions of the territory and upgrading the existing sewerage system in Kowloon-

(a) part of **4414DS – Rehabilitation of underground sewers** at an estimated cost of $391.9 million; and

(b) **4344DS – Upgrading of Central and East Kowloon sewerage – phase 3** at an estimated cost of $680.9 million,

in money-of-the-day (MOD) prices.

2. Details of the above proposals are at **Enclosures 1** and **2** respectively.

WAY FORWARD

3. We plan to seek funding approval from the Finance Committee (FC) for the proposed works under part of **4414DS** and **4344DS** after consulting the Public Works Subcommittee (PWSC). Members are invited to comment on the proposed funding application.

Environment Bureau
Drainage Services Department
April 2018

Enclosure 1

4414DS – Rehabilitation of underground sewers

PROJECT SCOPE

The part of **4414DS** that we propose to upgrade to Category A comprises –

(a) condition surveys of about 75 kilometres (km) of underground gravity sewers and the associated manholes distributed throughout the territory;

(b) rehabilitation of about 7 km of underground gravity sewers distributed throughout the territory; and

(c) ancillary works[1].

A plan showing the locations of the proposed works is at **Annex 1 to Enclosure 1**.

JUSTIFICATIONS

2. There are about 1 800 km underground sewers in Hong Kong. Routine inspection and maintenance are conducted on these sewers, and repairs will be made when defects are detected. As many of these sewers have been in service for many years and are suffering from ageing and deterioration at an increasing rate, it is necessary to carry out detailed surveys using more sophisticated techniques to ensure that defects can be timely detected and thoroughly rectified. In the past few years, there have been incidents of ageing pipe collapse, resulting in road subsidence and overflow of raw sewage and hence disruptions to traffic and nuisance to the public. Such incidents are expected to become more frequent as the sewers age further.

3. The "Enhanced Management of Underground Sewer and Drain Networks - Feasibility Study" has evaluated the risks of failure of the existing underground sewers in 2015, and formulated a territory-wide

[1] Ancillary works include manhole rehabilitation, temporary closure and reinstatement of carriageways/footpaths/open space necessary for completion of the proposed works.

replacement and rehabilitation (R&R) programme. The R&R programme includes the systematic investigation and rehabilitation of about 94 km of sewers with high risks of structural failure.

4. We propose to rehabilitate about 7 km of gravity sewers that were confirmed by past inspection records to have high risks of structural failure, by installing internal lining through the sewers. Trenchless technologies will be employed as far as possible to reduce road excavation works and minimise traffic impact. In addition, we propose to conduct condition surveys for part of the remaining gravity sewers (around 75 km) of the 94 km that were predicted to have high risks of structural failure as mentioned in paragraph 3 above.

5. Subject to funding approval of the Finance Committee, we aim to commence the proposed works in the fourth quarter of 2018 for completion in the fourth quarter of 2022. We will retain the remainder of **4414DS** in Category B, which comprises the rehabilitation of about 12 km of underground gravity sewers throughout different parts of the territory. Funding for the remainder of **4414DS** will be sought later after the completion of the design and preparatory work.

FINANCIAL IMPLICATIONS

6. We estimate the total capital cost of the proposed works as detailed in paragraph 1 above to be $391.9 million in money-of-the-day prices.

PUBLIC CONSULTATION

7. We consulted the relevant Committees of all 18 District Councils during the period from November 2017 to March 2018 as listed in **Annex 2 to Enclosure 1**. These Committees supported the proposed works.

ENVIRONMENTAL IMPLICATIONS

8. The proposed works is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). The Drainage Services Department completed a Preliminary Environmental Review (PER) for the proposed works in April 2018. The PER concluded and the

Director of Environmental Protection agreed that with appropriate mitigation measures, the proposed works would not have any long-term adverse environmental impact. We have included in the project estimate of the proposed works the cost for implementation of environmental mitigation measures.

9. During the construction phase, we will control noise, dust and site run-off nuisance to within the established standards and guidelines through the implementation of the recommended mitigation measures in the relevant contract. These measures include the use of silenced construction equipment and temporary noise barriers to reduce noise impact. In addition, water-spraying to the construction site will be applied regularly to minimise the emission of fugitive dust, and on-site treatment of site run-off will be carried out to minimise potential water quality impact. We will also carry out regular site inspections to ensure that these recommended mitigation measures and good practices will be properly implemented on site.

10. At the planning and design stages, we have considered ways to reduce generation of construction waste where possible including the use of trenchless construction method to minimise the extent of excavation and the avoidance of demolition of existing structures as far as practicable. In addition, we will require the contractor to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible, in order to minimise the need for disposal of inert construction waste to the public fill reception facilities (PFRF[2]). We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

11. We will also request the contractor to submit for approval a plan setting out waste management measures, including appropriate mitigation measures to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will request the contractor to separate inert and non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert and non-inert construction waste at PFRF and landfills respectively through a trip-ticket system.

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[2] PFRF are specified in Schedule 4 of Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste in PFRF requires a licence issued by the Director of Civil Engineering and Development.

12. We estimate that the proposed works will generate 5 100 tonnes of construction waste. Of these, we will reuse 400 tonnes (8%) on site, and deliver 200 tonnes (4%) of inert construction waste to PFRF for subsequent reuse. We will dispose of the remaining 4 500 tonnes (88%) of non-inert construction waste at landfills. The total cost for accommodating construction waste at PFRF and landfill sites is estimated to be $0.9 million[3].

HERITAGE IMPLICATIONS

13. The proposed works will not pose insurmountable impact on any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites and buildings, sites of archaeological interest or known areas of archaeological potential and government historic sites identified by the Antiquities and Monuments Office (AMO). Appropriate mitigation measures, including but not limited to structural monitoring, will be carried out to ensure the built heritage in the vicinity of the proposed works will not be directly or indirectly affected during the course of works. Appropriate mitigation measures will also be recommended if areas of archaeological potential are identified. We will work closely with AMO to formulate and implement the mitigation measures as and when required.

LAND ACQUISITION

14. The proposed works will only involve government land. No land resumption is required.

Environment Bureau
Drainage Services Department
April 2018

[3] The cost is calculated based on a unit charge rate of $71 per tonne for disposal at PFRF and $200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N).

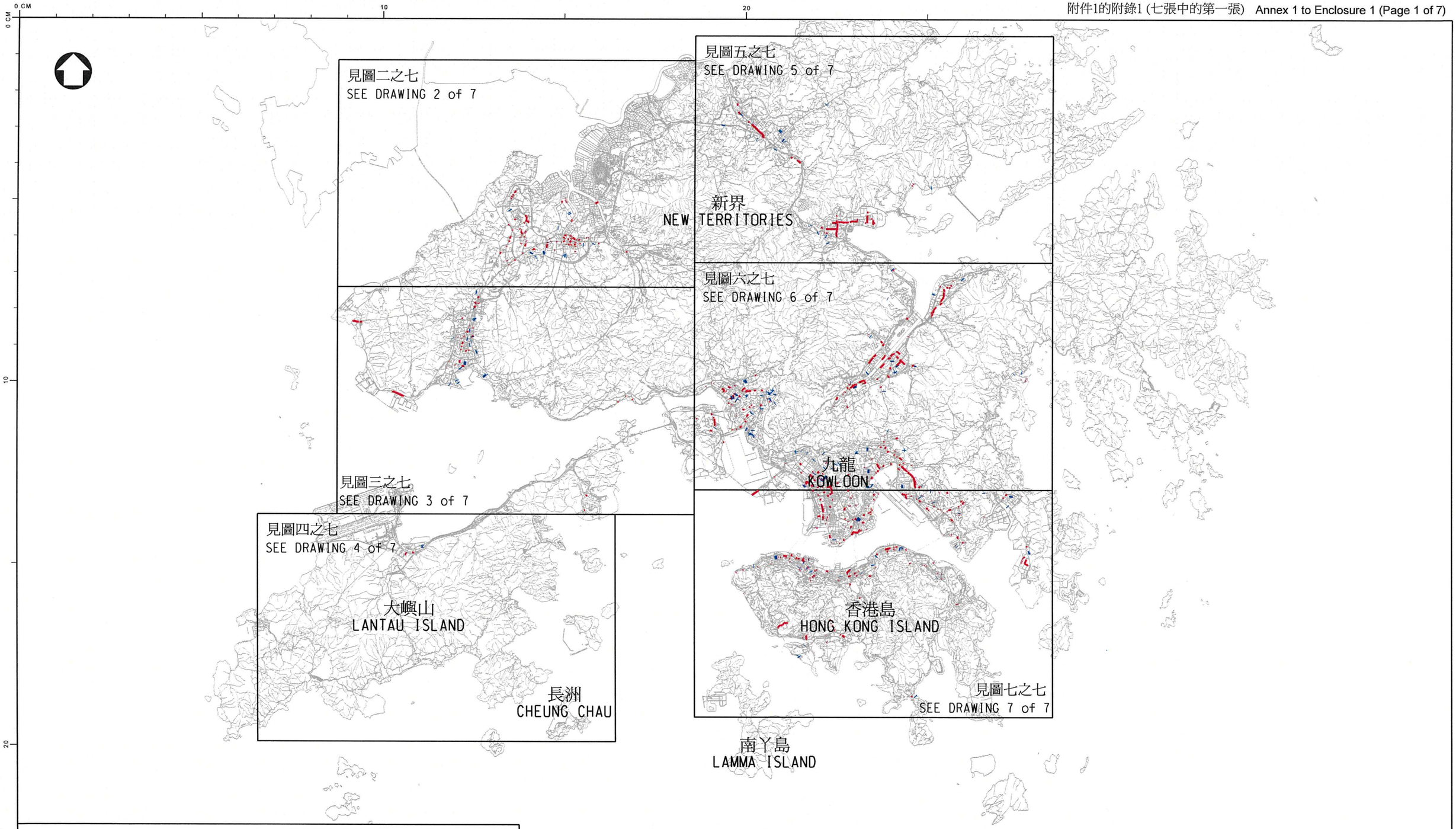

圖 例 LEGEND :

- 擬勘測之污水渠 PROPOSED SEWERS FOR CONDITION SURVEY
- 擬修復之污水渠 PROPOSED SEWERS FOR REHABILITATION

版 no.	日 期 date	修 改 項 目 description	簡 簽 initial

圖 則 名 稱 drawing title

工務計劃項目第4414DS號 －
地下污水渠修復工程 (圖一之七)
PWP ITEM NO.4414DS -
REHABILITATION OF UNDERGROUND SEWERS (DRAWING 1 OF 7)

繪 畫 drawn	*SIGNED* H.Y. LEE	日 期 date 21 MAR 2018
核 對 checked	*SIGNED* K.Y. CHEN	日 期 date 21 MAR 2018
批 核 approved	*SIGNED* K.W. FUNG	日 期 date 21 MAR 2018
部 門 office	工 程 管 理 部 PROJECT MANAGEMENT DIVISION	

圖 則 編 號 drawing no. DPM/4414DS/1004

比例 scale 1:200000

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

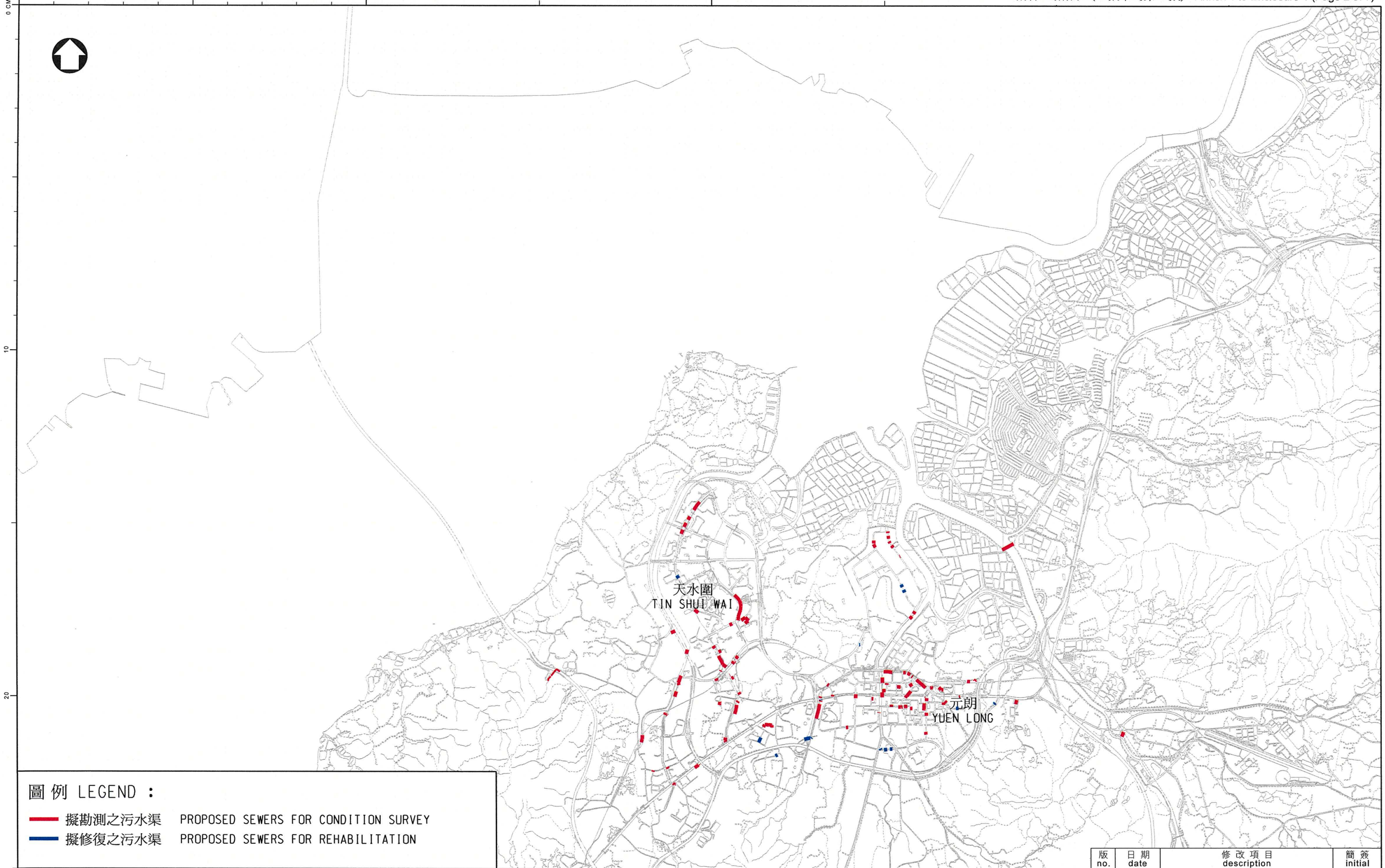

圖 例 LEGEND :

擬勘測之污水渠 PROPOSED SEWERS FOR CONDITION SURVEY

擬修復之污水渠 PROPOSED SEWERS FOR REHABILITATION

圖則名稱 drawing title

工務計劃項目第4414DS號 －
地下污水渠修復工程 (圖二之七)
PWP ITEM NO.4414DS -
REHABILITATION OF UNDERGROUND SEWERS (DRAWING 2 OF 7)

版 no.	日期 date	修改項目 description	簡簽 initial

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批核 approved	SIGNED K.W. FUNG	日期 date 21 MAR 2018	
部門 office	工程管理部 PROJECT MANAGEMENT DIVISION		

圖則編號 drawing no. DPM/4414DS/1005

比例 scale 1:50000

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
SPECIAL ADMINISTRATIVE REGION

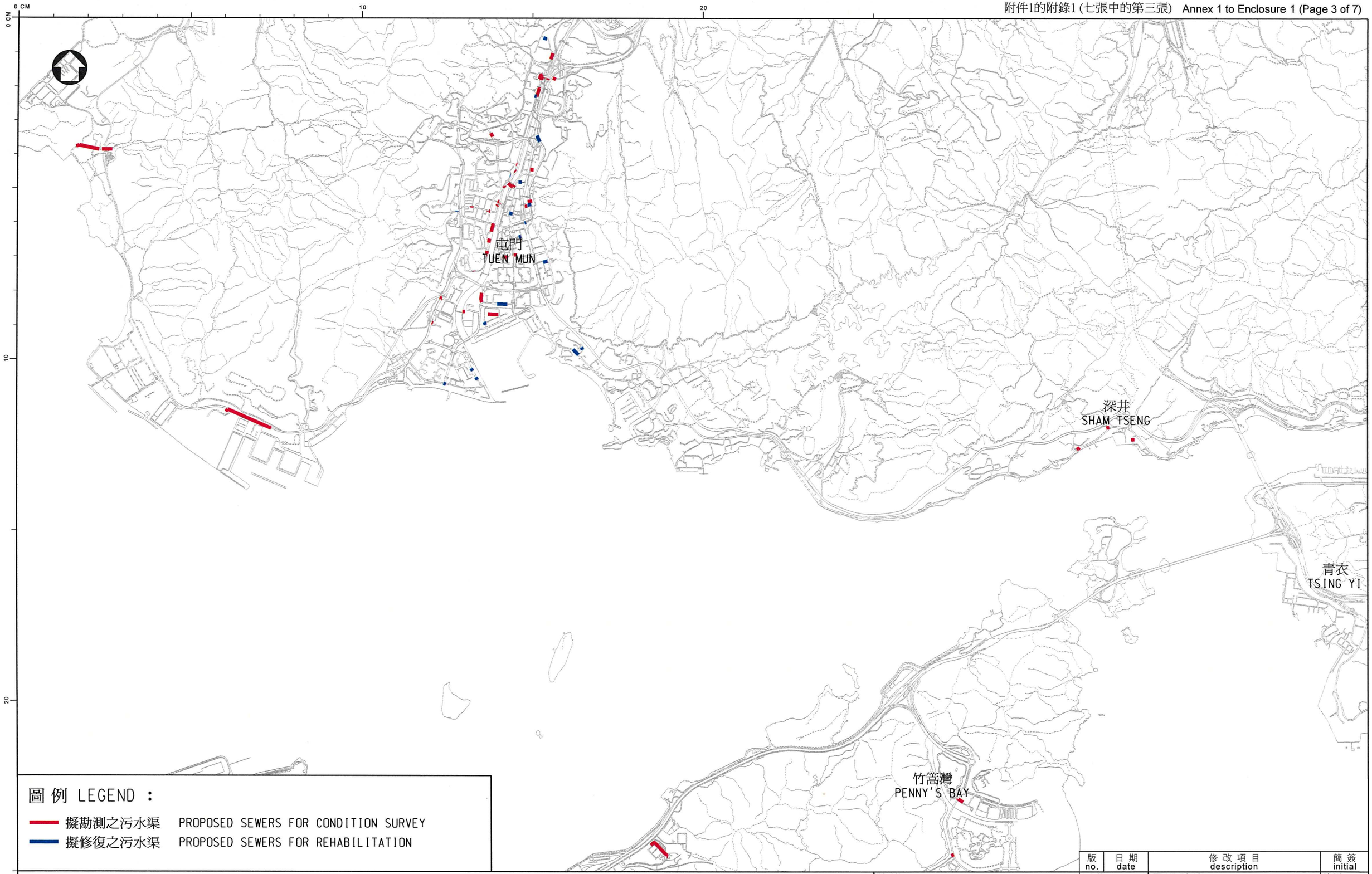

圖 例 LEGEND :

擬勘測之污水渠 PROPOSED SEWERS FOR CONDITION SURVEY

擬修復之污水渠 PROPOSED SEWERS FOR REHABILITATION

圖則名稱 drawing title

工務計劃項目第4414DS號 –
地下污水渠修復工程 (圖三之七)
PWP ITEM NO.4414DS -
REHABILITATION OF UNDERGROUND SEWERS (DRAWING 3 OF 7)

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批核 approved	*SIGNED* K.W. FUNG	日期 date 21 MAR 2018
部門 office	工程管理部 PROJECT MANAGEMENT DIVISION	

圖則編號 drawing no. DPM/4414DS/1006

比例 scale 1:50000

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
SPECIAL ADMINISTRATIVE REGION

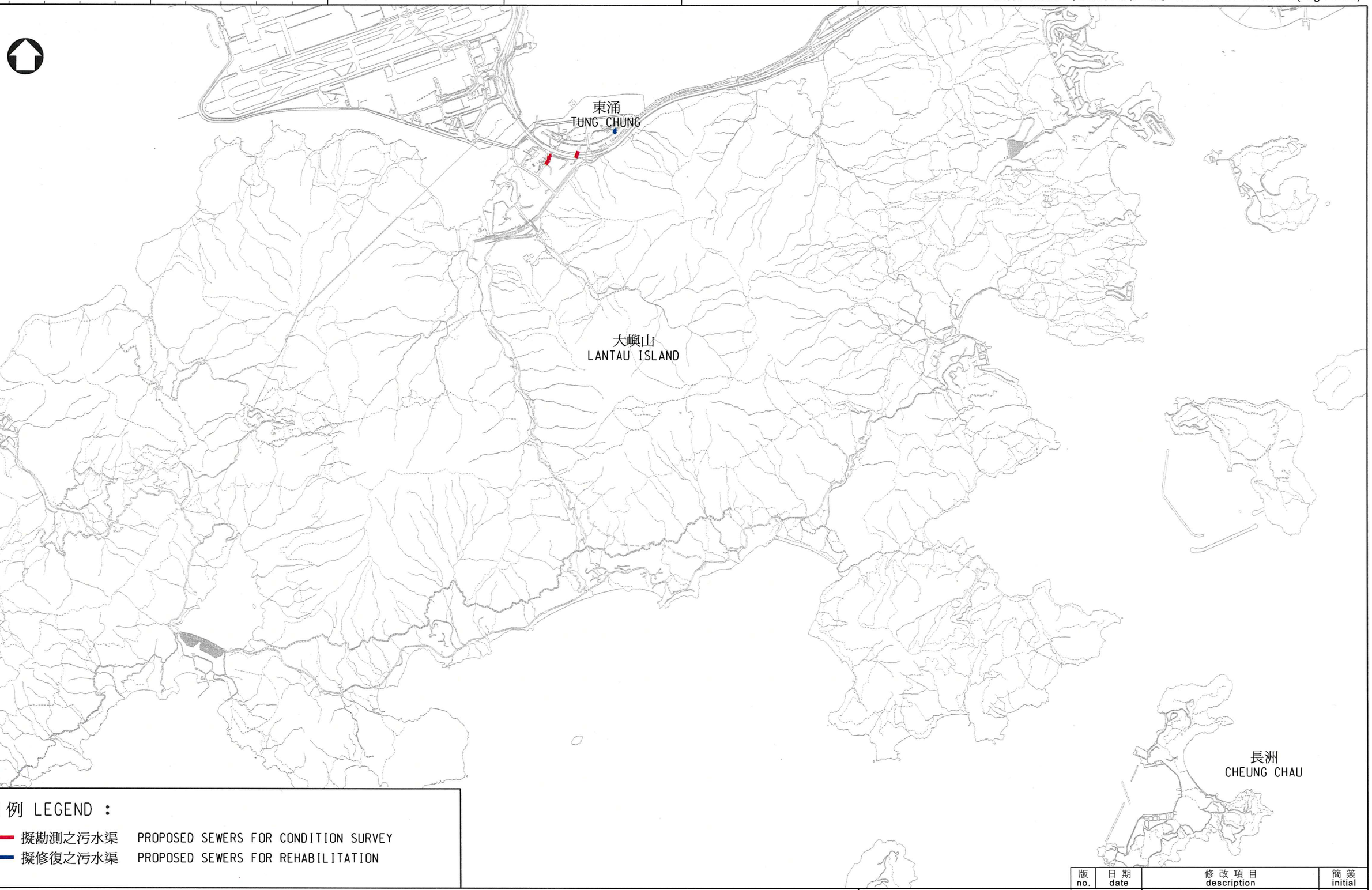

圖 例 LEGEND :

擬勘測之污水渠 PROPOSED SEWERS FOR CONDITION SURVEY

擬修復之污水渠 PROPOSED SEWERS FOR REHABILITATION

圖則名稱 drawing title

工務計劃項目第4414DS號 –
地下污水渠修復工程 (圖四之七)
PWP ITEM NO.4414DS –
REHABILITATION OF UNDERGROUND SEWERS (DRAWING 4 OF 7)

版 no.	日期 date	修改項目 description	簡簽 initial

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部門 office	工程管理部 PROJECT MANAGEMENT DIVISION	

圖則編號 drawing no. DPM/4414DS/1007

比例 scale 1:50000

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

0 CM 10 20

0 CM

10

20

上水
SHEUNG SHUI

粉嶺
FANLING

大埔
TAI PO

圖 例 LEGEND :

擬勘測之污水渠 PROPOSED SEWERS FOR CONDITION SURVEY

擬修復之污水渠 PROPOSED SEWERS FOR REHABILITATION

圖則名稱 drawing title

工務計劃項目第4414DS號 –
地下污水渠修復工程 (圖五之七)
PWP ITEM NO.4414DS –
REHABILITATION OF UNDERGROUND SEWERS (DRAWING 5 OF 7)

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批核 approved	SIGNED K.W. FUNG	日期 date 21 MAR 2018	
部門 office	工 程 管 理 部 PROJECT MANAGEMENT DIVISION		

圖則編號 drawing no. DPM/4414DS/1008

比例 scale 1:50000

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

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圖 例 LEGEND :

擬勘測之污水渠 PROPOSED SEWERS FOR CONDITION SURVEY

擬修復之污水渠 PROPOSED SEWERS FOR REHABILITATION

馬鞍山
MA ON SHAN

沙田
SHA TIN

西貢
SAI KUNG

葵涌
KWAI CHUNG

荃灣
TSUEN WAN

青衣
TSING YI

長沙灣
CHEUNG SHA WAN

九龍塘
KOWLOON TONG

九龍灣
KOWLOON BAY

圖則名稱 drawing title

工務計劃項目第4414DS號 –
地下污水渠修復工程 (圖六之七)
PWP ITEM NO.4414DS –
REHABILITATION OF UNDERGROUND SEWERS (DRAWING 6 OF 7)

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部門 office	工程管理部 PROJECT MANAGEMENT DIVISION	

圖則編號 drawing no. DPM/4414DS/1009

比例 scale 1:50000

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
SPECIAL ADMINISTRATIVE REGION

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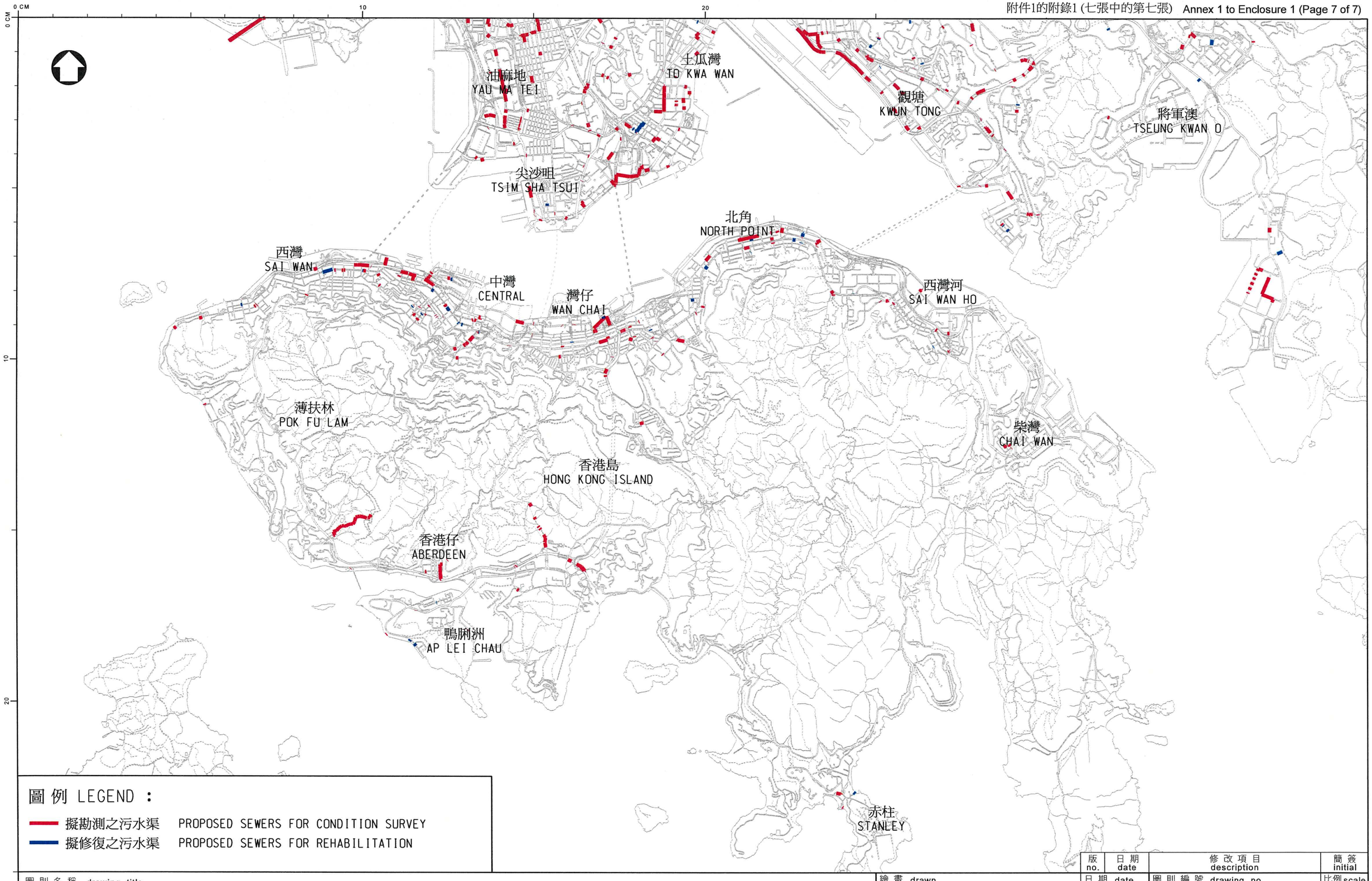

圖 例 LEGEND :

擬勘測之污水渠 PROPOSED SEWERS FOR CONDITION SURVEY

擬修復之污水渠 PROPOSED SEWERS FOR REHABILITATION

圖則名稱 drawing title

工務計劃項目第4414DS號 －
地下污水渠修復工程 (圖七之七)
PWP ITEM NO.4414DS -
REHABILITATION OF UNDERGROUND SEWERS (DRAWING 7 OF 7)

版 no.	日期 date	修改項目 description	簡簽 initial

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批核 approved	*SIGNED* K.W. FUNG	日期 date 21 MAR 2018
部門 office	工 程 管 理 部 PROJECT MANAGEMENT DIVISION	

圖則編號 drawing no. DPM/4414DS/1010

比例 scale 1:50000

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

Annex 2 to Enclosure 1

4414DS – Rehabilitation of underground sewers

Consultation with District Councils

Date	District Council	Committee
27 Nov 2017	Southern	District Development and Housing Committee
30 Nov 2017	Sham Shui Po	Environment and Hygiene Committee
5 Dec 2017	Eastern	Planning, Works and Housing Committee
12 Dec 2017	Wan Chai	Development, Planning & Transport Committee
19 Dec 2017	Wong Tai Sin	Food and Environmental Hygiene Committee
4 Jan 2018	Tsuen Wan	Environmental and Health Affairs Committee
10 Jan 2018	Tai Po	Environment, Housing and Works Committee
11 Jan 2018	Sai Kung	Housing and Environmental Hygiene Committee
11 Jan 2018	Sha Tin	Health and Environment Committee
15 Jan 2018	North	District Minor Works and Environmental Improvement Committee
18 Jan 2018	Yau Tsim Mong	Food, Environmental Hygiene and Public Works Committee
18 Jan 2018	Kowloon City	Housing and Infrastructure Committee
19 Jan 2018	Tuen Mun	Environment, Hygiene and District Development Committee
22 Jan 2018	Yuen Long	Environmental Improvement Committee
29 Jan 2018	Islands	Tourism, Agriculture, Fisheries and Environmental Hygiene Committee
30 Jan 2018	Kwun Tong	Environment and Hygiene Committee
20 Feb 2018	Kwai Tsing	Planning and District Facilities Management Committee
15 Mar 2018	Central and Western	Food, Environment, Hygiene and Works Committee

Enclosure 2

4344DS – Upgrading of Central and East Kowloon sewerage – phase 3

PROJECT SCOPE

The proposed scope of works under **4344DS** comprises –

(a) the construction of about 7 kilometres (km) of gravity sewers with diameters ranging from 300 millimetres (mm) to 1 050 mm in Central Kowloon;

(b) the demolition of about 7 km of existing gravity sewers;

(c) the rehabilitation of about 450 metres (m) of a gravity sewer with diameter of 1 200 mm in Tsim Sha Tsui; and

(d) ancillary works[1].

A plan showing the locations of the proposed works is at **Annex 1 to Enclosure 2**.

JUSTIFICATIONS

2. The "Review of Central and East Kowloon Sewerage Master Plans" completed in 2003 recommended that the existing sewerage system in the region should be upgraded to serve the increasing population, the district redevelopment and the planned changes in land use. The overall sewage flow in the region is projected to increase by as much as 30% from 2006 to 2041, having regard to the latest planning data.

3. The recommended sewerage upgrading works for Central and East Kowloon are divided into three phases. The first two phases, which cover the East Kowloon areas between Wong Tai Sin and Yau Tong, were completed in 2012 and 2016 respectively.

4. We now propose to proceed with phase 3 of the recommended sewerage upgrading works involving the demolition of about 7 km of existing

[1] Ancillary works include the utilities diversion, road and drainage works required to facilitate the sewerage works.

gravity sewers in Central Kowloon areas including San Po Kong, Kowloon City, To Kwa Wan, Ma Tau Wai, Hung Hom and Tsim Sha Tsui, and the reprovisioning with larger diameter gravity sewers. The diameters of these new sewers range from 300 mm to 1 050 mm and will serve to provide sufficient capacity to reduce the risk of sewage overflow in Central Kowloon. We will further rehabilitate about 450 m of gravity sewer with a diameter of 1 200 mm in Tsim Sha Tsui. Trenchless technologies will be employed, where appropriate, to reduce inconvenience to the public.

5. Subject to the funding approval of the Finance Committee, we aim to commence construction of the proposed works in the fourth quarter of 2018 for completion in the first quarter of 2024.

FINANCIAL IMPLICATIONS

6. We estimate that the total capital cost of the proposed works as detailed in paragraph 1 above to be $680.9 million in money-of-the-day prices.

PUBLIC CONSULTATION

7. We consulted the Traffic, Transport and Housing Committee of Yau Tsim Mong District Council (DC), Housing and Infrastructure Committee of Kowloon City DC, and Traffic and Transport Committee of Wong Tai Sin DC on 1, 15 and 27 March 2018 respectively. These committees supported the proposed works.

ENVIRONMENTAL IMPLICATIONS

8. The proposed works is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). The Drainage Services Department completed a Preliminary Environmental Review (PER) for the proposed works in 2008 and updated the PER in 2018. The updated PER concluded and the Director of Environmental Protection agreed that the proposed works would not have any long-term adverse environmental impacts. We have included in the project estimate of the proposed works the cost for implementing suitable mitigation measures to control short-term environmental impacts.

9. During the construction phase, we will control noise, dust and site run-off nuisance to within the established standards and guidelines through the

implementation of the recommended mitigation measures in the relevant contract. These measures include the use of silenced construction equipment and temporary noise barriers to reduce noise impact. In addition, water-spraying to the construction site will be applied regularly to minimise emission of fugitive dust, and on-site treatment of site run-off will be carried out to minimise potential water quality impact. We will also carry out regular site inspections to ensure that these recommended mitigation measures and good practices will be properly implemented on site.

10. At the planning and design stages, we have considered ways to reduce the generation of construction waste (e.g. use of common trenches to minimise excavation works) where possible. In addition, we will require the contractor to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible in order to minimise the disposal of inert construction waste to the public fill reception facilities (PFRF[2]). We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

11. We will also request the contractor to submit for approval a plan setting out the waste management measures, including appropriate mitigation measures to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will request the contractor to separate inert and non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert and non-inert construction waste at PFRF and landfills respectively through a trip-ticket system.

12. We estimate that the proposed works will generate 47 500 tonnes of construction waste. Of these, we will reuse about 12 800 tonnes (27%) of inert construction waste on site, and deliver the 31 200 tonnes (66%) of inert construction waste to PFRF for subsequent reuse. We will dispose of the remaining 3 500 tonnes (7%) of non-inert construction wastes at landfills. The total cost for accommodating construction waste at PFRF and landfill sites is estimated to be $2.9 million[3].

[2] PFRF are specified in Schedule 4 of Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste in PFRF requires a licence issued by the Director of Civil Engineering and Development.

[3] The cost is calculated based on a unit charge rate of $71 per tonne for disposal at PFRF and $200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N).

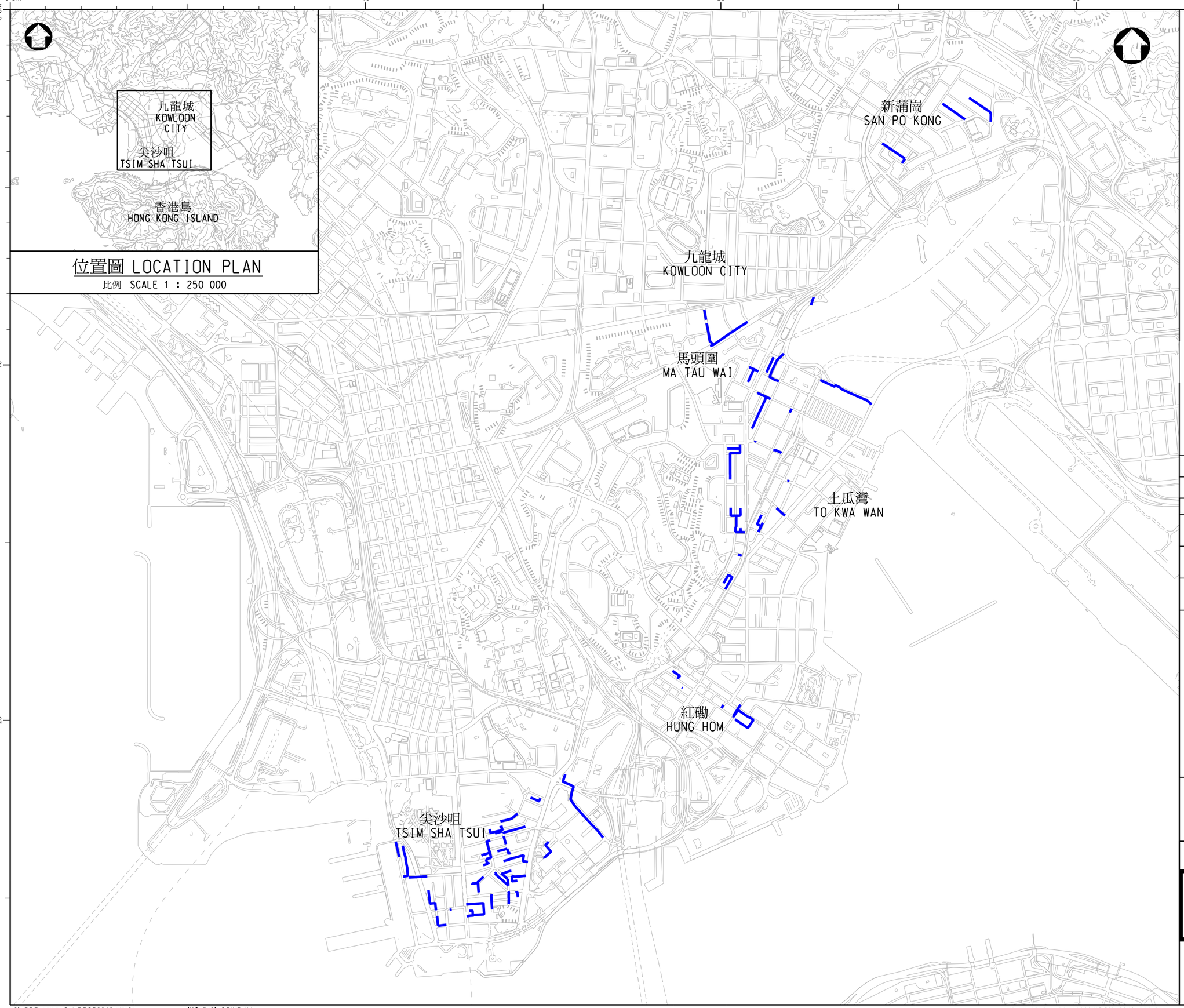
HERITAGE IMPLICATIONS

13. The proposed works will not pose insurmountable impact on any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites and buildings, sites of archaeological interest or known areas of archaeological potential and government historic sites identified by the Antiquities and Monuments Office (AMO). Appropriate mitigation measures, including but not limited to structural monitoring, will be carried out to ensure the built heritage in the vicinity of the proposed works will not be directly or indirectly affected during the course of works. Appropriate mitigation measures will also be recommended if areas of archaeological potential are identified. We will work closely with AMO to formulate and implement the mitigation measures as and when required.

LAND ACQUISTION

14. The implementation of the proposed works will only involve government land and a drainage reserve area within Hong Kong Polytechnic University. No land resumption is required.

Environment Bureau
Drainage Services Department
April 2018



位置圖 LOCATION PLAN

比例 SCALE 1 : 250 000

圖例
LEGEND :

擬議污水渠
PROPOSED SEWERS

版 no.	日 期 date	修 改 項 目 description	簡 簽 initial

修 訂 REVISION

	姓 名 name	日期 date
繪 畫 drawn	*SIGNED* W. Y. HUI	20 MAR 2018
核 對 checked	*SIGNED* Ir K. K. LEI	20 MAR 2018
批 核 approved	*SIGNED* Ir C. C. YEUNG	20 MAR 2018

圖 則 名 稱 drawing title

工務工程計劃編號4344DS
- 九龍中部及東部污水收集系統
改善工程 - 第3期
PWP ITEM NO. 4344DS
- UPGRADING OF CENTRAL AND EAST KOWLOON SEWERAGE - PHASE 3

圖 則 編 號 drawing no.	比例 scale
DCM/2018/008	1 : 20 000

部 門 office

顧 問 工 程 管 理 部
CONSULTANTS MANAGEMENT DIVISION

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION