

Maeda Corporation



Upgrading of Ting Kok Road Pumping Station No. 5

Monthly EM&A Report No. 8
for August 2006

September 2006

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Report no: EA01284R0241

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This report has been prepared for in accordance with the terms and conditions of Maeda Corporation appointment for the Upgrading of Ting Kok Road Pumping Station No. 5 in October 2005. Hyder Consulting Ltd (Incorporated in Hong Kong with limited liability – COI Number 126012) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.



**Certified by Landfill Gas Team Leader
Alexi Bhanja**

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1 Executive Summary

Drainage Services Department (DSD) 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. The construction contract commenced in September 2005 and the total construction period is approximately 28 months.

This report recorded the results and findings of the required EM&A works undertaken during August 2006. All relevant mitigation measures and requirements were implemented. There have been no exceedances in Action/Limit (A/L) Levels at any of the locations monitored under the EM&A programme.

An 11m-deep borehole, designated "M1", was installed by the Contractor to provide an "early warning" of potential LFG problems that could affect surface trenches, but does not form part of the EM&A programme. The Contractor has noted the monitoring results from M1 and will take them into consideration when planning surface trench works in the vicinity.

Manhole M2 was dismantled in July 2006 because of planned works and therefore monitoring at M2 has been terminated since July 2006. However, LFG has never been detected at M2 and so it is not considered that termination of monitoring at this location will have any significant impact on the overall effectiveness of the environmental monitoring programme, as monitoring at manhole M3 will continue.

Environmental Protection Department (EPD) has not conducted any site visit in the reporting period.

Event and Action Levels

The baseline monitoring results documented in the baseline monitoring report for the Project (our report ref.: EA01284R0022) provided the 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%.

Complaint Log

There were no non-compliances in terms of the EM&A programme during the reporting period and no complaints regarding LFG were received.

Reporting Changes

There have been no reporting changes during the reporting period.

Future Key Issues

Based on anticipated construction activities for next month, on the construction programme and on the review of relevant Contractor's method statements by the

LGT, no significant future key issues in terms of LFG have been identified at this time.

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 is implemented based on the findings of the Study *Review of North District and Tolo Harbour Sewerage Master Plan*.

The purpose of the Project is to upgrade the existing 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 2,888m³/day to 11,520m³/day in order to serve the increasing sewage flow along Ting Kok Road. The Project is of high priority and needs to commence as soon as possible because full commissioning of the upstream sewerage facilities along Ting Kok Road is dependent on the completion of this Project.

The proposed scope of works includes 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) will be located outside the existing passive vent trench of Shuen Wan Landfill and the three existing Landfill Gas (LFG) monitoring probes within the Project site will not be affected by the works.

Six village houses are located about 60m away from the boundary of the proposed pumping station. The proposed pumping station upgrading works therefore constitute 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 (DSD) awarded the contract for the upgrading of TKRPS to Maeda Corporation in September 2005. Maeda appointed Hyder Consulting Limited as the Contractor's Landfill Gas Team (LGT) during the construction period. CH2M HILL Hong Kong Limited is the Independent Checker (Landfill Gas) (IC(LG)) of the project. The construction contract commenced in September 2005 and the total construction period is approximately 28 months.

Close proximity of the Project to Shuen Wan Landfill (within the 250m Consultation Zone of Shuen Wan Landfill) may also suggest the possibility of landfill gas 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 and Engineer – DSD	Project Manager	Raymond LEE	2594 7457
	Engineer's Representative	Tim TSOI	2594 7460
Contractor – Maeda	Site Agent	George CHEUNG	9268 1918
LGT – Hyder Consulting	LGT Leader	Alexi BHANJA	2911 2916
IC(LG) – CH2M HILL	IC(LG)	Aldex LEE	2507 2203

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 reporting period have been carried out with the required LFG control measures in place (e.g. LFG monitoring for “hot works”).

2.4 Works Undertaken during the Month

Works undertaken during the reporting period included:

- Sheet piling work and temporary work for pumping station and trenchless method
- Construction of gravity sewer and rising main
- Excavation
- Pile head cutting and installation of pile head steel plate
- Construction of sub-structure

3 Environmental Status

3.1 Works Undertaken during the Month with Illustrations

Works undertaken during the reporting period are identified in Section 2.4. Illustrations of these works, such as location of works, etc., are provided in Appendix 3.

3.2 Project Area and Monitoring Locations

The site is located at Ting Kok Road in Tai Po, and the major items to be constructed are 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 is not intended that M1 forms 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).

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 has been terminated since July 2006. LFG has never been detected at M2 and so it is not considered that termination of monitoring at this location will have any significant impact on the overall effectiveness of the environmental monitoring programme, as monitoring at manhole M3 will continue. There are no other suitable manholes within the site that can be monitored in lieu of M2.

In terms of variable monitoring locations, these vary from month to month, depending on site activities. The fixed monitoring location is shown in Table 3-2:

Monitoring Station ID	Description	Purpose
M3	Existing Manhole (2m deep)	EM&A programme

Table 3-2 Fixed Monitoring Locations for LFG EM&A

Project area is shown in Appendix 3 and the fixed monitoring location is shown in Appendix 4.

4 Brief Summary of EM&A Requirements

4.1 Monitoring Parameters

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

4.2 Monitoring Equipment

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

Equipment	Manufacturer / Serial Nos.
Gas Analyser GA 2000	Geotechnical Instruments / GA 08277

Table 4-3 Equipment List for LFG Monitoring

4.3 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 location M3, 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 4-4 Action and Limit Levels and Action Plan for Landfill Gas

4.4 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. Relevant excerpts could be referred to the Project Profile for Upgrading of Ting Kok Road Pumping Station No. 5.

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

5 Implementation Status of LFG Control Measures

The status 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*.

6 Monitoring Results

Calibration records for the equipment used for LFG monitoring are provided in Appendix 6. Original *Field Measurement Recording Sheets* are provided in Appendix 7.

6.1 Early-warning Location M1

During the reporting period, LFG was monitored at M1 to give an “early warning” of potential LFG problems. M1 is an 11m-deep borehole and the carbon dioxide and methane concentrations may reflect possible influence of LFG at depth below the site. Monitoring results are shown in Table 6-5, below. Location M1 is not subject to EM&A and so A/L Levels are not applicable.

Monitoring Station ID	Date	Gas Concentration (%)			Temperature (°C)
		Methane	Carbon Dioxide	Oxygen	
M1	1 August 06	0	0.4	19.5	32.7

Table 6-5 Monitoring Results at M1

Considering the location of M1 adjacent to a restored landfill, the recorded levels are within expected norms and are not cause for concern. Notwithstanding, the Contractor has noted these concentrations and will take them into consideration when planning surface trench works in the vicinity.

6.2 Fixed Location M3

During the reporting period, LFG was monitored at the fixed location M3 for purposes of environmental protection. This is shown in Table 6-6, below:

Monitoring Station ID	Date	Gas Concentration (%)			Temperature (°C)
		Methane	Carbon Dioxide	Oxygen	
M3	1 August 06	0	0.5	19.4	34.6

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

Table 6-6 Monitoring Results at M3

Appendix 4 shows the position of each fixed monitoring station. There were no exceedances of A/L Levels at the fixed location during the reporting period.

6.3 Variable Locations

During the reporting period, LFG was also monitored at variable locations (for purposes of worker safety). These locations were within Portions 4 to 7 as shown in Appendix 3. A total of 430 readings, each including carbon dioxide, methane and oxygen, at variable locations were taken for safety-related reasons, including excavation and hot works. There were no exceedances for A/L Levels at any variable locations during the reporting period.

LFG monitoring results for variable locations are provided on the *Field Measurement Recording Sheets* in Appendix 7.

7 Report on Non-Compliance and Complaints

EPD has not conducted any site visit in the reporting period.

There were no non-compliances during the reporting period and no complaints regarding LFG were received.

8 Others

8.1 Future Key Issues

Construction activities for next month are anticipated to include:

- Excavation
- Diversion of existing drain
- Construction of gravity sewer and rising main
- Installation of walings and struts
- Installation of pile head steel plate
- Construction of sub-structure and super-structure

Based on the above, on the construction programme (shown in Appendix 2) and on the review of relevant Contractor's method statements by the LGT, no significant future key issues in terms of LFG have been identified at this time.

LFG monitoring will be continued and the tentative monitoring schedule at fixed locations for the next three months is shown below:

- 1 September 2006
- 3 October 2006
- 1 November 2006

8.2 Comments, Recommendations and Conclusions

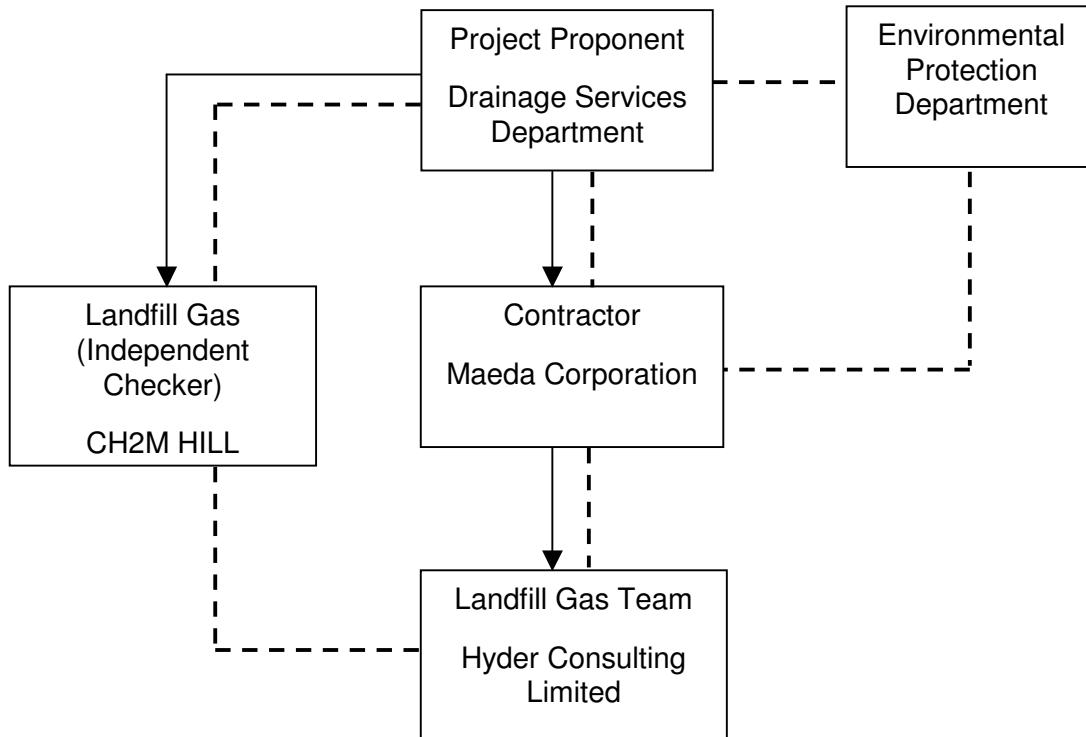
The LFG mitigation measures adopted by the Contractor during the reporting period are considered have been implemented in a satisfactory manner and there have been no exceedances in A/L Levels.

The EM&A programme is considered to have performed acceptably and there are no recommendations for improvements or modifications at this time.

In conclusion, there have been no significant issues relating to LFG hazard during the reporting period.

Appendix 1

Project Organisation



----- Line of communication

—————> Line of Authority

Appendix 2

Construction Programme

Appendix 3

Location of Works and Project Area

Appendix 4

Fixed Monitoring Locations

Appendix 5

Updated Implementation Schedule

Appendix 6

Calibration Records

Appendix 7

Field Measurement Recording Sheets