

①7 in EPD/N/08(VI)

 EPD Library

Hong Kong Government
Drainage Services Department

Agreement No. CE 18/94

Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II

Environmental Impact Assessment
Final Assessment Report

February 1997

 **MONTGOMERY WATSON** 環協顧問工程師

in association with

Mouchel

Mouchel Asia Limited
Consulting Engineers

Mouchel Asia Limited
Consulting Engineers

萬碩

EIA 107.1/BC




Mouchel

Hong Kong Government
Drainage Services Department

Agreement No. CE 18/94

Tolo Harbour Sewerage
of Unsewered Areas Stage I Phase II

Environmental Impact Assessment
Final Assessment Report

Document Reference no. SVJ/SEB/CC/90498/02.18.97				
	Name	Position	Signature	Date
Prepared by	S. E. Bezy	Senior Environmental Scientist		18.02.97
Checked by	S. V. Jones	Project Director		19/2/97
Approved by	S. V. Jones	Project Director		19/2/97
Copy No.	19 30			

♻️ This report is printed on recycled paper

Mouchel Asia Limited

MOUCHEL
No part of this document may be reproduced or transmitted, in any form or by any means electronic, mechanical, photographic, recording or otherwise, or stored in a retrieval system of any nature without the written permission of Mouchel Asia Ltd, application for which shall be made to Mouchel Asia Ltd, 24/F, Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong.

TABLE OF CONTENTS

1.0	INTRODUCTON	1-1
1.1	Background Information	1-1
1.2	Environmental Impact Assessment	1-1
1.3	Purpose of the Assignment	1-2
1.4	Report Structure	1-2
2.0	PROJECT DESCRIPTION	2-1
2.1	Project Area	2-1
2.2	Villages and Developments to be Sewered	2-1
2.3	Project Works	2-1
2.4	Construction Activities	2-1
2.5	Duration of Project Works and Timing of Activities	2-2
3.0	AREAS TO BE SEWERED	3-1
3.1	Village Developments	3-1
3.2	Other Development Areas and Main Sewers	3-1
3.3	Description of Villages and Other Areas to be Sewered	3-1
4.0	WASTE MANAGEMENT	4-1
4.1	Introduction	4-1
4.2	Waste Types	4-1
4.3	Waste Arisings	4-1
4.4	Waste Reduction Mitigation Measures	4-2
5.0	NOISE IMPACT ASSESSMENT	5-1
5.1	Introduction	5-1
5.2	Environmental Standards and Guidelines	5-1
5.2.1	General	5-1
5.2.2	Construction Noise	5-1
5.2.3	Operational Noise	5-1
5.3	Noise Sensitive Receivers	5-2
5.4	Existing Conditions	5-2
5.5	Potential Noise Impacts	5-3
5.5.1	Construction Noise from Pumping Stations	5-3
5.5.2	Construction Noise from Main Sewers	5-5
5.5.3	Construction Noise from Construction of Village Sewers	5-7
5.5.4	Noise Impacts from Operation of Pumping Stations	5-8
5.6	Mitigation Measures	5-8
5.7	Residual Impacts	5-9

6.0	AIR QUALITY ASSESSMENT	6-1
6.1	Introduction	6-1
6.2	Environmental Standards and Guidelines	6-1
6.3	Air Quality Sensitive Receivers	6-2
6.4	Existing Conditions	6-2
6.5	Air Pollution Impacts	6-3
	6.5.1 Construction Air Pollution	6-3
	6.5.2 Operational Air Pollution	6-3
	6.5.3 Conclusion	6-4
6.6	Mitigation Measures	6-5
	6.6.1 Construction Stage	6-5
	6.6.2 Operation Stage	6-5
7.0	WATER QUALITY	7-1
7.1	Introduction	7-1
7.2	Environmental Standards and Guidelines	7-1
	7.2.1 Background	7-1
	7.2.2 Inland Waters - Surface Waters	7-1
	7.2.3 Inland Waters - Ground Water	7-2
	7.2.4 Marine Waters	7-2
7.3	Water Quality Sensitive Receivers	7-3
7.4	Existing Conditions	7-3
	7.4.1 Surface Water	7-3
	7.4.2 Ground Water	7-4
	7.4.3 Marine Water	7-4
7.5	Potential Water Quality Pollution Sources	7-5
	7.5.1 Surface Water Quality	7-5
	7.5.2 Ground Water Quality	7-6
	7.5.3 Marine Water Quality	7-6
7.6	Mitigation Measures	7-6
7.7	Residual Impacts	7-8
8.0	ECOLOGY	8-1
8.1	Introduction	8-1
8.2	Project Area	8-1
8.3	Summary of Ecological Sensitive Receivers	8-1
	8.3.1 Ecological Sensitive Receivers	8-1
	8.3.2 Additional/Modified Sewer Alignments	8-2
8.4	Conclusions	8-3

8.5	Mitigation Measures	8-3
8.6	Residual Impacts	8-3
9.0	LANDUSE, LANDSCAPE AND VISUAL IMPACTS	9-1
9.1	Introduction	9-1
9.2	Existing Conditions	9-1
9.2.1	Landuse	9-1
9.2.2	Landscape	9-1
9.2.3	Visual	9-1
9.3	Potential Source of Impact to Resources	9-1
9.3.1	Landuse Impact	9-1
9.3.2	Landscape Impacts	9-2
9.3.3	Visual Impacts	9-2
9.4	Mitigation Control Measures	9-2
9.5	Residual Impact	9-2
10.0	CONCLUSIONS	10-1
10.1	Purpose of the Environmental Impact Assessment Report	10-1
10.2	Purpose of the Final Assessment Report	10-1
10.3	Potential Environmental Impact and Key Issues	10-1
10.3.1	Waste Management	10-1
10.3.2	Noise	10-1
10.3.3	Air Quality	10-2
10.3.4	Water Quality	10-2
10.3.5	Ecology	10-2
10.3.6	Landuse, Landscape and Visual Impact	10-2
10.4	Residual Impacts	10-3
10.5	Overall Conclusions	10-3

APPENDIX A PROJECT BRIEF

APPENDIX B COMMENTS AND RESPONSES TO DRAFT FAR

APPENDIX C CONSTRUCTION ACTIVITIES

APPENDIX D VILLAGE DESCRIPTIONS

APPENDIX E NOISE

APPENDIX F AIR QUALITY

APPENDIX G WATER

APPENDIX H ECOLOGY

1.0 INTRODUCTION

1.1 Background Information

The Drainage Services Department (DSD) of the Hong Kong Government appointed Montgomery Watson Hong Kong Limited (MWHK) on the 22 of May 1995, under Agreement No. CE 18/94, to undertake the Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II (herein referred to as the Project). The Project is proposed as a long term solution to alleviate pollution problems caused by the discharge of untreated sewage into Tolo Harbour, that were identified under the "Tolo Harbour Catchment Study on Unsewered Development".

The Project involves three stages of development as follows:

- the preliminary report stage - which includes preparation of the preliminary designs, specification, work programme and environmental impact assessment (EIA);
- the design/contract stage - which includes the preparation of detailed designs and drawings; and
- the construction and completion stage - which includes preparing the contract documents for signature and executing the Project works.

The Project is one Stage of three separate assignments, namely Stage I Phase I, Stage I Phase II and Stage II. The three stages are comprised of similar works at different locations around Tolo Harbour. The Stage I Phase II works are the subject of this EIA.

1.2 Environmental Impact Assessment

Under this assignment, MWHK has appointed Mouchel Asia Limited (Mouchel) to undertake the EIA as part of the Preliminary Report Stage of the Project. Clause 21 of the Study Brief outlines the requirements of the EIA and is provided in Appendix A of this report. In accordance with the Study Brief, the EIA is to be conducted in two stages, the Initial Assessment Report (IAR) and the Final Assessment Report (FAR). The Draft IAR was submitted 23 October 1995 and the Draft FAR for the EIA portion of the study was submitted in March 1996. The following is the Final FAR and has incorporated comments that were received on the Draft FAR as well as minor amendments to the Preliminary Design.

The environmental issue areas which are evaluated under this EIA include:

- solid waste
- noise
- air quality
- water quality
- ecology
- land use, landscape and visual impacts

The FAR has been prepared in compliance with the requirements as specified in Clause 21 of the Study Brief which require the following:

- a description of the existing environment within the study area and a description of the Project and associated works;
- the elements of the community likely to be affected by the Project and an assessment and evaluation of the environmental impacts that may arise from the Project as well as cumulative effects;
- determination of mitigation measures to reduce identified impacts of the project and determination of any residual impacts after mitigation measures are implemented or any

impacts resulting from implementation of the mitigation measures;

- identification of specific methods, measures and standards to be included in the detailed design, construction and operation of the Project; and
- design and specification of the environmental monitoring and audit requirements necessary to ensure the implementation and the effectiveness of the environmental protection and pollution control measures adopted;

1.3 Purpose of the Assignment

This EIA is intended to provide information on the nature and extent of environmental impacts arising from the construction and operation of the Project. This information will contribute to decisions on:

- the overall acceptability of any adverse environmental impacts that are likely to arise as a result of the Project;
- the conditions and requirements for the detailed design, construction and operation of the Project; and
- the acceptability of any residual impacts after the proposed mitigation measures are implemented.

The Project has been proposed to alleviate adverse environmental impacts that are presently occurring from pollution loading on Tolo Harbour. Although the Project will ultimately result in an overall beneficial impact to water quality in the Tolo Harbour area, the objective of the assignment is to assess the Project activities and carry out an EIA that determines and describes the adverse as well as the beneficial environmental impacts associated with the construction and operation of the Project. This has been carried out at the Preliminary Design Stage to determine how the Project may be designed in the Detailed Design Stage, and ultimately brought into operation, in an environmentally acceptable manner.

1.4 Report Structure

Following this Introduction, Section 2 of this report contains a Project description which describes features of the proposed development. The Project description has been prepared from information received from the development of the Stage I Phase II Preliminary Design and the Stage I Phase I works that are presently being undertaken. From this information, a general description of works, equipment requirements and schedule of Project implementation has been compiled.

Section 3 provides a summary of the village descriptions. A full description of the village environments and layout of the sewage alignment scheme have been provided in the Appendices.

Section 4 provides an assessment of solid waste materials based on the information provided in the Project description and also describes the estimated type and quantity of materials that will require removal and disposal.

Sections 5, 6, 7, 8 and 9 provide a description of existing noise, air quality, water quality, ecology and land use, landscape and visual aspects. For each issue area, the applicable environmental standards and guidelines are provided, the existing environment is described, the sensitive receivers are identified and an initial assessment has been carried out. Mitigation measures are recommended for each issue area.

Section 10 summarises the findings and conclusions.

2.0 PROJECT DESCRIPTION

2.1 Project Area

The villages and other type of developments that are included under this Project are located in the Tai Po and Shatin catchment areas, extending from the western edge of the Plover Cove Reservoir to Wu Kai Sha. The regional area is shown on Figure 2.1.

2.2 Villages and Developments to be Sewered

The Tolo Harbour Catchment Study on Unsewered Developments identified forty-seven sites, comprised mostly of villages and a few development areas, to be sewered under this Project. The names of the original villages to be sewered under this Project are provided in Appendix A, Study Brief. During the development of the Preliminary Design, it was recommended that some of the village sewerage should be deferred due to their remote locations and low populations. The villages to be deferred include Ha Lung Chung, Fa Sam Hang, Cheung Kang, Yuen Tun Ha, Ta Tit Yan, La Lau Uk and Tai Po Kau San Wai. Additional areas have also been added to this study which have been included as part of the EIA. The developments include Tung Tsz Village, the Hong Kong Scout Training Centre, an un-named development southwest of Tung Tsz Road, Sam Mun Tsai Road Main Sewer, Tung Tze Road Main Sewer, Ting Kok Road Trunk Sewer Extension, Yin Tse Lane and Tolo Ridge at Tai Po Kau developments. The areas that were originally included under this study and the additional areas to be sewered are listed in Tables 2.1 and 2.2 and the main sewer alignments are listed in Table 2.3.

2.3 Project Works

The Project will connect the villages to the existing public sewerage system to provide sewage treatment of the effluent at either the Tai Po or Shatin sewage treatment works. The works will include the construction of village sewers, main sewers and pumping stations.

The village sewers will use plastic piping and will range in diameter from 100 to 150 mm. The main sewers will be made of either vitrified clay or concrete and will include pumping mains and gravity mains that range in diameter from 150 to 375 mm, depending upon the population served.

There are two types of pumping stations proposed for this Project, type 1 and type 2. Both types will be equipped with submersible pumps. Figures 2.2 and 2.3 show typical examples of the two types of pumping station. The type 1 stations will be designed for flows up to 30 L/s and will include a small weatherproof control cabinet that is provided above ground level. Natural ventilation will be provided through a breather pipe terminating two metres above ground level. The type 2 pumping stations will be used for flows in excess of 30 L/s and will have an emergency storage area as well as a small building to house the electrical controls and a store. Vehicle access will be required for the type 2 stations which will require a parking area.

2.4 Construction Activities

The Preliminary Design has made full use of the road and foot path network within the villages for the sewer installations.

The installation of the main sewers will be carried out for the majority of the alignment by open trenching. There will be a short length of trenchless construction at Sheung Wo Che, where the sewers will be built by pipe jacking/micro-boring under the KCR railway line. For the village sewerage, small trenches will be constructed along village alleyways and pathways.

The construction of the village sewerage and main sewerage will require the following activities: concrete breaking, where existing paved surfaces need to be broken; excavation of the soil materials; compaction of earth and bedding material; installation of the pipeline; backfilling of soil materials; and repaving.

The construction of the pumping stations will require similar activities as the main and village sewerage, with the additional work of constructing a small structure above ground to house the monitoring and electrical equipment. In addition, there may be sheet piling at some of the proposed stations to support the excavations. It is expected that the pumping stations will require excavation of about 30 m³ for a type 1 pumping station and 180 m³ for a type 2 pumping station.

The equipment that will be necessary for constructing the village sewers and pumping stations include hand held breakers, air compressor, excavator, truck, compactor and a crane and lorry. The equipment that will be necessary for construction of the main sewers will be similar with the inclusion of a pneumatic breaker and asphalt paver.

It is expected that the majority of the construction and excavation works in the villages will be carried out by hand, similar to the Stage I Phase I Project, due to the limited space in the alleyways and the uncertainty of the location for many of the existing utility services. The construction of the main sewers will likely rely on mechanical powered equipment. A typical example of the construction works (based on the works that have been carried out for the Tolo Harbour Sewerage of Unsewered Areas Stage I Phase I) is shown in Appendix C.

2.5 Duration of Project Works and Timing of Activities

The duration of the Project works and the timing of constructing 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.

Table 2.1: Village and Development Areas to be Sewered in Tai Po

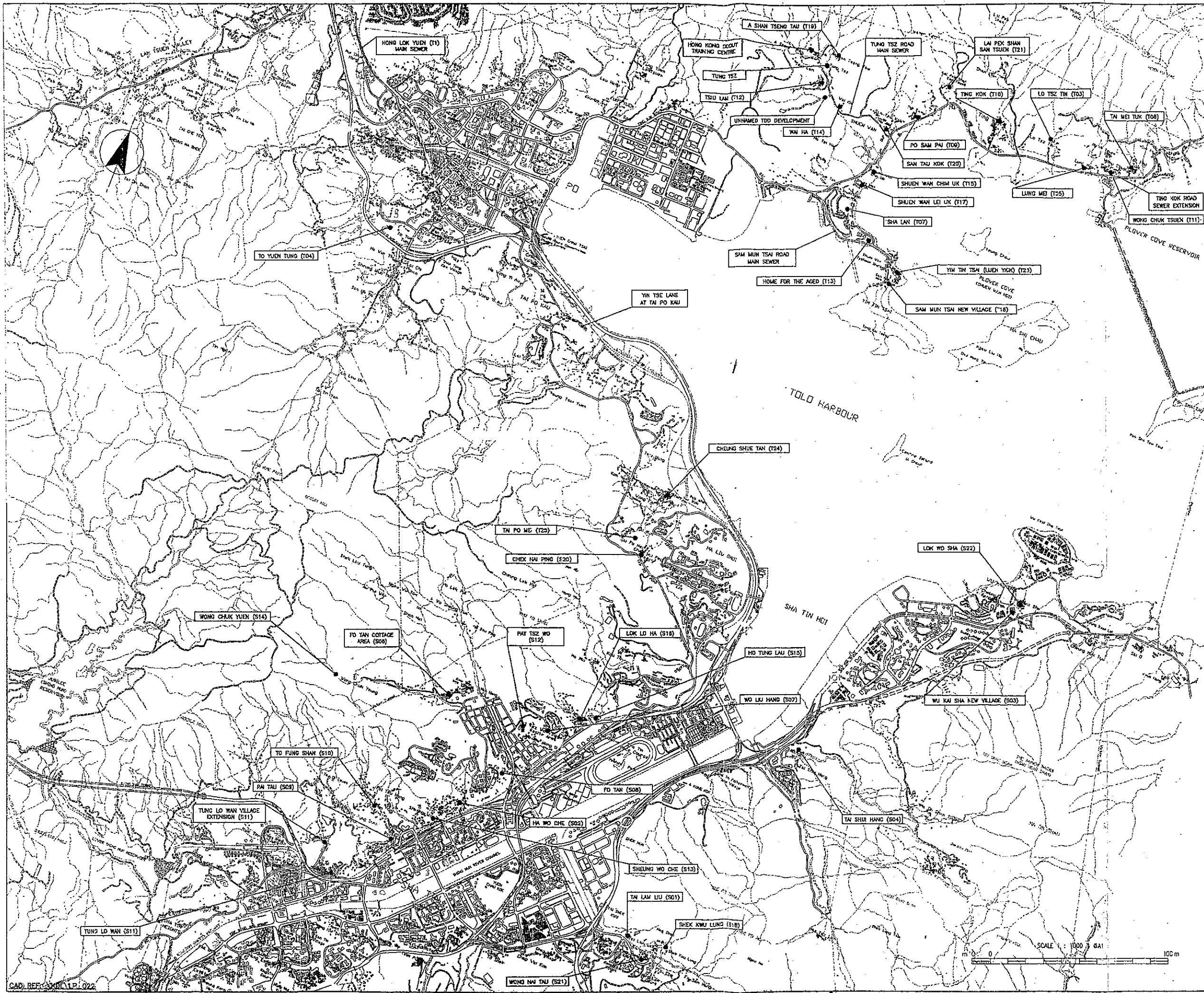
No.	Sewerage Area	Preliminary Design Numbers	
		Ref.	Drawing
1.	Tai Mei Tuk Village and Government Housing Area	T08	KDL/G/CE 18 94/PVSL-22
2.	Wong Chuk Tsuen Village	T11	KDL/G/CE 18 94/PVSL-20
3.	Lung Mei Village	T05	
4.	Lo Tsz Tin Village	T03	KDL/G/CE 18 94/PVSL-21
5.	Lai Pek Shan San Tsuen Village	T21	
6.	Ting Kok Village	T10	KDL/G/CE 18 94/PVSL-13
7.	Po Sam Pai Village	T09	KDL/G/CE 18 94/PVSL-14
8.	San Tau Kok Village	T20	KDL/G/CE 18 94/PVSL-26
9.	Wai Ha Village and un-named development southwest of Tung Tsz Road (addition to study)	T14	
10.	Tsiu Lam Village	T12	KDL/G/CE 18 94/PVSL-27
11.	Tung Tsz Village (addition to study)	-	
12.	A Shan Tseng Tau Village	T19	
13.	Scout Training Centre (connection to main sewer only addition to study)	-	
14.	Shuen Wan Chim Uk	T15	KDL/G/CE 18 94/PVSL-15
15.	Shuen Wan Lei UK	T17	
16.	Sha Lan Village	T07	
17.	Home for the Aged	T13	KDL/G/CE 18 94/PVSL-12
18.	Sam Mun Tsai New Village	T16	
19.	Luen Yick San Tsuen Village	T23	
20.	Hong Lok Yuen Development (connection to main sewer only)	T01	KDL/G/CE 18 94/MS-01, 02
21.	To Yuen Tung Village	T04	KDL/G/CE 18 94/PVSL-16
22.	Yuen Tun Ha Village (previously under original study will not be seweréd under this project)	T02	KDL/G/CE 18 94/PVSL-18
23.	Lo Lau Uk Village (previously under original study, will not be seweréd under this project)	T06	
24.	Ta Tit Yan Village (previously under original study, will not be seweréd under this project)	T22	KDL/G/CE 18 94/PVSL-19
25.	Tai Po Kau San Wai Village (previously under original study, will not be seweréd under this project)	T18	KDL/G/CE 18 94/PVSL-25
26.	Yin Tse Lane and Tolo Ridge at Tai Po Kau San Wai (addition to study)	-	KDL/G/CE 18 94/PVSL-24
27.	Cheung Shue Tan Village	T24	KDL/G/CE 18 94/PVSL-17
28.	Tai Po Mei Village	T25	KDL/G/CE 18 94/PVSL-23

Table 2.2: Village and Development Areas to be Sewered in Shatin

No.	Sewerage Area	Preliminary Design Numbers	
		Ref.	Drawing
29.	Chek Nai Ping Village	S20	KDL/G/CE 18 94/PVSL-10
30.	Fo Tan Village	S08	
31.	Ho Tung Lau Village	S15	KDL/G/CE 18 94/PVSL-04
32.	Lok Lo Ha Village	S16	
33.	Wo Liu Hang Village	S07	KDL/G/CE 18 94/PVSL-07
34.	Pat Tsz Wo Village	S12	
35.	Fo Tan Cottage Area	S06	KDL/G/CE 18 94/PVSL-05
36.	Wong Chuk Yeung Village	S14	
37.	Ha Wo Che Village	S02	KDL/G/CE 18 94/PVSL-09
38.	Sheung Wo Che Village	S13	
39.	To Fung Shan Village	S10	KDL/G/CE 18 94/PVSL-06
40.	Pai Tau Village	S09	KDL/G/CE 18 94/PVSL-08
41.	Tung Lo Wan Village and Village Extension	S11	KDL/G/CE 18 94/PVSL-11
42.	Tai Lam Liu Village	S01	KDL/G/CE 18 94/PVSL-02
43.	Shek Kwu Lung Village	S18	
44.	Wong Nai Tau Village	S21	
45.	Fa Sam Hang Village (previously under original study will not be sewerred under this project)	S17	KDL/G/CE 18 94/PVSL-03
46.	Tai Shui Hang Village	S04	KDL/G/CE 18 94/PVSL-03
47.	Cheung Kang Village (previously under original study will not be sewerred under this project)	S19	KDL/G/CE 18 94/PVSL-01
48.	Wu Kwai Sha New Village	S03	
49.	Lok Wo Sha Village	S22	

Table 2.3: Proposed Main Sewer Alignments

No.	Main Alignment	Ref	Preliminary Design Drawing Ref. No.
50.	main sewer from Hong Lok Yuen to Shui Wai	-	KDL/G/CE 18 94/MS-01, 02
51.	main sewer along Sam Mun Tsai Road (addition to study)	-	KDL/G/CE 18 94/MS-03,04,05
52.	main sewer along Tung Tsz Road (addition to study)	-	KDL/G/CE 18 94/MS-06,07,08
53.	trunk sewer along Ting Kok Road at Tai Mei Tuk (addition to study)	-	KDL/G/CE 18 94/MS-09
54.	pumping main from Cheung Shue Tan to existing Trunk Sewer in Tai Po Road	-	KDL/G/CE 18 94/MS-10



NOT FOR CONSTRUCTION

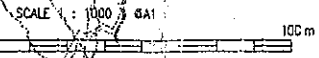
2/98	MAW	KPW			2	TUNG TSI & SCOUT TRAINING CENTRE ADDED
10/95	MAW	EL			1	DRAFT ISSUE
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE	REVISION DESCRIPTION

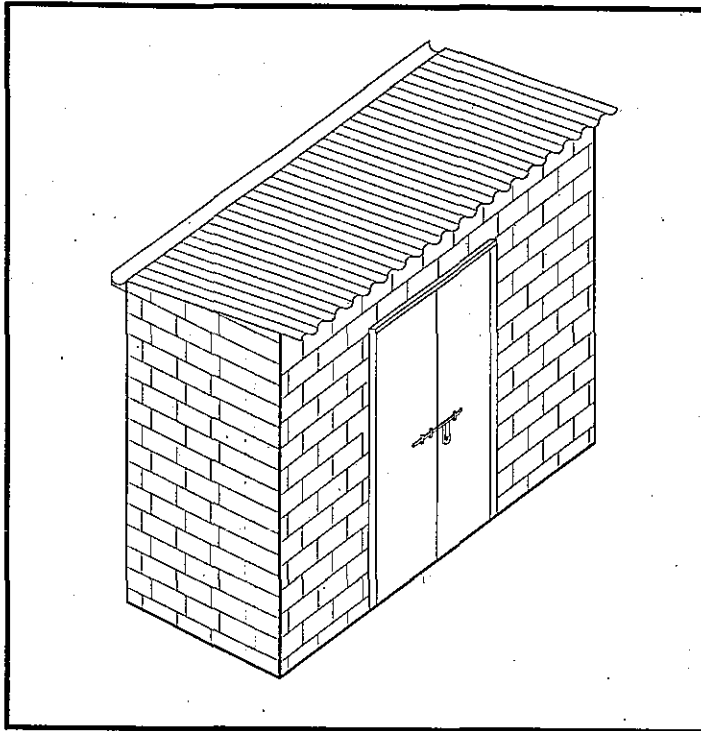
GOVERNMENT OF HONG KONG
Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

LOCATION PLAN

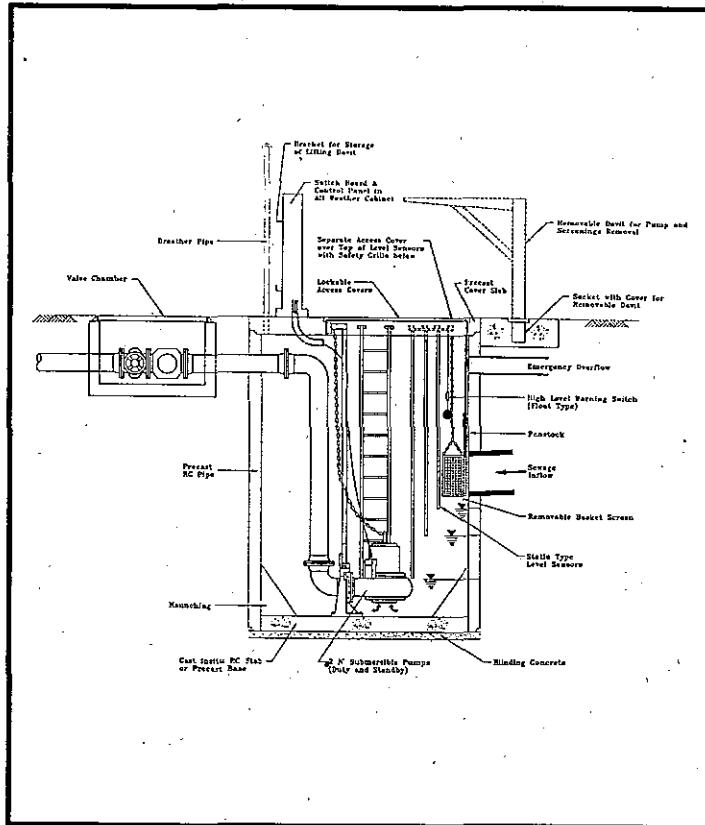
AGREEMENT NO. CE/18/94	SHEET 1 OF 1
Fig. No. 21	ISSUE 2

MONTGOMERY WATSON
 蒙哥馬利工程師
 In association with
Mouchel Asia Limited Consulting Engineers




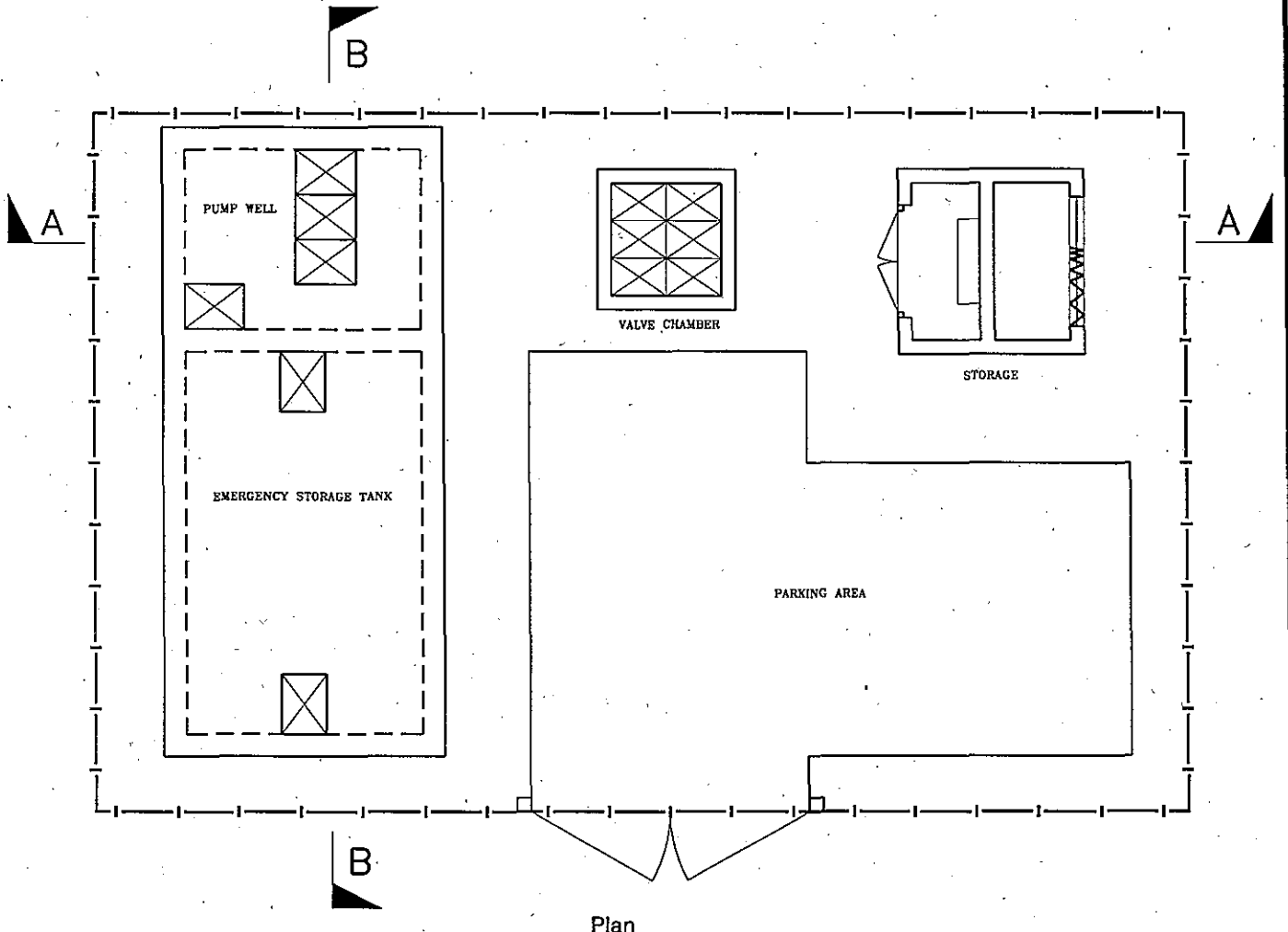


Above Ground View




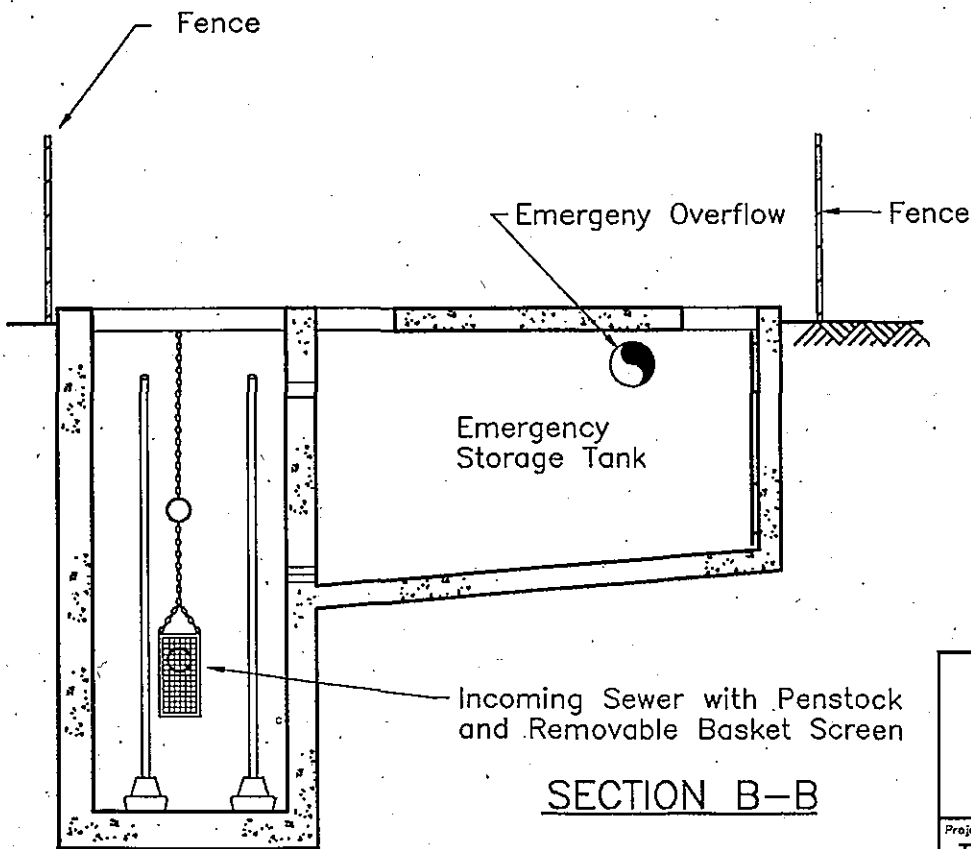
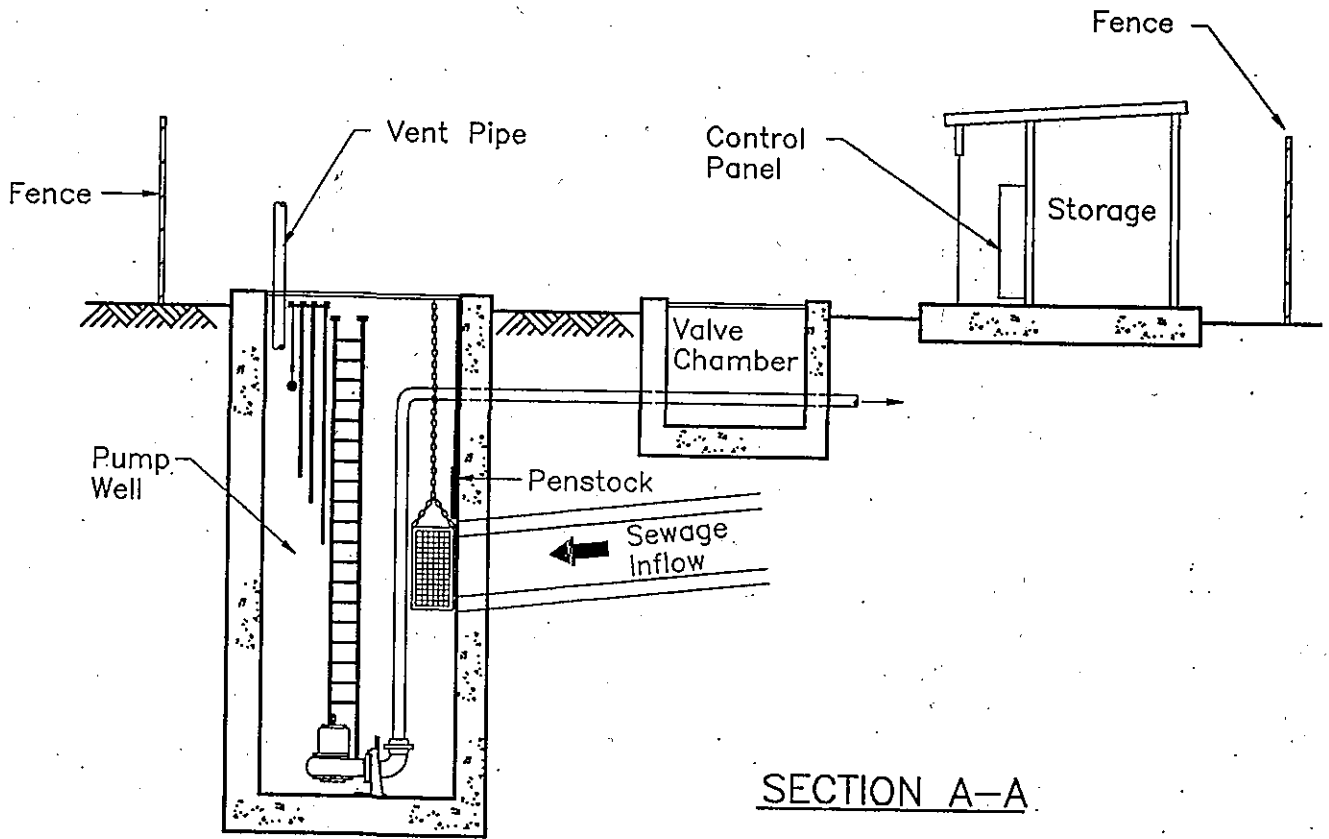
Below Ground View


 MONTGOMERY WATSON 限 環 境 顧 問 工 程 師 限 in association with Mouchel Asia Limited Consulting Engineers				
Project Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II				
Title Typical Pumping Station Arrangement (Type 1)				
CAD File No. 498-F26	Drawn D.W.	Checked S.E.B.	Approved S.V.A.	Scale N.T.S.
First Issued 21.9.95	Fig. No. 2.2	Rev.		



Plan

 MONTGOMERY WATSON 環 境 顧 問 工 程 師				
in association with Mouchel Asia Limited Consulting Engineers				
Project				
Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II				
Title				
Typical Pumping Station Arrangement (Type 2)				
CAD File No.	Drawn	Checked	Approved	Scale
498-F27	CL	S.E.B.	S.V.A.	M.T.S.
First Issued	Fig. No.			Rev.
		2.3a		



 MONTGOMERY WATSON 環 境 顧 問 工 程 師				
In association with Mouchel Asia Limited Consulting Engineers				
Project				
Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II				
Title				
Typical Pumping Station Arrangement (Type 2)				
CAD File No.	Drawn	Checked	Approved	Scale
499-727	CL	S.E.B.	S.V.L.	R.T.S.
First Issued	Fig. No.			Rev.
	2.3b			

3.0 AREAS TO BE SEWERED

The areas that are to be sewered comprise villages and other developments which are situated within the Tolo Harbour catchment area.

3.1 Village Developments

The villages to be sewered range in character due to the time that they were established and their original configuration. Several housing units within the villages have been built within the last ten years and are modern in style while other more traditional villages contain living structures that are over 30 years in age. The majority of the villages contain a mixture of both modern and old style houses. There are four types of configurations that are commonly found:

- villages designed in a grid pattern with a system of narrow lanes and footpaths;
- villages in a linear pattern, common for villages following tracks and roads along hillslopes;
- random groupings of houses associated with sporadic expansion; and
- the traditional walled villages.

The villages are located in both rural areas and highly populated urban and industrial areas. The surrounding land uses have influenced the development and character of the villages.

3.2 Other Development Areas and Main Sewers

The other types of developments to be sewered include a Home for the Aged, a Government Housing Area and developments southwest of Tung Tsz Road, at Hong Lok Yuen and at Yin Tse Lane. The connection of these developments to the main sewer system will not require the connection of individual units, as these connections have already been built. Rather, the combined outflow from these developments will be connected to the main sewer system.

3.3 Description of Villages and Other Areas to be Sewered

Field surveys of the villages and areas to be sewered were undertaken in August and September of 1995. A description of the characteristics of the villages and areas including their location, development features, access, existing environmental conditions, cultural resources, surrounding land uses and existing sewerage has been compiled and has been summarised in Appendix D. The Preliminary Sewerage Designs are also provided in Appendix D.

4.0 WASTE MANAGEMENT

4.1 Introduction

The following Section describes the quality, quantity and timing of waste materials that will be generated by the Project and provides recommendations for waste handling and disposal.

4.2 Waste Types

The type of waste material that will be generated during construction includes:

- broken concrete from the top layer of excavations along roads, tracks, paths and alleyways;
- broken asphalt from excavation in roadways; and
- soil from trench excavation.

Most of the soil materials that will be excavated will be suitable for use as backfill material. The remaining material and a small amount of the excavated soil will require off-site disposal, either because it is unsuitable to use as backfill or because it is surplus to requirements.

The waste material generated during the operation of the Project will be limited to materials that are removed during routine maintenance of screens at the pumping stations and at manholes after removal of blockages.

4.3 Waste Arisings

The quantity of broken concrete and asphalt materials that will require excavation and disposal during construction will depend upon the size of the area to be sewerred, the length of the sewers and the width of the trenches. At the Preliminary Design stage of the Project, it is not possible to determine the exact excavation and fill requirements for either the village or main sewers. However, an estimate of the quantity of materials that will require removal and disposal during the installation of the foul and main sewers has been carried out based on the excavation and fill requirements for a typical moderate sized village and the longest segment of the main sewers.

The village of Wong Chuk Tsuen is moderately sized in terms of population and covers a large area (see Drawing KDL/G/CE/ 18 94/PVSL-20, Village no. 2 in Appendix C). This village has been used to estimate the excavation quantities. The village will require approximately 750 m of foul sewerage that will generally follow existing concrete pathways and alleyways. For determining the excavation requirements, it was estimated that the foul sewerage for Wong Chuk Tsuen will be specified as follows:

- the diameter of the foul sewers will be 150 mm (190 mm external diameter) and will require a 0.6 m width of trench (Hong Kong Government, DSD Sewerage Manual, Part 1 May 1995);
- 150 mm of aggregate base and cover will be used above and below the pipeline;
- 600 mm of soil materials will be used above the aggregate cover; and
- a maximum of 100 mm of concrete and 50 mm of asphalt will be required for the finishing work.

Based on the above, the average required trench depth will be approximately 1.24 m and the width of the trench will be 0.6 m. The total quantity of excavated material will be approximately 558 m³ for the total of the 750 m length of foul sewer. About 67.5 m³ of the excavation will be hard material (broken concrete and asphalt) and the remaining 490.5 m³ will be soft soil material

that will mostly be suitable for backfill.

The surplus excavated material for the 750 m of foul sewers in this village will be approximately 220.5 m³ of soft material plus 67.5 m³ of hard materials. This will result in approximately 43 vehicle trips in total or about one vehicle trip every one to two days, given that the expected time period for sewerage of a moderate sized village will be two to three months and the average truck load capacity will be 6.7 m³. Disposal of the material should be at a public dump or at a landfill if a public dump is not available. This will not result in any significant environmental impacts.

The total quantity of material to be excavated at the villages will be about 25,110 m³ of which less than 13,005 m³ will require removal from site. An additional 870 m³ will be required to be disposed of from excavation of the pumping stations. The removal and disposal of this quantity of material is not expected to generate any significant environmental impacts however measures should be taken to reduce the potential for loss of materials during transport.

A small proportion of the material to be excavated may be contaminated due to leakage from the existing septic tanks. The quantity of this material is expected to be small but will not be known until excavation works have commenced on site. This material should be disposed of along with surplus soil material at landfill using special procedures to avoid health hazards to workers or environmental impacts.

One of the longest segment of main sewer is the Sam Mun Tsai Road sewer (1,156 m) followed by Tung Tsz Road (1,364 m), Cheung Shue Tan (1,000 m), Hong Lok Yuen (740 m) and Tai Mei Tuk (331m) sewers. It is expected that the main sewers will have similar excavation and fill requirements to the village sewers, with the exception of slightly more aggregate base and cover and soil cover due to the larger depth and width of the trenches. The excavation requirements for the Sam Mun Tsai Road main sewer are expected to be of the order of 2,385m³ of which 814 m³ will be surplus material that will require disposal off site at landfill or public dump. This is not a large amount of material and will result in a maximum of four truck trips from site per day given a one month period construction time and an average truck load of 6.7 m³. This will not result in any significant environmental impacts.

The material that will require disposal during operation will be screenings, grit and scum from pumping stations and material from blockages. The amount of material that will require removal during maintenance is expected to be small and the material will be disposed of at landfills. No significant impacts are expected from the removal of this material however during transport to landfills the material should be contained and covered to avoid spillage.

4.4 Waste Reduction Mitigation Measures

The following mitigation measures should be implemented to reduce spillage of materials during transport to disposal sites:

1. Material in lorries shall be covered by tarpaulins to reduce the potential for spillage.
2. Any screenings, grit and scum that are removed during maintenance shall be disposed of at a landfill site. The material shall be suitably contained and covered screenings should be stabilised by the addition of lime to the containers to minimise odour generation.

5.0 NOISE IMPACT ASSESSMENT

5.1 Introduction

The following Section provides the applicable noise criteria, a schedule of noise sensitive receivers, an assessment of potential noise impacts during construction and operation and mitigation measures required to reduce noise impacts. Residual noise impacts that may occur after implementation of proposed mitigation measures have been determined and are provided at the end of this Section.

5.2 Environmental Standards and Guidelines

5.2.1 General

The noise criteria for construction noise are addressed in the "Technical Memorandum on Noise From Construction Work Other Than Percussive Piling", the "Hong Kong Planning Standards and Guidelines" (HKPSG) and the EPD Criteria provided in the "Practice Note For Professional Persons (No. PNDECC PN2/93)". The noise criteria for operational noise are addressed in the "Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites".

5.2.2 Construction Noise

Construction works for this Project are planned to be carried out during daytime hours. The Practice Note for Professional Persons (No. PNDECC PN2/93) provide the criteria for acceptable noise levels from construction works during the daytime hours of 0700 to 1900 on normal working days, as shown in Table 5.1.

Table 5.1: Daytime Noise Criteria During Non-Restricted Hours (Construction Noise)

Receiver	Noise Level L_{eq} (30 min.)
Dwelling	75 dB(A)
School	70 dB(A) (65 dB(A) during examination)

There may be occasions where construction works are required to be carried out during restricted hours to reduce disturbance, for example by carrying out the installation of a main sewer in a heavily travelled roadway during evening hours (or early morning) to avoid traffic obstructions or for other types of work such as utility diversions. In the event that construction works are to be carried out during restricted hours, a noise permit will be required from EPD. The criteria for the noise permit will depend on the location and duration of work and will be assessed upon submittal of a noise permit application.

The Project will generate very few vehicle trips during construction (6 to 8 vehicles trips per day, per village). There will be no vehicle trips required during operation, aside from occasional maintenance vehicle trips. As vehicle trips will be minimal for this Project, vehicle generated noise has not been included in this assessment.

5.2.3 Operational Noise

The only noise source during operation will be noise from pumping stations. The criteria for noise generated during operation is based upon the location of the sensitive receiver and the assignment of an Area Sensitivity Rating (ASR) and Influencing Factors. The ASRs for

different types of Noise Sensitive Receivers (NSR) are shown in Table 5.2.

Table 5.2 : Area Sensitivity Rating for Sensitive Receivers (Operational Noise)

Type of Area Containing NSR	Degree to which NSR is affected by Influencing Factor		
	Not Affected	Indirectly Affected	Directly Affected
Rural areas, including country parks or village type developments	A	B	B
Low density residential area consisting of low rise or isolated high rise developments	A	B	C
Urban area	B	C	C
Areas other than those above	B	B	C

The acceptable noise levels (ANLs) for NSRs with ASR-A and ASR-B are shown below in Table 5.3.

Table 5.3: Acceptable Noise Levels (Operational Noise)

Time Period	Acceptable Noise Level (dB(A))	
	ASR-A	ASR-B
Day (0700 to 1900)	60	65
Evening (1900 to 2300)		
Night (2300 to 0700)	50	55

The HKPSG (Section 4.2.13) recommend that all fixed noise sources should be at least 5dB(A) below the appropriate ANL as shown above. This would reduce the ANL for ASR-A and ASR-B to 55 and 60 dB(A) for day and evening noise and 45 and 50 dB(A) for night time noise respectively.

5.3 Noise Sensitive Receivers

The NSRs for the construction stage of the Project include properties in the villages themselves, which may be exposed to noise from construction of village sewers, main sewers and pumping stations, and the surrounding properties next to areas where main sewers are proposed to be built. The NSRs for the operation stage of the Project include all properties in the vicinity of pumping stations.

5.4 Existing Conditions

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

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 higher. The housing units in the village that face the roadway are subjected 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 villages such as Fo Tan and Wo Liu Hang are located alongside industrial areas which also contribute to noise within the village environment.

5.5 Potential Noise Impacts

The following impact assessment has been carried out by determining impacts from the three sources of noise that will be generated, namely construction noise from pumping stations and main sewers, construction noise from village sewers and operational noise from pumping stations.

5.5.1 Construction Noise from Pumping Stations

Pumping stations that are to be installed as part of this project will be located in the following village areas:

- Cheung Shue Tan
- Tai Mei Tuk
- Yin Tse Lane at Tai Po Kau
- Sam Mun Tsai (three stations)
- Lok Wo Sha
- Ha Wo Che
- Wong Chuk Tsuen
- Lok Lo Ha
- Wo Liu Hang (two stations)
- Sheung Wo Che
- Luen Yick San Tsuen
- Chek Nai Ping
- Shuen Wan Chim Uk
- Sha Lan
- Hong Lok Yuen Road

Two types of pumping stations are proposed: type 1 and type 2. The type 1 stations are proposed for fifteen locations. The stations will be small in size and will require an area of about 5 m² and excavation of about 30 m³. The type 2 stations are proposed for three locations, Cheung Shue Tan, Chek Nai Ping and along Hong Lok Yuen Road. These stations will be larger than the type 1 and will require an area of about 150 m² and excavation of 181 m³. Pumping equipment will be underground in both cases.

Construction activities for the pumping stations will include concrete breaking, where existing paved surfaces need to be broken, and excavation. For most of the areas where pumping stations are to be installed, there is limited access and area for construction works. Villages where pumping stations are to be located close to residential units include: Wo Liu Hang, Luen Yick San Tsuen, Sha Lan, Tai Po Kau and Sam Mun Tsai. The majority of the construction work is expected to be carried out by hand at these locations (see Appendix C-1). The villages where pumping stations are to be located with easy access include: Lok Wo Sha, Lok Lo Ha, Wo Liu Hang, Sheung Wo Che, Ha Wo Che, Shuen Wan Chim Uk, Wong Chuk Tsuen, Tai Mei Tuk and along Hong Lok Yuen Road. The construction at these locations is expected to use more powered mechanical equipment. More remote pumping stations include Chek Nai Ping and Cheung Shue Tan which do not have well developed access routes but are located away from sensitive receivers.

The sound power levels of the typical equipment that will be used for pumping station construction are provided in Table 5.4. Because it will not be possible to use all of the equipment that are listed at any one time during construction, the expected sound power level has been totalled for the equipment that will likely be used at any one time.

Table 5.4: SPL of Equipment used for Pumping Station Construction

Equipment	No. of Equipment	Sound Power Level dB(A)	
		Per item	Total
Breaker, hand held, silenced (pneumatic)	1	110	110
Air Compressor, super silenced	1	95	
Excavator/Backhoe	1	112	114
Truck	1	109	
Crane/Lorry	1	112	112
Compactor	1	105	105

It is expected that the type 1 pumping stations can be constructed within a 2 to 3 week time period. The time that each item of powered mechanical equipment will be used is likely to be 0.5 day to 1.5 day for the breaker to remove any paving materials, 2 to 4 days for an excavator/backhoe for excavation works and manual hand excavation works (likely to be one day of excavator time), 0.5 day using a crane/lorry for placing equipment and 0.5 day of compaction work. Manual excavation and other miscellaneous construction activities will be carried out during the remaining construction time.

For the type 2 pumping stations it is expected that the work time would be about 4 days for breaking activities, 1 week for excavation works, 3 days using a crane/ lorry and 2 days compaction work. Sheet piling may also be necessary during construction of the pumping stations. It is expected that the piles will be installed using a backhoe and percussive piling is not expected. The expected noise level from sheet piling works will thus not exceed 114 dB(A). The duration of time for any sheet piling will be approximately 2 to 4 hours.

For the pumping station installation, the NSR are limited to the village housing units. The potential noise impacts have been assessed by comparing the distance that the plant would have to be set back from the NSR to attain a noise level below 75 dB(A). The minimum acceptable set-back distances and the number of NSRs that could be subjected to noise levels over the acceptable criteria during construction works are listed below in Table 5.5. The village units and distance from pumping stations are described in Appendix E-1.

Table 5.5: NSRs that may be Impacted from Pumping Station Construction Noise (without Mitigation)

Equipment	Total Sound Power Level dB(A)	Acceptable Distance (m)	No. of NSR Affected
Breaker, hand held, silenced (pneumatic) and Air Compressor, super silenced	110	22 to 23	50
Excavator/Backhoe and Truck	114	34 to 37	112
Crane/Lorry	112	27 to 29	55
Compactor	105	12 to 13	16

The affected villages would be subjected to noise levels ranging from 76 dB(A) to 90 dB(A) for a time period of 4 to 6 days unless mitigation is applied. Mitigation measures could include temporary noise barriers which would reduce predicted noise levels at NSRs by approximately 10 dB(A). The number of NSRs that will still be impacted by construction works, if a temporary noise barrier is used, would be reduced to one NSR during breaking activities, six NSR's during use of the excavator, four NSR's during use of the crane and lorry and no NSRs will be impacted during compaction. The noise impacts will only occur at areas where the type 1 pumping stations are to be located. The residual noise levels after implementation of noise barriers at the NSRs will range from 76 dB(A) to 82 dB(A) which, when considered with the short duration of the construction works for the type 1 stations, will not result in a significant long term disturbance to NSRs.

5.5.2 Construction Noise from Main Sewers

The project includes the following main sewers:

- Sewer and pumping main from Hong Lok Yuen to Shui Wai;
- Pumping main from Cheung Shue Tan to Campus Circuit North Road;
- Ting Kok Road Trunk Sewer Extension to Tai Mei Tuk
- Tung Tsz Road Main Sewer; and
- Sam Mun Tsai Road Main Sewer.

Construction of the main sewers will involve similar works as for the pumping stations along with additional equipment for breaking and paving works. Trenchless methods of construction such as micro tunnelling are only proposed for a short segment of the Sheung Wo Che Main portion of the main sewer and will involve pipe jacking/micro-boring under the KCR railway line. The remaining portions of the main sewers will involve open trench methods of construction.

The Sound Power Level of the equipment expected to be used for construction of the main sewers is provided below in Table 5.6. Similar to the pumping station construction, the equipment has been grouped into the type of equipment that could be used at one time.

Table 5.6: SPL of Equipment used for Main Sewer Construction

Equipment	No. of Equipment	Sound Power Level dB(A)	
		Per item	Total
Pneumatic Breaker, excavator mounted	1	122	122
Air Compressor, super silenced	1	95	
Breaker, hand held, silenced (pneumatic)	1	110	115
Air Compressor, super silenced	1	95	
Excavator/Backhoe	1	112	
Truck	1	109	105
Compactor	1	105	
Crane/Lorry	1	112	112
Asphalt paver	1	109	109

The duration of the noise impacts are considered to be important, as villages and surrounding land uses may be prepared to accept some inconvenience in view of the benefit that will accrue from the Project. The duration of construction works will generally be short and, for example, work using pneumatic breakers on a roadway stretch or sheet piling, if required, will not last longer than one or two days.

The potential noise impacts have been assessed by comparing the distance that this plant would have to be from a NSR to attain a noise level under 75 dB(A). The set-back distances for the noise to be within the criteria (assuming, at this stage, no mitigation) are listed below in Table 5.7.

Table 5.7: Set Back Distances to Achieve the Noise Criteria (Without Mitigation)

Equipment	Sound Power Level dB(A)	Acceptable Distance (m)
Pneumatic Breaker, excavator mounted and air compressor, super silenced	122	84 to 93
Breaker, air compressor, Excavator/Backhoe and truck	115	38 to 41
Compactor	105	12 to 13
Crane and Lorry	112	27 to 29
Asphalt paver	109	19 to 21

NSRs along the main sewer alignments which could be exposed to noise in excess of the criteria have been identified by inspecting the local plans. The noise impacts could include the following:

- The sewer main along Ting Kok Road would expose several housing units in these villages to noise levels that may exceed the noise criteria, particularly those units facing Ting Kok Road.
- The proposed pumping main from Cheung Shue Tan to the existing sewer in Campus Circuit North Road may result in noise impacts above the noise criteria at a residential block near Chue Sue Tan Village.
- Construction of the main sewer from Hong Lok Yuen to the existing sewer at Shui Wai may result in noise impacts above the acceptable criteria at residential units facing Tai Po Road at Tai Po Garden.
- Construction of the main sewer along Sam Mun Tsai Road may result in noise impacts above the acceptable criteria at the Home for the aged, the Springdale Garden residential complex and residential units 1 through 12 at Sam Mun Tsai New Village.
- Construction of the main sewer along Tung Tsz Road may result in noise impacts above the acceptable criteria at Wai Ha village, a housing development at the intersection of Tung Tsz Road, housing units next to corner of Tung Tsz Road, San Tau Kok Village and residential units in Tung Tsz village.

The potential impacts will be reduced significantly if temporary noise barriers were installed at locations as shown in Figures 5.1 to 5.5. The noise impacts will be reduced to levels within the acceptable criteria for the sewer alignments from Hong Lok Yuen to Shui Wai, along Sam Mun

Tsai Road, and from Cheung Shue Tan to Campus Circuit North Road.

The only residual noise impacts that after implementation of a noise barrier will be limited to the first row of residential units in Wong Chuk Tsuen, facing Ting Kok Road.

The duration of construction works will generally be short and, for example, for a 30m roadway stretch, will not last longer than one or two weeks and is therefore considered to be of minor significance to these residential units.

5.5.3 Construction Noise from Construction of Village Sewers

It is expected that most of the work for installation of the village sewerage will be carried out using hand held equipment due to the limited space in village alleyways. The mechanical equipment that may be used for village sewerage will be limited to a hand held pneumatic breaker and air compressor for breaking up concrete and a small track mounted excavator and small compactor for excavation and final cover works (see photos of Stage I Phase I construction works in Appendix C). The sound power level associated with this equipment is shown in Table 5.8.

Table 5.8: Typical Equipment for Installation of Foul Sewers

Equipment	No. of Equipment	Sound Power Level dB(A)	
		Per item	Total
Hand-held pneumatic breaker, silenced	1	110	110
Air compressor, super silenced	1	95	
Excavator	1	112	114
Truck	1	109	
Compactor/Roller	1	105	105

As for the main sewers and pumping stations, it is very unlikely that all the equipment as listed in Table 5.8 will be operated at one time. For example, the excavator or compactor may not be used in areas with limited access, such as alleyways.

The distances that the plant listed in Table 5.8 will have to be from a residential NSR to avoid impacts above the criteria are shown in Table 5.9.

Table 5.9: Equipment Distance from NSR

Equipment	Sound Power Level dB(A)	Setbacks Distance (m)
Hand-held breaker and air compressor	110	22 to 23
Excavator and truck	114	34 to 37
Compactor/Roller	105	12 to 13

The only houses that will be affected by noise will be those facing the works but noise levels could be quite high as many of the houses are within 1m of the trenches that will have to be constructed. Temporary noise barriers may be used on both sides of the trenches and these will reduce noise levels at NSR by 10 dB(A). The use of these barriers however may be restricted due to access difficulties to the residential units. The duration of the works in any one part of the village will generally be short and the use of a breaker, for example, close to any one property will only be for a few hours. It is considered that due to the beneficial result of this Project and the short duration of construction activities, residual noise impacts will be acceptable. Mitigation will include restricting the use of powered mechanical equipment within 5 m of NSRs and specifying hand working in these areas.

5.5.4 Noise Impacts from Operation of Pumping Stations

The only noise during operation of the project will be noise from the pumping stations. Both type 1 and type 2 pumping stations will have submersible pumps situated below ground level in a wet well, and under a concrete cover. The sound power level that will be generated by the electric pump will be 85 dB(A) at source. The noise insulation due to the pumping station cover slab will result in a reduction of noise levels by 35 dB(A). Thus, the resulting sound power level outside the pumping station will be 50 dB(A), which is in compliance with the criteria as listed in Table 5.3. The noise levels will also comply with the HKPSG recommendation of 5 dB(A) below the Technical Memorandum due to the noise attenuation over at least a 5 m separation between the NSRs and the proposed pumping stations.

5.6 Mitigation Measures

The following mitigation measures are recommended to reduce noise during construction of village sewers, main sewers and pumping stations.

1. All hand held breakers and portable air compressors shall be of the silenced type and the Contractor shall be required to provide documentary evidence in the form of manufacturers' specifications or other evidence acceptable to the Engineer of the sound power levels which shall not exceed 110 and 95 dB(A), respectively.
2. Construction works shall only be carried out on site between the hours of 0800 to 1800 and shall exclude Sundays and Public Holidays.
3. The Contractor shall ensure that no vehicles are used off paved roads unless it is not possible to use roadways, in which case prior permission shall be requested in writing from the Engineer.
4. Powered mechanical equipment shall not be used within 5m of an NSR without the written permission of the Engineer.

The following mitigation measures should be implemented during main sewer and pumping station construction.

1. Where noise levels at the nearest NSR are likely to exceed 75 dB(A) in urban areas, the total duration of noise activity shall not exceed 4 hours in any one day and shall be confined to the hours between 0900 to 1600.
2. Any pumping stations that are to be located within 37 m from the direct line of sight of a residential unit shall use a temporary noise barrier during construction activities. The Contractor shall demonstrate that the noise levels are within the acceptable criteria at

residential units during construction.

3. Noise barriers shall be used at the locations shown on figures 5.1 to 5.5 to reduce noise levels during main sewer construction. The Contractor shall demonstrate that the noise levels are within the acceptable criteria at residential units during construction works.
4. The following mitigation measure should be implemented during village sewer construction.
 - Temporary mobile barriers shall be used, unless precluded by access constraints.
5. The following mitigation measure is proposed for the pumping station to avoid impacts during operation.
 - The pumping stations shall be sealed to avoid escape of noise energy and shall be located no closer than 5 m from neighbouring residential units.

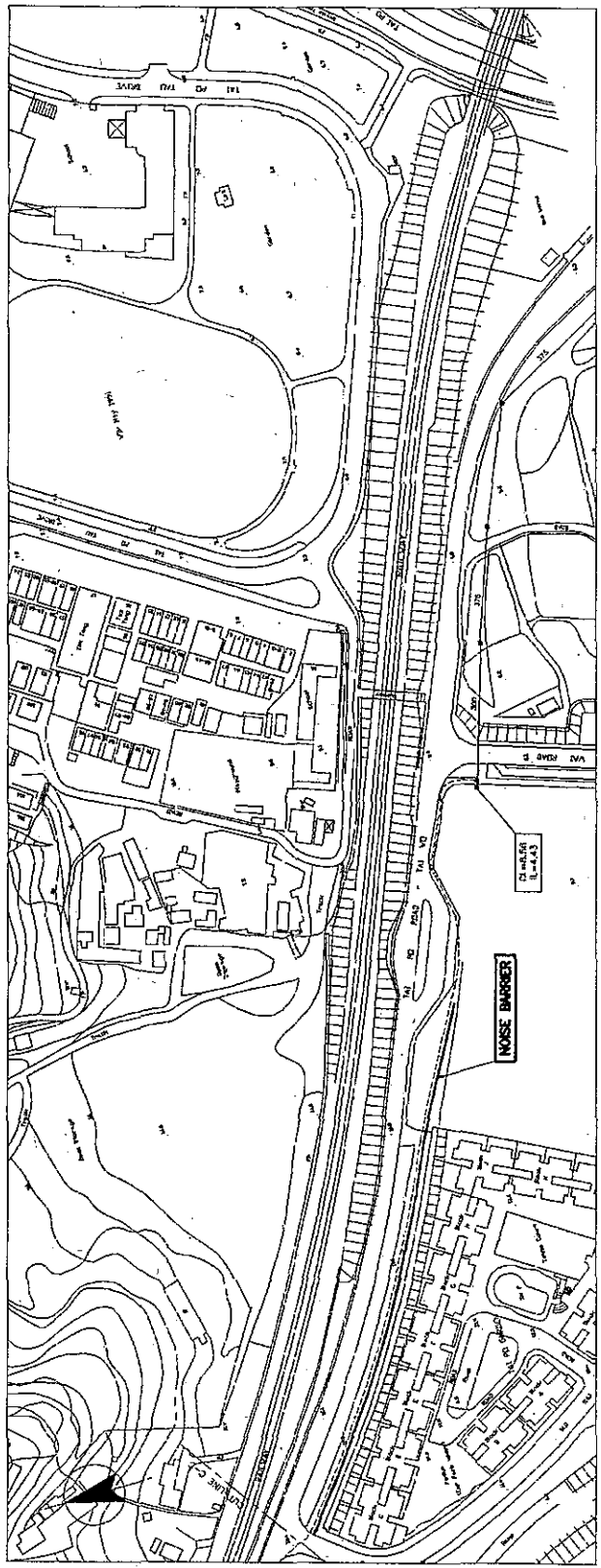
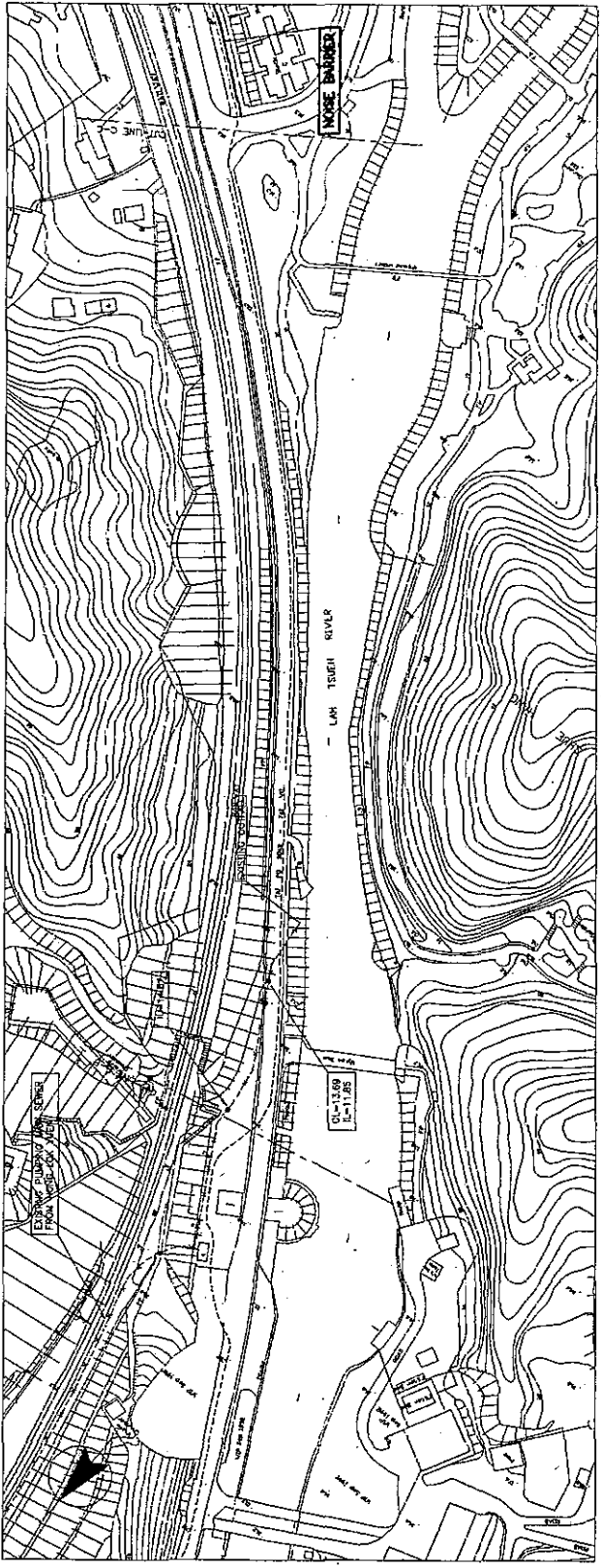
5.7 Residual Impacts

Temporary noise impacts may occur during pumping station construction even after implementation of mitigation measures. Six NSRs may be affected during use of an excavator, four NSRs during use of trucks and lorries and one NSR during breaking activities (see Appendix E-2). The noise impacts will be of the order of 76 dB(A) to 82 dB(A) but will only occur for a short duration (four hours a day, for about two to three days in total). The noise impacts are considered to be unavoidable but should be acceptable to residents due to the short duration of works and the overall benefit of the Project.

Residual impacts may occur at Wong Chuk Tsuen village during the construction of the main sewer. The residual noise levels will be approximately 2 to 6 dB(A) over the acceptable noise level criteria. The noise impacts are considered to be unavoidable but should be acceptable to residents due to the short duration of construction works and the overall benefit of the Project.

Residual impacts may occur during construction at the villages to be sewerred. These could be of the order of 77dB(A) to 96dB(A) but it is expected that village units will be affected for a period of no more than one week. The duration of the noise impact will only be three to four hours a day. The impact is considered to be unavoidable and should be acceptable due to the short duration of works and the beneficial impacts of the project.

No residual noise impacts will occur from operation of the Project.



LEGEND

- Existing Trench Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Trench Sewer
- Proposed Manhole
- Proposed Raising Eye
- Proposed Pumping Main
- Proposed Pump Station
- Proposed Sewer By TID
- Proposed Pumping Main by TID
- Extent of Proposed Development
- Outline of Proposed Development
- Areas Where Land Resumption will be Required in Excess of 1.5 Hektare (3/8 Acres of Manhole) or Distance between Structures
- Recently Constructed Houses in Approximate Position

NOTES

1. All data reproduced with permission of the Director of Lands, (D) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.
3. Levels Shown in Brackets (3.450) are Interpolated.

NOT FOR CONSTRUCTION

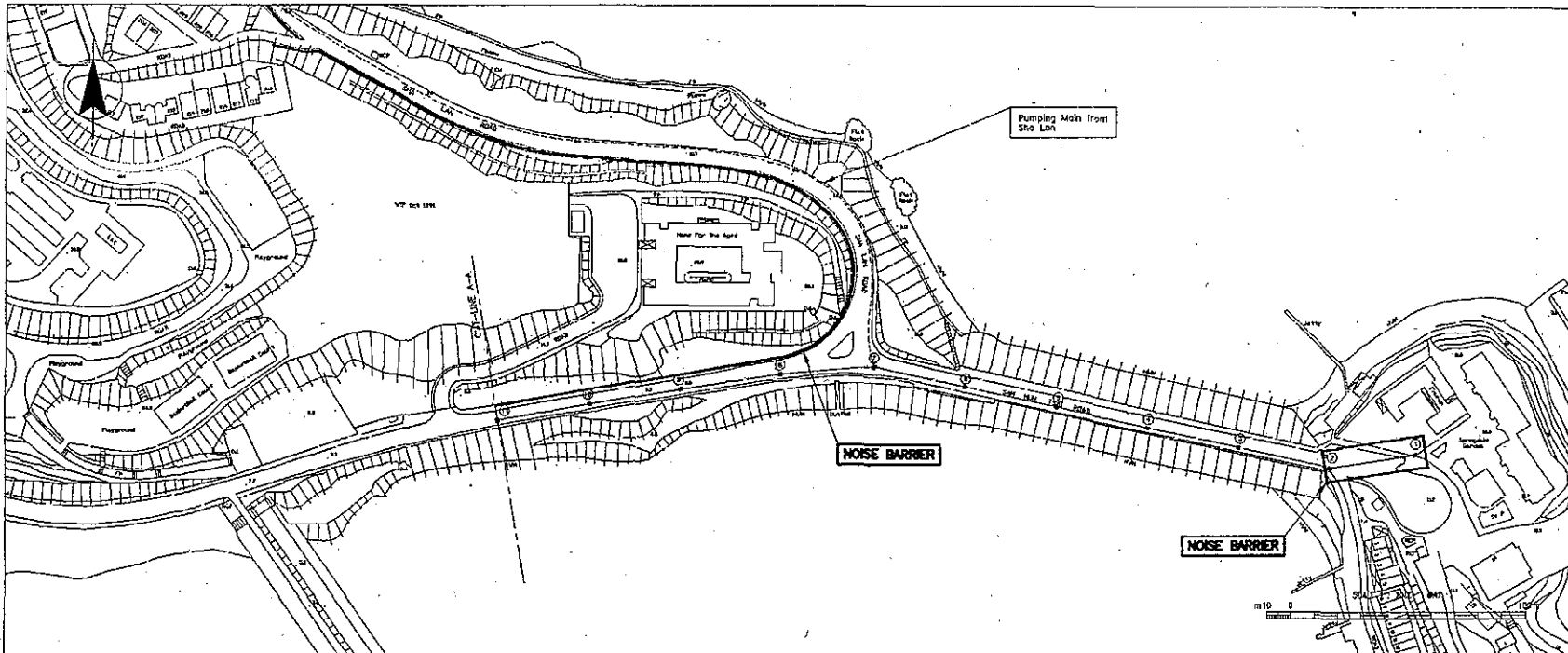
DATE	REVISION	BY	CHKD	APP'D	ISSUE	REVISION
1/8/84	1	WPH			1	DRAFT ISSUE
2/8/84	2	WPH			2	FOR REVIEW (PDS TO CHAIRMAN)

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

PROPOSED SEWER AND PUMPING MAIN
 FORM HONG LOK YUEN TO EXISTING SEWER
 AT SHUI WAI

PROJECT NO.	CE/18/84	SHEET 2 OF 2
DATE	18/1/84	ISSUE
SCALE	1:1000	

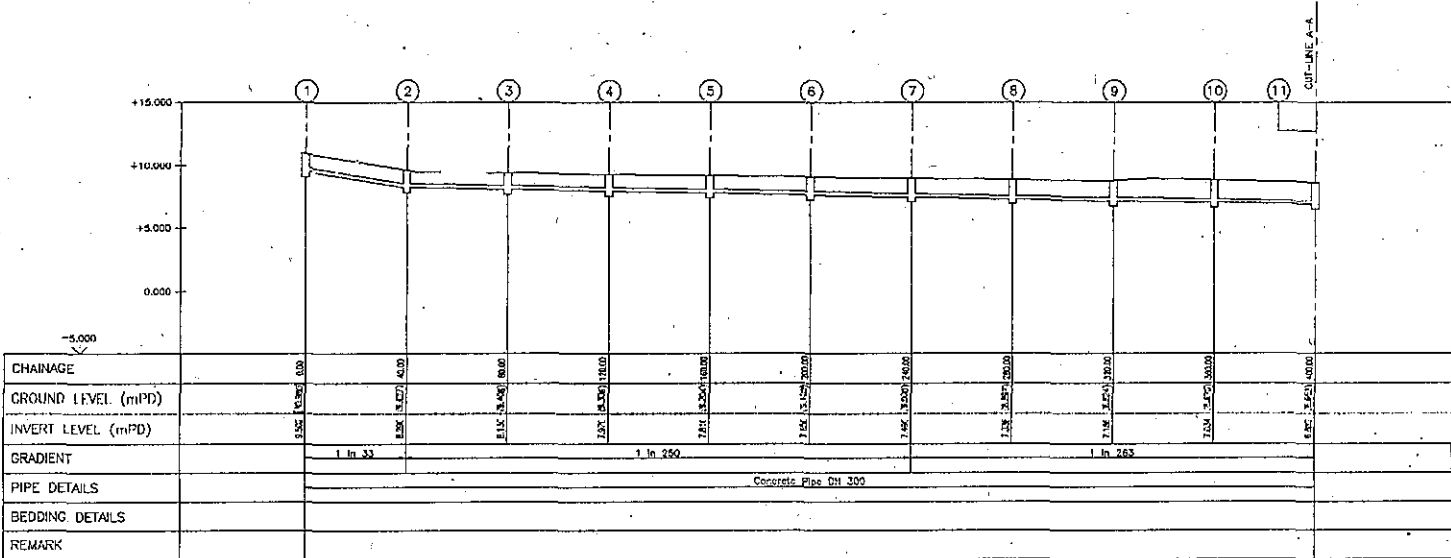
MONTGOMERY WATSON
 莫禮遜顧問工程師
 Mouchel Asia Limited Consulting Engineers



- LEGEND**
- Existing foul Unsewered Sewer
 - Existing Manhole
 - Existing Rising Main
 - Existing Sewer to be Abandoned
 - Proposed Foul Sewer
 - Proposed Manhole
 - Proposed Rodding Eye
 - Proposed Pumping Main
 - ▲ Proposed Pump Station
 - Proposed Sewer by TDD
 - Proposed Pumping Main by TDD
 - - - Extent of Proposed Development
 - Outline of Proposed Development
 - ▨ Areas Where Land Resumption will Be Required. Note: Actual Width Required is Lesser of 1.5 Metres (2 metres at Manhole) or Distance between Buildings.
 - ▨ Recently Constructed Houses in Approximate Position

- NOTES**
- Map data reproduced with permission of the Director of Land, (D) Hong Kong
 - All sewers to be 150mm diameter unless indicated otherwise.
 - Levels Shown in Brackets(13.450),are interpolated.

NOT FOR CONSTRUCTION



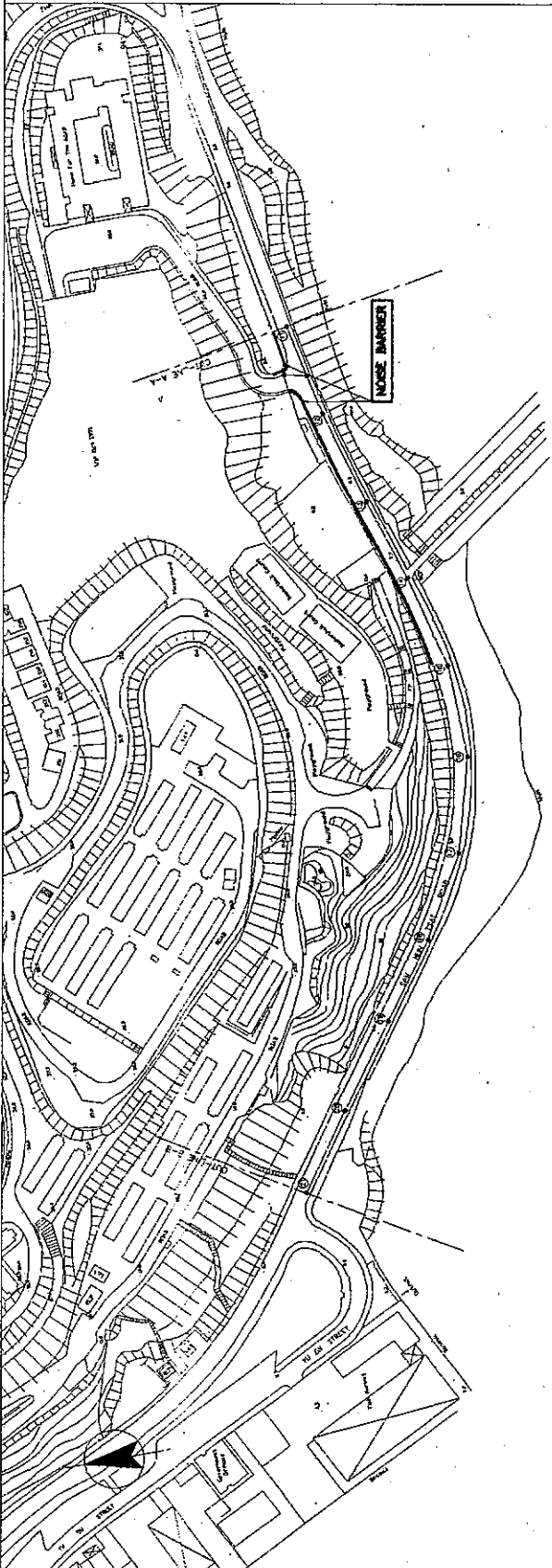
8/08	NAW	KPW			2	LAYOUT AMENDED FOLLOWING TRANSPORT DEPARTMENT COMMENT
3/06	NAW	KPW			1	DRAFT ISSUE
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE	REVISION DESCRIPTION

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

SAM MUN TSAI ROAD
 MAIN SEWER

AGREEMENT NO. CE/16/94	SHEET 1 OF 3
DRAWING NO. KOL/C/CE 18 84/85.03	ISSUE 1 2

MONTGOMERY WATSON
 蒙得華工程顧問
 In association with
Mouchel Asia Limited Consulting Engineers



SCALE 1:1000 0M 100m

LEGEND

- Existing Four Directly Served
- Existing Mainline
- Existing Heavy Main
- Existing Sewer to be Abandoned
- Proposed Four Served
- Proposed Mainline
- Proposed Pumping Main
- Proposed Pumping Eye
- Proposed Sewer By TID
- Proposed Pumping Main by TID
- Eriect of Proposed Development
- Outline of Proposed Development
- Area Where Land Reclamation will be Required. Note - Actual Width of Land Reclamation is 200 metres at Maximum or Greater Distance between Buildings.
- Recently Constructed Inocent in Approximate Position

NOTES

1. For data reproduced with permission of the Director of Land (D) Hong Kong.
2. Proposed observations.
3. Levels Shown in Brackets (13.450) are interpolated.

NOT FOR CONSTRUCTION

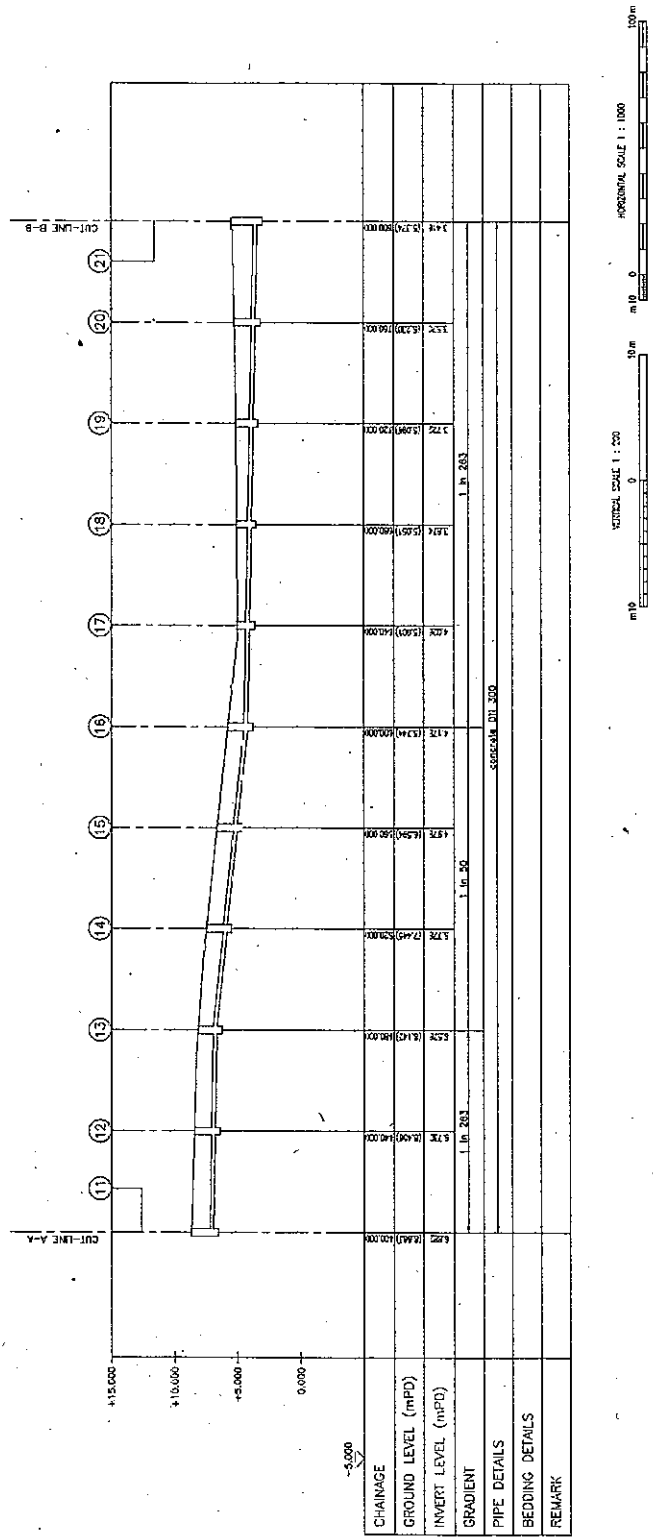
8/06	DAY	CPW	2	REVISIONS
3/96	MAN	CPW	1	DRAFT ISSUE
DATE	DESIGNED BY	DESIGNED	APPROVED	REVISIONS

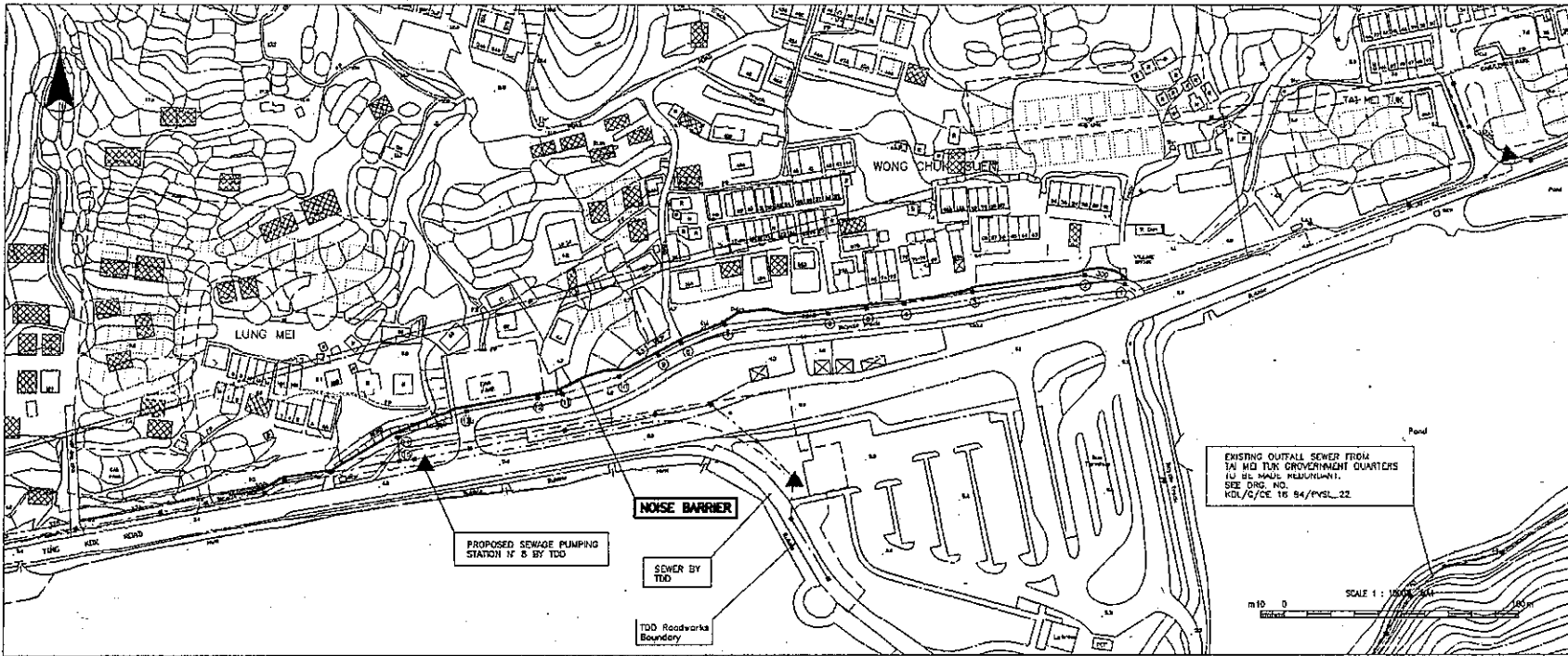
GOVERNMENT OF HONG KONG
Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

SAM MUN TSAI ROAD
 MAIN SEWER

PROJECT NO. CE/16/94	SHEET 2 OF 3
DRAWING NO. M/2/CE 18 41/M/LS 4	DATE 2

MONTGOMERY WATSON
 莫高美士有限公司
 In association with
Mouchel Asia Limited Consulting Engineers





- LEGEND**
- Existing Foul Gravity Sewer
 - Existing Manhole
 - - - Existing Rising Main
 - - - Existing Sewer to be Abandoned
 - Proposed Foul Sewer
 - Proposed Manhole
 - Proposed Rodding Eye
 - - - Proposed Pumping Main
 - ▲ Proposed Pump Station
 - Proposed Sewer By TDD
 - - - Proposed Pumping Main by TDD
 - - - Extant of Proposed Development
 - Outline of Proposed Development

Area Where Land Resumption will Be Required. Note: Actual Width Required is Lesser of 1.0 Metres (2 metres at Manholes) or Distance between Buildings.

Recently Constructed Houses in Approximate Position

- NOTES**
- Map data reproduced with permission of the Director of Land, (C) Hong Kong
 - All sewers to be 150mm diameter unless indicated otherwise.

EXISTING OUTFALL SEWER FROM TAI MEI TUK GOVERNMENT QUARTERS TO BE MADE REDUNDANT. SEE DRG NO. KDL/C/CE 16 84/PVSL 22



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CHAINAGE	0+00	0+15	0+30	0+45	0+60	0+75	0+90	1+05	1+20	1+35	1+50	1+65	1+80	1+95	2+10
GROUND LEVEL (mPD)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
INVERT LEVEL (mPD)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
GRADIENT	1 in 154														
PIPE DETAILS	Concrete Pipe DN 300														
BEDDING DETAILS															
REMARK															

NOT FOR CONSTRUCTION

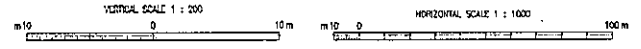
B/98	MAW	KPW				TDD BOUNDARY BOUNDARY ADDED AND REVISIONS
3/96	MAW	KPW				1 DRAFT ISSUE
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE	REVISION DESCRIPTION

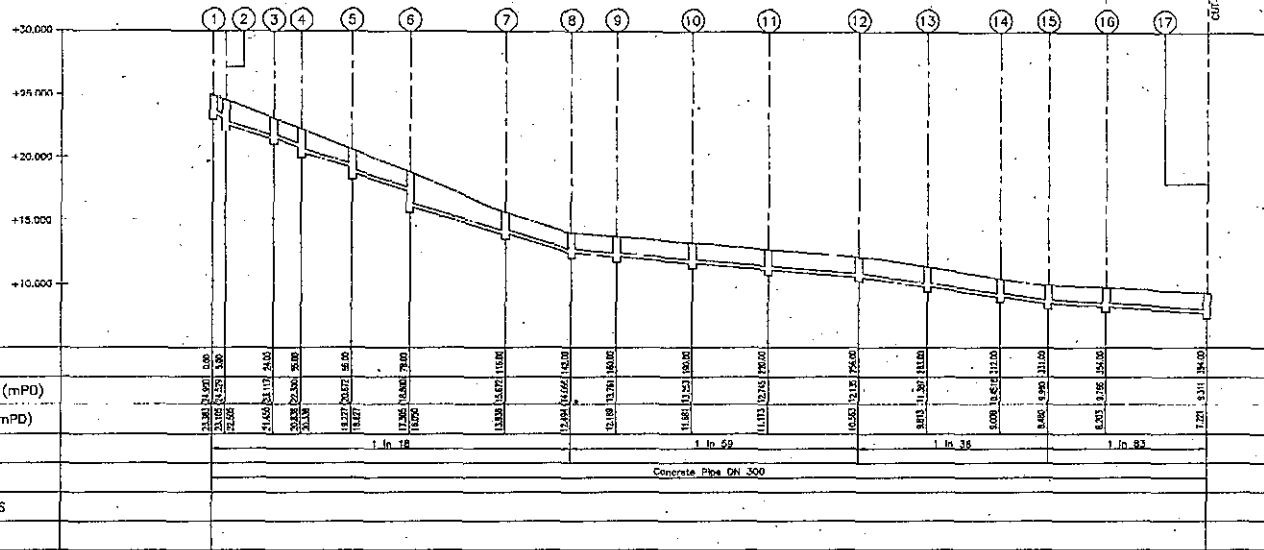
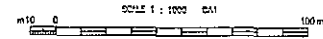
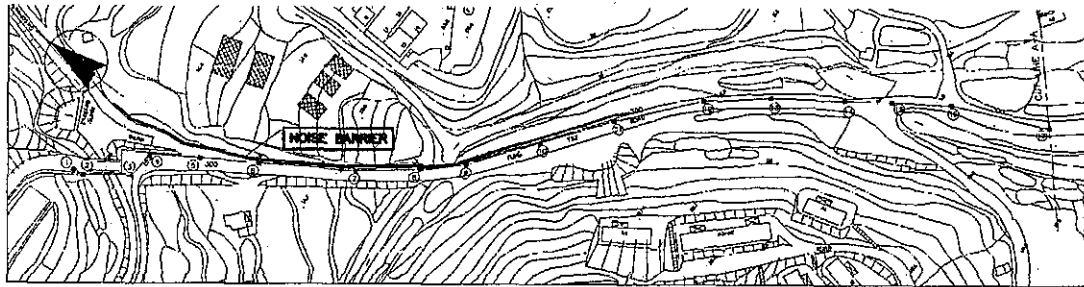
GOVERNMENT OF HONG KONG
Tofo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

PROPOSED TRUNK SEWER EXTENSION ALONG TING KOK ROAD TO TAI MEI TUK

Figure 5.4

AGREEMENT NO. CE/19/84 SHEET 1 OF 1
 DRAWING NO. KDL/C/CE 16 84/MC 09 ISSUE 2
MONTGOMERY WATSON
 環境顧問工程師
 Mouchel Asia Limited Consulting Engineers





- LEGEND**
- Existing foul Gravity Sewer
 - Existing Manhole
 - - - Existing Rising Main
 - - - Existing Sewer to be Abandoned
 - Proposed Foul Sewer
 - Proposed Manhole
 - Proposed Racking Eye
 - Proposed Pumping Main
 - ▲ Proposed Pump Station
 - Proposed Sewer By TDD
 - Proposed Pumping Main by TDD
 - - - Extent of Proposed Development
 - Outline of Proposed Development
 - ▨ Areas Where Land Resumption will Be Required. Note:- Actual Width Required is Lesser of 1.5 Metres (2 metres or less) or Distance between Buildings.
 - ▩ Recently Constructed Houses in Approximate Position

- NOTES**
1. Hsp data reproduced with permission of the Director of Land. (S) Hong Kong
 2. All sewers to be 150mm diameter unless indicated otherwise.
 3. Levels shown in brackets (13.450) are interpolated.

NOT FOR CONSTRUCTION

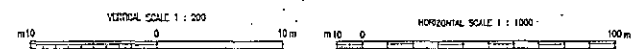
2/96	KLW	KPW		2	LAYOUT CHANGED TO FULL GRAVITY SYSTEM	
3/96	MAW	WCH		1	DRAFT ISSUE	
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE	REVISION DESCRIPTION

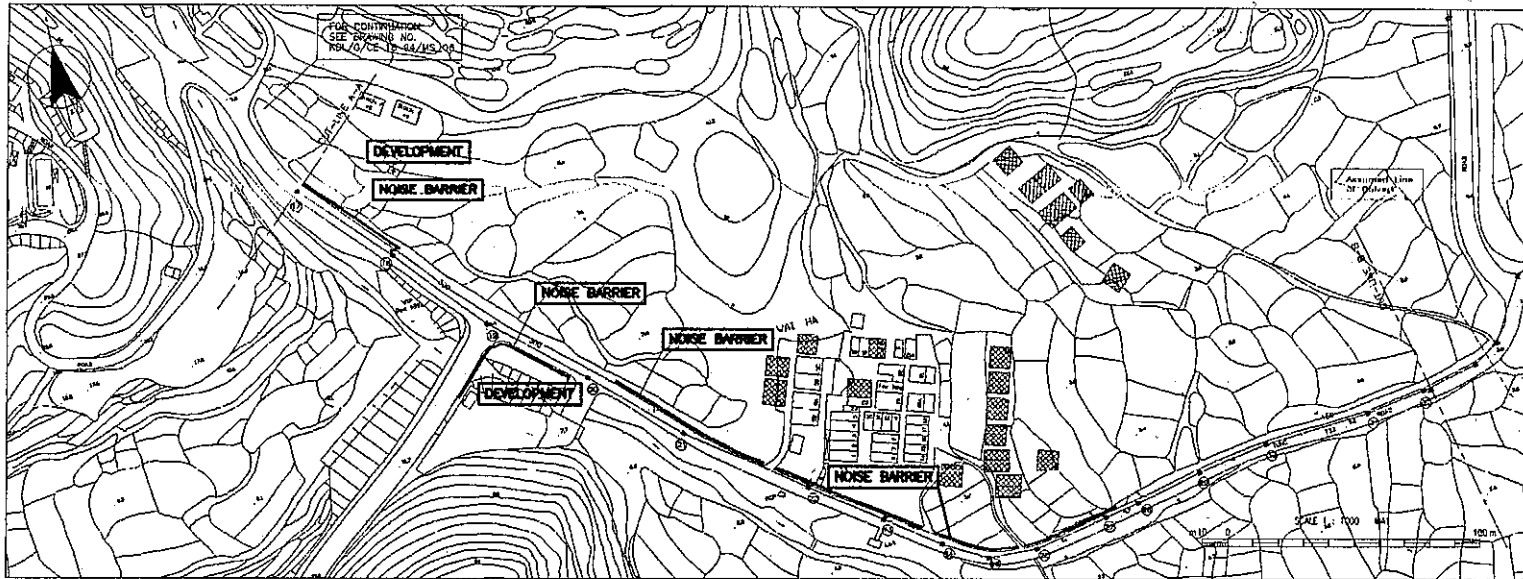
GOVERNMENT OF HONG KONG
Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

TUNG TSZ ROAD MAIN SEWER
 PLAN AND LONGITUDINAL SECTION

	AGREEMENT NO. CE/18/94	SHEET 1 OF 3
	DRAWING NO. MA/7/CE 18 94/NS.06	ISSUE 2

MONTGOMERY WATSON
 蒙哥馬利工程師
 In association with
Mouchel Asia Limited Consulting Engineers

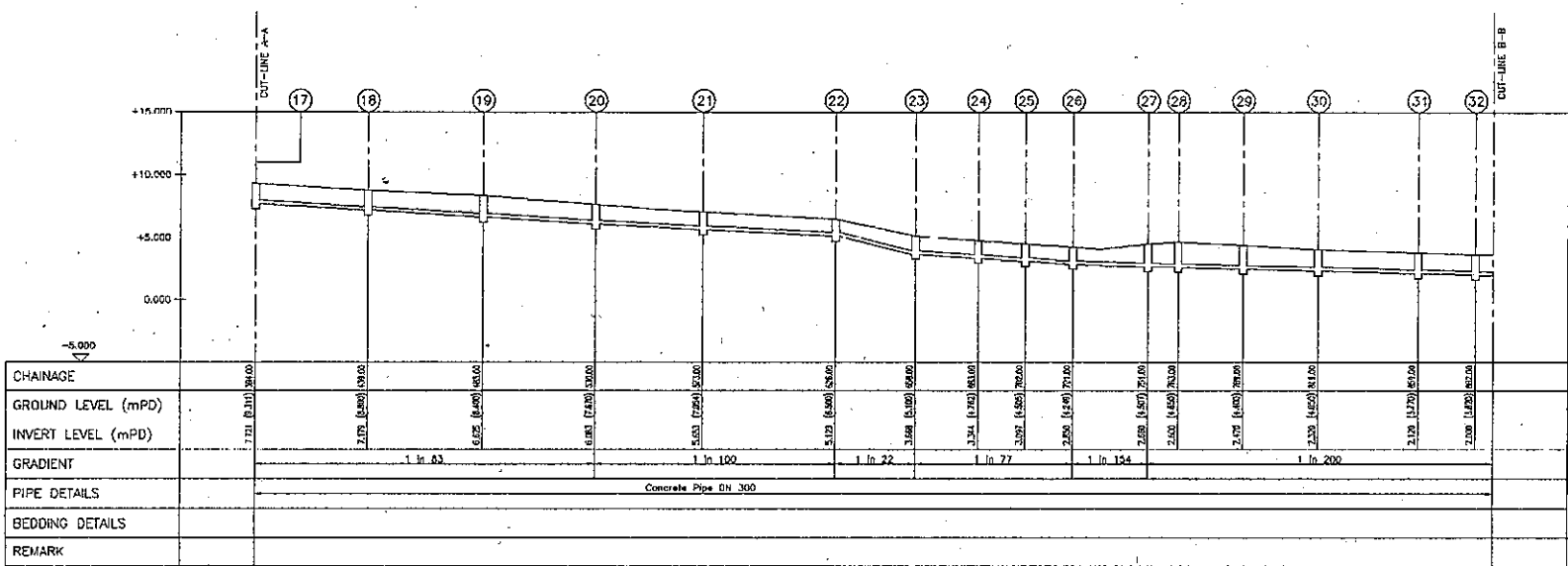




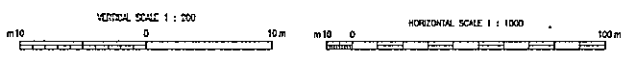
- LEGEND**
- Existing foul Gravity Sewer
 - Existing Manhole
 - Existing Rising Main
 - Existing Sewer to be Abandoned
 - Proposed Foul Sewer
 - Proposed Manhole
 - Proposed Rodding Eye
 - Proposed Pumping Main
 - ▲ Proposed Pump Station
 - Proposed Sewer By TID
 - Proposed Pumping Main by TID
 - Extent of Proposed Development
 - Outline of Proposed Development
 - ▨ Areas Where Land Resumption will Be Required, Note: Actual Width Required is Lesser of 1.5 Metres (2 metres at Manholes) or Distance between Buildings.
 - ▩ Recently Constructed Houses in Approximate Position

- NOTES**
- Map data reproduced with permission of the Director of Land, (C) Hong Kong
 - All sewers to be 150mm diameter unless indicated otherwise.
 - Levels Shown in Brackets (13.450) are Interpolated.

NOT FOR CONSTRUCTION



CHAINAGE	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
GROUND LEVEL (mPD)	7.721 (13.110)	7.478 (12.860)	6.925 (12.400)	6.881 (12.350)	5.953 (1.720)	5.123 (8.900)	3.548 (6.100)	3.244 (1.700)	2.921 (1.420)	2.250 (1.420)	2.269 (1.500)	2.420 (1.620)	2.075 (1.400)	2.220 (1.420)	2.170 (1.700)	2.200 (1.820)
INVERT LEVEL (mPD)	7.721 (13.110)	7.478 (12.860)	6.925 (12.400)	6.881 (12.350)	5.953 (1.720)	5.123 (8.900)	3.548 (6.100)	3.244 (1.700)	2.921 (1.420)	2.250 (1.420)	2.269 (1.500)	2.420 (1.620)	2.075 (1.400)	2.220 (1.420)	2.170 (1.700)	2.200 (1.820)
GRADIENT	1 in 100				1 in 22		1 in 27		1 in 154		1 in 200					
PIPE DETAILS	Concrete Pipe DN 300															
BEDDING DETAILS																
REMARK																



2/95	MAW	KPW		2	LAYOUT CHANGED TO FULL GRAVITY SYSTEM	
3/95	MAW	WCH		1	DRAFT ISSUE	
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE	BY/WORK DESCRIPTION

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

TUNG TSZ ROAD MAIN SEWER
 PLAN AND LONGITUDINAL SECTION

Figure 3.5c

AGREEMENT NO. CE/18/94	SHEET 2 OF 3
DRAWING NO. A/J/CE 18 64/VL/ST	ISSUE 2

MONTGOMERY WATSON
 廣達顧問工程師
 In association with
Mouchel Asia Limited Consulting Engineers

LEGEND

- Existing Four Manhole Sewer
- Existing Manhole
- Existing Riling Main
- Existing Sewer to be Abandoned
- Proposed Four Sewer
- Proposed Manhole
- Proposed Rooding Eye
- Proposed Pumping Man
- Proposed Pump Station
- Proposed Sewer by TCO
- Proposed Pumping Man by TCO
- Extent of Proposed Development
- Outline of Proposed Development
- Area Where Land Reclamation will be Required, Note - Actual Width of Main at Minibus or Distance between Buildings.
- Recently Constructed Houses in Approximate Position

NOTES

1. Map data reproduced with permission of the Director of Lands, (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.
3. Levels shown in brackets (13.450) are interpolated.

NOT FOR CONSTRUCTION

REV	DATE	BY	CHKD	APPD	REASON FOR ISSUE
5/85	1/85	WJW	WJW		1. LAYOUT CHANGED TO FULL GRAVITY SYSTEM
3/85	1/85	WJW	WJW		1. DRAFT ISSUE

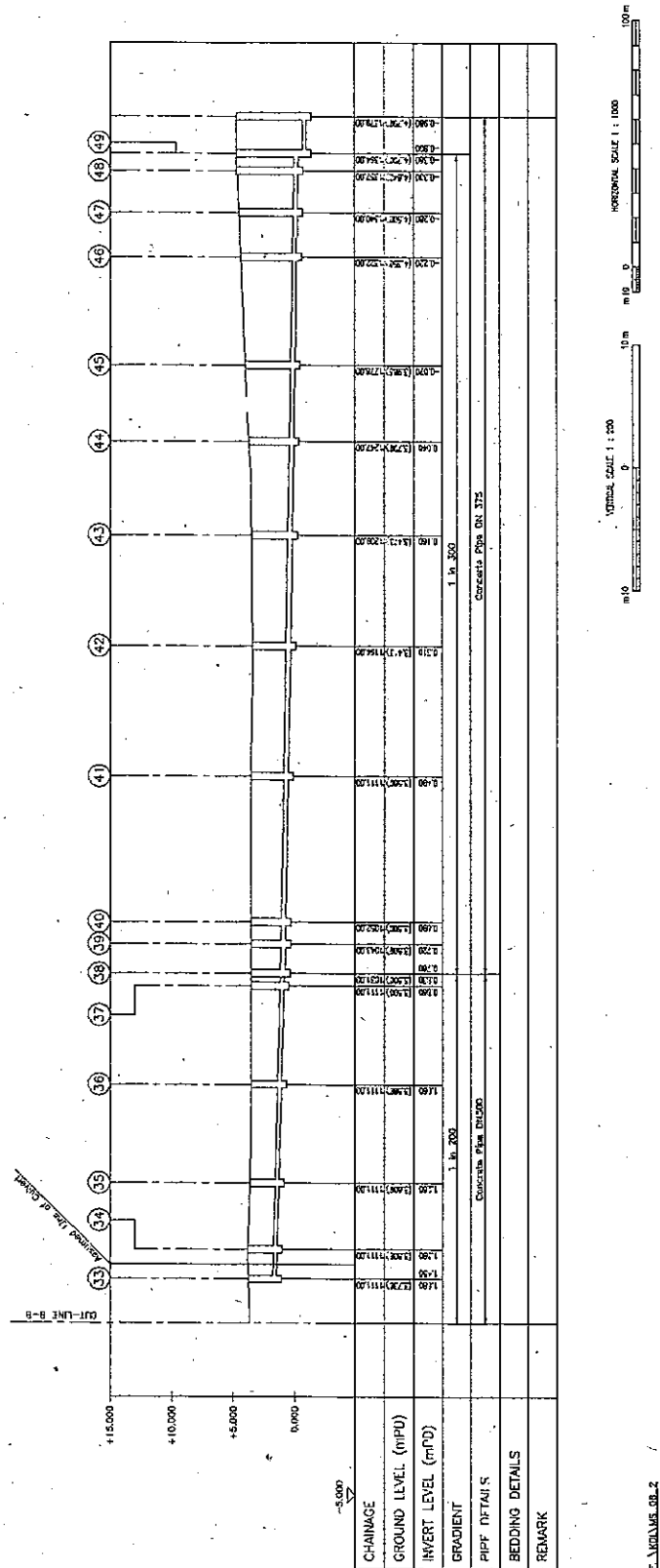
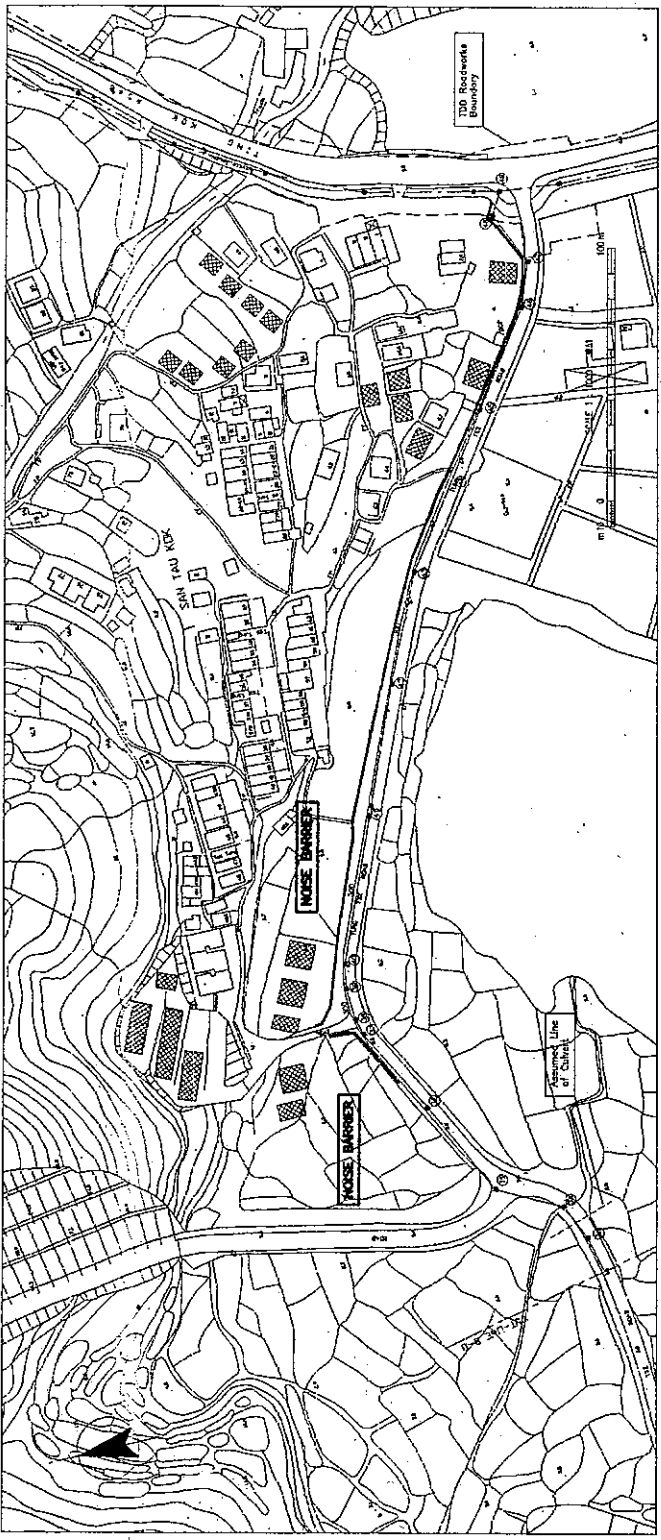
GOVERNMENT OF HONG KONG
Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

TUNG TSI ROAD MAIN SEWER
 PLAN AND LONGITUDINAL SECTION

PROJECT NO. CE/15/94
 DRAWING NO. 102/94/2 IS 11/A/10
 SHEET 3 OF 3
 ISSUE 1

DATE: 15/01/94

MONTGOMERY WATSON
 莫禮遜工程顧問有限公司
 Mouchel Asia Limited Consulting Engineers



6.0 AIR QUALITY ASSESSMENT

6.1 Introduction

The following Section describes the environmental standards for air pollutants, the sensitive receivers for air pollution, the existing air quality, the potential sources of air pollution from the Project and the impacts they may have on the environment and recommended mitigation measures to reduce potential impacts.

6.2 Environmental Standards and Guidelines

The Air Pollution Control Ordinance (APCO) (Cap 311) is the principal legislation for the management of air quality in Hong Kong. The statutory limits for specific air pollutants over specific time periods are stipulated by the APCO through Air Quality Objectives (AQOs). The AQOs are shown in Table 6.1.

Table 6.1: Hong Kong Air Quality Objectives

Parameter	Average Concentration ($\mu\text{g}/\text{m}^3$) ⁽¹⁾				
	Averaging Time				
	1 Hour ⁽²⁾	8 Hours ⁽³⁾	24 Hours ⁽³⁾	3 Months ⁽⁴⁾	1 Year ⁽⁴⁾
Sulphur Dioxide (SO ₂)	800		350		80
Total Suspended Particulates (TSP)			260		80
Respirable Suspended Particulates (RSP) ⁽⁵⁾			180		55
Nitrogen Dioxide (NO ₂)	300		150		80
Carbon Monoxide (CO)	30,000	10,000			

Note:
 (1) measured at 298°K (25°C) and 101.325 kPa (one atmosphere).
 (2) not to be exceeded more than three times per year.
 (3) not to be exceeded more than once per year.
 (4) arithmetic means.
 (5) respirable suspended particulates means suspended particles in air with a nominal aerodynamic diameter of 10 micrometres and smaller.

The majority of the construction works will be carried out using manual equipment and very few vehicle trips will be required. This will result in minimal impact from construction vehicle emissions. Therefore, only TSP and RSP pollution standards will be applicable for assessment under this Project.

The AQO's do not contain hourly criteria for concentrations of TSP and RSP. However, Dust Suppression Guidelines have been established by EPD to indicate the maximum acceptable concentration of TSP during construction works. The guidelines recommend that an hourly average of $500\mu\text{g}/\text{m}^3$ for TSP should not be exceeded at the construction site boundaries or at the nearest sensitive receiver.

The only air pollutant to be considered during operation of the Project is odour. There are no statutory limits for odorous emissions in Hong Kong, other than a requirement that a nuisance should not be caused. Odour does not generally become unpleasant or give rise to complaints

below a dilution factor of 5 odour units. For odour prediction, 5 odour units or above at any sensitive air receptor over the averaging time of 5 seconds shall be considered as an odour nuisance.

The works for this Project will be fragmented and small scale. The only sources of dust will be open sections of trench, material stockpiled alongside the trench, vehicle movements and loading and unloading of materials. It has been recommended that no more than 30 m of trench will be open at any one time and the stockpile will be no more than 30 m long and about 1m wide. This is to be covered whenever works are within village boundaries or close to sensitive receivers. Dust emissions from stockpiles will thus be minimal and will not result in a significant impact.

6.3 Air Quality Sensitive Receivers

The air quality sensitive receivers ASRs for the construction stage are the same as the noise sensitive receivers listed in Appendix E.

Assessment of air pollution during the operation of the Project will be limited to odours. Any potential odours will be restricted to those from the pumping stations and vent shafts that are proposed. The residential units located near proposed pumping stations are provided in Appendix E.

6.4 Existing Conditions

The villages to be sewered are mostly rural, 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 may be subject to dust and vehicle emissions.

The air pollutants in Tai Po and Shatin are monitored at EPD fixed measuring stations at locations shown on Figure 6.1. The 1994 pollution concentrations for these measuring stations are provided in Appendix F-1. The maximum monthly and annual average concentrations of TSP and RSP recorded at the Tai Po and Shatin measuring stations for 1994 are shown in Table 6.2.

Table 6.2: Tai Po and Shatin Measuring Station TSP and RSP Concentration (1994)

Measuring Station	1994 Pollution Concentration ($\mu\text{g}/\text{m}^3$)			
	TSP		RSP	
	Maximum Monthly	Annual	Maximum Monthly	Annual
Tai Po	142	87	80	50
Shatin	120	78	104	53

Note: the monthly particulate concentrations are the averages of 24-hour samples taken once every six days (i.e. five samples per month).

The 1994 annual TSP objective of $80\mu\text{g}/\text{m}^3$ was marginally exceeded at the Tai Po measuring station while the Shatin measuring station recorded TSP concentrations within the AQO. The RSP concentrations at both the Tai Po and Shatin measuring stations were below the annual

AQO threshold of $55 \mu\text{g}/\text{m}^3$ for 1994. The highest monthly concentrations of TSP and RSP at the measuring stations for 1994 were recorded in January. For the remaining months, TSP and RSP concentrations were significantly lower.

The Tai Po measuring station is located in an urban residential area and the Shatin measuring station is located within mixed industrial/residential area. These measuring stations are considered to be representative of the pollutant concentrations within the Project area.

6.5 Air Pollution Impacts

6.5.1 Construction Air Pollution

Dust may be generated from the following construction activities:

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

The number of vehicle trips during construction is expected to be very few (6 to 8 per village, per day) and for most areas vehicles movements will be on paved roadways. Only minimal movement of vehicles on unpaved roads will be required and vehicle speeds will generally be very low due to the restricted nature of the sites. The loading of surplus material excavated from trenches into trucks and unloading of backfill will be small in quantity, as most material excavated from the trenches will be used as backfill. It is expected that no more than one truckload per day would be generated, which will not generate significant dust impacts.

Some of the existing septic tanks in the villages may require removal or filling in to allow the village sewerage to be built and this could cause some release of odour. The odours from the removal of existing septic tanks will be short term (lasting one or two days) and are not considered to be significant with the adoption of effective odour mitigation measures.

6.5.2 Operational Air Pollution

Air pollution emissions during operation of the Project will be restricted to odours from ventilation systems of pumping stations and odour from removal of screenings from the pumping stations. There are two types of pumping stations proposed for this Project as described in Section 2.0. The larger pumping stations type 2 will have odour control and the smaller pumping stations type 1 will be designed to have natural ventilation to prevent the build up of gases to an unsafe level.

The potential sources of odours in the pumping stations are the wet wells. Hydrogen sulphide gas (H_2S) is the primary cause of odour nuisance. Hydrogen Sulphide gas concentration has been used to determine the odour impacts at the nearest air sensitive receivers for worst case scenario. The air sensitive receivers for the operation stage are the same as the noise sensitive receivers listed in Appendix E.

Measurements were carried out to estimate the hydrogen sulphide emissions from the wet well at an existing pumping station, Stanley Main Beach Pumping Station, that is similar in design and capacity to the proposed pumping stations in Tai Po and Shatin area. The Stanley Main Beach pumping station has a design flow of 30 litres per second. This flow will be similar to or be greater than the flows anticipated for the proposed type 1 pumping stations. The diameter of the vent pipe is 75 mm diameter and 1.5 m high. The outlets of the vent pipe are at the sides of

the vent pipe is 75 mm diameter and 1.5 m high. The outlets of the vent pipe are at the sides of the vent pipe and wire mesh.

The hydrogen sulphide concentrations were measured on 17/5/1996 by using Kitagawa sampling tubes with a detection range of 0.2 to 3.0 ppm at one stroke of the sampling pump. Measurements were taken by extracting 100 cm³ of air through a detection tube for 1 minute for each measurement. The concentration of hydrogen sulphide in the sample is obtained from a coloured scale in the sample tube. The colour range is from pale yellow to pink and the concentration is obtained directly from the scale printed on the tube. Ambient temperature was also recorded.

Measurements were taken at the vent pipe which was sealed within a screen to avoid the effects of wind. There is no forced ventilation in the Stanley pumping station so measurement of flow rate of the ventilation was not appropriate. Measurements around the vent pipe are thus equivalent to measurement at the open surface of the wet well.

The results of the monitoring are shown below in Table 6.3.

Table 6.3: Hydrogen Sulphide Measurements

Date	Time	Ambient Temperature (Degree Celsius)	Concentration of Hydrogen Sulphide (H ₂ S) (ppm)
17/5/96	11:20 a.m.	27.3	undetectable
17/5/96	2:15 p.m.	29.3	undetectable
17/5/96	2:30 p.m.	30.0	undetectable

All the odour readings at the vent pipe were below the limit of detection. The measurement team noted that there was a faint trace of odour at the ventilation pipe but there was no noticeable odour further than about 1 m from the pipe. There was no trace of any odour at the boundary of the pumping station.

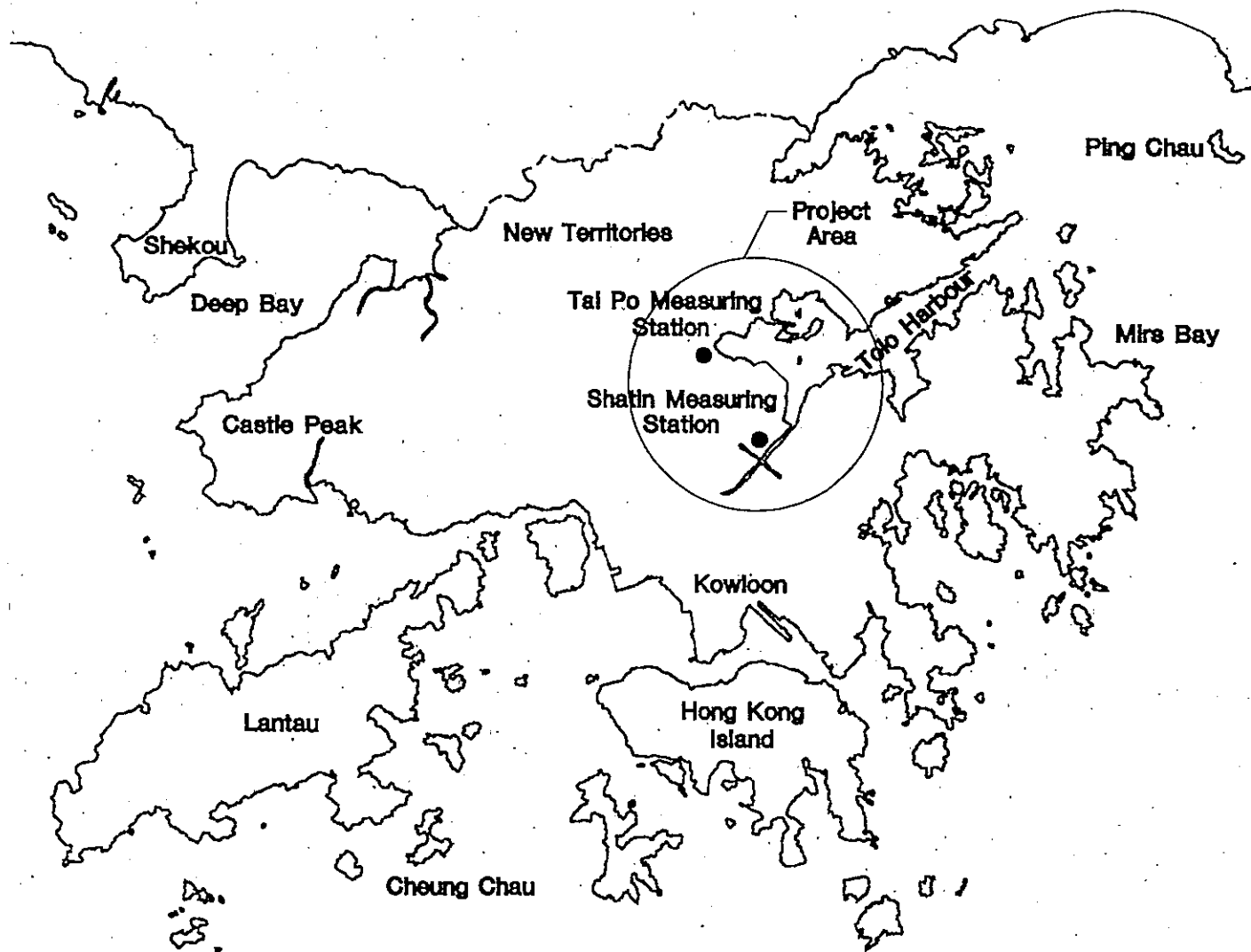
The other potential source of odour will be screenings from the pumping stations during maintenance. Maintenance will be carried out infrequently and no permanent provision of mitigation is likely to be required. Any odour impacts can be reduced by using a sealed container to transport the screenings and by minimising the time that the access chamber is open.


6.5.3 Conclusion

The type 2 pumping stations are proposed for only three locations, Chek Nai Ning, Cheung Shue Tan and along Hong Lok Yuen Road. The type 2 pumping stations will have odour control facilities due to the higher design flows with the odour control system being designed to meet EPD standards. The Stanley Main Beach Pumping Station is exactly the same type as the proposed type 1 pumping stations in the Sha Tin and Tai Po area and this pumping station has been used as an example to estimate the odour emissions. The measurement results were all less than the limit of detection and there was no noticeable odour at the pumping station. It is therefore concluded that the pumping stations will not cause odour nuisance to the nearest air sensitive receivers.



China



 MONTGOMERY WATSON 環境顧問工程師				
In association with				
Mouchel Asia Limited Consulting Engineers				
Project				
Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II				
Title				
Tai Po and Shatin Air Pollution Measuring Stations				
CAD File No. 488-781	Drawn D.W.	Checked S.E.S.	Approved E.V.L.	Scale N.T.S.
First Issued 21.9.95	Fig. No. 6.1		Rev.	

7.0 WATER QUALITY

7.1 Introduction

The following Section summarises the water quality standards applicable to marine, surface and ground waters, describes the existing water quality conditions in the Project area, identifies the potential impacts to water quality from Project construction and operation and identifies mitigation measures, as applicable, to reduce any identified impacts. Any impacts that may occur after implementation of the proposed mitigation measures are described at the end of this Section.

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.

7.2 Environmental Standards and Guidelines

7.2.1 Background

The implementation, construction and long term operation of the Project will be required to comply with the existing environmental standards and guidelines for surface and marine waters and to protect the use of limited ground water resources. Water quality in Hong Kong is controlled by the regulations defined in the Water Pollution Control Ordinance and implemented through the assignment of Beneficial Uses (BUs) to Water Control Zones (WCZs) and the Water Quality Objectives (WQOs) associated with each BU. The WQOs are controlled, use-related, water quality parameters to which statistical values or permissible deviation from ambient background levels are assigned.

The Project is located within the Tolo Harbour WCZ which is divided into three sub-zones, namely the Harbour, Buffer and Channel sub-zones. The surface waters which will be affected by the Project all drain into the Harbour sub-zone. The WQOs for the Tolo Harbour WCZ were established when the WCZ was gazetted in April 1987.

7.2.2 Inland Waters - Surface Waters

The BUs for surface waters have been assigned into four main groups, as follows:

- Group A - abstraction for potable water supply; these include all waters within water gathering grounds and within the boundaries of the country parks.
- Group B - irrigation; these are mainly in the agricultural areas of the New Territories.
- Group C - pond fish culture; these are waters passing through areas where there are large numbers of fish ponds and are mostly in the Yuen Long area.
- Group D - general amenity and secondary contact recreation; these are waters generally large enough to allow secondary contact recreation, those draining urban and semi urban areas and those draining to the sea at gazetted bathing beaches.

In addition to these BUs there are the more general uses for the preservation of aquatic life and for storm water channels. The quality requirements for these types of uses would equate to

Groups B and C, and D, respectively. The WQO are set in terms of pH, suspended solids, dissolved oxygen, chemical oxygen demand and biochemical oxygen demand.

The two principal water courses within the Tolo Harbour WCZ are the Lam Tsuen and Shing Mun Rivers. The Lam Tsuen and Shing Mun river catchments are subdivided into separate areas, in order to manage water quality in relation to their specific WQOs. The boundaries of the sub-catchments are shown on Figure 7.1 and the respective WQOs are given in Table G-1-1, of Appendix G-1.

In order to satisfy the WQOs and meet the requirements of the BUs, the maintenance of the surface water quality is controlled by the "Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters" which prescribes effluent discharge standards into the four water Classes. The values of the effluent standards are related to the volume of effluent being discharged.

Within the Tolo Harbour area there are designated water gathering grounds. Any developments or projects that are located within these areas are strictly controlled by the Water Supplies Department (WSD). For construction works, the WSD require the following to be carried out for Projects located within water gathering grounds:

- adequate protective measures shall be taken to ensure that no pollution or siltation occurs to the water gathering ground;
- no building materials, fuel, spoil, toxic materials or other materials which may cause contamination to the water gathering ground shall be allowed to be stockpiled on site;
- all surplus spoil shall be removed from the water gathering ground as soon as practicable;
- all excavation or filled surfaces which are subject to erosion shall be protected from erosion at all times;
- no construction plant which may cause pollution to the water gathering grounds due to leakage of oil or fuel shall be brought onto the site;
- no labour latrines shall be erected within water gathering grounds; and
- all waterworks access roads must be maintained unobstructed at all times.

For operation of the sewage system within water gathering grounds, the WSD require that the sewage mains are conveyed in cast iron pipes, with sealed joints and hatched boxes to discharge outside the water gathering grounds for treatment and disposal.

7.2.3 Inland Waters - Ground Water

Hong Kong is underlain by granite and, as such, there is little utilisable ground water. Where ground water is abstracted, it could be used for any of the four use Groups, defined in Section 7.2.2, and hence would need to meet the WQO for that particular Group. The effluent standards which are applied to the different Classes of surface waters do not apply to household septic tanks that discharge to the ground.

7.2.4 Marine Waters

Eight BUs have been identified for the Tolo Harbour marine waters which are common to all three zones, with the exception of bathing in the Harbour sub-zone and domestic and industrial use in the Channel sub-zone. A description of each of the BU is given in Appendix G-2, Table G-2-1 and G-2-2, and the water quality parameters which are currently required to be controlled to maintain the prescribed BU are given in Appendix G-2, Table G-2-3.

The WQO for dissolved oxygen, light penetration and chlorophyll-a become more stringent towards the seaward end of the zone. This reflects to a large extent the need to control the development of phytoplankton blooms, and in particular the red tides which were increasing in frequency over the period 1977 to 1988.

The WQO values are generally defined as annual depth averaged values or percentiles. However there may be short term, large magnitude variations which may have an impact on sensitive receivers but have little influence on the annual values.

7.3 Water Quality Sensitive Receivers

Sensitive receivers are defined as those users of the surface, ground and marine waters whose authorised use of the water could be impaired as a result of a reduction in quality of the water. The users may be active, as in the case of water abstraction for a particular use, or passive, such as the aquatic and marine ecosystem.

Surface water sensitive receivers include users of water extracted for domestic, agriculture and industrial use and the general riverine ecosystem. A survey of watercourses that are located within or near to the villages to be seweraged have been listed in Appendix G-3, Table G-3-1.

Ground water sensitive receivers include any extraction of ground water for domestic or agricultural use within the Project area or linked aquifer.

Sensitive receivers for the marine water in Tolo Harbour include:

- the SSSI's located within Tolo Harbour;
- the Marine Science Laboratory of the Chinese University of Hong Kong (CUHK);
- Water Supplies Department (WSD) sea water intake stations at Tai Po and ShaTin;
- mariculture zones at Three Fathoms Cove and Yim Tin Tsai; and
- the general marine ecosystem of Tolo Harbour.

7.4 Existing Conditions

7.4.1 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. The water quality within the five catchment areas of Tolo Harbour, shown in Figure 7.2, is monitored regularly by EPD and the quality is assessed by using the Index System developed by the Netherlands Ministry of Transport and Public Works. The Index is based on a point system that awards points to measurements of biochemical oxygen demand, dissolved oxygen and ammonia-nitrogen in accordance with a numerical scale. The Index System is summarised in Appendix G, Table G-1-2.

A field survey and pollution load assessment was carried out as part of the Tolo Harbour Catchment Study on Unsewered Developments (1990), THCSUD, which assessed water quality in and around Tolo Harbour. The results of this survey showed that thirty water course systems within the villages fell into the categories of bad and very bad. These quality indices indicate waters that are prone to odour nuisances. In cases where poor water quality was due to sewage discharges, unacceptably high *E. coli* levels would exist.

These conditions occur principally as a result of the arrangements for sewage disposal. For most villages, watercourses are affected by direct discharge or by indirect discharges via septic

tanks. Septic tanks probably remove only 10 - 20% of biochemical oxygen demand and a lower percentage of nitrogen because they are not maintained or cleaned on a regular basis. Moreover, the septic tanks in most cases treat only foul discharges, with sullage being discharged directly to receiving waters.

Similarly, small industries discharge to surface water courses exacerbating a situation which is already under pressure from domestic wastewater. Thus, the existing condition of water quality at receiving waters within individual villages is of concern for public health and aesthetic reasons as well as for its contributions to pollution loadings, in particular nitrogen, to Tolo Harbour.

The EPD annual report on river water quality for 1993, indicates that the water quality upstream in the five main catchments is improving to a level classified as good or excellent, with the exception of the upper reaches of the Fo Tan tributary of the Shing Mun river where the water quality is defined as fair.

In addition to effects due to direct and indirect discharges of waste water from domestic properties, the water quality is also affected by refuse disposal. This is due in part to dumping directly to water courses or to open ground from where run off can occur during the wet season. Since the THCSUD studies, the progressive implementation of the Waste Disposal (Livestock Waste) Regulations (1988) has helped to improve water quality in these areas and efforts are continuing to improve water quality in the Shing Mun, Lam Tsuen and Tai Po rivers, which are regarded as 'priority rivers' based on their history of suffering from pollution.

7.4.2 Ground Water

The routine EPD water quality monitoring programme includes monitoring of three wells, one of which is situated at Lam Tsuen in the Tolo Harbour Supplementary WCZ. The water in this well is regarded as unsatisfactory, with a median biochemical oxygen demand of 2mg/l and geometric mean *E. coli* count of 1,109cfu/100ml, in 1993. Since the local residents raise fish in the well itself, the poor quality may be due to a combination of these activities in addition to septic tank overflows into soakaways within the immediate catchment.

7.4.3 Marine Water

The quality of surface water discharged into the Tolo Harbour clearly 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 610/100ml. Compliance with the dissolved oxygen WQO has been deteriorating and is in the region of 75%. Annual average and maximum suspended solids concentrations are below 10mg/l. The annual mean concentration of un-ionised ammonia is below the WQO value of 0.021mgN/l applied to other WCZs. The annual mean inorganic nitrogen concentration exceeds the values suggested by Watson et al (1988)¹ as required to limit algal growth which is giving rise to the high concentrations of algal growth indicated by the high chlorophyll-a concentrations.

¹ Ref. Watson et al 1988, Hong Kong Government EPD Sewage Strategy Study Working Paper 2 Water Quality Objectives

7.5 Potential Water Quality Pollution Sources

Water quality impacts for this Project can be divided into those occurring during the construction and those following the completion of the construction. Those occurring during the construction will be related to the engineering works associated with the trenching works for the sewers and excavations for pumping stations. These would be expected to be of short duration and of relatively localised impact. Following the completion of the works and the collection and treatment of the domestic wastewater, the nitrogen loads to Tolo Harbour will decrease in proportion to the number of dwellings connected.

7.5.1 Surface Water Quality

The most significant potential impact on water quality will be due to suspended solids runoff from excavation sites and spoil heaps and from dewatering of trenches and foundations when water containing high concentrations of suspended solids may be discharged to water courses. The magnitude of this impact will depend on:

- the extent of excavation site;
- the nature of the excavated ground;
- topography; and
- weather conditions.

A list of the villages that have water courses near construction works is provided in Appendix G-3. Additionally, six of the village developments to be sewered are within or partially within WSD designated water gathering grounds, as follows:

- Tai Mei Tuk Government Housing
- Hong Lok Yuën
- Wong Chuk Yeung
- Tai Lam Liu
- Shek Kwu Lung
- Wong Nai Tau

The villages of Lo Lau Uk, Ta Tit Yan and Fa Sam Hang are also within WSD designated water gathering grounds however these villages are no longer proposed to be sewered under this project. Potential impacts could occur from construction activities that are carried out at these villages as well as other villages containing water courses.

At this stage it is not possible to quantify the magnitude or location of the potential construction impacts since the detailed design of the sewers, river crossing points, pumping stations and construction methods have not yet been established. On the regional scale, the impacts are not likely to be severe but they could give rise to localised problems such as blockage of gullies and drains and siltation in streams and channels.

Many of the lower sections of the water courses are concrete lined channels. Where sewer pipes are to cross these channels, disturbances to the river bank and consequent displacement of solids into the water course during construction will be minimal.

The use of mechanical plant inevitably requires refuelling together with fuel and oil storage and maintenance areas. As a consequence, there is the risk of spillage and leakage which may be transported to the surface waters and thereby give rise to oil films on the surface. Neither fuel storage or areas of mechanical equipment storage are allowed within the water gathering grounds.

Following commissioning of each village sewer system, the reduction of loading of wastewater to the local surface waters and to the marine environment will be immediate leading to a progressive recovery of the water quality. In some sections of the watercourses, the discharge of domestic wastewater may be a significant component of the dry season flow. Interception of this flow may result in loss of habitat in wetlands or streams. Potential impacts may also occur during operation if malfunctions of the sewage system occurs. This may result in impacts to water quality, particularly within villages identified above which are located within the water gathering grounds. The proposed pumping stations will have telemetry devices to raise an alarm in the event of equipment or power failure. The type 2 stations will further have an emergency generators which will eliminate potential impacts from power failure. The volume of sewage pumped at a type 1 station is expected to be small and would not result in significant impacts to the environment in the event of failure. Task of failure would be expected to be small if the stations are maintained on a regular basis.

There could be impacts to surface water quality in the event of failure of the pump at a pumping station when the emergency overflow will be used. It is not possible to assess these impacts quantitatively since the frequency or duration of occurrence cannot be estimated. The only mitigation measure that can be applied is to direct the emergency overflow to non-sensitive water bodies and it is recommended that this should be done.

7.5.2 Ground Water Quality

It is unlikely that the construction of shallow trenches for the sewer pipes will have any significant impact on ground water quality unless contaminated materials from the trench or contaminated backfill material is used.

The problem of run off from mechanical plant refuelling and maintenance areas has been addressed above with surface water. There is a similar risk of downward and lateral migration of hydrocarbons into the ground water from where it may cause deterioration of underground service materials or seep into ground waters.

During the operational phase there are unlikely to be any adverse effects on the ground water other than those resulting from leakage of raw sewage from damaged sewers. At the moment, the ground water is being contaminated as a result of overflow from septic tanks to soakaways which are contaminating the unsaturated and saturated zones. In the absence of sewer failure, an improvement in ground water quality would be expected.

7.5.3 Marine Water Quality

The only effect on marine water quality will arise from transport of suspended solids into the waters of Tolo Harbour. However, in the harbour, the plume will disperse or settle to the sea bed with minimal impact.

Once constructed and operational, the Project will greatly improve the water quality in Tolo Harbour as village effluent will be diverted and nitrogen loadings are removed through the effluent export scheme.

7.6 Mitigation Measures

The following mitigation measures shall be carried out during all construction activities to reduce the potential for soil materials entering water courses:

1. Stockpiled materials shall be contained in a designated area, at least 5 m from any

- stream course and either down gradient from any stream course located in the area or up gradient with a suitably constructed barrier to reduce loss of materials.
2. Any materials that are temporarily stockpiled along trenches during construction works shall be stockpiled on the up gradient side of the trench from any water course located in the area.
 3. Stockpiled materials shall be covered with tarpaulins at all times to prevent fines from being washed out and carried to surface water drains.
 4. For villages where surface water channels discharge into streams, silt traps shall be installed to attenuate the transport of silt. The silt traps shall not be removed until all works upstream of the trap have been completed.
 5. The Contractor shall ensure that all proposed sediment removal facilities are maintained and deposited sediment and grit should be removed regularly as well as after each rainstorm. Following completion of works, the Contractor shall inspect all surface drains and remove any deposits of silt which may have accumulated as a result of contamination of runoff during construction works.
 6. For any natural vegetation area that is disturbed during construction works, the area shall be revegetated as soon as the works are completed.
 7. Rainwater pumped out from trenches or excavations shall be discharged into storm drains via sediment removal facilities.
 8. All storm catch basins/inlets receiving storm runoff from construction areas shall be covered with wire mesh filter and crushed stone on top in order to prevent sediment from entering inlet structures.

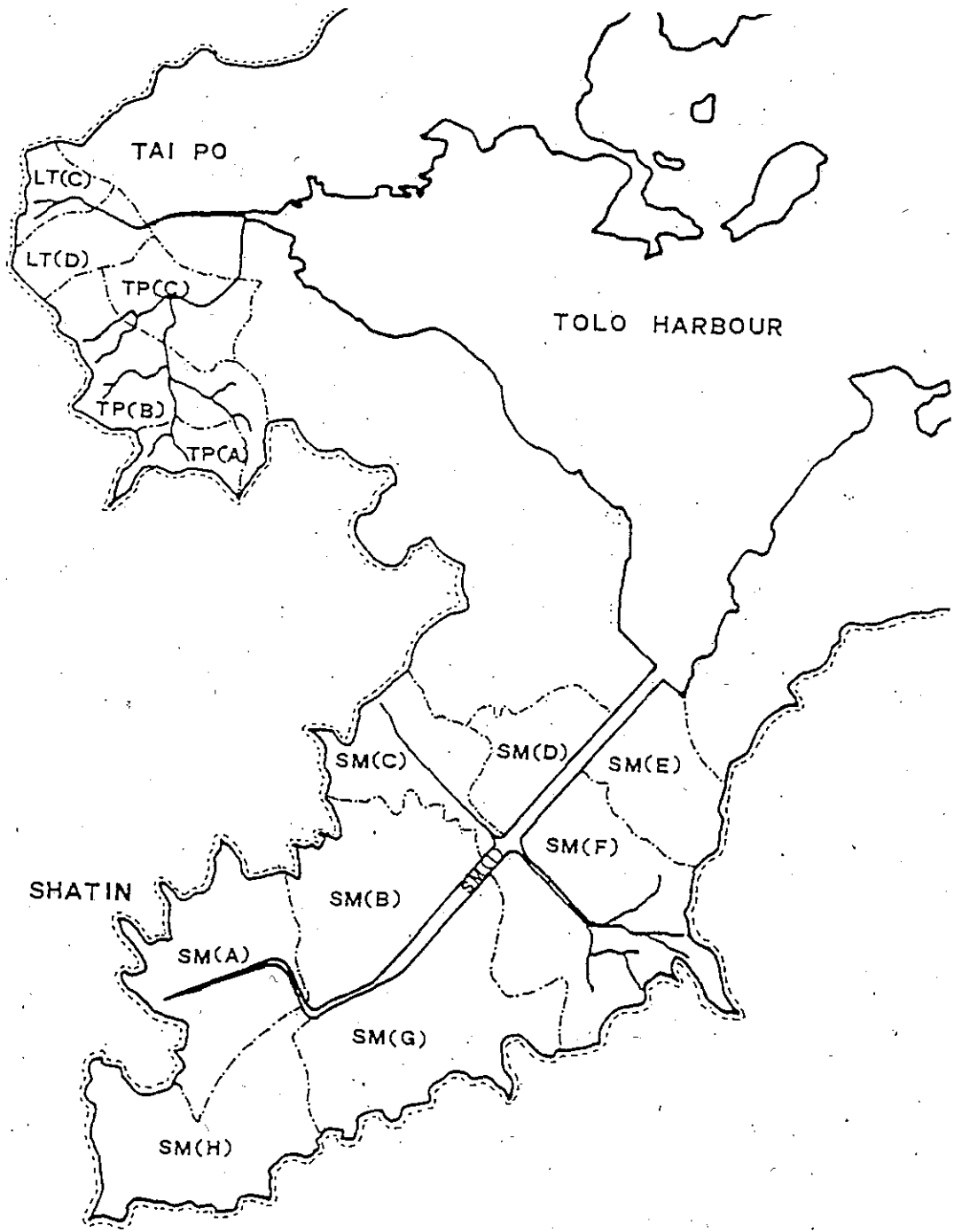
The following shall be carried out during construction to reduce the potential for impacts to occur to water resources from mechanical equipment:

1. All construction plant shall be in proper working order and maintained such that there shall be no leakage of oil or fuel. Any waste oils shall be collected in designated tanks prior to disposal off site.
2. All mechanical plant maintenance and refuelling areas shall be carefully sited on paved areas and shall have oil separators/petrol interceptors. The fuel tanks shall be housed within a bunded containment area that shall be regularly drained of rain water. All storm water runoff from these areas shall be discharged into storm drains via oil separators/petrol interceptors and sediment traps.
3. In accordance with WSD requirements the following general conditions/requirements shall be observed for the villages that are located within water gathering grounds, including: Tai Mei Tuk Government Housing, Hong Lok Yuen (inclusive of the connection route that may be within the water gathering grounds), Wong Chuk Yeung, Tai Lam Liu, Shek Kwu Lung and Wong Nai Tau.
 - adequate protective measures shall be taken to ensure that no pollution or siltation occurs to the water gathering ground;
 - no building materials, fuel, spoil, toxic materials or other materials which may cause contamination to the water gathering ground shall be allowed to be

- stockpiled on site;
 - all surplus spoil shall be removed from the water gathering ground as soon as practicable;
 - all excavated or filled surfaces which are subject to erosion shall be protected from erosion at all times;
 - no construction plant which may cause pollution to the water gathering ground due to leakage of oil or fuel shall be brought onto the site;
 - no labour latrines shall be erected within water gathering ground, and
 - all waterworks access roads must be maintained unobstructed at all times.
4. Any sewerage main to be laid within the water gathering grounds should comprise cast iron pipes, with sealed joints and hatched boxes to discharge outside water gathering grounds for treatment and disposal.
5. Any pressure mains to be located within the designated water gathering grounds, should be carefully designed with burst main alarm and system tripping for preventing back feeding. Reversed flow switches should be installed at the individual pumping mains which will give the alarm and trip associated pumps.
6. WSD has commented that for the pumping main from Hong Kok Yuen to the existing sewer at Shui Wai, an alternative route should be located away from Lam Tsuen River for preventing the potential for pollution risk in the water gathering grounds and that pressure mains should be carefully designed with burst main alarm and system tripping should be available in accordance with the specific measures for sewers located within the water gathering grounds, as described above. The final alignment to be adopted is now under discussion by the detailed design team with DSD and other Government departments including WSD. The alignment route will be subject to final confirmation during the detailed design stage of the Project.


7.7 Residual Impacts

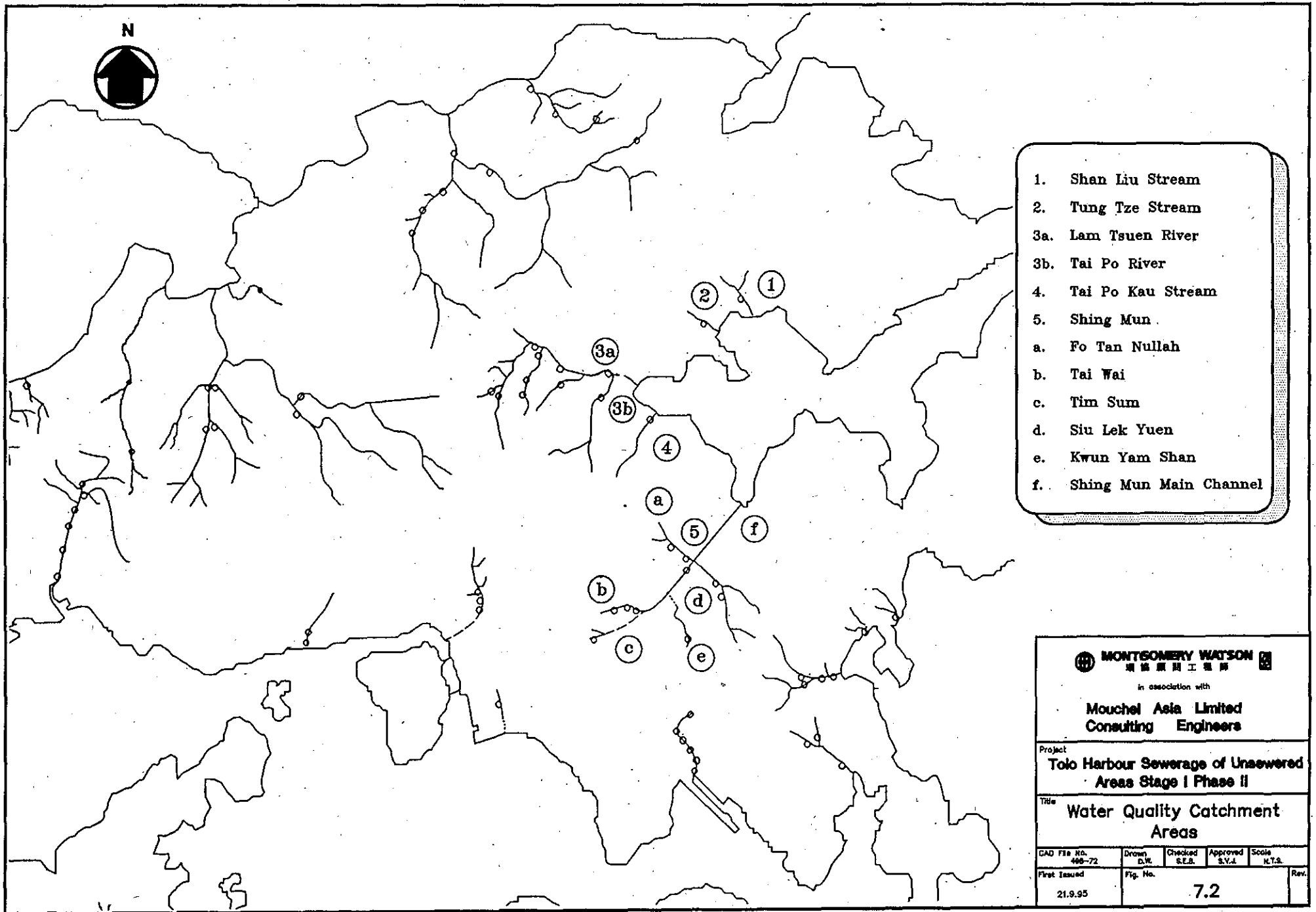
Implementation of the above mitigation measures will reduce impacts to a less than significant level with no impact to sensitive receivers.



0 1km

LT - LAM TSUEN RIVER
 SM - SHING MUN RIVER
 TP - TAI PO RIVER
 () - ZONE
 - - - - - BOUNDARY OF WATER-COURSE SUBZONE
 - - - - - BOUNDARY OF TOLO WATER CONTROL ZONE

 MONTGOMERY WATSON 莫格遜顧問工程師 In association with Mouchel Asia Limited Consulting Engineers				
Project Tolo Harbour Sewerage of Unsewered Area Stage I Phase II				
The EPD Watercourse Subzones in the Tolo Harbour and Channel Water Control Zone				
DAD File No. 488-771	Drawn D.W.	Checked S.E.S.	Approved S.V.L.	Scale N.T.S.
First Issued 21.9.95	Fig. No.	7.1		Rev.



1. Shan Liu Stream
2. Tung Tze Stream
- 3a. Lam Tsuen River
- 3b. Tai Po River
4. Tai Po Kau Stream
5. Shing Mun
- a. Fo Tan Nullah
- b. Tai Wai
- c. Tim Sum
- d. Siu Lek Yuen
- e. Kwun Yam Shan
- f. Shing Mun Main Channel

MONTGOMERY WATSON
 莫高美士工程顧問有限公司
 in association with
Mouchel Asia Limited
 Consulting Engineers

Project
Tofo Harbour Sewerage of Unsewered Areas Stage I Phase II

Title
Water Quality Catchment Areas

CAD File No. 466-72	Drawn D.W.	Checked S.E.B.	Approved S.Y.A.	Scale N.T.S.
First Issued 21.9.95	Fig. No. 7.2			Rev.

8.0 ECOLOGY

8.1 Introduction

Baseline ecological surveys were carried out (October 1995) at villages that will be seweraged and along the proposed main sewer alignments. The surveys identified areas where ecologically sensitive resources may be present and determined the areas where the Project may result in impacts. The sewer alignment has since been modified to take into account the findings of the ecological surveys as well as comments from Government agencies. As a result, the ecologically important areas that were identified in the surveys are now avoided. The following Section summarises the findings of the ecological surveys in respect to the modified sewerage layout, identifies the remaining ecological impacts and recommends mitigation measures to reduce potential impacts to acceptable levels.

8.2 Project Area

The majority of the sewers will follow the existing concrete and dirt pathways and access roads. These will also provide access for the construction works. In general, these areas have had a high level of human disturbance, resulting in few areas of natural vegetation or wildlife which could be disturbed by the works.

8.3 Summary of Ecological Sensitive Receivers

The baseline surveys were carried out within the villages and along the main sewer alignments to identify significant areas of ecological concern. Photographic records were taken at potential areas of concern and the position of important sites and habitats were recorded on 1:2,000 scale maps. Full details of the surveys are given in Appendix H1. Particular attention was given to recording natural or currently undisturbed habitats that may be disturbed by the Project and identifying areas where further ecological assessment might be required.

Additional sewage works have been included in the Project after the baseline surveys were carried out. These include the villages of Tung Tsz and Wai Ha, an unnamed development along the road running south west from Tung Tsz Road, Yin Tse Lane at Tai Po Kau and the Scout Training Centre. The main sewer alignments also now include Hong Lok Yuen to Shui Wai, Sam Mun Tsai Road, Ting Kok Road at Tai Mei Tuk and Cheung Shue Tan to Campus Circuit North. The potential for ecological impacts to occur at these areas has been included in this assessment.

8.3.1 Ecological Sensitive Receivers

The ecological surveys identified seven areas where there could be minor ecological impacts. Most of these areas are no longer impacted by the proposed alignment, due to alignment modifications. However, for some of the modified alignments, additional areas have been identified as having the potential to be impacted. The potential for ecological impacts is described below.

The baseline survey identified the potential for impacts to the woodland area in the north west corner of the Government Housing Area at Tai Mei Tuk. The wooded area includes *Litsea glutinosa*, *Viburnum odoratissimum* and *Antidesma bunius*. The sewer alignments have now been modified to use an existing sewer from the Government Quarters, thus avoiding construction works in this area and the potential for ecological impacts. The new alignment will however result in the removal of a wooded area and natural vegetation in the southern portion

of the site (see Figure 8.1). The removal of the trees and shrub vegetation is not considered to be a loss of habitat or a significant ecological impact. However measures should be taken to minimise the removal of mature trees and the area should be revegetated with the same species as soon as possible after completion of the works.

The survey identified the potential for impacting the Ting Kok Mangrove SSSI at Po Sam Pai village, if there are increased sediment loads in the Po Sam Pai stream. Sediment loads are not likely to be of a magnitude that would result in impacts to the mangrove trees, but mitigation measures are nevertheless recommended to reduce soil runoff. These are provided in Section 7.0 of this Report.

Sewers at the villages of Cheung Shue Tan, Tai Po Mei and Chek Nai Ping, were previously planned to be laid across hillside scrubland, which includes species such as *Eurya japonica*, *Melastoma sanguineum*, *Rhodomyrtus tomentosa* and *Sapium sebiferum*. The sewer alignment also followed a wooded hillside, where there are species such as *Sterculia lanceolata*, *Ficus fistulosa* and *Cleistocalyx operculata*. The sewers will now be located beneath an existing pathway which will significantly reduce loss of vegetation and will not result in impacts to ecology.

For the villages of Wu Kai Sha New Village and Lok Wo Sha, the baseline survey recommended that felling or disturbance of a patch of mature trees including *Ficus microcarpa*, *Cletis sinensis* and *Dimocarpus longan* behind buildings and To Tau Village should be avoided. The sewage layouts now avoid disturbance to the tree area however the location of the proposed pumping station near Lok Wo Sha Village would be close to a camphor tree of over 200 years old which requires preservation as described in Section 9.0.

For Ho Tung Lau village, the ecological survey identified a wooded hillside with *Garcinia oblongifolia*, *Ficus hispida*, *Aporosa dioica* and *Microcos paniculate* that may be impacted during the construction of a short stretch of rising main. The sewer layouts have now been amended to be outside the wooded area and will not cause any impacts.

For Lo Lau Uk, Yuen Tun Ha, Ta Tit Yan village, the baseline survey identified potential impacts to the stream and riparian vegetation in Yuen Tun Ha and Ta Tit Yan. The preliminary design now recommends that these villages are not sewered, thus eliminating any ecological impacts.

The Sheun Wan Egretty near Shuen Wan Chim Uk, Sheun Wan Lei Uk and Sam Mun Tsai villages is a sensitive receiver. Sewers in this area will be wholly outside the Egretty and all construction works will be confined to the existing roadway in front of the housing. In addition the housing will provide a barrier between construction works and the Egretty. Therefore, the works will not result in impacts to the Sheun Wan Egretty SSSI.

8.3.2 Additional/ Modified Sewer Alignments.

Additional villages and developments that have been included in the Project after the initial ecological surveys are Wai Ha Village, Tung Tsz Village, the Scout Training Centre at the top of Tung Tsz Road and an unnamed development along a road running south west from Tung Tsz Road. The sewers through these areas are to be placed within roadways and footpaths and will not result in any disturbance to vegetation. The additional work of construction of the main sewer along Tung Tsz Road and Ting Kok Road will not result in any ecological impacts.

There are two areas in the village of Wong Nai Tau (Figure 8.2) and one portion of the

alignment in Sam Mun Tsai New Village (leading up to the school) (Figure 8.3) that may result in minor impacts to natural vegetation. The alignment should follow the existing pathways as much as possible to reduce vegetation loss. For the wooded area in Sam Mun Tsai New Village, the alignment should follow the existing roadway leading up to the school.

For the development site of Tsiu Lam the alignment has changed from following the existing roadway to traversing up the embankment (see Figure 8.4) which may result in a loss of trees in the area.

8.4 Conclusions

The assessment has not identified any potential impacts to habitats that are considered of importance to wildlife. The majority of the potential impacts apply to damage or loss of vegetation and this loss should be minimised during development of the detailed design and during construction. Measures should be taken for the Tai Me Tuk Government Housing Area and the villages of Lok Wo Sha, Tai Po Mei, Tai Lam Liu, Sam Mun Tsai New Village and Tsiu Lam and recommendations for these are discussed below.

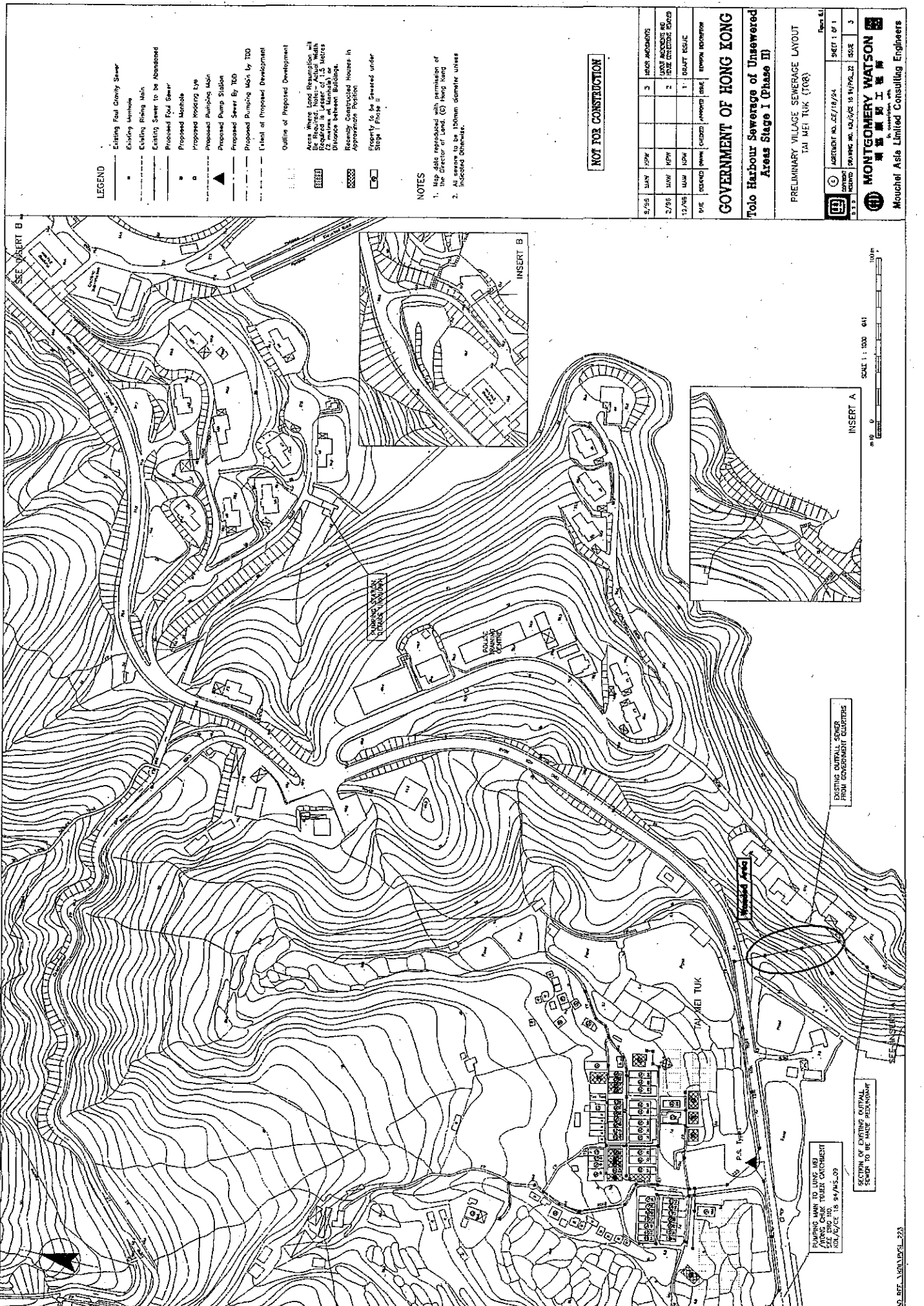
8.5 Mitigation Measures

The following measures should be carried out to reduce the potential for ecological impacts in Tai Me Tuk Government Housing Area, Tai Lam Liu, Sam Mun Tsai New Village and Tsiu Lam.

1. The Contractor should restrict construction works to existing pathways and roadways, as much as possible, to avoid ecological impacts. The Contractor should avoid any damage to the woodland areas through measures such as restricting vehicles, heavy equipment and building materials to an area outside of a 5 m buffer zone from the edge of the woodland. Particular care shall be given to ensure that the root system of the 200 year old camphor tree located in the village of Lok Wo Sha is not disturbed.
2. Should felling of trees be unavoidable, a detailed tree felling proposal should be submitted to the relevant authority for approval in accordance to the Works Branch Technical Circular No. 24/94.
3. For the Shuen Wan Chim Uk, Shuen Wan Lei Uk and Sam Mun Tsai Villages, it is recommended that works are carried out during the non breeding season from September to February to avoid any potential disturbance to the Shuen Wan Egret.

8.6 Residual Impacts

There will be no residual ecological impacts after implementation of the recommended mitigation measures.



LEGEND

- Existing Fault Gravity Sewer
- Existing Mainline
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Fault Sewer
- Proposed Mainline
- Proposed Wording Eye
- Proposed Pumping Main
- Proposed Pumping Station
- Proposed Sewer By TUD
- Proposed Pumping Main by TUD
- Limit of Proposed Development
- Outline of Proposed Development

- Areas Where Land Reclamation to be Required, Note: Actual Width Required is Less or 1.5 Metres Distance between Buildings.
- Recently Constructed Houses in Approximate Position
- Property to be Sewered under Stage I (Phase II)

NOTES

1. Top data reproduced with permission of the Director of Land (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

DATE	REVISION	BY	FOR	REASON
8/26	1	WPK	WPK	ISSUE AGREEMENTS
2/26	2	WPK	WPK	UNIT AGREEMENTS AND ISSUE CONTRACTS
12/85	3	WPK	WPK	1. DRAFT ISSUE
0/16	4	WPK	WPK	2. DRAFT ISSUE

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

PRELIMINARY VILLAGE SEWERAGE LAYOUT
 TAI MEI TUK (TVR)

PROJECT NO. CE/19/24
 DRAWING NO. 18 84/MS-09
 SHEET 1 OF 1
 SCALE 1:100
MONTGOMERY WATSON
 莫高美 顧問工程師
 Mouchat Asia Limited Consulting Engineers

SCALE 1:100
 0 10 20 30 40 50 60 70 80 90 100m



LEGEND

- Existing Road Layout, Name
- Existing Mainline
- Existing Rising Muth
- Existing Sewer to be Abandoned
- Proposed Total Sewer
- Proposed Mains
- Proposed receiving tank
- Proposed Pumping Main
- Proposed Pump Station
- Extent of Proposed Development
- Outline of Proposed Development (taken from the Tin and North Island Planning Office Plan No. L/27/33/1A)
- Area Where Land Reclamation is Required. Note: Areas Within 100m of the Proposed Sewerage Lines are to be Reclaimed. Distance between Buildings.
- Recently Constructed Houses in Approximate Position
- Proposed to be Sewered under Single System

NOTES

1. Map shall be considered with permission of the Director of Land, (C) Hong Kong.
2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

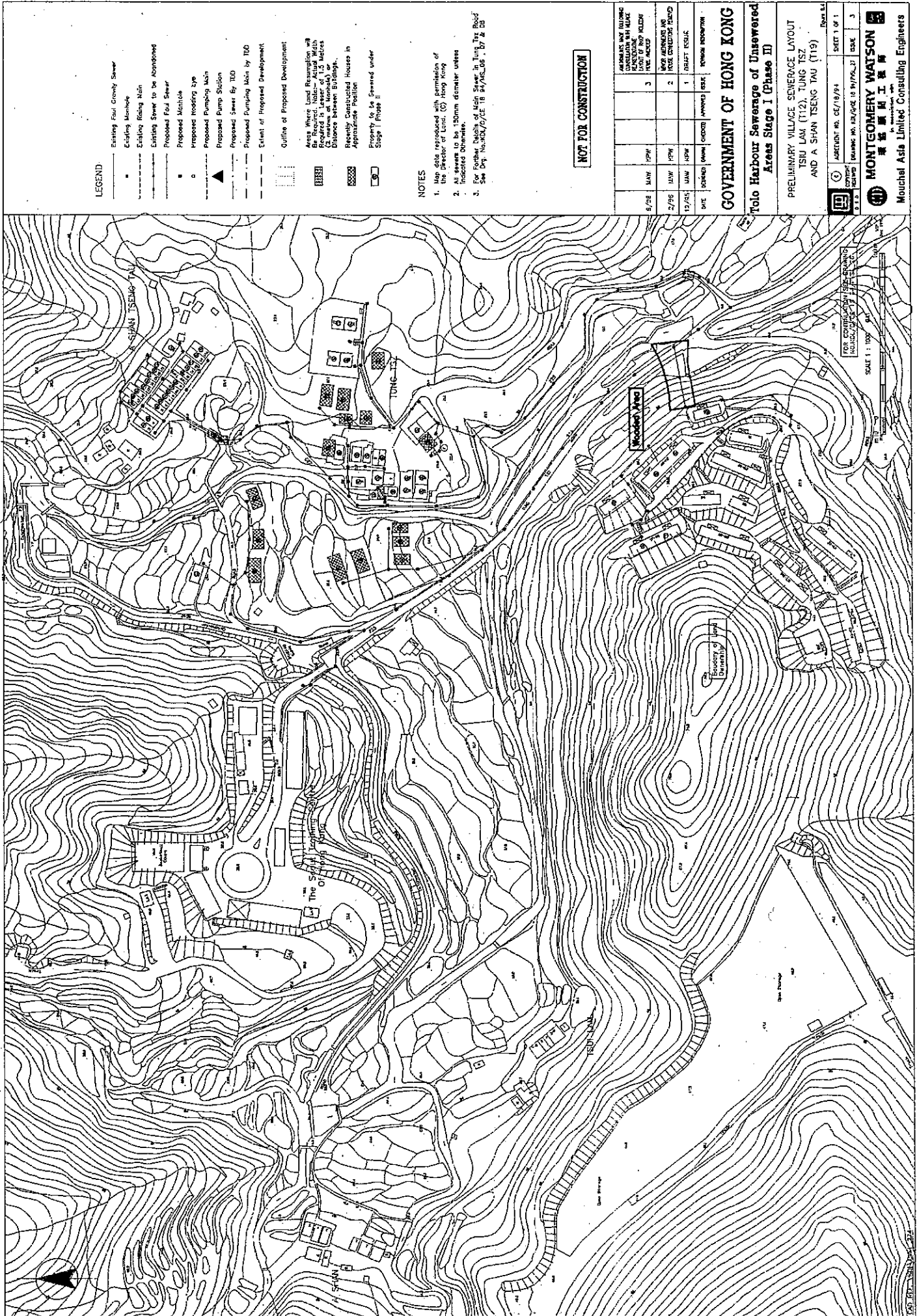
DATE	BY	FOR	REVISION
8/96	MAW	KPW	1. LAYOUT ASSESSMENT TO BE COMPLETED WITHIN 10 WORKING DAYS
2/98	MAW	STW	2. LAYOUT ASSESSMENT TO BE COMPLETED WITHIN 10 WORKING DAYS
10/98	MAW	EL	1. DRAFT ISSUE
DATE	DESIGNED BY	CHECKED BY	APPROVED BY

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

PRELIMINARY VILLAGE SEWERAGE LAYOUTS
 TAI LAM LUI (S1), SHEK KWU LUNG (S18)
 AND WONG NAI TAU (S21)

PROJECT NO. CE/16/94
 SHEET 1 OF 1
 DRAWING NO. SW/2/CE/16/94/S1/S18/S21

MONTGOMERY WATSON
 莫高美士工程顧問有限公司
 Mouchel Asia Limited Consulting Engineers



LEGEND

- Existing Four Gravity Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Four Sewer
- Proposed Manhole
- Proposed Rooding Eye
- Proposed Pumping Main
- Proposed Pumping Station
- Proposed Sewer by TID
- Proposed Pumping Main by TID
- Proposed Sewer by TID
- Extent of Proposed Development
- Outline of Proposed Development

- Area Where Land Reclamation will be Required, Note: Actual Width Required is 100m, 150m, 200m, 300m, 400m, 500m, 600m, 700m, 800m, 900m, 1000m, 1100m, 1200m, 1300m, 1400m, 1500m, 1600m, 1700m, 1800m, 1900m, 2000m, 2100m, 2200m, 2300m, 2400m, 2500m, 2600m, 2700m, 2800m, 2900m, 3000m, 3100m, 3200m, 3300m, 3400m, 3500m, 3600m, 3700m, 3800m, 3900m, 4000m, 4100m, 4200m, 4300m, 4400m, 4500m, 4600m, 4700m, 4800m, 4900m, 5000m, 5100m, 5200m, 5300m, 5400m, 5500m, 5600m, 5700m, 5800m, 5900m, 6000m, 6100m, 6200m, 6300m, 6400m, 6500m, 6600m, 6700m, 6800m, 6900m, 7000m, 7100m, 7200m, 7300m, 7400m, 7500m, 7600m, 7700m, 7800m, 7900m, 8000m, 8100m, 8200m, 8300m, 8400m, 8500m, 8600m, 8700m, 8800m, 8900m, 9000m, 9100m, 9200m, 9300m, 9400m, 9500m, 9600m, 9700m, 9800m, 9900m, 10000m
- Recently Constructed Houses in Appropriate Position
- Property to be Covered under Stage I Phase II

NOTES

1. Map data reproduced with permission of the Director of Land, (C) Hong Kong
2. All sewers to be 150mm diameter unless otherwise specified
3. See Appendix A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ

NOT FOR CONSTRUCTION

DATE	DESCRIPTION	BY	CHKD
8/28	RAW	HPW	
2/26	RAW	HPW	
12/25	RAW	HPW	
	DESIGN (SHEET CHECK)	HPW	
	DESIGN (SHEET CHECK)	HPW	

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

PRELIMINARY VILLAGE SEWERAGE LAYOUT
 TSH LAM (112), TUNG Tsz
 AND A SHAN TSENG TAU (119)

PROJECT NO. CE/18/894
 DRAWING NO. JJA/CAE 18 14/P/01.27
 SHEET 1 OF 1
 DATE 3

MONTGOMERY WATSON
 莫禮遜工程顧問有限公司
 Mouchel Asia Limited Consulting Engineers

9.0 LANDUSE, LANDSCAPE AND VISUAL IMPACTS

9.1 Introduction

The following Section describes the potential landuse, landscape and visual impacts resulting from the Project during its construction and operation.

9.2 Existing Conditions

9.2.1 Landuse

The villages fall within the Outline Zoning Plans for Sha Tin (No. S/ST/6), Ting Kok (No. S/NE-TK/1), Tai Po (No. S/TP/7) and Ma On Shan (No. S/MOS/3). 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 all Country Park boundaries.

There are several cultural features located in and around the villages. These include graves, shrines, urns, tsz tongs and temples. A list of the cultural features found within and around each village is provided in the village descriptions contained in Appendix D.

9.2.2 Landscape

The study area includes villages that border the coast of Tolo Harbour, inland villages located in 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, woodlands 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. However, the ecological assessment identified vegetated areas that should be preserved if possible, including woodlands, streams and riparian vegetation as well as areas designated as Sites of Special Scientific Interest (SSSI). The location of these areas is described in Section 8.0.

9.2.3 Visual

The scenic values of the villages range greatly depending upon the condition of the sanitation within the villages and the maintenance of landscaping. The villages include new development, a mixture of new and old houses and older villages.

The scenic value from the villages 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.

9.3 Potential Source of Impact to Resources

9.3.1 Landuse Impacts

Land use impacts to be considered include disturbance to sacred areas within the villages including shrines, graves, urns, temples and tsz tongs. The Preliminary Designs do not show disturbances to any of these areas, however measures should be taken to ensure that impacts do not occur during construction.

9.3.2 Landscape Impacts

The potential impacts to vegetation and Sites of Special Scientific Interest are assessed in Section 8.0, Ecology. In addition, there are several large camphor and longan trees in the Wu Kwai Sha New Village, Kwai Po Lau and Lok Wo Sha areas. Impacts to these trees should be avoided.

9.3.3 Visual Impacts

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 by the contractor keeping a neat and tidy site.

Most of the sewers will be constructed below existing roadways and footpaths; therefore, there will be no long term visual impacts. Some of the sewers, however, may be located above ground due to access constraints and existing utility installations that obstruct the installation of pipe below ground. This is not the preferred option and will only apply in areas where utilities are already above ground and the sewage pipes will therefore not generate new visual impacts. The visual aspects of these pipelines are considered minor given the beneficial aspects of the Project.

Minor 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 areas but should nevertheless be designed to complement the village architecture.

9.4 Mitigation Control Measures

The following measures are proposed to mitigate visual, land use, and landscape impacts.

1. The contractor shall be required to remove and properly dispose of all residual material that remains on site after completion of work.
2. Pumping house equipment housings shall be designed to blend with the environment of the villages.
3. The contractor shall avoid disturbance to any cultural resources.
4. Construction works shall be avoided in areas with mature trees. In particular, impacts to the Fung Shui grove of Wu Kwai Sha Village and the mature trees between Lok Wo Sha and Kwai Po Lau shall be avoided.

9.5 Residual Impact

No unacceptable residual impacts are expected to occur.

10.0 CONCLUSIONS

10.1 Purpose of the Environmental Impact Assessment Report

The purpose of this Environmental Impact Assessment is to provide information on the nature and extent of the Project's impact on the environment. The objective of the Study is to identify any unacceptable environmental impacts and develop mitigation measures which can be incorporated into the engineering design, construction and operation of the Project.

10.2 Purpose of the Final Assessment Report

The purpose of this Final Assessment Report is to review the environmental acceptability of the Project based on existing and preliminary information regarding the Study Area and the Project design. The potential environmental impacts have been identified and mitigation measures to reduce the potential for adverse impacts are presented.

10.3 Potential Environmental Impacts and Key Issues

10.3.1 Waste Management

The waste materials generated from construction will include broken concrete, broken asphalt, soil and possibly some contaminated soils 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.

The preliminary assessment has indicated that there are unlikely to be insurmountable problems associated with waste arisings from construction of the Project. Mitigation measures are specified that require the Contractor to take care during disposal of excavated materials that are not reused.

10.3.2 Noise

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 developments between villages. The assessment has identified the scale of the impacts and has concluded that mitigation is required to reduce noise to acceptable levels. 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 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 from 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 in all cases be within acceptable levels.

The assessment has indicated that there are not likely to be insurmountable problems associated with noise impacts during construction or operation of the Project. Mitigation measures proposed for noise impacts include using silenced equipment, avoiding carrying out construction works during restricted hours, and providing enclosures or sufficient buffer distances from NSR during noisy activities.

10.3.3 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 may generate odours from pumping stations.

The assessment of air pollution has determined that there will be no insurmountable issues during construction or operation. 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 30m 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 20m from any residential building, school or other air sensitive receiver.

Mitigation measures have been proposed to minimise odour from removal of septic tanks.

An odour assessment of pumping stations has been carried out which determined that odour impacts at sensitive receivers would not occur during operation of the pumping stations.

10.3.4 Water Quality

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.

The assessment of water pollution impacts has determined that there are no insurmountable issues relating to water pollution from construction or operation. 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 WSD requirements to avoid pollution in water gathering grounds.

10.3.5 Ecology

The assessment of ecological impacts has determined that there will be no insurmountable issues relating to ecological disturbance during construction and there will be no ecological impacts during operation. Mitigation measures have been provided to reduce the potential for disturbances to vegetation.

10.3.6 Landuse, Landscape and 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. Measures to protect these resources have been provided.

10.4 Residual Impacts

The residual impacts after recommended mitigation measures are implemented are limited to short term noise impacts. Due to the short duration and low noise levels that would occur from construction works, this disturbance is considered to be acceptable.

10.5 Overall Conclusions

There are not likely to be any insurmountable or unacceptable environmental impacts from construction or operation of the Project that cannot be mitigated to an acceptable level. Where necessary, mitigation measures to reduce the potential environmental impacts have been proposed.

As a result of the above conclusion, the Project is considered to be environmentally feasible and is considered to be preferable due to the long term benefit to water quality and the sanitation of the villages.

APPENDICES

Appendix A

Project Brief

21. Environmental Impact Assessment (EIA) Study

21.1 Control of the EIA Study

21.1.1 The Director's Representative has delegated the management of the EIA Study to a Study Management Group (SMG) chaired by a representative of the Director of Environmental Protection. This shall be the forum for liaison with Government departments and agencies, providing guidance to the study consultant, and for comment and review on the work and outputs of the study. All secretarial services will be provided by the Consultant.

21.1.2 The Consultant should make himself/herself available to be present in Advisory Council on the Environment (ACE), DB and/or any public consultation meeting(s) (if necessary) to brief his/her case(s) against the relevant environmental impacts generated.

21.2 Minimisation of Waste Paper Production

In order to make our working environment greener, the Consultants should be encouraged to follow the recommendation in Appendix B which provides a general guidance on the waste reduction objective required for published documents produced by all EPD-related Consultants.

21.3 Objectives of the EIA Study

The objectives of the assessment are as follows :

- i) to describe the Project and associated works together with the requirements for carrying out the Project;
- ii) to identify and describe the elements of the community and environment likely to be affected by the Project, and/or likely to cause adverse impacts upon the Project, including both the natural and man-made environment;
- iii) to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses;
- iv) to identify and quantify any potential losses or damage to flora, fauna and natural habitats;

- v) to propose the provision of infrastructure or mitigation measures so as to minimize pollution, environmental disturbance and nuisance during construction, operation of the Project;
- vi) to identify, predict and evaluate the residual (i.e. after practicable mitigation) environmental impacts and cumulative effects expected to arise during the construction, operation phases of the Project in relation to the sensitive receivers and potential affected uses;
- vii) to identify, assess and specify methods, measures and standards, to be included in the detailed design, construction, operation of the Project which are necessary to mitigate these impacts and reduce them to acceptable levels;
- viii) to design and specify the environmental monitoring and audit requirements necessary to ensure the implementation and the effectiveness of the environmental protection and pollution control measures adopted;
- ix) to investigate the extent of side-effects of proposed mitigation measures that may lead to other forms of impacts;
- x) to identify constraints associated with the mitigation measures recommended in the study; and
- xi) to identify any additional studies necessary to fulfil the objectives to the requirements of this Environmental Impact Assessment Study.

21.4 Description of the EIA Study

21.4.1 The purpose of this Environmental Impact Assessment (EIA) Study is to provide information on the nature and extent of environmental impacts arising from the construction, operation of the Project and all related activities taking place concurrently. This information will contribute to decisions on :

- i) the overall acceptability of any adverse environmental consequences that are likely to arise as a result of Project;
- ii) the conditions and requirements for the detailed design, construction, operation, of the Project;
- iii) the acceptability of residual impacts after the proposed mitigation measures are implemented.

21.4.2 The Consultant shall meet the objectives listed in Clause 21.3 above by:

- i) carrying out the necessary background studies to identify, collect and analyze existing information relevant to the EIA study;
- ii) carrying out any necessary environmental survey, site investigations and baseline monitoring work to achieve the objectives;

- iii) quantifying, by use of models or other predictive methods, the residual and cumulative environmental impacts (specifying whether these are transient, long term and/or irreversible) arising from the construction, operation of the Project;
- iv) proposing practicable, effective and enforceable methods, measures and standards to effectively mitigate any significant environmental impacts in the short and long term; and
- v) outlining a programme by which the environmental impacts of the Project can be assessed, monitored and audited.

In further defining the scope of the EIA Study, consideration should be given to beneficial and adverse effects, short and long term effects, secondary and induced effects, cumulative effects, synergistic effects and transboundary effects.

21.5 Deliverables

21.5.1 The following deliverables are to be supplied by the Consultants for the EIA Study:

- i) an Inception Report which shall include the following :
 - a) the Consultant's understanding and appreciation of the objectives of the Study;
 - b) the approach and methodology for the various parts of the Study;
 - c) a work programme, with major work tasks and key decision points identified and briefly described;
 - d) a schedule detailing the submission of reports and Study Management Group meetings (where necessary); and
 - e) organisation and staffing of the environmental study team and the curricula vitae of the key study team members.
- ii) an Initial Assessment Report which
 - a) provides an initial assessment and evaluation of the environmental impacts and cumulative effects arising from the Project sufficient to identify those issues of key concern during the construction, operation of the Project which are likely to influence decisions on the Project;
 - b) defines measurable environmental parameters and environmental features likely to be affected by the Project and identifies the environmental monitoring programmes which are required both to provide a baseline profile of

existing environmental conditions and to monitor impacts and compliance during construction, commissioning, operation of the Project;

- c) defines the environmental audit requirements for compliance and post-project audit, which would include a review of the monitoring data both to identify compliance with regulatory requirements, policies and standards and to define any remedial works required to redress unanticipated or unacceptable consequential environmental impacts; and
 - d) proposes a detailed programme of investigation able to meet all other objectives of the assessment.
- iii) **Key Issue Reports** covering those issues of key concern identified through the Initial Assessment Report or the review of the Initial Assessment Report by the Director of Environmental Protection;
- iv) a **Final Assessment Report** which
- a) fully satisfies the requirements of this brief in respect to the prediction and assessment of impacts, the identification of environmental impact mitigation measures and the associated residual impacts;
 - b) describes the agreed schedules and programmes for monitoring and audit requirements;
 - c) prescribes the specification for detailed design, construction and operation requirements of the Project; and
 - d) provides with the impacts summary, the study findings, conclusions, recommendations and a mechanism for implementation;
- v) an **Executive Summary** in both English and Chinese of the study, highlighting the issues of concern to the community, the acceptability of residual environmental impacts and cumulative effects, requirements for implementation of the Project, and the basis for and implications of those requirements. It is intended that the information contained therein would assist the Government in undertaking ACE, DB and other public consultation(s);
- vi) all working papers comprising Initial Assessment Report, Key Issue Report and Final Assessment Report should be prepared and submitted in draft to the Director of Environmental Protection for comment; and
- vii) any revisions or supplements to the above as might be required by the Director of Environmental Protection.

21.5.2 The Consultant shall produce the following reports to the Director of Environmental Protection during the course of the EIA Study:

- | | | |
|-------|--|--------------|
| i) | a draft Inception Report | (30 copies) |
| ii) | a final Inception Report | (30 copies) |
| iii) | a draft Working Paper | (30 copies) |
| iv) | a final Working Paper | (80 copies) |
| v) | a draft Initial Assessment Report | (30 copies) |
| vi) | a final Initial Assessment Report | (80 copies) |
| vii) | a draft Key Issue Report | (30 copies) |
| viii) | a final Key Issue Report | (80 copies) |
| ix) | a draft Final Assessment Report | (30 copies) |
| x) | a Final Assessment Report | (80 copies) |
| xi) | a draft Executive Summary Report | (30 copies) |
| xii) | an Executive Summary Report* | (150 copies) |
| xiii) | an Environmental Monitoring & Audit Manual ... | (30 copies) |

* in both Chinese and English versions.

21.5.3 The Consultant shall also supply the government with appropriate copies of such reports, technical notes, working papers, briefs, supporting documents and other relevant inputs as may be required during the EIA Study or any public consultation exercise.

21.6 Services to be provided by the Consultants

21.6.1 Technical Requirements

The Consultant shall consider all aspects of the activities arising from the Project in any stage/phase of implementation, and, observe the following guidelines in addition to the Hong Kong Planning Standards and Guidelines as well as other statutory requirements during the EIA Study.

21.6.1.1 Sensitive Uses/Restoration

Due consideration should be given to existing and committed future land-uses and sensitive receivers in the study area must be identified. Future land-uses should include those that will be occupied during the construction and operation phases of the Project.

21.6.1.2 Mitigation Measures

Effective mitigation measures should be proposed to reduce impacts to acceptable levels and to minimize the probability, occurrence and consequences of predicted impacts in terms of the layout and design of the Project, the duration of pollution activities, construction methods and equipment, operational procedures and administrative controls.

21.6.1.3 Residual Impacts

Residual environmental impacts shall be identified and quantified and their acceptability should be determined against the Environmental Chapter of the "Hong Kong Planning Standards and Guidelines" and other statutory requirements as stated in section 21.6.3.

21.6.1.4 Noise Impact

The noise assessment shall address the following :

- i) background information and existing noise levels;
- ii) identification of representative sensitive receivers, and/or, potentially affected uses;
- iii) provision of an emission inventory of the noise sources; e.g. noise producing processes, plant, vehicles and machinery from activities including the construction of the land and/or submarine pipelines, rising mains, pumping stations, screening plants and control structures;
- iv) analysis of construction activities and noise levels generated;
- v) analysis of operational activities and noise levels generated;
- vi) presentation of predicted future noise levels; and
- vii) evaluation of noise impacts and proposals for noise control or mitigation to minimize impacts to an acceptable level.

21.6.1.5 Air quality Impact

The air quality impact assessment shall address the following:

- i) existing and background air quality in the study area for the purpose of evaluating the cumulative air quality impacts of the Project;
- ii) identification of representative sensitive receptors and/or potential affected uses; the locations of the representative sensitive receptors and/or potential affected uses should be agreed with the Director of Environmental Protection;

- iii) provision of an emission inventory of the air pollution sources; e.g. dust producing processes, plant, vehicles and machinery from activities including the construction of the land and/or submarine pipelines, rising mains, pumping stations, screening plants and control structures;
- iv) from a knowledge of the likely type, sequence and duration of construction activities required for the project implementation, identify those construction activities to cause air pollution problems to the receptors;
- v) from a knowledge of the likely type, sequence and duration of operational activities required for the project implementation, identify those operational activities to cause air pollution problems to the receptors;
- vi) assessment and evaluation of the net and cumulative air quality impacts of the air emissions identified in iii) at the receptors identified in ii) by dispersion modelling. The Consultant should provide detailed methodology statement and key assumptions of the selected model such as emission factors and other input parameters etc. to the Director of Environmental Protection for comment and consent before the commencement of the study. For evaluation of dust impact from construction activities, Fugitive Dust Modelling (FDM) is usually preferred. The report should contain sample calculations and input parameters used in modelling. Air Pollution Isopleths should be produced as output of the study;
- vii) proposals of effective mitigation measures to reduce the cumulative air pollution impacts to acceptable levels.

21.6.1.6

Water Quality Impact (Marine, fresh and ground water)

- i) The impacts on watercourses and the receiving water body should be identified and assessed during both construction and operation phases;
- ii) Recommend appropriate cost effective mitigation measures to minimise any adverse water quality impacts identified.

averaging time of five seconds shall be considered as an indication of odour nuisance. For odour monitoring, two odour units at the site boundary shall be criteria for odour nuisance.

21.6.2 Environmental Monitoring and Audit (EM&A) Requirements

i) Environmental Monitoring

The Consultant shall identify and recommend environmental monitoring requirements for all construction, post-project and operational phases of the development. These requirements shall include but not be limited to the identification of sensitive receivers, monitoring locations, monitoring parameters and frequencies, monitoring equipment to be used, and any other necessary programmes for baseline monitoring, impact and compliance monitoring, and data management of monitoring results.

ii) Environmental Audit

The Consultant shall identify and recommend environmental audit requirements for all construction, post-project and operational phases of the development. These requirements shall include but not be limited to:

- a. organisation and management structure, and procedures for auditing of the implementation of respective environmental mitigation measures recommended for the detailed design, contract document preparation, construction, post-project operation stages of the development;
- b. environmental quality performance limits for compliance auditing for each of the recommended monitoring parameters to ensure compliance with relevant environmental quality objectives, statutory or planning standards, or acceptance criteria recommended by the EIA. These limits shall give indication of a deteriorating environmental quality and shall allow proactive responses to be taken. (The commonly used approach is a set of trigger, action and target levels);
- c. organisation and management structure, and procedures for reviewing the monitoring results and auditing the compliance of the monitoring data with the environmental quality performance limits (point (b) above), project contractual and regulatory requirements, and environmental policies and standards;

- d. Event/Action plans for impact and compliance monitoring;
- e. complaints handling, liaison and consultation procedures; and
- f. reporting procedures, report formats and reporting frequency including periodical reports and annual reviews to cover all construction and post-project/operational phases of the development.

iii) The Consultant shall prepare an Environmental Schedule (Manual) which covers the requirements and recommendations in (i) and (ii) above. The Manual shall also contain a summary list of recommended environmental mitigation measures. This Manual shall be used as a guideline for environmental monitoring and audit during the construction and post-project operational phases. This Manual shall be a stand-alone document and form part of the EIA report.

21.6.3 Compliance with Environmental Law

21.6.3.1 An EIA Study is a tool to identify potential environmental impacts arising from the Project and to provide a basis for decisions for the implementation of the Project, but it does not automatically exempt the proposal from licensing requirements and the approvals from relevant authorities.

21.6.3.2 The Consultant shall comply with and observe all Ordinances, bye-laws, regulations and rules for the time being in force in Hong Kong governing the control of any form of pollution for environmental protection.

21.6.4 The Consultant shall liaise with relevant Government departments and agencies, and all other parties involved in this and any other projects or developments likely to be affected by this development. Any correspondence, notes or minutes arising from this liaison in connection with this EIA study shall be copied to the Director of Environmental Protection.

21.6.5 The requirements in the PELB's General Circular 2/94 on the Public Access to Environmental Impact Assessment (EIA) Reports shall be complied with. The final EIA reports and the Executive Summary will be made available to the public according to the provisions in the circular. The EIA study findings may be presented to the Advisory Council on the Environment (ACE).

21.6.6 In accordance with PELB T/C 2/92, if there is any disagreement on the finding of the study or on the necessary environmental protection and pollution

21.6.1.7 Solid Waste Impact

- i) Identify the quantity, quality and timing for the generation of wastes, including contaminated spoil/dredged materials, construction and demolition wastes, and surplus excavated materials, etc. arising during the construction and operation phases of the Project;
- ii) Recommend suitable waste handling and disposal measures including considerations for the reuse/recycling of surplus excavated materials and construction wastes for construction purpose so as to minimise the amount of wastes to be disposed of at landfills. Recommend suitable handling and disposal measures for any contaminated spoils generated and chemical waste produced.

21.6.1.8 Ecological Impact Study

- i) Assess the actual and potential ecological impacts during the construction period and subsequent operation including a baseline survey of existing flora, fauna and habitats. The baseline survey shall include the flora and fauna found on site, their abundance, adaptation to environmental changes, important habitats and any other relevant features. The list of species found within the site should be prepared with special reference to those which are rare, endangered, restricted in distribution or protected under local legislation or international conventions or to the discretion of the Director of Agriculture & Fisheries.
- ii) Evaluate the impacts and suggest mitigatory measures to the ecological impacts during the construction and subsequent operation. These mitigation measures should include protection of existing natural features, buildings, woodlands, big trees and other special habitats. Detailed landscape planting schemes should form part of the mitigatory measures.

21.6.1.9 Landuse, Landscape and Visual Impacts

- i) Assess the actual and potential landuse and landscape impacts including a baseline survey of existing landuse natural and cultural features which should include, but not limited to agricultural land, recreation areas, country parks, special areas and sites of special scientific interest, geographical features, stream course, skyline, villages, graves,

fields and other associated features. The visual impact on landscape should also be assessed.

- ii) Evaluate the impacts and suggest mitigatory measures to the landuse, landscape and visual impacts during the construction and subsequent operation. These mitigation measures should include protection of existing natural features, buildings, woodlands, big trees and other special habitats. Detailed landscape planting schemes should form part of the mitigatory measures.

21.6.1.10 Conservation

The Consultant shall observe the importance of environmental conservation and incorporate it into design, construction and operation of the proposal, wherever possible. The general outlines shall address the following:

- i) maintenance of the balance of the use of resources; and
- ii) reduction, reuse and re-cycle resources wherever practical.

21.6.1.11 The assessments should be carried out as follows :-

- i) construction noise should be assessed in accordance with the Technical Memoranda contained in the Noise Control Ordinance;
- ii) the impacts of criterion air pollutants (i.e. those included in the Hong Kong Air Quality Objectives (HKAQOs)) should be assessed with reference to the HKAQOs. For the impacts of non-criterion air pollutants with health implications, the consultants should review relevant standards of other countries and international bodies such as WHO and propose for DEP's agreement the appropriate reference criteria.
- iii) the operating assessment should be made with reference to the guidelines contained in the Environment Chapter of Hong Kong Planning Standards and Guidelines, and noise assessed using the appropriate Technical Memoranda contained in the Noise Control Ordinance.
- iv) In case of odour impact, from pumping stations and treatment works, any odour prediction at a receptor exceeding 5 odour units based on a prediction

control measures, the issue will be referred to the Secretary for Planning, Environment and Lands who shall resolve the differences in consultation with the Advisory Council on the Environment, appropriate Branches and Departments.

21.7 General Reference

The ELA Study should be carried out with due regard to the information, policies, regulations and procedures contained in :-

- a. All anti-pollution Ordinances, Technical Memoranda, advisory booklets etc;
- b. PEL Branch/Works Branch, April 1992 : 'EIA of major private sector projects' (Technical Circular No. 2/92, 14/92);
- c. PEL Branch, May 1994 : 'Public access to EIA reports' (General Circular No. 2/94);
- d. EPD and Planning Department, April 1991 : 'Environmental Guidelines for Planning in Hong Kong' (Chapter 9 of 'HKPSG');
- e. EPD : 'Environment Hong Kong' (Annual Review);
- f. PEL Branch, November 1993 : 'The Hong Kong Environment : A green Challenge for the Community'; and
- g. EPD, February 1994 : Consultancy Documents Submitted to EPD - Working Greener' DTC No. 15.2.94.

Appendix B

**Comments and Responses to the
Draft Final Assessment Report**

Agreement No. CE18/94
Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II
Environmental Impact Assessment
Comments and Responses to the Draft Final Assessment Report

Comments

Response to Comments

Mr CHIU Mau-fat, Chief Engineer, Technical Services, Civil Engineering Office, Civil Engineering Department, Ref (4) in TS CG/CE18 (94).0 PT01 dated 3 May 1996

With reference to the captioned report attached under cover of CE/CM, DSD's memo ref. (52) in DSD CM 8/4179DS/17 dated 21.4.96, I have no comments.

Noted.

Mr Y C Chan, for District Lands Officer, District Lands Office, Tai Po Lands Department, Ref (19) in DLO/TP 170/172/94 II dated 3 May 1996

It is not uncommon to receive some minor complaints from villagers regarding the nuisances arising from dust and contaminated soils during construction stage of previous sewerage project. Grateful if you would incorporate some measures, if any, into your design to enhance the situation.

Noted. This has been provided for in the mitigation measures of Section 4.4 and 6.6.

Mr Joseph Y S Ho, for District Officer, Tai Po District Officer, Ref (2) in TP 372/139/89 (16) dated 10 May 1996

I am given to understand that the draft Final Assessment Report for EIA is just for internal comments. In this connection, we have no particular comment on this report. You may wish to consult the locals on the final version of EIA if you deem necessary.

Noted. Public consultation on the EIA is not considered necessary for this project due to low potential for impacts and the consultation that has already taken place in regard to design aspects.

Agreement No. CE18/94
Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II
Environmental Impact Assessment
Comments and Responses to the Draft Final Assessment Report

Comments

Response to Comments

Matthew W C Chan, Environmental Protection Officer (Territory Assessment Group) for Director of Environmental Protection, Environmental Protection Department Ref. () in EP2/N1/08/IV dated 9 May 1996

1. Noise

a. P.5-8, S.5.5.4

According to figure 2.7a, there will be two pumping sets for the type 2 pumping station. Thus, the total sound power level for type 2 pumping system should 88dB(A) rather than 85 dB(A) which is for type 1 pumping station. Further assessment for the type 2 pumping station is required.

The pumps shown in Figure 2.7 include both the active and reserve pumps. It is expected that only one pump will be operational at one time. Even if noise levels were increased to 88 dB(A), impacts would not occur to sensitive receivers near these two stations as noise levels would be 52 dB(A) at the source and would be reduced significantly at the facade of the sensitive receivers.

2. Air Quality

a. General

It is noted that an odour assessment for the odour impacts from the proposed pumping stations will be carried out as part of a separate report and subsequently be included in the EIA Final Report (Ref : S.6.1). We reserve our comments on the odour assessment. However, you should take account of our comments on your previously submitted proposals of odour modelling methodology when assessing the odour impact.

Your comments on our proposal for odour modelling were considered in the Odour Impact Assessment.

b. P.6.2, S.6.2 1st paragraph

The criteria of odour nuisance should be stated here. Hence, you should add "For odour prediction, 5 Odour Units or above at any air receptors over the averaging time of 5 seconds shall be considered as odour nuisance" at the end of this paragraph.

Text has been amended per your comment.

Agreement No. CE18/94
Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II
Environmental Impact Assessment
Comments and Responses to the Draft Final Assessment Report

Comments

Response to Comments

c. P.6-4, S.6.6.2

Whilst we support the proposed mitigation measures and agree that mitigation of odour during operation is largely a matter of application of good design practice, additional mitigation measures should be proposed, if necessary, which are subject to the odour assessment results, to ensure that there will not be any odour nuisance at any air receptors during operation stage.

The odour impact assessment results show that sensitive receivers will not be impacted by odours from pumping stations.

Mr K W CHEUNG, for Director of Agriculture & Fisheries, Agriculture & Fisheries Department, Ref (16) in AF POL 03/9 V, dated 14 May 1996

1. As the scale of the proposed works is relatively small and most of the works are to be confined to existing roads and paths, we note the conclusion in Section 10.3.5 that there will be no insurmountable issues relating to ecological disturbance during construction and there will be no ecological impacts during operation. Nevertheless, we have a few comments on the draft Report as follows :

a: Section 8.3.1. Ecological Sensitive Receivers

page 8-2, para. 4

It is noted that the sewage layouts have avoided disturbance to the tree area in Wu Kai Sha New Village and Lok Wo Sha. However, the location of the proposed pump station near Lok Wo Sha Village (Appendix D-1-49) would be close to a huge camphor tree of over 200 years old. During the construction works, care must be taken to ensure no disturbance to this tree including its root system.

Comment noted. Mitigation measures have been incorporated into the report (Section 9.0) to avoid disturbance to this area.

Agreement No. CE18/94
Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II
Environmental Impact Assessment
Comments and Responses to the Draft Final Assessment Report

Comments

Response to Comments

- b. page 8-2, para. 7

Although the Shuen Wan Egretty is unlikely to be impacted by proposed works, it should be careful in planning and management of the works in order not to cause disturbance to the birds there especially during the breeding season from March to August. If possible, the construction works should not be scheduled within this period.

The management of the works has now been emphasised in the EIA. As impacts have not been identified to the Egretty, it would not be acceptable to restrict the Construction Schedule however your recommendation has been included.

- c. Section 8.5 Mitigation Measures

It is not clear where the proposed "5m buffer zone from edge of the works area" refers to. Would it be better to have the proposed "5m buffer zone" from the edge of woodland rather than that from the works area ?

Comment noted. Text amended.

Should felling of trees be unavoidable, detailed tree felling proposal should be submitted to the relevant authority for approval in accordance to the Works Branch Technical Circular No. 24/94.

This has been included in the EIA.

- d. Section 10.3.5 Ecology

Please insert "be" before "insurmountable" in line 1 and delete "during construction" after "operation" in line 3.

Text revised per comment.

Mr F W Wong, for Project Manager/NT North, Ref () in NTN 4/1/312, dated 15 May 1996

1. I refer to your above quoted memo and have no comment.

Noted.

Agreement No. CE18/94
Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II
Environmental Impact Assessment
Comments and Responses to the Draft Final Assessment Report

Comments

Response to Comments

Mr. Michael Fong, for Chief Engineer/Consultants Management, Drainage Services Department, Ref (25) in CM8/4179DS/26(V) dated 29 May 1996

1. I would like to advise you that I have no comment to make on the above report.

Noted.

Mr. Lau Chi-ming, for Chief Engineer/Mainland North East Water Supplies Department, Ref (2) in WWO 1/16/30/8/9411 TJ(1), dated 3 June 1996

a. Sections 7.5.1 and 7.6 : the village "Fa Sam Hong" should read "Fa Sam Hang".

Text revised per comment.

b. Appendix D, Village No. 20 : Hong Lok Yuen Development. There is no plan to show the details of proposed connection. However from Figure No. 5/a in Chapter 5, it is shown that the proposed connection is near the waterworks intake at Tai Po Tau. For the section of sewage main within water gathering ground, i.e. from manhole (1) to (3), the sewerage should be conveyed in case iron pipes, with sealed joints and hatchboxes to discharge outside water gathering ground, or else the connection point should be made downstream of the fabridam at Tai Po Tau.

The proposed connection for this village is still being determined. The EIA will address your concerns regarding the connection route within the water gathering ground once the preliminary design is established. A measure for doing so has now been included in the EIA.

c. Our Senior Engineer/Planning (2) advised that Fo Tan Cottage Area may be within water gathering ground. Please check and add it to section 7.5.1 if confirmed.

See above.

Mr. W.C. Fung, for Chief Engineer/Electrical & Mechanical Projects Drainage Services Department, Ref (16) in DSD EM/8/14179DS, dated 31 May 1996

a. Section 1

- In sub-section 1.4, should 'Phase I Stage II' be read 'Stage I Phase II'?

Noted. Typo has been amended.

Agreement No. CE18/94
Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II
Environmental Impact Assessment
Comments and Responses to the Draft Final Assessment Report

Comments

Response to Comments

b. Section 2

- The layout of the proposed type one pumping station (fig. 2.6) does not seem practical and should be revised. Please consult Montgomery Watson for my comments. Please check whether the change in the layout would affect the findings and recommendations of the EIA.

It is our understanding that your comments reflected to the odour ventilation pipe. This has been addressed in our description of the pumping stations in Section 2.3.

c. Section 5

- Based on which information is the sound power level of the pump determined as 85dBA? Is there any special requirements on the cover slab for the attenuation of 35dBA?

The SPL was obtained from the Technical Memorandum on Noise from construction work other than Percussions Piling (Id. Code CNP 283) water pump, submersible. There are no special requirements for the concrete cover.

- The assessment stages the noise level of the pump in sound power level while the requirements in the Technical Memorandum are specified in sound pressure level. Please clarify if the sound power level of 50dBA outside the pumping station could comply with the requirements of the Technical Memorandum and HKPSG.

The sound power level of 50 dBA will comply with the requirements of the Technical Memorandum and HKPSG.

- Regarding the mitigations for noise during constructions, is there any site constraint which limits the use of noise barriers? If so, what will be mitigation measures?

There should not be any site constraints for the provision of temporary barriers as the sites have sufficient space between the receiver and the location of the sewers. The temporary barriers will likely only be 15 to 30 cm in width.

d) Section 6

- Regarding the operational air pollution from the pumping station, I consider that odour will be a problem and type one pumping station will not be an exception.

Section 6.5.2 stated that the odour assured from pumping stations would be provided as a separate assessment. The results of this assessment found that no odour impacts would occur from type 1 pumping stations.

- It may be necessary to cover all the excavated materials until they are refilled or disposal of.

The covering of all excavated materials is not considered to be necessary for this project as excavation will often occur in areas where there are no sensitive receivers and the amount of trench that can be excavated at any one time has been restricted. This is addressed in Section 6.2 and 6.6.1 (no. 2 and 5).

Agreement No. CE18/94
Tolo Harbour Sewerage of Unsewered Areas Stage I Phase II
Environmental Impact Assessment
Comments and Responses to the Draft Final Assessment Report

Comments

Response to Comments

Mr. Y H Law, for Director of Environmental Protection, Ref. EP2/N1/08 dated 11 June 1996

I refer to the odour impact assessment attached with your fax to Mr. W.H. She with ref. : SVJ/DJ/SEB/CC/90498.403 of 29/5/96.

I have no comments on the result so measurements of hydrogen sulphide concentrations. However, as commented before, it is your responsibility to confirm the measurement results are applicable to this project. Please also confirm if the odour control facilities for Type 2 pumping stations are standard equipment in the design of pumping stations in order not to cause odour nuisance to the surrounding environment, i.e. odour level at air receptors over an averaging time of 5 seconds is less than 5 odour units. If it is so, no further assessment for the odour impact arising from such pumping stations is required. If the odour control facilities are not standard equipment, then you should establish the odour emission rate from the pumping stations in order to assess the odour impact.

Mr. Peter Kung, for Chief Engineer/Mainland North, Drainage Services Department, 19 December 1996.

I have no comment on the Final Assessment Report and Executive Summary Report for the above project.

The odour control facilities for Type 2 pumping stations will be standard equipment and will be designed such that they will not cause odour nuisance to the surrounding environment.

Noted.

Appendix C

Construction Activities

Appendix C-1

Stage I Phase I Construction Work

Figure C-1-1: Excavation Works for Village Sewerage - Stage I Phase I



Figure C-1-2: Excavation Works for Village Sewerage - Stage I Phase I

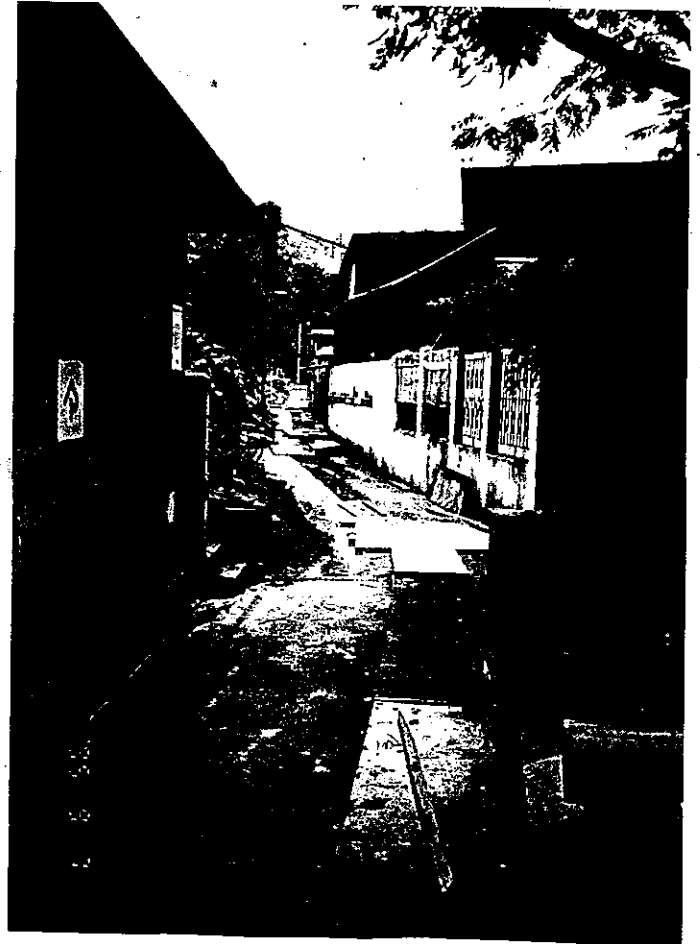
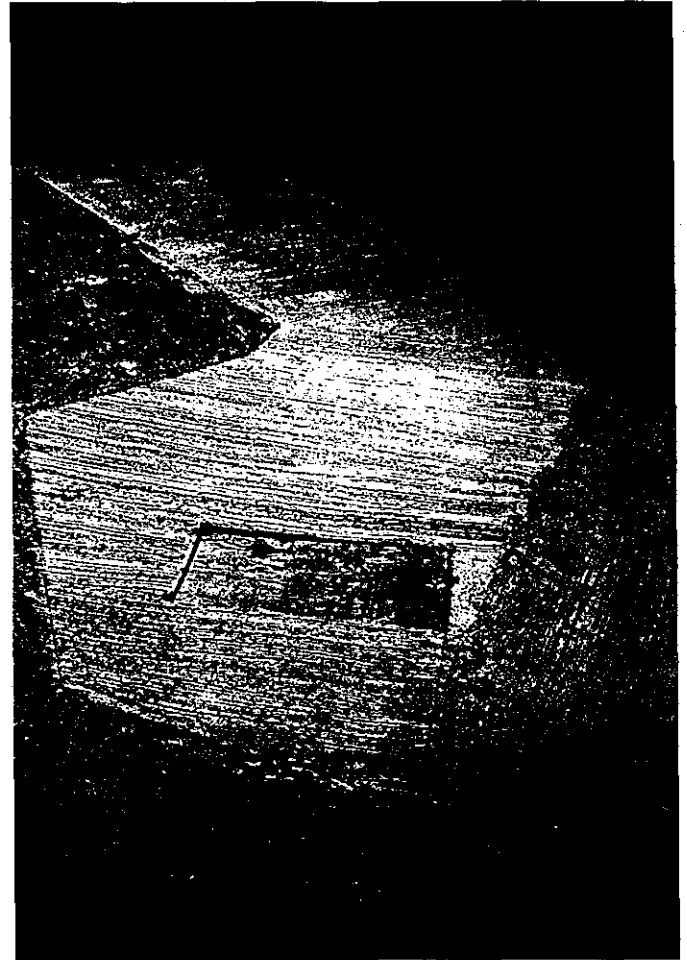
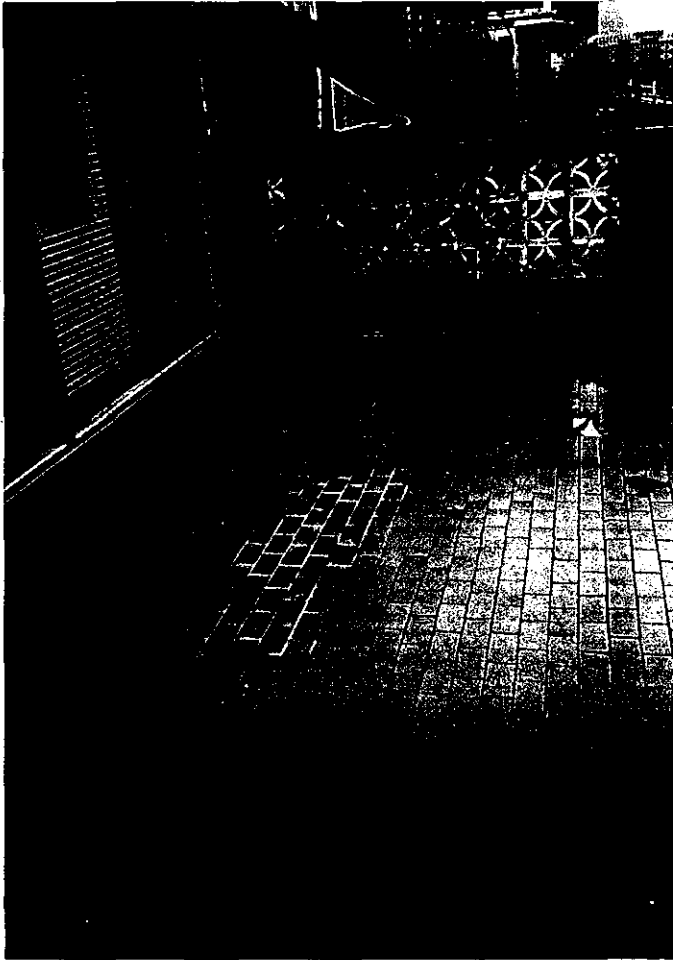


Figure C-1-3: Excavation Works for Village Sewerage - Stage I Phase I



Figure C-1-4: Excavation Works for Village Sewerage - Stage I Phase I



Appendix D

Village Descriptions/Maps

No. 1: Tai Mei Tuk Village and Government Housing Area (T08)**Village Details**

Location: Tai Mei Tuk is located in Tai Po, on the western edge of the Plover Cove Reservoir (E849425 N835352). The area to be seweraged includes the Government Quarters, including the police training area, and Tai Mei Tuk village, located west of the Government Quarters, bordering Ting Kok Road. The Tai Mei Tuk Government Quarters and Tai Mei Tuk Village preliminary sewerage layout are shown on drawing KDL/G/CE 1894/PVSL-22.

Development: The Government Housing Areas comprise relatively new free standing units (approximately 15 years in age) that range from one to two stories in height. The free standing units are spread out throughout the area. There are approximately 20 units in the complex, along with a water pumping station for the reservoir and a police training facility.

Tai Mei Tuk village consists of approximately 50 housing units that are a mixture of older (greater than 30 years) and newly constructed housing units that range from one to three stories in height.

Access: Access to the Government Housing area is via Ting Kok Road and Brides Pool Road. There are roadways that lead to each housing unit. Access to Tai Mei Tuk village is by a road leading off of Ting Kok Road.

Village Status: Recognised.

Existing Environment: The Government Housing area in Tai Mei Tuk is well maintained and scenic in character. The housing units are situated along the undulating terrain with both manmade and natural landscaping. There are several housing units that face the reservoir with views of Tolo Harbour and Plover Cove. There is a drainage channel that runs through the Government Housing area, under Bride's Pool Road, and exits into the Plover Cove Reservoir, north of the peninsula of Tai Mei Tuk. The background noise levels in the Government Housing area are low and there is no traffic along the roadways other than residential traffic.

Tai Mei Tuk village consists of sloping terrain that gradually decreases in level toward Ting Kok Road. The village is well maintained and most landscaping consists of plantings and small areas of active and fallow agricultural land. There is a main roadway that extends to the northernmost portion of the village with various foot paths throughout the village area. There are several ponds situated south of the village. Most of the houses have views of the pond areas and the Plover Cove. There are no streams that pass directly through the village itself. The noise environment in the village is moderate, with noise levels increasing close to the Ting Kok Roadway. The uppermost portion of the village is very quiet and rural in nature. There is no traffic along the village access road other than residential traffic for the village itself.

Cultural Resources: There are no cultural features in the Tai Mei Tuk Government Housing Area. In the Tai Mei Tuk village there is a Tsz Tong situated in the central northern portion of the village, behind housing unit no. 12.

Surrounding Land Uses: The Tai Mei Tuk Government Housing Quarters are relative isolated. The Pat Sin Leng Country Park is located north of the village. The Plover Cove Reservoir is located to the south and east. Ting Kok Roadway, undeveloped land and the Tai Mei Tuk village are located to the west of the village.

The land uses that surround the Tai Mei Tuk village area include undeveloped land leading to the Pat Sin Leng Country Park to the north, pond areas across Ting Kok Road

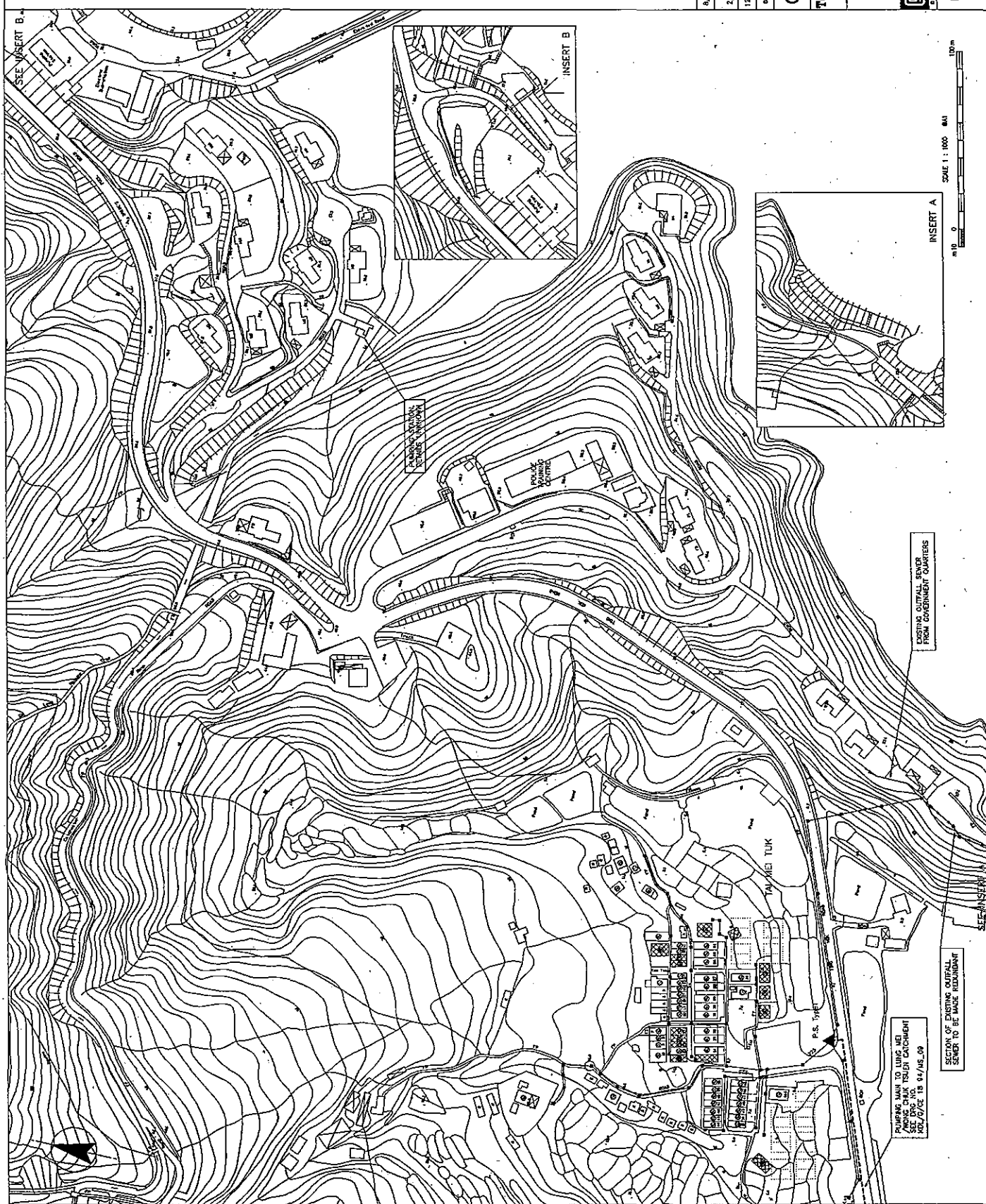
to the south, undeveloped land to the east and Wong Chuk Tsuen village to the west.

Existing Sewerage: Both areas are serviced by septic tanks. The Tai Mei Tuk Government Housing Quarters has an existing network of mains that transfer effluent from individual septic tanks to an outfall below Plover Cove Reservoir.

Proposed Sewerage: The Tai Mei Tuk Government Housing Quarters will be connected to an existing sewer at the southern most portion of the site. A gravity main will then be installed up to Ting Kok Road.

The gravity mains will traverse west along Ting Kok Road to a proposed pumping station (Type 1) located at the junction of Ting Kok Road and the access road leading to Tai Mei Tuk Village.

Tai Mei Tuk Village will then be sewered by gravity sewer that will follow the existing access road and pathways within the village area leading to the proposed pumping station. A pumping main is to be installed from the proposed pumping station to Lung Mei Wong Chuk Tsuen Village catchments along Ting Kok Road.



LEGEND

- Existing foul Gravity Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Rooding Eye
- Proposed Pumping Main
- Proposed Pump Station
- Proposed Sewer by TID
- Proposed Pumping Main by TID
- Extent of Proposed Development
- Outline of Proposed Development

Areas Where Land Reclamation will be Required. Note: Actual Width Required is shown in 1:5 Metres Scale between Buildings.

Recently Constructed Houses in Approximate Position

Proposed to be Sewered under Stage I Phase II

NOTES

1. Map data reproduced with permission of the Director of Land (C) Hong Kong.
2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

8/76	MAN	EPW		3	WORK MEMORANDUMS
2/76	MAN	EPW		2	NOTE AMENDS AND ISSUE CORRECTIVE BOARD
12/75	MAN	EPW		1	DRAFT ISSUE
DATE	DESIGNED BY	CHECKED BY	APPROVED BY		REVISION DESCRIPTION

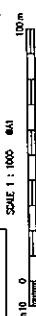
GOVERNMENT OF HONG KONG

Tai Harbour Sewerage of Unsewered Areas Stage I (Phase II)

PRELIMINARY VILLAGE SEWERAGE LAYOUT
TAI MEI TUK (TD8)

PROJECT NO. C2/76/94	SHEET 1 OF 1
CONTRACT NO. TD/6/76/18 SY/PL/2	ISSUE 3

MONTGOMERY WATSON
 羅敏申有限公司
 In association with
Mouchel Asia Limited Consulting Engineers

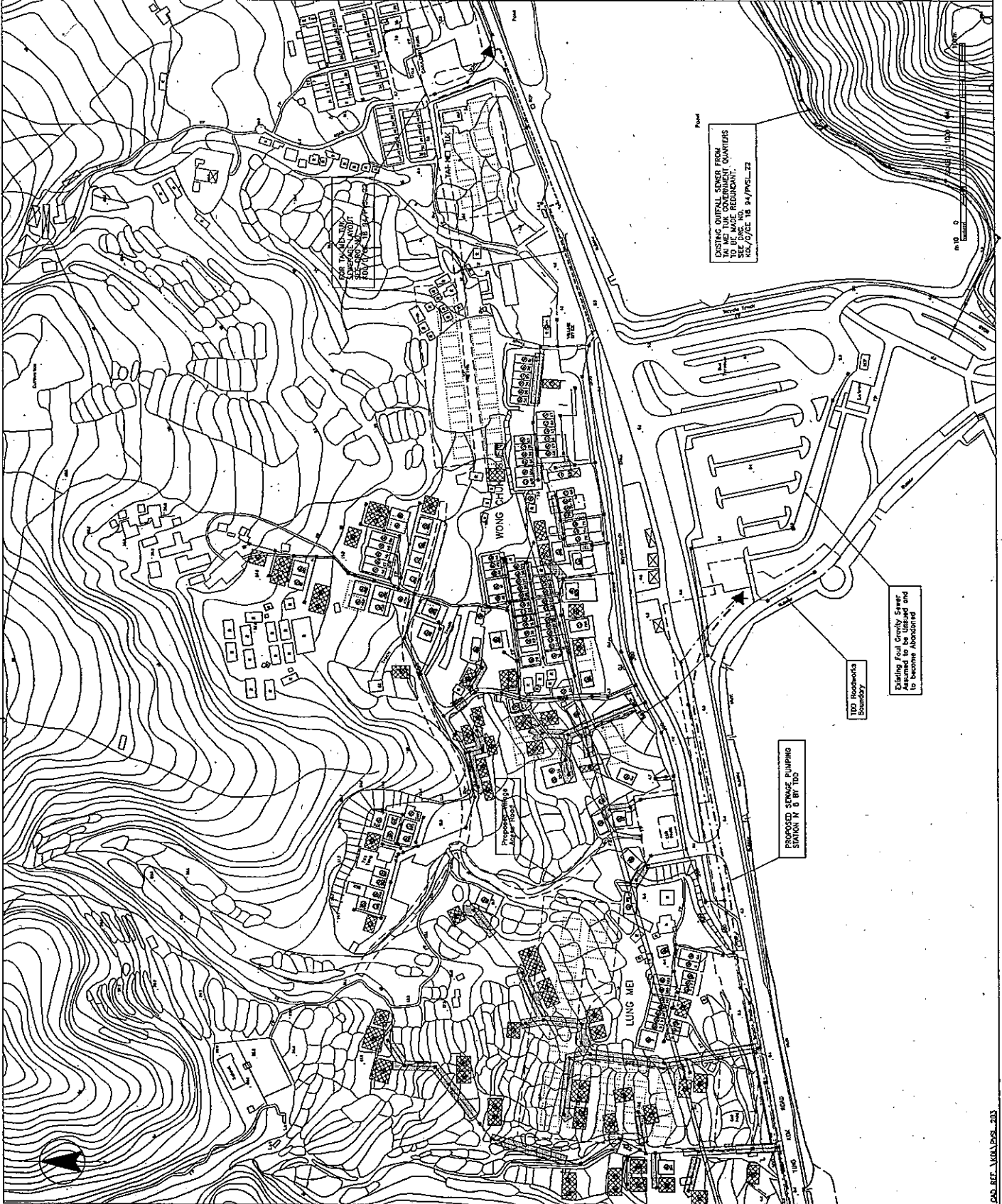


No. 2: Wong Chuk Tsuen Village (T11)**Village Details**

- Location:** Wong Chuk Tsuen village is located in Tai Po, on the north east shore of Plover Cove (E841955 N837088). The preliminary sewerage layout area is depicted on drawing KDL/G/CE 18 94/PVSL-20.
- Development:** The village area contains both new structures and older structures. Most of the units are three stories in height. The older structures are to the north with many of the new units facing Ting Kok Road. There are several housing units within the village that are under construction. The southern portion of the village, facing Ting Kok Road, contains outdoor eating areas and shops with a bicycle rental area across the roadway. Most of the alleyways in the village are level, wide and accessible.
- Access:** Access to the village is by Ting Kok Road from a road on the western border of the village.
- Village Status:** Unrecognised
- Existing Environment:** Wong Chuk Tsuen village is similar to Tai Mei Tuk village in character. The village topography is of sloping terrain that gradually decreases in level toward Ting Kok Road. The village is well maintained and most landscaping consists of landscaped plantings and small areas of active and fallow agricultural land. There is a main roadway located on the eastern side of the village that provides access to most housing units, with footpaths that lead to the northern portion of the village and to individual housing units. There appear to be no outstanding cultural features within the housing area with the exception of a shrine located on the eastern edge of the village. There is a bus terminus located across Ting Kok Road to the south of the village. Many of the houses have views of pond areas and Plover Cove. There are no streams that directly pass through the village itself. There is a drainage channel on the eastern edge of the village that separates the village from Tai Mei Tuk.
- The noise environment in the village is moderate, with noise levels increasing close to the Ting Kok Roadway. The second row of the houses are quiet with noise levels reducing in the northern portion of the village. The southernmost part of the village is commercial in nature becoming rural in the northern area. There is no traffic along the village access area other than residential traffic for the village off of Ting Kok Road.
- Cultural Resources:** There is one shrine located in the east area of the village.
- Surrounding Land Uses:** The Wong Chuk Tsuen village is surrounded by undeveloped areas bordering the Pat Sin Leng Country Park to the north, Ting Kok Road and a bus terminus to the south, Tai Mei Tuk village to the east and Lung Mei village to the west.
- Existing Sewerage:** The village disposes of sewage via septic tanks.
- Proposed Sewerage:** Gravity sewers are proposed to be installed in the village area, along existing footpaths and roadways. The sewers will discharge to a gravity foul sewer extending from the rising main in Ting Kok Road and will connect to a sewage pumping station south of Ting Kok Road.

No. 3: Lung Mei Village (T05)Village Details

- Location:** Lung Mei is located in Tai Po, on the western shore of the Plover Cove Reservoir, north of Ting Kok Road (E841695 N837012). The preliminary sewerage layout is shown on drawing KDL/G/CE 18 94/PVSL-20.
- Development:** The village consists of approximately 40 housing units, many of which are new units of three stories in height.
- Access:** Access to the village is by a roadway leading off Ting Kok Road and footpaths through the village area.
- Village Status:** Recognised
- Existing Environment:** Lung Mei Village can be divided in three sections with a cluster of housing units in the south area on flat land close to Plover Cove and another cluster of houses along the hillside. In the northern area, on slightly higher ground and further from the coastline, there are a few housing units on flat land serviced by a road from neighbouring Wong Chuk Tsuen to the east. A temple stands among the housing units and a shrine is situated just south of the units. There is a small drainage channel that runs east of the housing units and exits into Plover Cove. The noise environment, especially for the southern housing units, is influenced by traffic along Ting Kok Road. The northern portion of the village is quieter and more rural in nature. There is no traffic along the village access road other than the residential traffic.
- Cultural Resources:** There is one Tsz Tong in the north area of the village situated between units 56F and 57A.
- Surrounding Land Uses:** To the east of Lung Mei is the village of Wong Chuk Tsuen, to the south the Ting Kok Road and Plover Cove Reservoir, to the north and west there is rural open space.
- Existing Sewerage:** The village disposes of foul sewage via septic tanks.
- Proposed Sewerage:** Gravity sewers are proposed to be installed within the village area and these will be constructed along existing footpaths, roadways and alleyways. The gravity sewers will discharge into the proposed TDD pumping main to be located south of Ting Kok Road.



LEGEND

- Existing Foul Gravity Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Rooding Eye
- Proposed Pumping Main
- Proposed Pump Station
- Proposed Sewer by T05
- Proposed Pumping Main by T05
- Extension of Proposed Development
- Outline of Proposed Development
- Area Where Land Reclamation will be Required (2 metres at 1:50 Slope) (2 metres at 1:50 Slope) or Distance between Buildings
- Recently Constructed Houses in Approximate Position
- Property to be Sewered under Stage I (Phase II)

NOTES

1. Map data reproduced with permission of the Director of Land, (C) Hong Kong.
2. All sewers to be 150mm diameter unless indicated otherwise.
3. For Further Details of Ring Road Main Sewer Extension No. 101, 70/92, 18/94/MS, DS.

NOT FOR CONSTRUCTION

DATE	ISSUED	BY	REASON FOR ISSUE
6/99	RAW	3	ISSUE FOR CONSTRUCTION
2/98	RAW	2	ISSUE FOR CONSTRUCTION
12/95	RAW	1	ISSUE FOR CONSTRUCTION

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

PRELIMINARY VILLAGE SEWERAGE LAYOUT
 LUNG MEI (T05) & WONG CHUK TSUEN (T11)

PROJECT NO. CE/10/94
 DRAWING NO. 22/02/CE/18 24/02/94
 SHEET 1 OF 1
 ISSUE 3

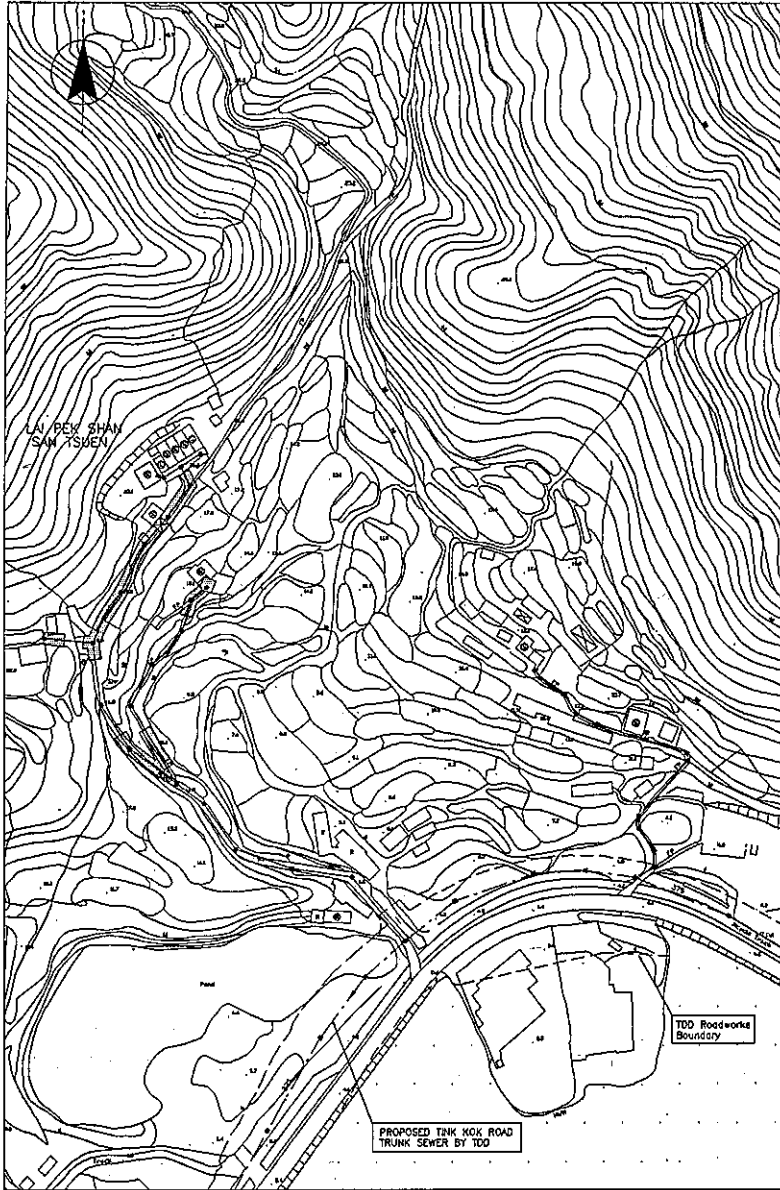
MONTGOMERY WATSON
 蒙格美華遜有限公司
 Mouchel Asia Limited Consulting Engineers

No. 4: Lo Tsz Tin Village (T03)**Village Details**

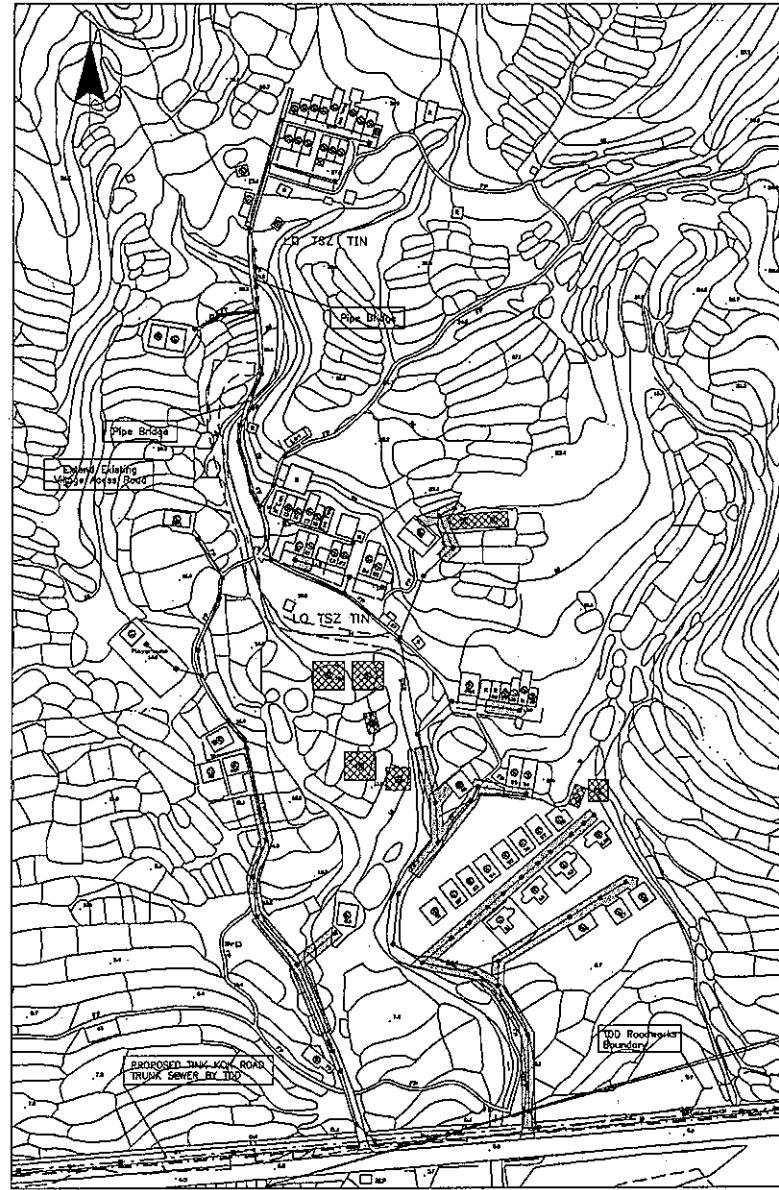
- Location:** Lo Tsz Tin is located in Tai Po, on the western shore of Plover Cove along the southern edge of Ting Kok Road (E841272 N837244). The preliminary sewerage layout is shown on drawing KDL/G/CE 18 94/PVSL-21.
- Development:** Lo Tsz Tin consists of approximately 66 housing units. These units are a mixture of old and new and vary between one and three stories.
- Access:** Access to Lo Tsz Tin is via a road leading off Ting Kok Road, which runs north, through the village.
- Village Status:** Recognised
- Existing Environment:** The housing units in Lo Tsz Tin are spread northwards along an uphill gradient away from the Ting Kok Road, most have views of Tolo Harbour. There are two temples located north of Lo Tsz Tin, amongst housing units, and one shrine in the south of the road leading to Lo Tsz Tin village. To the east, just outside the village, there are three grave sites. There is a channel that runs north to south through Lo Tsz Tin which discharges into Tolo Harbour. The noise environment in Lo Tsz Tin is very quiet and rural. The road running through the village area carries only the village residential traffic. The village has sloping terrain that gradually decreases in elevation toward Ting Kok Road. The village is well maintained and most landscaping consists of plantings and small areas of active and fallow agricultural land.
- Cultural Resources:** There are two Tsz Tongs within the village, one located in the centre of the village next to unit 18, and one in the north of the village amongst the housing units near the northern village boundary.
- Surrounding Land Uses:** East of Lo Tsz Tin there is a hill above some fields used for agriculture. To the north and west there are agricultural fields on a gradual slope southwards to Ting Kok Road and the coast.
- Existing Sewerage:** The village disposes of sewage via septic tanks.
- Proposed Sewerage:** Gravity sewers are proposed to be installed throughout the village area. The gravity main will follow the village access road and connections will be installed along existing paths and alleyways. The sewage will be discharged into the sewer to be installed by TDD along Ting Kok Road.

No. 5: Lai Pek Shan San Tsuen Village (T21)**Village Details**

- Location:** Lai Pek Shan San Tsuen village is located in Tai Po, on the north west shore of Plover Cove (E840051, N837204). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-21.
- Development:** The village contains approximately 17 housing units. Most of the units are old, of one to two stories and are spread out with no focal point to the village.
- Access:** Access to the village is via two roads leading off Ting Kok Road.
- Village Status:** Unrecognised
- Existing Environment:** Lai Pek Shan San Tsuen is rural in nature with agricultural fields spread out between housing units. Noise levels are low but increase toward Ting Kok Road.
- Cultural Resources:** There is one shrine in the south east area of the village near to the village border.
- Surrounding Land Uses:** To the north west and east of the village area there is very steep uncultivated terrain. To the south west there is a pond and some agricultural fields. Due south is Ting Kok Road and Plover Cove where there is a egret.
- Existing Sewerage:** None
- Proposed Sewerage:** The village sewerage will consist of two gravity sewers, located under the existing footpaths at the western and eastern edge of the village. Both gravity mains will connect into the Ting Kok Road trunk sewer.



LAI PEK SHAN SAN TSUEN



LO TSZ TIN

LEGEND

- Existing Foul Gravity Sewer
- Existing Manhole
- - - Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Rodding Eye
- - - Proposed Pumping Main
- ▲ Proposed Pump Station
- Proposed Sewer By TDD
- - - Proposed Pumping Main by TDD
- - - Extant of Proposed Development
- Outline of Proposed Development
- ▨ Area Where Land Resumption will Be Required. Note: Actual Width Required is Lesser of 1.2 Metres (2 metres of Monholes) or Distance between Buildings.
- ▩ Recently Constructed Houses in Approximate Position
- ⊕ Property to be Sewered under Stage I Phase II

NOTES

1. Map data reproduced with permission of the Director of Land, (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

8/96	MAW	KPW		3	MINOR AMENDMENTS	
2/96	MAW	KPW		2	MAJOR AMENDMENTS AND HOUSE CONNECTIONS ROAD	
12/95	MAW	WKH		1	DRAFT ISSUE	
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE	REVISION DESCRIPTION

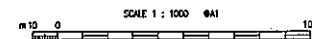
GOVERNMENT OF HONG KONG

Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

PRELIMINARY VILLAGE SEWAGE LAYOUT
LAI PEK SHAN SAN TSUEN (T21) &
LO TSZ TIN (T03)

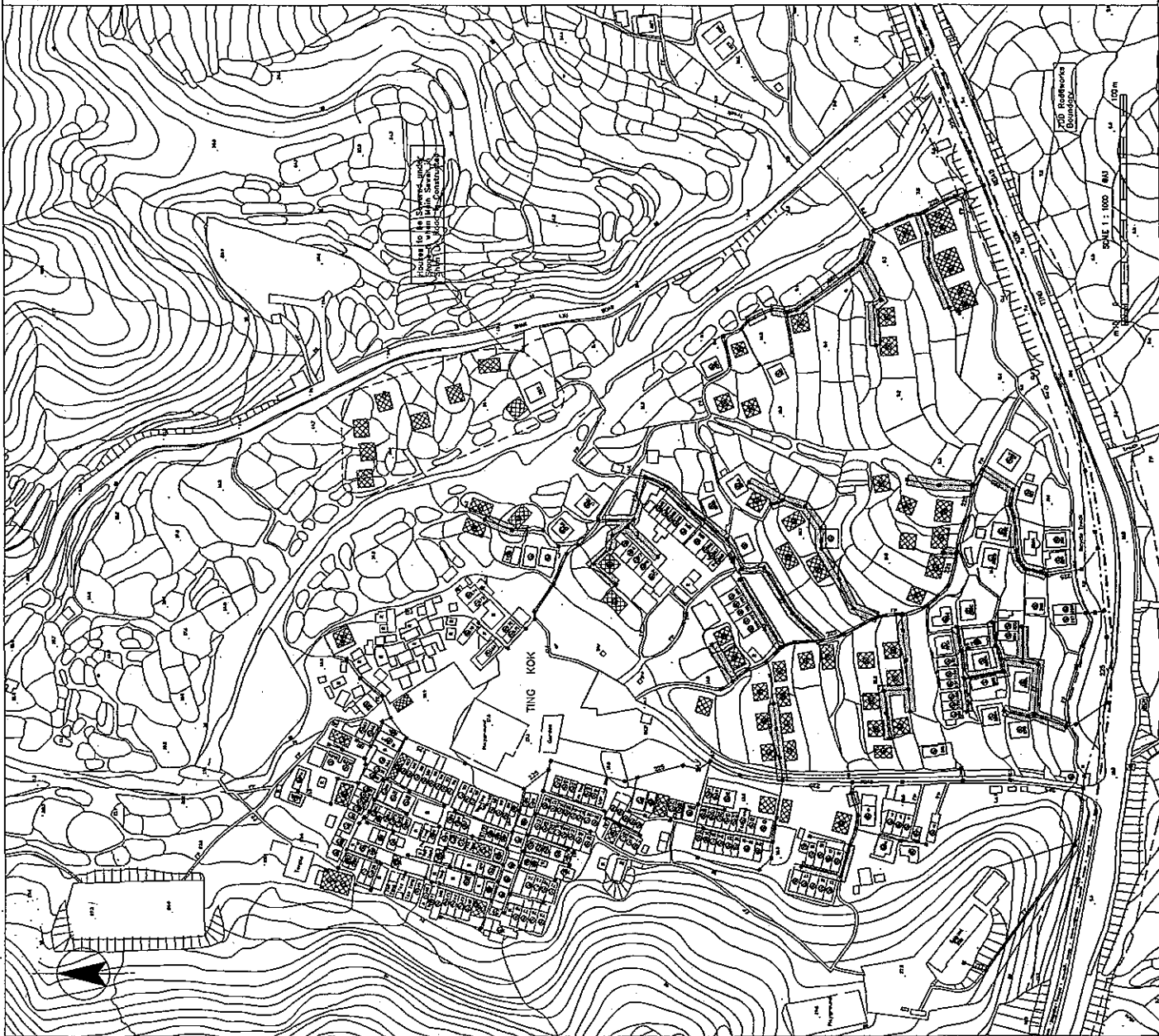
		AGREEMENT NO. CE/18/94	SHEET 1 OF 1
		DRAWING NO. KSL/6/CE 18 94/PVOL 21	ISSUE 3

MONTGOMERY WATSON
 蒙格馬利工程師
 In association with
 Mouchel Asia Limited Consulting Engineers



No. 6: Ting Kok Village (T10)**Village Details**

- Location:** Ting Kok is located in Tai Po, on the western edge of Plover Cove Reservoir (E840598 N837073). The preliminary sewerage layout is shown on drawing KDL/G/CE 18 94/PVSL-13.
- Development:** Ting Kok consists of approximately 298 housing units which are a mixture of old and new structures, of two to three stories in height.
- Access:** Access to the village is by Ting Kok Road running south of the village. There is a network of smaller roads throughout the village area. In the centre of Ting Kok there is a large garden and playground area.
- Village Status:** Recognised
- Existing Environment:** Ting Kok village spreads northwards and upslope on a gentle gradient away from the Ting Kok Road. The village itself mainly focuses on a central playground and garden and several of the housing units have views of this area. There is a channel that runs south through the village to the east of the housing units. There are ten temples amongst the housing units to the west of the central playground and garden area. There are two shrines to the east of this same area.
- The noise environment in the village is quiet at housing units north from the road. However noise levels rise closer to the main roads. The Shan Lui Road runs north/south along the village boundary to the east and the Ting Kok Road runs along the southern boundary of the village. Most housing units are some distance from both these larger roads.
- Cultural Resources:** There are nine Tsz Tongs and one temple all located in the centre of the village amongst village buildings. They are also two shrines in the centre of the village.
- Surrounding Land Uses:** To the west there are steep uncultivated slopes and to the north and west the land is relatively flat with many agricultural fields. Ting Kok Road and Plover Cove are due south and a green belt area and agriculture area are located to the east.
- Existing Sewerage:** The village disposes of sewage via septic tanks.
- Proposed Sewerage:** Ting Kok village will be serviced by three main gravity sewers running in a north to south direction that will be located within existing footpaths and roadways. The mains will feed into the proposed gravity sewer to be installed under Ting Kok Road to Lung Mei. The flows will then be pumped back along Ting Kok Road towards Tai Po.



LEGEND

- Existing Foul Gravity Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Racking Eye
- Proposed Pumping Main
- Proposed Pump Station
- Proposed Sewer by TPO
- Proposed Pumping Main by TPO
- Extent of Proposed Development
- Outline of Proposed Development
- Areas Where Land Reclamation will be Required in Excess of 1.5 Metres (2 Acre at Minimum) or Distance Between Sub-Range
- Recently Constructed Houses in Approximate Position
- Property to be Sewered under Slope 1 Phase II

NOTES

1. Map data reproduced with permission of the Director of Land. (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

0/94	1/94	1/94	3	LAYOUT AUTHORIZED AT BICYCLE TRACK
2/95	1/95	1/95	2	WORK APPROVED AND DISE CONTRACTING BOARD
12/95	1/95	1/95	1	DRAFT ISSUE
DATE	DESIGNED BY	CHECKED BY	APPROVED BY	INTERNAL APPROVAL

GOVERNMENT OF HONG KONG

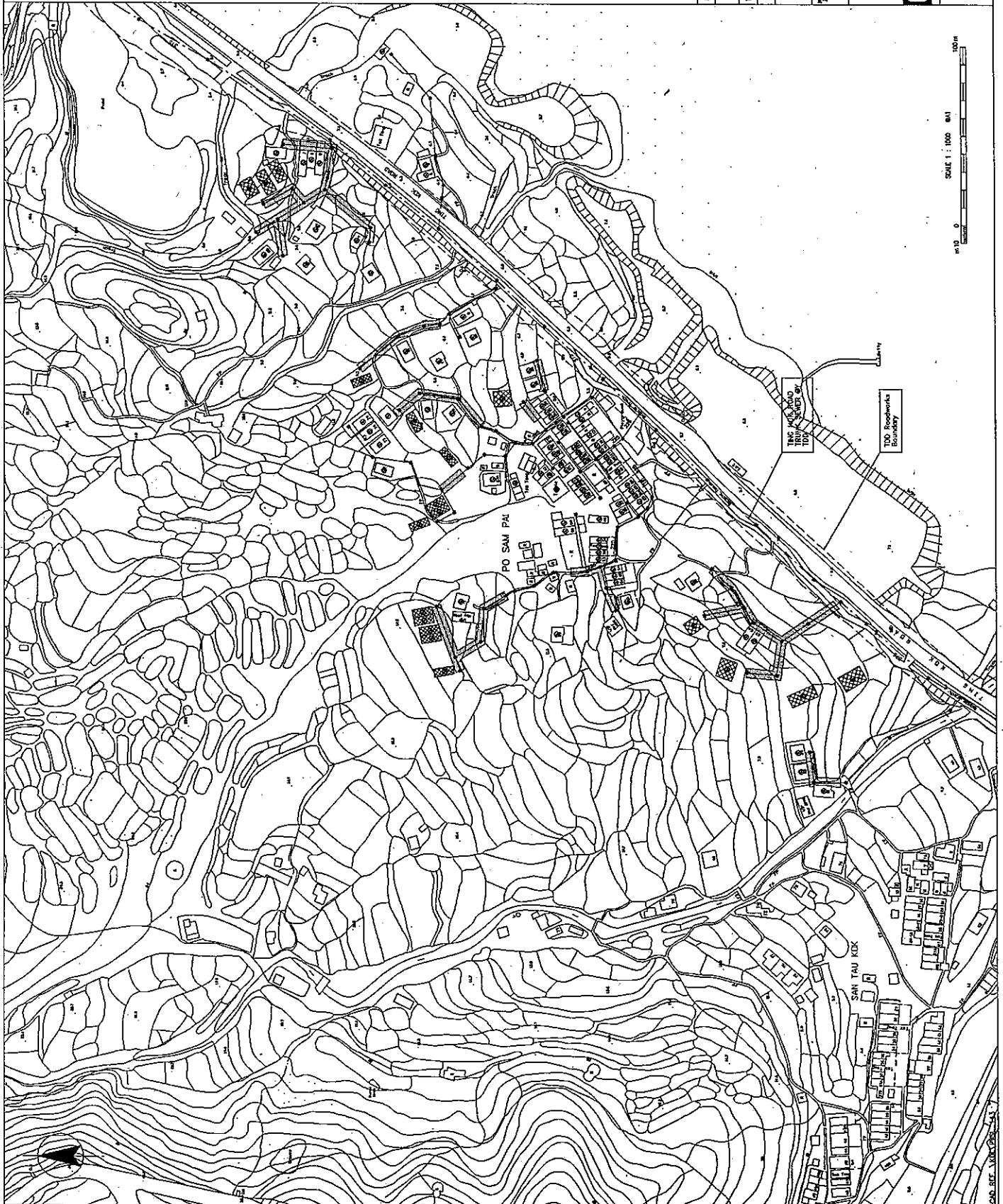
Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

PRELIMINARY VILLAGE SEWERAGE LAYOUTS
TING KOK (T10)

	APPROVED NO. 12/18/94	SHEET 1 OF 1
	DRAWING NO. W4/94/26.9 (P/MS/1.1)	DATE 3
MONTGOMERY WATSON 工程顧問有限公司		
Mouchel Asia Limited Consulting Engineers		

No. 7: Po Sam Pai Village (T09)Village Details

- Location:** Po Sam Pai village is located in Tai Po, on the north west side of Plover Cove (E839734, N83686). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-14.
- Development:** The village contains approximately 102 housing units which are a mixture of old and new structures, one to three stories in height.
- Access:** Access to the village is via three short access roads leading directly off Ting Kok Road.
- Village Status:** Recognised
- Existing Environment:** The village is situated along the north west coast of Plover Cove. There is a Site of Special Scientific Interest (the Shuen Wan Egretty), which is situated beyond Ting Kok Road which borders the village. A portion of the village area lies on the eastern side of Ting Kok Road, which directly borders the coastline. There is a large watercourse to the west of the village which drains into Plover Cove. Most of the village is comprised of open space and agricultural land. The village units are primarily clustered in the middle of the site but with some sprawling development throughout the village area. The noise levels within the village are influenced by traffic along Ting Kok Road which principally affect the first row of village units. These units shield most of the noise for the other housing units.
- Cultural Resources:** There are five Tsz Tongs located within the village development, between units 58 and 60, 29 and 18, 63 and 62 and near unit 6.
- Surrounding Land Uses:** To the north of Po Sam Pai village there is agricultural land. San Tau Kok lies due west with some agricultural fields separating the two villages. South and east across the Ting Kok Road there is the Ting Kok Site of Special Scientific Interest.
- Existing Sewerage:** The village is presently served by septic tanks.
- Proposed Sewerage:** The village is to be seweraged by gravity sewers to be located within existing footpaths and access roads within the village. The gravity mains will feed into the gravity main to be constructed by TDD in Ting Kok Road.



LEGEND

- Existing Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Sewer
- Proposed Manhole
- Proposed Backing Eye
- Proposed Pumping Main
- Proposed Pump Station
- Proposed Sewer by TID
- Proposed Pumping Main by TID
- Extent of Proposed Development
- Outline of Proposed Development
- Areas Where Land Resumption will be Required. Note: (A) 15m width (B) 2 metres at Manhole or (C) Distance between Buildings.
- Recently Constructed Houses in Approximate Position
- Property to be Sewered under Stage I Phase II

NOTES

1. Map data prepared with permission of the Director of Land, (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

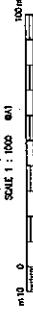
8/96	MMW	KPW	3	MINOR AMENDMENT
2/96	MMW	KPW	2	MAKE INDICATED AND MAKE FUNCTIONING SEWER
12/95	MMW	KPW	1	DRAFT ISSUE
SUB	ISSUED	SEAL	DATE	APPROVED ISSUE

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

PRELIMINARY VILLAGE SEWERAGE LAYOUTS
 PO SAN PAI (109)

AGREEMENT NO. CE/18/94
 SHEET 1 OF 1
 DRAWING NO. SA/18/CE 18 SA/PAL-11 ISSUE 3

MONTGOMERY WATSON
 莫高美 莫工建築師
 In association with
 Mouchel Asia Limited Consulting Engineers

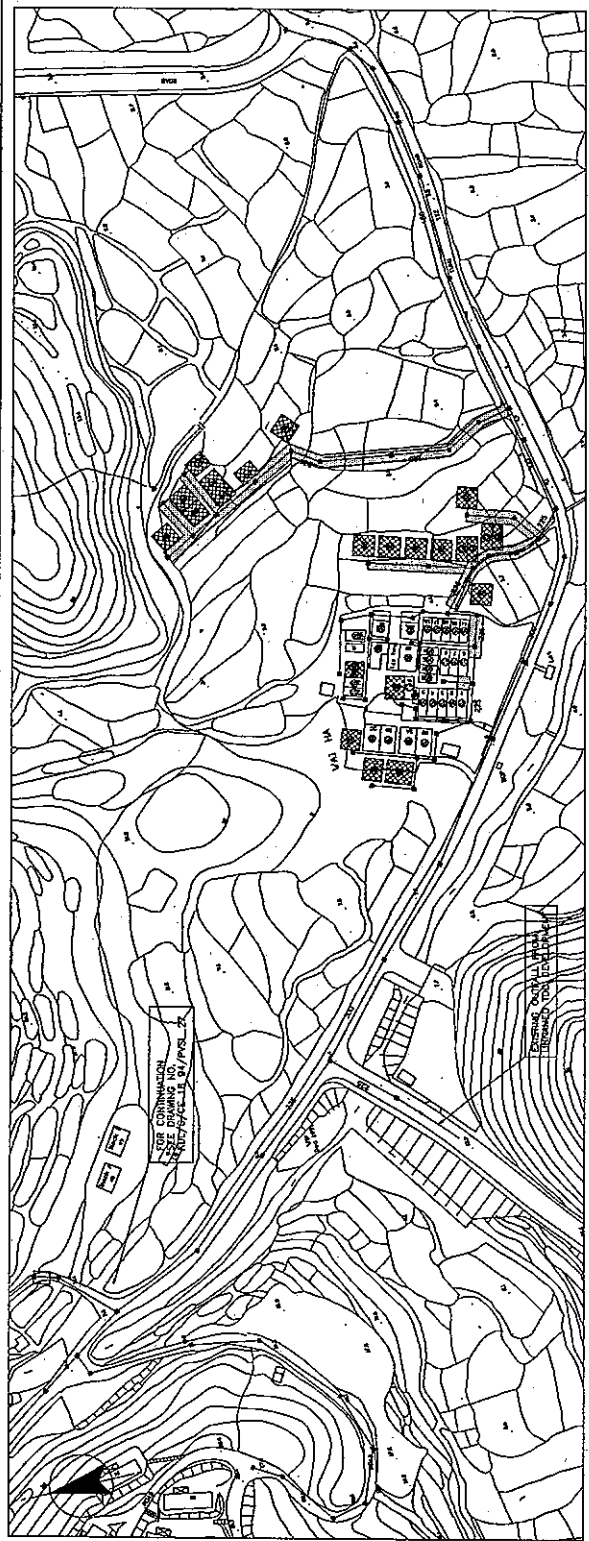


No. 8: San Tau Kok Village (T20)**Village Details**

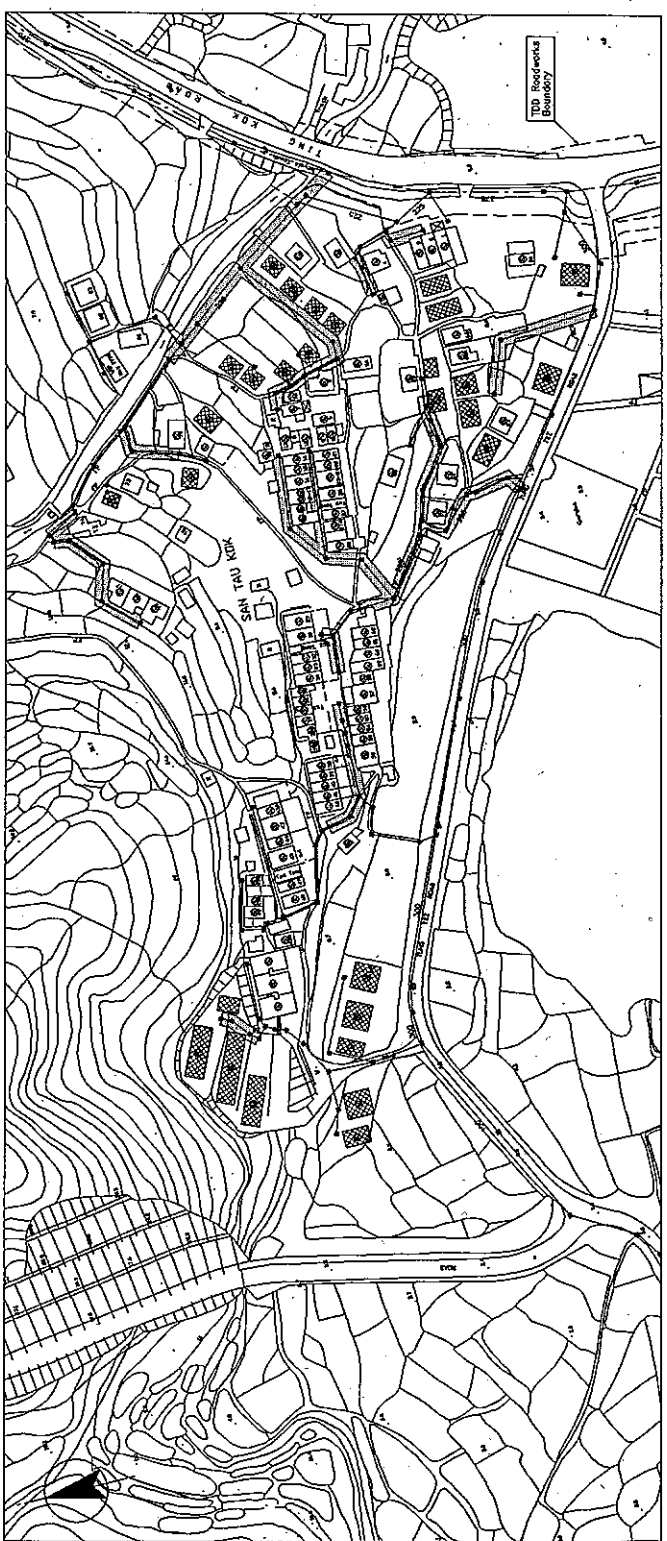
- Location:** San Tau Kok is located in Tai Po, on the western edge of Plover Cove (E839437 N836652). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 1894/PVSL-26.
- Development:** The area to be seweraged includes approximately 85 units. Most are newly built structures.
- Access:** Access to the village is provided by two roads leading off of Ting Kok Road and Tung Tsz Road.
- Village Status:** Recognised
- Existing Environment:** The village is situated along the north west coast of Plover Cove, west of Po Sam Pai village. There is a Site of Special Scientific Interest (the Shuen Wan Egretty), which is situated beyond Ting Kok Road which borders the village. There is a large watercourse that borders the village development on the east that drains into Plover Cove and separates the village from Po Sam Pai. There is also a large pond area located south west of the village. The noise levels within the village are generally quiet, despite being within close proximity of Tung Tsz Road. Most of the village area is rural in nature.
- Cultural Resources:** There are four Tsz Tongs located within the village; three are located between units 47 and 48, 37 and 36 and 25 and 27. There are several graves and a burial urn located at the northern edge of the village area.
- Surrounding Land Uses:** East and south east of San Tau Kok there is the Ting Kok Road and the Ting Kok Site of Special Scientific Interest. Directly south of the village there is a nursery and garden area. To the west lies agricultural land and north is a Green Belt area.
- Existing Sewerage:** The village uses septic tanks for sewage disposal.
- Proposed Sewerage:** The village is to be seweraged by gravity sewers located through the village units within existing footpaths and the main access roads. The western section of the village will have four outfalls connecting into the main sewer in Tung Tsz Road. The eastern section of the village will have two outfalls connecting into the Ting Kok Road Trunk Sewer.

No. 9: Wai Ha Village and Unnamed TDD Development (T14)**Village Details**

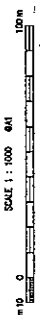
- Location:** Wai Ha is located in Tai Po on the western edge of Plover Cove and midway along Tung Tsz Road (E8838934 N836627). The unnamed TDD Development lies along side an unnamed road to the west of Tung Tsz Road. The preliminary sewerage layouts are shown on drawing no. KDL/G/CE 1894/PVSL-26.
- Development:** The Wai Ha Village area to be sewered includes 55 housing units, which are mostly modern units that range from one to three stories in height. The village is rectangular in shape and is compact. The unnamed development has only a few residential units that have recently been constructed.
- Access:** Access to the village and unnamed development is provided by roads leading off Tung Tsz Road.
- Village Status:** Recognised
- Existing Environment:** The village and development are situated inland from Plover Cove, within an agricultural area. The sites boarder Tung Tsz Road. There is a prominent watercourse located further west of Tung Tsz Road. The noise levels within the village are generally low.
- Cultural Resources:** There is one Tsz Tong in the centre of Wai Ha village between units 13 and 22.
- Surrounding Land Uses:** Wai Ha and the development are surrounding by agricultural land except for the Tung Tsz Road south west and a small area of Green Belt to the north.
- Existing Sewerage:** Wai Ha Village via septic tanks and the unnamed development via existing wastewater treatment facility.
- Proposed Sewerage:** The village will be connected to gravity foul sewers that will be located within existing alleyways, footpaths and access roads. One gravity main will feed to the main to be located in Tung Tsz Road. The unnamed development will be connected to the new main in Tung Tsz Road by gravity sewer along the access road.



WAL HA



SAN TAU KOK



LEGEND

- Existing Foul Gravity Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Ridding Eye
- Proposed Pumping Main
- Proposed Pumping Station
- Proposed Sewer By TOD
- Proposed pumping main by TOD
- Extent of Proposed Development
- Outline of Proposed Development
- Area Where Land Reclamation (R) is Required. Note - Actual Width Required is Lesser of 1.2 Metres and 10% of the Distance between Buildings.
- Recently Constructed Houses in Approximate Position
- Property to be Sewered under Stage 1 Phase II

NOTES

1. Map also reproduced with permission of the Director of Land, (C) Hong Kong.
2. All sewers to be 150mm diameter unless indicated otherwise.
3. For further details of Sewer in Tung Tze Road See Eng. No. 100/9/CE (10) 24/7/2006, 27 & 28

NOT FOR CONSTRUCTION

DATE	REVISION	BY	APPROVED	REASON	DESCRIPTION
8/95	1	AWK	CPW	3	MADE AMENDMENTS RELATIVE TO THE PROPOSED SANITATION PLAN AND TO THE DRAINAGE PLAN
2/98	2	AWK	CPW	2	MADE AMENDMENTS AND ROSE CONNECTIONS DRAWING
12/03	3	AWK	CPW	1	DRIFT SIZE

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

PRELIMINARY VILLAGE SEWERAGE LAYOUT
 SAN TAU KOK (T20), WAL HA (T14)
 AND UNNAMED TOD DEVELOPMENT

PROJECT NO. CE/18/94 SHEET 1 OF 1
 DRAWING NO. 10/9/CE IS 24/P/20.2 ISSUE 3
 MONTGOMERY WATSON
 莫高利工程顧問有限公司
 Mouchel Asia Limited Consulting Engineers

No. 10 : Tsui Lam (T12)**Village Details**

- Location:** Tsui Lam is located in Tai Po, inland of the north western edge of Tolo Harbour (E838252 N836925). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-27.
- Development:** The development comprises two sections. The south east section consists of a complex which was once owned by the Royal Hong Kong Police and used as a holiday home but is now shared with a church/missionary organisation. Most of the units are of older construction and one to two stories in height. The north west section is near the village of A Shan and consists of about five housing units.
- Access:** Access to the south east development area is provided by a private access road off Tung Tsz Road. Within the village there is a concrete pathway that provides access to the individual units. Access to the western portion of the village is via footpaths.
- Village Status:** Unrecognised
- Existing Environment:** Both the south east and western developments are situated in a rural area that contains very little development. There is a watercourse which runs along the eastern edge of the village boundary. The noise levels within the two areas is very low and there are no outside influencing factors which generate noise.
- Cultural Resources:** There are no outstanding cultural features located within the villages.
- Surrounding Land Uses:** Tsui Lam is surrounded by a Green Belt area with agricultural land.
- Existing Sewerage:** The units presently dispose of foul waste by septic tank.
- Proposed Sewerage:** For the south east development, a gravity sewer is proposed which will lead to a gravity main running down the access road for connection to the main sewer to be located in Tung Tsz Road. There are no sewage proposals for the western section of the village.

No. 11 : Tung Tsz Village
No. 12 : A Shan Tseng Tau Village (T19)
No. 13 : Scout Training Centre

Village Details

- Location:** A Shan Tseng Tau, Tung Tsz Village and the Scout Training Centre are located in Tai Po, approximately 750 m inland of the north western edge of Tolo Harbour (E8838676 N837146). The two villages are located on the eastern side of Tung Tsz Road and The Scout Training Centre is located north west of Tung Tsz Road. The preliminary sewerage layouts are shown on drawing no. KDL/G/CE 18 94/PVSL-27.
- Development:** The two villages are small in size and contains 21 housing units in A Shan Tseng Tau, most of which are of older construction and one to two stories in height and 28 housing units in Tung Tsz that are as mix of old and new units.
- Access:** Access to the villages and training centre is provided by a private access road off Tung Tsz Road. Within the villages there is a concrete pathway that provides access to the individual units.
- Village Status:** Unrecognised
- Existing Environment:** The villages and Scout Training Centre are situated in a rural area that contains very little development. There is a watercourse which runs along the western edge of A Shan Tseng Tau village boundary and through Tung Tsz Village. There is a catch water running south of the Scout Training Centre. There are farming areas within the village area. The noise levels within the village are very low and there are no outside influencing factors which generate noise in the village.
- Cultural Resources:** There is one Tsz Tong located within the centre of A Shan Tseng Tau Village, between housing units 9 and 11.
- Surrounding Land Uses:** A Shan Tseng Tau and Tung Tsz are surrounded by a Green Belt area, with a small area to the west which is agricultural land and an orchard to the south. The Scout Training Centre, located further west of the village, across Tung Tsz Road is also surrounded by agriculture and open space.
- Existing Sewerage:** The village units presently dispose of foul waste by septic tank and grey water is disposed of in stormwater drains/channels.
- Proposed Sewerage:** A gravity main will be built along Tung Tsz Road from the entrance of the Scout Training Centre down to the pumping station at San Tau Kok Road. The village sewerage will consist of gravity foul sewers, which will lead to a gravity main that will connect to the new sewer main to be built by TDD.

LEGEND

- Existing Full Gravity Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Full Sewer
- Proposed Manhole
- Proposed Rooding Eye
- Proposed Pumping Main
- Proposed Pump Station
- Proposed Sewer By TDD
- Proposed Pumping Main by TDD
- Extent of Proposed Development
- Outline of Proposed Development
- Area Where Land Reclamation will Be Required. Note - Actual Width of Proposed Land Reclamation (20 metres at Mahood) or Distance between Buildings.
- Recently Constructed Houses in Approximate Position
- Property to be Sewered under. Stage I / Phase II

NOTES

1. All data furnished with permission of the Director of Land, (C) Hong Kong.
2. All access to be 150mm diameter unless indicated otherwise.
3. For Further Details of Main Sewer in Tung Tau Road See Dwg. No. HDL/07/CE 19 24/MS.06, 07 & 08.

NOT FOR CONSTRUCTION

DATE	REVISION	DESCRIPTION
6/98	NAW	ISSUE FOR CONSULTATION WITH THE DIRECTOR OF LAND
2/06	NAW	ISSUE FOR CONSULTATION WITH THE DIRECTOR OF LAND
12/95	NAW	ISSUE FOR CONSULTATION WITH THE DIRECTOR OF LAND
		ISSUE FOR CONSULTATION WITH THE DIRECTOR OF LAND

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

PRELIMINARY VILLAGE SEWERAGE LAYOUT
 TSUI LAM (T12), TUNG TAU
 AND A SHAN TSEANG TAU (T19)

PROJECT NO. CE/10/94 SHEET 1 OF 1
 DRAWING NO. HDL/07/CE 19 24/MS.07 ISSUE 3
MONTGOMERY WATSON
 莫高美利士
 In association with
Mouchel Asia Limited Consulting Engineers



FOR CONSULTATION WITH THE DIRECTOR OF LAND
 NO. HDL/07/CE 19 24/MS.07
 SCALE 1:1000

No. 14 : Shuen Wan Chim Uk Village (T15)**Village Details**

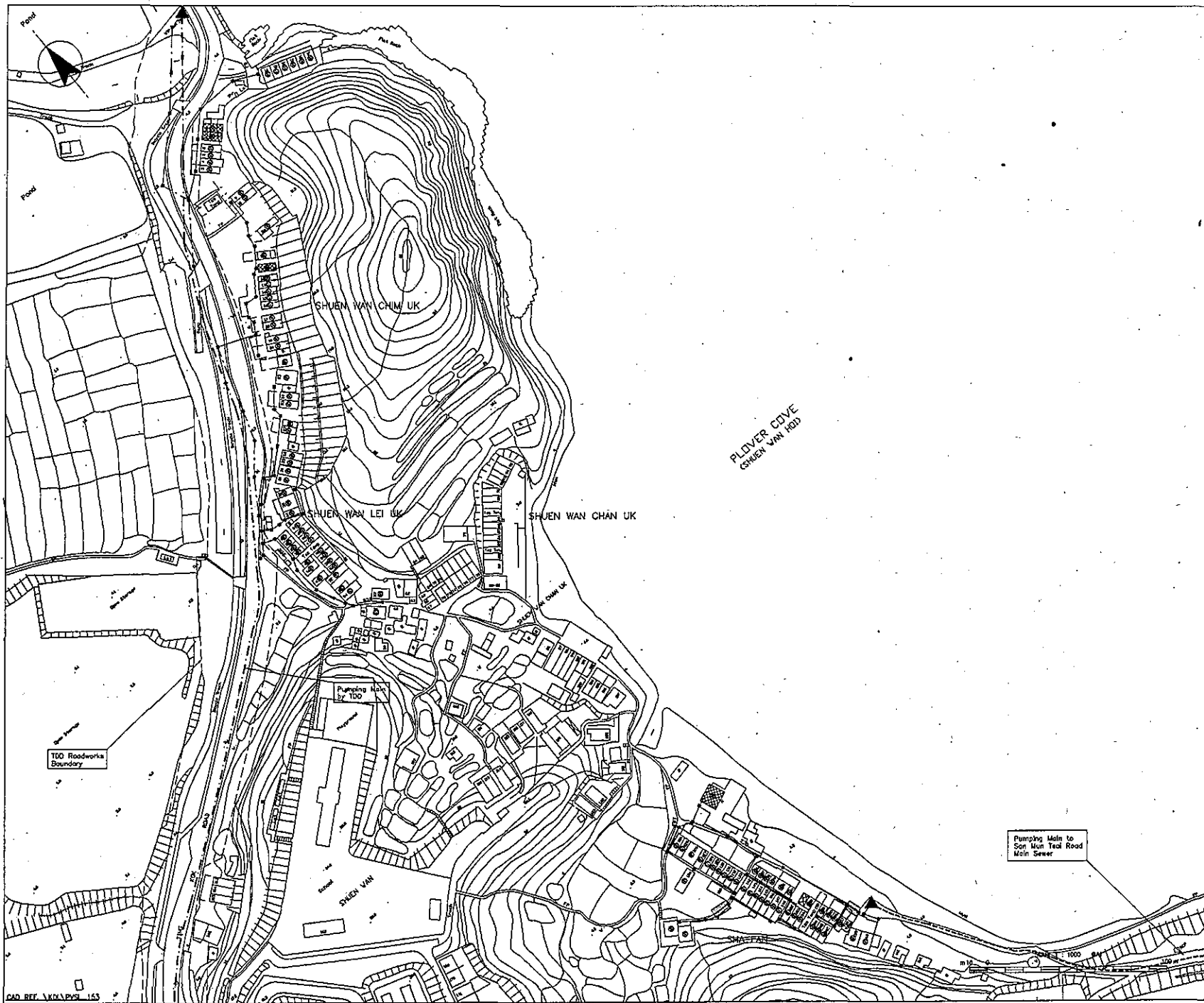
- Location:** Shuen Wan Chim Uk is located in Tai Po along the coastline of Plover Cove, just north of the Yim Tin Tsai peninsula (E 839475 N836061). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-15.
- Development:** The village is of medium size and contains approximately 40 housing units, consisting of older and more recent development.
- Access:** Access to the village is provided directly off of Ting Kok Road. Within the village there is a concrete pathway that provides access to the individual units.
- Village Status:** Recognised
- Existing Environment:** The village contains a site of Special Scientific Interest (the Shuen Wan Egretty), which is located between the village and the coastline. The village area is located on level land next to Ting Kok Road and is backed by a hillside to the east. There is a large watercourse that is situated directly across Ting Kok Road from the village which drains into Plover Cove. There is a second water course, draining into Plover Cove, that is located in the norther portion of the village, across from units 1A-1F. The noise levels within the village are heavily influenced by traffic along Ting Kok Road which affect most of the village units.
- Cultural Resources:** There is one Tsz Tong within the village; fronting units 9 and 10.
- Surrounding Land Uses:** Shuen Wan Chim Uk is surrounded by Plover Cove to the east and north, Ting Kok Road and agriculture land (with open storage) to the west and Shuen Wan Le Uk village to the south.
- Existing Sewerage:** The village units presently dispose of wastewater via stormwater drains/channels.
- Proposed Sewerage:** The Project will provide village sewerage consisting of gravity sewers to be built from the front of the housing units and lead to Ting Kok Road via existing roadways and paths. The gravity sewers will lead to a main sewer in Ting Kok Road and will be collected at a pumping station north of the village which will pump the sewerage back up Ting Kok Road.

No. 15 : Shuen Wan Lei Uk Village (T17)**Village Details**

- Location:** Shuen Wan Lei Uk is located in Tai Po along the coastline of Plover Cove, just north of the Yim Tin Tsai peninsula and south of Shuen Wan Chim Uk village (E839446 N835877). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-15.
- Development:** The village is medium size and contains approximately 50 housing units, consisting of both older and more recent development.
- Access:** Access to the village is provided by footpath off of Ting Kok Road. Within the village there is a concrete pathway that provides access to the individual units. There is a prominent footpath to the south of the village.
- Village Status:** Recognised
- Existing Environment:** The village is situated on the coast of Plover Cove. There is a Site of Special Scientific Interest (the Shuen Wan Egretty), north of the village. The village is located on level land and there is a large watercourse that is situated directly across Ting Kok Road which drains into Plover Cove. The noise levels within the village are influenced by traffic along Ting Kok Road which affect the front village units. The units facing Plover Cove are affected very little by noise from Ting Kok Road.
- Cultural Resources:** There are three Tsz Tongs within the villages; between housing units 83 and 84, 40 and 47, 89 and 90.
- Surrounding Land Uses:** Shuen Wan Lei Uk is surrounded by Plover Cove to the east, Shuen Wan Chim and the Shuen Wan Egretty SSSI to the north, Ting Kok Road and agriculture land (with open storage) to the west and Shuen Wan Chan Uk village to the south.
- Existing Sewerage:** The village units presently dispose of wastewater by stormwater drains/channels.
- Proposed Sewerage:** TDD will be building a sewer along Ting Kok Road. The Project will provide gravity sewers that will be situated within the existing pathways.

No. 16 : Sha Lan Village (T07)**Village Details**

- Location:** Sha Lan village is located within Tai Po, on the coast of Plover Cove, on the Yim Tin Tsai peninsula, south of Shuen Wan Chan Uk village (E839446 N835626). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-15.
- Development:** The village development is large in size with approximately 70 housing units, consisting of a mixture of older and more recent development.
- Access:** Access to the village is provided by an access road off of Ting Kok Road that passes the Shuen Wan Temporary Housing Area. Within the village there is a roadway to each village unit and concrete foot paths that provide access to other nearby villages and agriculture land.
- Village Status:** Recognised
- Existing Environment:** The village is situated on the coast of Plover Cove. The village is grouped in a semi-circular pattern, with the eastern portion bordering Plover Cove and the southern and western portion bordering temporary housing. There is a hill in the centre of the village and a watercourse on the northern edge of the village that drains into Plover Cove. The noise levels within the village are low and are not influenced by traffic along Ting Kok Road. The units facing Plover Cove are very quiet.
- Cultural Resources:** There is one grave site located on the top of the hill in the centre of the village and two Tsz Tongs located between housing units.
- Surrounding Land Uses:** Shuen Wan Lei Uk is surrounded by Plover Cove to the east, Shuen Wan Chim and the Shuen Wan Egretty SSSI to the north, Ting Kok Road and agriculture land (with open storage) to the west and Shuen Wan Chan Uk village to the south.
- Existing Sewerage:** The village presently disposes of foul sewage via septic tanks.
- Proposed Sewerage:** A pumping station will be built along the foot path at the south edge of the Shuen Wan Lei Uk village. The village will then be connected by gravity sewers installed along the existing roadways and paths which will discharge into the pumping station, then be pumped to San Mun Tsai Road Main Sewer.



LEGEND

- Existing Foul Gravity Sewer
- Existing Manhole
- - - Existing Rising Main
- - - Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Rooding Eye
- - - Proposed Pumping Main
- ▲ Proposed Pump Station
- Proposed Sewer by TDD
- - - Proposed Pumping Main by TDD
- - - Extent of Proposed Development
- Outline of Proposed Development
- ▨ Areas Where Land Resumption will be Required. Note: Actual Width Required is Lesser of 1.5 Metres (2 metres at Manhole) or Distance between Buildings.
- ▩ Recently Constructed Houses in Approximate Position
- Property to be Sewered under Stage I Phase II

NOTES

1. Map data reproduced with permission of the Director of Land. (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

8/98	MAW	KPW			3	LAYOUT AMENDED ON THE EXISTING ROAD AND NEW PUMPING STATION RELOCATED
2/98	MAW	KPW			2	MINOR AMENDMENTS AND HOUSE CONNECTIONS DRAWN
12/93	MAW	NKH			1	DRWT ISSUE
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE	REVISION DESCRIPTION

GOVERNMENT OF HONG KONG

Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

PRELIMINARY VILLAGE SEWERAGE LAYOUT
SHA LAN (T07), SHUEN WAN LEI UK (T17)
AND SHUEN WAN CHIM UK (T15)

AGREEMENT NO. CE/18/94	SHEET 1 OF 1
DRAWING NO. KOL/4/CE 18 54/P/S/L15	ISSUE 3

MONTGOMERY WATSON
 蒙格蒙崗工程師
 in association with
Mouchel Asia Limited Consulting Engineers

No. 17 : Home for the Aged (T13)Village Details

- Location:** The Home for the Aged is located within Tai Po, on the coastline of Plover Cove, north of the Shuen Wan Typhoon Shelter (E839765 N835662). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-12.
- Development:** The development consists of an old persons care facility with approximately 183 residents located on a headland near the villages of San Mun Tsai and Yim Tin Tsai.
- Access:** Access to the facility is provided by Sam Mun Tsai Road.
- Village Status:** N/A
- Existing Environment:** There are no watercourses that run through the facility. The noise environment is very quiet.
- Cultural Resources:** N/A
- Surrounding Land Uses:** The Home for the Aged is bordered by Plover Cove to the north, the Shuen Wan Typhoon Shelter to the South, Yim Tin Tsai to the east and residential development to the west.
- Existing Sewerage:** The facility presently disposes of wastewater via a septic tank.
- Proposed Sewerage:** The facility is to be sewerred by connecting it to the main proposed to be built along Sam Mun Tsai Road.

No. 18: Sam Mun Tsai New Village (T16)Village Details

- Location:** Sam Mun Tsai New Village is located in Tai Po along the eastern edge of the Shuen Wan Typhoon Shelter (E 840169 N835141). The preliminary sewerage design is shown on drawing no. KDL/G/CE 18 94/PVSL-12.
- Development:** The village is of large size and contains approximately 150 housing units, generally of more recent development.
- Access:** Access to the village is provided by Sam Mun Tsai Road which runs on a causeway connecting the village to the mainland. Within the village there is road access to some of the village units.
- Village Status:** Recognised
- Existing Environment:** The village is situated along the coast. There is an egret within the village area that has recently been designated as a SSSI. The noise levels within the village are very quiet.
- Cultural Resources:** There is one shrine in the centre of the village, between housing units 25 and 26.
- Surrounding Land Uses:** Sam Mun Tsai New Village is bordered by Luen Yick San Tsuen to the east, a residential development (Springdale Garden) to the north and open space agricultural area to the south.
- Existing Sewerage:** The village units presently dispose of sewage via septic tanks and directly into the sea via short private outfalls.
- Proposed Sewerage:** The village is to be seweraged by a combination of pumping and gravity mains that will follow existing foot paths and roads within the village. The sewage network will discharge north of the village, into a gravity sewer along Sam Mun Tsai Road. There will be three pumping stations in the village.

No. 19: Luen Yick San Tsuen Village (T23)Village Details

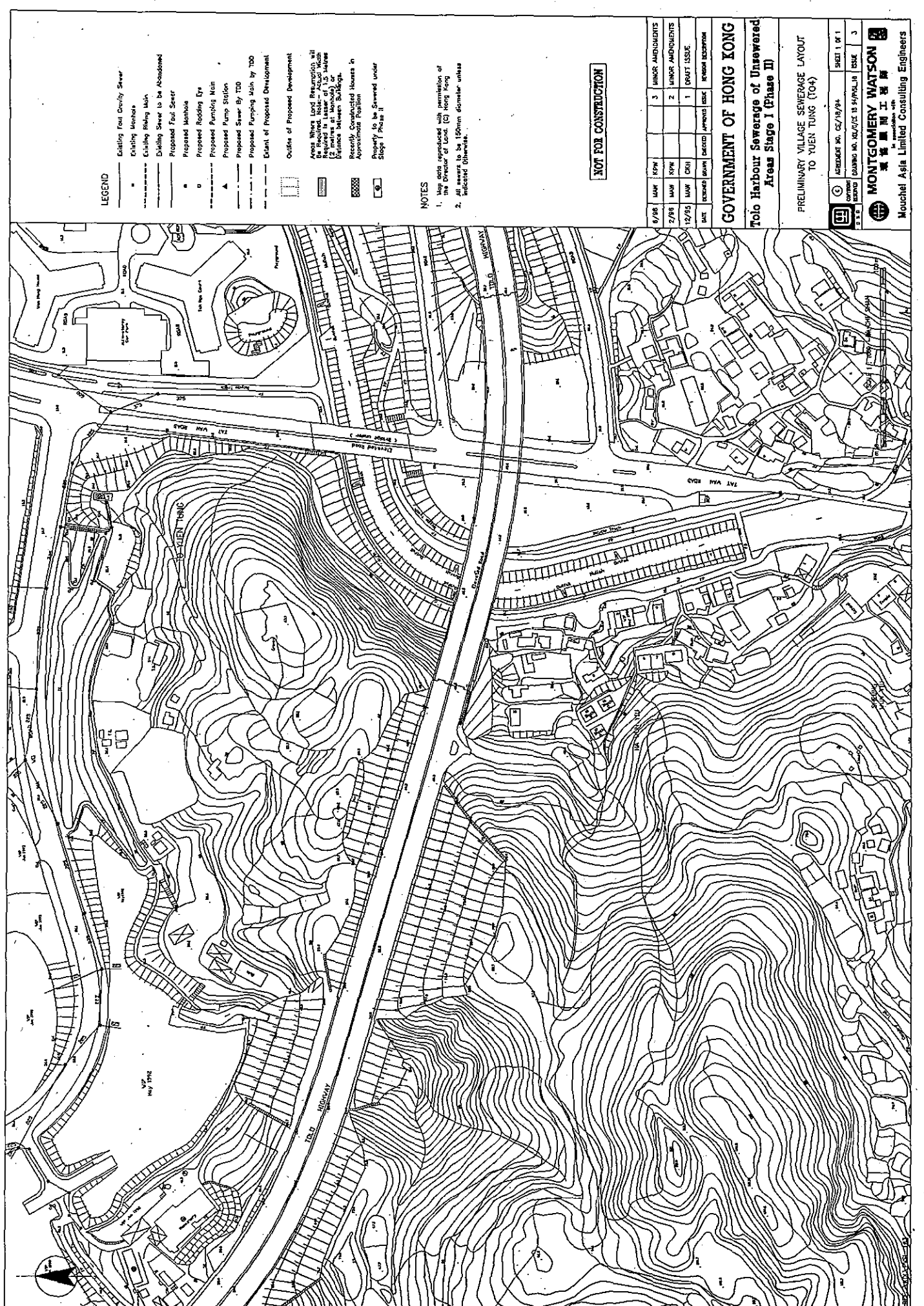
- Location:** Luen Yick San Tsuen is located along the southern edge of Plover Cove (E 840107 N835000). The preliminary sewerage design is shown on drawing no. KDL/G/CE 18 94/PVSL-12.
- Development:** The village is of large size and contains approximately 102 housing units, generally of more recent development.
- Access:** Access to the village is provided by Sam Mun Tsai Road. Within the village there is road access to each village unit.
- Village Status:** Unrecognised
- Existing Environment:** The village is situated on a raised elevation overlooking Plover Cove. There is an egretty near the village area that has recently been designated as a SSSI. The noise levels within the village are very low.
- Cultural Resources:** There are two shrines located on the eastern and southern edge of the village development.
- Surrounding Land Uses:** Luen Yick San Tsuen village is bordered by Sam Mun Tsai New Village to the west, a residential development (Springdale Garden) to the north west and Plover Cove to the direct north, south and east.
- Existing Sewerage:** The village units presently dispose of sewage via septic tanks.
- Proposed Sewerage:** The village is to be seweraged primarily by gravity mains that will follow the existing foot paths and roads within the village and will discharge north of the village to the proposed gravity main in Ting Kok Road. A pumping station (Type 1) will be built north of village units 27A and 45.

No. 20: Hong Lok Yuen Development**Village Details**

- Location:** Hong Lok Yuen is a residential complex located in Tai Po, inland from Tolo Harbour (E833996 N835000). The preliminary sewerage design is shown on drawing no. KDL/G/CE 18 94/PVSL-23.
- Development:** The residential area consists of a large, relatively new, housing development.
- Access:** Access to the site is provided by Tai Po Road. Within the complex there is road access to each village unit.
- Village Status:** The area is zoned for residential development
- Existing Environment:** The complex is situated near the Kowloon Canton Railway within a semi rural area. East of the site there is a Site of Special Scientific Interest (Fung Yuen Valley). The noise levels within the residential complex are very low.
- Cultural Resources:** None
- Surrounding Land Uses:** The residential complex is situated within a Green Belt area containing very little development.
- Existing Sewerage:** The complex presently disposes of sewage by foul sewer to a local sewage treatment works.
- Proposed Sewerage:** The project will intercept the existing main sewer and will connect it into the Tai Po sewerage system.

No. 21: To Yuen Tung Village (T04)**Village Details**

- Location:** To Yuen Tung is located in Tai Po, along the southern edge of Plover Cove (E 835001 N833498). The preliminary sewerage design is shown on drawing no. KDL/G/CE 18 94/PVSL-16.
- Development:** The village is of moderate size and contains mostly recent development.
- Access:** Access to the village is provided by Ma Wo Road.
- Village Status:** Recognised
- Existing Environment:** The development is situated between Ma Wo Road to the north, Tat Wan Road to the east, Tolo Highway to the south and residential units to the west. The noise levels in the village are high. There is a watercourse south of the site.
- Cultural Resources:** There is a monastery and a shrine on the western edge of the development.
- Surrounding Land Uses:** The village is situated between major roadways with newly constructed residential development on all sides.
- Existing Sewerage:** Unknown
- Proposed Sewerage:** The area to be seweraged includes a short gravity mains that will connect to an existing main sewer in Ma Wo Road.



LEGEND

- Existing Four Channel Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Four Saver
- Proposed Manhole
- Proposed Rooding Eye
- Proposed Pumping Main
- Proposed Pump Station
- Proposed Sewer By TID
- Proposed Pumping Main by TID
- Extent of Proposed Development
- Outline of Proposed Development
- Area Where Land Reclamation, all or part, is required for the sewerage system (2 metres at 1000ft) or between adjacent buildings
- Recently Constructed Houses in Approximate Position
- Property to be Sewered under Slope 1 Phase II

NOTES

1. Map data reproduced with permission of the Director of Lands, (C) Hong Kong
2. All sewers to be 1500mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

NO.	DATE	BY	FOR	REVISION
1	12/78	AWM	REP	1
2	2/79	AWM	REP	2
3	5/78	AWM	REP	3

GOVERNMENT OF HONG KONG
To Lo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

PRELIMINARY VILLAGE SEWERAGE LAYOUT
 TO YUEN TUNG (104)

AGREEMENT NO. CE/19/94
 SHEET 1 OF 1

DATE OF ISSUE: 12/78
 DRAWING NO. 104/1/2/13 BY/REV. IN ISSUE: 3

MONTGOMERY WATSON
 莫禮遜 顧問工程師

Mouchel Asia Limited Consulting Engineers

No. 22: Yuen Tun Ha Village (T02)Village Details

- Location:** Yuen Tun Ha is located in Tai Po, Ta Tit Yan and Lo Lau Uk south of Harbour (E 834469 N831950). The preliminary sewerage design is shown on drawing no. KDL/G/CE 18 94/PVSL-18.
- Development:** The village appears to consist mostly of ruins.
- Access:** Access to the village is provided by footpath leading from a small car park 300m north of the village.
- Village Status:** Recognised
- Existing Environment:** The village is situated in a rural Green Belt area. The noise levels in the village are very low. There is a watercourse located west of the village.
- Cultural Resources:** None identified.
- Surrounding Land Uses:** Rural open space.
- Existing Sewerage:** None
- Proposed Sewerage:** The preliminary design recommend leaving the village unsewered. However, if at a later date new development takes place then sewerage facilities should be reconsidered.

No. 23: Lo Lau Uk Village (T06)**Village Details**

- Location:** Lo Lau Uk is located within Tai Po inland in an area south of Tolo Harbour (E834877 N831850). The preliminary sewerage design is shown on drawing no. KDL/G/CE/ 18 94/PVSL-18.
- Development:** There are a few housing units and ruins in this village development.
- Access:** Access to the village is provided by Tat Wan Road, which follows the water catchment channel.
- Village Status:** Unrecognised
- Existing Environment:** The village is situated in a rural Green Belt area. The noise levels in the village are very low. There are watercourses located throughout the village.
- Cultural Resources:** There are several burial urns located in the area.
- Surrounding Land Uses:** Rural open space.
- Existing Sewerage:** None
- Proposed Sewerage:** There are no plans for connecting this village to a sewerage system. If at a later date new development takes pace then the provision of sewerage facilities should be reconsidered.

LEGEND

- Existing Full Capacity Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Full Sewer
- Proposed Manhole
- Proposed Racking Eye
- Proposed Pumping Main
- Proposed Pump Station
- Proposed Sewer By TDD
- Proposed Pumping Main by TDD
- Extent of Proposed Development
- Outline of Proposed Development
- Areas Where Land Reservation will be Required. Note: Actual Width (2 metres at Manhole) or Distance between Buildings.
- Recently Constructed Houses in Approximate Position
- Property to be Sewered under Slope (Phase I)

NOTES

1. Use sites indicated with permission of the Director of Land (C) Hong Kong.
2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

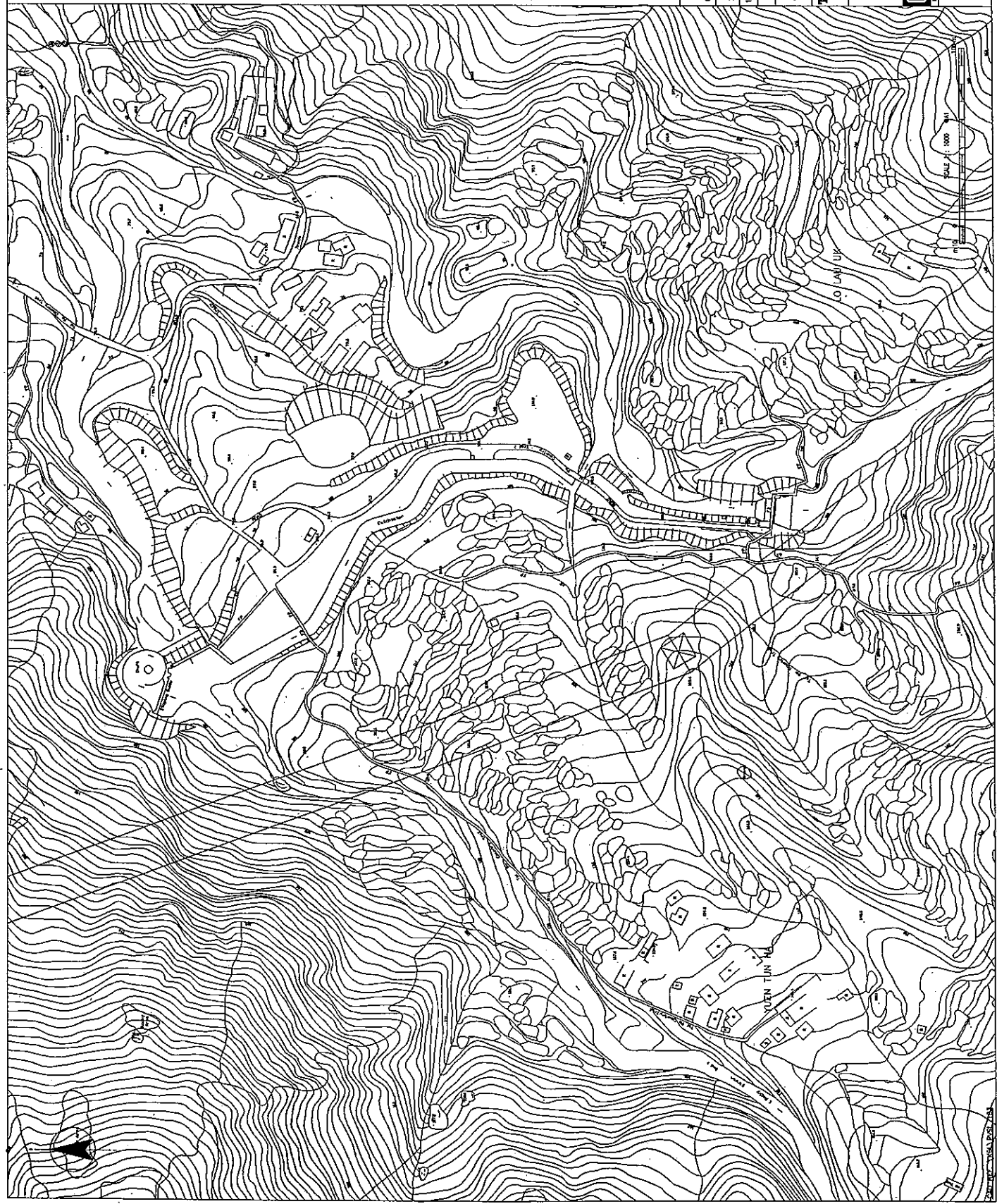
8/86	MAN	KPW	3	LAYOUT REVISIONS FROM 850
2/86	MAN	KPW	2	MAN PROPOSED AND SOLE CONTRACTOR BOARD
12/85	MAN	CRH	1	DRAFT ISSUE
DATE	DESIGNED BY	CHECKED BY	SCALE	REVISION REASON

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

PRELIMINARY VILLAGE SEWERAGE LAYOUT
 YUEN TUN HA (102) & LO LAU UK (106)

PROJECT NO. 25/18/84
 DRAWING NO. 82/4/2E IS 84/P/01/10 ISSUE 3
 SHEET 1 OF 1

MONTGOMERY WATSON
 蒙哥馬利華士頓
 Mouchel Asia Limited Consulting Engineers



No. 24: Ta Tit Yan Village (T22)Village Details

- Location:** Tai Tit Yan is located within Tai Po, inland of Tolo Harbour (E834761 N831566). The preliminary sewerage design is shown on drawing no. KDL/G/CE 18 94/PVSL-19.
- Development:** There are a few village housing units within the rural area. Many of the units appear to be abandoned.
- Access:** Access to the village is by a roadway off Tat Wan Road, then by footpath following the water catchment channel.
- Existing Environment:** The village is situated in an isolated rural area and is surrounded by branched watercourses. The noise levels in the village are very low.
- Cultural Resources:** There is one temple and one Tsz Tong located southwest of the village area and burial urns located northwest of village.
- Surrounding Land Uses:** Rural open space
- Existing Sewerage:** None
- Proposed Sewerage:** There are no plans for connecting this village to a sewerage system. If at a later date new development takes place then the provision of sewerage facilities should be reconsidered.

LEGEND

- Existing Four County Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Four County Sewer
- Proposed Manhole
- Proposed Rodding Eye
- Proposed Pumping Main
- Proposed Pumping Station
- Proposed Sewer By TDD
- Proposed Pumping Main by TDD
- Extent of Proposed Development
- Outline of Proposed Development

- Areas Where Land Reclamation will be Required. Area - Actual Width (indicated by dashed line) Distance between Buildings.
- Recently Constructed Houses in Approximate Position
- Property to be Sewered, under Stage I phase II

NOTES



1. Top data represented with permission of the Director of Civil Engineering.
2. Indicated otherwise.

NOT FOR CONSTRUCTION

6/00	MAN	10/00	3	MAN	MAN
2/00	MAN	10/00	2	MAN	MAN
10/00	MAN	10/00	1	MAN	MAN
10/00	MAN	10/00	1	MAN	MAN

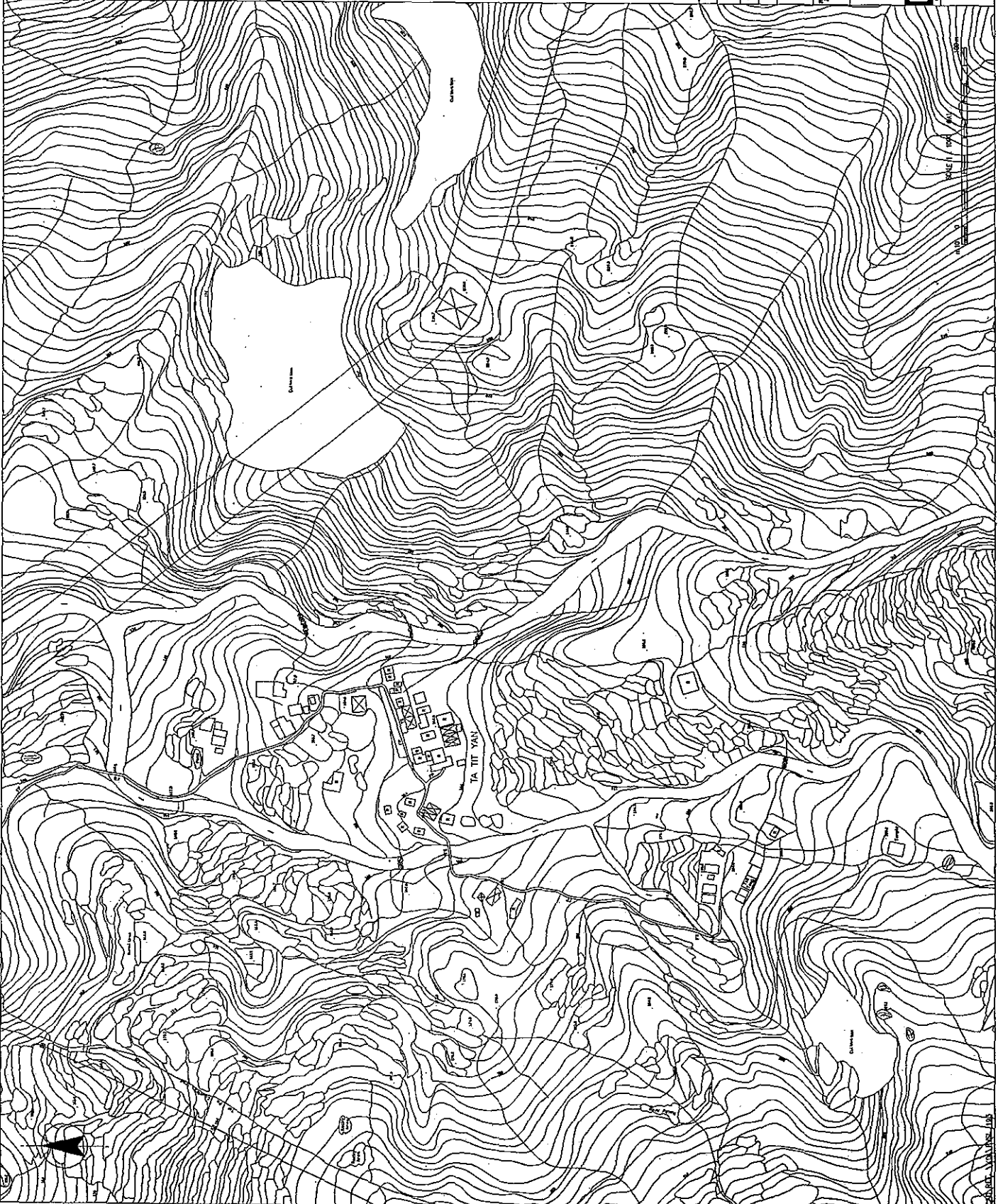
GOVERNMENT OF HONG KONG
Toio Harbour Sewerage of Unsewered Areas Stage I (Phase II)

PRELIMINARY VILLAGE SEWERAGE LAYOUT
 TA TIT YAN (122)

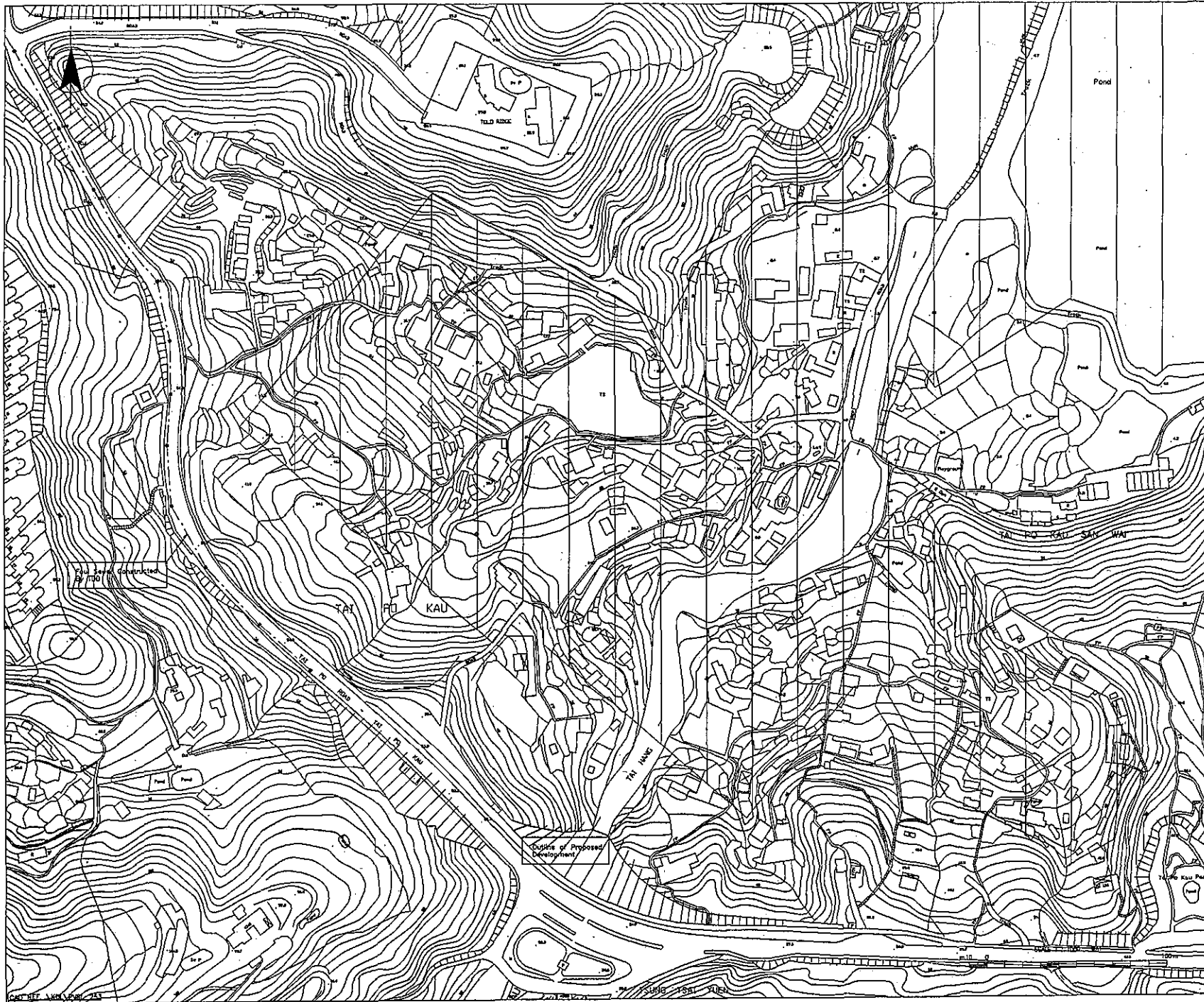
PROJECT NO. CE/16/94
 DRAWING NO. CE/16/94 IS 10/00-10 (SEE 3)
 SHEET 1 OF 1

MONTGOMERY WATSON
 莫特利華工程顧問有限公司
 Mouchel Asia Limited Consulting Engineers



No. 25: Tai Po Kau San Wai Village (T18)**No. 26: Tai Po Kau****Village Details**

- Location:** Tai Po Kau San Wai is located within Tai Po in an area west of Tolo Harbour (E837410 N832741). The preliminary sewerage design is shown on drawings nos. KDL/G/CE 18 94/PVSL-25 and KDL/G/CE 18 94/PVSL-24.
- Development:** Tai Po Kau San Wai consists of a few residential units located next to a pond area. The units are mostly marked as temporary structures. Tai Po Kau, consists of approximately 20 new residential units.
- Access:** Road access to the village is from Tai Po Road which has several branches that extend into the village.
- Village Status:** Unrecognised
- Existing Environment:** The village is situated on the western edge of Tolo Harbour. There is a pond area adjacent to the northeast portion of the village and a watercourse on the east edge of the village. All of the village is in open space agricultural use with the village units spread out in Tai Po Kau San Wai and Tai Po Kau. There is very little background noise within the village area.
- Cultural Resources:** None
- Surrounding Land Uses:** The village has a pond area to the north and agricultural land and open space to the south, east and west.
- Existing Sewerage:** The village units presently dispose of sewage via septic tanks.
- Proposed Sewerage:** Tai Po Kau San Wai will be left unsewered. If at a later date new development takes place then the provision of sewerage facilities should be reconsidered. The sewage in Tai Po Kau will consist of a pumping station situated near unit 20 of the village with a pumping main running along the road to a foul sewer constructed in Tai Po Kau Road. The sewerage will also include the Tolo Ridge development.



- LEGEND**
- Existing Foul Gravity Sewer
 - Existing Manhole
 - - - Existing Rising Main
 - - - Existing Sewer to be Abandoned
 - Proposed Foul Sewer
 - Proposed Manhole
 - Proposed Rodding Eye
 - - - Proposed Pumping Main
 - ▲ Proposed Pump Station
 - - - Proposed Sewer By TDD
 - - - Proposed Pumping Main by TDD
 - - - Extant of Proposed Development
 - Outline of Proposed Development
 - ▨ Areas Where Land Resumption will be Required. Note—Actual Width Required is Lesser of 1.5 Metres (2 metres at Manhole) or Distance between Buildings.
 - ▨ Recently Constructed Houses in Approximate Position
 - ⊖ Property to be Sewered under Stage I Phase II

- NOTES**
1. Map data reproduced with permission of the Director of Land. (C) Hong Kong
 2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

8/98	MAW	KPW		3	TLO SEWER AND DEVELOPMENT BOUNDARY ADDED
2/98	MAW	KPW		2	MINOR AMENDMENTS AND HOUSE CONNECTIONS REMOVED
12/95	MAW	KPW		1	DRAFT ISSUE
DATE	DESIGNED	BY	CHECKED	APPROVED	ISSUE
					REVISION DESCRIPTION

GOVERNMENT OF HONG KONG

Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

PRELIMINARY VILLAGE SEWAGE LAYOUT
TAI PO KAU SAN WAI (T18)

	AGREEMENT NO. CE/18/84	SHEET 1 OF 1
	DRAWING NO. KPL/C/DC 15 94/POL/25	ISSUE 3
Mouchel Asia Limited Consulting Engineers		

LEGEND

- Existing Foul County Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Ridding Eye
- Proposed Pumping Main
- Proposed Pump Station
- Proposed Sewer By TPO
- Proposed Pumping Main by TPO
- Extent of Proposed Development
- Outline of Proposed Development
- Area Where Land Reclamation will be Proposed (Area of 1.5 Hektare (3.7 Acres) of Manhole) or Distance between Buildings
- Recently Constructed Houses in Approximate Position
- Proposed to be Sewered under Slope (Phase II)

NOTES

1. Map data reproduced with permission of the Director of Land, (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

6/7/84	MAN	KPW		3	MINOR AMENDMENTS
2/7/84	MAN	KPW		2	LAYOUT AMENDED
12/7/83	MAN	KPW		1	DRAFT ISSUE
DATE	DESIGNED BY	CHECKED BY	APPROVED BY	SCALE	REVISION DESCRIPTION

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

PRELIMINARY VILLAGE SEWAGE LAYOUTS
 YIN TSE LANE & TOLO RIDGE AT TAI PO KAU.

AGREEMENT NO. CE/19/84
 DRAWING NO. 82/4/CE 18 S/P/84.24
 SHEET 1 OF 3
 ISSUE 3

MONTGOMERY WATSON
 莫高美利士工程顧問有限公司
 In association with
 Mouchel Asia Limited Consulting Engineers



No. 27: Cheung Shue Tan Village (T24)Village Details

- Location:** Cheung Shue Tan is located within Ma Lui Shui, inland, in an area south west of Tolo Harbour (E838719 N831826). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-17.
- Development:** The Cheung Shue Tan development consists of approximately 50 residential units including both older and newer structures which range from one to two stories. The village is spread out in a circular manner.
- Access:** Road access to the village is from Tai Po Road. A branch from Tai Po Road divides in two to provide the village with two main access roads.
- Village Status:** Recognised
- Existing Environment:** The village is situated along the western edge of Tolo Harbour, south of Pak Shek Kok. There are several watercourses that border the village development and drain into Plover Cove. The Tai Po Mei Han and the Cheung Shue Tan Han rivers run adjacent to the village on the south, east and west boundaries. The noise levels within the village are low, despite the close proximity of Tolo Highway and the KCR. Most of the village area is rural in nature and is surrounded by woodlands.
- Sanitation:** The sanitation within the village is considered good.
- Cultural Resources:** There are four Tsz Tong in the village, one near unit 81 and one shrine to the north of the village area. There is a Fung Shui area located at the north east portion of the village.
- Surrounding Land Uses:** The village is bordered by Pak Shek Kok, the KCR and the Tolo Highway to the north, and rural green belt area to the south, east and west.
- Existing Sewerage:** The village units presently dispose of sewage via septic tank.
- Proposed Sewerage:** The sewers from the village will flow south east, following the line of a proposed new road before joining the sewer from Tai Po Mei and Chek Nai Ping. The total combined flow will then travel north east to a new pumping station on the southern side of the disused railway embankment. The combined flows from all the villages in the area will then be pumped up to a high point on a private road within the Chinese University of Hong Kong. The flows will then gravitate down to connect with an existing sewer.

No. 28: Tai Po Mei Village (T25)**Village Details**

- Location:** Tai Po Mei is located within Ma Lui Shui inland in an area south west of Tolo Harbour (E838485 N831319). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-23.
- Development:** Tai Po Mei consists of approximately 40 residential units including a mixture of old and new structures. The village area follows the Tai Po Mei Hang river and is elongated, with rows of houses containing three to four units for about ten blocks. The village wraps around a hillside. The units are a combination of both older and newer structures.
- Access:** Road access to the village is from Tai Po Road.
- Village Status:** Recognised
- Existing Environment:** The village is situated in a rural valley between two mountains. The village follows the Tai Po Mei Han river and there is a stream course that runs through the village. There is very little noise within the village.
- Cultural Resources:** There is a Tsz Tong located between a playground and housing unit 42A.
- Surrounding Land Uses:** The village is surrounded by Po Min village to the north, green belt area to the south and mountains to the east and west.
- Existing Sewerage:** The village units presently dispose of sewage via septic tank.
- Proposed Sewerage:** A gravity sewer will be installed along an existing footpath that extends from the centre of the village to the edge of Po Min village. The sewer will then continue north and follow the Tai Po Mei Hang river to Chueng Shue Tan.

No. 29: Chek Nai Ping Village (S20)Village Details

- Location:** Chék Nai Ping is located within Ma Lui Shui in an area south west of Tolo Harbour, west of the Chinese University and North of Tai Po Road (E838728 N831165). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-10.
- Development:** Chek Nai Ping consists approximately 100 residential units that are comprised of both older and newer development. Most of the village units are of three stories and of modern type of development. The village development spread out.
- Access:** The village is situated directly to the north of Tai Po Road. A short sideroad connecting onto Tai Po Road gives access to the village.
- Village Status:** Recognised
- Existing Environment:** The village is situated on high ground east of Tai Po Mei. There are good views from the village of Tolo Harbour and the valley below, including Cheung Shue Tan. The village area is stepped and is rural in nature. There are no streamcourses that runs through the village and there is very little noise within the village with the exception of a few units that are affected by Tai Po Road.
- Cultural Resources:** There is one Tsz Tong located in the centre of the village buildings, between units 59 and 60.
- Surrounding Land Uses:** The village is bordered by rural development and the Chinese University to the North, Tai Po Road and rural landuses to the south, east and west.
- Existing Sewerage:** The village units presently dispose of sewage via septic tanks.
- Proposed Sewerage:** A gravity sewer will be installed along existing footpaths in the village and across agricultural land on its eastern edge. A pumping station will serve the eastern portion of the village and will discharge via a rising main to the gravity main extending from Tai Po Mei.

No. 30: Fo Tan Village (S08)**Village Details**

- Location:** Fo Tan is located in Sha Tin, southwest of Tolo Harbour (E838146 N828474). The preliminary sewerage layout designs are shown on drawing no. KDL/G/CE 18 94/PVSL-10.
- Development:** Fo Tan consists of approximately 27 residential units located in a residential/commercial area, just north of the Shing Mun River Channel. The village consists of older houses, mostly on the western edge, and newly constructed units on the eastern edge, many of which are not yet occupied. Most of the older units are of one story with a few structures of two stories. All of the newer structures are three stories in height.
- Access:** Road access to the village is via Shan Mei Street.
- Village Status:** Recognised
- Existing Environment:** The village is situated in the valley bottom, south of the Sha Tin New Town Commercial Centre. There is little natural vegetation. No rivers run through the site however the Shing Mun River Channel fronts the north boundary of the village. The village environment has high noise levels due to its surrounding land uses.
- Cultural Resources:** There are three Tsz Tongs in the centre of the village, one between units 2 and 10, one between units 2 and 4, and one between units 16 and 18. There is one shrine in the south-east of the village.
- Surrounding Land Uses:** Fo Tan is situated in a commercial/residential area. There is a bus terminus and car park to the west, factories to the north, across Shing Mun River Channel, Highway and Fo Tan Train Station to the east, and a hillside, with residential development to the south.
- Existing Sewerage:** The village units presently dispose of sewage via septic tanks.
- Proposed Sewerage:** Gravity sewers are proposed at the northern and southern end of the village area. The gravity sewers will be connected to an existing main located along the road between the village and the Shing Mun River Channel. There is an existing sewer system and pumping station at the eastern end of the village.

No. 31: Ho Tung Lau Village (S15)**Village Details**

- Location:** Ho Tung Lau is located within Shatin, inland, in an area south of Tolo Harbour (E838935 N829293). The preliminary sewerage layout is shown drawing no. KDL/G/CE 18 94/PVSL-04.
- Development:** Ho Tung Lau consists of approximately 40 residential units dispersed in a sprawling manner.
- Access:** The nearest major road to this village is Tai Po Road. Access to the village is by footpath from Lok Lo Ha.
- Village Status:** Recognised
- Existing Environment:** The village is located north-west of the Shatin Racecourse, bordering the KCR railway. The village area contains agricultural land and ponds. There are minor watercourses located within the village; and a watercourse that borders the village to the south, across the KCR railway. The village has high noise levels due to the influence of Tolo Highway and the KCR.
- Cultural Resources:** None
- Surrounding Land Uses:** The village is bordered by green belt area to the north and east, the Tai Po Road, KCR and Shatin Race Course to the south, and Lok Lo Ha village to the west.
- Existing Sewerage:** The village units presently dispose of sewage via septic tanks.
- Proposed Sewerage:** Gravity foul sewers will be built flowing into an existing sewer in Lok Shun Path.

No. 32: Lok Lo Ha Village (S16)Village Details

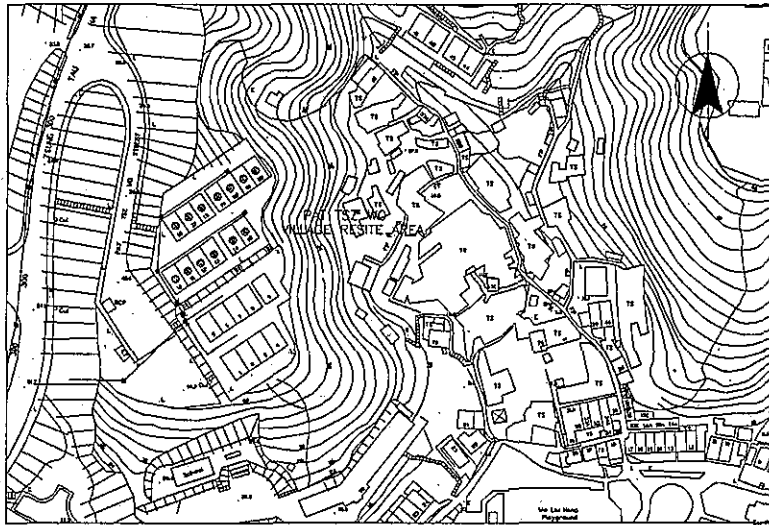
- Location:** Lok Lo Ha is located within Shatin, to the north east of Ho Tung Lau in an area south of Tolo Harbour (E838757 N829184). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-04.
- Development:** Lok Lo Ha consists of approximately 140 residential units that are dispersed along a hillside area.
- Access:** Access to the village is from Lok King Street, which then leads onto Lok Shun Path, where the road ends next to the village.
- Village Status:** Recognised
- Existing Environment:** The village is located west of Shatin Racecourse, bordering the KCR railway. The village comprises residences, agricultural plots and hillside areas with natural vegetation. There is a watercourse that runs through the middle of the village. The village has high noise levels due to the influence of Tolo Highway.
- Cultural Resources:** There is one Tsz Tong in the south area of the village amongst the village buildings - between units 26 and 37.
- Surrounding Land Uses:** The village is bordered by green belt area to the north and northeast, Ho Tung Lau village to the southwest, the Tai Po Road, KCR and Shatin Race Course to the west, a small greenbelt area and residential complex to the south and green belt area to the west.
- Existing Sewerage:** The village units presently dispose of sewage by septic tanks.
- Proposed Sewerage:** Gravity foul sewers will extend from the northernmost part of the village to Lok Shun Path through paved areas and will branch at Lok Shun Path. A pumping station will be built next to the car park area with a rising main extending just north of the bicycle path to an existing sewer located in Lok King Street.

No. 33: **Wo Liu Hang (S07)****Village Details**

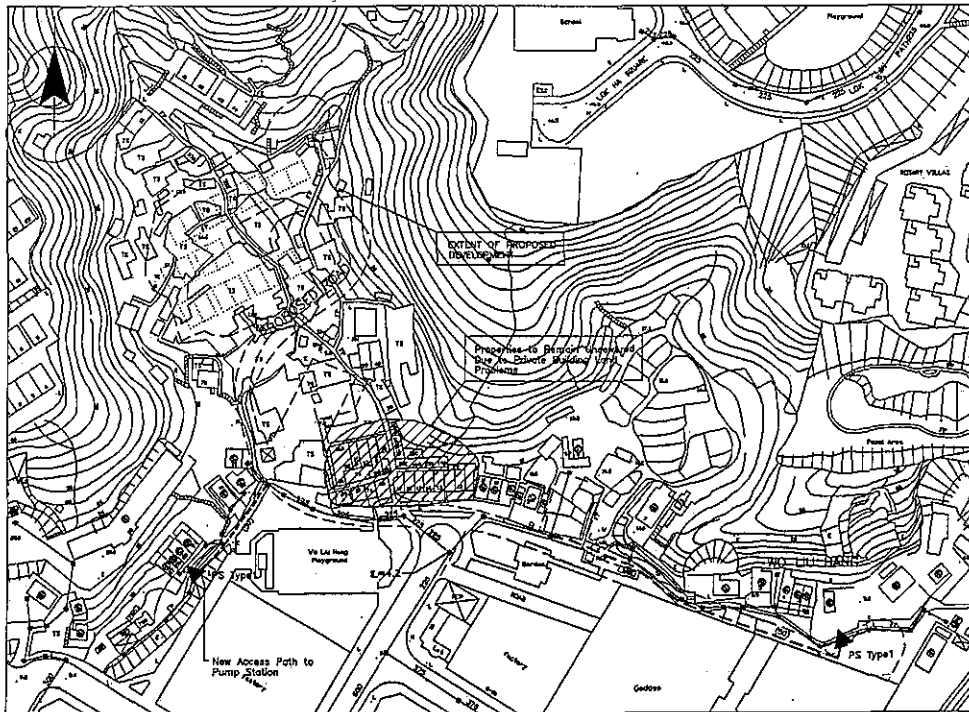
- Location:** Wo Liu Hang is located within Shatin, inland, in an area south of Tolo Harbour (E838379 N828822). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-07.
- Development:** Wo Liu Hang village consists of approximately 25 residential units that are spread out in a linear manner.
- Access:** Road access to the village is from either Lok King Street, Lok Lam Road or Tsung Tau Ha Road. Side roads lead into the village from these three roads.
- Village Status:** Recognised
- Existing Environment:** The village is located in a developed area west of the Shatin Racecourse. There is very little natural vegetation within the village and there are no streams or rivers traversing the site. Noise levels in the village range from moderate to high, due to its proximity to major highways and the railway.
- Cultural Resources:** There is one grave area situated to the north-west of the centre of the village on a hillside.
- Surrounding Land Uses:** Wo Liu Hang is directly west of the railway depot. It is bordered to the north by a strip of green belt area. To the south is an industrial park. To the east is the railway and to the west is Pat Tse Wo village.
- Existing Sewerage:** Unknown
- Proposed Sewerage:** Wo Liu Hang will be seweraged by gravity sewers with a connection to two pumping stations (Type 1) which will direct flows via pumping main.

No. 34: Pat Tsz Wo Village (S12)Village Details

- Location:** Pat Tsz Wo is located within Shatin, inland, in an area south-west of Tolo Harbour (E838214 N828871). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-07.
- Development:** Pat Tsz Wo is a village resite area that consists of approximately 22 residential units. There is a school located in the southern portion of the village.
- Access:** Road access to the village is by Tsung Tau Ha Road which branches into Pat Tsz Wo Street, leading into the western portion of the village or by Shek Lau Tung Street which leads to the south of the village.
- Village Status:** Recognised
- Existing Environment:** The village is located within hilly terrain. There are no streams or rivers traversing the site however there is a large nullah south of the village, approximately 150 m away. Noise levels in the village range from moderate to high, due to its proximity to major highways and the railway.
- Sanitation:** The sanitation within the village area is considered to be good.
- Cultural Resources:** None identified.
- Surrounding Land Uses:** Pat Tsz Wo is situated west of Wu Liu Hang village and Rosary Villas, south of residential development and east and north of factories.
- Existing Sewerage:** The village units presently dispose of sewage via septic tanks.
- Proposed Sewerage:** The village will be seweraged using gravity sewers which will connect to an existing gravity main located within Tsung Tau Ha Road.



PAT TSZ WO



WO LIU HANG

LEGEND

- Existing Foul Gravity Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Rodding Eye
- Proposed Pumping Main
- ▲ Proposed Pump Station
- - - Extant of Proposed Development
- Outline of Proposed Development (Taken from Sha Tin and North East District Planning Office Plan No. L/SI 43/18)
- ▨ Areas Where Land Resumption will be Required: Height-Accepted Width Required is Lesser of 1.5 Metres (2 metres at Manhole) or Distance Between Buildings.
- ▩ Recently Constructed Houses in Approximate Position
- ⊗ Properly to be Sewered under Stage I Phase II

NOTES

1. Map data reproduced with permission of the Director of Land (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

8/96	MAW	KPW			4	LAYOUT AMENDED FOLLOWING CONSULTATION WITH RESIDENTS. ALL EXISTING DESIGN SYMBOLS REMOVED.
2/96	MAW	KPW			3	LAYOUT AMENDED HOUSE CONNECTIONS REMOVED.
11/95	MAW	CHK			2	PROPOSED ROAD LAYOUT ALIGNED TO MATCH THAT SHOWN ON DEVELOPMENT AND APPROVED DIVISION APPROVED DESIGN DRAWING NO. DDY 3151A.
10/95	MAW	EL			1	DRAFT ISSUE.
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	SCALE	REVISION DESCRIPTION

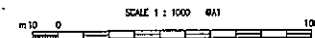
GOVERNMENT OF HONG KONG

Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

PRELIMINARY VILLAGE SEWERAGE LAYOUT
WO LIU HANG (S07) & PAT TSZ WO (S12)

	AGREEMENT NO. CE/18/04	SHEET 1 OF 1
	DRAWING NO. KLA/0/CE 18 04/PVSL/07	ISSUE 4

MONTGOMERY WATSON
 莫盛廣同工程師
 In association with
Mouchel Asia Limited Consulting Engineers



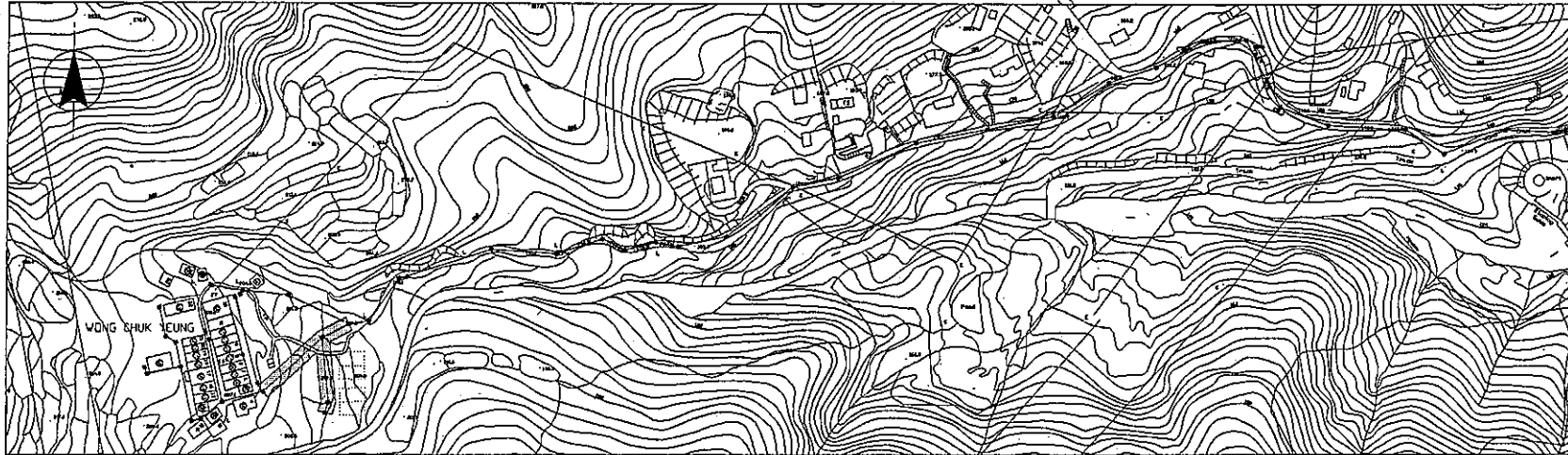
No. 35: Fo Tan Cottage Area (S06)Village Details

- Location:** Fo Tan Cottage Area is located within Shatin, inland, in an area southwest of Tolo Harbour (E837242 N828914). The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-05.
- Development:** The Fo Tan Cottage Area consists of approximately 62 residential units set out in a linear manner. The village housing units appear to have been constructed within the last 15 years. Most of the units are one to two stories in height. The majority of the village is owned by the Hong Kong Housing Authority.
- Access:** Road access to the village is from Wong Chuk Yeung Street which branches into Kwei Tei San Chuen Road which runs along the east side of the village.
- Village Status:** Unrecognised
- Existing Environment:** The village is situated on a rural hillside. There is a large watercourse that flows past the village on the south western boundary and a nullah approximately 210 m north of the village. The village is very quiet, aside from noise generated from new construction. There is a bus terminal located down hill of the village; however, noise from this area is not audible inside the village.
- Cultural Resources:** There is one large grave site to the north of the village, just outside the village boundary.
- Surrounding Land Uses:** Fo Tan Cottage Area is situated about 200m north of Sha Tin Bus Depot. To the north, south and west of the village, there are designated green belt areas. To the northeast there is the Kwai Tei New village.
- Existing Sewerage:** The village units presently dispose of sewage via septic tanks.
- Proposed Sewerage:** The village is already sewered by a gravity foul sewers along existing alleyways.

No. 36: Wong Chuk Yeung Village (S14)Village Details

- Location:** Wong Chuk Yeung is located in Shatin, inland and southwest of Tolo Harbour (E842755 N826744). The preliminary sewerage design is shown on drawing no. KDL/G/CE 18 94/PVSL-05.
- Development:** Wong Chuk Yeung consists of approximately 26 residential units located in a remote area west of Tolo Harbour. Most of village housing units are relatively old and are of one story with a few two storeys structures.
- Access:** Access to this village is via Wong Chuk Yeung Street which leads directly into the village.
- Village Status:** Recognised
- Existing Environment:** The village is situated in a very rural area. High voltage powerlines cross the village to the west of the site and there is a large watercourse that flows past the village to the south. The noise levels in and around the village are very low.
- Cultural Resources:** There is one Tsz Tong located in the centre of the village, between units 8 and 9.
- Surrounding Land Uses:** Wong Chuk Yeung is situated within a rural open space area. There are a few small farm plots surrounding the village.
- Existing Sewerage:** None
- Proposed Sewerage:** Gravity foul sewers will be built to carry the village sewerage to a gravity main traversing Wong Chuk Yeung Tsuen path and Wong Chuk Yeung Tsuen Street.

SEE BELOW
LHS FOR
CONTINUATION



WONG CHUK YEUNG

LEGEND

- Existing Foul Gravity Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Rodding Eye
- Proposed Pumping Main
- ▲ Proposed Pump Station
- - - Extent of Proposed Development

Outline of Proposed Development

Area Where Land Resumption Will Be Required. Note:- Actual Width Required is Lesser of 1.5 Metres (2 metres at Manhole) or Distance between Buildings.

Recently Constructed Houses in Approximate Position

Property to be Sewered under Stage I Phase II

NOTES

1. Map data reproduced with permission of the Director of Land, (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

8/96	MAW	KPW		4	JOBNEY YARD CONNECTION REMOVED LAYOUT AMENDED FOLLOWING COMMENTS MADE BY VILLAGE REPRESENTATIVE	
2/96	MAW	KPW		3	LAYOUT AMENDED HOUSE CONNECTIONS REMOVED	
11/95	MAW	KPW		2	EXISTING SEWERAGE SYSTEM FOR FO TAN COTTAGE AREA (TAKEN FROM HOUSE DEPARTMENT'S RECORDS)	
10/95	MAW	EL		1	DRAFT ISSUE	
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE	REVISION DESCRIPTION

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

PRELIMINARY VILLAGE SEWERAGE LAYOUT
WONG CHUK YEUNG (S14)
AND FO TAN COTTAGE AREA (S06)

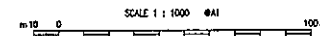
AGREEMENT NO. CE/16/94	SHEET 1 OF 1
DRAWING NO. KCL/A/CE 10 S4/PWSL_05	ISSUE 4

MONTGOMERY WATSON
蒙格馬利工程師
In association with
Mouchel Asia Limited Consulting Engineers



FO TAN COTTAGE AREA

SEE ABOVE
RHS FOR
CONTINUATION

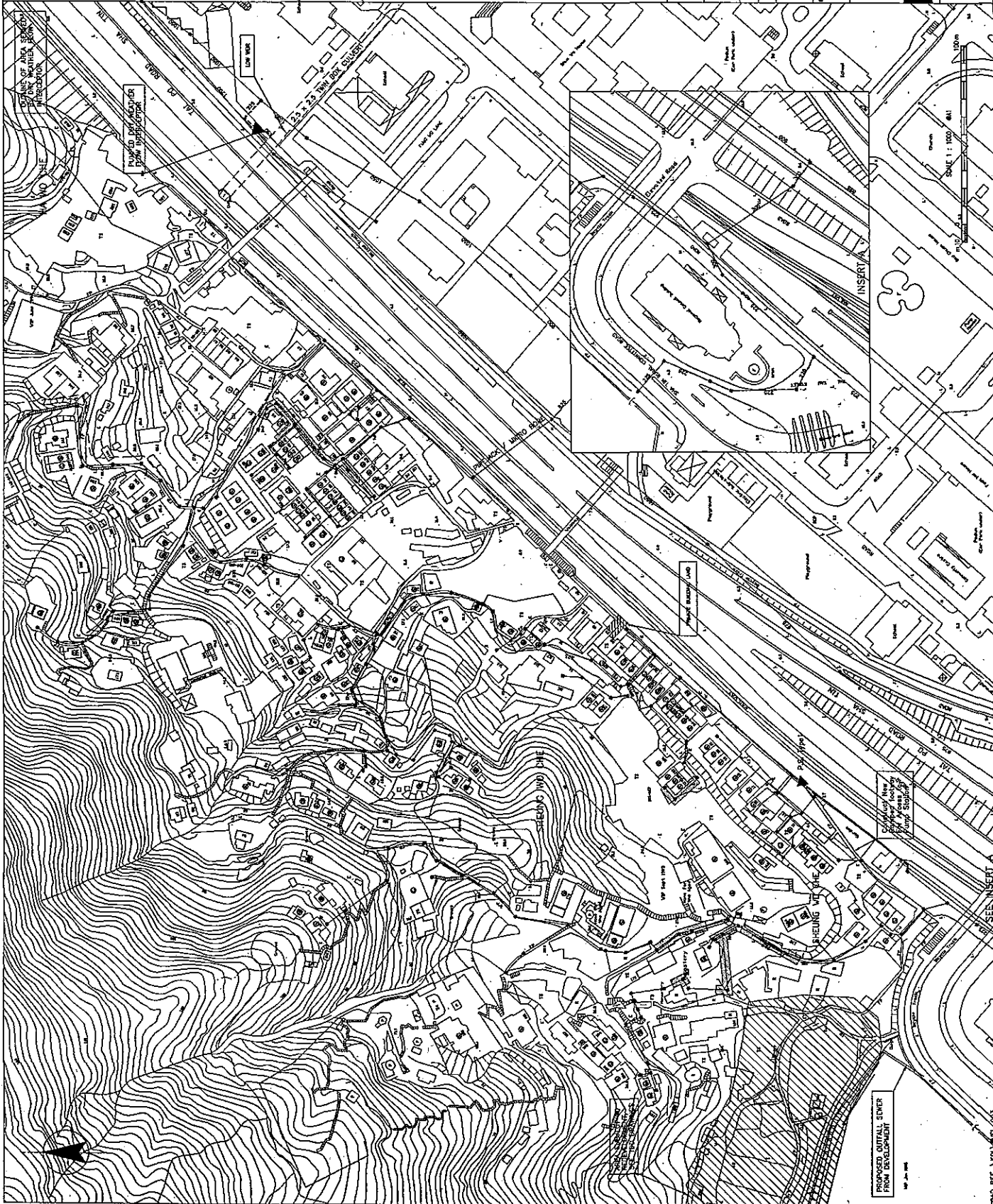


No. 37: Ha Wo Che VillageVillage Details

- Location:** Ha Wo Che is located within Shatin, inland and south west of Tolo Harbour (E837858 N827913). The preliminary sewage design is shown on drawing no. KDL/G/CE 18 94/PVSL-09.
- Development:** Ha Wo Che consists of approximately 65 residential units located in a residential/commercial area, north of the Shing Mun River Channel. The village contains both older and new houses. The village has been developed in a sprawling manner, extending up a hillside.
- Access:** The closest road to the village is Shi Wo Road.
- Village Status:** Recognised
- Existing Environment:** The village is situated within a residential/commercial area. There are two rivers that run through the village which join in the middle of the village, flowing towards the Shing Mun River Channel. The background noise levels within the village are mostly low.
- Cultural Resources:** There are three large grave sites, all near the centre of the village and within the village boundary.
- Surrounding Land Uses:** Ha Wo Che is situated in a residential/commercial area. There are residential units to the north (Scenery Garden), the east (Wing Hong House and Sui Wo Court) and the south west (Sheung Wo Che village). There is open space to the north west.
- Existing Sewerage:** The village units presently dispose of sewage via septic tanks.
- Proposed Sewerage:** The village will be sewered by a gravity sewers which will travel below Tai Po Road to a dry weather flow interceptor.

No. 38: Sheung Wo Che Village (S13)**Village Details**

- Location:** Sheung Wo Che is located in Shatin south west and inland of Tolo Harbour (E837 654 N827 612). The preliminary sewerage layouts are shown on KDL/G/CE 18 94/PVSL-09.
- Development:** Sheung Wo Che contains over 100 residential units located within a residential/commercial area, north of the Shing Mun River Channel. The village has been developed in a sprawling manner along a hillside.
- Access:** Access to the village is possible from Fung Wo Lane and Sui Wo Road.
- Village Status:** Recognised
- Existing Environment:** The village is situated within a residential/commercial area. There are three rivers that run through the village, two on the southwest and one in the north east, which flow towards the Shing Mun River Channel. The background noise levels within the village are moderate with noise levels increasing at the units closest to Tai Po Road and the railway.
- Sanitation:** The sanitation level within the village is considered to be poor.
- Cultural Resources:** There are five large grave sites, located within the village boundary, two shrines located in the northern area of the village, and one Tsz Tong situated in the centre of the village amongst the village buildings (between units 35 and 37).
- Surrounding Land Uses:** Sheung Wo Che is situated within a commercial/residential area. There is a village to the north (Ha Wo Che), residential units to the south, the railway and Tai Po Road to the east and rural undeveloped land to the west.
- Existing Sewerage:** The village units presently dispose of sewage by septic tank.
- Proposed Sewerage:** A pumping station will be installed in the central southern portion of the village to which the village gravity sewers will discharge. A rising main will extend from the pumping station and travel to the west along the roadway.



LEGEND

- Existing Four County Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Four County Sewer
- Proposed Manhole
- Proposed Rooding Eye
- Proposed Pumping Inlet
- Proposed Pump Station
- Extent of Proposed Development
- Outline of Proposed Development
- Open from Site Plan and North
- Open from Surveying Office Plan
- No. 1/57 117/9
- Areas Where Local Reservations will
- Be Required. Note - Actual Width
- Required is 1.5m of 1.5 Metres
- Distance between Buildings.
- Recently Constructed Houses in
- Approximate Position
- Property to be Sewered under.
- Stage 1 Phase II

NOTES

1. Maps sets accompanied with permission of the Government of Hong Kong
2. All streets to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

2/76	MAY	KPW	3	WORKS DRAWING FOR THE VILLAGE RESERVATION
2/98	MAY	KPW	2	LAYOUT ADJUSTED LAYOUT CONNECTIONS REVISED
10/93	MAY	EL	1	DRAFT ISSUE
DATE	DESIGNED BY	CHECKED BY	APPROVED BY	WORKS DESCRIPTION

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

PRELIMINARY VILLAGE SEWERAGE LAYOUT
 SHEUNG WO CHE (S13)
 HA WO CHE (S02)

PROJECT NO. EC/19/76	SHEET 1 OF 1
DRAWING NO. REL/1/12 IS H/W/1/2/30	ISSUE 3
MONTGOMERY WATSON 莫高美洋行	
Mouchel Asia Limited Consulting Engineers	



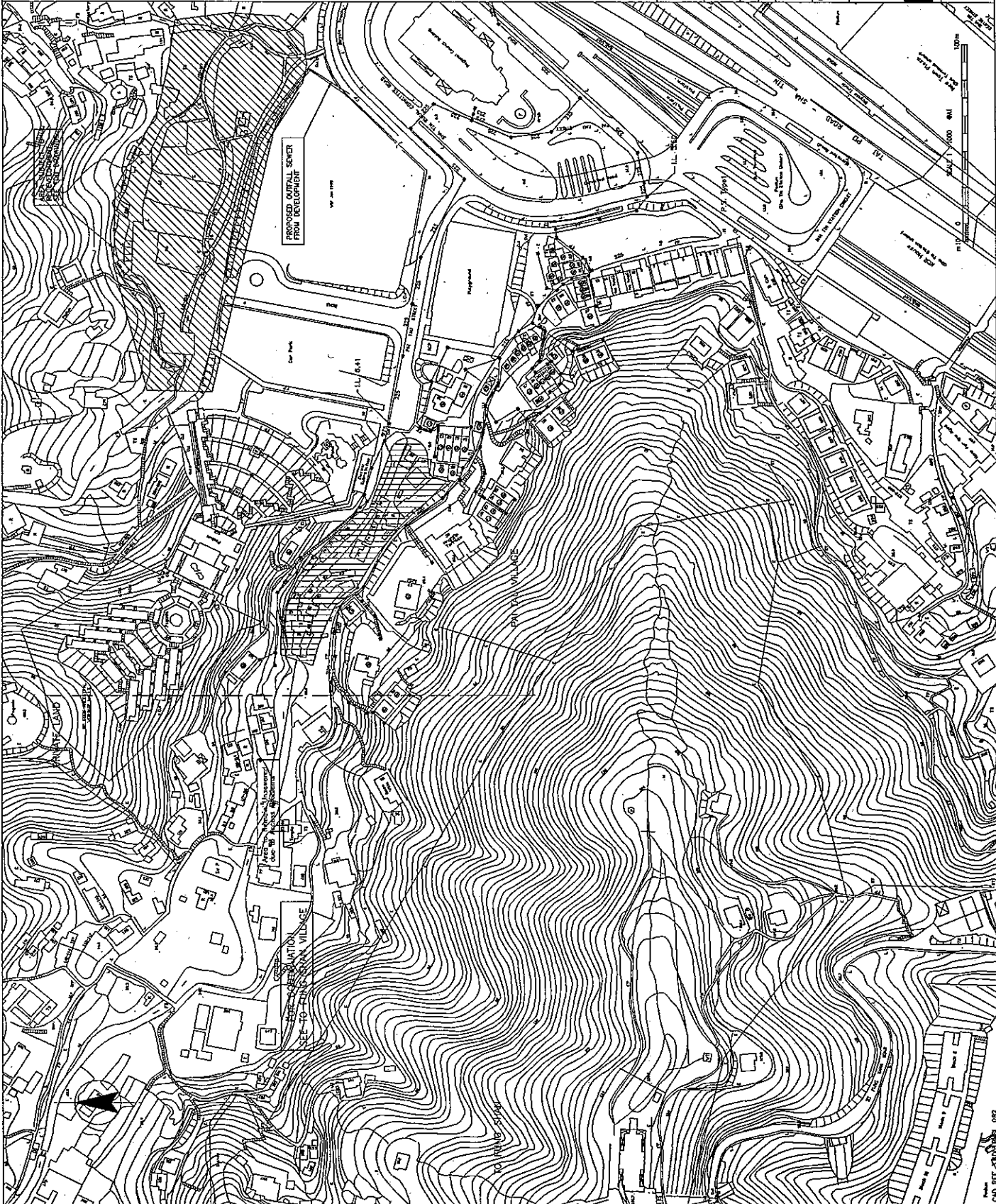
SCALE 1:1000

No. 39 : To Fung Shan Village (S10)Village Details

- Location:** To Fung Shan is located in Shatin, inland of Tolo Harbour. The preliminary sewerage layout is shown on drawing on. KDL/G/CE 18 94/PVSL-06.
- Development:** The village is of medium size and contains residential units as well as the ten thousand buddahas monastery.
- Access:** Access to the village is provided by To Fung Shan Road which also provides access to the neighbouring Pristine Villa residential complex. Within the village there are a concrete pathways that provides access to the individual units.
- Village Status:** Unrecognised
- Existing Environment:** The village is situated in an elevated location in a rural area that contains very little development. There are no prominent watercourses within the village boundary. The village contains hilly terrain. The noise levels within the village are very low.
- Cultural Resources:** There are no cultural resources in the village area.
- Surrounding Land Uses:** To Fung Shan is surrounded by a Green Belt area. The residential complex of Pristine Villa is located southeast of the village.
- Existing Sewerage:** The village units presently dispose of foul waste via septic tanks.
- Proposed Sewerage:** Gravity sewers will be built which will connect with sewers from Fai Tau Village.

No. 40 : Pai Tau Village (S09)Village Details

- Location:** Pai Tau is located in Shatin, north east of Tai Po Road. The preliminary sewerage design is shown on drawing no. KDL/G/CE 18 94/PVSL-08.
- Development:** The village contains about 200 housing units over a large area.
- Access:** Access to the village is by Pai Tou Street off Sha Tin Rural Committee Road.
- Village Status:** Recognised
- Existing Environment:** The village is surrounded by a Green Belt area, with the lower village area boarded by Pai Tau village to the west and the Po Fook. There is an Ancestral Workshop Hall and recent development to the northeast.
- Cultural Resources:** There are three Tsz Tongs and one temple within the village, situated in the south of the village amongst the village buildings. There are several shrines, amongst village buildings. Also there are grave areas, north of Pai Tau on higher ground.
- Surrounding Land Uses:** The surrounding area is primarily rural, open space. The village is bordered by Tai Po Road with Shatin to the south east.
- Existing Sewerage:** The village units presently dispose of sewage via septic tank.
- Proposed Sewerage:** There is an existing sewer main in Shatin Rural Committee Road. The village sewers will discharge into this main via gravity sewers.



LEGEND

- Existing Foul Gravity Sewer
- Existing Manhole
- Existing Raising Work
- Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Raising Work
- Proposed Pumping Station
- Outlet of Proposed Development
- Outline of Proposed Development
- Area Where Land Reclamation will be Required in Excess of 1.5 Metres (2 metres at Member's Discretion between Buildings)
- Recently Constructed Houses in Approximate Position
- Property to be Sewered under Slope 1 Plans II

NOTES

1. Map data reproduced with permission of the Director of Land (S) Hong Kong.
2. All areas to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

9/74	MAW	KPH	3	PRELIMINARY VILLAGE SEWERAGE LAYOUT (PHASE II) VALUE REVISIONS
2/76	MAW	KPH	2	LAYOUT ADDED HOUSE CONNECTIONS
10/75	MAW	EL	1	DRAFT ISSUE
	REVISION	DATE	APPROVED	REVISION DESCRIPTION

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

PRELIMINARY VILLAGE SEWERAGE LAYOUT
 PAI TAU (\$09)

	AUTHORITATIVE NO. SE/74/74 DRAWING NO. HS/4/02 IS HS/4/02	SHEET 1 OF 1 ISSUE 2
MONTGOMERY WATSON 莫高利工程顧問有限公司 In association with Mouchel Asia Limited Consulting Engineers		

No. 41 : Tung Lo Wan Village and Village Extension (S11)**Village Details**

- Location:** Tung Lo Wan is located in Shatin, south west of Tolo Harbour. The preliminary sewerage layout is shown on drawing no. KDL/G/CE.18 94/PVSL-11.
- Development:** Tung Lo Wan village consists of two developed areas. The northern village extension is comprised of approximately 60 units and the southern village contains approximately 100 units.
- Access:** Access to the village is via Tung Lo Wan Road.
- Village Status:** Recognised
- Existing Environment:** The area consists of hilly terrain. North of the village there is little development and abandoned structures. There are no water courses that run through the site however there is a stream on the western border of the site. Noise levels within the village are generally low.
- Cultural Resources:** There is one Tsz Tong in Tung Lo Wan South building between units 72 and 74, and one grave area to the east of the village.
- Surrounding Land Uses:** At the village extension, there is a pond area within a disused quarry to the west, open space area to the north and south and the Salvation Army Bradbury House of Loving Kindness (Home for the Aged) to the east. At the southern village, surrounding land uses include residential units to the north east, Government offices to the north, hillside to the west and Chung Ling Road and Shing Mun Tunnel Road to the south.
- Existing Sewerage:** The village units presently dispose of sewage via septic tanks.
- Proposed Sewerage:** Gravity sewers will also be installed from Tung Lo Wan Village and Tung Lo Wan Village Extension.



LEGEND

- Existing Foul Gravity Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Rooding Eye
- Proposed Pumping Main
- Proposed Pump Station
- Extent of Proposed Development
- Outline of Proposed Development
- Call from Planning Office File No. 1/31/33/23
- Areas Where Land Reservation will Be Required: Motor - Approx. Width (2 meters at boundary) or distance between buildings.
- Recently Constructed Houses in Approximate Position
- Property to be Sewered under Stage I Phase II

NOTES

1. Map scale reproduced with permission of the Director of Land. (S) Hong Kong.
2. All sewers to be 150mm diameter unless indicated otherwise.



NOT FOR CONSTRUCTION

2/7/95	MAN	1/20	3	LAYOUT AMENDED. PUMP STATION REMOVED.
2/7/95	MAN	1/20	2	LAYOUT AMENDED. HOUSE CONNECTIONS REMOVED.
10/7/95	MAN	EL	1	DRAFT ISSUE.
DATE	DESIGNED BY	CHECKED BY	APPROVED BY	REVISION DESCRIPTION

GOVERNMENT OF HONG KONG

Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

PRELIMINARY VILLAGE SEWAGE LAYOUT
TUNG LO WAN AND
TUNG LO WAN VILLAGE EXTENSION (S11)


 AGREEMENT NO. CE/18/94 SHEET 1 OF 1
 DRAWING NO. SD/2/95/19 34/PROJ.11 ISSUE 3

MONTGOMERY WATSON
 香港測量師學會
 HONG KONG SURVEYORS' SOCIETY
 Mouchel Asia Limited Consulting Engineers

No. 42 : Tai Lam Liu Village (S01)

No. 43 : Shek Kwu Lung Village (S18)

No. 44 : Wong Nai Tau Village (S21)

Village Details

- Location:** The three villages are located in Shatin inland from the south western edge of Tolo Harbour. The preliminary sewage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-02.
- Development:** The villages are small and contain 51, 26 and 53 housing units, respectively. Tai Lam Liu and Shek Kwu Lung Villages are in close proximity to each other and form generally one village development. Wong Nai Tau is located south of Tai Lam Liu.
- Access:** Access to Tai Lam Liu, Shek Kwu Lung and Wong Nai Tau is provided by Siu Lek Yuen road. Within the villages there are roadways and concrete pathways that provide access to the individual units.
- Village Status:** Recognised
- Existing Environment:** The villages are situated in a rural area that contains very little development. There is a watercourse which runs south of Tai Lam Liu and north of Wong Nai Tau. There are farming areas within the village area. The noise levels within the village are very low and there are no external noise sources with the exception of Wong Nai Tau which is near a bus terminus.
- Cultural Resources:** There are several Tsz Tongs located in the villages.
- Surrounding Land Uses:** The villages are surrounded by a Green Belt, with a small residential and commercial complex to the south west.
- Existing Sewerage:** The villages presently dispose of foul waste by septic tanks.
- Proposed Sewerage:** There is an existing main located within Siu Lek Yuen Road. The village sewerage will connect to a gravity main extending from Tai Lam Liu to the existing main in Siu Lek Yuen.

LEGEND

- Existing foul gravity sewer
- Existing manhole
- Existing rising main
- Existing sewer to be abandoned
- Proposed foul sewer
- Proposed manhole
- Proposed flooding eye
- Proposed pumping main
- Proposed pump station
- Extent of Proposed Development (taken from Site In and North Map No. 1/21 (33) (A))
- Approximate Position
- Property to be Sewered under Stage 1 Phase II

NOTES




1. All points marked with identification of the position of Lines, (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

8/98	MAF	RPW	3	LAYOUT AMENDED FOLLOWING COMMENTS MADE BY THE A/E
2/96	MAF	RPW	2	LAYOUT AMENDED FOLLOWING COMMENTS MADE BY THE A/E
10/93	MAF	EL	1	DRAFT ISSUE
DATE	DESIGNED BY	CHECKED BY	APPROVED BY	REVISION DESCRIPTION

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

PRELIMINARY VILLAGE SEWERAGE LAYOUTS
 TAI LAN LIU (S1), SHEK KIU LUNG (S18)
 AND WONG NAI TAU (S21)


 REGISTRATION NO. CE/10784 SHEET 1 OF 1

 DRAWING NO. WJL/01/02 18 84/P/01/02 ISSUE 3
MONTGOMERY WATSON
 莫高美 莫高美 莫高美
 In association with

Mouchel Asia Limited Consulting Engineers



No. 45: Fa Sam Hang Village (S17)

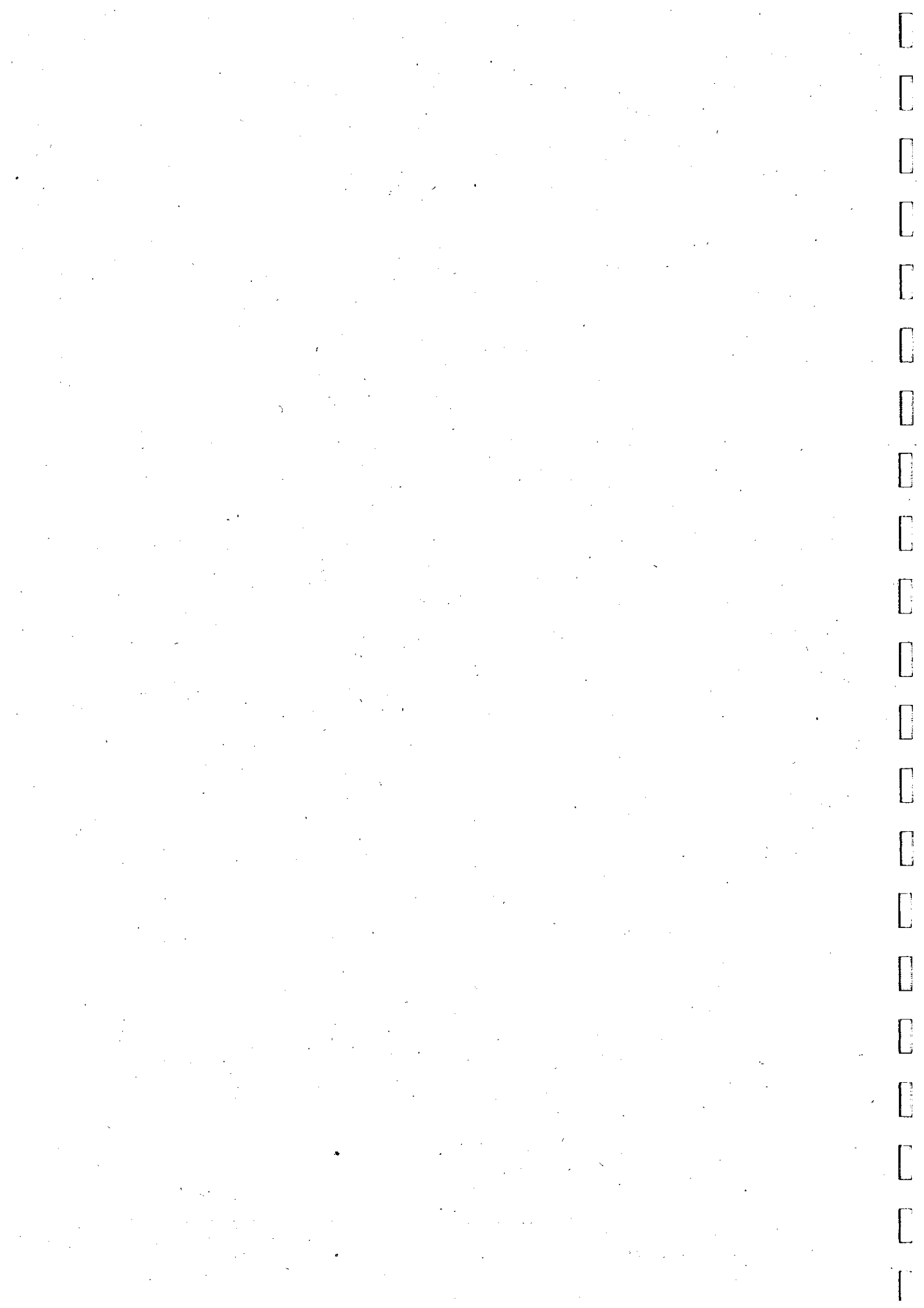
No. 46: Tai Shui Hang Village (S04)

Village Details

- Location:** Fa Sam Hang and Tai Shui Hang Villages are located within Ma On Shan inland and south of Tolo Harbour (E841171 N829669). The preliminary design is shown on drawing no. KDL/G/CE 18 94/PVSL-03.
- Development:** Tai Shui Hang consists of approximately 42 residential units comprised of newer (1980's) and older structures. The village is divided by a large watercourse with a bridge connecting the two parts. Fa Sam Hang is comprised of 10 housing units.
- Access:** Road access to the Tai Shui Hang Village is from Hang Tak Street. This branches onto a road that leads eastward to the north of the village. The village road joins to this road approximately 100 m from Hang Tak Street. Access to Fa Sam Hang Village is by private access road.
- Village Status:** Recognised
- Existing Environment:** The Tai Shui Hang Village is situated in a rural valley, between two mountains. The village follows the Tai Po Mei Han river. There is a watercourse that runs through the village. There is a bus terminal and highway nearby; however, there is surprisingly little noise within the village. Fa Sam Hang Village is in a remote area surrounded by agriculture land.
- Cultural Resources:** There is one Tsz Tong located in the centre of the Tai Shui Hang Village, two shrines inside the village boundary, and one shrine outside the village boundary to the south, between units 90 and 20.
- Surrounding Land Uses:** Tai Shui Hang Village is bordered by Chevalier Garden to the south, a school to the west, rural countryside to the east and Ma On Shan Road to the north.
- Existing Sewerage:** The village units presently dispose of sewage via septic tanks.
- Proposed Sewerage:** Gravity village sewers will be built along footpaths and alleyways within the village of Tai Shui Hang. Fa Sam Hang Village will not be sewerred under this project.

No. 47: Cheung Kang Village (S19)Village Details

- Location:** Cheung Kang is located within Ma On Shan, along the southern coast of Tolo Harbour (E842446 N832210). The preliminary sewage design is shown on drawing no. KDL/G/CE 18 94/PVSL-01. The District Planning Office Layout Plan No. L/ST 110/3 indicate that the village will be resited to the northwest of the site.
- Development:** Cheung Kang consists old style houses. Many of the structures in the village area are abandoned. The occupied portion of the village is situated in the western area of the site.
- Access:** The nearest road to this village is Sai Sha Road, in front of Villa Athena. From here, access is by footpath only. Footpath access is also possible from Lok Wo Sha and Wu Kwai Sha New Village.
- Village Status:** Unrecognised
- Existing Environment:** The village is situated on the shore of Tolo Harbour and there are two jetties that serve the village. The village contains both fallow and active agricultural land and is surrounded by planted trees. There are no watercourses that run through the village. The village has high noise levels due to outdoor activities at the adjacent Wu Kai Sha Youth Camp.
- Cultural Resources:** None
- Surrounding Land Uses:** The village is bordered by Tolo Harbour to the north and west and the Wu Kai Sha Youth Village to the south and east.
- Existing Sewerage:** The village units presently dispose of sewage via septic tanks.
- Proposed Sewerage:** Due to the small population in the existing village, it is recommended to leave this village unsewered.



No. 48: Wu Kwai Sha New Village (S03)**Village Details**

- Location:** Wu Kwai Sha New Village is located within Ma On Shan, inland and south of Tolo Harbour. The village is situated next to the Wu Kai Sha Youth Camp. The sewage alignment is shown on preliminary drawing no. KDL/G/CE 18 94/PVSL-01.
- Development:** Wu Kwai Sha New Village consists of approximately 80 residential units that are comprised of houses built approximately 10 to 20 years ago. The housing units are two and three stories in size and are organised in a box pattern. A playground and community office are situated in the centre of the village.
- Access:** Road access is from Sai Sha Road, which has a short branch leading directly to the village.
- Village Status:** Unknown
- Existing Environment:** The village is located near Tolo Harbour, south of the Wu Kai Sha Camp. The village area is mostly developed and there is very little vegetation within the village boundary. There are no watercourses that run through the village, however a watercourse which flows into Tolo Harbour is located north of the village. The village has high noise levels due to outdoor activities carried out at the adjacent Wu Kai Sha Youth Camp.
- Cultural Resources:** There is one shrine located on the north-east edge of the village development.
- Surrounding Land Uses:** The village is bordered by Wu Kai Sha Camp to the north and east, Sai Sha Road and Kam Lung Court to the south and Lok Wo Sha to the east.
- Existing Sewerage:** Unknown
- Proposed Sewerage:** A proposed gravity sewer will be built from On Chiu Street along the roadway bordering the Wu Kai Sha Youth Village through Wu Kai Sha New Village to a pumping station located at the edge of Lok Wo Sha.

No. 49: Lok Wo Sha Village (S22)Village Details

- Location:** Lok Wo Sha is located within Ma On Sha, inland, in an area south of Tolo Harbour. The preliminary sewerage layout is shown on drawing no. KDL/G/CE 18 94/PVSL-01.
- Development:** Lok Wo Sha consists approximately 45 residential units built within the last twenty years. The housing units are mostly three story and are organised in a box line pattern.
- Access:** Road access to the village is from Sai Sha Road, through Wu Kwai Sha New Village.
- Village Status:** Unknown
- Existing Environment:** The village is located near Tolo Harbour, east of the Wu Kai Sha Camp. The village area is mostly developed and there is very little vegetation. There is a watercourse that borders the village to the west, and discharges into Tolo Harbour. The village has moderate background noise levels and is influenced by the outdoor activities at the adjacent Wu Kai Sha Youth Camp and Sai Sha Road. There are two mature Banyan Trees on the western side of the village, behind two shrines, that are outside the village limits.
- Cultural Resources:** There is an area containing two shrines accompanied by some mature camphor trees. This area is situated to the north-east of the village.
- Surrounding Land Uses:** The village is bordered by agriculture land to the north, Sai Sha Road and Lee On Estate to the south Wu Kai Sha Camp to the east and Wu Kwai Sha New village to the west.
- Existing Sewerage:** Unknown
- Proposed Sewerage:** Lok Wo Sha will be seweraged by gravity sewers. The sewage will be discharged to a pumping station to be located on the north west corner of the village. The pumping station will pump the sewage via a rising main along an existing footpath leading to an existing sewer located in a roadway south of the Wu Kai Sha Youth Village.

LEGEND

- Existing foul Gravity Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Rooding Eye
- Proposed Pumping Main
- Proposed Pump Station
- Extent of Proposed Development
- Outline of Proposed Development Taken from Site Plan and North East District Planning Office Plan No. NS/P/11/74
- Areas Where Land is Available for Sewerage Works (All Areas are subject to the approval of the Planning Department)
- Recently Constructed Houses in Approachable Position
- Property to be Sewered under Slope 1 Phase II

NOTES


1. Map data prepared by members of the Government Land (G) from Hong Kong.
2. All sewer to be 150mm diameter unless indicated otherwise.


NOT FOR CONSTRUCTION

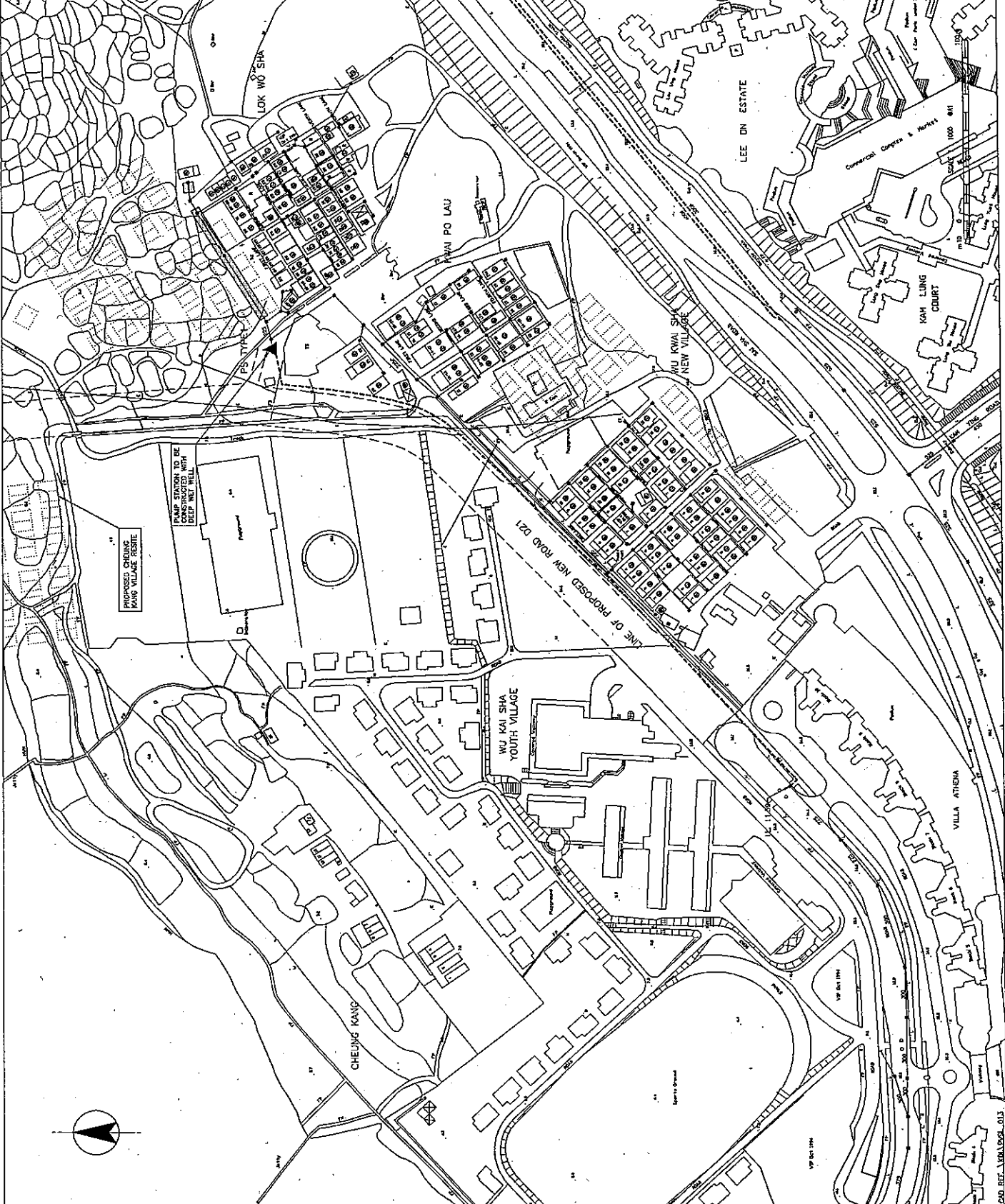
8/98	MAW	KPM	3	LAYOUT AMENDED COMMENTS MADE BY SURVEY
2/98	MAW	KPM	2	LAYOUT AMENDED COMMENTS MADE BY SURVEY
10/95	MAW	EL	1	DRAFT ISSUE
DATE	DESIGNED	CHECKED	APPROVED	REVISION DESCRIPTION

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

PRELIMINARY VILLAGE SEWERAGE LAYOUT
 CHEUNG KANG (S19), LOK WO SHA (S22)
 AND WU KWAI SHA NEW VILLAGE (S03)


 PROJECT NO. EC/18/74
 DRAWING NO. DS/ACE/S/19/01/01
 SHEET 1 OF 1
 ISSUE 3


MONTGOMERY WATSON
 莫高美顧問工程師
 Mouchel Asia Limited Consulting Engineers



No. 50: Proposed Main Sewer from Hong Lok Yuen to Existing Sewer at Shui Wai**Village Details****Service Area:**

The proposed Main Sewer will service Hong Lok Yuen. The development of Hong Lok Yuen presently has its own sewage treatment plant within the site boundary.

Main Sewer Characteristics:

The Proposed Main Sewer will consist of a gravity main sewer that will traverse from the existing outfall sewer from Hong Lok Yuen development to a type 2 pumping station at the intersection of Hong Lok Yuen Road and Tai Po Road and a rising sewer will be located under the eastern shoulder of Tai Po Road - Tai Wo to Shui Wai Road. The majority of the pipe line will be 375 mm in diameter. The trench width that would likely be required will be about 1.05 m. The rising main sewer is shown on the preliminary design drawings KDL/G/CE 18 94/MS-01 and 02.

No. 51: Sam Mun Tsai Road Proposed Main Sewer**Service Area:**

The Sam Mun Tsai Road Main Sewer will service the villages of Sam Mun Tsai New Village, Yim Tin Tsai (Luen Yick) and the Home for the Aged.

Main Sewer Characteristics:

The Proposed Main Sewer will consist of a gravity main sewer that will be built from the turning circle at the eastern end of Sam Mun Tsai Road and travel in a westerly direction along the roadway, picking up the connection from the Home for the Aged, then connect into the existing foul sewer in Yu On Street. The main sewer will be 1,156 m long. The majority of the pipe line will be 300 mm in diameter. The trench width that will likely be required would be approximately 0.8 m. The Main Sewer is shown on the preliminary design drawings KDL/G/CE 18 94/MS-03, 04 and 05.

No. 52: Tung Tsz Road Proposed Main Sewer**Service Area:**

The Main Sewer will service the Scout Training Centre and A Shan San Tseng Tau, Tung Tsz, Tsui Lam, the Unnamed TDD Development and Wai Ha Villages.

Main Sewer Characteristics:

The head of the proposed main sewer will be just to the south of the Scout Training Centre. From here it will travel south easterly down Tung Tsz Road, pick up the outfalls from A Shan Tseng Tau/Tung Tsz, Tsui Lam, and the unnamed TDD development, before reaching Wai Ha and the majority of San Tau Kok. The sewer will then discharge into TDD's Ting Kok Road trunk sewer.

The main sewer will be about 1,379 m in length. The sewer will likely require an average trench width of 0.8 m. The main sewer is shown on the preliminary design drawings KDL/G/CE 18 94/MS-06, 07 & 08.

No. 53: Ting Kok Road at Tai Mei Tuk Proposed Sewer Extension**Village Details**

Service Area: The main sewer will service Tai Mei Tuk and Wong Chuk Tsuen.

Main Sewer Characteristics: The sewer will be constructed along the road fronting Wong Chuk Tsuen from the east of the village to the proposed TDD pumping station at the west side of the village.

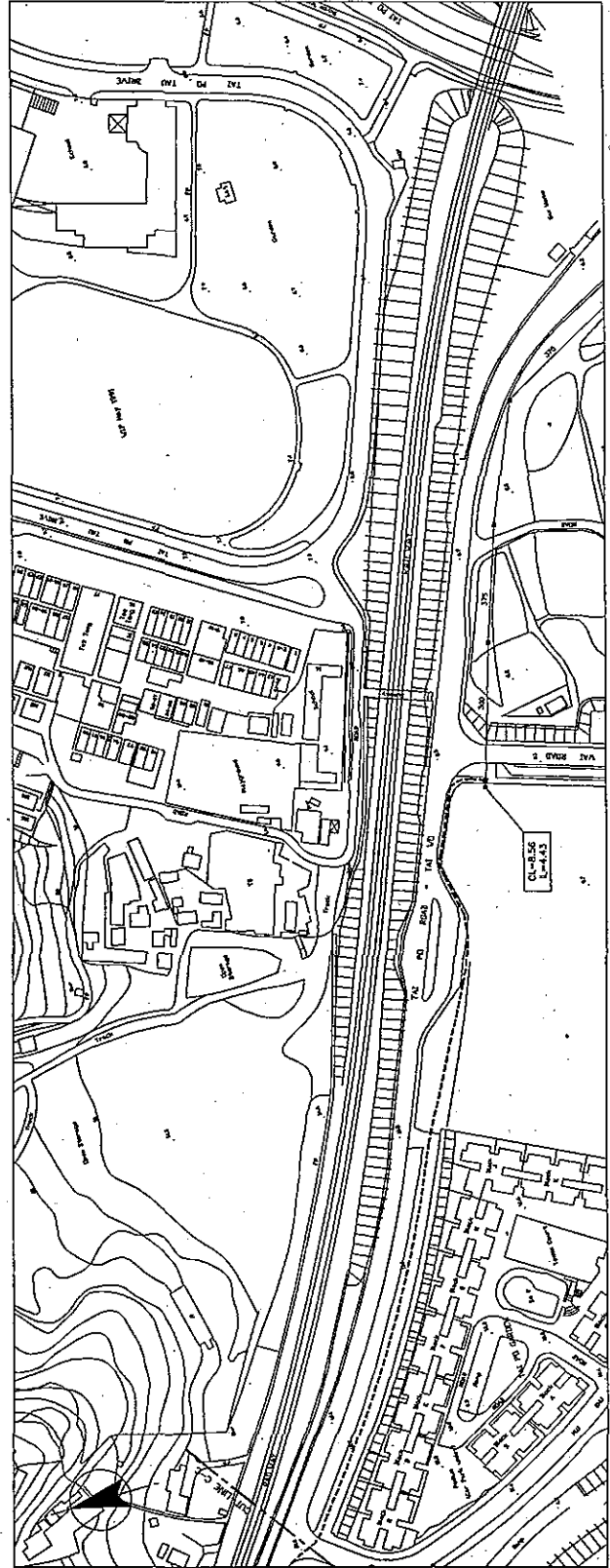
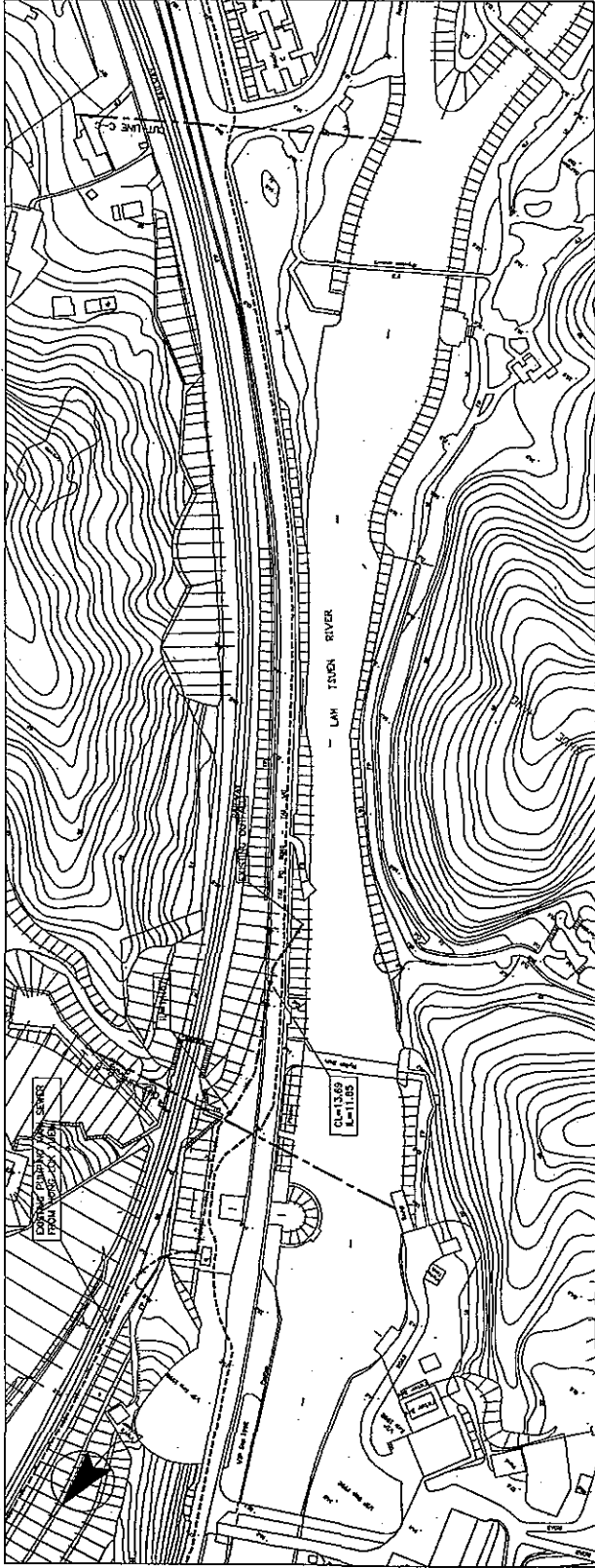
The main gravity sewer will be 331 m long and will vary from 2.95 to 4.7 m below ground level. The pipeline will be 300 mm in diameter and will require a trench width of 0.8 m. The main sewer is shown on the preliminary design drawing no. KDL/G/CE 18 94/MS-09.

No. 54: Cheung Shue Tan to Existing Sewer in Campus Circuit North Road Proposed Pumping Main

Service Area: Tai Po Mei Chek Nai Ping, Cheung Shue Tan.

Main Sewer Characteristics: The pumping main will start at a new pumping station on the southern side of the disused railway embankment. The combined flows from all the villages in the area will then be pumped to an existing gravity main.

The pumping main will be approximately 1,000m long and will be 225mm in diameter. The required trench width for the pipe will be roughly 0.75m. The main sewer is shown on the preliminary design drawing no. KDL/G/CE 18 94/MS-10.



LEGEND

- Existing foul gravity sewer
- Existing handhole
- Existing rising main
- Existing sewer to be abandoned
- Proposed foul sewer
- Proposed handhole
- Proposed flooding eye
- Proposed pumping main
- Proposed pump station
- Proposed sewer by 100
- Proposed pumping main by 100
- Extent of Proposed Development
- Outline of Proposed Development

Areas where Land Development is required to be sewer of 1.5 Metres (5 feet) minimum depth. Buildings, etc. are shown in black. Approximate Position

NOTES

1. Map data reproduced with permission of the Director of Land (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.
3. Levels shown in brackets (13.65) are interpolated.

NOT FOR CONSTRUCTION

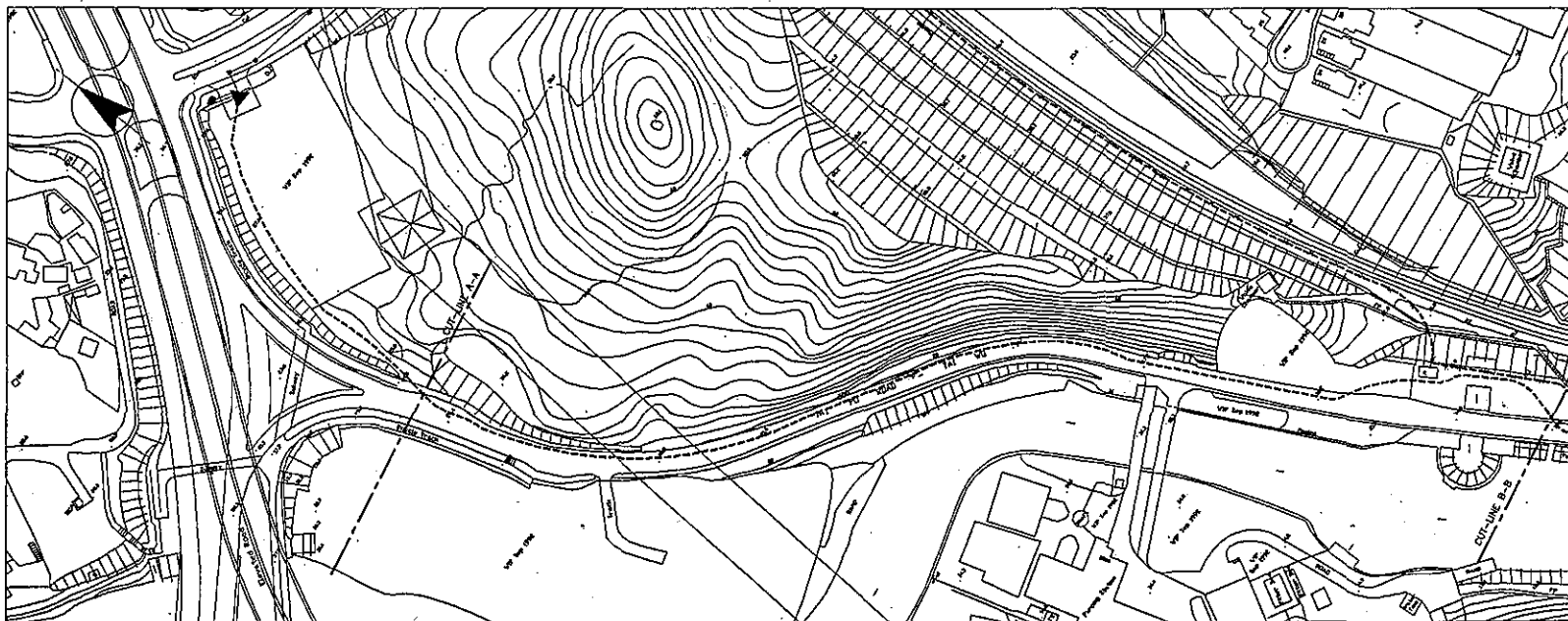
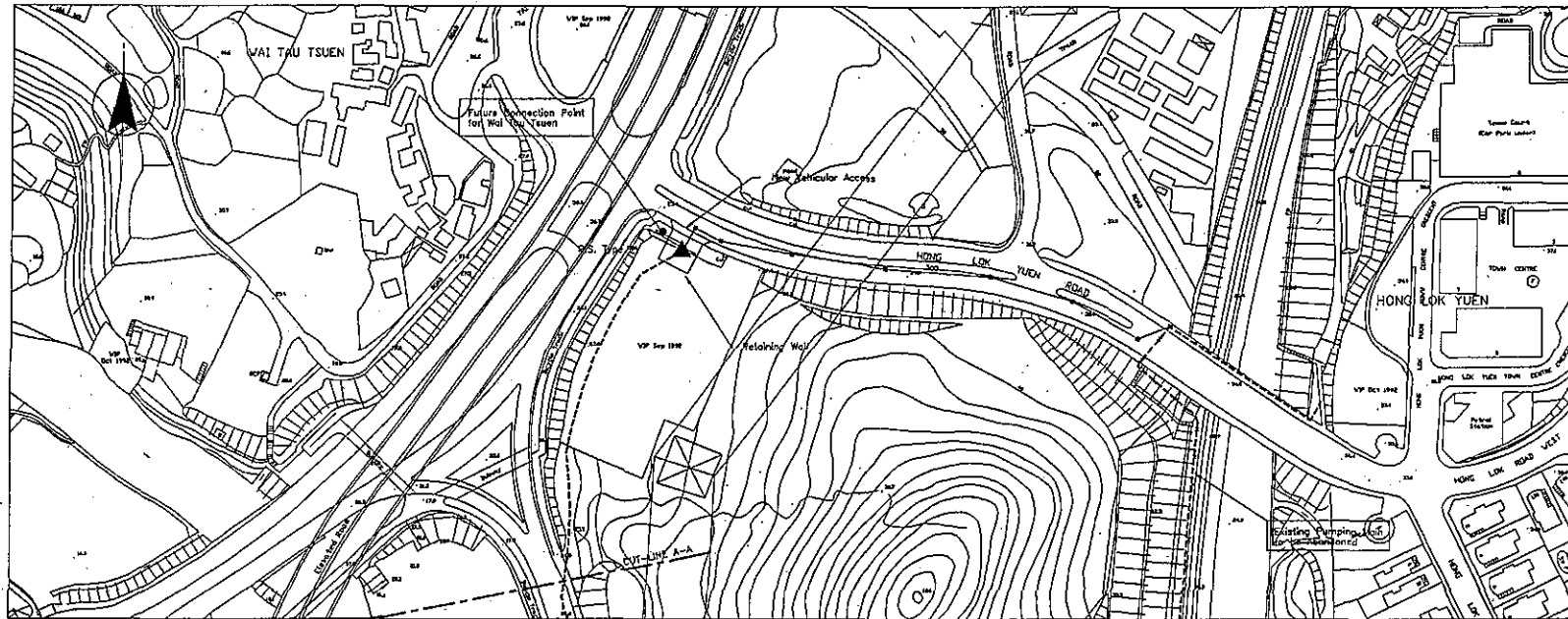
DATE	REVISION	DESCRIPTION
2/7/96	1	DRAFT ISSUE
3/7/96	2	FULL REVISION (REV. NO. CHANGED)

GOVERNMENT OF HONG KONG

Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

PROPOSED SEWER AND PUMPING MAIN FORM HONG LOK YUEN TO EXISTING SEWER AT SHUI WA

PROJECT NO. CS/78/94 SHEET 2 OF 2
 DRAWING NO. DS/4/02 01/SCALE
 ISSUE 2
MONTGOMERY WATSON
 顧問工程師
 Mouchel Asia Limited Consulting Engineers



LEGEND

- Existing Foul Gravity Sewer
- Existing Manhole
- Existing Rising Main
- - - Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Rodding Eye
- Proposed Pumping Main
- ▲ Proposed Pump Station
- Proposed Sewer by TDD
- Proposed Pumping Main by TDD
- - - Extent of Proposed Development
- Outline of Proposed Development
- ▨ Areas Where Land Resumption will be Required. Note: Actual Width Required is Lesser of 1.5 Metres (2 metres of Manhole) or Distance between Buildings.
- ▩ Recently Constructed Houses in Approximate Position

NOTES

1. Map data reproduced with permission of the Director of Land, (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.
3. Levels Shown in Brackets (13.450) are Interpolated.

NOT FOR CONSTRUCTION

8/96	MAW	KPW		2	FULL REVISION DRO. NO. CHANGED
3/96	MAW	KPW		1	DRAFT ISSUE
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE REVISION DESCRIPTION

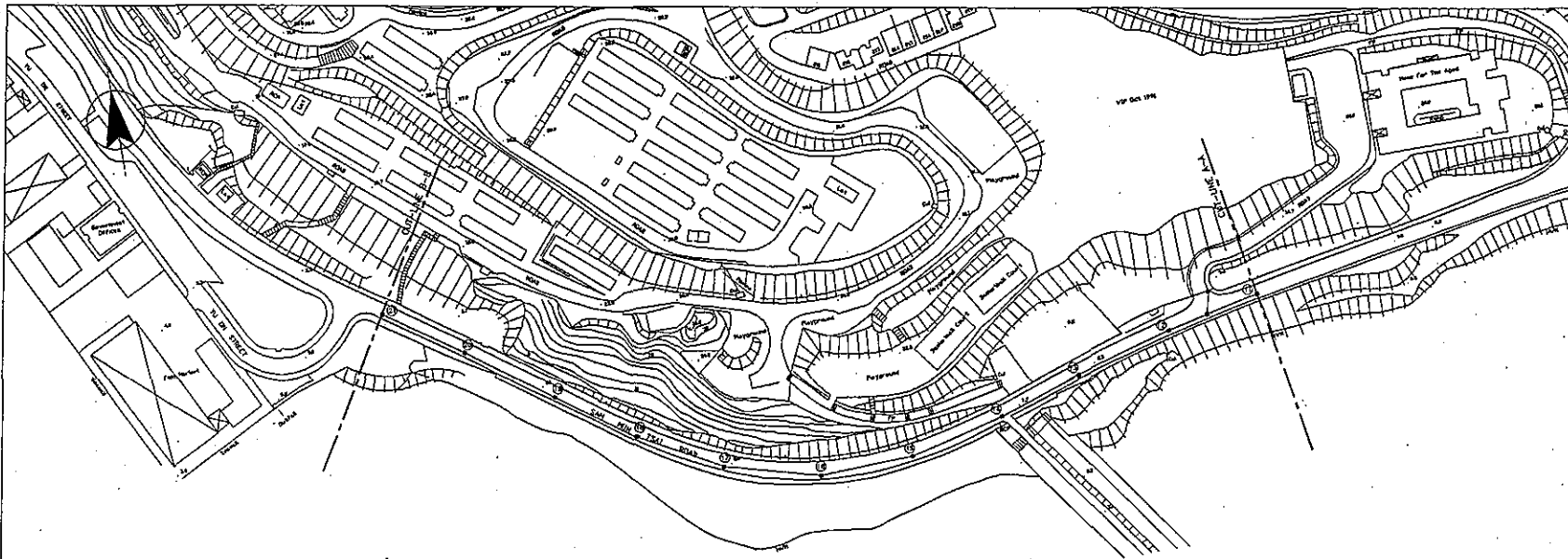
GOVERNMENT OF HONG KONG

Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

PROPOSED SEWER AND PUMPING MAIN
FROM HONG LOK YUEN TO EXISTING SEWER
AT SHUI WAI

AGREEMENT NO. CE/18/94	SHEET 1 OF 2
DRAWING NO. KIL/9/CE 18 94/MS.01	ISSUE 2

MONTGOMERY WATSON
 華誠顧問工程師
 In association with
Mouchel Asia Limited Consulting Engineers



LEGEND

- Existing foul Gravity Sewer
- Existing Manhole
- Existing Rising Main
- - - Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- o Proposed Rodding Eye
- Proposed Pumping Main
- ▲ Proposed Pump Station
- - - Proposed Sewer By TDD
- - - Proposed Pumping Main by TDD
- - - - - Extent of Proposed Development
- Outline of Proposed Development
- ▨ Areas Where Land Resumption will be Required. Note: Actual Width Required is Lesser of 1.5 Metres (2 metres of Manhole) or Distance between Buildings.
- ▩ Recently Constructed Houses in Approximate Position

NOTES

1. Map data reproduced with permission of the Director of Land, (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.
3. Levels Shown in Brackets(13.450),are interpolated.

NOT FOR CONSTRUCTION

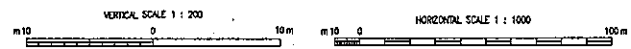
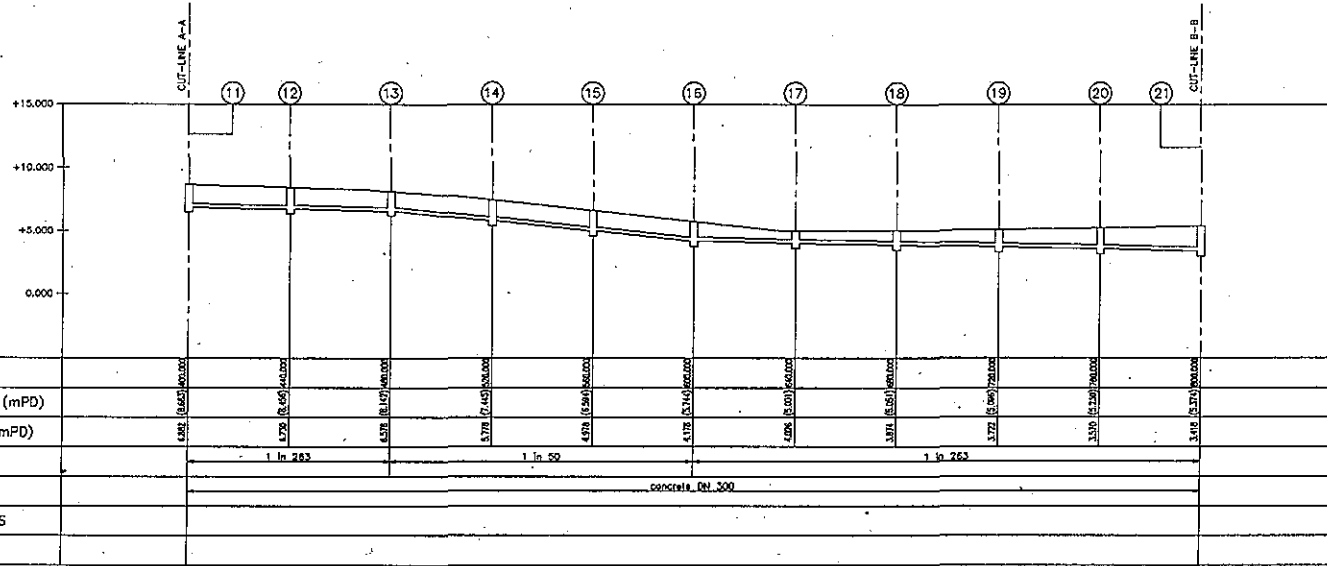
B/96	MAW	KPW		2	MINOR AMENDMENTS
3/96	MAW	KPW		1	DRAFT ISSUE
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE
					REVISION DESCRIPTION

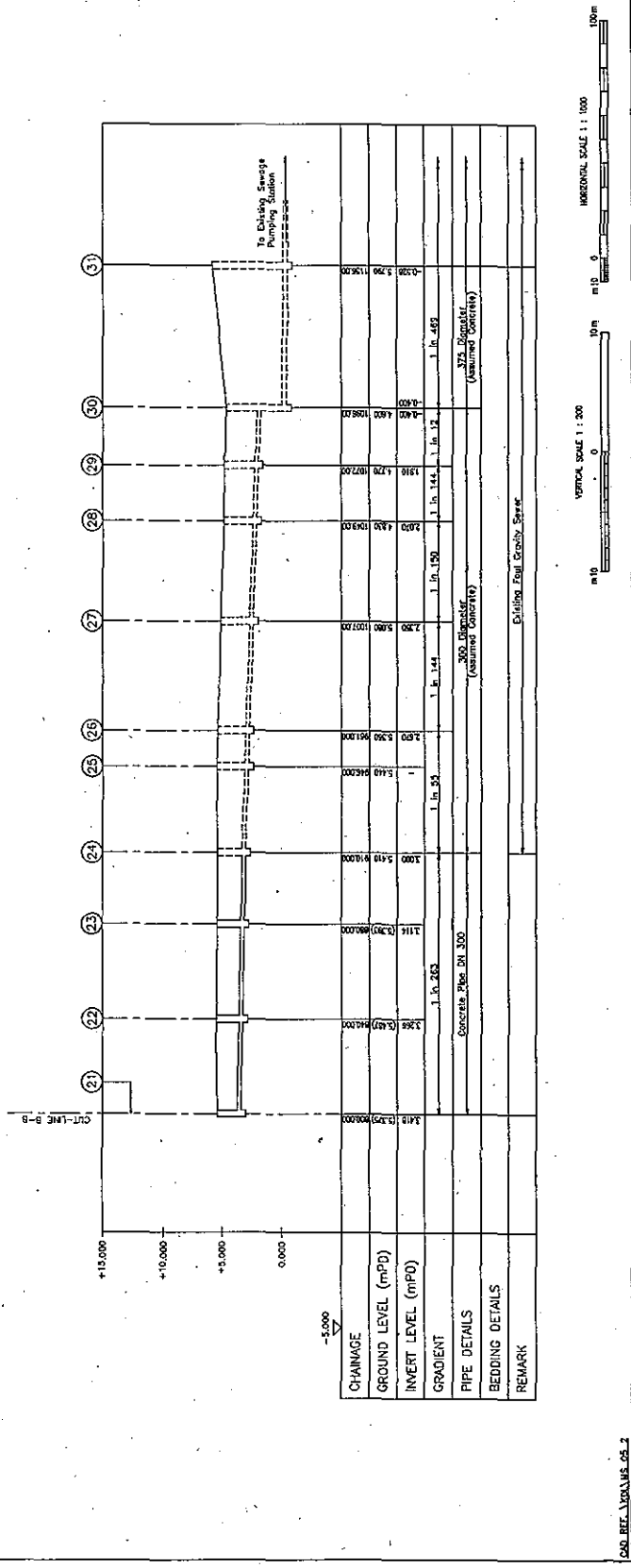
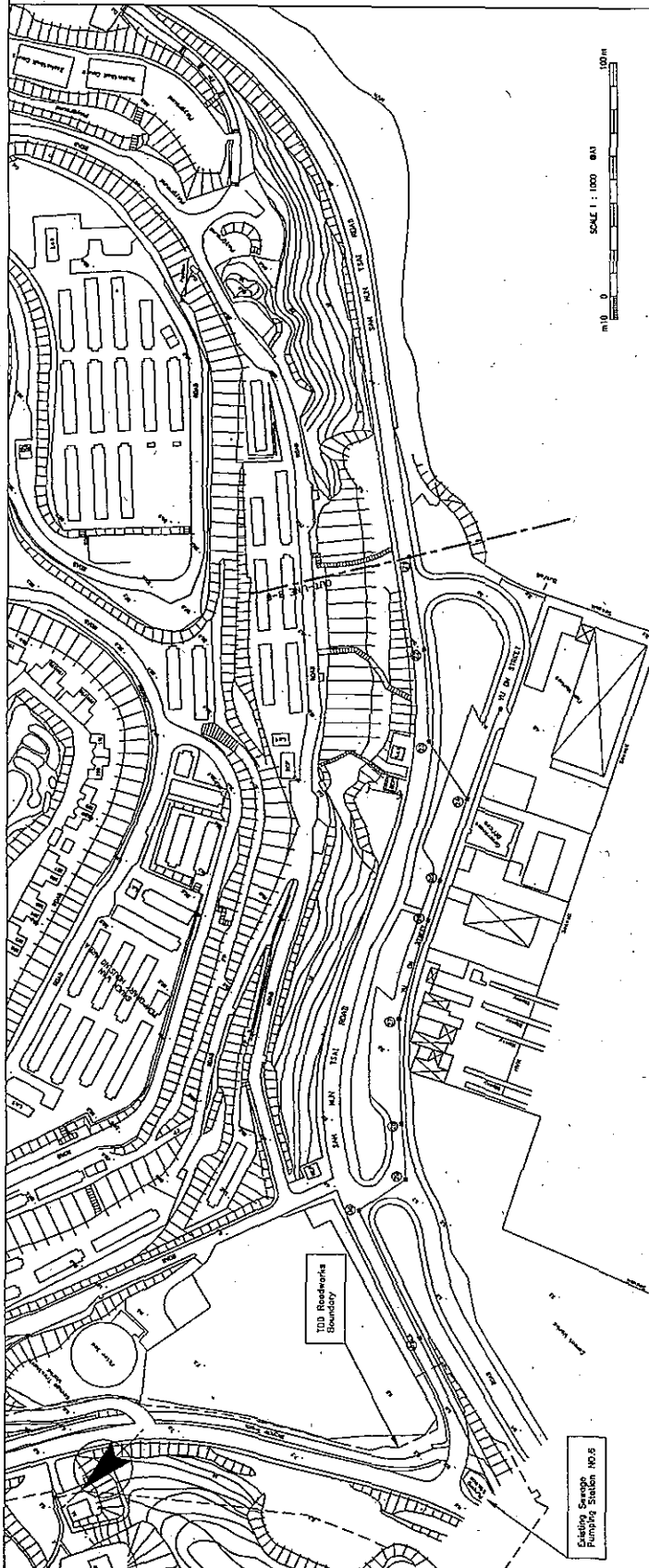
GOVERNMENT OF HONG KONG
Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

SAM MUN TSAI ROAD
 MAIN SEWER

	AGREEMENT NO. CE/18/94	SHEET 2 OF 3
	DRAWING NO. KLA/CE/18 94/AL/04	ISSUE 2

MONTGOMERY WATSON
 莫格利有限公司
 In association with
Mouchel Asia Limited Consulting Engineers





NOT FOR CONSTRUCTION

8/86	8/86	2	MINOR AMENDMENTS
DATE	REVISED (BY)	CREATED / APPROVED (BY)	REVISION DESCRIPTION
3/7/8	8/86	1	DRAFT ISSUE

GOVERNMENT OF HONG KONG

Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

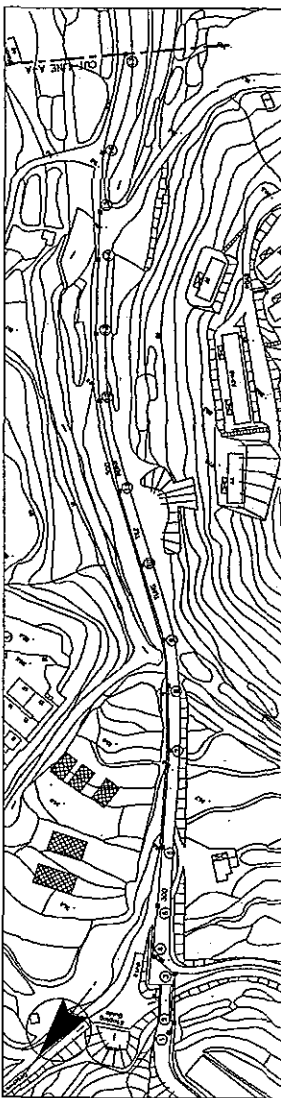
SAM MUN TSI ROAD
MAIN SEWER

AGREEMENT NO. CE/19/94
SHEET 3 OF 3

CONTRACT NO. 102/92C IS 21/92.00
ISSUE 2

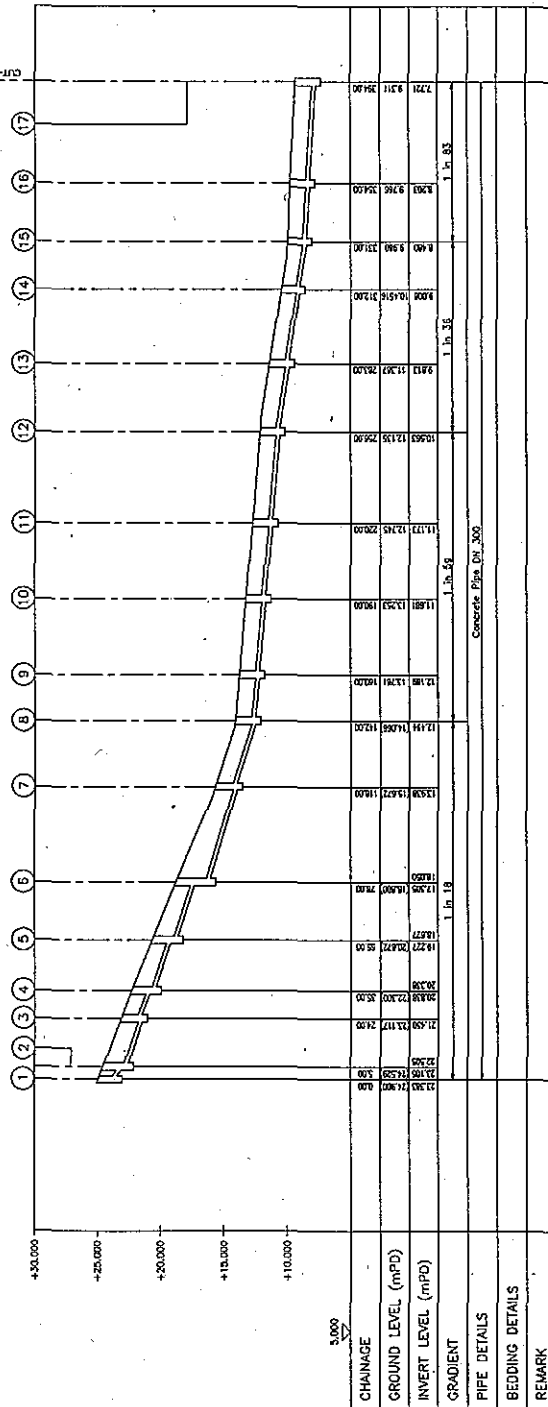
MONTGOMERY WATSON
MONTGOMERY WATSON ENGINEERS

Mouchel Asia Limited Consulting Engineers



SCALE 1 : 1000 1M

CUT-DONE A-A



5,000

VERTICAL SCALE 1 : 200
HORIZONTAL SCALE 1 : 1000

- LEGEND**
- Existing Foul Gravity Sewer
 - Existing Manhole
 - Existing Rising Main
 - Existing Sewer to be Abandoned
 - Proposed Foul Sewer
 - Proposed Manhole
 - Proposed Rooding Eye
 - Proposed Pumping Main
 - Proposed Pump Station
 - Proposed Sewer by TID
 - Proposed Pumping Main by TID
 - Extent of Proposed Development
 - Outline of Proposed Development
 - Areas Where Land Reclamation will be Undertaken
 - Proposed 150mm diameter culvert (2 metres at Manhole) or Distance between Boreholes
 - Recently Constructed Houses in Approximate Position

- NOTES**
- Map data reproduced with permission of the Director of Land (C) Hong Kong
 - All sewers to be 150mm diameter unless indicated otherwise.
 - Levels Shown in Brackets(13.450)are interpolated.

NOT FOR CONSTRUCTION

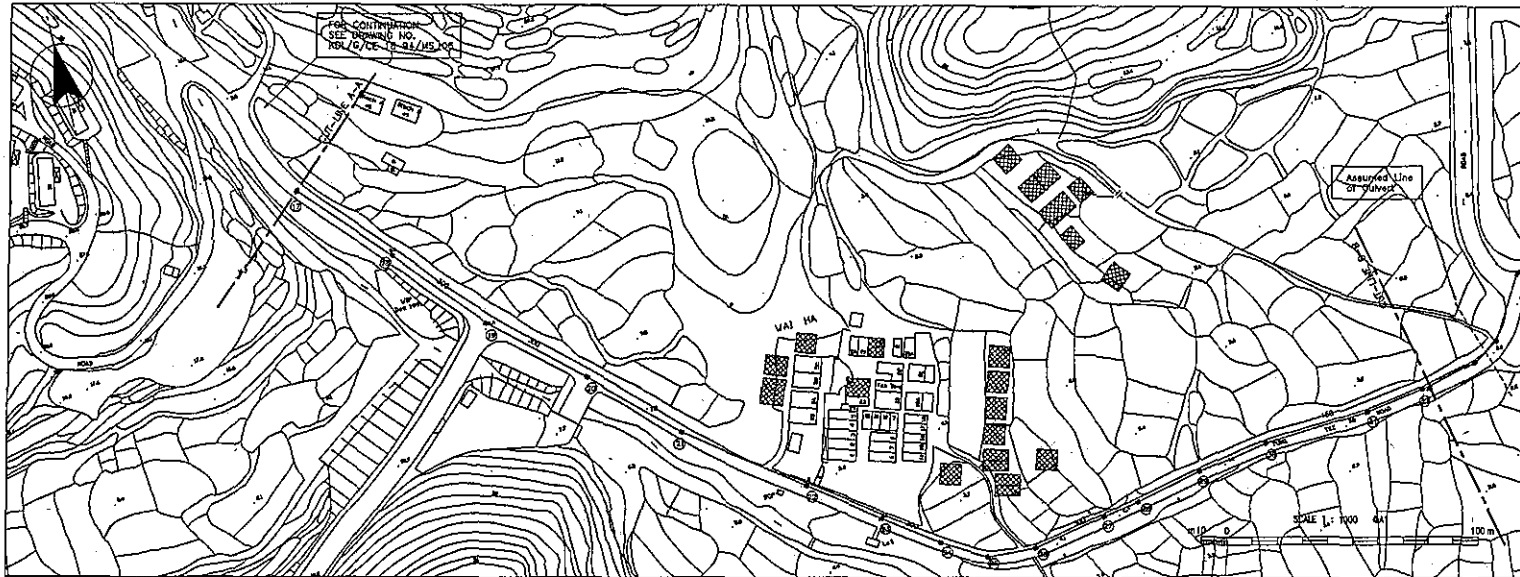
8/96	MAW	KPW		2	REVISED TO FULL GRABIT SYSTEM
3/96	MAW	WCH		1	DRAFT ISSUE
DATE	DESIGNED	CHECKED	APPROVED	ISSUE	ISSUE DESCRIPTION

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

TUNG TSI Z ROAD MAIN SEWER
PLAN AND LONGITUDINAL SECTION

PROJECT NO. CE/10/94	SHEET 1 OF 3
DRAWING NO. 01/A/18 18 19/02.06	ISSUE 2

MONTGOMERY WATSON
莫天恩 工程師
In association with
Mouchel Asia Limited Consulting Engineers



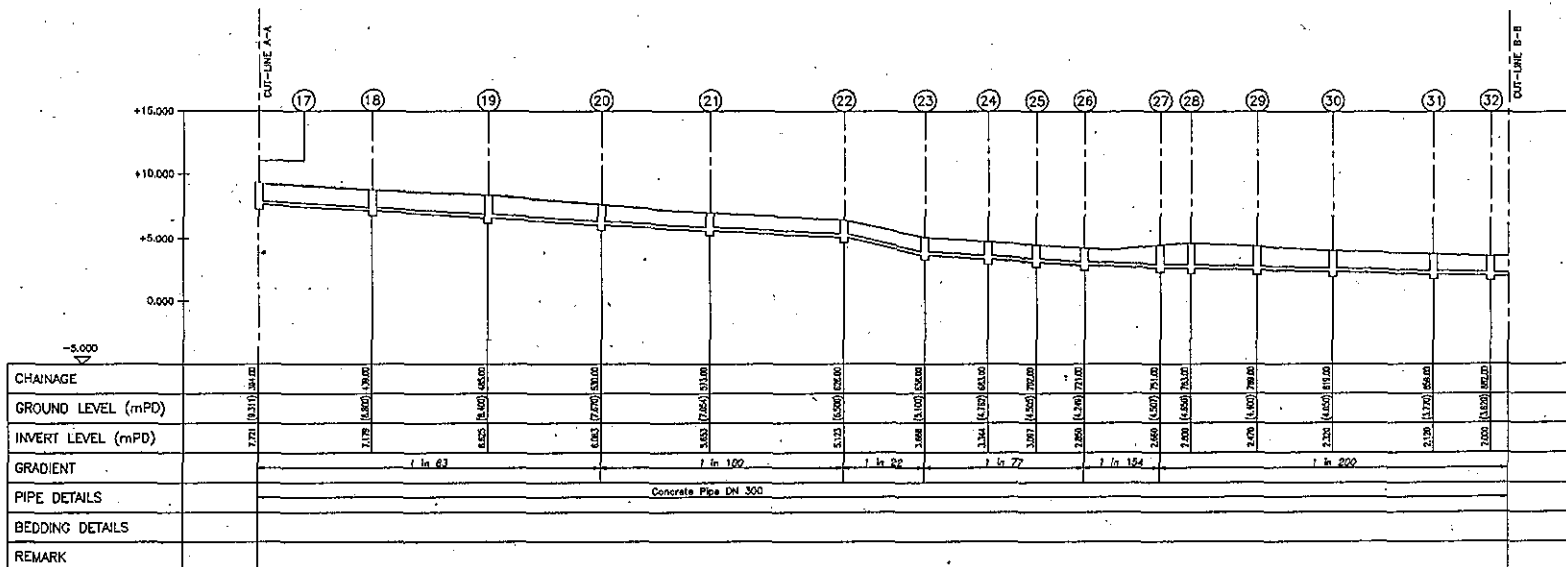
LEGEND

- Existing Foul Gravity Sewer
- Existing Manhole
- - - Existing Rising Main
- - - Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- ◻ Proposed Rodding Eye
- - - Proposed Pumping Main
- ▲ Proposed Pump Station
- - - Proposed Sewer By TDD
- - - Proposed Pumping Main by TDD
- - - Extent of Proposed Development
- Outline of Proposed Development
- ▨ Areas Where Land Restriction will be Required. Note: Actual Width Required is Lesser of 1.5 Metres (3 metres at Manholes) or Distance between Buildings.
- ▩ Recently Constructed Houses in Approximate Position

NOTES

1. Map data reproduced with permission of the Director of Land, (C) Hong Kong
2. All sewers to be 150mm diameter unless indicated otherwise.
3. Levels Shown in Brackets (13.450) are interpolated.

NOT FOR CONSTRUCTION



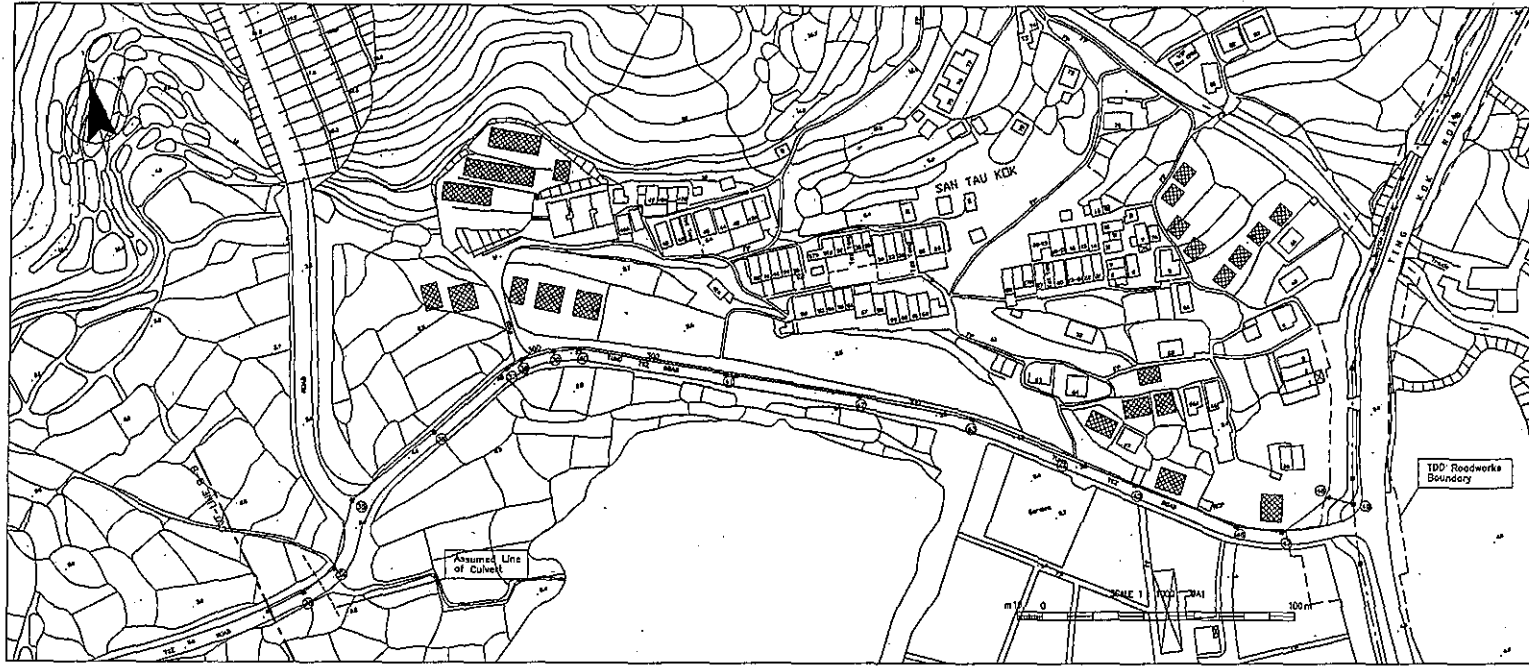
8/96	MAW	KPW		2	LAYOUT CHANGED TO FULL GRAVITY SYSTEM	
3/98	MAW	WYH		1	DRAFT ISSUE	
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE	REVISION DESCRIPTION

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

TUNG TSZ ROAD MAIN SEWER
 PLAN AND LONGITUDINAL SECTION

	AGREEMENT NO. CE/18/94	SHEET 2 OF 3
	DRAWING NO. HDL/2/CE-18-31/MS-07	ISSUE 2
MONTGOMERY WATSON 環 境 規 劃 工 程 師 In association with Mouchel Asia Limited Consulting Engineers		

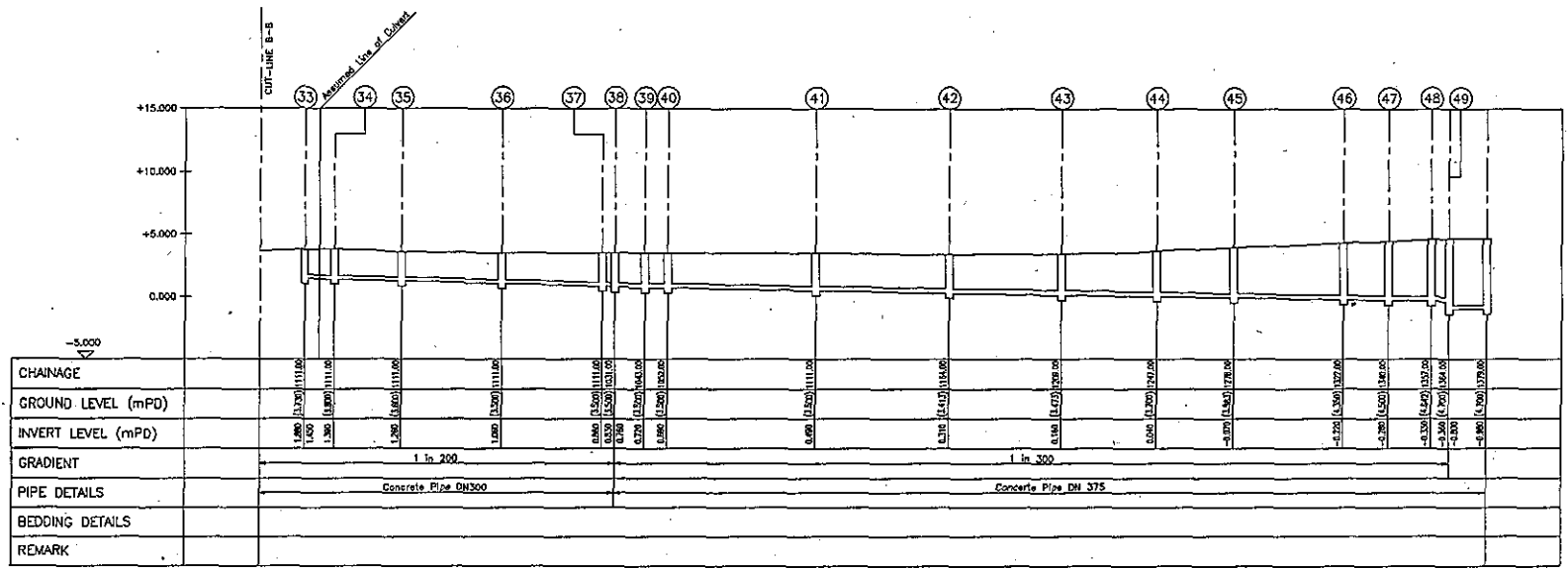




- LEGEND**
- Existing Foul Gravity Sewer
 - Existing Manhole
 - - - Existing Rising Main
 - - - Existing Sewer to be Abandoned
 - Proposed Foul Sewer
 - Proposed Manhole
 - ◻ Proposed Rodding Eye
 - - - Proposed Pumping Main
 - ▲ Proposed Pump Station
 - Proposed Sewer by TDD
 - Proposed Pumping Main by TDD
 - - - Extent of Proposed Development
 - ◻ Outline of Proposed Development
 - ◻ Areas Where Land Resumption will be Required, Note—Actual Width Required is Lesser of 1.5 Metres (3 metres of Manhole) or Distance between Buildings.
 - ◻ Recently Constructed Houses in Approximate Position

- NOTES**
1. Map data reproduced with permission of the Director of Land, (C) Hong Kong
 2. All sewers to be 150mm diameter unless indicated otherwise.
 3. Levels shown in Brackets (13,450) are interpolated.

NOT FOR CONSTRUCTION



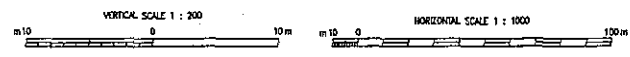
8/98	MAW	KPW		2	LAYOUT CHANGED TO FULL GRAVITY SYSTEM	
3/98	MAW	WKH		1	DRAFT ISSUE	
DATE	DESIGNED	DRAWN	CHECKED	APPROVED	ISSUE	REVISION DESCRIPTION

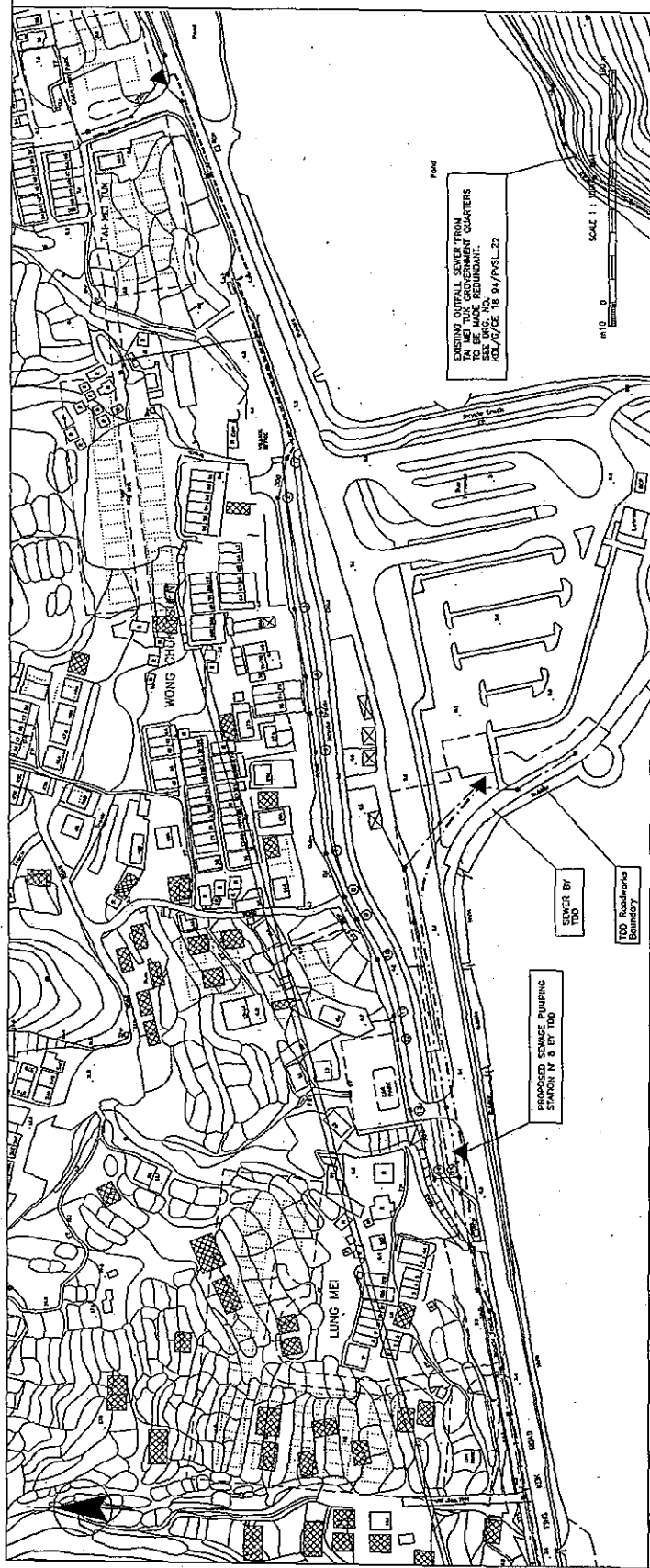
GOVERNMENT OF HONG KONG
Tolo Harbour Sewerage of Unsewered Areas Stage I (Phase II)

TUNG TSZ ROAD MAIN SEWER PLAN AND LONGITUDINAL SECTION

OFFPRINT	AGREEMENT NO. CE/18/94	SHEET 3 OF 3
ISSUED	DRAWING NO. XE1/2/CE 18 94/M/08	ISSUE 1

MONTGOMERY WATSON
 蒙格馬頓工程師
 In association with
Mouchel Asia Limited Consulting Engineers





LEGEND

- Existing Foul Sewer
- Existing Manhole
- Existing Rising Main
- Existing Sewer to be Abandoned
- Proposed Foul Sewer
- Proposed Manhole
- Proposed Rooding Eye
- Proposed Pumping Main
- Proposed Pumping Station
- Proposed Sewer By TDD
- Proposed Pumping Main by TDD
- Extent of Proposed Development
- Outline of Proposed Development
- Area Where Load Distribution will be Required. Note - Actual Width of Road may vary (2 metres at Manhole) or (3 metres between Buildings).
- Recently Constructed Houses in Approximate Position

NOTES

1. Site data measured with permission of the Director of Land, (C) Hong Kong.
2. All assets to be 150mm diameter unless indicated otherwise.

NOT FOR CONSTRUCTION

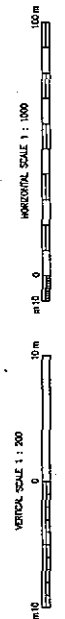
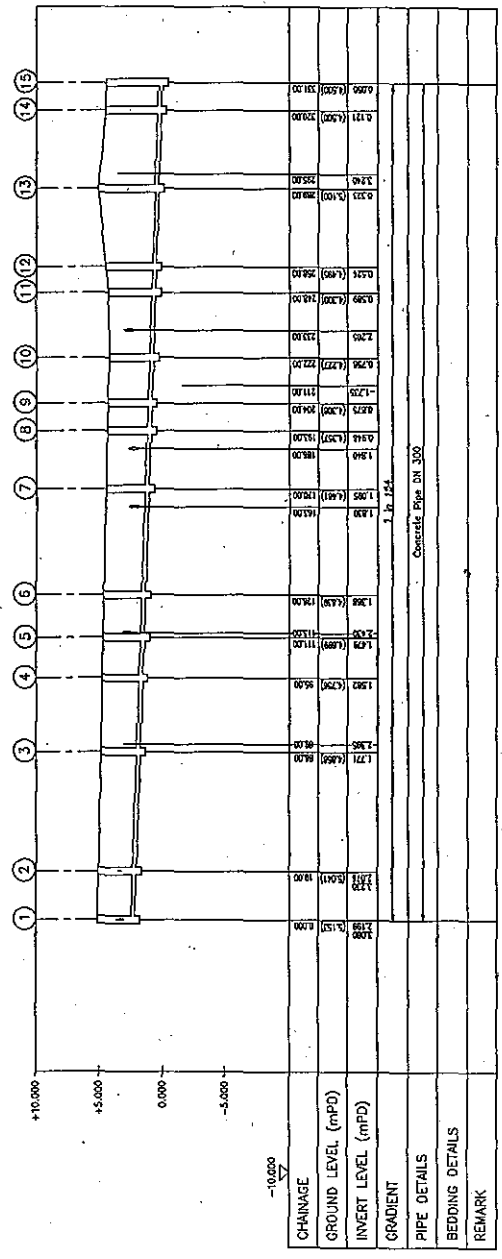
8/96	MAN	2	TED APPROVES FOR THE WORKS
3/96	MAN	1	START ISSUE
DATE	ISSUED	BY	REVISION

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

PROPOSED TRUNK SEWER EXTENSION
 ALONG TING KOK ROAD TO TAI MEI TUK

PROJECT NO. CE/19/94
 SHEET 1 OF 1
 DRAWING NO. CE/19/94/S/ANLOR/ESSE/2

MONTGOMERY WATSON
 莫高美工程顧問有限公司
 In association with
 Mouchel Asia Limited Consulting Engineers



Appendix E

Noise

Appendix E-1

**Noise Sensitive Receivers located near
Proposed Pumping Stations**

Table E-1-1: Noise Sensitive Receivers near Proposed Pumping Stations

No.	Sewerage Area	Preliminary Design No.	Preliminary Design Drawing No.	No. of Pumping Stations	Structures in Proximity of Pumping Stations	Distance from nearest NSR (m)
1	Tai Mei Tuk Village Tai Mei Tuk Gov. Housing Area	T08	KDL/G/CE 18 94/PVSL-22	Tai Mei Tuk Village 1 (type 1) located along Ting Kok Road, South of	newly constructed structured unit - 46A	35 35
2	Wong Chuk Tsuen Village	T11	KDL/G/CE 18 94/PVSL-20	1 pumping station proposed	none	80
3	Lung Mei Village	T05				
4	Lo Tsz Tin Village	T03	KDL/G/CE 18 94/PVSL-21	none proposed as part of this project	n/a	n/a
5	Lai Pek Shan San Tsuen Village	T21				
6	Ting Kok Village	T10	KDL/G/CE 18 94/PVSL-13	none proposed as part of this project	n/a	n/a
7	Po Sam Pai Village	T09	KDL/G/CE 18 94/PVSL-14	none proposed as part of this project	n/a	n/a
8	San Tau Kok Village	T20	KDL/G/CE 18 94/PVSL-26	none proposed as part of this project	n/a	n/a
9	Wai Ha Village	T14		none proposed as part of this project	n/a	n/a
10.	Tsiu Lam Village	T12	KDL/G/CE 18 94/PVSL-27	none proposed	n/a	n/a
11.	Tung Tsz Village					
12	A Shan Tseng Tau Village	T19				
13	Scout Training Centre and main sewer along Tung Tsz Road from Scout Centre					
14	Shuen Wan Chim Uk	T15	KDL/G/CE 18 94/PVSL-15	1 type 1 station	unit - 1A	60
15.	Shuen Wan Lei UK	T17		none proposed	n/a	n/a
16.	Sha Lan Village	T07		one pumping station (type 1) proposed for of village	unit 159 unit 158 unit 160	20 15 20

No.	Sewerage Area	Preliminary Design No.	Preliminary Design Drawing No.	No. of Pumping Stations	Structures in Proximity of Pumping Stations	Distance from nearest NSR (m)
17.	Home for the Aged	T13	KDL/G/CE 18 94/PVSL-12	no pumping stations proposed	n/a	n/a
18.	Sam Mun Tsai New Village	T16		3 pumping stations proposed in southern, mid and upper portion of village	southern most station unit - 110 unit - 111 unit - 112 unit - 113 unit - 114 unit - 115 unit - 120 unit - 121 unit - 122 unit - 123 unit - 124 middle station unit - 163 unit - 77 unit - 78 unit - 79 unit - 80 upper unit - 22 unit - 23 unit - 24 unit - 25 unit - 26 unit - 27	22 20 18 14 13 8 8 10 14 18 20 38 12 10 14 28 26 20 16 12 14 18
19.	Luen Yick San Tsuen Village	T23		one pumping station (type 1) located in northern area of village	unit - 27A unit - 45 unit - 53	19 16 28
20.	Hong Lok Yuen	-		KDL/G/CE 18 94/PVSL-23	no pumping stations proposed	n/a
21.	To Yuen Tung Village	T04	KDL/G/CE 18 94/PVSL-16	no pumping stations proposed	n/a	n/a
22.	Yuen Tun Ha Village	T02	KDL/G/CE 18 94/PVSL-18	no sewerage proposed for this village	n/a	n/a
23.	Lo Lau Uk Village	T06		none proposed	n/a	n/a
24.	Ta Tit Yan Village	T22	KDL/G/CE 18 94/PVSL-19	no sewerage proposed for this village	n/a	n/a

No.	Sewerage Area	Preliminary Design No.	Preliminary Design Drawing No.	No. of Pumping Stations	Structures in Proximity of Pumping Stations	Distance from nearest NSR (m)
25.	Tai Po Kau San Wai Village	T18	KDL/G/CE 18 94/PVSL-25	no sewerage proposed for this village	n/a	n/a
26.	Yin Tse Lane at Tai Po Kau San Wai	-	KDL/G/CE 18 94/PVSL-24	one proposed pumping station locate at eastern most portion of the development	unit - 20 unit - 19	5 13
27.	Cheung Shue Tan Village	T24	KDL/G/CE 18 94/PVSL-17, -21	one pumping station (type 2) to be situated south of the railway east of Cheung Shue Tan	no neighboring receivers	n/a
28.	Tai Po Mei Village	T25	KDL/G/CE 18 94/PVSL-23	no pumping stations proposed	n/a	n/a
29.	Chek Nai Ping Village	S20	KDL/G/CE 18 94/PVSL-10	one pumping station (type 2) located east of Chek Nai Ping village next to proposed access road	no existing receivers one proposed housing unit	16
30.	Fo Tan Village	S08				
31.	Ho Tung Lau Village	S15	KDL/G/CE 18 94/PVSL-04	one proposed pumping station (type2) located south of Lok Lo Ha	unit - 1A unit - 1 unit - 2C unit - 2B	18 30 46 56
32.	Lok Lo Ha Village	S16				
33.	Wo Liu Hang Village	S07	KDL/G/CE 18 94/PVSL-07	two proposed pumping stations (type 1), one located on the west and one on the east side of the village	units - 25, 26, 27 unit - 23 unit - 79 unnamed unit - 3 unit - 4	8 26 25 12 20 24
34.	Pat Tsz Wo Village	S12				
35.	Fo Tan Cottage Area	S06	KDL/G/CE 18 94/PVSL-05	no pumping stations proposed	n/a	n/a
36.	Wong Chuk Yeung Village	S14				

No.	Sewerage Area	Preliminary Design No.	Preliminary Design Drawing No.	No. of Pumping Stations	Structures in Proximity of Pumping Stations	Distance from nearest NSR (m)
37	Ha Wo Che Village			one dry weather flow interceptor pump located north of Tai po Road and south of village	no sensitive receivers in proximity of pumping station	n/a
38	Sheung Wo Che Village	S13	KDL/G/CE 18 94/PVSL-09	one pumping station to be located south east of village north of the railway	unit - 18 unit - 11 unit - 14 unit - 15 unit - 16 unit - 17	28 20 16 20 21 22
39	To Fung Shan Village	S10	KDL/G/CE 18 94/PVSL-06	no pumping stations proposed	n/a	n/a
40	Pai Tau Village	S09	KDL/G/CE 18 94/PVSL-08	no pumping stations proposed	n/a	n/a
41	Tung Lo Wan Village and Tung Lo Wan Village Extension	S11	KDL/G/CE 18 94/PVSL-11	no pumping stations proposed	n/a	n/a
42	Tai Lam Liu Village	S01				
43	Shek Kwu Lung Village	S18	KDL/G/CE 18 94/PVSL-02	no pumping stations proposed	n/a	n/a
44	Wong Nai Tau Village	S21				
45	Fa Sam Hang Village	S17	KDL/G/CE 18 94/PVSL-03	no pumping stations proposed	n/a	n/a
46	Tai Shui Hang Village	S04		no pumping station proposed	n/a	n/a
47	Cheung Kung Village	S19				
48	Wu Kwai Sha New Village	S03	KDL/G/CE 18 94/PVSL-01	one pumping station (type 1) to be constructed	unit - 22D unit - 23	20 32
49	Lok Wo Sha Village	S22				

Appendix E-2

**Residual Noise Level at NSRs from
Pumping Station Construction Works after Mitigation**

Appendix E-2: Residual Impacts to NSRs From Pumping Station Construction

Pumping Station	Housing Units	Exposure Levels dBA from Pumping Station Construction after Noise Barrier Implementation			
		Excavator/Backhoe and Truck	Crane/Lorry	Beaker and Air Compressor	Compactor
Wu Liu Hang	units - 27, 26, 25	78 dB(A)	76 dB(A)	-	-
Sam Mun Tsai New Village	Middle Pumping Station unit - 78	76 dB(A)	-	-	-
	Southern Pumping Station unit - 115 unit - 120 unit - 121	78 dB(A)	76 dB(A)	-	-
		78 dB(A)	76 dB(A)	-	-
76 dB(A)		-	-	-	
Yin Tse Lane at Tai Po Kau	unit - 20	82 dB(A)	80 dB(A)	78 dB(A)	-

Table E-2-2: Sensitive Receivers Near Proposed Pumping Stations along Main Sewer

No.	Sewerage Area	Ref.	Preliminary Design Drawing No.	Pumping Stations	Structures in Proximity of Pumping Stations	Distance (m)
1.	Proposed main sewer from Hong Lok Yuen to Existing Sewer at Shui Wai	-	KDL/G/CE 18 94/MS-01 & 02	no pumping stations are proposed	n/a	n/a
2.	Proposed main sewer along Sam Mun Tsai Road	-	KDL/G/CE 18 94/MS-03, 04 & 05	no pumping stations are proposed	n/a	n/a
3.	Proposed main sewer along Tung Tsz Road	-	KDL/G/CE 18 94/MS-06, 07 & 08	one proposed pumping station at border of Wai Ha	n/a	n/a
4.	Proposed Trunk Sewer Extension along Ting Kok Road at Tai Mei Tuk	-	KDL/G/CE 18 94/MS-09	one pumping station as described for Tai Mei Tuk Village another pumping station south of Ting Kok Road	(see no. 1 of village sewerage)	(see no. 1 of village sewerage)
5.	Proposed pumping main from Cheung Shue Tan to existing Trunk Sewer in Tai Po Road	-	KDL/G/CE 18 94/MS-10	one proposed pumping station (type 2)	no sensitive receivers located nearby	n/a

Appendix F

Air Quality

Appendix F-1

**TSP and RSP Concentration at Tai Po
and Shatin Measuring Stations**

CONCENTRATIONS OF TOTAL SUSPENDED PARTICULATES (TSP) FOR 1994

(a) Monthly and annual averages

UNIT: MICROGRAMS PER CUBIC METRE

STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
KWUN TONG	141	114	119	93	99	82	81	108	98	135	118	93	107
SHA TIN	120	93	95	56	73	44	53	66	72	99	96	63	78
TAI PO	142	104	119	64	83	46	55	75	69	104	102	78	87
SIAM SHUI PO	161	96	127	88	105	70	79	90	85	121	121	82	102
CENTRAL / WESTERN	128	105	121	73	71	43	61	74	63	118	114	78	87
TSUEN WAN	145	105	129	73	103	66	78	85	99	125	122	78	101
KWAI CHUNG	124	83	130	65	94	56	60	74	98	112	98	63	88
MONG KOK	194	147	197	146	170	113	117	167	132	188	183	141	158
HONG KONG AVERAGE	144	106	130	82	100	65	73	92	90	125	119	85	101

CONCENTRATIONS OF RESPIRABLE SUSPENDED PARTICULATES (RSP) FOR 1994

(a) Monthly and annual averages

UNIT: MICROGRAMS PER CUBIC METRE

STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
KWUN TONG	89	63	68	48	48	38	46	61	55	64	53	49	57
SHA TIN	104	55	67	36	46	28	34	42	46	63	65	45	53
TAI PO	80	55	69	29	44	28	31	43	37	59	67	54	50
SIAM SHUI PO	97	70	82	51	55	38	49	47	55	67	72	54	61
CENTRAL / WESTERN	98	74	90	53	38	30	38	44	37	60	63	50	56
TSUEN WAN	92	70	86	44	56	40	53	53	63	70	72	50	62
KWAI CHUNG	85	53	79	34	49	31	34	44	43	65	59	39	51
MONG KOK	92	70	80	63	63	46	67	78	67	72	75	58	69
HONG KONG AVERAGE	92	64	78	48	50	35	44	52	50	65	66	50	57

Appendix G
Water Quality

Appendix G-1

Water Quality Objectives for Inland Waters

Table G-1-1: WQO for the Inland Waters of Tolo Harbour Water Control Zone (WCZ)

Parameter	Location	Units
pH	Whole WCZ, other than below	6.0-9.0
	Shing Mun (A,B,C,F,G,H)	6.5-8.5
	Lam Tsuen (C,D)	6.5-8.5
	Tai Po (A,B,C)	6.5-8.5
Suspended Solids	Whole WCZ, other than below	25mg/l
	Shing Mun (A,B,C,F,G,H)	20mg/l
	Lam Tsuen (C,D)	20mg/l
	Tai Po (A,B,C)	20mg/l
Dissolved Oxygen	Whole Zone	not less than 4mg/l
COD	Whole WCZ, other than below	30mg/l
	Shing Mun (B,F,G)	15mg/l
	Lam Tsuen (C,D)	15mg/l
	Tai Po (A)	15mg/l
BOD ₅	Whole WCZ, other than below	5mg/l
	Shing Mun (B,F,G)	3mg/l
	Lam Tsuen (C,D)	3mg/l
	Tai Po (A)	3mg/l

Table G-1-2 : Water Quality IndexThe water quality index for watercourses in Hong Kong

The Water quality Index (WQI) is a numerical value which is used to summarize the state of river water quality, on the basis of monitoring data. The WQI adopted by the Environmental Protection Department is based on that used by the Netherlands Ministry of Transport and Public Works. The index is calculated from the water quality measurements of dissolved oxygen (DO), 5-day biochemical oxygen demand (BOD₅) and ammoniacal nitrogen (NH₄-N). The measurement of each parameter is evaluated in accordance with the following scale:

No. of points awarded	DO (% saturation)	BOD ₅ (mg/L)	NH ₄ -N (mg/L)
1	91 - 110	< 3	< 0.5
2	71 - 90	3.1 - 6.0	0.5 - 1.0
3	111 - 120 51 - 70	6.1 - 9.0	1.1 - 2.0
4	121 - 130 31 - 50	9.1 - 15.0	2.1 - 5.0
5	< 30 or > 130	> 15.0	> 5.0

The three parameters are weighed equally and the final score of points and, hence, the WQI is the sum of points calculated for these parameters. An average of each routine monthly index is determined to give an annual average Water Quality Index.

The WQI ranges from 3 to 15 and corresponds to the following gradings of water quality condition.

WQI	Water Quality Condition
3.0 - 4.5	Excellent
4.6 - 7.5	Good
7.6 - 10.5	Fair
10.6 - 13.5	Bad
13.6 - 15.0	Very Bad

The WQI increases with increasing organic pollution in the watercourses.

Appendix G-2

Marine Water Quality Standards

Table G-2-1: Beneficial Uses Applicable to the Marine Waters of the Tolo Harbour WCZ

Beneficial Use	Harbour Sub-zone	Buffer Sub-zone	Channel Sub-zone
BU-1	+	+	+
BU-2	+	+	+
BU-3	+	+	+
BU-4	-	+	+
BU-5	+	+	+
BU-6	+	+	-
BU-7	+	+	+
BU-8	+	+	+

Note: + indicates BU applicable to WCZ and,
- indicates not applicable.

Table G-2-2: Beneficial Uses Applicable to Hong Kong Marine Waters

BU number	Description of BU
BU-1	as a source of food for human consumption.
BU-2	as a resource for commercial fin and shell fisheries.
BU-3	as a habitat for marine life and a resource for human exploitation.
BU-4	for bathing.
BU-5	for secondary contact recreation - diving, sail-board and dinghy sailing.
BU-6	for domestic and industrial purposes.
BU-7	for navigation and shipping including the use of officially approved and endorsed sheltered harbours and typhoon shelters.
BU-8	for aesthetic enjoyment.

Table G-2-3: WQO for the Marine Waters of the Tolo Harbour WCZ

Water Quality Parameter	Objective		
	Harbour Sub-zone	Buffer Sub-zone	Channel Sub-zone
Offensive odour, tints and colours	not to be present	not to be present	not to be present
Visible foam, oil, grease, scum, litter	not to be present	not to be present	not to be present
<i>E.coli</i> (no/100ml; annual geometric mean)	not to exceed 610	not to exceed 610	not to exceed 610
Dissolved Oxygen within 2 m of the bottom	not less than 2 mg/l	not less than 3 mg/l	not less than 4 mg/l
Dissolved Oxygen in remainder of water column	not less than 4 mg/l	not less than 4 mg/l	not less than 4 mg/l
pH change	not to exceed 0.5	not to exceed 0.3	not to exceed 0.1
Salinity change	not to exceed 3 mg/l	not to exceed 3 mg/l	not to exceed 3 mg/l
Temperature Change	absolute change not to exceed 1°C	absolute change not to exceed 1°C	absolute change not to exceed 1°C
Settleable Solids adversely affecting benthic communities or bottom geometry	not to be present	not to be present	not to be present
Light Penetration	not to be reduced by more than 20%	not to be reduced by more than 15%	not to be reduced by more than 10%
Toxicants	not to be present at levels producing significant effects	not to be present at levels producing significant effects	not to be present at levels producing significant effects
Chlorophyll-a (running mean of 5 samples)	not to exceed 20 mg/m ³	not to exceed 10 mg/m ³	not to exceed 6 mg/m ³

Appendix G-3

Watercourse Identification for Villages

Table G-3-1: Preliminary Watercourse Identificaton for Sites

Id.	Village Area	Identified Watercourses	Measures
1.	Tai Mei Tuk Village and Government Housing Area	At the government housing area, a water channel is situated at the Southwestern portion of the site, west of the proposed sewer alignment. Within Tai Me Tuk Village, a watercourse runs under the roadway and the proposed main on the north side of the village area.	Care should be taken with stockpiled materials in this location.
2.	Wong Chuk Tsuen Village	A watercourse is located on the eastern border of the site next to Tai Mei-Tuk.	Care should be taken with stockpiled materials in this area.
3.	Lung Mei Village	There is a watercourse located on the eastern portion of the site.	Care should be taken with stockpiled materials in this area.
4.	Lo Tsz Tin Village	A watercourse traverses the middle of the site.	Care should be taken with stockpiled materials in this location.
5.	Ting Kok Village	A watercourse runs along the eastern border of the site.	Care should be taken with stockpiled materials in this location.
6.	Lai Pek Shan San Tsuen Village	There is a watercourse located in the south of the village.	Care should be taken with stockpiled materials in this location.
7.	Po Sam Pai Village	The watercourse runs along the western border of this site.	Care should be taken with stockpiled materials in this location.
8.	San Tau Kok Village	There is a watercourse located on the western portion of the site.	Care should be taken with stockpiled materials in this location.
9.	Wai Ha Village	none within the village.	none
10.	Tsiu Lam Village	A watercourse runs close to the proposed main on eastern edge of village area.	Care should be taken with stockpiled materials in this location.
11.	Tung Tsz Village	There is a watercourse located through the centre of the village area.	Care should be taken with stockpiled materials in this location.
12.	A Shan Tseng Tau Village	The watercourse crosses the just west of village area	Care should be taken with stockpiled materials in this location.
13.	Scout Training Centre	none within the development.	
14.	Shuen Wan Chim Uk Village	none within the village however a water catchment is located on the northern side of main sewer.	none
15.	Shuen Wan Lei Uk Village	none within the development however a water catchment is located on the northern side of main sewer.	none
16.	Sha Lan Village	A proposed pumping station is to be located close to a watercourse and Tolo Harbour	Care should be taken with stockpiled materials at this location.
17.	Home for the Aged	none	none
18.	Sam Mun Tsai New Village	none	none
19.	Luen Yick San Tsuen Village	none	none
20.	Hong Lok Yuen Village	none	none
21.	To Yuen Tung Village	none	none
22.	Yuen Tun Ha Village	none, not sewerred	none
23.	Lo Lau Uk Village	A watercourse runs through the southern regions however this village will not be sewerred	none

Table G-3-1: Preliminary Watercourse Identificaton for Sites (Cont.)

Id.	Village Area	Identified Watercourse	Measures
24.	Ta Tit Yan Village	A watercourse runs through the southern portion of the site however this village will not be sewerred.	none
25.	Tai Po Kau San Wai Village	There is a major watercourse running through this village however this village will not be sewerred.	one
26.	Yintse Lane at Tai Po Kau San Wai	none	none
27.	Cheung Shue Tan Village	A watercourse runs to the south.	Care should be taken with stockpiled materials at this location.
28.	Tai Po Mei Village	A watercourse runs parallel along the western portion of the village area.	Care should be taken with stockpiled materials at this location.
29.	Chek Nai Ping Village	none	none
30.	Fo Tan	none	none
31.	Ho Tung Lau Village	none	none
32.	Lok Lo Ha Village	A watercourse runs through the centre of the village towards the coast.	Care should be taken with stockpiled materials in this area.
33.	Wo Liu Hang Village	none	none
34.	Pat Tsz Wo Village	none	none
35.	Fo Tan Cottage Area Village	Watercourse runs close to the proposed connection between Wong Chuk Yeung and Fo Tan Cottage Area.	Care should be taken with stockpiled materials at this location.
36.	Wong Chuk Yeung Village	See above.	See above.
37.	Ha Wo Che Village	There are ponds located adjacent to main north of village area and stream channels running through the site.	Care should be taken with stockpile materials in this area.
38.	Sheung Wo Che Village	Stream channel on eastern area of site.	Care should be taken with stockpile materials in this area.
39.	To Fung Shan Village	There is a major watercourse running through the site.	Care should be taken with stockpile materials in this area.
40.	Pai Tau Village	Thre is a major watercourse located in the northern portion of the site.	Care should be taken with stockpile materials in this area.
41.	Tung Lo Wan Village	none	none
42.	Tai Lam Liu Village	There is a river running between this village and Wong Nai Tau.	Care should be taken with stockpile materials in this area.
43.	Shek Kwu Lung Village	none	none
44.	Wong Nai Tau Village	A watercourse runs north of this village area.	Care should be taken with stockpiled materials in this area and river crossing.
45.	Fa Sam Hang Village	none, not sewerred.	none
46.	Tai Shui Hang Village	A watercourse runs between the north and south village area.	Care should be taken with stockpiled materials.
47.	Cheung Kang Village	none, not sewerred.	none
48.	Wu Kai Sha New Village	none	none
49.	Lok Wo Sha Village	A watercourse crosses and runs parallel to a proposed foul sewer.	Care should be taken with stockpiled materials at this location.

Appendix H

Ecology

Appendix H-1
Ecological Resources

Table H.1-1: Ecological Resources

Id.	Project Area	Habitat Disturbed	Resource	Impact
1.	Tai Mei Tuk Village and Gov. Housing Area	access road/foot paths and woodland area	wooded area to the south of Tai Mei Tuk Government Housing Area	There is potential for tree damage in the southern portion of the housing area. This area is not considered to be of prime ecological importance. Trees should be impacted as little as possible and revegetation should be carried out after sewer installation.
2.	Wong Chuk Tsuen Village	track/concrete paths	none	none identified
3.	Lung Mei Village	track	none	none identified
4.	Lo Tsz Tin Village	stream bank/roadway	stream	potential sedimentation of stream
5.	Lai Pek Shan San Tsuen Village	road/footpath	none	none identified
6.	Ting Kok Village	roadway/footpath	none	none identified
7.	Po Sam Pai Village	footpath/stream bank	stream	potential sedimentation of stream (already impacted by previous work)
8.	San Tau Kok Village	track/footpath	none	none identified
9.	Wai Ha Village and unmed TDD Development	footpath	none	none identified
10.	Tsiu Lam Village	roadway	none	none identified
11.	Tung Tsz Village	roadway	none	none identified
12.	A Shan Tseng Tau Village	roadway	none	none identified
13.	Scout Training Centre	roadway	none	none identified
14.	Shuen Wan Chim Uk Village	roadway/pathway	none	none identified
15.	Shuen Wan Lei Uk Village			
16.	Sha Lan Village			
17.	Home for the Aged	roadway	none	none identified
18.	Sam Mun Tsai New Village	roadway/tree area	potential loss of trees	There is the potential for tree loss however tree area is not considered to be ecologically significant. The trees in this area should be retained as much as possible.
19.	Luen Yick San Tsuen	roadway	none	none identified
20.	Hong Lok Yuen	roadway	none	none identified
21.	To Yuen Tung Village	roadway/construction site	none	none identified
22.	Yuen Tun Ha Village	-	-	no sewerage proposed for this area.
23.	Lo Lau Uk Village	-	stream/stream banks	no sewerage proposed for this area.
24.	Ta Tit Yan Village	-	-	no sewerage proposed for this area.
25.	Tai Po Kau San Wai Village	road/track, stream crossing (bridge)	stream	no sewerage proposed for this area.
26.	Yin Tse Lane at Tai Po Kau San Wai	-	none	none identified

Table H.1-1: Preliminary Ecological Impact Assessment (Cont.)

Id.	Project Area	Habitat Disturbed	Resource	Impact
27.	Cheung Shue Tan Village	footpaths/roadway	none	none identified
28.	Tai Po Mei Village	footpath/stream/ stream banks/fruit plantation/ hillside scrubland	stream/woodland	There is the potential for stream sedimentation, tree damage or loss. However, tree loss would be mostly of plantation. Tree felling should be avoided as much as possible and revegetation should be carried out once construction works are completed.
29.	Chek Nai Ping Village			
30.	Fo Tan Village	roadway/footpath	none	none identified
31.	Ho Tung Lau Village	existing footpaths and roadways	none	none identified
32.	Lok Lo Ha Village	footpath	none	none identified
33.	Wo Liu Hang Village	footpath/roadway	none	none identified
34.	Pat Tsz Wo Village	roadway	none	none identified
35.	Fo Tan Cottage Area	road	none	none identified
36.	Wong Chuk Yueng Village	footpaths/roadway	none	none identified
37.	Ha Wo Che Village	roadway	none	none identified
38.	Sheung Wo Che Village	roadway	none	none identified
39.	To Fung Shan Village	roadway/residential	none	none identified
40.	Pai Tau Village	roadway/footpath	none	none identified
41.	Tung Lo Wan Village	roadway/footpath	none	none identified
42.	Tai Lam Liu Village	roadway/footpath/ vegetation/stream	tree area	There are two areas that may have unnecessary tree remove in the southern portion of the village. The sewer alignment should follow the existing pathways as much as possible to avoid tree felling.
43.	Shek Kwu Lung Village	roadway/footpath	none	none identified
44.	Wong Nai Tau Village	roadway/footpath	none	none identified
45.	Fa Sam Hang Village		none	no sewerage proposed for this area
46.	Tai Shui Hang Village	roadway	none	none identified
47.	Cheung Kang Village		none	no sewerage proposed for this area
48.	Wu Kai Sha New Village	existing footpaths and roadways	none	none identified
49.	Lok Wo Sha Village	existing footpaths and roadways	none	none identified

萬 碩

Mouchel Asia Limited

24/F., Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong
Telephone: (852) 2566 7522 Fax: (852) 2807 1577