Upgrading of Ting Kok Road Pumping Station No. 5

Final EM&A Review

(December 2005 – April 2008)

August 2008

Report no: 01284R761

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MAEDA

Upgrading of Ting Kok Road Pumping Station No. 5

Final EM&A Review (December 2005 – April 2008)

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Report no: EA01284R0761

Date: July 2008

Certified by Landfill Gas Team Leader
Alexi Bhanja

Hyder Consulting

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1 Executive Summary

Drainage Services Department awarded the contract for the 'Upgrading of Ting Kok Road Pumping Station No. 5' to Maeda Corporation in September 2005. Maeda appointed Hyder Consulting Limited as the Contractor's Landfill Gas (LFG) Team during the construction period. Landfill gas hazard related activities were carried out in the period from December 2005 to the end of April 2008, during this time the EM&A programme was implemented.

This 'Final Environmental Monitoring and Audit Review Report' summarises the results and findings of period from December 2005 to the end of April 2008.

The baseline monitoring results documented in the baseline monitoring report for the Project (our report ref.: EA01284R0022) provided the Action and Limit (A/L) Levels for LFG impact monitoring and also the Action Plan. For methane, A/L Levels are 0.5%/1.0%; for carbon dioxide, A/L Levels are 0.5%/1.5%; and for oxygen, A/L Levels are 19.0%/18.0%.

There have been no non-compliances, complaints or project-related exceedances in Action/Limit (A/L) Levels at the locations monitored under the EM&A programme. All relevant mitigation measures and requirements were implemented.

Site inspections and landfill gas monitoring, were conducted as recommended in the Report on Landfill Gas Hazard Assessment as per Section 8.

As specified by the Contractor, LFG hazard related activities finished on 30 April 2008. The EM&A programme was therefore completed at the end of April 2008.

2 Introduction

2.1 Basic Project Information

Upgrading of Ting Kok Road Pumping Station No. 5 (TKRPS) under North District and Tolo Harbour Sewerage, Sewage Treatment and Disposal – High Priority Works has been implemented based on the findings of the Study *Review of North District and Tolo Harbour Sewerage Master Plan*.

The purpose of the Project was to upgrade TKRPS to cope with the sewerage needs of both existing and future developments along Ting Kok Road up to Tai Mei Tuk. The design pumping capacity of TKRPS has to be increased from 2,888m^3/day to 11,520m^3/day in order to serve the increasing sewage flow along Ting Kok Road.

The scope of works included construction of a new pumping station, laying of about 350m long twin 450mm diameter rising mains and 250m long 600mm diameter gravity sewer, and demolition of the existing pump pit. The main pumping station, transformer room, gravity sewers, manholes and boundary wall (except the twin rising mains) have been relocated to outside the existing passive vent trench of the adjacent Shuen Wan Landfill.

There are six village houses located about 60m away from the boundary of the pumping station. The pumping station upgrading works therefore constitutes a Designated Project under type F.3(b)(i) in Schedule 2 of the Environmental Impact Assessment Ordinance. A Project Profile (PP) for direct application of the Environmental Permit (EP) (Application No.DIR-115/2005) was approved by the Environmental Protection Department (EPD) in March 2005 and an EP (EP-212/2005) was granted in April 2005, prior to the commencement of the upgrading works.

Drainage Services Department awarded the contract for the upgrading of TKRPS to Maeda Corporation in September 2005. Maeda appointed Hyder Consulting Limited as the Contractor's LFG Team (LGT) during the construction period. The construction contract commenced in September 2005 and the total construction period is approximately 30 months.

Close proximity of the Project to Shuen Wan Landfill (within the 250m Consultation Zone of Shuen Wan Landfill) means there is a hazard of LFG being released during excavation works for substructure of pumping station, transformer room and associated rising mains and gravity sewers. As such, a *Report on Landfill Gas Hazard Assessment* has been prepared previously (as Appendix E to the PP) in accordance with EPD's *Landfill Gas Hazard Assessment Guidance Note* and the *Practice Note for Professional Persons – Landfill Gas Hazard Assessment for Development Adjacent to Landfills*.

2.2 Management Structure and Project Organisation

The Engineer (DSD) is responsible for overseeing the construction works and ensuring that they are undertaken by the Contractor (Maeda) in accordance with the specification and contractual requirements. The Contractor shall report to the Engineer. The LGT is employed by the Contractor and responsible for conducting the EM&A programme. The IC(LG) shall advise the Engineer on LFG issues related to the Project.

The key personnel contact names and telephone number are summarised in Table 2-1. The project organisation is shown in Appendix 1.

Party	Position	Name:	Tel. No.:
Project Proponent – DSD	Project Manager	Raymond LEE	2594 7457
	Engineer's Representative	Lap Kei TSANG	2594 7459
Contractor – Maeda	Site Agent	George CHEUNG	9268 1918
LGT – Hyder Consulting	LGT Leader	Alexi BHANJA	2911 2916
IC(LG) –CH2M HILL	IC(LG)	Edward YIP	2872 2951

Table 2-1 Contact Details for Key Project Personnel

2.3 Construction Programme

Construction programme of the Project is attached in Appendix 2. As can be seen, all works carried out during the project have been carried out with the required LFG control measures (e.g. LFG monitoring for "hot works").

2.4 Works Undertaken

Works undertaken during the Project included:

- Construction of mini-piles
- Temporary Works for Construction of TKRPS
- Driving of sheet piles
- Excavation
- Laying of 600mm Gravity Sewer and 450mm Twin Rising Mains
- Construction of TKRPS
- Finishings
- Laying of Cable Ducts
- Construction of Cable Drawpits
- Construction of Road Drainage
- Demolition of the Existing Pump Pit

- Construction of Concrete Carriageway
- Grouting of Existing Disused Pipes
- Construction of Boundary Walls

3 Brief Summary of EM&A Requirements

3.1 Monitoring Parameters

During the construction phase, impact monitoring of LFG has been carried out in accordance with the *Report on Landfill Gas Hazard Assessment* at the selected locations. LFG parameters oxygen, methane and carbon dioxide were monitored. Temperature was also recorded but this is not a LFG parameter.

3.2 Monitoring Equipment

Table 4-3 shows the equipment list for LFG monitoring.

Equipment	Manufacturer / Serial Nos.
GFM410	GAS DATA LTD / 10239

Table 3-2 Equipment List for LFG Monitoring

3.3 Event and Action Levels/Plans

The baseline monitoring results documented in the baseline monitoring report for the Project (our report ref.: EA01284R0022) provided the Action and Limit (A/L) Levels for LFG impact monitoring and also the Action Plan. As per the *Report on Landfill Gas Hazard Assessment*, and in keeping with the standard presentation of LFG EM&A in other projects, both the A/L Levels and Action Plan are shown in the same table.

Table 4-4 shows the combined A/L Level and Action Plan for the Project, to be triggered if the LFG criteria are exceeded at fixed locations M2 or MH3, or at any of the variable locations:

Parameter	A/L Level	Action Plan
Oxygen	<19%	– Ventilate to restore oxygen to > 19%
	<18%	– Stop works – Evacuate personnel/prohibit entry – Increase ventilation to restore oxygen to >19%
Methane	>10% LEL (i.e. > 0.5 % by volume)	– Prohibit hot works – Ventilate to restore methane to < 10% LEL
	> 20% LEL (i.e. > 1% by volume)	– Stop works – Evacuate personnel/prohibit entry – Increase ventilation to restore methane to < 10% LEL
Carbon Dioxide	>0.5%	– Ventilate to restore carbon dioxide to <0.5%
	>1.5%	– Stop works – Evacuate personnel/prohibit entry – Increase ventilation to restore carbon dioxide to >0.5%

Table 3-3 Action and Limit Levels and Action Plan for Landfill Gas

3.4 Mitigation Measures & Requirements in Contract Documents

Measures for mitigating LFG hazards during the construction works have been stated clearly in the *Report on Landfill Gas Hazard Assessment*, which forms part of the contract documents Specification.

Section 4.2 and Appendix 5 summarise the mitigation measures and requirements as well as the implementation status.

4 Summary of Implementation Status of Environmental Protection

4.1 Project Area and Monitoring Locations

The site is located at Ting Kok Road in Tai Po, and the major items to be constructed were located outside the existing passive vent trench of the adjacent Shuen Wan Landfill, which has been restored and is currently being monitored.

The impact monitoring locations specified in the *Report on Landfill Gas Hazard Assessment* comprise "utilities' manholes and chambers" (i.e. fixed locations for purposes of environmental protection) and at excavations of 1m depth or more (i.e. variable locations for purposes of worker safety).

An 11m-deep borehole, designated "M1", was installed by the Contractor (in addition to contract requirements) to provide an "early warning" of potential LFG problems that could affect surface trenches. It was not intended that M1 form part of the EM&A programme, since conditions deep below the surface do not fall within the scope of the EM&A programme (i.e. manholes and excavations >1m).

However, as works progressed, Borehole M1 clashed with the boundary wall construction and was dismantled on 30 August 2007. It was not proposed to replace Borehole M1 since its purpose was only to provide an early warning of potential LFG problems for surface trench works, which were by then almost completed. Besides, as advised by the Contractor, future construction did not involve excavation of more than 3-m. Therefore, monitoring at Manhole M3 was used to serve the same purpose as the dismantled Borehole M1. As Borehole M1 did not form part of the EM&A programme, there was no impact to the effectiveness of the EM&A programme after Borehole M1 was dismantled.

In terms of fixed monitoring locations, the Baseline Report identified two existing manholes (M2 and M3). Manhole M2, however, was dismantled in July 2006 because of planned works and therefore monitoring at M2 was terminated from July 2006 onwards. LFG had never been detected at M2 and so it was not considered that termination of monitoring at this location would have any significant impact on the overall effectiveness of the environmental monitoring programme, as monitoring at manhole M3 continued. There were no other suitable manholes within the site that could be monitored in lieu of M2.

As works progressed, connection of the gravity sewer to the new pumping system was completed in Ting Kok Road. As such, the existing pump pit, together with the fixed monitoring location M3, was demolished in December 2007. A manhole MH3 (approximately 4m depth and 3m next to M3) of the new system was constructed as an alternative monitoring station to serve the same purpose of M3.

In terms of variable monitoring locations, these changed from month to month, depending on site activities. The fixed monitoring locations are described in Table 4-4.

Monitoring Station ID	Description
M1	New Deep Borehole (11m deep)
M2	Existing Manhole (2m deep)
M3	Existing Manhole (3m deep)
MH3	Constructed Manhole (4m deep)

Table 4-4 Fixed Monitoring Locations for LFG EM&A

The Project Area is shown in Appendix 3 and the fixed monitoring locations are shown in Appendix 4.

4.2 LFG Control Measures

The summary of the mitigation measures implemented by the Contractor is listed in Appendix 5. All LFG hazard control measures have been implemented as stipulated in the contract documents and in the *Report on Landfill Gas Hazard Assessment.*

4.3 LFG Monitoring

4.3.1 Fixed Location Monitoring

During the reporting period, LFG was monitored at the fixed locations M2, M3 and MH3 for purposes of environmental protection, and in deep borehole M1 to show 'early warning' of LFG levels. This is shown in Table 6-5, below:

Fixed Monitoring Station	Date of measurement	Gas Concentration (%)			Temp. (^{0}C)	Remarks
		Methane	Carbon Dioxide	Oxygen		
M1	22-Dec-05	0.0	0.0	20.5	14.2	
M2		0.0	0.0	19.7	15.3	
M3		0.0	0.0	20.5	14.7	
M1	4-Jan-06	0.0	0.3	20.3	24.6	
M2		0.0	0.0	20.3	23.5	
M3		0.0	0.1	20.3	23.8	
M1	3-Feb-06	0.0	**1.0**	20.3	19.0	
M2		0.0	0.0	20.6	18.8	
M3		0.0	0.0	20.7	18.8	
M1	1-Mar-06	0.0	**0.9**	20.2	9.4	
M2		0.0	0.1	20.5	10.9	
M3		0.1	0.1	20.5	11.3	

Fixed Monitoring Station	Date of measurement	Gas Concentration (%)			Temp. (^{0}C)	Remarks
		Methane	Carbon Dioxide	Oxygen		
M2	3-Apr-06	0.1	0.1	20.3	27.5	
M3		0.2	0.3	19.9	27.5	
M2	10-May-06	0	0	20.4	37.6	
M3		0.1	0.3	20.0	41.7	
M2	3-Jun-06	0.0	0.0	20.3	27.3	
M3		0.1	0.2	19.8	27.0	
M1	27-Jul-07	0.0	0.0	19.7	28.9	
M3		0.0	0.0	19.8	28.9	
M1	29-Aug-07	0.0	0.0	19.8	25.8	
M3		0.0	0.0	19.8	25.8	
M3	25-Sep-07	0.0	0.0	20.7	28.1	
M3	29-Oct-07	0.0	0.0	20.6	23.4	1m depth
M3		0.0	0.0	20.7	23.4	3m depth
M3	26-Nov-07	0.0	0.0	20.6	19.7	1m depth
M3		0.0	0.0	20.5	20.2	3m depth
MH3	21-Dec-07	0.0	0.0	20.9	20.0	1m depth
MH3		0.0	0.0	20.9	20.0	3m depth
M1	26-Jan-07	0.0	0.0	20.4	16.2	
M3		0.0	0.0	20.4	16.2	
M1	27-Feb-07	0.0	0.0	20.4	19.8	
M3		0.0	0.0	20.3	19.8	
M1	26-Mar-07	0.0	0.0	20.3	23.5	
M3		0.0	0.0	20.3	23.5	
M1	26-Apr-07	0.0	0.0	19.8	22.0	
M3		0.0	0.0	19.6	22.0	
M1	26-May-07	0.0	0.0	19.6	30.0	
M3		0.0	0.0	19.8	30.0	
M1	29-Jun-07	0.0	0.0	19.7	30.0	
M3		0.0	0.0	19.8	30.0	
M3	27-Jul-07	0.0	0.0	19.8	28.9	
M1	29-Aug-07	0.0	0.0	19.8	25.8	
M3		0.0	0.0	19.8	25.8	
M3	25-Sep-07	0.0	0.0	20.7	28.1	1m depth
M3		0.0	0.0	20.7	28.1	3m depth

Fixed Monitoring Station	Date of measurement	Gas Concentration (%)			Temp. (^{0}C)	Remarks
		Methane	Carbon Dioxide	Oxygen		
M3	29-Oct-07	0.0	0.0	20.6	23.4	1m depth
M3		0.0	0.0	20.7	23.4	3m depth
M3	29-Nov-07	0.0	0.0	20.5	16.8	1m depth
M3		0.0	0.0	20.6	23.4	3m depth
MH3	21-Dec-07	0.0	0.0	20.9	20	1m depth
MH3		0.0	0.0	20.9	20	3m depth
MH3	29-Jan-08	0.0	0.0	20.9	10	1m depth
MH3		0.0	0.0	20.9	10	3m depth
MH3	28-Feb -08	0.0	0.0	20.6	11	1m depth
MH3		0.0	0.0	20.6	11.5	3m depth
MH3	27-Mar-08	0.0	0.0	20.6	23.0	1m depth
MH3		0.0	0.0	20.6	23.5	3m depth
MH3	18-Apr-08	0.0	0.0	20.7	25.0	1m depth
MH3		0.0	0.0	20.7	25.0	3m depth

Note : **bold** indicates an exceedance of Action Level and **bold** indicates exceedance of Limit Level

Table 4-5 Monitoring Results at fixed locations

With true exception of manhole M1 in February and March 2006, there have been no exceedances of A/L Levels at any of the fixed or variable monitoring locations that form part of the EM&A programme. At Manhole M1 there were exceedances for carbon dioxide with a level of 1% in February 2006 and 0.9% in March 2006. As M1 is a fixed location which is not part of the excavation works, there were no safety-related issues. Location M1 is not affected by any ongoing Works and so these exceedances are not considered to be due to the construction activities, nor were they considered to be non-compliances in terms of the EM&A programme and implementation of the Action/Event Plan.

Appendix 4 shows the position of each fixed monitoring station.

The field measurement recording sheets for February and March 2006, showing the two exceedances for M1 are provided in Appendix 6 for easy reference. All other field measurement recording sheets show no exceedance for all parameters and so have not been included.

4.3.2 Variable Locations

During the construction period, LFG was monitored at variable locations (for purposes of worker safety) within Portions 4 to 7, as shown in Appendix 3. Readings were taken for safety-related reasons during piling works, trench excavation, hot works, post-drilling work and the construction of the temporary drainage system.

There were no exceedances for A/L Levels at any variable locations during the Project. Field measurement recording sheets for all locations show no exceedance for all parameters and so have not been included.

5 Summary of Non-Compliance, Complaints and Remedial Measures

EPD conducted 13 no. site inspections during this Project. No adverse comment was given.

There were no non-compliances on the project and no complaints regarding LFG were received during the whole EM&A programme, as summarized in Table 5-6:

Summary	Total No.	No. to follow-up
Non-compliance	0	0
Complaints	0	0

Table 5-6 Summary of non-compliances and complaints

6 Review and Conclusions

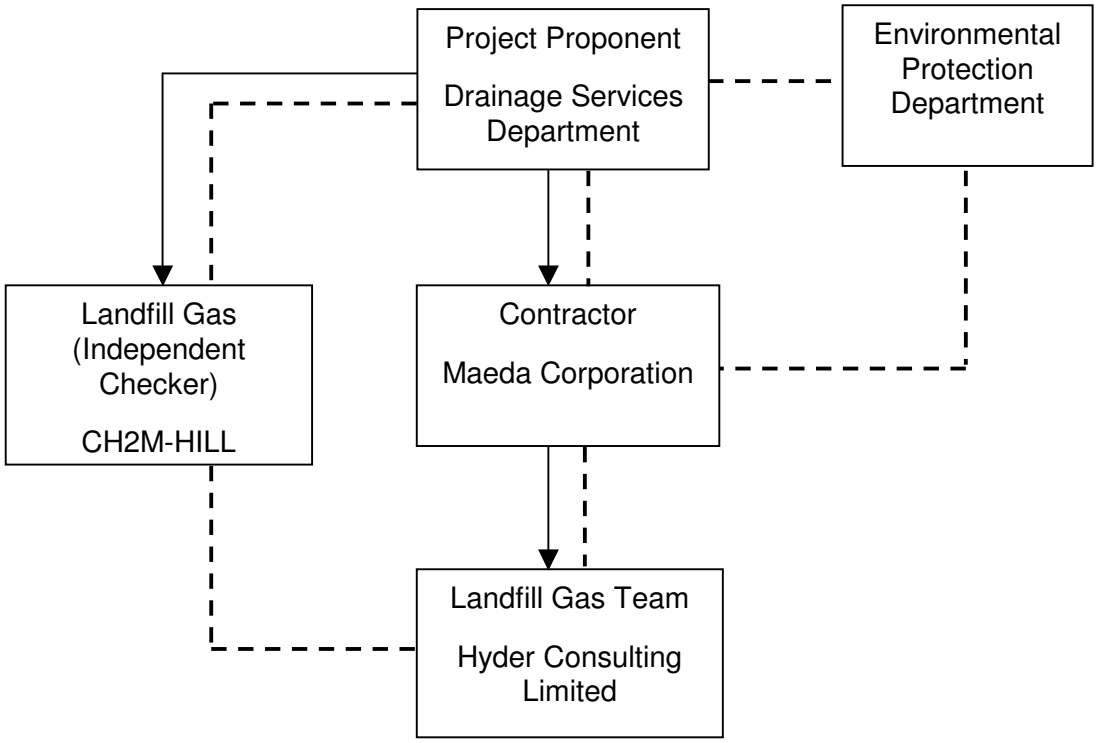
There have been no non-compliances, no complaints and no LFG-related accidents were recorded during the Project.

There have been no exceedances in A/L level at any monitoring locations, except for manhole M1 in February and March 2006, which did not pose any safety concerns. Furthermore, the required site inspections have been conducted and no deficiencies, i.e. non-compliances, were noted. EPD conducted 13 no. site inspections during the monitoring programme and no adverse comments have been reported.

In conclusion, the Contractor has performed and carried out their work in accordance with the requirements of *The Report on Landfill Gas Hazard Assessment*, Section 8 (Environmental Monitoring and Audit). Thus, the EM&A programme is considered to have been successful for the entire project period.

Appendix 1

Project Organisation



Line of communication

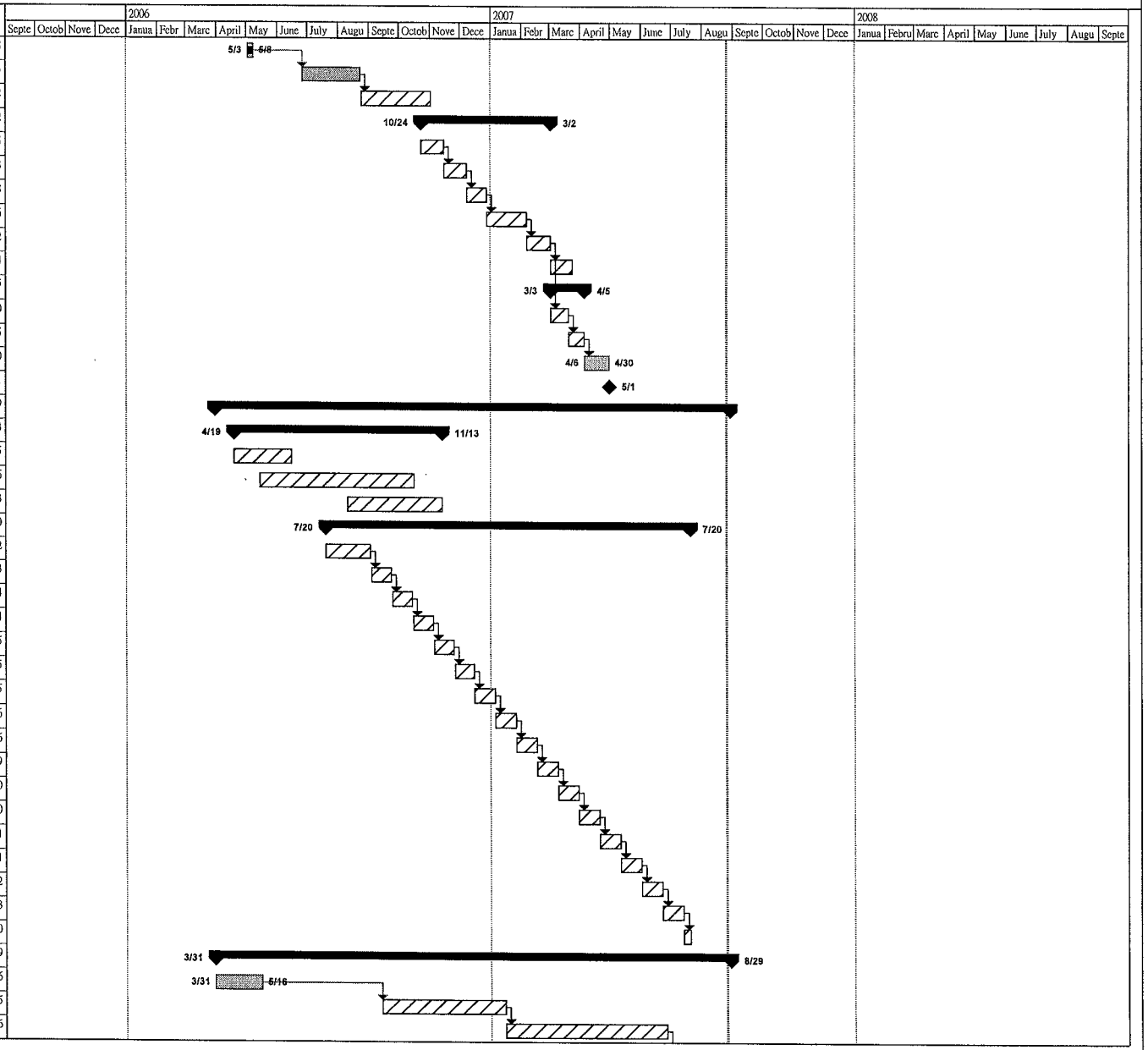
Line of Authority

Appendix 2

Construction Programme

Maeda Corporation
Contract No. DC/2005/01
Expansion of Shek Wu Hui Sewage Treatment Works and
Upgrading of Ting Kok Road Pumping Station No.5
Master Programme (Rev. 6A)

ID	Task Name	Duration	Start	Finish
295	General Excavation & Trial Trench	5 days	Wed 06/5/3	Mon 06/5/8
296	Sheet Piling	50 days	Tue 06/6/27	Wed 06/8/23
297	ELS Works for Pumping Station No. 5	60 days	Fri 06/8/25	Thu 06/11/2
298	Sub-structure works for Pumping Station No. 5	113 days	Tue 06/10/24	Fri 07/3/2
299	Lift 1 (from -4.08 mPD to -2.35 mPD)	20 days	Tue 06/10/24	Wed 06/11/15
300	Lift 2 (from -2.35mPD to -1.25 mPD)	20 days	Thu 06/11/16	Fri 06/12/8
301	Lift 3 (from -1.25 mPD to +2.5mPD)	18 days	Sat 06/12/9	Thu 06/12/28
302	Lift 4 (from +2.50mPD to +5.30mPD)	34 days	Fri 06/12/29	Tue 07/2/6
303	Lift 5 (from +2.50mPD to +6.30mPD)	21 days	Wed 07/2/7	Fri 07/3/2
304	Water Tightness Test	19 days	Sat 07/3/3	Sat 07/3/24
305	Superstructure works for Pumping Station No. 5	29 days	Sat 07/3/3	Thu 07/4/5
306	Lift 6 (from +6.30mPD to +13.20mPD)	15 days	Sat 07/3/3	Tue 07/3/20
307	Lift 7 (from +13.20mPD to +14.30mPD)	14 days	Wed 07/3/21	Thu 07/4/5
308	Internal Finishes (incl. Plumbing, cat ladder, etc.)	21 days	Fri 07/4/6	Mon 07/4/30
309	Key date of Section 6 of the Works	1 day	Tue 07/5/1	Tue 07/5/1
310	Section 7 of the Works	444 days	Fri 06/3/31	Wed 07/8/29
311	Pipe Jacking	179 days	Wed 06/4/19	Mon 06/11/13
312	TL2	50 days	Wed 06/4/19	Thu 06/6/15
313	TL3	133 days	Mon 06/5/15	Mon 06/10/16
314	TL1	81 days	Fri 06/8/11	Mon 06/11/13
315	Twin 450mm Rising Mains	315 days	Thu 06/7/20	Fri 07/7/20
316	Portion 1 (12m)	39 days	Thu 06/7/20	Sat 06/9/2
317	Portion 2 (24m)	18 days	Mon 06/9/4	Sat 06/9/23
318	Portion 3 (24m)	18 days	Mon 06/9/25	Sat 06/10/14
319	Portion 4 (24m)	18 days	Mon 06/10/16	Sat 06/11/4
320	Portion 5 (24m)	18 days	Mon 06/11/6	Sat 06/11/25
321	Portion 6 (24m)	18 days	Mon 06/11/27	Fri 06/12/15
322	Portion 7 (24m)	18 days	Sat 06/12/16	Fri 07/1/5
323	Portion 8 (24m)	18 days	Sat 07/1/6	Fri 07/1/26
324	Portion 9 (24m)	18 days	Sat 07/1/27	Fri 07/2/16
325	Portion 10 (24m)	18 days	Sat 07/2/17	Fri 07/3/9
326	Portion 11 (24m)	18 days	Sat 07/3/10	Fri 07/3/30
327	Portion 12 (24m)	18 days	Sat 07/3/31	Fri 07/4/20
328	Portion 13 (24m)	18 days	Sat 07/4/21	Fri 07/5/11
329	Portion 14 (24m)	18 days	Sat 07/5/12	Fri 07/6/1
330	Portion 15 (24m)	18 days	Sat 07/6/2	Fri 07/6/22
331	Portion 16 (12m)	18 days	Sat 07/6/23	Fri 07/7/13
332	Pressure Test & CCTV	6 days	Sat 07/7/14	Fri 07/7/20
333	Gravity Sewers and Manholes	444 days	Fri 06/3/31	Wed 07/8/29
334	Excavation of Trial Pits	40 days	Fri 06/3/31	Tue 06/5/16
335	Stage 2 (MH8 - MH9)	107 days	Thu 06/9/14	Mon 07/1/15
336	Stage 1 and 1A(V.O. MH8 - MH7A - MH7)	139 days	Tue 07/1/16	Tue 07/6/26

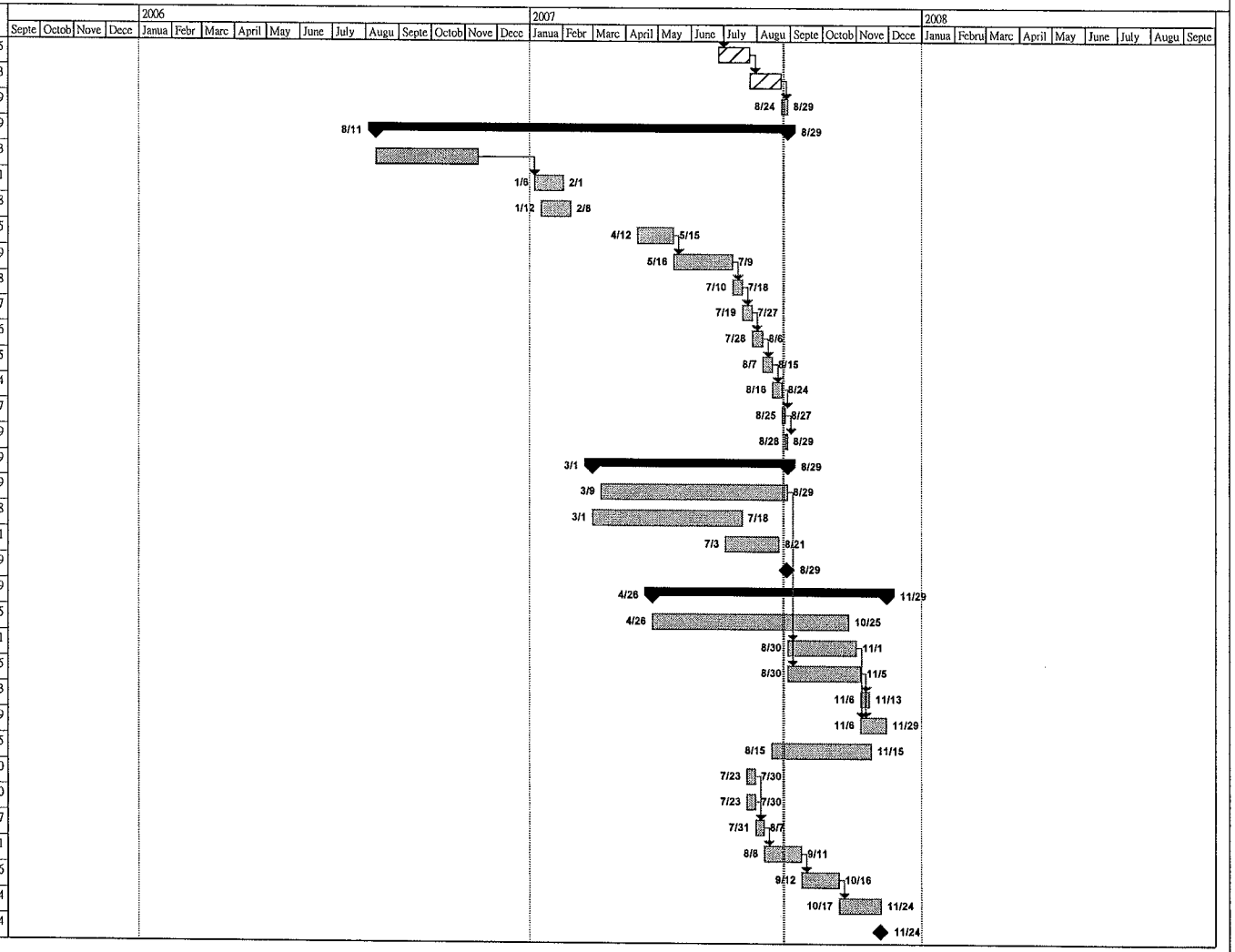


Date: Sat 07/8/25

Task | Progress | Summary | Rolled Up Critical Task | Rolled Up Progress | External Tasks
Critical Task | Milestone | Rolled Up Task | Rolled Up Milestone | Split | Project Summary

Maeda Corporation
Contract No. DC/2005/01
Expansion of Shek Wu Hui Sewage Treatment Works and
Upgrading of Ting Kok Road Pumping Station No.5
Master Programme (Rev. 6A)

ID	Task Name	Duration	Start	Finish
337	Stage 3 (MH9 - MH10)	25 days	Wed 07/6/27	Wed 07/7/25
338	Stage 4 (MH10 - Existing Manhole)	25 days	Thu 07/7/26	Thu 07/8/23
339	CCTV Inspection	5 days	Fri 07/8/24	Wed 07/8/29
340	Ting Kok Road Pumping Station No. 5 (Pipeworks)	330 days	Fri 06/8/11	Wed 07/8/29
341	Laying Sewer MH6 - MH5 (by trenchless method)	81 days	Fri 06/8/11	Mon 06/11/13
342	Construction of MH6	23 days	Sat 07/1/6	Thu 07/2/1
343	Construction of MH5	24 days	Fri 07/1/12	Thu 07/2/8
344	Sheet Piling and Excavation (Type E & F)	29 days	Thu 07/4/12	Tue 07/5/15
345	Laying Sewer MH5 - MH4	47 days	Wed 07/5/16	Mon 07/7/9
346	Construction of MH4	8 days	Tue 07/7/10	Wed 07/7/18
347	Laying Sewer MH4 - MH3	8 days	Thu 07/7/19	Fri 07/7/27
348	Construction of MH3	8 days	Sat 07/7/28	Mon 07/8/6
349	Construction of MH 13	8 days	Tue 07/8/7	Wed 07/8/15
350	Connection of MH 3 to Existing Sewer	8 days	Thu 07/8/16	Fri 07/8/24
351	Testing of pipeline	2 days	Sat 07/8/25	Mon 07/8/27
352	CCTVInspection	2 days	Tue 07/8/28	Wed 07/8/29
353	Remaining Works for P/S and T/H	156 days	Thu 07/3/1	Wed 07/8/29
354	Civil works for E&M installation (Cable Ducts & Draw Pits)	149 days	Fri 07/3/9	Wed 07/8/29
355	External Finishes	120 days	Thu 07/3/1	Wed 07/7/18
356	Roofing Finishes	43 days	Tue 07/7/3	Tue 07/8/21
357	Key Date of Section 7 of the Works	1 day	Wed 07/8/29	Wed 07/8/29
358	Section 8 - All Remaining Works	187 days	Thu 07/4/26	Thu 07/11/29
359	E&M installation (by Others)	157 days	Thu 07/4/26	Thu 07/10/25
360	External Cable Duct, Drainage & Catchpit	55 days	Thu 07/8/30	Thu 07/11/1
361	Construction of Boundary Wall	58 days	Thu 07/8/30	Mon 07/11/5
362	Demolition of Existing Boundary Wall	7 days	Tue 07/11/6	Tue 07/11/13
363	Road Paving	21 days	Tue 07/11/6	Thu 07/11/29
364	Testing and Commissioning (by Others)	80 days	Wed 07/8/15	Thu 07/11/15
365	Connection to MH F2	7 days	Mon 07/7/23	Mon 07/7/30
366	Connection to MH1	7 days	Mon 07/7/23	Mon 07/7/30
367	Demolition of existing pumping pit	7 days	Tue 07/7/31	Tue 07/8/7
368	Grouting for Existing Sewer & Manhole	30 days	Wed 07/8/8	Tue 07/9/11
369	Landscaping	30 days	Wed 07/9/12	Tue 07/10/16
370	Establishment works	34 days	Wed 07/10/17	Sat 07/11/24
371	Key Date of Section 8 of the Works	1 day	Sat 07/11/24	Sat 07/11/24

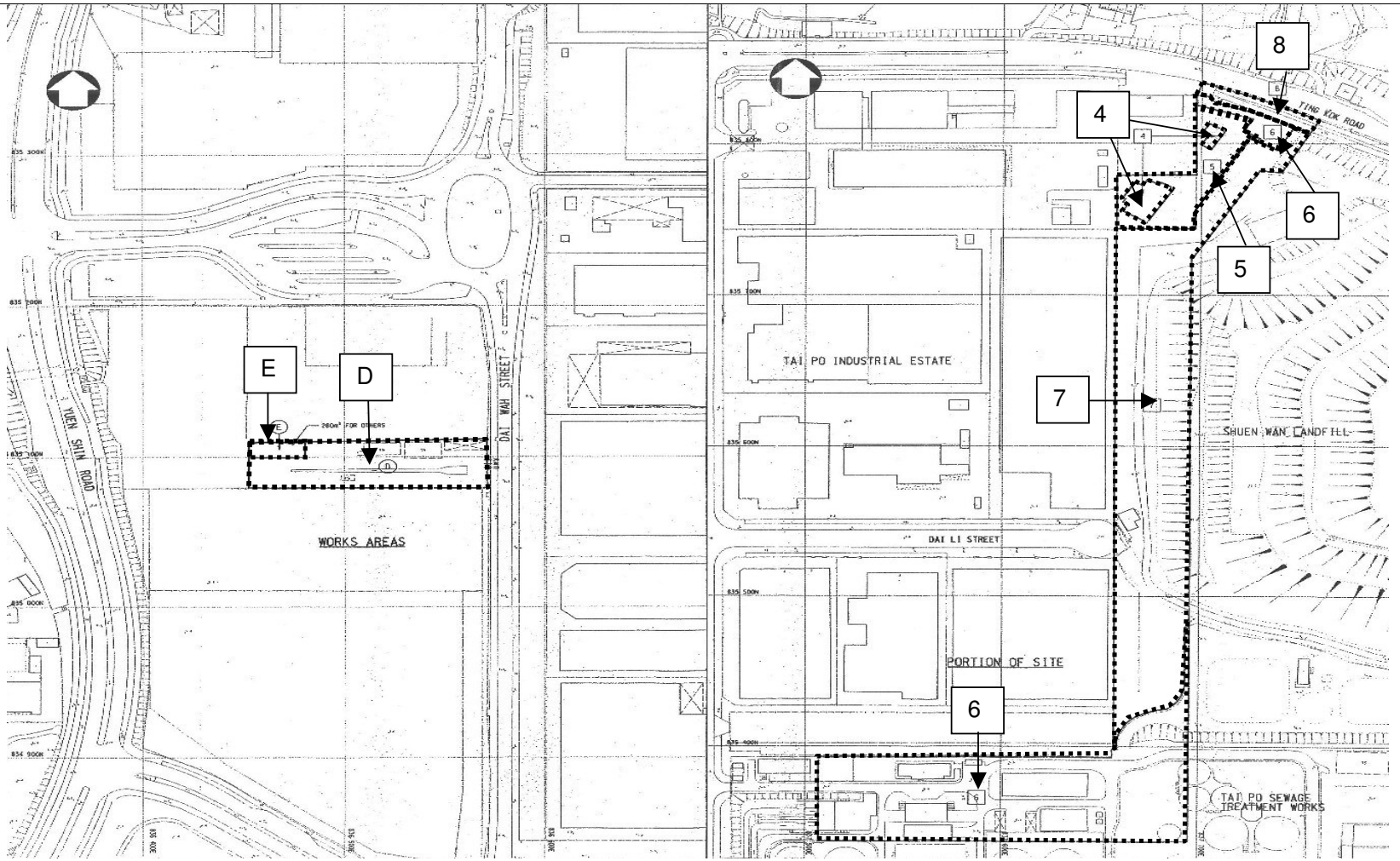


Date: Sat 07/8/25

Task | Progress | Summary | Rolled Up Critical Task | Rolled Up Progress | External Tasks
Critical Task | Milestone | Rolled Up Task | Rolled Up Milestone | Split | Project Summary

Appendix 3

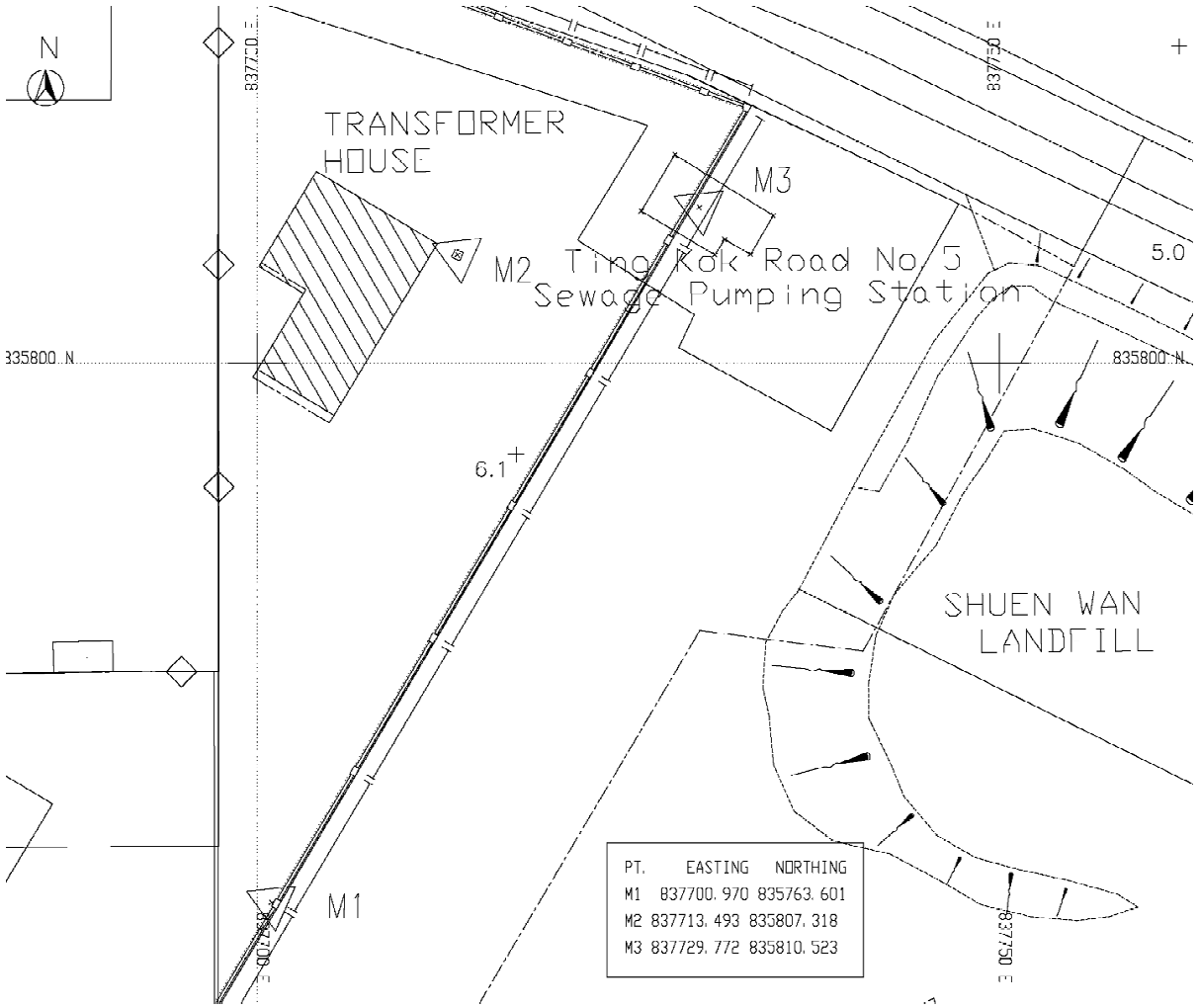
Location of Works and Project Area



Hyder Consulting	MAEDA	Title: Upgrading of Ting Kok Road Pumping Station No. 5 – Portion of Site and Works Area	Date: Dec 2005 Figure: N.A. Scale: NTS

Appendix 4

Fixed Monitoring Locations



Hyder Consulting	MAEDA	Title: Upgrading of Ting Kok Road Pumping Station No. 5 – LFG Monitoring Station	Date: Dec 2005 Figure: N.A. Scale: NTS

Appendix 5

Updated Implementation Schedule

Section	Environmental Protection Measure	Status	Location	Implementation Agent	Implementation Stage	Relevant Legislation & Guidelines
6.1	Safety officer, trained in the use of gas detection equipment and landfill gas-related hazards should be appointed on site throughout the ground works phase. The Safety Officer should be provided with intrinsically safe portable instruments, appropriately calibrated and capable of measuring the following gases in the ranges indicated: methane 0-100% LEL and 0-100% by volume; carbon dioxide 0-100%;and oxygen 0-21%	Y	Within the work site	Contractor	Construction	Code of practice on Safety and Health at Work in Confined Space. Landfill Gas Hazard Assessment Guidance Note (EPD/TR8/97)
6.2	No smoking and naked flames should be allowed.	Y				Landfill Gas Hazard Assessment Guidance Note (EPD/TR8/97)
6.2	No worker should work alone at any time in the confined area or any excavation trenches.	Y				
6.2	Construction equipment should be equipped with a vertical exhaust at least 0.6m above ground level and/or with spark arrestors	Y				
6.2	Electrical motors and electrical extension cords should be explosion-proof or intrinsically safe.	N/A				
6.2	Welding, flame-cutting or other hot works should only be carried out in trenches or confined spaces when controlled by a 'permit to work' procedure, properly authorized by the Safety Officer.	N/A				
6.2	Forced ventilation should be required for workers, if in a trench deeper than 1m.	N/A				

Section	Environmental Protection Measure	Status	Location	Implementation Agent	Implementation Stage	Relevant Legislation & Guidelines
6.2	During piping assembly or conducting construction, all valves/seals should be closed as installed to prevent the migration of gases through the pipeline/conduit. Forced ventilation and gas monitoring should be performed before staff entering and working in large diameter pipe.	N/A	Within the work site	Contractor	Construction	Landfill Gas Hazard Assessment Guidance Note (EPD/TR8/97)
6.2	The Safety Officer should set down the monitoring frequency and areas prior to commencement of construction works.	Y				
6.2	Daily and routine monitoring should be carried out in all excavations.	Y				
6.2	All measurements in excavations should be made with the extended monitoring tube located not more than 10mm from the exposed ground surface. Monitoring should be performed properly to make sure that the area is free of landfill gas before any man enters the area.	Y				
6.2	For excavations deeper than 1m, measurement should be carried out: ▪ at the ground surface before excavation commences; ▪ immediately before any worker enters the excavation; ▪ at the beginning of each half working day (i.e morning and afternoon) for the entire period the excavation remains open; and ▪ periodically through the working day whilst works are in the excavation.	N/A				

Section	Environmental Protection Measure	Status	Location	Implementation Agent	Implementation Stage	Relevant Legislation & Guidelines
6.2	For excavations between 300mm and 1m deep, measurements should be carried out: ▪ Directly after the excavation has been completed; and ▪ Periodically whilst the excavation remains open.	Y				
6.2	The landfill gas precautionary measures involved with excavation and piping works should be included in the Safety Plan.	Y	Within the work site	Contractor	Construction	Landfill Gas Hazard Assessment Guidance Note (EPD/TR8/97)
6.3	The cracks on the ground level at the working area should be monitored during ground-works construction	N/A				
6.4	Where there are any temporary site offices, or any other buildings that have enclosed spaces with the capacity to accumulate landfill gas, then they should either: ▪ Be located on an area which has been proved to be free of landfill gas and monitored manually by the Safety officer or an approved and appropriately qualified person to ensure that hazardous concentration of landfill gas does not occur; or ▪ Be raised clear of the ground. If buildings are raised clear of the ground, a minimum, clear separation distance should be 500mm.	Y				
6.5	Such offices or buildings should be provided with some kinds of control of gas by mechanical means e.g. forced ventilation using fans or blowers.	Y				
6.6	Adequate fire extinguishing equipment, fire-resistant clothing and breathing apparatus (BA) sets should be made available on site.	Y				

Section	Environmental Protection Measure	Status	Location	Implementation Agent	Implementation Stage	Relevant Legislation & Guidelines
6.7	Periodic environmental monitoring report with LFG control measures evaluation during construction phase should be provided by contractor and submitted to SP/DSD and EPD.	Y				
7.1	When service voids, manholes or inspection chambers within the proposed site are entered for maintenance, monitoring and a checklist system of safety requirements should be performed before entry.	N/A	Manhole/ chamber	DSD	Operation	Code of Practice on Safety and health at Work in Confined Spaces
7.2	A procedure should be developed as part of the station operation to respond to gas detector alarms. The detection system should be maintained and calibrated regularly in accordance with the manufacturer's recommendations. In the event of a power failure, the detectors should have an 8-hour battery back-up system, and the procedures should indicate for manual monitoring in the station in the event of prolonged power failure (or longer than 8 hours).	N/A	Pumping station			
7.3	Forced ventilation should be used if methane of more than 0.5% (by volume) in the internal atmosphere (e.g. in service voids, manholes, inspection chambers or rooms as mentioned above) in detected.	N/A	Manhole/ chamber/ pumping station			
7.4	No person should enter or remain in a confined spaces or trenches where the carbon dioxide concentration exceed 1.5% (by volume).	N/A				
7.5	Oxygen concentration should be monitored and no person should enter or remain in any confined spaced or trenches where the oxygen content of air has fallen below 18% by volume.	N/A				

Section	Environmental Protection Measure	Status	Location	Implementation Agent	Implementation Stage	Relevant Legislation & Guidelines
7.6	All the access to these confined spaces would be restricted only to authorize personnel who should be aware of the LFG hazard. No member of general public should be permitted or allowed to access these confined spaces, manholes or inspection chambers.	N/A				

Note:

Y – Implemented

N – Not Implemented

N/A – Not Applicable

Appendix 6

Field Measurement Recording Sheets

FAX

ANNEX A

Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Ting Kok Road Pumping station No.5
Date of measurement: 3 Feb 2006

Sampling equipment used:	Dates calibrated
GA 2000	04/11/05
Serial no. GA08277	

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes: Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
No1	3 Feb 06	8:39am	Fine	78.7	0	1.0	20.3	19.0	$CO_2 > 0.5\%$
Ma2	3 Feb 06	8:41am	Fine	79.4	0	0	20.6	18.8	
Ma3	3 Feb 06	8:36am	Fine	79.3	0	0	20.7	18.8	

28 FEB 2006
Hyder Consulting Limited
Date received 0006-11831
Rec no. EAV
Div/Dep GW
Manager
Date received 28 FEB 2006
For Action | Info | Copy | Date
SO | | SO | 28/2/06
LKY | | |
AB | | |
Copy to
Reply to
Rec no. EA01284-03

Field Technician: Jacqueline Yip

Checked by: (SO)

ANNEX A
Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tung Kok Road Pumping Station No. 5
Date of measurement:

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no. GA 08277	04/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes: Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	4 Feb 06	9:30	Cloudy	79.1	0	0	20.8	16.1	Bar Sun
Portion 4	4 Feb 06	13:02	Fine	79.2	0	0	20.7	18.6	Hot work
"	"	13:04	Fine	79.2	0	0	20.7	18.6	
Portion 4	6 Feb 06	8:15	Fine	79.1	0	0	20.8	15.9	Hot
"	"	8:16	Fine	79.1	0	0	20.7	15.8	Work.
Portion 7	6 Feb 06	8:19	Fine	79.2	0	0	20.6	16.0	Sheet
Portion 7	"	8:20	"	79.1	0	0	20.7	16.0	piling.
Portion 4	6 Feb 06	12:12	Fine	79.1	0	0	20.8	23.2	Hot
"	"	12:14	"	79.1	0	0	20.8	23.1	work
Portion 7	"	12:15	"	79.2	0	0	20.7	23.1	sheet
"	"	12:16	"	79.1	0	0	20.8	23.0	piling.

Field Technician: Lam Kong (TA)

Checked by: (SO)

ANNEX A

Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tung Kok Road Pumping Station N.T.
Date of measurement:

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no. GA 05277	04/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes							
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Pat.4	7 Feb 06	8:36	Fine	79.1	0	0	20.8	18.6	Hot
"	"	8:37	"	79.2	0	0	20.7	18.7	Work.
Pat.7	"	8:39	"	79.2	0	0	20.7	18.7	Shut
"	"	8:40	"	79.1	0	0	20.8	18.7	p.ing
Pat.4	7 Feb 06	13:32	Fine	79.2	0	0	20.6	27.4	Hot
"	"	13:33	"	79.3	0	0	20.8	27.2	work
Pat.7	"	13:35	"	79.1	0	0	20.8	27.0	shut
"	"	13:36	"	79.2	0	0	20.7	27.2	p.ing.

Field Technician: Chan Kwong (TA)

Checked by: (SO)

ANNEX A

Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tin Kok Road Pumping Station No. 5
Date of measurement: See below

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no GA 08277	04/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes: Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
~~Portion 6~~	8/2/06	8:24	Fine	79.1	0	0	20.7	16.8	Hot work
Portion 4	8/2/06	8:26	"	79.1	0	0	20.7	16.8	
Portion 7	8/2/06	8:31	Fine	79.2	0	0	20.6	17.1	Shoot piling
"	8/2/06	8:32	"	79.2	0	0	20.6	17.1	
Portion 4	8/2/06	13:40	Fine	79.3	0	0	20.1	24.6	Hot work.
"	"	13:41	"	79.2	0	0	20.6	23.9	
Portion 5	8/2/06	13:40	Fine	79.0	0	0	20.8	24.0	Hot work Excavation
"	"	13:42	"	79.1	0	0	20.8	24.0	
Portion 4	9/2/06	8:12	Fine	79.1	0	0	20.7	15.9	Hot work
"	"	8:13	"	79.1	0	0	20.7	15.9	
Portion 4	9/2/06	8:02	Fine	79.2	0	0	20.6	19.4	Hot work
"	"	13:04	"	79.2	0	0	20.6	19.4	

Field Technician: [signature] (Sub-Agent)

Checked by: [signature] (SO)

ANNEX A

Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tung Kok Road Pumping Station No.5

Date of measurement: See below

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no. GA 0877	04/11/08

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes						
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	10/2/06	8:06	Fine	79.2	0	0	20.6	14.4	Hot work
"	"	8:08	"	79.2	0	0	20.6	14.4	
Portion 4	10/2/06	13:28	Fine	79.3	0	0	20.6	25.0	Hot work.
"	"	13:29	"	79.2	0	0	20.6	25.0	
Portion 4	11/2/06	8:11	Fine	79.2	0	0	20.6	15.8	Hot work.
	11/2/06	8:12	Fine	79.2	0	0	20.7	15.7	
Portion 4	11/2/06	13:14	Fine	79.2	0	0	20.6	24.3	Hot work.
"	11/2/06	13:15	"	79.3	0	0	20.6	24.2	
Portion 4	13/2/06	8:17	Fine	79.0	0	0	20.8	17.7	Hot work.
"	13/2/06	8:18	"	79.1	0	0	20.8	17.7	
Portion 4	13/2/06	13:16	Fine	79.1	0	0	20.8	21.8	Hot work.
"	13/2/06	13:17	"	79.0	0	0	20.8	22.0	

Field Technician: Dora Kwong (TA)

Checked by: (Safety Officer)

ANNEX A
Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tsing Kok Road pumping station No.5
Date of measurement:

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no. GA 08277	02/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes						
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	14 Feb 06	8:20	Rain	79.0	0	0	20.8	18.6	Hot
"	"	8:21	Rain	79.1	"	0	20.7	18.6	Work
Portion 4	14 Feb 06	13:22	Cloudy	79.3	0	0	20.6	19.9	Hot
"	"	13:23	Cloudy	79.2	0	0	20.7	19.9	Work.
Portion 4	15 Feb 06	8:19	Cloudy	79.1	0	0	20.8	19.4	Hot
"	"	8:20	"	79.0	0	0	20.8	19.8	Work.
Portion 4	15 Feb 06	13:22	Fine	79.3	0	0	20.6	26.7	Hot
"	"	13:23	Fine	79.3	0	0	20.6	26.8	Work.
Portion 4	16/2/06	8:06	Cloudy	79.2	0	0	20.6	21.2	Hot work
"	"	8:08	"	79.2	0	0	20.6	21.2	"
Portion 4	16/2/06	13:31	Fine	79.1	0	0	20.7	25.7	Hot work
"	"	13:33	"	79.1	0	0	20.7	25.7	"

Field Technician: Chan Kwong (TA)

Checked by: (Safety officer)

ANNEX A
Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tong Kok road pumping station No 5.
Date of measurement:

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no. GA 06477	02/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes						
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	17 Feb 06	8:17	Fine	79.6	0	0	20.4	17.5	Hot
"	"	8:18	"	79.0	0	0	20.8	17.5	Work.
Portion 4	17 Feb 06	13:14	Fine	79.1	0	0	20.8	21.3	Hot
Portion 5	17 Feb 06	13:14	Fine	79.2	0	0	20.6	21.3	Work.
Portion 4	18/2/06	8:02	Rain	79.1	0	0	20.8	14.1	Hot work
"	"	8:05	"	79.1	0	0	20.8	14.1	"
Portion 4	18/2/06	13:14	Cloudy	79.2	0	0	20.6	14.9	Hot
"	"	13:15	Cloudy	79.3	0	0	20.6	15.0	Work
Portion 4	20/2/06	8:08	Fine	79.1	0	0	20.7	14.7	Hot work
"	"	8:09	"	79.1	0	0	20.7	14.7	"
Portion 4	20/2/06	13:10	Fine	79.2	0	0	20.6	20.8	Hot work
"	"	13:12	"	79.2	0	0	20.6	20.8	"

Field Technician: _____ (Sub-agent)

Checked by: _____ (Safety Officer)

ANNEX A
Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tng Kok Road Pumping Station No. 5
Date of measurement: See below

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no.: GA 08277	04/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes						
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	21 Feb 06	08:06	Fine	79.1	0	0	20.7	18.1	Hot work
"	"	08:07	"	79.1	0	0	20.7	18.1	"
Portion 4	21 Feb 06	13:02	Fine	79.2	0	0	20.6	22.4	Hot work
"	"	13:04	"	79.2	0	0	20.6	22.4	"
Portion 4	22 Feb 06	8:11	Fine	79.0	0	0	20.9	20.4	Hot
"	"	8:12	"	79.1	0	0	20.8	20.4	work.
Portion 4	22 Feb 06	13:15	Fine	79.2	0	0	20.6	27.8	Hot
"	"	13:16	"	79.2	0	0	20.6	27.8	work.
Portion 4	23 Feb 06	08:10	Cloudy	79.0	0	0	20.8	18.0	Hot work
"	"	08:11	"	79.0	0	0	20.8	18.0	"
Portion 4	23 Feb 06	13:10	Cloudy	79.1	0	0	20.7	21.7	Hot work
"	"	13:12	"	79.1	0	0	20.7	21.7	"

Field Technician: _____ (Sub-agent)

Checked by: _____ (Safety Officer)

ANNEX A

Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tsing Kok Road Pumping Station No. 5
Date of measurement: See below

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no. GA 08277	09/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes						
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	24 Feb 06	08:09	Cloudy	79.1	0	0	20.7	17.8	Hot weather
"	"	08:11	"	79.1	0	0	20.7	17.8	"
Portion 4	24 Feb 06	13:10	Cloudy	79.1	0	0	20.7	18.3	Hot weather
"	"	13:11	"	79.1	0	0	20.7	18.3	"
Portion 4	25/2/06	08:15	Cloudy	79.1	0	0	20.8	17.0	Hot weather
"	"	08:17	"	79.1	0	0	20.8	17.0	"
Portion 4	27/2/06	8:09	Cloudy	79.1	0	0	20.7	16.1	Hot weather
"	"	"	"	79.1	0	0	20.8	16.1	"
Portion 4	27 Feb 06	13:05	cloudy	79.1	0	0	20.7	17.1	Hot weather
"	"	13:07	"	79.1	0	0	20.7	17.1	"

Field Technician: _____ (Sub-agent)

Checked by: _____ (Safety Officer)

To: Shanjah / Claudine
From = Zahir
Total 9 pages

Annex A

ANNEX A
Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tung Loi Road Pumping Station No. 5
Date of measurement: 1 Mar 2006

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no. GA 08277	4/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes						
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
M000001	1/3/06	08:33	Fine	78.9	0	0.9	20.2	9.4	
M000002	1/3/06	08:35	Fine	98.2	0	0.1	20.5	10.9	
M000003	1/3/06	08:37	Fine	79.2	0.1	0.1	20.5	11.3	

Field Technician: Jacqueline Ng (Sub-Agent)

Checked by: (RSO)

ANNEX A

Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tung Kok Road Pumping Station No. 5

Date of measurement: See below

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no. GA 08737	4/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes						
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	1/3/06	8:10	Fine	79.3	0	0	20.5	9.4	Hot work
"	"	8:12	"	79.3	0	0	20.5	9.4	"
Portion 4	1/3/06	13:01	Fine	79.0	0	0	20.8	11.9	Hot work
"	"	13:02	"	79.0	0	0	20.8	11.9	"
Portion 5	1/3/06	13:04	Fine	79.0	0	0	20.8	11.9	Excavation
"	1/3/06	13:05	"	79.0	0	0	20.8	11.9	"
Portion 4	2/3/06	08:15	Fine	79.3	0	0.1	20.5	9.8	Hot work
"	"	08:16	"	79.3	0	0.1	20.5	9.8	"
Portion 4	2/3/06	13:06	Fine	79.2	0	0	20.6	16.4	Hot work
"	"	13:07	"	79.2	0	0	20.6	16.4	"
Portion 4	3/3/06	08:10	Fine	79.2	0	0.1	20.5	12.8	Hot work
"	"	08:12	"	79.2	0	0.1	20.5	12.8	"
Portion 4	3/3/06	13:06	Fine	79.2	0	0	20.6	22.8	Hot work
"	"	13:08	"	79.2	0	0	20.6	22.8	"

Field Technician: [signature] (Sub-Agent)

Checked by: [signature] (RSO)

ANNEX A
Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tsing Yi Road Pumping station No.5
Date of measurement: See below

Sampling equipment used:	Dates calibrated
GA-2000	
Serial no. GA08277	4/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes						
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	4/3/06	08:06	Fine	79.3	0	0.1	20.5	15.0	Hot work
"	"	08:07	"	79.3	0	0.1	20.5	15.0	
Portion 4	4/3/06	12:56	Cloudy	79.1	0	0	20.7	17.1	Hot work
"	"	12:58	"	79.1	0	0	20.7	17.1	
Portion 4	6/3/06	08:11	Rain	79.1	0	0.1	20.6	19.1	Hot work
"	"	08:13	"	79.2	0	0	20.7	19.1	
Portion 4	6/3/06	13:10	Cloudy	79.2	0	0	20.6	21.2	Hot work
"	"	13:11	"	79.2	0	0	20.7	21.2	
Portion 4	7/3/06	08:05	Cloudy	79.2	0	0	20.6	21.1	Hot work
"	"	08:06	"	79.2	0	0	20.6	21.1	
Portion 4	7/3/06	13:03	Cloudy	79.2	0	0	20.7	23.3	Hot work
"	"	13:05	"	79.2	0	0	20.7	23.3	

Field Technician: Jacquelyn Ng

Checked by: (RSO)

ANNEX A

Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tong Fok Road Pumping Station No 5

Date of measurement: See ~~the~~ below

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no. GA 08277	4/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes: Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	8/3/06	08:10	Fine	79.1	0	0	20.8	19.9	Hot work
"	"	08:11	"	79.1	0	0	20.8	19.9	
Portion 4	8/3/06	13:06	Fine	79.2	0	0	20.7	25.1	Hot work
"	"	13:08	"	79.2	0	0	20.7	25.1	
Portion 4	9/3/06	08:15	Cloudy	79.1	0	0	20.7	18.4	Hot work
"	"	08:17	"	79.1	0	0	20.7	18.5	
Portion 4	9/3/06	13:06	Fine	79.1	0	0	~~20.8~~ 20.8	24.8	Hot work
"	"	13:07	"	79.1	0	0	20.8 ~~24.8~~	24.8	
Portion 4	10/3/06	08:15	Fine	79.2	0	0	20.7	22.9	Hot Work
"	"	08:17	"	79.2	0	0	20.7	22.9	
Portion 4	10/3/06	13:01	Fine	79.3	0	0	20.6	25.1	Hot work
"	"	13:03	"	79.3	0	0	20.6	25.1	

Field Technician: Jacqueline Yap

Checked by: (RSO)

Annex A

ANNEX A
Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tung Fat Road Pumping Station No.5
Date of measurement: See below

Sampling equipment used:	Dates calibrated
GA2000	
Serial no. GA08223	4/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes							
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	11/3/06	08:15	Fine	79.2	0	0	20.7	22.4	Hot work.
"	"	08:17	"	79.2	0	0	20.7	22.4	
Portion 4	11/3/06	13:01	Fine	79.2	0	0	20.7	23.6	Hot work
"	"	13:03	Fine	79.2	0	0	20.7	23.6	
Portion 4	13/3/06	08:06	Rain	79.0	0	0	20.8	12.0	Hot work
"	"	08:08	Rain	79.0	0	0	20.8	12.0	
Portion 4	13/3/06	13:06	Cloudy	79.0	0	0	20.8	11.8	Hot work
"	"	13:07	Cloudy	79.0	0	0	20.8	11.8	
Portion 4	14/3/06	08:11	Fine	79.0	0	0.1	20.7	10.1	Hot work
"	"	08:13	"	79.0	0	0.1	20.7	10.1	
Portion 4	14/3/06	13:13	Cloudy	79.1	0	0	20.6	16.2	Hot work
"	"	13:14	"	79.1	0	0	20.6	16.2	

Field Technician: Cannon Tsui

Checked by: (RSO)

ANNEX A
Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Ting Kok Road Pumping Station No. 4.
Date of measurement: see below.

Sampling equipment used:	Dates calibrated
GA 200	
Serial No.: GA 08277	04/11/05.

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes							
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	15/03/06	08:15	cloudy.	79.1	0	0	20.6	16.0	Hot Work.
"	"	08:17	"	79.2	0	0	20.6	16.0	
Portion 4	15/03/06	13:15	Sunny	79.1	0	0	20.6	21.9	Hot Work
"	"	13:17	"	79.1	0	0	20.6	21.9	
Portion 4	16/03/06	08:10	Cloudy	79.1	0	0	20.6	19.4	Hot Work
"	16/03/06	08:12	"	79.1	0	0	20.6	19.4	
Portion 4	16/03/06	13:05	Sunny	79.3	0	0	20.6	26.3	Hot Work
"	"	13:07	"	79.3	0	0	20.6	26.3	
Portion 4	17/03/06	08:10	Rainy	79.2	0	0	20.6	20.6	Hot Work
"	"	08:12	"	79.2	0	0	20.6	20.6	
Portion 4	17/03/06	13:05	Cloudy	79.1	0	0	20.7	21.7	Hot Work
"	"	13:07	"	79.1	0	0	20.7	21.7	

Field Technician: Carman Fu.

Checked by: (ISO)

ANNEX A
Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Ting Kok Road Pumping Station No.5
Date of measurement: See below

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no. GA08277	4/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes							
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	18/3/06	08:05	Cloudy	79.7	0	0	20.6	21.1	Hot work
"	"	08:07	"	79.2	0	0	20.6	21.1	
Portion 6	18/03/06	13:14	Fine	79.3	0	0	20.6	30	Hot Work
"	"	13:17	"	79.3	0	0	20.6	30	
Portion 4	20/3/06	08:03	Fine	79.0	0	0	20.8	18.6	Hot work
"	"	08:05	Fine	79.0	0	0	20.8	18.6	
Portion 4	20/3/06	13:02	Fine	79.1	0	0	20.7	20.1	Hot work
"	"	13:03	Fine	79.1	0	0	20.7	20.1	
Portion 4	21/3/06	08:07	Fine	79.0	0	0	20.8	18.4	Hot work
"	"	08:03	Fine	79.0	0	0	20.8	18.4	
Portion 4	21/3/06	13:10	Fine	79.2	0	0	20.6	22.0	Hot work
"	"	13:11	"	79.2	0	0	20.6	22.0	

Field Technician: [signature]

Checked by: [signature] (PSO)

ANNEX A

Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tong Kok Road Pumping Station No.5

Date of measurement: See below

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no. GA 82277	4/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes							
			Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	22/3/06	08:01	Cloudy/Rain	79.1	0	0	20.7	21.6	Hot work
"	"	08:03	"	79.1	0	0	20.7	21.6	"
Portion 4	22/3/06	13:16	Cloudy	79.2	0	0	20.6	22.5	Hot work
"	"	13:18	"	79.2	0	0	20.6	22.5	"
Portion 4	23/3/06	08:10	Rain	79.2	0	0	20.6	23.2	Hot work
"	"	08:11	"	79.2	0	0	20.6	23.2	"
Portion 4	23/3/06	13:03	Rain	79.3	0	0	20.6	23.9	Hot work
"	"	13:04	Rain	79.3	0	0	20.6	23.9	"
Portion 4	24/3/06	08:06	Rain	79.0	0	0	20.8	17.6	Hot work
"	"	08:08	Rain	79.1	0	0	20.7	17.6	"
Portion 4	24/3/06	13:06	Rain	79.1	0	0	20.7	16.9	Hot work
"	"	13:08	Rain	79.1	0	0	20.7	16.9	"

Field Technician: J Jacquelyn Yip

Checked by: (ESO)

ANNEX A
Landfill Gas Monitoring – Field Measurement Recording Sheet (Sample)

Name of site: Tuen Mun Fok Road Pumping Station No.5
Date of measurement: See below

Sampling equipment used:	Dates calibrated
GA 2000	
Serial no. GM 08277	4/11/05

Sample location	Date of measurement	Sampling time	Perimeter on-site and/or off-site monitoring holes: Weather condition	Balance gas (%)	Flammable gas (methane %)	Carbon dioxide (%)	Oxygen (%)	Temp (°C)	Remark
Portion 4	25/3/06	08:07	Rain	79.1	0	0	20.6	17.8	} Hot work
"	"	08:08	Rain	79.1	0	0	20.6	17.8	
Portion 4	25/3/06	13:10	Cloudy	79.2	0	0	20.6	18.6	} Hot work
"	"	13:12	"	79.2	0	0	20.6	18.6	
Portion 4	27/3/06	08:14	Rain	79.1	0	0	20.7	17.7	} Hot work
"	"	08:15	"	79.1	0	0	20.7	17.7	
Portion 4	27/3/06	13:08	Rain	79.2	0	0	20.6	18.1	} Hot work
"	"	13:10	"	79.2	0	0	20.6	18.1	
Portion 4	28/3/06	08:17	Fine	79.1	0	0	20.7	17.5	} Hot work
"	"	08:19	Fine	79.1	0	0	20.7	17.5	
Portion 4	28/3/06	13:05	Fine	79.2	0	0	20.6 ~~20.3~~ 9	19.3	} Hot work
"	"	13:06	"	79.2	0	0	20.6 ~~20.3~~ 9	19.3	

Field Technician: [signature]

Checked by: [signature] (RSO)