



水務署



Water Supplies Department

**Contract No. 13/WSD/16**

Mainlaying in Tseung Kwan O

**3<sup>rd</sup> Quarterly EM&A Report  
For February 2019 to April 2019**

May 2019  
(Rev. 0)

	<b>Prepared by:</b>	<b>Certified by:</b>
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<b>Position</b>	Environmental Team	Environmental Team Leader
<b>Signature</b>		
<b>Date:</b>	4 June,2019	4 June,2019

### Revision History

<b>0</b>	1 <sup>st</sup> Submission	
<b>Rev.</b>	<b>DESCRIPTION OF MODIFICATION</b>	<b>DATE</b>

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## **EXECUTIVE SUMMARY**

- A1. Penta-Ocean - Concentric Joint Venture (POCJV) is contracted to carry out the Mainlaying in Tseung Kwan O under Contract No. 13/WSD/16 (hereinafter known as “the Project”).
- A2. In accordance with the Environmental Monitoring and Audit (EM&A) Manual for the Project, EM&A works should be carried out by Environmental Team (ET), Acuity Sustainability Consulting Limited (ASCL), during the construction phase of the Project.
- A3. The construction works of Mainlaying in Tseung Kwan O commenced on 30 August, 2018. This is the 3<sup>rd</sup> quarterly Environmental Monitoring and Audit (EM&A) summary Report prepared by ASCL. This report presenting the EM&A works carried out during the period of 1 February 2019 to 30 April 2019.
- A4. A summary of the monitoring activities undertaken in this reporting period is listed below:

<b>Monitoring Activities</b>	<b>Frequency</b>
Daytime Noise monitoring	0 times
Landfill Gas Monitoring	560 times
Environmental Site Inspection	13 times

- A5. No project-related exceedance of the Action/Limit Level was recorded during the reporting quarter.
- A6. No noise monitoring was conducted in the reporting quarter since there are no projected-related construction activities undertaken within a radius of 300m from the monitoring locations.
- A7. No exceedance of landfill gas monitoring was recorded during the reporting quarter.
- A8. No summons/ prosecutions were received in the reporting quarter.
- A9. There were no changes to be reported that may affect the on-going EM&A programme.

## **1 Basic Project Information**

### **1.1 Background**

- 1.1.1 The proposed Desalination Plant at Tseung Kwan O (DPTKO) will produce potable water with an initial capacity of 135 million liters per day (MLD), expandable to an ultimate capacity of 270 MLD in the future to provide a secure and alternative fresh water resource complying with the World Health Organization (WHO) standards. The plant will adopt the Seawater Reverse Osmosis (SWRO) technology, which dominates the market due to its reliability and progressive reduction in cost as the technology advances.
- 1.1.2 Pursuant to the Environmental Impact Assessment Ordinance (EIAO), the Director of Environmental Protection granted the Variation of Environmental Permit (No. EP-503/2015/A) to Water Supplies Department (WSD) for the Project on 26 January 2018.
- 1.1.3 The scope of the Contract may be considered in brief, to consist of the laying of about 10km long 1200mm diameter fresh water mains and the associated works along the alignment of the Project as shown with the overall view in **Appendix A**.

### **1.2 The Reporting Scope**

- 1.2.1 This is the 3<sup>rd</sup> Quarterly EM&A Report for the Project which summarizes the key findings of the EM&A programme during the reporting period from 1 February 2019 to 30 April 2019.

### **1.3 Project Organization**

- 1.3.1 The Project Organization structure for Construction Phase is presented in **Appendix B**.
- 1.3.2 Contact details of the key personnel are presented in **Table 1.1** below:

**Table 1.1 Contact Details of Key Personnel**

<b>Party</b>	<b>Position</b>	<b>Name</b>	<b>Telephone no.</b>
Penta-Ocean -Concentric Joint Venture	Environmental Officer	Tony Tang	9433-2628
Acuity Sustainability Consulting Limited	Environmental Team Leader	Jacky Leung	2698-6833
ANewR Consulting Limited	Independent Environmental Checker	James Choi	2618-2831

1.4 Summary of Construction Works

1.4.1 Details of the major construction works undertaken in this reporting quarter are shown in Table 1.2 and **Appendix D**. The construction programme is presented in **Appendix C**.

**Table 1.2 Summary of the Construction Works Undertaken during the Reporting quarter**

Location	Works Conducted in the reporting quarter
Portion J of the Project Site	<ul style="list-style-type: none"> <li>• Continue utilities checking and detection before road works.</li> <li>• 24 nos. of trial pits done at Wan Po Road (CH. A3+50, 5+30, 13+70, 15+40, 16+30, 18+50, 19+00, 22+70, 27+50 and 41+10), Po Hong Road (CH. A44+80, 51+80, 59+70, 60+00, 63+60 and 66+90), Ling Hong Road (CH. A55+50 and 56+00), Po Shun Road (CH.A 54+30), Wan Po Road (CH. A37+25, 19+20 and footpath near HK Velodrome for alternative alignment VD1, VD2 and VD3)</li> <li>• 3 nos. of work fronts implemented as scheduled for the open-trench between CH. A0+00 to 13+70</li> <li>• Trench excavation at CHA1+50, CH7+20, CH13+50</li> <li>• 1 no. of work front for working pit construction of trenchless work implemented and trial pit to verify the location of existing underground utilities such as 11kV and 132kV CLP cables at carriageway</li> </ul>
Tseung Kwan O Area 137 Fill Bank	<ul style="list-style-type: none"> <li>• laying of NS250 HDPE pipe</li> </ul>

1.5 Summary of Environmental Status

1.5.1 A summary of the valid permits, licences, and /or notifications on environmental protection for this Project is presented in Table 1.3

**Table 1.3 Summary of the Status of Valid Environmental Licence, Notification, Permit and Documentations**

Permit/ Licences/ Notification	Reference	Validity Period	Remarks
Variation of Environmental Permit	EP no.: EP-503/2015/A	Throughout the Contract	-
Notification of Construction Works under the Air Pollution Control (Construction Dust) Regulation (Form NA)	Ref no.: 423775	Throughout the Contract	-
Chemical Waste Producer Registration	WPN: 5213-839-P3287-01	Throughout the Contract	-
Billing Account for Disposal of Construction Waste	A/C no.: 7029491	Throughout the Contract	-

1.5.2 The status for all environmental aspects is presented **Table 1.4**.

**Table 1.4 Summary of Status for Key Environmental Aspects under the EM&A Manual**

<b>Parameters</b>	<b>Status</b>
Noise	
Baseline Monitoring	The baseline noise monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under VEP Condition 3.4
Impact Monitoring	No impact monitoring for noise impact was conducted in the reporting quarter due to the over distant monitoring station from the works location, where they were farther than 1 km from the closest monitoring station NSR4 to the works location.
Waste Management	
Mitigation Measures in Waste Monitoring Plan	On-going
Landfill Gas Monitoring	
Mitigation Measures	On-going
Monitoring	On-going
Environmental Audit	
Site Inspection	On-going

1.5.3 Other than the EM&A works by ET, regular environmental management meetings were conducted in order to enhance environmental awareness and closely monitor the environmental performance of the contractors.

1.5.4 The EM&A programme has been implemented in accordance with the recommendations presented in the approved EIA Report and the EM&A Manual. A summary of implementation status of the environmental mitigation measures for the construction phase of the Project during the reporting period is provided in **Appendix E**.

## **2 Noise Monitoring**

2.1 Referring to EM&A manual Section 4.1.2, the impact noise monitoring should be carried out at all the designated monitoring stations when there are project-related construction activities undertaken within a radius of 300m from the monitoring stations. No impact monitoring for noise impact was conducted in the reporting quarter due to the over distant monitoring station from the works location, where they were farther than 1 km from the closest monitoring station NSR4 to the works location.

2.2 Action and Limit Level is provided in **Appendix F**.

2.3 No notification of summons and prosecution related to noise was received in the reporting quarter.

## **3 Waste Management**

3.1 Total of 1.0484 m<sup>3</sup> of inert C&D materials was collected to the Fill Bank, 0.028 m<sup>3</sup> C&D waste and general refuse were disposed of at Landfill, 0 tonnes of paper/ cardboard packaging was recycled and 0 tonnes chemical waste collected by licensed contractor for disposal in the reporting quarter.

#### **4 Summary of Monitoring Exceedance, Complaints, Notification of Summons and Prosecutions**

4.1 No monitoring exceedance, notification of summons and prosecution was received in the reporting quarter.

#### **5 EM&A Site Inspection**

5.1 Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. In the reporting quarter, site inspections were carried out 4,14,21, 27 February,2019 , 8,15,22, 27 March, 2019 and 4,10,18,25,29 April, 2019 at the site portions list in **Table 5.1** below.

**Table 5.1 Site Inspection Record**

<b>Date</b>	<b>Inspected Site Portion</b>	<b>Time</b>
4,14,21,27 February,2019 , 8,15,22, 27 March, 2019 and 4,10,18,25,9 April, 2019	Portion J	10:00am - 11:00am

5.2 Three joint site inspection with IEC was carried out on 27 February, 27 March, 29 April, 2019.

5.3 Minor deficiencies were observed during weekly site inspection. Key observations during the site inspections are summarized in **Table 5.2**.

**Table 5.2 Site Observations**

<b>Date</b>	<b>Environmental Observations</b>	<b>Follow-up Status</b>
2-Feb 2019	No Observations	-
14-Feb 2019	<ol style="list-style-type: none"> <li>1. Waste was found in the channels at Portion F</li> <li>2. Chemical was not placed on drip tray at Portion F</li> <li>3. Sandbags was not fully placed at the barriers at CHA1+50</li> <li>4. Some of the gullies were not blocked or covered with geotextile at CHA13+50</li> <li>5. Some of the fences moved across to the passengers road at ACHA13+50</li> <li>6. Waste and general refuse were found in excavated area at A12+50</li> </ol>	<ol style="list-style-type: none"> <li>1. Removed the waste in the channels</li> <li>2. Placed the oil drum on the drip tray</li> <li>3. Place sufficient sandbags along the water barriers</li> <li>4. Covered the gullies with geotextile</li> <li>5. Moved the plastic barriers to the road</li> <li>6. Removed the general refuse</li> </ol>
21-Feb 2019	<ol style="list-style-type: none"> <li>1. Sands and excavated materials was not cleaned near the sandbags at CHA 7+20</li> </ol>	<ol style="list-style-type: none"> <li>1. Removed the C&amp;D material</li> </ol>
27-Feb 2019	<ol style="list-style-type: none"> <li>1. Sandbags should be placed along the working area at the site near 137 (CHA 1+50) and CHA12+50</li> </ol>	<ol style="list-style-type: none"> <li>1. Placed sufficient sandbags along the water barriers</li> </ol>
8-Mar 2019	<ol style="list-style-type: none"> <li>1. Sand bags should be placed along the working area at CHA 1+50</li> </ol>	<ol style="list-style-type: none"> <li>1. Place sufficient sandbags along the water barriers</li> </ol>
15-Mar 2019	<ol style="list-style-type: none"> <li>1. Sandbags should be placed along the working area at CHA1+50</li> <li>2. Housekeeping are needed near the site exit at</li> </ol>	<ol style="list-style-type: none"> <li>1. Place sufficient sandbags along water barriers</li> <li>2. Clean the surface of</li> </ol>



Date	Environmental Observations	Follow-up Status
	A1+50	concrete carriageway
22-Mar 2019	No Observations	-
27-Mar 2019	No Observations	-
4-Apr 2019	<ol style="list-style-type: none"> <li>1. Chemical was not placed in the drip tray at Portion F.</li> <li>2. Wastes in the U-channel were not cleaned at Portion F.</li> <li>3. Construction wastes/ materials were not treated properly at Portion CHA1+50.</li> </ol>	<ol style="list-style-type: none"> <li>1. Drip tray is provided for storing of chemicals</li> <li>2. Remove the wastes in the U-channel</li> <li>3. Remove the construction wastes / materials</li> </ol>
10-Apr 2019	<ol style="list-style-type: none"> <li>1. Sandbags were not placed along the site boundaries fully at A1+50.</li> <li>2. Road section near the site exits were not free from dusty materials at A1+20.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide sufficient sandbags along the water barriers</li> <li>2. Remove the C&amp;D materials on the access road</li> </ol>
18-Apr 2019	<ol style="list-style-type: none"> <li>1. Road section near the site exit was not free from dusty materials at A1+50.</li> <li>2. Construction materials along the site boundary were not treated properly at A1+50.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove the dusty material at the site exit</li> <li>2. Remove the onstruction materials along the water barriers</li> </ol>
25-Apr 2019	No Observations	-
29-Apr 2019	No Observations	-

5.4 According to the EIA Study Report, Environmental Permit, contract documents and EM&A Manual, the mitigation measures detailed in the documents are implemented as much as practical during the reporting quarter. An updated Implementation Status of Environmental Mitigation Measures (EMIS) is provided in **Appendix E**.

## **6 Landfill gas monitoring**

6.1 In accordance with Section 11 of the EM&A Manual, monitoring of landfill gas is required for construction works within the 250m Consultation Zone. Part of the desalination plant and the indicative area of natural slope mitigation works fall within the SENT Landfill Extension Consultation Zone; and part of the 1,200 mm diameter fresh water mains along Wan Po Road falls within the SENT Landfill and SENT Landfill Extension Consultation Zones, TKO Stage II/III Restored Landfill and TKO Stage I Restored Landfill Consultation Zones. Monitoring conducted in February 2019 and April 2019.

6.2 Monitoring of oxygen, methane and carbon dioxide was performed for excavations at 1m depth or more within the consultation Zone. In this reporting quarter, 560 times of monitoring was recorded. Action and Limit Level is provided in **Appendix F**

6.3 Monitoring Equipment used in the reporting quarter are summarised in Table 6.1

**Table 6.1 Landfill Gas Monitoring Equipment**

Equipment	Model and Make	Calibration Expiry Date
Gas Detector	Industrial Scientific Corporation M40	28 August 2019
Gas Detector	RAE System QRAE3	17 October 2019

- 6.4 In the reporting quarter, landfill gas monitoring was carried out by the Registered Safety Officer by the Contractor at the excavation locations for 560 times. The monitoring results and Action Level are provided in **Appendix G** and **Appendix F** respectively.

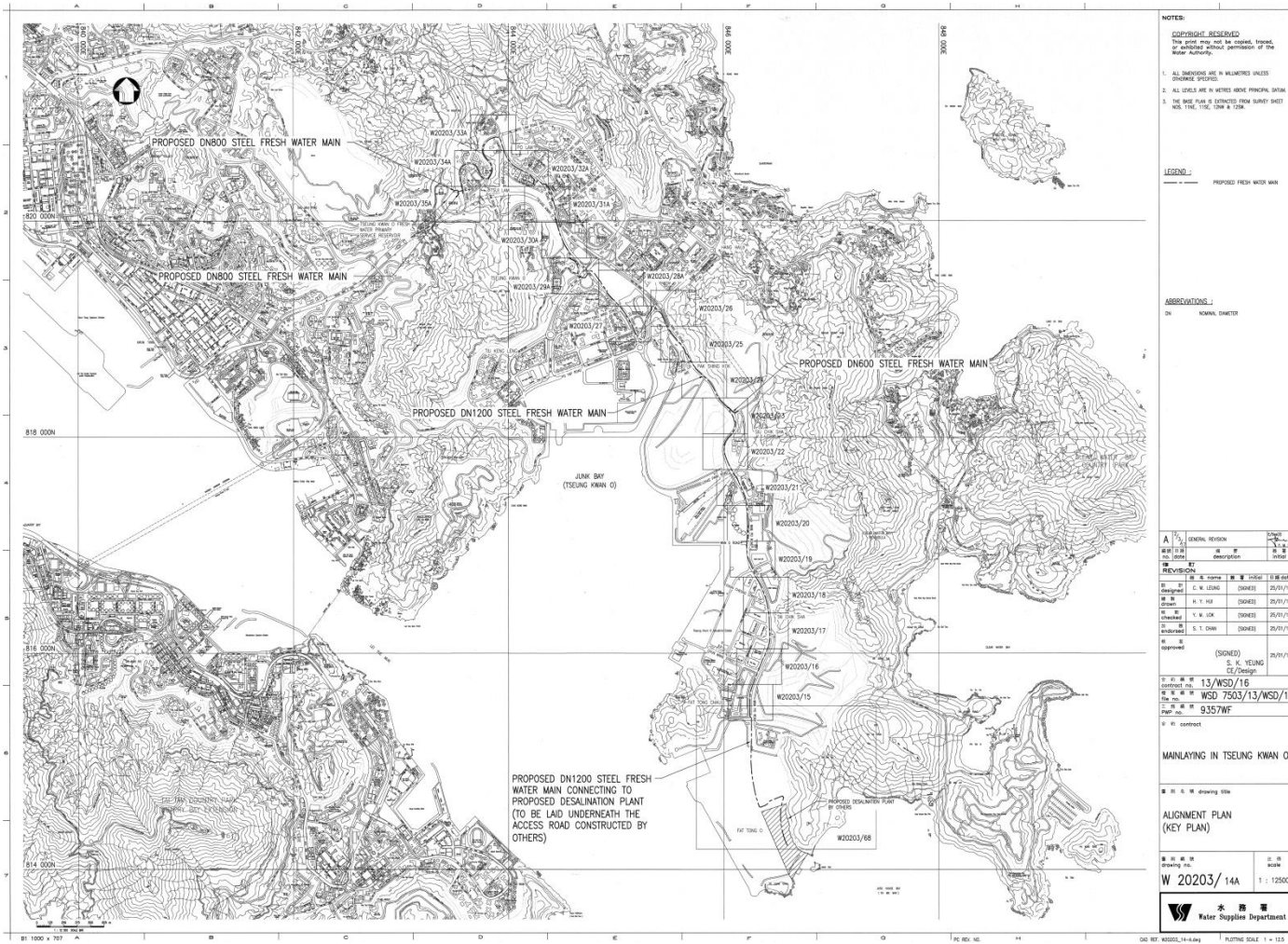
## **7 Conclusion and Recommendations**

- 7.1 This is the 3<sup>rd</sup> quarterly Environmental Monitoring and Audit (EM&A) summary Report prepared by ASCL. This report presenting the EM&A works carried out during the period of 1 February 2019 to 30 April 2019 in accordance with the EM&A Manual and the requirement under EP-503/2015/A.
- 7.2 No noise monitoring was conducted during the reporting period due to the over distant monitoring station from the works location.
- 7.3 No landfill gas exceedance was recorded in the reporting quarter.
- 7.4 No project-related exceedance of the Action Level was recorded during the reporting period.
- 7.5 Weekly environmental site inspection was conducted during the reporting quarter. Minor deficiencies were observed during site inspection and were rectified. The environmental performance of the Project was therefore considered satisfactory.
- 7.6 According to the environmental site inspections performed in the reporting quarter, the Contractor is reminded to pay attention on maintaining site tidiness and proper materials storage.
- 7.7 No environmental complaint was received in the reporting quarter.
- 7.8 No notification of summons or prosecution was received since commencement of the Contract.
- 7.9 The ET will keep track on the construction works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.
- 7.10 Statistics on complaints and regulatory compliance are summarized in **Appendix H**.

# Appendix A

## Overview of Mainlaying in TKO

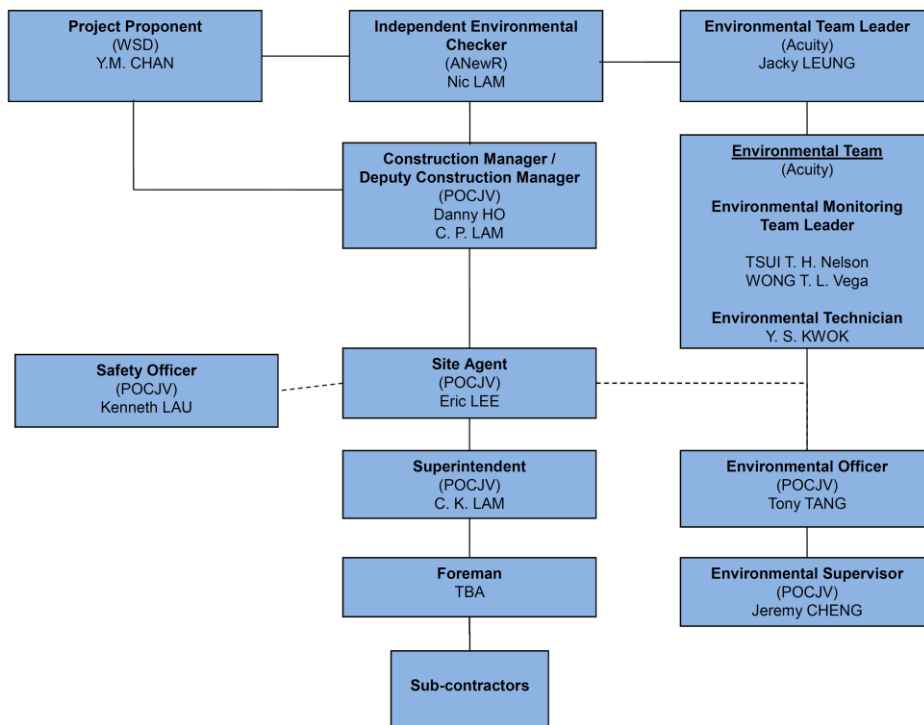
**Contract No. 13/WSD/16**  
**Mainlaying in Tseung Kwan O**  
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# Appendix B

## Project Organization Chart

**Contract No. 13/WSD/16**  
**Mainlaying in Tseung Kwan O**  
**3<sup>rd</sup> Quarterly EM&A Report for February 2019 to April 2019**



# Appendix C

## Construction Programme

# Contract No. 13/WSD/16

## Mainlaying in Tseung Kwan O

### 3<sup>rd</sup> Quarterly EM&A Report for February 2019 to April 2019



13/WSD/16 - Mainlaying in Tseung Kwan O  
Outline Construction Programme (As on 31 Aug 2018)

YEAR	LOCATION		FROM	TO	2018												2019												2020												2021											
					1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
<b>Section A (TKO137 to Wan Po Road)</b>																																																				
	-	Wan Po Road	0	362																																																
	A	Wan Po Road	362	530																																																
	-	Wan Po Road	530	1379																																																
	B	Wan Po Road	1379	2268																																																
	-	Wan Po Road	2268	4113																																																
<b>Section B (Po Yap Road to Po Hong Road)</b>																																																				
	C	Po Yap Road	4113	4200																																																
	-	Po Yap & Po Hong Rd	4200	5500																																																
	D1 & D2	Po Hong & Ling Hong Rd	5500	5600																																																
	-	Ling Hong Road	5600	5799																																																
	E	Po Hong Road	5799	5838																																																
	-	Po Hong Road	5838	6254																																																
	F	Po Hong Road	6254	6368																																																
	-	Po Hong Road	6368	7250																																																
<b>Section C (Po Lam Road to Tsui Lam to TKOFWPSR*)</b>																																																				
	-	Po Lam Road	7250	7740																																																
	G	Tsui Lam Road	7740	7770																																																
	-	Tsui Lam Road	7770	8300																																																
	-	TKOFWPSR	8300	8376																																																

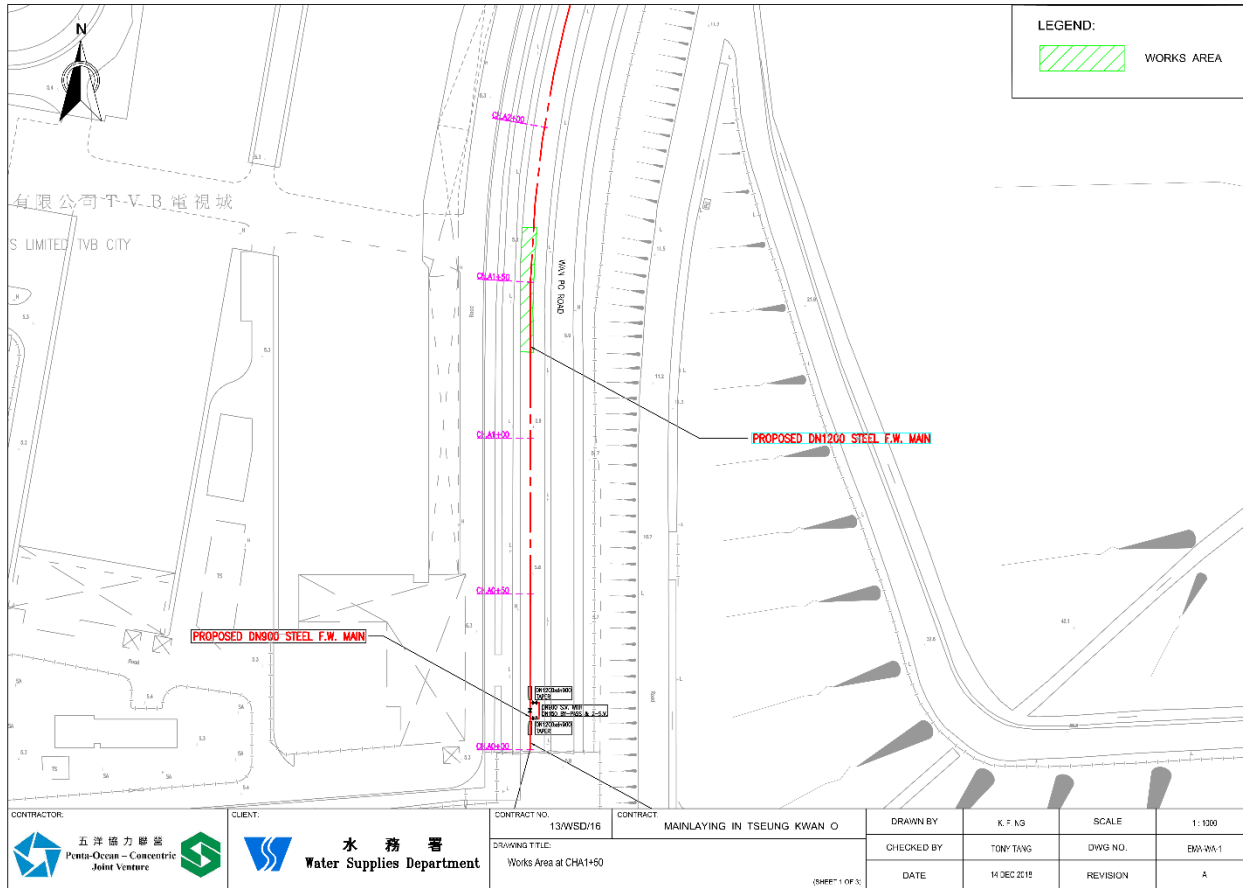
# Commencement of works at CHA 720 on 30 Aug 2018.  
\*TKOFWPSR - Tseung Kwan O Fresh Water Primary Service Reservoir  
\*\*Remaining 1581m within TKO137 with site possession from Nov 2019



## Appendix D

# Layout of Major Construction Works Undertaken during the Reporting Quarter

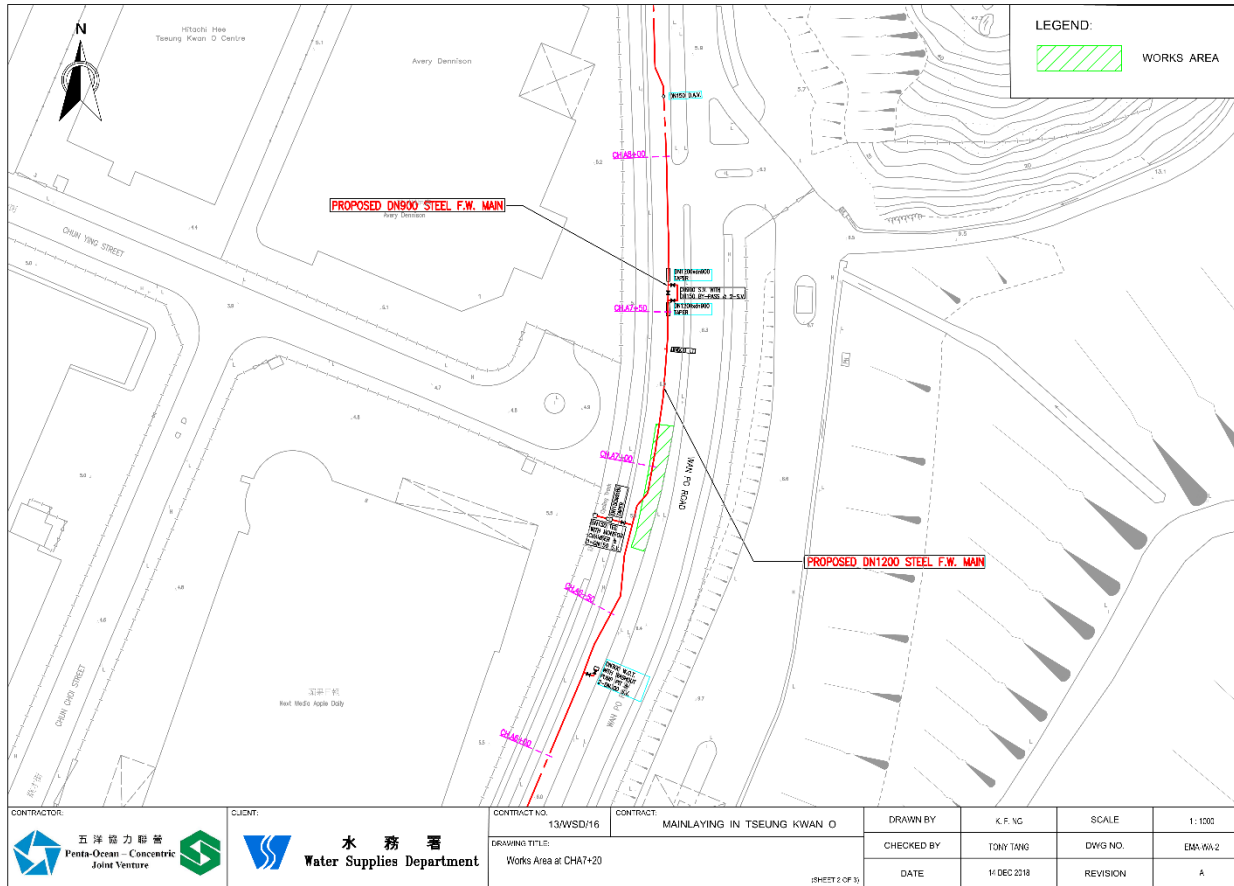
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CONTRACTOR: 	CLIENT: 	CONTRACT NO. 13/WSD/16	CONTRACT MAINLAYING IN TSEUNG KWAN O	DRAWN BY	K. F. NG	SCALE	1:1200
				CHECKED BY	TONY TANG	DWG NO.	EM-WA-1
				DATE	14 DEC 2018	REVISION	A

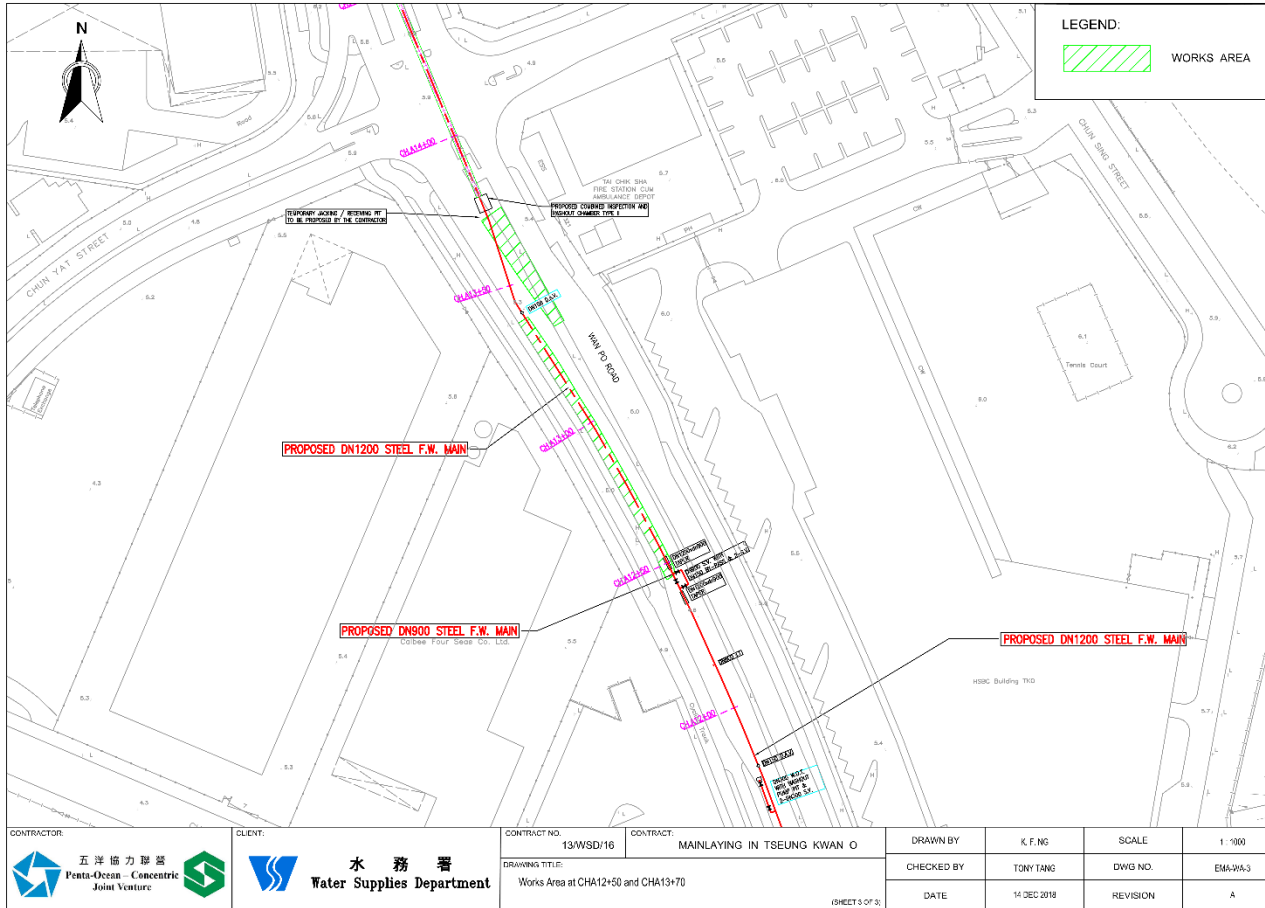
(SHEET 1 OF 3)

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CONTRACTOR: 	CLIENT: 	CONTRACT NO.: 13/WSD/16	CONTRACT: MAINLAYING IN TSEUNG KWAN O	DRAWN BY: K.F. NG	SCALE: 1:1000
		DRAWING TITLE: Works Area at CHAT+20		CHECKED BY: TONY TANG	DWG NO.: EMA/WA/2
		(SHEET 2 OF 3)		DATE: 11 DEC 2018	REVISION: A

**Contract No. 13/WSD/16**  
**Mainlaying in Tseung Kwan O**  
**3<sup>rd</sup> Quarterly EM&A Report for February 2019 to April 2019**



# Appendix E

## Summary of Implementation Status of Environmental Mitigation

**Contract No. 13/WSD/16**  
**Mainlaying in Tseung Kwan O**  
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EIA Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Implementation Agent	Implementation Stage			Implementation status	Relevant Legislation & Guidelines
				D	C	O		
<b>Air Quality</b>								
S4.8.1	Impervious dust screen or sheeting will be provided to enclose scaffolding from the ground floor level of building for construction of superstructure of the new buildings.	Land site/ During Construction	Contractor(s)		✓		N/A	Air Pollution Control (Construction Dust)
S4.8.1	Impervious sheet will be provided for skip hoist for material transport.	Land site/ During Construction, particularly dry season	Contractor(s)		✓		Implemented	
S4.8.1	The area where dusty work takes place should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after dusty activities as far as practicable.	Land site/ During Construction	Contractor(s)		✓		Implemented	
S4.8.1	All dusty materials should be sprayed with water or a dust suppression chemical immediately prior to any loading, unloading or transfer operation.	Land site/ During Construction	Contractor(s)		✓		Implemented	
S4.8.1	Dropping heights for excavated materials should be controlled to a practical height to minimise the fugitive dust arising from unloading.	Land site/ During Construction	Contractor(s)		✓		Implemented	
S4.8.1	During transportation by truck, materials should not be loaded to a level higher than the side and tail boards, and should be dampened or covered before transport.	Land site/ During Construction	Contractor(s)		✓		Implemented	
S4.8.1	Wheel washing device should be provided at the exits of the work sites. Immediately before leaving a construction site, every vehicle shall be washed to remove any dusty material from its body and wheels as far as practicable.	Land site/ During Construction	Contractor(s)		✓		Implemented	

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EIA Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Implementation Agent	Implementation Stage			Implementation status	Relevant Legislation & Guidelines
				D	C	O		
S4.8.1	Road sections between vehicle-wash areas and vehicular entrance will be paved.	Land site/ During Construction	Contractor(s)		✓		Implemented	
S4.8.1	Hoarding of not less than 2.4m high from ground level will be provided along the length of the Project Site boundary.	Land site/ During construction	Contractor(s)	✓	✓		Implemented	
S4.8.1	Haul roads will be kept clear of dusty materials and will be sprayed with water so as to maintain the entire road surface wet at all times.	Land site/ During construction	Contractor(s)		✓		Implemented	
S4.8.1	Temporary stockpiles of dusty materials will be either covered entirely by impervious sheets or sprayed with water to maintain the entire surface wet all the time.	Land site/ During construction	Contractor(s)		✓		Implemented	
S4.8.1	Stockpiles of more than 20 bags of cement, dry pulverised fuel ash and dusty construction materials will be covered entirely by impervious sheeting sheltered on top and 3-sides.	Land site/ During construction	Contractor(s)		✓		N/A	
S4.8.1	All exposed areas will be kept wet always to minimise dust emission.	Land site/ During construction	Contractor(s)		✓		N/A	
S4.8.1	Ultra-low-sulphur diesel (ULSD) will be used for all construction plant on-site, as defined as diesel fuel containing not more than 0.005% sulphur by weight) as stipulated in Environment, Transport and Works Bureau Technical Circular (ETWB-TC(W)) No 19/2005 on Environmental Management on Construction Sites.	Land site/ During construction/ During Operation	Contractor(s)		✓	✓	Implemented	Environment, Transport and Works Bureau Technical Circular (ETWB- TC(W)) No 19/2005 on Environmental Management on Construction Sites
S4.8.1	The engine of the construction equipment during idling will be switched off.	Land site/ During construction	Contractor(s)		✓		Implemented	

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EIA Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Implementation Agent	Implementation Stage			Implementation status	Relevant Legislation & Guidelines
				D	C	O		
S4.8.1	Concrete batching plant will be required on site. control measures recommended in the Guidance Note on a Best Practicable Means for Cement Works (Concrete Batching Plant) (BPM 3/2 (93)) will be implemented. The control measures recommended in the Guidance Note on a Best Practicable Means for Cement Works (Concrete Batching Plant) (BPM 3/2 (93)) will be implemented.	Land site/ During construction	Contractor(s)		✓		N/A	Guidance Note on a Best
S4.8.1	Regular maintenance of construction equipment deployed on-site will be conducted to prevent black smoke emission.	Land site/ During construction	Contractor(s)		✓		Implemented	
S4.10	To ensure proper implementation of the recommended dust mitigation measures and good construction site practices during the construction phase, environmental site audits on weekly basis is recommended throughout the construction period.	Land site/ During construction	Contractor(s)/ Environmental Team (ET) & Independent Environmental Checker (IEC)		✓		Implemented	

Note: D – Design stage C – Construction O – Operation



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EIA Reference	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Implementation Agent	Implementation Stage			Implementation status	Relevant Legislation & Guidelines
				D	C	O		
<b>Noise</b>								
S5.7	Only well-maintained plant will be operated on-site and plant will be serviced regularly during the construction phase.	All area/ During construction	Contractor(s)		✓		Implemented	A Practical Guide for the Reduction of Noise from Construction Works,
S5.7	Silencers or mufflers on construction equipment will be utilised and will be properly maintained during the construction phase.	Noise control/ During construction	Contractor(s)		✓		N/A	A Practical Guide for the Reduction of Noise from Construction Works,
S5.7	Mobile plant, if any, will be sited as far away from NSRs as possible.	Noise control/ During construction	Contractor(s)		✓		N/A	A Practical Guide for the Reduction of Noise from Construction Works,
S5.7	Machines and plant (such as trucks) that may be in intermittent use will be shut down between work periods or will be throttled down to a minimum.	Noise control/ During construction	Contractor(s)		✓		Implemented	A Practical Guide for the Reduction of Noise from Construction Works,
S5.7	Plants known to emit noise strongly in one direction will, wherever possible, be orientated so that the noise is directed away from the nearby NSRs.	Noise control/ During construction	Contractor(s)		✓		Implemented	A Practical Guide for the Reduction of Noise from Construction Works,
S5.7	Material stockpiles and other structures will be effectively utilised, wherever practicable, in screening noise from on-site construction activities.	Noise control/ During construction	Contractor(s)		✓		N/A	A Practical Guide for the Reduction of Noise from Construction Works,
S5.7	Use of Quiet Powered Mechanical Equipment (QPME).	Noise control/ During	Contractor(s)		✓		N/A	A Practical

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				D	C	O		
		construction						Guide for the Reduction of Noise from Construction Works,
S5.7	Movable noise barriers of 3m in height with skid footing should be used and located within a few metres of stationary plant and mobile plant such that the line of sight to the NSR is blocked by the barriers. The length of the barrier should be at least five times greater than its height. The noise barrier material should have a superficial surface density of at least 7 kg m <sup>-2</sup> and have no openings or gaps.	Noise control/ During construction	Contractor(s)		✓		N/A	A Practical Guide for the Reduction of Noise from Construction Works,
S5.7	The noise insulating sheet should be deployed such that there would be no opening or gaps on the joints.	Noise control/ During construction	Contractor(s)		✓		N/A	A Practical Guide for the Reduction of Noise from Construction Works,
S5.7	Construction activities (e.g. excavation/shoring, reinstatement (asphalt), and pipe jacking) will be planned and carried out in sequence, such that items of PME proposed for these activities will not be operated simultaneously.	Noise control/ During construction	Contractor(s)		✓		Implemented	A Practical Guide for the Reduction of Noise from Construction Works
S5.7	PMEs will not be used at the works areas near educational institutions with residual impact (ie the "influence area" within a radius of 40m) during school hours in order to reduce impact to the educational institutions.	Noise control / During construction	Contractor(s)		✓		N/A	A Practical Guide for the Reduction of Noise from Construction Works
S5.7	Noise enclosures or acoustic sheds would be used to cover stationary PME such as generators. Portable/Movable noise enclosure made of material with superficial surface density of at least 7 kg m <sup>-2</sup> may be used for screening the noise from operation of the saw/groover, concrete.	Noise control/ Pre-construction/ During construction	Contractor(s)	✓	✓		Implemented	
S5.9	Sawcutting pavement, breaking up of pavement,	Noise control/ Pre-	Contractor(s)	✓	✓		N/A	

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	excavation /shoring, pipe laying, backfilling, reinstatement (concrete) and pipe jacking shall be scheduled outside the examination period.	construction/ During construction						
S5.9	In view the duration of noise exceedance at Creative Secondary School, PLK Laws Foundation College, TKO Kei Tak Primary School and School of Continuing and Professional Studies-CUHK is limited to 8 weeks, the construction work in the influence areas near the four schools shall be scheduled during long school holidays (eg summer holiday, Easter holiday or Christmas holiday, etc) as far as practicable. Scheduling the construction work for the four schools.	Noise control/ Pre-construction/ During construction	Contractor(s)	✓	✓		N/A	
S5.10	A noise monitoring programme shall be implemented for the construction phase.	Designated monitoring stations as defined in EM&A Manual/During construction phase	Environmental Team (ET)		✓		N/A	
S5.10	The effectiveness of on-site control measures could also be evaluated through the regular site audits.	All facilities/ During construction	Contractor(s)/ Environmental Team (ET) & Independent Environmental Checker (IEC)		✓		Implemented	-

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				D	C	O		
<b>Water Quality</b>								
S6.9	Dredged marine sediment will be disposed of in a gazetted marine disposal area in accordance with marine dumping permit conditions of the Dumping at Sea Ordinance (DASO).	Marine Dredging/ During construction	Contractor(s)		✓		N/A	Dumping at Sea Ordinance (DASO)
S6.9	Disposal vessels will be fitted with tight bottom seals in order to prevent leakage of material during transport.	Marine Dredging/ During construction	Contractor(s)		✓		N/A	-
S6.9	Barges will be filled to a level, which ensures that material does not spill over during transport to the disposal site and that adequate freeboard is maintained to ensure that the decks are not washed by wave action.	Marine Dredging/ During construction	Contractor(s)		✓		N/A	-
S6.9	After dredging, any excess materials will be cleaned from decks and exposed fittings before the vessel is moved from the dredging area.	Marine Dredging/ During construction	Contractor(s)		✓		N/A	-
S6.9	All vessels should be well maintained and inspected before use to limit any potential discharges to the marine environment.	Marine Dredging/ During construction	Contractor(s)		✓		N/A	-
S6.9	All vessels must have a clean ballast system.	Marine Dredging/ During construction	Contractor(s)		✓		N/A	-
S6.9	No discharge of sewage/grey wastewater should be allowed. Waste water from potentially contaminated area on working vessels should be minimized and collected. These kinds of wastewater should be brought back to port and discharged at appropriate collection and treatment system.	Marine Dredging/ During construction	Contractor(s)		✓		N/A	-
S6.9	No soil waste is allowed to be disposed overboard.	Marine Dredging/ During construction	Contractor(s)		✓		N/A	-

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S6.9	Silt removal facilities such as silt traps or sedimentation facilities will be provided to remove silt particles from runoff to meet the requirements of the TM standard under the WPCO. The design of silt removal facilities will be based on the guidelines provided in ProPECC PN 1/94. All drainage facilities and erosion and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly.	Land site & drainage/ During construction	Contractor(s)		✓		Implemented	ProPECC PN 1/94 TM Standard under the WPCO
S6.9	Earthworks to form the final surfaces will be followed up with surface protection and drainage works to prevent erosion caused by rainstorms.	Land site & drainage/ During construction	Contractor(s)		✓		N/A	-
S6.9	Appropriate surface drainage will be designed and provided where necessary.	Land site & drainage/ During construction	Contractor(s)		✓		N/A	-
S6.9	The precautions to be taken at any time of year when rainstorms are likely together with the actions to be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94.	Land site & drainage/ During construction	Contractor(s)		✓		Implemented	ProPECC PN 1/94
S6.9	Oil interceptors will be provided in the drainage system where necessary and regularly emptied to prevent the release of oil and grease into the storm water drainage system after accidental spillages.	Land site & drainage/ During construction	Contractor(s)		✓		Implemented, rectified after observation	-
S6.9	Temporary and permanent drainage pipes and culverts provided to facilitate runoff discharge, if any, will be adequately designed for the controlled release of storm flows.	Land site & drainage/ During construction	Contractor(s)		✓		Implemented	-

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S6.9	The temporary diverted drainage, if any, will be reinstated to the original condition when the construction work has finished or when the temporary diversion is no longer required.	Land site & drainage/ During construction	Contractor(s)		✓		N/A	-
S6.9	Appropriate numbers of portable toilets shall be provided by a licensed contractor to serve the construction workers over the construction site to prevent direct disposal of sewage into the water environment.	Land site & drainage/ During construction	Contractor(s)		✓		Implemented	-
S6.9 and S6.12	The sterilization water should be dechlorinated with total residual chlorine (TRC) level below 1 mg/L before discharge to public sewer. In situ testing of TRC should also be conducted for the discharge of chlorinated water for pipeline disinfection to ensure sufficient dechlorination before discharge to public sewer.	Sterilization of water mains prior to commissioning	Contractor(s)		✓	✓	N/A	Technical Memorandum for Effluents Discharged into Drainage and Sewerage Systems Inland and Coastal Waters
S6.9	The cleaning and flushing water should also be treated and desilted to the relevant discharge requirement stipulated in TM-DSS before discharging.	Sterilization of water mains prior to commissioning	Contractor(s)		✓	✓	N/A	Technical Memorandum for Effluents Discharged into Drainage and Sewerage Systems Inland and Coastal Waters
S6.9	Site drainage should be well maintained and good construction practices should be observed to ensure that oil, fuels, solvents and other chemicals are managed, stored and handled properly and do not enter the nearby water streams.	Land site & drainage/ During construction/ During operation	Contractor(s)		✓	✓	Implemented, rectified after observation	-
S6.12	Regular site inspections will be carried out in order to confirm that regulatory requirements are being met and that contractors are implementing the standard site practice and mitigation measures as proposed to reduce potential impacts to water quality.	During construction	Contractor(s)/ Environmental Team (ET) & Independent Environmental Checker (IEC)		✓		Implemented	-

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				D	C	O		
<b>Waste Management</b>								
S8.5	Nomination of approved personnel to be responsible for standard site practices, arrangements for collection and effective disposal to an appropriate facility of all wastes generated at the site.	Contract mobilisation/ During construction	Contractor(s)		✓		Implemented	-
S8.5	Training of site personnel in proper waste management and chemical handling procedures. Training will be provided to workers on the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling at the beginning of the construction works.	Contract mobilisation/ During construction	Contractor(s)		✓		Implemented	-
S8.5	Provision of sufficient waste disposal points and regular collection for disposal.	All area/ During construction/ During operation	Contractor(s)		✓	✓	Implemented	DEVB TC(W) No. 8/2010, Enhanced Specification for Site Cleanliness and Tidiness.
S8.5	Appropriate measures to reduce windblown litter and dust transportation of waste by either covering trucks or by transporting wastes in enclosed containers.	All area/ During construction	Contractor(s)		✓		Implemented	DEVB TC(W) No. 8/2010, Enhanced Specification for Site Cleanliness and Tidiness.
S8.5	A waste management plan (WMP) as stated in the "ETWB TC(W) No. 19/2005, Environmental Management on Construction Sites" for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established and implemented during the construction phase as part of the Environmental Management Plan (EMP). The Contractor will be required to prepare the EMP and submits it to the Architect/ Engineer under the Contract for approval prior to implementation.	All area/ During construction	Contractor(s)		✓		Implemented	ETWB TC(W) No. 19/2005, Environmental Management on Construction Sites
S8.5	Separation of chemical wastes for special handling and appropriate treatment at the Chemical Waste Treatment Centre at Tsing Yi.	All area/ During construction	Contractor(s)		✓		Implemented	Chapters 2 & 3 Code of Practice on the Packaging, Labelling, Storage of Chemical Wastes published under the Waste Disposal

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				D	C	O		
								Ordinance (Cap 354), Section 35
S8.5	Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.	Land site/ During construction	Contractor(s)		✓		Implemented	Waste Disposal Ordinance (Cap 354)
S8.5	A recording system for the amount of wastes generated/ recycled and disposal sites. The trip- ticket system will be included as one of the contractual requirements and implemented by the contractor(s).	Land site/ During construction	Contractor(s)		✓		Implemented	DEVB TC(W) No. 6/2010, Trip Ticket System for Disposal of Construction & Demolition Materials
S8.5	Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of material and their proper disposal.	Land site/ During construction/ During operation	Contractor(s)		✓		Implemented, rectified after observation	WBTC 32/92, The Use of Tropical Hard Wood on Construction Site
S8.5	Encourage collection of aluminium cans and waste paper by individual collectors during construction with separate labelled bins provided to segregate these wastes from other general refuse by the workforce.	Land site/ During construction	Contractor(s)		✓		Implemented	ETWB TCW No. 33/2002, Management of Construction and Demolition Material Including Rock
S8.5	Any unused chemicals and those with remaining functional capacity will be recycled as far as possible.	Land site/ During construction	Contractor(s)		✓		Implemented	-
S8.5	Use of reusable non-timber formwork to reduce the amount of C&D materials.	All areas/ During construction	Contractor(s)		✓		N/A	WBTC 32/92, The Use of Tropical Hard Wood on Construction Site
S8.5	Prior to disposal of construction waste, wood, steel and other metals will be separated to the extent practical, for re-use and/or recycling to reduce the quantity of waste to be disposed of to landfill.	All areas/ During construction	Contractor(s)		✓		Implemented	DEVB TC(W) No. 6/2010, Trip Ticket System for Disposal of Construction & Demolition Materials
S8.5	Proper storage and site practices to reduce the potential for damage or contamination of construction materials.	All areas/ During construction	Contractor(s)		✓		Implemented, rectified after observation	-
S8.5	Plan and stock construction materials carefully to reduce amount of waste generated and avoid	All areas/ During construction	Contractor(s)		✓		Implemented	-



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				D	C	O		
	unnecessary generation of waste.							
S8.5	A Sediment Quality Report (SQR) for sampling and chemical testing of the sediment will be prepared and submitted to the EPD for approval. The approved detailed sampling and chemical testing will be carried out prior to the commencement of the dredging activities to confirm the sediment disposal method.	Marine works/ During construction	Contractor(s)		✓		N/A	ETWB TC(W) No. 34/2002 and Dumping at Sea Ordinance (DASO)
S8.5	The management of dredged/ excavated sediment management requirement from <i>ETWB TC(W) No. 34/2002</i> will be incorporated in the Specification of the Contract Documents.	Marine works/ During construction	WSD/ Contractor(s)		✓		Implemented	ETWB TC(W) No. 34/2002 and Dumping at Sea Ordinance (DASO)
S8.5	The contractor will open a billing account with EPD in accordance with the Waste Disposal (Charges for Disposal of Construction Waste) Regulation for the payment of disposal charges.	Contract mobilisation/ During construction	Contractor(s)		✓		Implemented	Cap 354N Waste Disposal (Charges for Disposal of Construction Waste) Regulation
S8.5	A trip-ticket system will be established in accordance with DEVB TC(W) No. 6/2010 to monitor the reuse of surplus excavated materials off-site and disposal of construction waste and general refuse at transfer facilities/ landfills, and to control fly-tipping.	Contract mobilisation/ During construction	Contractor(s)		✓		Implemented	DEVB TC(W) No. 6/2010, Trip Ticket System for Disposal of Construction & Demolition Materials
S8.5	The project proponent will also conduct regular inspection of the waste management measures implemented on site as described in the Waste Management Plan.	All area/ During construction	Contractor(s)/ Environmental Team (ET) & Independent Environmental Checker (IEC)		✓		Implemented	ETWB TC(W) No. 19/2005, Environmental Management on Construction Sites
S8.5	A recording system (similar to summary table as shown in Annex 5 and Annex 6 of Appendix G of <i>ETWB TC(W) No. 19/2005</i> ) for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established during the construction phase.	All area/ During construction	Contractor(s)		✓		Implemented	Annex 5 and Annex 6 of Appendix G of <i>ETWB TC(W) No. 19/2005</i>
S8.5	Inert C&D materials (public fill) will be reused within	All area/ During construction	Contractor(s)		✓		N/A	-

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				D	C	O		
	the Project as far as practicable.							
S8.5	Public fill and construction waste shall be segregated and stored in different containers or skips to facilitate reuse or recycling of materials and their proper disposal.	All area/ During construction	Contractor(s)		✓		N/A	-
S8.5	Specific areas of the work site will be designated for such segregation and storage if immediate use is not practicable.	All area/ During construction	Contractor(s)		✓		N/A	-
S8.5	To reduce the potential dust and water quality impacts of site formation works, C&D materials will be wetted as quickly as possible to the extent practice after filling.	All area/ During construction	Contractor(s)		✓		Implemented	Air Pollution Control (Construction Dust) Regulation (Cap 311R); WPCO (Cap 358)
S8.5	Open stockpiles of excavated/ fill materials or construction wastes on-site should be covered with tarpaulin or similar fabric.	Land site/ During Construction, particularly dry season	Contractor(s)		✓		N/A	Air Pollution Control (Construction Dust) Regulation (Cap 311R)
S8.5	Chemical waste container shall be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed.	All area/ During construction/ During operation	Contractor(s)/ WSD		✓	✓	Implemented	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Handling and Storage of Chemical Wastes
S8.5	Chemical waste container shall have a capacity of less than 450 L unless the specifications have been approved by the EPD.	All area/ During construction/ During operation	Contractor(s)/ WSD		✓	✓	Implemented	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Handling and Storage of Chemical Wastes
S8.5	A label in English and Chinese shall be displayed on the chemical container in accordance with instructions	All area/ During construction/ During operation	Contractor(s)/ WSD		✓	✓	Implemented	Waste Disposal (Chemical Waste)

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				D	C	O		
	prescribed in Schedule 2 of the Regulations.							(General) Regulation; Code of Practice on the Packaging, Handling and Storage of Chemical Wastes
S8.5	Storage areas for chemical waste shall be enclosed on at least 3 sides.	All area/ During construction/ During operation	Contractor(s)/ WSD		✓	✓	Implemented	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Handling and Storage of Chemical Wastes
S8.5	Storage areas for chemical waste shall have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest.	All area/ During construction/ During operation	Contractor(s)/ WSD		✓	✓	Implemented	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Handling and Storage of Chemical Wastes
S8.5	Storage areas for chemical waste shall have adequate ventilation.	All area/ During construction/ During operation	Contractor(s)/ WSD		✓	✓	Implemented	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Handling and Storage of Chemical Wastes
S8.5	Storage areas for chemical waste shall be covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary).	All area/ During construction/ During operation	Contractor(s)/ WSD		✓	✓	Implemented	Waste Disposal (Chemical Waste) (General) Regulation; Code of

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				D	C	O		
								Practice on the Packaging, Handling and Storage of Chemical Wastes
S8.5	Storage areas for chemical waste shall be arranged so that incompatible materials are appropriately separated.	All area/ During construction/ During operation	Contractor(s)/ WSD		✓	✓	Implemented	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Handling and Storage of Chemical Wastes
S8.5	General refuse will be stored in enclosed bins or compaction units separately from construction and chemical wastes.	All area/ During construction/ During operation	Contractor(s)/ WSD		✓	✓	Implemented	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Handling and Storage of Chemical Wastes
S8.5	Adequate number of waste containers will be provided to avoid over-spillage of waste.	All area/ During construction/ During operation	Contractor(s)/ WSD		✓	✓	Implemented	DEVB TC(W) No. 8/2010 Enhanced Specification for Site Cleanliness and Tidiness.
S8.5	A reputable waste collector will be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimise odour, pest and litter impacts.	All area/ During construction/ During operation	Contractor(s)/ WSD		✓	✓	N/A	-
S8.5	Recycling bins will be provided at strategic locations within the Site to facilitate recovery of recyclable materials (including aluminium can, waste paper, glass bottles and plastic bottles) from the Site. Materials recovered will be sold for recycling.	All area/ During construction/ During operation	Contractor(s)/ WSD		✓	✓	Implemented	-

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S8.5	To avoid any odour and litter impact, accurate number of portable toilets will be provided for workers on-site.	All area/ During construction	Contractor(s)		✓		Implemented	-
S8.5	The burning of refuse on construction sites is prohibited by law.	All area/ During construction	Contractor(s)		✓		Implemented	Air Pollution Control Ordinance (Cap 311)
S8.7	To facilitate monitoring and control over the contractors' performance on waste management, a waste inspection and audit programme will be implemented throughout the construction phase.	All facilities/ During construction	ET/ IEC		✓		Implemented	-

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<b>Ecology</b>								
S9.7	For slope mitigation works within the Clear Water Bay Country Park, to avoid tree felling and damages to trees, the exact locations of the flexible barrier foundation plates, soil nails and rock dowels can be adjusted during detailed design, and a setback distance from existing trees is recommended to be maintained as far as practical. A detailed specification describing the exact locations of the flexible barrier foundation plates, soil nails and rock dowels will be prepared to illustrate how the setback distance from existing trees would be implemented for tree avoidance.	Slope mitigation works area/ During detailed design/ During construction	Contractor(s)	✓	✓		N/A	-
S9.7	Pruning of tree canopies along the alignment of the flexible barriers shall be limited to a minimum.	Slope mitigation works area/ During construction	Contractor(s)		✓		N/A	
S9.7	The alignment of flexible barriers shall be optimized to preserve all species of conservation interest and minimize the impact to the existing vegetation as far as practicable. All individuals of <i>Marsdenia lachnostoma</i> within the slope mitigation areas shall be retained <i>in-situ</i> , by positioning the alignment of flexible barrier at a minimum 1.5m in a radius away from these individuals.	Slope mitigation works area/ During detailed design/ During construction	Contractor(s)	✓	✓		N/A	-
S9.7 and 9.10	At the detailed design stage prior to the commencement of the slope mitigation works, a vegetation survey shall be carried out at the slope mitigation areas within the Clear Water Bay Country Park to assess the condition and identify the location of each individual of <i>Marsdenia lachnostoma</i> and other flora species of conservation interest that may be directly affected by the construction works.	Slope mitigation works area/ During detailed design/ During construction	Contractor(s)	✓	✓		N/A	-
S9.7	Temporary fencing will be installed to fence off the concerned species either in groups of individually within the works area and in the close proximity to prevent from being damaged and disturbed during construction. A sign identifying the site shall be attached to the fence and flagging tape shall be attached to the individuals to visualize their locations.	Slope mitigation works area/ During construction	Contractor(s)		✓		N/A	-
S9.7 and S9.10	A specification for fencing and demarcating individuals of <i>Marsdenia lachnostoma</i> (or other flora species of	Slope mitigation works area/ During construction	Contractor(s)		✓		N/A	-

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				D	C	O		
	conservation interest, if found) adjacent to the proposed alignment of the flexible barriers will be prepared to protect the species.							
S9.7	Induction training shall also be provided to all site personnel in order to brief them on this flora of conservation interest including the locations and their importance.	Slope mitigation works area/ During construction	Contractor(s)		✓		Implemented	-
S9.7	The resident site supervisory staff will closely monitor the conditions of concerned individuals during construction of flexible barriers in the close proximity.	Slope mitigation works area/ During construction	Contractor(s)		✓		N/A	-
S9.7	Erect fences along the boundary of the works area before the commencement of works to prevent vehicle movements and encroachment of personnel onto adjacent areas.	All area/ During construction	Contractor(s)		✓		N/A	-
S9.7	Regularly check the work site boundaries to ensure that they are not breached and that damage does not occur to surrounding areas.	All area/ During construction	Contractor(s)/ Environmental Team (ET)		✓		N/A	-
S9.7	Avoid any damage and disturbance, particularly those caused by filling and illegal dumping, to the surrounding habitats through proper management of waste disposal.	All area/ During construction	Contractor(s)		✓		N/A	-
S9.7	Reinstate temporarily affected areas, particularly the habitats of plantation and shrubland-grassland immediately after completion of construction works, through on-site tree/shrub planting. The tree/shrub species will be chosen with reference to those in the surrounding area.	All area/ During construction	Contractor(s)		✓		N/A	-
S9.7	Affected habitats within the Clear Water Bay Country Bay shall be reinstated by hydro-seeding and planting of climbers and native shrub seedlings where practical upon completion of the slope mitigation works.	All area/ During construction	Contractor(s)		✓		N/A	-

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				D	C	O		
<b>Landscape &amp; Visual</b>								
S11.10 & 11.11	The construction area and area allowed for temporary structures, such as the contractor's office, will be minimized to a practical minimum. (MM1)	All area/ Detailed design/ During construction/ During operation	WSD/ Contractor(s)	✓	✓	✓	Implemented	-
S11.10 & 11.11	At the detailed design stage, the design team will seek to minimize the landscape footprint of the Project and above ground facilities, while satisfying all other requirements. (MM2)	All area/ Detailed design/ During construction/ During operation	WSD/ Contractor(s)	✓	✓	✓	Implemented	-
S11.10 & 11.11	Design principles will be adopted to take into account the surrounding area, particularly Clear Water Bay Country Park behind and the nearby waterfront, with due consideration given to: - green roofs where practical (ie without equipment on the roof); - roadside planting; - aesthetic treatment of all structures; - vertical greening; screen planting along application site; and - landscape enhancement with amenity planting where practical including planting along the edge (site boundary) fence with native shrubs where feasible, - to reduce their visual impact and blend them into the surrounding landscape. (MM3)	All area/ Detailed design/ During construction/ During operation	WSD/ Contractor(s)	✓	✓	✓	Implemented	-
S11.10 & 11.11	All trees within the Project Site or the potential slope mitigation works area will be carefully protected during construction according to DEVB TCW No. 10/2013 – Tree Preservation (MM4)	All area/ Detailed design/ During construction/ During operation	WSD/ Contractor(s)	✓	✓	✓	Implemented	ETWB TCW No. 3/2006 - Tree Preservation.
S11.10 & 11.11	No tree within the Country Park will be felled. Trees within the Site unavoidably affected by the works will be transplanted where necessary and practical. For trees that need to be felled, compensatory planting will be provided to the satisfaction of relevant Government departments. A compensatory tree planting proposal including locations of tree compensation will be submitted to seek relevant government department's approval, in accordance with DEVB TC(W) No. 10/2013. (MM5)	All area/ Detailed design/ During construction/ During operation	WSD/ Contractor(s)	✓	✓	✓	Implemented	DEVB TC(W) No. 10/2013



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				D	C	O		
S11.10 & 11.11	Any slope mitigation works necessary to address natural terrain hazards, will be minimized to minimize any potential environmental impact to the Country Park e.g. soil nailing and rock stabilization will aim to avoid existing trees e.g. should any restoration of vegetation be necessary, the best planting matrix with native species will be established, with the aim of resembling the existing vegetation. (MM6)	All area/ Detailed design/ During construction/ During operation	WSD/ Contractor(s)	✓	✓	✓	Implemented	
S11.10 & 11.11	Dredging works for the installation of intake structures and outfall diffusers should be minimized to avoid or reduce any potential environmental impacts to as low as reasonably practicable (ALARP). The intake and outfall structures (e.g. intake openings and diffuser heads) will be prefabricated and transferred to site for installation. (MM7)	All area/ Detailed design/ During construction/ During operation	WSD/ Contractor(s)	✓	✓	✓	N/A	
S11.10 & 11.11	All night-time lighting will be reduced to a practical minimum both in terms of number of level and will be hooded and directional. (MM8) units and lux level and will be hooded and directional. (MM8)	All area/ Detailed design/ During construction/ During operation	WSD/ Contractor(s)	✓	✓	✓	Implemented	-

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				D	C	O		
	<b>Landfill Gas Hazard</b>							
S12.7	During all works, safety procedures should be implemented to minimise the risks of fires and explosions, asphyxiation of workers and toxicity effects resulting from contact with contaminated soil and groundwater.	All area/ Detailed design/ During construction/ During operation	Contractor(s)	✓	✓	✓	Implemented	-
S12.7	During trenching and excavation as well as creation of confined spaces at near to or below ground level, precautions should be clearly laid down and rigidly Gas detection equipment and appropriate breathing apparatus should be available and used when entering confined spaces or trenches deeper than 1 metre.	All area/ Detailed design/ During construction/ During operation	Contractor(s)	✓	✓	✓	N/A	
S12.7	The Contractor should make the workers are aware of potential hazards of working in confined spaces (any chamber, manhole or culvert which is large enough to permit access to personnel). Such work in confined spaces is controlled by the Factories and Industrial Undertakings (Confined Spaces) Regulations of the Factories and Industrial Undertakings Ordinance. Following the Safety Guide to Working in Confined Spaces ensures compliance with the above regulations.	All area/ Detailed design/ During construction/ During operation	Contractor(s)	✓	✓	✓	Implemented	
S12.7	Safety officers, specifically trained with regard to landfill gas and leachate related hazards and the appropriate actions to take in adverse circumstances, should be present on the site throughout the works, in particular, when works are undertaken below grade.	All area/ Detailed design/ During construction/ During operation	Contractor(s)	✓	✓	✓	Implemented	
S12.7	All personnel who work on site and all visitors to the site should be made aware of the possibility of ignition of gas in the vicinity of the works, the possible presence of contaminated water and the need to avoid physical contact with it.	All area/ Detailed design/ During construction/ During operation	Contractor(s)	✓	✓	✓	Implemented	
S12.7	Monitoring for landfill gas should be undertaken in all excavations, manholes, chambers (particularly during pipe jacking) and any confined spaces through the use of an intrinsically safe portable instrument, appropriately calibrated and capable of measuring the concentrations of methane, carbon dioxide and oxygen.	All area/ Detailed design/ During construction/ During operation	Contractor(s)	✓	✓	✓	N/A	
S12.7	Monitoring frequency and areas to be monitored should be specified prior to commencement of	All area/ Detailed design/ During construction/ During operation	Contractor(s)	✓	✓	✓	N/A	

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				D	C	O		
	groundwork, either by the Safety Officer, or by an appropriately qualified person. All measurements should be recorded and documented.	operation						
S12.7	Proceed drilling with adequate care and precautions against the potential hazards which may be encountered.	All area/ Detailed design/ During construction/ During operation	Contractor(s)	✓	✓	✓	Implemented	
S12.7	Prior to the commencement of the site works, the drilling contractor should devise a 'method-of- working' statement covering all normal and emergency procedures (including but not limited to number of operatives, experience and special skills of operatives, normal method of operations, emergency procedures, supervisors responsibilities, storage and use of safety equipment, safety procedures and signs, barriers and guarding). The site supervisor and all operatives must be familiar with this statement.	All area/ During construction/ During operation	Contractor(s)	✓	✓	✓	Implemented	
S12.7	Where below ground service entries are necessary to the Incoming Switchgear Room, 132 kV Substation and Chlorine Store (I) and (II), the entry point should be sealed to prevent gas entry. In addition, any below grade cable trenches entering the Incoming Switchgear Room and 132 kV Substation can become the pathway for landfill gas and hence grilled metal covers should be used.	All area/ Detailed design/ During construction/ During operation	Contractor(s)	✓	✓	✓	N/A	
S12.7	It is recommended regular landfill gas monitoring should be carried out at the Incoming Switchgear Room, 132 kV Substation and Chlorine Store (I) and (II). The monitoring frequency will be monthly for the first year of operation. If the monitoring results show no sign of landfill gas migration, reduce the monitoring frequency to once every six months.	All area/ Detailed design/ During construction/ During operation	Contractor(s)	✓	✓	✓	N/A	
S12.7	The manholes and utility pits within the Project Site and along the fresh water mains. Each manhole/ utility pit should be monitored with two measurements (at mid depth and base). Each measurement should be monitored for a minimum of 10 minutes. A steady reading and peak reading should be recorded at each manhole/ utility pit and for each measurement. The need for venting the manhole/ utility pit and further	All area/ Detailed design/ During construction/ During operation	Contractor(s)	✓	✓	✓	N/A	

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				D	C	O		
S12.7	monitoring will be reviewed after the initial monitoring. All construction, operation and maintenance personnel working on-site as well as visitors should be made aware of the hazards of landfill gas and its possible presence on-site. This should be achieved through a combination of posting warning signs in prominent places and also by access to detailed information on landfill gas hazards and the designs and procedural means by which these hazards are being minimised on-site.	All area/ Detailed design/ During construction/ During operation	Contractor(s)	✓	✓	✓	Implemented	

Note: D – Design stage C – Construction O – Operation

# Appendix F

## Action and Limit Level for Noise and Landfill Gas

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**Action/ Limit Level for Noise Monitoring**

<b>Time Period</b>	<b>Action</b>	<b>Limit (dB(A))</b>
0700-1900 hours on normal weekdays	When one documented complaint is received from any one of the noise sensitive receivers	<ul style="list-style-type: none"><li>• 70 dB(A) for school and</li><li>• 65 dB(A) during examination period</li></ul>
Notes: (a) Limits specified in the GW-TM and IND-TM for construction and operation noise, respectively.		

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**Action Level for Landfill Gas Monitoring**

<b>Parameters</b>	<b>Level</b>
Oxygen (O <sub>2</sub> )	Action Level < 19% O <sub>2</sub>  Limit Level < 19% O <sub>2</sub>
Methane (CH <sub>4</sub> )	Action Level >10% LEL  Limit Level >20% LEL
Carbon Dioxide (CO <sub>2</sub> )	Action Level >0.5% CO <sub>2</sub> Limit Level >1.5% CO <sub>2</sub>

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# Appendix G

## Landfill Gas Monitoring Results



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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
1/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	17	1023	PGM-2500 (QRAE 3)	
1/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	17	1023	PGM-2500 (QRAE 3)	
1/2/2019	CHA7+20	0.1	8:30	Fine	0	0	0	20.9	17	1023	PGM-2500 (QRAE 3)	
1/2/2019	CHA7+20	0.1	13:30	Fine	0	0	0	20.9	17	1023	PGM-2500 (QRAE 3)	
1/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	17	1024	PGM-2500 (QRAE 3)	
1/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	17	1022	PGM-2500 (QRAE 3)	
1/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	17	1024	PGM-2500 (QRAE 3)	
1/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	17	1022	PGM-2500 (QRAE 3)	
1/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	17	1024	PGM-2500 (QRAE 3)	
1/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	17	1022	PGM-2500 (QRAE 3)	
2/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	19	1020	PGM-2500 (QRAE 3)	
2/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	19	1018	PGM-2500 (QRAE 3)	
2/2/2019	CHA7+20	0.1	8:30	Fine	0	0	0	20.9	19	1020	PGM-2500 (QRAE 3)	
2/2/2019	CHA7+20	0.1	13:30	Fine	0	0	0	20.9	19	1018	PGM-2500 (QRAE 3)	
2/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	19	1020	PGM-2500 (QRAE 3)	
2/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	19	1017	PGM-2500 (QRAE 3)	
2/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	19	1020	PGM-2500 (QRAE 3)	
2/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	19	1017	PGM-2500 (QRAE 3)	
2/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	19	1020	PGM-2500 (QRAE 3)	
2/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	19	1017	PGM-2500 (QRAE 3)	
11/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	18	1025	PGM-2500 (QRAE 3)	
11/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	18	1024	PGM-2500 (QRAE 3)	
11/2/2019	CHA7+20	0.1	8:30	Fine	0	0	0	20.9	18	1025	PGM-2500 (QRAE 3)	
11/2/2019	CHA7+20	0.1	13:30	Fine	0	0	0	20.9	18	1024	PGM-2500 (QRAE 3)	
11/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	18	1025	PGM-2500 (QRAE 3)	
11/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	18	1023	PGM-2500 (QRAE 3)	
11/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	18	1025	PGM-2500 (QRAE 3)	
11/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	18	1023	PGM-2500 (QRAE 3)	
11/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	18	1026	PGM-2500 (QRAE 3)	
11/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	18	1023	PGM-2500 (QRAE 3)	
12/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	20	1025	PGM-2500 (QRAE 3)	
12/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	20	1023	PGM-2500 (QRAE 3)	
12/2/2019	CHA7+20	3.3	8:30	Fine	0	0	0	20.9	20	1025	PGM-2500 (QRAE 3)	
12/2/2019	CHA7+20	3.3	13:30	Fine	0	0	0	20.9	20	1023	PGM-2500	

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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
											(QRAE 3)	
12/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	20	1025	PGM-2500 (QRAE 3)	
12/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	20	1023	PGM-2500 (QRAE 3)	
12/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	20	1025	PGM-2500 (QRAE 3)	
12/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	20	1023	PGM-2500 (QRAE 3)	
12/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	20	1026	PGM-2500 (QRAE 3)	
12/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	20	1023	PGM-2500 (QRAE 3)	
13/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	20	1023	PGM-2500 (QRAE 3)	
13/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	20	1021	PGM-2500 (QRAE 3)	
13/2/2019	CHA7+20	3.3	8:30	Fine	0	0	0	20.9	20	1023	PGM-2500 (QRAE 3)	
13/2/2019	CHA7+20	3.3	13:30	Fine	0	0	0	20.9	20	1021	PGM-2500 (QRAE 3)	
13/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	20	1023	PGM-2500 (QRAE 3)	
13/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	20	1020	PGM-2500 (QRAE 3)	
13/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	20	1023	PGM-2500 (QRAE 3)	
13/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	20	1020	PGM-2500 (QRAE 3)	
13/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	20	1023	PGM-2500 (QRAE 3)	
13/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	20	1020	PGM-2500 (QRAE 3)	
14/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	22	1022	PGM-2500 (QRAE 3)	
14/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	22	1020	PGM-2500 (QRAE 3)	
14/2/2019	CHA7+20	3.3	8:30	Fine	0	0	0	20.9	22	1022	PGM-2500 (QRAE 3)	
14/2/2019	CHA7+20	3.3	13:30	Fine	0	0	0	20.9	22	1020	PGM-2500 (QRAE 3)	
14/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	22	1022	PGM-2500 (QRAE 3)	
14/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	22	1019	PGM-2500 (QRAE 3)	
14/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	22	1022	PGM-2500 (QRAE 3)	
14/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	22	1019	PGM-2500 (QRAE 3)	
14/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	22	1022	PGM-2500 (QRAE 3)	
14/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	22	1019	PGM-2500 (QRAE 3)	
15/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	19	1021	PGM-2500 (QRAE 3)	
15/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	19	1020	PGM-2500 (QRAE 3)	
15/2/2019	CHA7+20	3.3	8:30	Fine	0	0	0	20.9	19	1021	PGM-2500 (QRAE 3)	
15/2/2019	CHA7+20	3.3	13:30	Fine	0	0	0	20.9	19	1020	PGM-2500 (QRAE 3)	
15/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	19	1022	PGM-2500 (QRAE 3)	
15/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	19	1019	PGM-2500 (QRAE 3)	
15/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	19	1022	PGM-2500 (QRAE 3)	

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15/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	19	1019	PGM-2500 (QRAE 3)	
15/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	19	1022	PGM-2500 (QRAE 3)	
15/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	19	1019	PGM-2500 (QRAE 3)	
16/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	24		PGM-2500 (QRAE 3)	
16/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	24		PGM-2500 (QRAE 3)	
16/2/2019	CHA7+20	3.3	8:30	Fine	0	0	0	20.9	24		PGM-2500 (QRAE 3)	
16/2/2019	CHA7+20	3.3	13:30	Fine	0	0	0	20.9	24		PGM-2500 (QRAE 3)	
16/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	24		PGM-2500 (QRAE 3)	
16/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	24		PGM-2500 (QRAE 3)	
16/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	24		PGM-2500 (QRAE 3)	
16/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	24		PGM-2500 (QRAE 3)	
16/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	24		PGM-2500 (QRAE 3)	
16/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	24		PGM-2500 (QRAE 3)	
18/2/2019	CHA1+50	4	8:00	Rain	0	0	0	20.9	17	1015	PGM-2500 (QRAE 3)	
18/2/2019	CHA1+50	4	13:00	Rain	0	0	0	20.9	17	1014	PGM-2500 (QRAE 3)	
18/2/2019	CHA7+20	3.3	8:30	Rain	0	0	0	20.9	17	1015	PGM-2500 (QRAE 3)	
18/2/2019	CHA7+20	3.3	13:30	Rain	0	0	0	20.9	17	1014	PGM-2500 (QRAE 3)	
18/2/2019	CHA12+50	2	9:00	Rain	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
18/2/2019	CHA12+50	2	14:00	Rain	0	0	0	20.9	17	1015	PGM-2500 (QRAE 3)	
18/2/2019	CHA13+70	1.5	9:30	Rain	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
18/2/2019	CHA13+70	1.5	14:30	Rain	0	0	0	20.9	17	1015	PGM-2500 (QRAE 3)	
18/2/2019	137	1.7	10:00	Rain	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
18/2/2019	137	1.7	15:00	Rain	0	0	0	20.9	17	1015	PGM-2500 (QRAE 3)	
19/2/2019	CHA1+50	4	8:00	Rain	0	0	0	20.9	19	1017	PGM-2500 (QRAE 3)	
19/2/2019	CHA1+50	4	13:00	Rain	0	0	0	20.9	19	1016	PGM-2500 (QRAE 3)	
19/2/2019	CHA7+20	3.3	8:30	Rain	0	0	0	20.9	19	1017	PGM-2500 (QRAE 3)	
19/2/2019	CHA7+20	3.3	13:30	Rain	0	0	0	20.9	19	1016	PGM-2500 (QRAE 3)	
19/2/2019	CHA12+50	2	9:00	Rain	0	0	0	20.9	19	1018	PGM-2500 (QRAE 3)	
19/2/2019	CHA12+50	2	14:00	Rain	0	0	0	20.9	19	1015	PGM-2500 (QRAE 3)	
19/2/2019	CHA13+70	1.5	9:30	Rain	0	0	0	20.9	19	1018	PGM-2500 (QRAE 3)	
19/2/2019	CHA13+70	1.5	14:30	Rain	0	0	0	20.9	19	1015	PGM-2500 (QRAE 3)	
19/2/2019	137	1.7	10:00	Rain	0	0	0	20.9	19	1018	PGM-2500 (QRAE 3)	
19/2/2019	137	1.7	15:00	Rain	0	0	0	20.9	19	1015	PGM-2500 (QRAE 3)	
20/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	24	1019	PGM-2500	

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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
											(QRAE 3)	
20/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	24	1018	PGM-2500 (QRAE 3)	
20/2/2019	CHA7+20	3.3	8:30	Fine	0	0	0	20.9	24	1019	PGM-2500 (QRAE 3)	
20/2/2019	CHA7+20	3.3	13:30	Fine	0	0	0	20.9	24	1018	PGM-2500 (QRAE 3)	
20/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	24	1020	PGM-2500 (QRAE 3)	
20/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	24	1017	PGM-2500 (QRAE 3)	
20/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	24	1020	PGM-2500 (QRAE 3)	
20/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	24	1017	PGM-2500 (QRAE 3)	
20/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	24	1020	PGM-2500 (QRAE 3)	
20/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	24	1017	PGM-2500 (QRAE 3)	
21/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	21	1018	PGM-2500 (QRAE 3)	
21/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	21	1017	PGM-2500 (QRAE 3)	
21/2/2019	CHA7+20	3.3	8:30	Fine	0	0	0	20.9	21	1018	PGM-2500 (QRAE 3)	
21/2/2019	CHA7+20	3.3	13:30	Fine	0	0	0	20.9	21	1017	PGM-2500 (QRAE 3)	
21/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	21	1019	PGM-2500 (QRAE 3)	
21/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	21	1016	PGM-2500 (QRAE 3)	
21/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	21	1019	PGM-2500 (QRAE 3)	
21/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	21	1016	PGM-2500 (QRAE 3)	
21/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	21	1019	PGM-2500 (QRAE 3)	
21/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	21	1016	PGM-2500 (QRAE 3)	
22/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	18	1018	PGM-2500 (QRAE 3)	
22/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	18	1016	PGM-2500 (QRAE 3)	
22/2/2019	CHA7+20	3.3	8:30	Fine	0	0	0	20.9	18	1018	PGM-2500 (QRAE 3)	
22/2/2019	CHA7+20	3.3	13:30	Fine	0	0	0	20.9	18	1016	PGM-2500 (QRAE 3)	
22/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	18	1018	PGM-2500 (QRAE 3)	
22/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	18	1015	PGM-2500 (QRAE 3)	
22/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	18	1018	PGM-2500 (QRAE 3)	
22/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	18	1015	PGM-2500 (QRAE 3)	
22/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	18	1018	PGM-2500 (QRAE 3)	
22/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	18	1015	PGM-2500 (QRAE 3)	
23/2/2019	CHA1+50	4	8:00	Rain	0	0	0	20.9	15	1016	PGM-2500 (QRAE 3)	
23/2/2019	CHA1+50	4	13:00	Rain	0	0	0	20.9	15	1015	PGM-2500 (QRAE 3)	
23/2/2019	CHA7+20	3.3	8:30	Rain	0	0	0	20.9	15	1016	PGM-2500 (QRAE 3)	
23/2/2019	CHA7+20	3.3	13:30	Rain	0	0	0	20.9	15	1015	PGM-2500 (QRAE 3)	

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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
23/2/2019	CHA12+50	2	9:00	Rain	0	0	0	20.9	15	1016	PGM-2500 (QRAE 3)	
23/2/2019	CHA12+50	2	14:00	Rain	0	0	0	20.9	15	1014	PGM-2500 (QRAE 3)	
23/2/2019	CHA13+70	1.5	9:30	Rain	0	0	0	20.9	15	1016	PGM-2500 (QRAE 3)	
23/2/2019	CHA13+70	1.5	14:30	Rain	0	0	0	20.9	15	1014	PGM-2500 (QRAE 3)	
23/2/2019	137	1.7	10:00	Rain	0	0	0	20.9	15	1017	PGM-2500 (QRAE 3)	
23/2/2019	137	1.7	15:00	Rain	0	0	0	20.9	15	1013	PGM-2500 (QRAE 3)	
25/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	17	1018	PGM-2500 (QRAE 3)	
25/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	17	1017	PGM-2500 (QRAE 3)	
25/2/2019	CHA7+20	3.3	8:30	Fine	0	0	0	20.9	17	1018	PGM-2500 (QRAE 3)	
25/2/2019	CHA7+20	3.3	13:30	Fine	0	0	0	20.9	17	1017	PGM-2500 (QRAE 3)	
25/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	17	1019	PGM-2500 (QRAE 3)	
25/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
25/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	17	1019	PGM-2500 (QRAE 3)	
25/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
25/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	17	1019	PGM-2500 (QRAE 3)	
25/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
26/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	18	1019	PGM-2500 (QRAE 3)	
26/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	18	1018	PGM-2500 (QRAE 3)	
26/2/2019	CHA7+20	3.3	8:30	Fine	0	0	0	20.9	18	1019	PGM-2500 (QRAE 3)	
26/2/2019	CHA7+20	3.3	13:30	Fine	0	0	0	20.9	18	1018	PGM-2500 (QRAE 3)	
26/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	18	1019	PGM-2500 (QRAE 3)	
26/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	18	1017	PGM-2500 (QRAE 3)	
26/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	18	1019	PGM-2500 (QRAE 3)	
26/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	18	1017	PGM-2500 (QRAE 3)	
26/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	18	1019	PGM-2500 (QRAE 3)	
26/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	18	1017	PGM-2500 (QRAE 3)	
27/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	22	1017	PGM-2500 (QRAE 3)	
27/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	22	1015	PGM-2500 (QRAE 3)	
27/2/2019	CHA7+20	3.3	8:30	Fine	0	0	0	20.9	22	1017	PGM-2500 (QRAE 3)	
27/2/2019	CHA7+20	3.3	13:30	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
27/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	22	1017	PGM-2500 (QRAE 3)	
27/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	22	1013	PGM-2500 (QRAE 3)	
27/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	22	1017	PGM-2500 (QRAE 3)	
27/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	22	1013	PGM-2500	

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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
											(QRAE 3)	
27/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	22	1017	PGM-2500 (QRAE 3)	
27/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	22	1013	PGM-2500 (QRAE 3)	
28/2/2019	CHA1+50	4	8:00	Fine	0	0	0	20.9	24	1015	PGM-2500 (QRAE 3)	
28/2/2019	CHA1+50	4	13:00	Fine	0	0	0	20.9	24	1014	PGM-2500 (QRAE 3)	
28/2/2019	CHA7+20	3.3	8:30	Fine	0	0	0	20.9	24	1015	PGM-2500 (QRAE 3)	
28/2/2019	CHA7+20	3.3	13:30	Fine	0	0	0	20.9	24	1014	PGM-2500 (QRAE 3)	
28/2/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	24	1016	PGM-2500 (QRAE 3)	
28/2/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	24	1013	PGM-2500 (QRAE 3)	
28/2/2019	CHA13+70	1.5	9:30	Fine	0	0	0	20.9	24	1016	PGM-2500 (QRAE 3)	
28/2/2019	CHA13+70	1.5	14:30	Fine	0	0	0	20.9	24	1013	PGM-2500 (QRAE 3)	
28/2/2019	137	1.7	10:00	Fine	0	0	0	20.9	24	1016	PGM-2500 (QRAE 3)	
28/2/2019	137	1.7	15:00	Fine	0	0	0	20.9	24	1013	PGM-2500 (QRAE 3)	
1/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	21	1017	PGM-2500 (QRAE 3)	
1/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	21	1016	PGM-2500 (QRAE 3)	
1/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	21	1017	PGM-2500 (QRAE 3)	
1/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	21	1016	PGM-2500 (QRAE 3)	
1/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	21	1018	PGM-2500 (QRAE 3)	
1/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	21	1015	PGM-2500 (QRAE 3)	
1/3/2019	CHA13+70	0.4	9:30	Fine	0	0	0	20.9	21	1018	PGM-2500 (QRAE 3)	
1/3/2019	CHA13+70	0.4	14:30	Fine	0	0	0	20.9	21	1015	PGM-2500 (QRAE 3)	
1/3/2019	137	1.7	10:00	Fine	0	0	0	20.9	21	1018	PGM-2500 (QRAE 3)	
1/3/2019	137	1.7	15:00	Fine	0	0	0	20.9	21	1015	PGM-2500 (QRAE 3)	
2/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	23	1014	PGM-2500 (QRAE 3)	
2/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	23	1012	PGM-2500 (QRAE 3)	
2/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	23	1014	PGM-2500 (QRAE 3)	
2/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	23	1012	PGM-2500 (QRAE 3)	
2/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	23	1015	PGM-2500 (QRAE 3)	
2/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	23	1011	PGM-2500 (QRAE 3)	
2/3/2019	CHA13+70	0.4	9:30	Fine	0	0	0	20.9	23	1015	PGM-2500 (QRAE 3)	
2/3/2019	CHA13+70	0.4	14:30	Fine	0	0	0	20.9	23	1011	PGM-2500 (QRAE 3)	
2/3/2019	137	1.7	10:00	Fine	0	0	0	20.9	23	1015	PGM-2500 (QRAE 3)	
2/3/2019	137	1.7	15:00	Fine	0	0	0	20.9	23	1011	PGM-2500 (QRAE 3)	
4/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	

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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
4/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
4/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
4/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
4/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	22	1015	PGM-2500 (QRAE 3)	
4/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
4/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	22	1015	PGM-2500 (QRAE 3)	
4/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
5/3/2019	CHA1+60	4	8:00	Rain	0	0	0	20.9	21	1013	PGM-2500 (QRAE 3)	
5/3/2019	CHA1+60	4	13:00	Rain	0	0	0	20.9	21	1012	PGM-2500 (QRAE 3)	
5/3/2019	CHA6+64	3.3	8:30	Rain	0	0	0	20.9	21	1013	PGM-2500 (QRAE 3)	
5/3/2019	CHA6+64	3.3	13:30	Rain	0	0	0	20.9	21	1012	PGM-2500 (QRAE 3)	
5/3/2019	CHA12+50	2	9:00	Rain	0	0	0	20.9	21	1013	PGM-2500 (QRAE 3)	
5/3/2019	CHA12+50	2	14:00	Rain	0	0	0	20.9	21	1011	PGM-2500 (QRAE 3)	
5/3/2019	137	1.7	9:30	Rain	0	0	0	20.9	21	1013	PGM-2500 (QRAE 3)	
5/3/2019	137	1.7	14:30	Rain	0	0	0	20.9	21	1011	PGM-2500 (QRAE 3)	
6/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	21	1013	PGM-2500 (QRAE 3)	
6/3/2019	CHA1+60	4	13:00	Rain	0	0	0	20.9	21	1013	PGM-2500 (QRAE 3)	
6/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	21	1013	PGM-2500 (QRAE 3)	
6/3/2019	CHA6+64	3.3	13:30	Rain	0	0	0	20.9	21	1013	PGM-2500 (QRAE 3)	
6/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	21	1014	PGM-2500 (QRAE 3)	
6/3/2019	CHA12+50	2	14:00	Rain	0	0	0	20.9	21	1013	PGM-2500 (QRAE 3)	
6/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	21	1014	PGM-2500 (QRAE 3)	
6/3/2019	137	1.7	14:30	Rain	0	0	0	20.9	21	1013	PGM-2500 (QRAE 3)	
7/3/2019	CHA1+60	4	8:00	Rain	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
7/3/2019	CHA1+60	4	13:00	Rain	0	0	0	20.9	17	1015	PGM-2500 (QRAE 3)	
7/3/2019	CHA6+64	3.3	8:30	Rain	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
7/3/2019	CHA6+64	3.3	13:30	Rain	0	0	0	20.9	17	1015	PGM-2500 (QRAE 3)	
7/3/2019	CHA12+50	2	9:00	Rain	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
7/3/2019	CHA12+50	2	14:00	Rain	0	0	0	20.9	17	1015	PGM-2500 (QRAE 3)	
7/3/2019	137	1.7	9:30	Rain	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
7/3/2019	137	1.7	14:30	Rain	0	0	0	20.9	17	1015	PGM-2500 (QRAE 3)	
8/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	18	1017	PGM-2500 (QRAE 3)	
8/3/2019	CHA1+60	4	13:00	Rain	0	0	0	20.9	18	1016	PGM-2500 (QRAE 3)	



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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
8/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	18	1017	PGM-2500 (QRAE 3)	
8/3/2019	CHA6+64	3.3	13:30	Rain	0	0	0	20.9	18	1016	PGM-2500 (QRAE 3)	
8/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	18	1017	PGM-2500 (QRAE 3)	
8/3/2019	CHA12+50	2	14:00	Rain	0	0	0	20.9	18	1015	PGM-2500 (QRAE 3)	
8/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	18	1017	PGM-2500 (QRAE 3)	
8/3/2019	137	1.7	14:30	Rain	0	0	0	20.9	18	1015	PGM-2500 (QRAE 3)	
9/3/2019	CHA1+60	4	8:00	Rain	0	0	0	20.9	16	1013	PGM-2500 (QRAE 3)	
9/3/2019	CHA1+60	4	13:00	Rain	0	0	0	20.9	16	1011	PGM-2500 (QRAE 3)	
9/3/2019	CHA6+64	3.3	8:30	Rain	0	0	0	20.9	16	1013	PGM-2500 (QRAE 3)	
9/3/2019	CHA6+64	3.3	13:30	Rain	0	0	0	20.9	16	1011	PGM-2500 (QRAE 3)	
9/3/2019	CHA12+50	2	9:00	Rain	0	0	0	20.9	16	1013	PGM-2500 (QRAE 3)	
9/3/2019	CHA12+50	2	14:00	Rain	0	0	0	20.9	16	1010	PGM-2500 (QRAE 3)	
9/3/2019	137	1.7	9:30	Rain	0	0	0	20.9	16	1013	PGM-2500 (QRAE 3)	
9/3/2019	137	1.7	14:30	Rain	0	0	0	20.9	16	1010	PGM-2500 (QRAE 3)	
11/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	19	1016	PGM-2500 (QRAE 3)	
11/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	19	1015	PGM-2500 (QRAE 3)	
11/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	19	1016	PGM-2500 (QRAE 3)	
11/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	19	1015	PGM-2500 (QRAE 3)	
11/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	19	1016	PGM-2500 (QRAE 3)	
11/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	19	1014	PGM-2500 (QRAE 3)	
11/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	19	1016	PGM-2500 (QRAE 3)	
11/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	19	1014	PGM-2500 (QRAE 3)	
12/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	17	1017	PGM-2500 (QRAE 3)	
12/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
12/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	17	1017	PGM-2500 (QRAE 3)	
12/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
12/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	17	1017	PGM-2500 (QRAE 3)	
12/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	17	1015	PGM-2500 (QRAE 3)	
12/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	17	1017	PGM-2500 (QRAE 3)	
12/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	17	1015	PGM-2500 (QRAE 3)	
13/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	17	1018	PGM-2500 (QRAE 3)	
13/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	17	1017	PGM-2500 (QRAE 3)	
13/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	17	1018	PGM-2500	



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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
											(QRAE 3)	
13/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	17	1017	PGM-2500 (QRAE 3)	
13/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	17	1018	PGM-2500 (QRAE 3)	
13/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
13/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	17	1018	PGM-2500 (QRAE 3)	
13/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	17	1016	PGM-2500 (QRAE 3)	
14/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	16	1019	PGM-2500 (QRAE 3)	
14/3/2019	CHA1+60	4	13:00	Rain	0	0	0	20.9	16	1018	PGM-2500 (QRAE 3)	
14/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	16	1019	PGM-2500 (QRAE 3)	
14/3/2019	CHA6+64	3.3	13:30	Rain	0	0	0	20.9	16	1018	PGM-2500 (QRAE 3)	
14/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	16	1020	PGM-2500 (QRAE 3)	
14/3/2019	CHA12+50	2	14:00	Rain	0	0	0	20.9	16	1017	PGM-2500 (QRAE 3)	
14/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	16	1020	PGM-2500 (QRAE 3)	
14/3/2019	137	1.7	14:30	Rain	0	0	0	20.9	16	1017	PGM-2500 (QRAE 3)	
15/3/2019	CHA1+60	4	8:00	Rain	0	0	0	20.9	17	1021	PGM-2500 (QRAE 3)	
15/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	17	1021	PGM-2500 (QRAE 3)	
15/3/2019	CHA6+64	3.3	8:30	Rain	0	0	0	20.9	17	1021	PGM-2500 (QRAE 3)	
15/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	17	1021	PGM-2500 (QRAE 3)	
15/3/2019	CHA12+50	2	9:00	Rain	0	0	0	20.9	17	1022	PGM-2500 (QRAE 3)	
15/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	17	1020	PGM-2500 (QRAE 3)	
15/3/2019	137	1.7	9:30	Rain	0	0	0	20.9	17	1022	PGM-2500 (QRAE 3)	
15/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	17	1020	PGM-2500 (QRAE 3)	
16/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	20	1020	PGM-2500 (QRAE 3)	
16/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	20	1020	PGM-2500 (QRAE 3)	
16/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	20	1020	PGM-2500 (QRAE 3)	
16/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	20	1019	PGM-2500 (QRAE 3)	
16/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	20	1021	PGM-2500 (QRAE 3)	
16/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	20	1019	PGM-2500 (QRAE 3)	
16/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	20	1021	PGM-2500 (QRAE 3)	
16/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	20	1019	PGM-2500 (QRAE 3)	
18/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	20	1018	PGM-2500 (QRAE 3)	
18/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	20	1017	PGM-2500 (QRAE 3)	
18/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	20	1018	PGM-2500 (QRAE 3)	

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**3<sup>rd</sup> Quarterly EM&A Report for February 2019 to April 2019**



Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
18/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	20	1016	PGM-2500 (QRAE 3)	
18/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	20	1018	PGM-2500 (QRAE 3)	
18/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	20	1016	PGM-2500 (QRAE 3)	
18/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	20	1018	PGM-2500 (QRAE 3)	
18/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	20	1016	PGM-2500 (QRAE 3)	
19/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	20	1017	PGM-2500 (QRAE 3)	
19/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	20	1014	PGM-2500 (QRAE 3)	
19/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	20	1017	PGM-2500 (QRAE 3)	
19/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	20	1014	PGM-2500 (QRAE 3)	
19/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	20	1017	PGM-2500 (QRAE 3)	
19/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	20	1014	PGM-2500 (QRAE 3)	
19/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	20	1017	PGM-2500 (QRAE 3)	
19/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	20	1014	PGM-2500 (QRAE 3)	
20/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
20/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	22	1013	PGM-2500 (QRAE 3)	
20/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
20/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	22	1013	PGM-2500 (QRAE 3)	
20/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
20/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	22	1012	PGM-2500 (QRAE 3)	
20/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
20/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	22	1012	PGM-2500 (QRAE 3)	
21/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	24	1012	PGM-2500 (QRAE 3)	
21/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	24	1011	PGM-2500 (QRAE 3)	
21/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	24	1012	PGM-2500 (QRAE 3)	
21/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	24	1011	PGM-2500 (QRAE 3)	
21/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	24	1012	PGM-2500 (QRAE 3)	
21/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	24	1011	PGM-2500 (QRAE 3)	
21/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	24	1012	PGM-2500 (QRAE 3)	
21/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	24	1011	PGM-2500 (QRAE 3)	
22/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	25	1012	PGM-2500 (QRAE 3)	
22/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	25	1012	PGM-2500 (QRAE 3)	
22/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	25	1012	PGM-2500 (QRAE 3)	
22/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	25	1012	PGM-2500	

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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
											(QRAE 3)	
22/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	25	1012	PGM-2500 (QRAE 3)	
22/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	25	1011	PGM-2500 (QRAE 3)	
22/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	25	1012	PGM-2500 (QRAE 3)	
22/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	25	1011	PGM-2500 (QRAE 3)	
23/3/2019	CHA1+60	4	8:00	Rain	0	0	0	20.9	19	1017	PGM-2500 (QRAE 3)	
23/3/2019	CHA1+60	4	13:00	Rain	0	0	0	20.9	19	1017	PGM-2500 (QRAE 3)	
23/3/2019	CHA6+64	3.3	8:30	Rain	0	0	0	20.9	19	1017	PGM-2500 (QRAE 3)	
23/3/2019	CHA6+64	3.3	13:30	Rain	0	0	0	20.9	19	1017	PGM-2500 (QRAE 3)	
23/3/2019	CHA12+50	2	9:00	Rain	0	0	0	20.9	19	1018	PGM-2500 (QRAE 3)	
23/3/2019	CHA12+50	2	14:00	Rain	0	0	0	20.9	19	1016	PGM-2500 (QRAE 3)	
23/3/2019	137	1.7	9:30	Rain	0	0	0	20.9	19	1018	PGM-2500 (QRAE 3)	
23/3/2019	137	1.7	14:30	Rain	0	0	0	20.9	19	1016	PGM-2500 (QRAE 3)	
25/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	18	1018	PGM-2500 (QRAE 3)	
25/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	18	1017	PGM-2500 (QRAE 3)	
25/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	18	1018	PGM-2500 (QRAE 3)	
25/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	18	1017	PGM-2500 (QRAE 3)	
25/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	18	1018	PGM-2500 (QRAE 3)	
25/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	18	1016	PGM-2500 (QRAE 3)	
25/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	18	1018	PGM-2500 (QRAE 3)	
25/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	18	1016	PGM-2500 (QRAE 3)	
26/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	21	1019	PGM-2500 (QRAE 3)	
26/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	21	1019	PGM-2500 (QRAE 3)	
26/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	21	1019	PGM-2500 (QRAE 3)	
26/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	21	1019	PGM-2500 (QRAE 3)	
26/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	21	1020	PGM-2500 (QRAE 3)	
26/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	21	1018	PGM-2500 (QRAE 3)	
26/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	21	1020	PGM-2500 (QRAE 3)	
26/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	21	1018	PGM-2500 (QRAE 3)	
27/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	22	1019	PGM-2500 (QRAE 3)	
27/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	22	1017	PGM-2500 (QRAE 3)	
27/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	22	1019	PGM-2500 (QRAE 3)	
27/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	22	1017	PGM-2500 (QRAE 3)	

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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
27/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	22	1019	PGM-2500 (QRAE 3)	
27/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	22	1016	PGM-2500 (QRAE 3)	
27/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	22	1019	PGM-2500 (QRAE 3)	
27/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	22	1016	PGM-2500 (QRAE 3)	
28/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	23	1014	PGM-2500 (QRAE 3)	
28/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	23	1012	PGM-2500 (QRAE 3)	
28/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	23	1014	PGM-2500 (QRAE 3)	
28/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	23	1012	PGM-2500 (QRAE 3)	
28/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	23	1014	PGM-2500 (QRAE 3)	
28/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	23	1011	PGM-2500 (QRAE 3)	
28/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	23	1014	PGM-2500 (QRAE 3)	
28/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	23	1011	PGM-2500 (QRAE 3)	
29/3/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	26	1010	PGM-2500 (QRAE 3)	
29/3/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	26	1010	PGM-2500 (QRAE 3)	
29/3/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	26	1010	PGM-2500 (QRAE 3)	
29/3/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	26	1010	PGM-2500 (QRAE 3)	
29/3/2019	CHA12+50	2	9:00	Fine	0	0	0	20.9	26	1011	PGM-2500 (QRAE 3)	
29/3/2019	CHA12+50	2	14:00	Fine	0	0	0	20.9	26	1009	PGM-2500 (QRAE 3)	
29/3/2019	137	1.7	9:30	Fine	0	0	0	20.9	26	1011	PGM-2500 (QRAE 3)	
29/3/2019	137	1.7	14:30	Fine	0	0	0	20.9	26	1009	PGM-2500 (QRAE 3)	
1/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	19	1020	PGM-2500 (QRAE 3)	
1/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	19	1019	PGM-2500 (QRAE 3)	
1/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	19	1020	PGM-2500 (QRAE 3)	
1/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	19	1019	PGM-2500 (QRAE 3)	
1/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	19	1021	PGM-2500 (QRAE 3)	
1/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	19	1018	PGM-2500 (QRAE 3)	
1/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	19	1021	PGM-2500 (QRAE 3)	
1/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	19	1018	PGM-2500 (QRAE 3)	
2/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	19	1020	PGM-2500 (QRAE 3)	
2/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	19	1018	PGM-2500 (QRAE 3)	
2/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	19	1020	PGM-2500 (QRAE 3)	
2/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	19	1017	PGM-2500 (QRAE 3)	
2/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	19	1020	PGM-2500	

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**3<sup>rd</sup> Quarterly EM&A Report for February 2019 to April 2019**



Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
											(QRAE 3)	
2/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	19	1017	PGM-2500 (QRAE 3)	
2/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	19	1020	PGM-2500 (QRAE 3)	
2/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	19	1017	PGM-2500 (QRAE 3)	
3/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	22	1017	PGM-2500 (QRAE 3)	
3/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	22	1017	PGM-2500 (QRAE 3)	
3/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	22	1017	PGM-2500 (QRAE 3)	
3/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	22	1016	PGM-2500 (QRAE 3)	
3/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	22	1018	PGM-2500 (QRAE 3)	
3/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	22	1016	PGM-2500 (QRAE 3)	
3/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	22	1018	PGM-2500 (QRAE 3)	
3/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	22	1016	PGM-2500 (QRAE 3)	
4/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	21	1018	PGM-2500 (QRAE 3)	
4/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	21	1017	PGM-2500 (QRAE 3)	
4/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	21	1018	PGM-2500 (QRAE 3)	
4/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	21	1016	PGM-2500 (QRAE 3)	
4/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	21	1018	PGM-2500 (QRAE 3)	
4/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	21	1016	PGM-2500 (QRAE 3)	
4/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	21	1018	PGM-2500 (QRAE 3)	
4/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	21	1016	PGM-2500 (QRAE 3)	
6/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
6/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	22	1013	PGM-2500 (QRAE 3)	
6/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
6/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	22	1012	PGM-2500 (QRAE 3)	
6/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
6/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	22	1012	PGM-2500 (QRAE 3)	
6/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
6/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	22	1011	PGM-2500 (QRAE 3)	
8/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	27	1012	PGM-2500 (QRAE 3)	
8/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	27	1012	PGM-2500 (QRAE 3)	
8/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	27	1012	PGM-2500 (QRAE 3)	
8/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	27	1011	PGM-2500 (QRAE 3)	
8/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	27	1013	PGM-2500 (QRAE 3)	

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**3<sup>rd</sup> Quarterly EM&A Report for February 2019 to April 2019**



Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
8/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	27	1011	PGM-2500 (QRAE 3)	
8/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	27	1013	PGM-2500 (QRAE 3)	
8/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	27	1010	PGM-2500 (QRAE 3)	
9/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	26	1012	PGM-2500 (QRAE 3)	
9/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	26	1011	PGM-2500 (QRAE 3)	
9/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	26	1012	PGM-2500 (QRAE 3)	
9/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	26	1010	PGM-2500 (QRAE 3)	
9/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	26	1012	PGM-2500 (QRAE 3)	
9/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	26	1010	PGM-2500 (QRAE 3)	
9/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	26	1012	PGM-2500 (QRAE 3)	
9/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	26	1010	PGM-2500 (QRAE 3)	
10/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	25	1013	PGM-2500 (QRAE 3)	
10/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	25	1011	PGM-2500 (QRAE 3)	
10/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	25	1013	PGM-2500 (QRAE 3)	
10/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	25	1010	PGM-2500 (QRAE 3)	
10/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	25	1013	PGM-2500 (QRAE 3)	
10/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	25	1010	PGM-2500 (QRAE 3)	
10/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	25	1013	PGM-2500 (QRAE 3)	
10/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	25	1009	PGM-2500 (QRAE 3)	
11/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	28	1010	PGM-2500 (QRAE 3)	
11/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	28	1009	PGM-2500 (QRAE 3)	
11/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	28	1011	PGM-2500 (QRAE 3)	
11/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	28	1009	PGM-2500 (QRAE 3)	
11/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	28	1011	PGM-2500 (QRAE 3)	
11/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	28	1009	PGM-2500 (QRAE 3)	
11/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	28	1011	PGM-2500 (QRAE 3)	
11/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	28	1009	PGM-2500 (QRAE 3)	
12/4/2019	CHA1+60	4	8:00	Rain	0	0	0	20.9	22	1012	PGM-2500 (QRAE 3)	
12/4/2019	CHA1+60	4	13:00	Rain	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
12/4/2019	CHA6+64	3.3	8:30	Rain	0	0	0	20.9	22	1012	PGM-2500 (QRAE 3)	
12/4/2019	CHA6+64	3.3	13:30	Rain	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
12/4/2019	CHA12+50	3.3	9:00	Rain	0	0	0	20.9	22	1013	PGM-2500 (QRAE 3)	
12/4/2019	CHA12+50	3.3	14:00	Rain	0	0	0	20.9	22	1014	PGM-2500	

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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
											(QRAE 3)	
12/4/2019	Jacking Pit B	1.2	9:30	Rain	0	0	0	20.9	22	1013	PGM-2500 (QRAE 3)	
12/4/2019	Jacking Pit B	1.2	14:30	Rain	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
13/4/2019	CHA1+60	4	8:00	Rain	0	0	0	20.9	22	1015	PGM-2500 (QRAE 3)	
13/4/2019	CHA1+60	4	13:00	Rain	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
13/4/2019	CHA6+64	3.3	8:30	Rain	0	0	0	20.9	22	1015	PGM-2500 (QRAE 3)	
13/4/2019	CHA6+64	3.3	13:30	Rain	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
13/4/2019	CHA12+50	3.3	9:00	Rain	0	0	0	20.9	22	1015	PGM-2500 (QRAE 3)	
13/4/2019	CHA12+50	3.3	14:00	Rain	0	0	0	20.9	22	1013	PGM-2500 (QRAE 3)	
13/4/2019	Jacking Pit B	1.2	9:30	Rain	0	0	0	20.9	22	1015	PGM-2500 (QRAE 3)	
13/4/2019	Jacking Pit B	1.2	14:30	Rain	0	0	0	20.9	22	1013	PGM-2500 (QRAE 3)	
15/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	22	1015	PGM-2500 (QRAE 3)	
15/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	22	1015	PGM-2500 (QRAE 3)	
15/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	22	1015	PGM-2500 (QRAE 3)	
15/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
15/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	22	1016	PGM-2500 (QRAE 3)	
15/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
15/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	22	1016	PGM-2500 (QRAE 3)	
15/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	22	1013	PGM-2500 (QRAE 3)	
16/4/2019	CHA1+60	4	8:00	Rain	0	0	0	20.9	20	1013	PGM-2500 (QRAE 3)	
16/4/2019	CHA1+60	4	13:00	Rain	0	0	0	20.9	20	1011	PGM-2500 (QRAE 3)	
16/4/2019	CHA6+64	3.3	8:30	Rain	0	0	0	20.9	20	1013	PGM-2500 (QRAE 3)	
16/4/2019	CHA6+64	3.3	13:30	Rain	0	0	0	20.9	20	1011	PGM-2500 (QRAE 3)	
16/4/2019	CHA12+50	3.3	9:00	Rain	0	0	0	20.9	20	1013	PGM-2500 (QRAE 3)	
16/4/2019	CHA12+50	3.3	14:00	Rain	0	0	0	20.9	20	1012	PGM-2500 (QRAE 3)	
16/4/2019	Jacking Pit B	1.2	9:30	Rain	0	0	0	20.9	20	1013	PGM-2500 (QRAE 3)	
16/4/2019	Jacking Pit B	1.2	14:30	Rain	0	0	0	20.9	20	1012	PGM-2500 (QRAE 3)	
17/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	22	1013	PGM-2500 (QRAE 3)	
17/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	22	1011	PGM-2500 (QRAE 3)	
17/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	22	1013	PGM-2500 (QRAE 3)	
17/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	22	1011	PGM-2500 (QRAE 3)	
17/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
17/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	22	1010	PGM-2500 (QRAE 3)	



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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
17/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	22	1014	PGM-2500 (QRAE 3)	
17/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	22	1010	PGM-2500 (QRAE 3)	
18/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	23	1011	PGM-2500 (QRAE 3)	
18/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	23	1010	PGM-2500 (QRAE 3)	
18/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	23	1011	PGM-2500 (QRAE 3)	
18/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	23	1010	PGM-2500 (QRAE 3)	
18/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	23	1011	PGM-2500 (QRAE 3)	
18/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	23	1009	PGM-2500 (QRAE 3)	
18/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	23	1011	PGM-2500 (QRAE 3)	
18/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	23	1009	PGM-2500 (QRAE 3)	
23/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	28	1011	PGM-2500 (QRAE 3)	
23/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	28	1010	PGM-2500 (QRAE 3)	
23/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	28	1011	PGM-2500 (QRAE 3)	
23/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	28	1010	PGM-2500 (QRAE 3)	
23/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	28	1011	PGM-2500 (QRAE 3)	
23/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	28	1009	PGM-2500 (QRAE 3)	
23/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	28	1011	PGM-2500 (QRAE 3)	
23/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	28	1009	PGM-2500 (QRAE 3)	
24/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	26	1011	PGM-2500 (QRAE 3)	
24/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	26	1010	PGM-2500 (QRAE 3)	
24/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	26	1011	PGM-2500 (QRAE 3)	
24/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	26	1009	PGM-2500 (QRAE 3)	
24/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	26	1011	PGM-2500 (QRAE 3)	
24/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	26	1010	PGM-2500 (QRAE 3)	
24/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	26	1011	PGM-2500 (QRAE 3)	
24/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	26	1010	PGM-2500 (QRAE 3)	
25/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	27	1009	PGM-2500 (QRAE 3)	
25/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	27	1009	PGM-2500 (QRAE 3)	
25/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	27	1009	PGM-2500 (QRAE 3)	
25/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	27	1009	PGM-2500 (QRAE 3)	
25/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	27	1010	PGM-2500 (QRAE 3)	
25/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	27	1009	PGM-2500 (QRAE 3)	
25/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	27	1010	PGM-2500	



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Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
											(QRAE 3)	
25/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	27	1009	PGM-2500 (QRAE 3)	
26/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	27	1011	PGM-2500 (QRAE 3)	
26/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	27	1010	PGM-2500 (QRAE 3)	
26/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	27	1011	PGM-2500 (QRAE 3)	
26/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	27	1010	PGM-2500 (QRAE 3)	
26/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	27	1011	PGM-2500 (QRAE 3)	
26/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	27	1009	PGM-2500 (QRAE 3)	
26/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	27	1011	PGM-2500 (QRAE 3)	
26/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	27	1009	PGM-2500 (QRAE 3)	
27/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	24	1013	PGM-2500 (QRAE 3)	
27/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	24	1012	PGM-2500 (QRAE 3)	
27/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	24	1013	PGM-2500 (QRAE 3)	
27/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	24	1012	PGM-2500 (QRAE 3)	
27/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	24	1013	PGM-2500 (QRAE 3)	
27/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	24	1012	PGM-2500 (QRAE 3)	
27/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	24	1013	PGM-2500 (QRAE 3)	
27/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	24	1012	PGM-2500 (QRAE 3)	
29/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	25	1012	PGM-2500 (QRAE 3)	
29/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	25	1010	PGM-2500 (QRAE 3)	
29/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	25	1012	PGM-2500 (QRAE 3)	
29/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	25	1010	PGM-2500 (QRAE 3)	
29/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	25	1013	PGM-2500 (QRAE 3)	
29/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	25	1009	PGM-2500 (QRAE 3)	
29/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	25	1013	PGM-2500 (QRAE 3)	
29/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	25	1009	PGM-2500 (QRAE 3)	
30/4/2019	CHA1+60	4	8:00	Fine	0	0	0	20.9	26	1015	PGM-2500 (QRAE 3)	
30/4/2019	CHA1+60	4	13:00	Fine	0	0	0	20.9	26	1014	PGM-2500 (QRAE 3)	
30/4/2019	CHA6+64	3.3	8:30	Fine	0	0	0	20.9	26	1015	PGM-2500 (QRAE 3)	
30/4/2019	CHA6+64	3.3	13:30	Fine	0	0	0	20.9	26	1014	PGM-2500 (QRAE 3)	
30/4/2019	CHA12+50	3.3	9:00	Fine	0	0	0	20.9	26	1015	PGM-2500 (QRAE 3)	
30/4/2019	CHA12+50	3.3	14:00	Fine	0	0	0	20.9	26	1013	PGM-2500 (QRAE 3)	
30/4/2019	Jacking Pit B	1.2	9:30	Fine	0	0	0	20.9	26	1015	PGM-2500 (QRAE 3)	

**Contract No. 13/WSD/16**  
**Mainlaying in Tseung Kwan O**  
**3<sup>rd</sup> Quarterly EM&A Report for February 2019 to April 2019**



Date of Measurement	Sampling Location	Depth (m)	Sampling time	Weather Condition	Balance Gas(%)	Flammable gas (methane%)	Carbon Dioxide (%)	Oxygen (%)	Temp (C)	Pressure (m bar)	Measurement Equipment	Remarks
30/4/2019	Jacking Pit B	1.2	14:30	Fine	0	0	0	20.9	26	1013	PGM-2500 (QRAE 3)	

# Appendix H

## Complaint Log and Regulatory Compliance Proforma

**Statistical Summary of Environmental Complaints**

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
1 Feb 2019- 30 Apr 2019	0	0	N/A

**Statistical Summary of Environmental Summons**

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Details
1 Feb 2019- 30 Apr 2019	0	0	N/A

**Statistical Summary of Environmental Prosecution**

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Details
1 Feb 2019- 30 Apr 2019	0	0	N/A