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# Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II

Executive Summary

February 1997



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## DURATION OF PROJECT WORKS

The duration of the project works and the timing of construction of the sewerage for each village will depend upon the Contractor's resources. It is likely that works will be in progress in only five or six villages at any one time. The estimated time required for construction of the village sewerage is two months for a small sized village, three months for a medium sized village and six months for a large village. The construction time period may be increased however due to the diversion of other utility services.

## EXISTING ENVIRONMENT

### NOISE

The majority of the villages to be sewered are located within quiet rural areas, with the surrounding land used for open space and agriculture. For the majority of the villages, noise levels are very low and are not influenced by noise generated outside of the village area. This is the situation for villages including Fo Tan Cottage Area, Wong Chuk Yeung, Tai Lam Liu, Shek Kwu Lung and Wong Nai Tau. The major contributions to noise in the rural villages are agricultural activities, dogs barking, insects and construction of new village houses.

Background noise levels within the villages located along the major roadways such as Ting Kok Road, including Tai Mei Tuk, Wong Chuk Tsuen and Lung Mei, are much higher. The housing units in the village that face the roadway are subject to noise from traffic, however the residential units that are set back from the road are generally quiet as they are sheltered by the houses closer to the road. Some of the other villages such as Fo Tan and Wo Liu Hang are located alongside industrial areas which also contribute to noise within the village environment.

### AIR QUALITY

The villages to be sewered are located mostly in rural areas, either within or surrounded by agriculture or open space, where the main source of dust pollutants is agriculture. There are a few villages that are located near industrial areas which may be recipients of odours and other industrial air pollutants. The villages that are located along the more heavily trafficked roadways are subject to dust and vehicle emissions.

The annual average pollution concentration ( $\mu\text{g}/\text{m}^3$ ) for TSP and RSP for the Tai Po area in 1994 was  $87 \mu\text{g}/\text{m}^3$  and  $50 \mu\text{g}/\text{m}^3$ , respectively, and for Shatin was  $78 \mu\text{g}/\text{m}^3$  and  $53 \mu\text{g}/\text{m}^3$  respectively.

### WATER QUALITY

The villages presently pollute water sources from the

discharge of foul sewage, septic that overflow and sullage.

### Surface Water

The rivers and streams in the project area are subject to several types of pollution, including domestic sewage effluent, contaminated storm water, industrial effluent and agricultural waste. A field survey and pollution load assessment carried out as part of the Tolo Harbour Catchment Study on Unsewered Development (1990) which assessed water quality in and around Tolo Harbour showed that thirty water course systems within the villages fell into the categories of bad and very bad. The quality indices indicate that the waters are prone to odour nuisances.

### Ground Water

Ground water monitored in a well situated at Lam Tsuen in the Tolo Harbour Supplementary WCZ is sampled by EPD. The water quality in this well has been regarded as unsatisfactory, with a median biochemical oxygen demand of  $2 \text{ mg}/\text{L}$  and a geometric mean *E. coli* count of  $1,109 \text{ cfu}/100\text{mL}$  in 1993.

### Marine Water

The quality of surface water discharged into the Tolo Harbour has an impact on both the near shore and the overall marine water quality. EPD carry out routine water quality surveys throughout the Territory's waters. Analysis of the data shows that the annual geometric mean values of *E. coli* is within the WQO value of  $610/100\text{mL}$ , compliance with the dissolved oxygen WQO has been deteriorating, the annual mean concentration of un-ionised ammonia is below the WQO value of  $0.021 \text{ mgN}/\text{L}$  applied to other WCZs and the annual mean inorganic nitrogen concentrations exceed the values suggested in the Watson et al (1988)<sup>1</sup> Study as required to limit algal growth.

### ECOLOGY

Much of the natural vegetation within the villages and along the main sewer alignments have been highly disturbed over the years from development and agricultural activities. The ecologically significant areas near the proposed sewer alignments include trees and shrub vegetation however the majority of this vegetation is disturbed. There are a few Sites of

<sup>1</sup> Ref. Watson et al 1988, Hong Kong Government EPD Sewerage Strategy Study Working Paper 2 Water Quality Objectives.

Special Scientific Interest (SSSI) in the Tolo Harbour area. These include the Ting Kok Mangrove SSSI near Po Sam Pai village, and the Sheun Wan Egret SSSI near Shuen Wan Chim Uk, Sheun Wan Lei Uk and Sam Mun Tsai villages.

## LANDUSE, LANDSCAPE & VISUAL IMPACTS

### Landuse

The villages fall within the Outline Zoning Plans for Shatin, Ting Kok, Tai Po and Ma On Shan. The majority of the sewerage areas are located within areas designated as "Village Type Development" under their zoning plans. Some of the proposed alignment routes traverse through other types of land uses, including "Open Space" and "Green Belt". The Project is outside the boundary of the Country-Park.

There are several cultural features located in and around the villages. These include graves, shrines, urns, tsz tongs and temples.

### Landscape

The study area includes villages that border the coast of Tolo Harbour, inland villages located in the rural mountainous areas and villages located within the developed areas of Tai Po and Shatin. The landscape within these villages includes both active and fallow agricultural land, plantings, grass and scrubland, woodland and coastal vegetation. The landscape type differs from village to village.

There are no areas within the study area that are designated as areas of special landscape value or nature reserve areas.

### Visual

The scenic values of the villages range greatly depending upon the condition of the sanitation within the villages and the maintenance of the landscaping. The village developments generally include a range of relatively new houses, a mixture of new and old houses and older housing units.

The scenic value from the villages also are different and include views of rural countryside, mountain areas, views of Tolo Harbour and views of highly developed areas. At several of the villages there are construction projects for development of new housing units.

## POTENTIAL ENVIRONMENTAL IMPACTS AND THEIR MITIGATION

### WASTE MANAGEMENT

#### Impacts

The type of waste material generated during construction will include:

- broken concrete from the top layer of excavations along road, tracks, paths and alleyways;
- broken asphalt from excavation in roadways;
- soil from trench excavation; and
- possibly some contaminated sludge from excavations near septic tanks.

Ground that is excavated will be hard material, such as pavement and soft material consisting of soil. Much of the soft material will likely be reused as fill for the project and therefore will not require disposal. It is considered that the small amount of material requiring disposal will not result in environmental impacts.

Waste materials produced during operation of the project are limited to screen materials at the pumping stations. Measures have been proposed in the EIA to reduce impacts from potential odours from removal of these materials.

### NOISE

#### Impacts

Noise will be generated by construction of main sewers, village sewers and, pumping stations. This noise may affect noise sensitive receivers both in the villages and scattered housing development between villages. The assessment has identified the scale of the impacts and has concluded that mitigation is required to reduce noise levels to an acceptable level. Residual impacts may still occur at some village housing units after mitigation measures are implemented, however impacts will only occur for a short duration (no more than about two weeks at each location) and will be no more than 1 to 5 dB(A) above the acceptable noise criteria.

Noise impacts are not expected to occur from the operation of pumping stations, as sound power levels that will be generated immediately outside the pumping station will be only 50 dB(A), which is within the acceptable day and evening noise criteria. Noise impacts at sensitive receivers will be much lower and will be within acceptable levels in all cases.

### AIR QUALITY

Air quality issues are dust during construction and odours during operation. The project may generate

dust from:

- concrete breaking and removal;
- excavation of trenches, terminal manholes and pumping stations;
- stockpiling of excavated material and other material, such as bedding; and
- backfilling of materials

Once operational, the project is not expected to generate odours from pumping stations. The type 1 pumping stations will be small with natural ventilation and measurements at similar pumping stations have shown that there are no detectable odour at the station's boundary. The type 2 pumping stations will have odour control systems designed to EPD standards

Mitigation measures proposed to reduce dust levels during construction include ensuring that equipment, plant and raw material are transported by manual means, requiring vehicles to use paved roads, restricting the excavated trenches to 30 m and at any one time, containing materials within hoardings, restricting concrete batching on site and covering of stockpiled materials with tarpaulins whenever works are within village boundaries or within 20 m from any residential building, school or other air sensitive receivers. The mitigation measures will eliminate any impacts.

## WATER QUALITY

### Impacts

Water quality impacts during construction may arise from works that are in water gathering grounds, sewer pipelines crossing water courses areas where soil materials may be stockpiled and areas where oil or fuel may be stored.

Measures proposed to reduce the potential for water pollution include siting mechanical plant maintenance and refuelling areas outside sensitive areas, containment of stockpiled materials, providing and inspecting silt traps and fully complying with the WSD requirements to avoid pollution in water gathering grounds.

The assessment of water pollution impacts has determined that with the implementation of the proposed mitigation measures there will be no insurmountable impacts relating to water pollution from construction and operation.

## ECOLOGY

The assessment did not identify any potential impacts to habitats that are considered important to wild life. The majority of the potential impacts apply to the damage or loss of vegetation which should be

minimise during development of the detailed design and during construction.

Measures to reduce vegetation loss are provided for the Tai Me Tuk Government Housing Area and Tai Lam Liu and Sam Mun Tsai New Village.

The mitigation measures proposed to reduce potential ecological impacts comprise: restricting construction works to existing pathways and roadways; restricting vehicles, heavy equipment and building materials to designated areas; and requiring that the alignment in Lo Lau Uk to cross the existing foot bridge to reduce impacts to riparian vegetation.

The assessment of ecological impacts has determined that with mitigation there will be no impacts relating to ecological disturbance during construction and there will be no ecological impacts during operations.

## LANDUSE, LANDSCAPE & VISUAL IMPACTS

The villages contain several cultural features such as graves, shrines, urns, tsz tongs and temples as well as visual features and landscaping that requires protection.

Impacts to landscape have been assessed in the Ecology Section. There are several large camphor and longan trees in the Wu Kwai Sha New Village, Kwai Po Lau and Luk Wo Sha areas. Any impact to these trees can be avoided by the proposed mitigation measures.

The visual impacts during construction will include views of stockpiled soil, rock and pipes as well as open trenches. The visual impacts associated with the construction activities will be temporary and can be mitigated.

All of the sewers will be placed below ground unless factors such as utilities or access constraints prevent this. The visual impacts of these exceptions are considered minor compared to the benefit of the project.

Visual impacts may also occur from the equipment housings for the pumping stations. The pumping station housings will be very small and will be located away from sensitive receivers.

Mitigation measures to reduce identified impacts include: removal and proper disposal of residual materials after completion of the works; design of pumping house stations to blend with the environment; avoiding disturbance to cultural resources; and avoiding areas of mature trees in villages, the Fung Shui grove of Wu Kwai Sha village and in particular the mature trees between Lok Wo Sha and Kwai Po Lau.

## **BENEFICIAL IMPACTS**

The successful implementation of the project will reduce the pollution loads to surface waters that flow into Tolo Harbour and to ground waters by intercepting and treating domestic foul sewage, septic tank overflow and sullage that are currently discharged directly into watercourses. The Project will therefore have a progressive beneficial impact on water quality as the sewerage network and associated plant is brought into operation.

## **ENVIRONMENTAL MONITORING AND AUDIT (EM&A)**

The EIA has identified and quantified the potential environmental effects of the Project and proposed mitigation measures. To ensure the effective implementation of the measures and to monitor unanticipated effects, an EM&A programme has been established which will undertake the following specific activities:

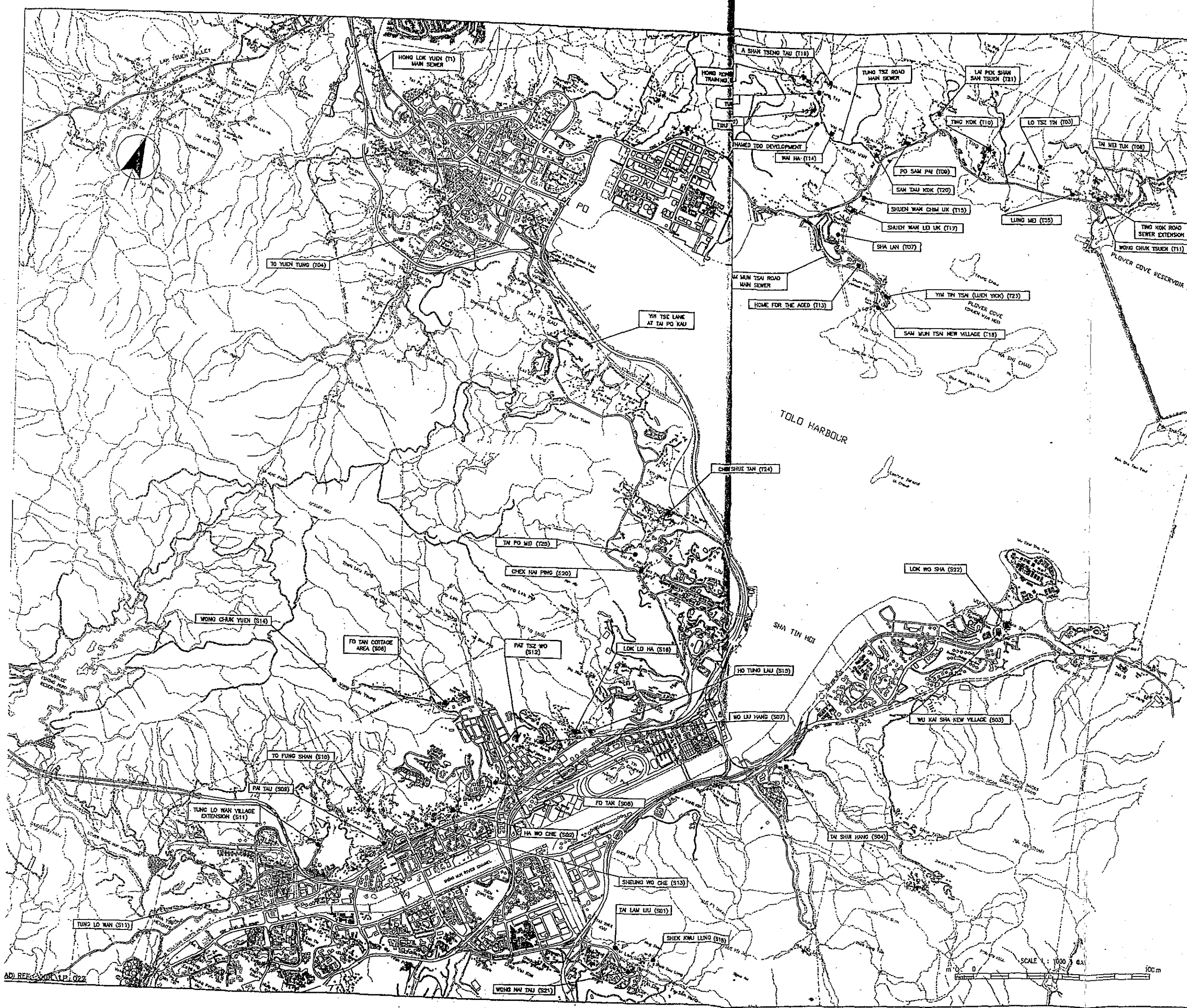
- monitoring of the environmental performance of the Project and the effectiveness of the mitigation measures;
- verify the environmental impacts predicted in the EIA;
- determine the compliance with regulatory requirements and government policies; and
- initiate remedial action if un-anticipated impacts arise.

Monitoring will be undertaken during the Project construction to determine the effect of the activities and the effectiveness of the mitigation measures and compliance with regulatory requirements and standards.

The results of environmental monitoring programme will be reported to EPD.

## **CONCLUSION**

The implementation of the mitigation measures recommended in the EIA Report supported by the EM&A programme will ensure that the Project is carried out in such a way that the potential environmental impacts are controlled to within the environmental guidelines and standards and will generate the least amount of impact to residents within the villages developments.



NOT FOR CONSTRUCTION

DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE	REVISION DESCRIPTION
2/86	MAW	KPW			2	TUNG TSZ & SCOUT TRAINING CENTRE ADDED
10/85	MAW	EL			1	DRAFT ISSUE

**GOVERNMENT OF HONG KONG**  
**Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)**

LOCATION PLAN

 DSD	AGREEMENT NO. CE/18/84	SHEET 1 OF 1
	<b>Fig. No. 1</b>	ISSUE 2

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ADD REF: 11/1/92

**Annex A**



**Annex A: Village and Development Areas to be Sewered in Tai Po****Sewerage Area**

Tai Mei Tuk Village and Government Housing Area  
Wong Chuk Tsuen Village  
Lung Mei Village  
Lo Tsz Tin Village  
Lai Pek Shan San Tsuen Village  
Ting Kok Village  
Po Sam Pai Village  
San Tau Kok Village  
Wai Ha Village and un-named development southwest of Tung Tsz Road  
Tsiu Lam Village  
Tung Tsz Village  
A Shan Tseng Tau Village  
Scout Training Centre (connection to main sewer only)  
Shuen Wan Chim Uk  
Shuen Wan Lei UK  
Sha Lan Village  
Home for the Aged  
Sam Mun Tsai New Village  
Luen Yick San Tsuen Village  
Hong Lok Yuen Development (connection to main sewer only)  
To Yuen Tung Village  
Yin Tse Lane and Tolo Ridge at Tai Po Kau San Wai  
Cheung Shue Tan Village  
Tai Po Mei Village

**Annex A: Village and Development Areas to be Sewered in Shatin****Sewerage Area**

Chek Nai Ping Village  
Fo Tan Village  
Ho Tung Lau Village  
Lok Lo Ha Village  
Wo Liu Hang Village  
Pat Tsz Wo Village  
Fo Tan Cottage Area  
Wong Chuk Yeung Village  
Ha Wo Che Village  
Sheung Wo Che Village  
To Fung Shan Village  
Pai Tau Village  
Tung Lo Wan Village and Village Extension  
Tai Lam Liu Village  
Shek Kwu Lung Village  
Wong Nai Tau Village  
Tai Shui Hang Village  
Wu Kwai Sha New Village  
Lok Wo Sha Village

**Annex A: Proposed Main Sewers**

**Main Alignment**

main sewer from Hong Lok Yuen to Shui Wai

main sewer along Sam Mun Tsai Road

main sewer along Tung Tsz Road

trunk sewer along Ting Kok Road at Tai Mei Tuk

pumping main from Cheung Shue Tan to existing Trunk Sewer in Tai Po Road

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