



# South East New Territories (SENT) Landfill Extension

Monthly Environmental Monitoring &  
Audit Report No.60 for December  
2023

PREPARED FOR



翠谷工程有限公司  
Green Valley Landfill, Limited

Green Valley Landfill Ltd.

DATE  
29 February 2024

REFERENCE  
0465169





翠谷工程有限公司  
Green Valley Landfill, Limited

## South East New Territories (SENT) Landfill Extension

### Environmental Certification Sheet EP-308/2008/B and FEP-01/308/2008/B

#### Reference Document/Plan

Document/Plan to be Certified/Verified:	Monthly Environmental Monitoring & Audit Report No.60 for December 2023 for South East New Territories (SENT) Landfill Extension
Date of Report:	29 February 2024

#### Reference EP Condition

EP Condition:	Condition No. 3.4
Four hard copies and one electronic copy of monthly EM&A Report shall be submitted to the Director within 10 working days after the end of the reporting month. The EM&A Reports shall include a summary of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit Levels). The submissions shall be verified by the IEC. Additional copies of the submission shall be provided to the Director upon request by the Director.	

#### ET Certification

I hereby certify that the above referenced document/plan complies with the above referenced condition of EP-308/2008/B and FEP-01/308/2008/B.

Terence Fong,  
Environmental Team Leader:  
  
(ERM Hong-Kong, Limited)

Date: 29 February 2024

#### IEC Verification

I hereby verify that the above referenced document/plan complies with the above referenced condition of EP-308/2008/B and FEP-01/308/2008/B.

Claudine Lee,  
Independent Environmental  
Checker:  
  
(Meinhardt Infrastructure and  
Environment Limited)

Date: 7 March 2024

## DOCUMENT DETAILS

DOCUMENT TITLE	South East New Territories (SENT) Landfill Extension
DOCUMENT SUBTITLE	Monthly Environmental Monitoring & Audit Report No.60 for December 2023
PROJECT NUMBER	0465169
Date	29 February 2024
Version	1
Author	Abbey Lau
Client name	Green Valley Landfill Ltd.

## DOCUMENT HISTORY

				ERM APPROVAL TO ISSUE		
	REVISION	AUTHOR	REVIEWED BY	NAME	DATE	
	0	AL	TF	TF	11.01.2024	
	1	AL	TF	TF	29.02.2024	

SIGNATURE PAGE

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Monthly Environmental Monitoring & Audit Report No.60 for  
December 2023

0465169



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## EXECUTIVE SUMMARY

The SENT Landfill Extension (SENTX) forms an integral part in the Strategic Plan in maintaining the continuity of landfill capacity in the Hong Kong for the cost-effective and environmentally satisfactory disposal of waste. ERM-Hong Kong, Limited (ERM) is commissioned to undertake the role of Environmental Team (ET) for the construction, operation/restoration and aftercare of SENTX Project (“the Project”) in accordance with the requirements specified in the Environmental Permit (EP), updated Environmental Monitoring and Audit (EM&A) Manual, the approved Environmental Impact Assessment (EIA) Report of the Project taking account of the latest design and other relevant statutory requirements. The construction (not including works related to site clearance and preparation) and operation of the Project commenced on 2 January 2019 and 21 November 2021, respectively.

This Monthly EM&A report presents the EM&A works carried out during the period from 1 to 31 December 2023 for the Project in accordance with the updated EM&A Manual.

## EXCEEDANCE OF ACTION AND LIMIT LEVELS FOR AIR QUALITY

No exceedance of Action and Limit Levels for operation/restoration phase air quality monitoring was recorded in the reporting period.

## EXCEEDANCE OF ACTION AND LIMIT LEVELS FOR NOISE

No exceedance of Action and Limit Levels for operation/restoration phase noise monitoring was recorded in the reporting period.

## EXCEEDANCE OF ACTION AND LIMIT LEVELS FOR WATER QUALITY

One exceedance of the Limit Level for groundwater (Chemical Oxygen Demand (COD)) was recorded for water quality impact monitoring in the reporting period. The groundwater (COD) exceedance at MWX-6 on 14 December 2023 was considered non Project-related upon further investigation.

## EXCEEDANCE OF ACTION AND LIMIT LEVELS FOR LANDFILL GAS

No exceedance of Action and Limit Levels for operation/restoration phase landfill gas monitoring was recorded in the reporting period.

## ENVIRONMENTAL COMPLAINTS, SUMMONS AND PROSECUTIONS

There were no complaints, notification of summons or prosecution recorded in the reporting period.

## REPORTING CHANGE

There was no reporting change in the reporting period.

## FUTURE KEY ISSUES

Potential environmental impacts arising from the upcoming construction/ operational activities in the next reporting period of January 2024 are mainly associated with dust emission from the exposed area and loading and unloading operation of dusty materials.

# 1. INTRODUCTION

## 1.1 BACKGROUND

The SENT Landfill Extension (SENTX) forms an integral part in the Strategic Plan in maintaining the continuity of landfill capacity in the Hong Kong for the cost-effective and environmentally satisfactory disposal of waste. The *Environmental Impact Assessment (EIA) Report* and the associated *Environmental Monitoring and Audit (EM&A) Manual* for the construction, operation, restoration and aftercare of the SENTX (hereafter referred to as “the Project”) have been approved under the *Environmental Impact Assessment Ordinance (EIAO)* in May 2008 (Register No.: AEIAR-117/2008) (hereafter referred to as the approved EIA Report) and an Environmental Permit (EP-308/2008) (EP) was granted by the Director of Environmental Protection (DEP) on 5 August 2008.

Since then, applications for Variation of an Environmental Permit (No. VEP-531/2017) were submitted to EPD and the Variation of Environmental Permits (EP-308/2008/A and EP-308/2008/B) were granted on 6 January 2012 and 20 January 2017, respectively, as the Hong Kong SAR Government has decided to reduce the scale of the design scheme of SENTX assessed in the approved EIA Report and SENTX will only receive construction waste. In May 2018, a Further Environmental Permit (FEP) (FEP-01/308/2008/B) was granted to the SENTX’s contractor, Green Valley Landfill, Limited (GVL).

ERM-Hong Kong, Limited (ERM) and Meinhardt Infrastructure and Environment Limited (Meinhardt) are commissioned to undertake the roles of Environmental Team (ET) and the Independent Environmental Checker (IEC), respectively, to undertake the EM&A activities for the Project in accordance with the requirements specified in the EP, updated EM&A Manual <sup>(1)</sup>, approved EIA Report <sup>(2)</sup> taking account of the latest design and other relevant statutory requirements.

## 1.2 PROJECT DESCRIPTION

The SENTX is a piggyback landfill, occupying the southern part of the existing SENT Landfill (including its infrastructure area) and 13 ha of Tseung Kwan O (TKO) Area 137. A layout plan of the SENTX is shown in **Figure 1.1**. Under the latest design, the SENTX has a net void capacity of about 6.5 Mm<sup>3</sup> and provides an additional lifespan of about 6 years, commencing operation upon exhaustion of the SENT Landfill. The SENTX will receive construction waste only.

The key implementation milestones of the Project are indicatively summarised in **Table 1.1**. The construction works and operation of the Project commenced on 2 January 2019 and 21 November 2021, respectively.

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<sup>(1)</sup> ERM (2018). South East New Territories (SENT) Landfill Extension: Environmental Monitoring & Audit Manual

<sup>(2)</sup> ERM (2007). South East New Territories (SENT) Landfill Extension – Feasibility Study: Environmental Impact Assessment Report

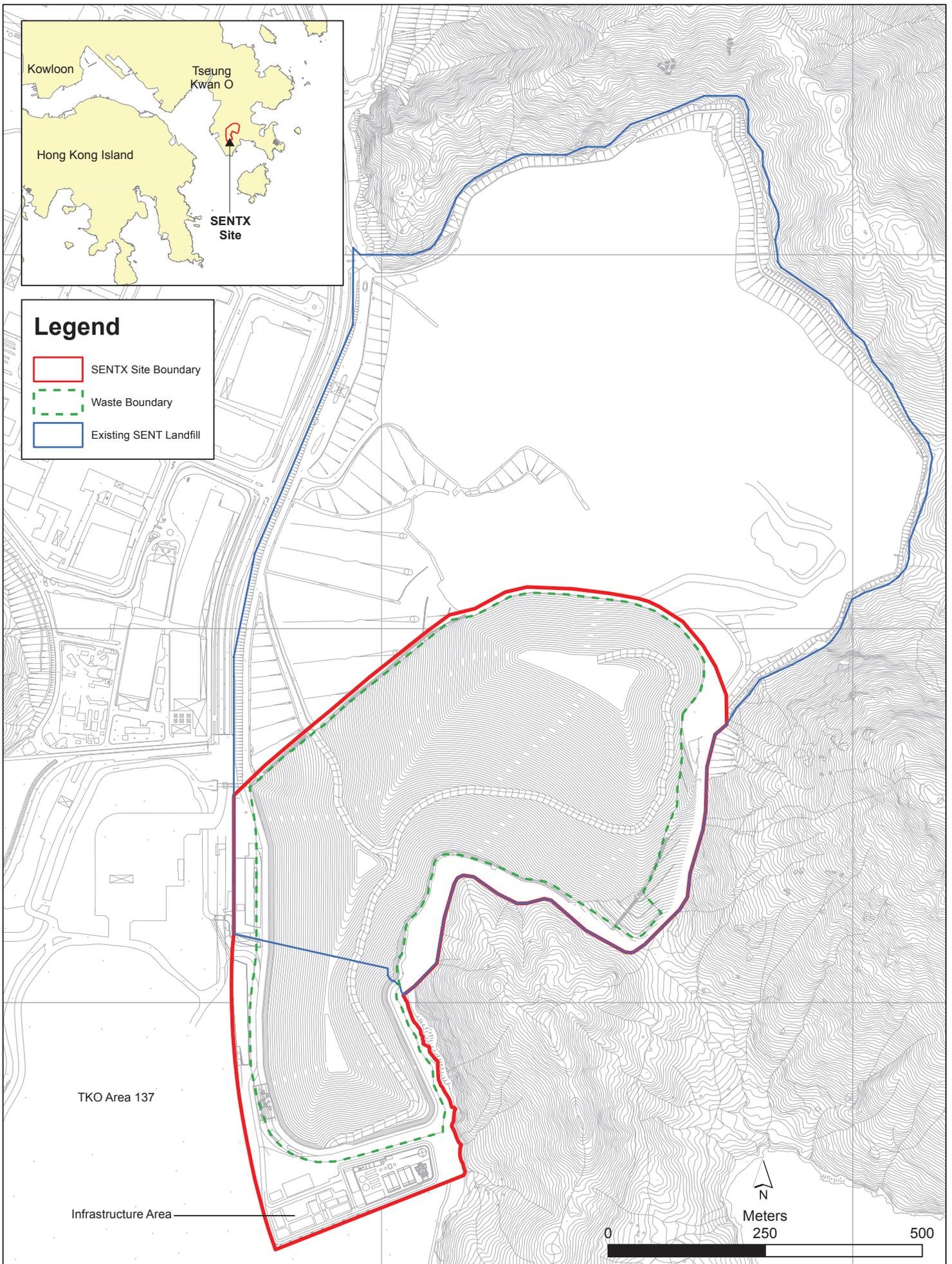


Figure 1.1

Layout Plan of SENTX



**TABLE 1.1 ESTIMATED KEY DATES OF IMPLEMENTATION PROGRAMME**

<b>Key Stage of the Project</b>	<b>Indicative Date</b>
Start construction	2 January 2019
Commissioning of new infrastructure facilities	2020
Demolition of existing infrastructure facilities	2021
Start waste intake at SENTX	21 November 2021
Estimated exhaustion date of. SENTX	2027
End of aftercare for SENTX	2057

The major construction works of the SENTX includes:

- Site formation at the TKO Area 137 and the existing infrastructure area at SENT Landfill;
- Construction of surface and groundwater drainage systems;
- Construction of the leachate containment and collection systems;
- Construction of new leachate and landfill gas treatment facilities, site offices, maintenance yards at the new infrastructure area;
- Construction of new pipelines to transfer the leachate and landfill gas collected from the existing SENT Landfill to the treatment facilities at the new infrastructure area;
- Construction of the site access and new waste reception facilities; and
- Demolition of the facilities at the existing SENT Landfill infrastructure area.

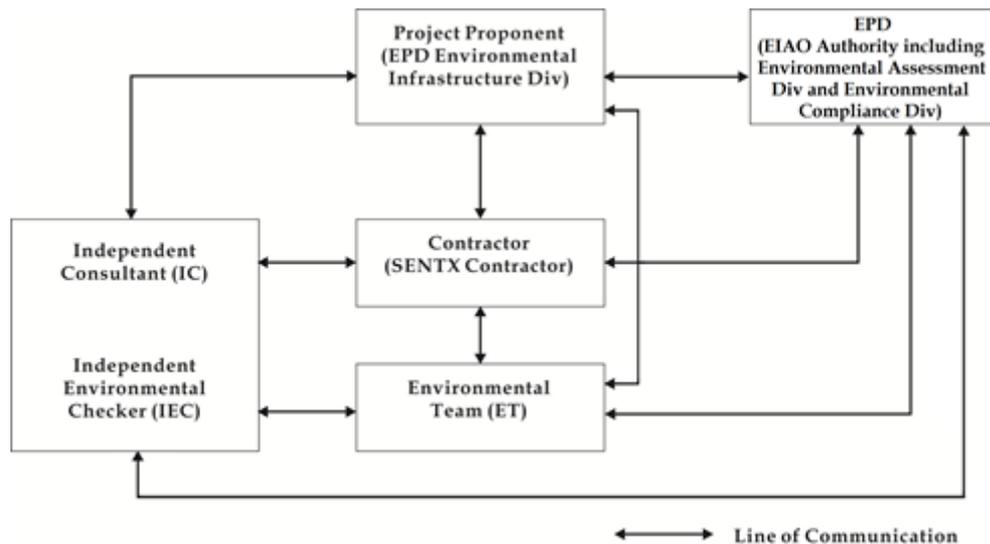
### 1.3 SCOPE OF THE EM&A REPORT

This is the Monthly EM&A Report for the Project which summarises the key findings of the EM&A programme during the reporting period from 1 to 31 December 2023 for the construction and operation works.

### 1.4 PROJECT ORGANISATION

The organisation structure of the Project is presented in **Figure 1.2**.

FIGURE 1.2 ORGANISATION CHART



Contact details of the key personnel are summarised in **Table 1.2** below.

TABLE 1.2 CONTACT INFORMATION OF KEY PERSONNEL

Party	Position	Name	Telephone
Contractor (Green Valley Landfill Limited)	Project Manager	Carl Lai	2706 8829
Environmental Team (ET) (ERM-Hong Kong, Limited)	ET Leader	Terence Fong	2271 3156
Independent Environmental Checker (IEC) (Meinhardt Infrastructure and Environment Limited)	IEC	Claudine Lee	2859 5409

## 1.5 SUMMARY OF CONSTRUCTION WORKS

The programme of the construction is shown in **Annex A**. As informed by the Contractor, the major works carried out in this reporting period include:

- Maintenance and improvement of temporary surface water drainage;
- Weighbridge enhancement with C-easy; and
- Restoration of Phase 1 Cell 1X, 2X and Phase 2 Cell 3X west slopes.

The implementation schedule of the mitigation measured recommended in the Updated EM&A Manual is presented in **Annex B**.

## 1.6 SUMMARY OF EM&A PROGRAMME REQUIREMENTS

The status for all environmental aspects are presented in **Table 1.3**. The EM&A requirements remained unchanged during the reporting period.

**TABLE 1.3 SUMMARY OF STATUS FOR THE ENVIRONMENTAL ASPECTS UNDER THE UPDATED EM&A MANUAL**

<b>Parameters</b>	<b>Status</b>
<b>Air Quality</b>	
Baseline Monitoring	The results of baseline air quality monitoring were reported in Baseline Monitoring Report and Pre-operation Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Impact Monitoring	On-going
<b>Noise</b>	
Baseline Monitoring	The results of baseline noise monitoring were reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Impact Monitoring	On-going
<b>Water Quality</b>	
Baseline Monitoring	The results of baseline surface water quality monitoring were reported in Baseline Monitoring Report and Pre-operation Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Impact Monitoring	On-going
<b>Landfill Gas</b>	
Impact Monitoring	On-going
<b>Waste Management</b>	
Waste Monitoring	On-going
<b>Landscape and Visual</b>	
Baseline Monitoring	The results of baseline landscape and visual monitoring were reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Operation Phase Audit	On-going
<b>Site Environmental Audit</b>	
Regular Site Inspection	On-going
Complaint Hotline and Email Channel	On-going
Environmental Log Book	On-going

Taking into account the operation works, impact monitoring of air quality, noise, water quality, landfill gas and waste management were carried out in the reporting period. The impact monitoring schedule of air quality, noise, water quality and landfill gas monitoring are provided in **Annex C**.

The EM&A programme also involved environmental site inspections and related auditing conducted by the ET for checking the implementation of the required environmental mitigation

measures recommended in the approved EIA Report and relevant EP submissions. To promote the environmental awareness and enhance the environmental performance of the contractors, environmental trainings and regular environmental management meetings were conducted during the reporting period, which are summarized as below:

- One environmental management meeting was held with the Contractor, ER, ET, IEC and EPD on 14 December 2023; and
- Environmental toolbox trainings on Noise Control Ordinance and illegal Dumping on 13 December 2023 and 20 December 2023, respectively by the Contractor to the workers.

## 1.7 STATUS OF STATUTORY ENVIRONMENTAL COMPLIANCE WITH THE ENVIRONMENTAL PERMIT

The status of statutory environmental compliance with the EP conditions under the EIAO, submission status under the EP and implementation status of mitigation measures are presented in **Table 1.4**.

**TABLE 1.4 STATUS OF SUBMISSIONS REQUIRED UNDER THE EP AND IMPLEMENTATION STATUS OF MITIGATION MEASURES**

EP Condition	Submission / Implementation Status	Status
2.3	Management Organisation of Main Construction Companies	Submitted and accepted by EPD.
2.4	Setting up of Community Liaison Group	Community Liaison Group was set up.
2.5	Submission of Detailed Landfill Gas Hazard Assessment Report	Submitted and accepted by EPD on 10 January 2019.
2.6	Submission of Restoration and Ecological Enhancement Plan	Submitted to EPD on 28 June 2019.
2.7	Setting up of Trial Nursery	Trial Nursery works was commenced on 28 August 2019.
2.8	Advance Screen Planting	Advance Screen Planting works were completed on 28 June 2019.
2.9	Provision of Multi-layer Composite Liner System	Under implementation.

## 1.8 STATUS OF OTHER STATUTORY ENVIRONMENTAL REQUIREMENTS

The environmental licenses and permits (including EP, *Water Pollution Control Ordinance* (WPCO) discharge license, registration as a chemical waste producer, and construction noise permit) that are valid in the reporting period are presented in **Table 1.5**. No non-compliance with environmental statutory requirements was identified.

**TABLE 1.5 STATUS OF STATUTORY ENVIRONMENTAL REQUIREMENTS**

<b>Description</b>	<b>Ref No.</b>	<b>Status</b>
Environmental Permit	EP-308/2008	Granted on 5 August 2008
Variation of Environmental Permit	EP-308/2008/A	Granted on 6 January 2012
	EP-308/2008/B	Granted on 20 January 2017
Further Environmental Permit	FEP-01/308/2008/B	Granted on 16 May 2018
Water Discharge License under WPCO (Permit Holder: GVL)	Licence No.: WT00041447-2022	Validity from 17 June 2022 to 30 June 2024
Billing Account for Disposal of Construction Waste	Chit Account Number: 5001692	Approved on 28 December 2005
Registration as a Chemical Waste Producer (Permit Holder: GVL)	5296-839-G2228-01	Issued on 31 December 2015
Construction Noise Permit (Permit Holder: GVL)	GW-RE1146-23	Validity from 15 September 2023 to 14 March 2024

## 2. EM&A RESULTS

The EM&A programme for the Project required environmental monitoring for air quality, noise, water quality and landfill gas as well as environmental site inspections for air quality, noise, water quality, landfill gas, waste management, and landscape and visual impacts. The EM&A requirements and related findings for each component are summarised in the following sections.

### 2.1 AIR QUALITY MONITORING

#### 2.1.1 DUST MONITORING

##### 2.1.1.1 MONITORING REQUIREMENTS AND EQUIPMENT

According to the updated EM&A Manual of the Project, impact dust monitoring (in term of Total Suspended Particulates (TSP)) was carried out at the four designated locations along the site boundary (i.e. AM1, AM2, AM3 and AM4) during the operation/restoration phase, at a 6-day interval.

The Action and Limit Levels of the dust monitoring is provided in **Table 2.1** below.

**TABLE 2.1 ACTION AND LIMIT LEVELS FOR 24-HOUR TSP**

Monitoring Station	Action Level	Limit Level
AM1 - SENTX Site Boundary (North)	260 $\mu\text{g m}^{-3}$	260 $\mu\text{g m}^{-3}$
AM2 - SENTX Site Boundary (West, near DP3)		
AM3 - SENTX Site Boundary (West, near RC15)		
AM4 - SENTX Site Boundary (West, near EPD building)		

High volume air samplers (HVSs) in compliance with the specifications listed under Section 3.2.2 of the updated EM&A Manual were used to measure 24-hour TSP levels at the dust monitoring stations. The HVSs were calibrated upon installation and thereafter at bi-monthly intervals to check the validity and accuracy of the results.

The equipment used in the impact dust monitoring programme and monitoring locations are summarised in **Table 2.2** and illustrated in **Figure 2.1**, respectively. Copies of the calibration certificates for the equipment are presented in **Annex D1**.

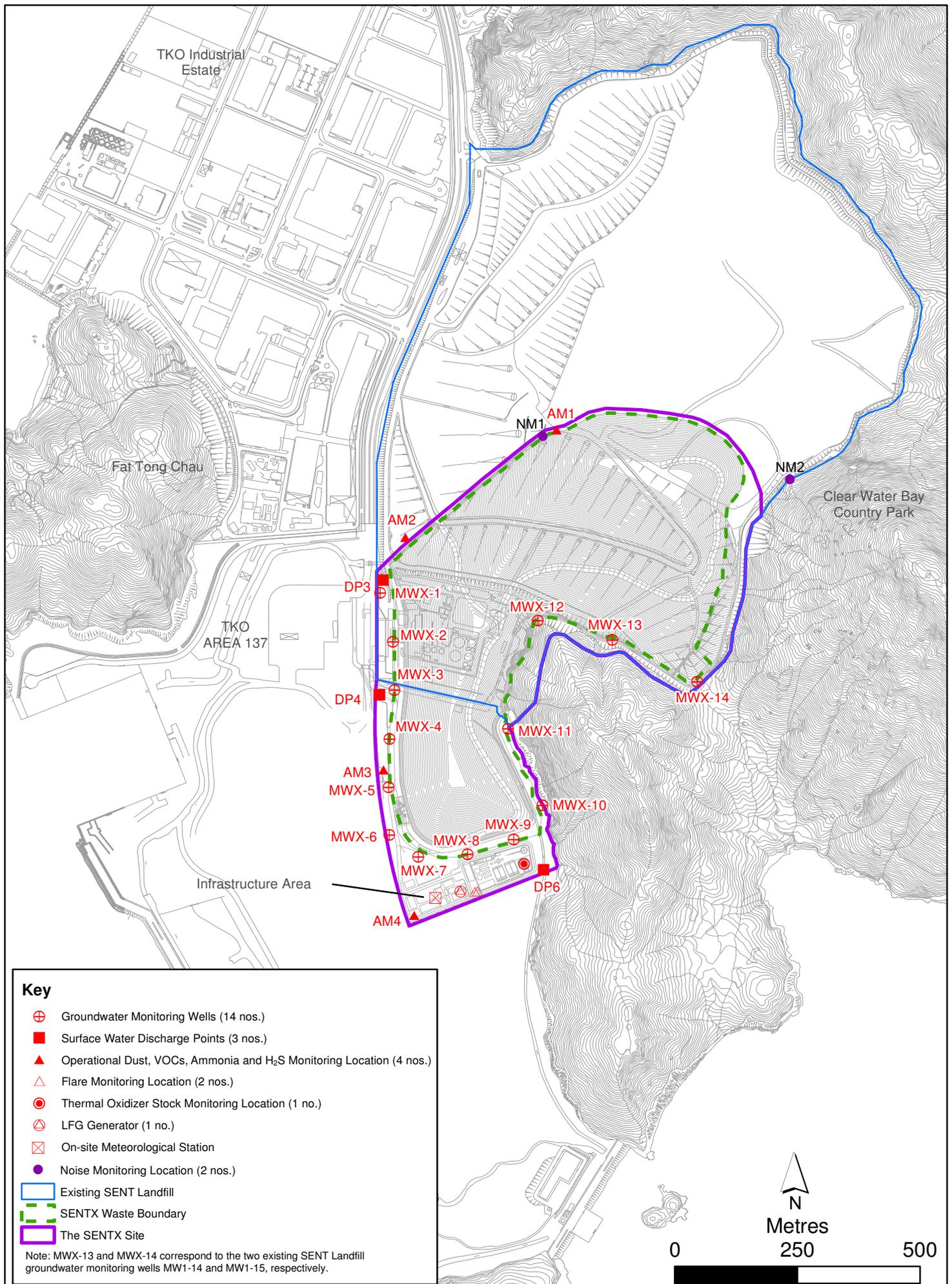


Figure 2.1

Environmental Monitoring Locations



TABLE 2.2 DUST MONITORING DETAILS

Monitoring Station	Location	Parameter	Frequency and Duration	Monitoring Dates	Equipment
AM1	SENTX Site Boundary (North)	24-hour TSP	Once every 6 days	3, 9, 15, 21, 27 Dec 2023	Tisch TE-5170 (S/N: 3976)
AM2	SENTX Site Boundary (West, near DP3)				Tisch TE-5170 (S/N: 3573)
AM3	SENTX Site Boundary (West, near RC15)				Tisch TE-5170 (S/N: 3572)
AM4	SENTX Site Boundary (West, near EPD building)				Tisch TE-5170 (S/N: 3957)

### 2.1.1.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

The schedule for dust monitoring during the reporting period is provided in **Annex C**.

### 2.1.1.3 RESULTS AND OBSERVATIONS

The monitoring results for 24-hour TSP are summarised in **Table 2.3**. The detailed monitoring results and the graphical presentation of the 24-hour TSP results at each monitoring location are provided in **Annex D2**.

TABLE 2.3 SUMMARY OF 24-HOUR TSP MONITORING RESULTS IN THE REPORTING PERIOD

Monitoring Station Location	Average 24-hr TSP Concentration ( $\mu\text{g m}^{-3}$ ) (Range in bracket)	Action Level ( $\mu\text{g/m}^3$ )	Limit Level ( $\mu\text{g/m}^3$ )
AM1 - SENTX Site Boundary (North)	133 (68 – 186)	260	260
AM2 - SENTX Site Boundary (West, near DP3)	122 (85 – 154)	260	260
AM3 - SENTX Site Boundary (West, near RC15)	148 (109 – 178)	260	260
AM4 - SENTX Site Boundary (West, near EPD building)	151 (93 – 252)	260	260

The major dust sources in the reporting period included fugitive dust emission from exposed area in SENTX as well as nearby operations of the TKO Area 137 Fill Bank.

No Action and Limit Levels exceedance was recorded for TSP monitoring in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in **Annex D3**.

#### 2.1.1.4 METEOROLOGICAL DATA

Meteorological data obtained from the SENTX on-site meteorological monitoring station was used for the dust monitoring and is shown in **Annex D4**. It is considered that meteorological data obtained at the on-site meteorological monitoring station is representative of the Project area and could be used for the operation/restoration phase dust monitoring programme for the Project.

### 2.1.2 ODOUR MONITORING

#### 2.1.2.1 MONITORING REQUIREMENTS

According to the updated EM&A Manual of the Project, odour patrol was carried out along the site boundary during the operation/ restoration phase.

During the first month of operation, daily odour patrol (3 times per day) was conducted jointly by the ET and the IEC. The odour intensity detected was based on that determined by the IEC. In addition, an independent party (ALS Technichem (HK) Pty Ltd.) was appointed to undertake odour patrol together with the ET and IEC three times per week. During these patrols, the odour intensity detected was based on that determined by the independent third party.

Reduction of odour monitoring frequency from Period 1 (daily, three times per day) to Period 2 (weekly) was approved by EPD on 4 February 2022. Weekly odour patrol was conducted jointly by the ET and the IEC from 10 February 2022. In addition, an independent party (ALS Technichem (HK) Pty Ltd.) was appointed to undertake odour patrol together with the ET and IEC once every two weeks.

Reduction of odour monitoring frequency from Period 2 (weekly) to Period 3 (monthly) was approved by EPD on 2 June 2022. Monthly odour patrol was conducted jointly by the ET and the IEC from 28 June 2022. In addition, an independent party (ALS Technichem (HK) Pty Ltd.) was appointed to undertake odour patrol together with the ET and IEC quarterly.

The Action and Limit Levels for odour patrol is provided in **Table 2.4** below.

**TABLE 2.4 ACTION AND LIMIT LEVELS FOR ODOUR PATROL**

Parameter	Action Level	Limit Level
Perceived odour intensity and odour complaints	<ul style="list-style-type: none"> <li>Odour intensity <math>\geq</math> Class 2 recorded; or</li> <li>One documented complaint received</li> </ul>	<ul style="list-style-type: none"> <li>Odour intensity <math>\geq</math> Class 3 recorded on 2 consecutive patrol <sup>(a)</sup> <sup>(b)</sup></li> </ul>

**Notes:**

(a) i.e. either Class 3-strong or Class 4-extreme odour intensity.

(b) The exceedances of the odour intensity do not need to be recorded at the same location.

Odour patrol was conducted by trained personnel/competent persons with a specific sensitivity to a reference odour (i.e. on reference materials n-butanol with the concentration of 50ppm in nitrogen (v/v)) in compliance with Section 3.7.2 of the updated EM&A Manual patrolling and sniffing along the SENTX Site boundary to detect any odour.

The odour monitoring programme and patrol route are summarised in **Table 2.5** and illustrated in **Figure 2.2** respectively. Copies of the certificates of the qualified odour panelist are presented in **Annex D5**.

**TABLE 2.5 ODOUR MONITORING DETAILS**

Patrol Locations	Parameters	Patrol Frequency <sup>(a)</sup>	Monitoring Dates
Patrol along the SENTX Site Boundary (Checkpoints OP1 – OP17)	Odour Intensity (see <i>Table 2.6</i> )	<p><u>Period 1 - First month of operation</u> Daily, three times a day in the morning, afternoon and evening/night (between 18:00 and 22:00 hrs) conducted by the ET and the IEC</p> <p>Three times per week on different days conducted by an independent third party together with the ET and IEC <sup>(b)</sup></p> <p><u>Period 2 - Three months following period 1 <sup>(c)</sup></u> Weekly conducted by the ET and the IEC</p> <p>Once every two weeks conducted by an independent third party together with the ET and IEC <sup>(b)</sup></p> <p><u>Period 3 - Throughout operation following period 2 <sup>(c)</sup></u> Monthly conducted by the ET and the IEC</p> <p>Quarterly conducted by an independent third party together with the ET and IEC <sup>(b)</sup></p>	<p><u>Conducted by ET &amp; IEC:</u> -</p> <p><u>Conducted by an independent third party, ET &amp; IEC:</u> 15 Dec 2023</p>

**Notes:**

- (a) Reduction of monitoring frequency will be subject to the monitoring results to demonstrate environmentally acceptable performance.
- (b) Patrol shall be scheduled so that they are carried out together with the patrols to be carried out jointly by the ET and the IEC.
- (c) Commencement of each period will be justified by the ET Leader and verified by the IEC and will be subject to agreement with the EPD (EIAO Authority) and Project Proponent.

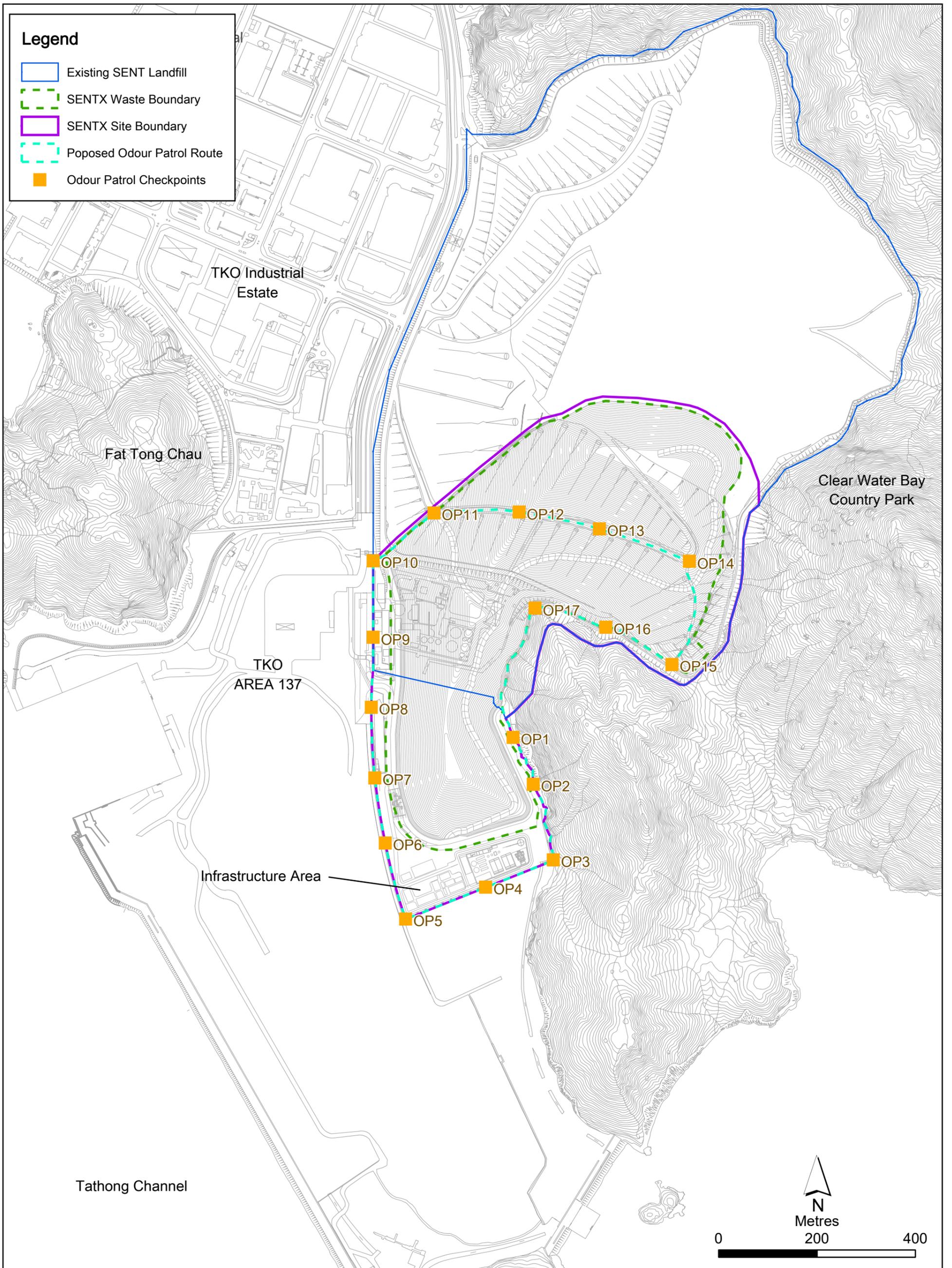


Figure 2.2

Odour Patrol Route for  
Operation/ Restoration Phase Odour Monitoring



TABLE 2.6 ODOUR INTENSITY LEVEL

Class	Odour Intensity	Description
0	Not Detected	No odour perceived or an odour so weak that it cannot be easily characterised or described.
1	Slight	Identified odour, slight
2	Moderate	Identified odour, moderate
3	Strong	Identified odour, strong
4	Extreme	Severe odour

### 2.1.2.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

The schedule for odour patrol during the reporting period is provided in **Annex C**.

### 2.1.2.3 RESULTS AND OBSERVATIONS

The odour monitoring results are summarised and provided in **Table 2.7** and **Annex D6**, respectively.

TABLE 2.7 SUMMARY OF ODOUR MONITORING RESULTS IN THE REPORTING PERIOD

Odour Checkpoints	Odour Intensity Class	Action Level	Limit Level
OP1	0	Odour intensity $\geq$ Class 2 recorded	Odour intensity $\geq$ Class 3 recorded on 2 consecutive patrol
OP2	0		
OP3	0		
OP4	0		
OP5	0		
OP6	0		
OP7	1		
OP8	0		
OP9	0		
OP10	1		
OP11	0		
OP12	0		
OP13	0		
OP14	0		

Odour Checkpoints	Odour Intensity Class	Action Level	Limit Level
OP15	1		
OP16	1		
OP17	0		

The potential odour source in the reporting period included the Cell 4X tipping area and planting area at SENTX and WSD trench. All the odour monitoring results were below the Action and Limit Levels in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in **Annex D3**.

### 2.1.3 THERMAL OXIDISER, LANDFILL GAS FLARE AND LANDFILL GAS GENERATOR STACK EMISSION MONITORING

#### 2.1.3.1 MONITORING REQUIREMENTS AND EQUIPMENT

According to the updated EM&A Manual of the Project, the performance of the thermal oxidiser, landfill gas flare and landfill gas generator was monitored when they are in operation. Gas samples were collected from the stack of the thermal oxidizer, landfill gas flare and landfill gas generator for laboratory analysis for NO<sub>2</sub>, CO, SO<sub>2</sub>, Benzene and Vinyl chloride and in-situ analysis for exhaust gas velocity at monthly interval and for laboratory analysis for non-methane organic compounds and ammonia (for thermal oxidizer only) at quarterly interval. The operating conditions of the thermal oxidiser, landfill gas flare and landfill gas generator were also monitored continuously.

The Limit Levels for stack emission of the thermal oxidiser, landfill gas flare and landfill gas generator are provided in **Tables 2.8 – 2.10** below.

**TABLE 2.8 LIMIT LEVELS FOR STACK EMISSION OF THE THERMAL OXIDISER**

Parameters	Limit Level
NO <sub>2</sub>	1.58 gs <sup>-1</sup>
CO	0.53 gs <sup>-1</sup>
SO <sub>2</sub>	0.07 gs <sup>-1</sup>
Benzene	3.01 x 10 <sup>-2</sup> gs <sup>-1</sup>
Vinyl chloride	2.23 x 10 <sup>-3</sup> gs <sup>-1</sup>
Gas combustion temperature	850°C (minimum)
Exhaust gas exit temperature	443K (minimum) <sup>(a)</sup>
Exhaust gas velocity	7.5 ms <sup>-1</sup> (minimum) <sup>(a)</sup>

**Note:**

(a) Level under full load condition.

**TABLE 2.9 LIMIT LEVELS FOR STACK EMISSION OF THE LANDFILL GAS FLARE**

Parameters	Limit Level
NO <sub>2</sub>	0.97 gs <sup>-1</sup>
CO	2.43 gs <sup>-1</sup>
SO <sub>2</sub>	0.22 gs <sup>-1</sup>
Benzene	4.14 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	2.60 x 10 <sup>-4</sup> gs <sup>-1</sup>
Gas combustion temperature	815°C (minimum)
Exhaust gas exit temperature	923 K (minimum) <sup>(a)</sup>
Exhaust gas velocity	9.0 m s <sup>-1</sup> (minimum) <sup>(a)</sup>

**Note:**

(a) Level under full load condition.

**TABLE 2.10 LIMIT LEVELS FOR STACK EMISSION OF THE LANDFILL GAS GENERATOR**

Parameters	Limit Level
NO <sub>2</sub>	1.91 gs <sup>-1</sup>
CO	2.48 gs <sup>-1</sup>
SO <sub>2</sub>	0.528 gs <sup>-1</sup>
Benzene	2.47 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	1.88 x 10 <sup>-5</sup> gs <sup>-1</sup>
Gas combustion temperature	450°C (minimum)
Exhaust gas exit temperature	723K (minimum) <sup>(a)</sup>
Exhaust gas velocity	30.0 ms <sup>-1</sup> (minimum) <sup>(a)</sup>

**Note:**

(a) Level under full load condition.

Gas samples were collected from the centroid of the stack with stainless steel sampling probe, into inert sample containers (i.e. Canister and Tedlar Bag) and transferred to ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066) laboratory within 24 hours of collection for direct analysis on a gas chromatography within 48 hours after collection. The flue gas velocity of the gas stream at the exhaust of thermal oxidize was determined by S-Pitot tube during the emission sampling.

The stack emission monitoring programme and monitoring locations are summarised in **Table 2.11** and illustrated in **Figure 2.1**, respectively.

**TABLE 2.11 THERMAL OXIDISER, LANDFILL GAS FLARE AND LANDFILL GAS GENERATOR STACK EMISSION MONITORING DETAILS**

Monitoring Location	Parameter	Frequency	Monitoring Date
Stack of Thermal Oxidiser	Laboratory analysis for <ul style="list-style-type: none"> <li>• NO<sub>2</sub></li> <li>• CO</li> <li>• SO<sub>2</sub></li> <li>• Benzene</li> <li>• Vinyl chloride</li> </ul> In-situ analysis for <ul style="list-style-type: none"> <li>• Exhaust gas velocity</li> </ul>	Monthly for the first 12 months of operation and thereafter at quarterly intervals	15 Dec 2023
	Laboratory analysis for <ul style="list-style-type: none"> <li>• Non-methane organic compounds CO</li> </ul>	Quarterly for the 1 <sup>st</sup> year of operation <sup>(b)</sup>	-
	Laboratory analysis for <ul style="list-style-type: none"> <li>• Ammonia</li> <li>• Gas combustion temperature</li> <li>• Exhaust temperature</li> <li>• Exhaust gas velocity <sup>(a)</sup></li> </ul>	Quarterly	-
	<ul style="list-style-type: none"> <li>• Gas combustion temperature</li> <li>• Exhaust temperature</li> <li>• Exhaust gas velocity <sup>(a)</sup></li> </ul>	Continuously	1 – 31 Dec 2023
Stack of Landfill Gas Flare	Laboratory analysis for <ul style="list-style-type: none"> <li>• NO<sub>2</sub></li> <li>• CO</li> <li>• SO<sub>2</sub></li> <li>• Benzene</li> <li>• Vinyl chloride</li> </ul> In-situ analysis for <ul style="list-style-type: none"> <li>• Exhaust gas velocity</li> </ul>	Monthly for the first 12 months of operation and thereafter at quarterly intervals	14 Dec 2023
	Laboratory analysis for <ul style="list-style-type: none"> <li>• Non-methane organic compounds CO</li> </ul>	Quarterly for the 1 <sup>st</sup> year of operation <sup>(b)</sup>	-

Monitoring Location	Parameter	Frequency	Monitoring Date
Stack of Landfill Gas Flare	<ul style="list-style-type: none"> <li>Gas combustion temperature</li> <li>Exhaust temperature</li> <li>Exhaust gas velocity<sup>(a)</sup></li> </ul>	Continuously	1 – 31 Dec 2023
Stack of Landfill Gas Generator	Laboratory analysis for <ul style="list-style-type: none"> <li>NO<sub>2</sub></li> <li>CO</li> <li>SO<sub>2</sub></li> <li>Benzene</li> <li>Vinyl chloride</li> </ul> In-situ analysis for <ul style="list-style-type: none"> <li>Exhaust gas velocity</li> </ul>	Monthly for the first 12 months of operation and thereafter at quarterly intervals	14 Dec 2023
	Laboratory analysis for <ul style="list-style-type: none"> <li>Non-methane organic compounds</li> </ul>	Quarterly for the 1 <sup>st</sup> year of operation <sup>(b)</sup>	-
	<ul style="list-style-type: none"> <li>Exhaust temperature</li> <li>Exhaust gas velocity<sup>(a)</sup></li> </ul>	Continuously	1 – 31 Dec 2023

**Notes:**

- (a) The exhaust gas velocity is calculated based on the cross-section area of the stack and continuous monitored gas flow and combustion temperature data.
- (b) The monitoring results are being reviewed to determine if monitoring of this parameter can be terminated upon agreement by the EIAO Authority, IEC and Project Proponent.

### 2.1.3.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

The schedule for thermal oxidizer, landfill gas flare and landfill gas generator stack emission monitoring during the reporting period is provided in **Annex C**.

### 2.1.3.3 RESULTS AND OBSERVATIONS

The thermal oxidizer, landfill gas flare and landfill gas generator stack emission monitoring results and detailed continuous monitoring results are summarised in **Tables 2.12 - 2.14** and provided in **Annex D7**, respectively.

**TABLE 2.12 SUMMARY OF THERMAL OXIDISER STACK EMISSION MONITORING IN THE REPORTING PERIOD**

Parameters	Monitoring Results (Range in Bracket)	Limit Level
NO <sub>2</sub>	0.68 gs <sup>-1</sup>	1.58 gs <sup>-1</sup>
CO	0.03 gs <sup>-1</sup>	0.53 gs <sup>-1</sup>
SO <sub>2</sub>	<0.005 gs <sup>-1</sup>	0.07 gs <sup>-1</sup>
Benzene	<2.0 x 10 <sup>-4</sup> gs <sup>-1</sup>	3.01 x 10 <sup>-2</sup> gs <sup>-1</sup>
Vinyl chloride	<1.0 x 10 <sup>-4</sup> gs <sup>-1</sup>	2.23 x 10 <sup>-3</sup> gs <sup>-1</sup>
Gas combustion temperature	926°C (923°C – 935°C)	850°C (minimum)
Exhaust gas exit temperature	1,212K (1,204K – 1,221K)	443K (minimum) <sup>(a)</sup>
Exhaust gas velocity	7.7 ms <sup>-1</sup> <sup>(b)</sup>	7.5 ms <sup>-1</sup> (minimum) <sup>(a)</sup>

**Notes:**

(a) Level under full load condition.

(b) The exhaust gas velocity was calculated based on the cross-section area of the stack and the gas flow and combustion temperature data measured during the stack emission monitoring.

(c) The emission limit for ammonia is under review and will be supplemented in subsequent revision.

**TABLE 2.13 SUMMARY OF LANDFILL GAS FLARE STACK EMISSION MONITORING IN THE REPORTING PERIOD**

Parameters	Monitoring Results (Range in Bracket)	Limit Level
NO <sub>2</sub>	0.03 gs <sup>-1</sup>	1.58 gs <sup>-1</sup>
CO	0.02 gs <sup>-1</sup>	0.53 gs <sup>-1</sup>
SO <sub>2</sub>	<0.01 gs <sup>-1</sup>	0.07 gs <sup>-1</sup>
Benzene	<1.26 x 10 <sup>-4</sup> gs <sup>-1</sup>	3.01 x 10 <sup>-2</sup> gs <sup>-1</sup>
Vinyl chloride	<1.01 x 10 <sup>-4</sup> gs <sup>-1</sup>	2.23 x 10 <sup>-3</sup> gs <sup>-1</sup>
Gas combustion temperature	Flare 1: 918°C (830°C – 990°C) Flare 2: 858°C (750°C – 960°C)	815°C (minimum)
Exhaust gas exit temperature	Flare 1: 1,117K (1,033K – 1,253K) Flare 2: 1,044K (923K – 1,143K)	923 K (minimum) <sup>(a)</sup>
Exhaust gas velocity	9.0 ms <sup>-1</sup> <sup>(b)</sup>	9.0 m s <sup>-1</sup> (minimum) <sup>(a)</sup>

**Note:**

(a) Level under full load condition.

(b) The exhaust gas velocity was calculated based on the cross-section area of the stack and the gas flow and combustion temperature data measured during the stack emission monitoring.

**TABLE 2.14 SUMMARY OF LANDFILL GAS GENERATOR STACK EMISSION MONITORING IN THE REPORTING PERIOD**

Parameters	Monitoring Results (Range in Bracket)	Limit Level
NO <sub>2</sub>	0.075 gs <sup>-1</sup>	1.91 gs <sup>-1</sup>
CO	0.994 gs <sup>-1</sup>	2.48 gs <sup>-1</sup>
SO <sub>2</sub>	<4.00 x 10 <sup>-4</sup> gs <sup>-1</sup>	0.528 gs <sup>-1</sup>
Benzene	1.86 x 10 <sup>-4</sup> gs <sup>-1</sup>	2.47 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	<9.5 x 10 <sup>-6</sup> gs <sup>-1</sup>	1.88 x 10 <sup>-5</sup> gs <sup>-1</sup>
Exhaust gas exit temperature	ENGA: 877K (869K – 884K) ENGB : 869K (868K – 869K)	723K (minimum) <sup>(a)</sup>
Exhaust gas velocity	10.5 ms <sup>-1</sup> <sup>(b)</sup>	30.0 ms <sup>-1</sup> (minimum) <sup>(a)</sup>

**Notes:**

(a) Level under full load condition.

(b) The exhaust gas velocity was calculated based on the cross-section area of the stack and the gas flow and combustion temperature data measured during the stack emission monitoring.

No Action and Limit Level exceedance was recorded for thermal oxidizer, landfill gas flare and landfill gas generator stack emission monitoring in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in **Annex D3**.

## 2.2 NOISE MONITORING

### 2.2.1 MONITORING REQUIREMENTS AND EQUIPMENT

According to the updated EM&A Manual of the Project, impact noise monitoring was conducted weekly at the monitoring location (i.e. NM1) to obtain one set of 30-minute measurement between 07:00 and 19:00 hours on normal weekdays.

The Action and Limit Levels for operational noise of the Project are provided in **Table 2.15** below.

TABLE 2.15 ACTION AND LIMIT LEVELS FOR OPERATIONAL NOISE

Time Period	Action Level <sup>(a)</sup>	Limit Level <sup>(b)</sup>
07:00 – 19:00 hrs on all days	When one documented complaint is received from any one of the noise sensitive receivers (NSRs) or 75 dB(A) recorded at the monitoring station	65 dB(A) at NSRs <sup>(c)</sup>
19:00 – 23:00 hrs on all days		65 dB(A) at NSRs <sup>(c)</sup>
23:00 – 07:00 hrs on all days		55 dB(A) at NSRs <sup>(c)</sup>

**Notes:**

- (a) 75dB(A) along and at about 100m from the SENTX site boundary was set as the Action Level.  
(b) Limits specified in the GW-TM and IND-TM for construction and operational noise, respectively.  
(c) Limit Level only apply to operational noise without road traffic and construction activities noise.

Noise monitoring was performed by ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066) using sound level meter at the designated monitoring station NM1 (see *Figure 2.1*) in accordance with the requirements stipulated in the updated EM&A Manual. Acoustic calibrator was deployed to check the sound level meter at a known sound pressure level. Details of the deployed equipment are provided in **Table 2.16**. Copies of the calibration certificates for the equipment are presented in **Annex E1**.

TABLE 2.16 NOISE MONITORING DETAILS

Monitoring Station <sup>(1)</sup>	Location	Parameter	Frequency and Duration	Monitoring Dates	Equipment
NM1	SENTX Site Boundary (North)	$L_{eq}$ (30 min) measurement between 07:00 and 19:00 hours on normal weekdays (Monday to Saturday)	Once per week for 30 mins during operation of the Project	4, 11, 18, 28 Dec 2023	Sound Level Meter: Rion NL-52 (S/N: 00643049)  Acoustic Calibrator: CAL200 (S/N: 15678) CAL200 (S/N: 16878)

### 2.2.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

The schedule for noise monitoring during the reporting period is provided in **Annex C**.

### 2.2.3 RESULTS AND OBSERVATIONS

A total of 4 impact noise monitoring events were scheduled during the reporting period. Results for noise monitoring are summarised in **Table 2.17**. The monitoring results and the graphical presentation of the data are provided in **Annex E2**.

**TABLE 2.17 SUMMARY OF OPERATION NOISE MONITORING RESULTS IN THE REPORTING PERIOD**

Monitoring Station	Measured Noise Level $L_{eq}$ (30 min), dB(A)		
	Average	Range	Action and Limit Level
NM1	54.4	53.9 – 54.7	75

Major noise sources identified during the noise monitoring included noise from operations of the SENTX and the TKO Area 137 Fill Bank, aircrafts and insects.

No Action and Limit Levels exceedance was recorded for operation noise monitoring in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in **Annex E3**.

## 2.3 WATER QUALITY MONITORING

### 2.3.1 SURFACE WATER QUALITY MONITORING

#### 2.3.1.1 MONITORING REQUIREMENTS AND EQUIPMENT

According to the updated EM&A Manual of the Project, impact surface water quality monitoring was carried out at the three designated surface water discharge points (i.e. DP3, DP4 and DP6) at monthly intervals during operation/ restoration phase to ensure that the SENTX will not cause adverse water quality impact.

The parameters as listed in **Table 2.19** were determined by ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066).

The Limit Levels of the surface water quality impact monitoring are provided in **Table 2.18**.

**TABLE 2.18 LIMIT LEVELS FOR SURFACE WATER QUALITY**

Parameters	Limit Level
<b>DP3</b>	
Ammoniacal-nitrogen	> 0.5 mg/L
COD	> 80 mg/L
SS	> 30 mg/L
<b>DP4 &amp; DP6</b>	
Ammoniacal-nitrogen	> 7.1 mg/L
COD	> 30 mg/L
SS	> 20 mg/L

**Notes:**

The limit levels specified for other parameters in *Table 10a of the Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters* shall also be followed.

The locations of the monitoring stations for the Project are shown in **Figure 2.1**. All *in situ* monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the surface water quality monitoring programme. Calibration for a DO meter was carried out before measurement according to the instruction manual of the equipment model. Details of the equipment used in the impact surface water quality monitoring works are provided in **Table 2.19**. Copies of the calibration certificates for the equipment are presented in **Annex F1**.

**TABLE 2.19 IMPACT SURFACE WATER QUALITY MONITORING DETAILS**

Monitoring Station	Location	Frequency	Monitoring Dates	Parameter	Equipment	
DP3	Surface water discharge point DP3	Monthly	15 Dec 2023	<ul style="list-style-type: none"> <li>• pH</li> <li>• Electrical conductivity (EC)</li> <li>• DO</li> <li>• SS</li> <li>• COD</li> <li>• BOD<sub>5</sub></li> <li>• TOC</li> <li>• Ammoniacal-nitrogen</li> <li>• Nitrate-nitrogen</li> <li>• Nitrite-nitrogen</li> <li>• TKN</li> <li>• TN</li> <li>• Phosphate</li> <li>• Sulphate</li> <li>• Sulphide</li> <li>• Carbonate</li> <li>• Oil &amp; Grease</li> </ul>	<ul style="list-style-type: none"> <li>• Bicarbonate</li> <li>• Chloride</li> <li>• Sodium</li> <li>• Potassium</li> <li>• Calcium</li> <li>• Magnesium</li> <li>• Nickel</li> <li>• Manganese</li> <li>• Chromium</li> <li>• Cadmium</li> <li>• Copper</li> <li>• Lead</li> <li>• Iron</li> <li>• Zinc</li> <li>• Mercury</li> <li>• Boron</li> </ul>	Horiba U-52G (S/N: NVAE080GT)
DP4	Surface water discharge point DP4					
DP6	Surface water discharge point DP6					

### 2.3.1.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

The schedule for surface water quality monitoring during the reporting period is provided in **Annex C**.

### 2.3.1.3 RESULTS AND OBSERVATIONS

One monitoring event for impact surface water quality monitoring was scheduled at all designated monitoring stations during the reporting period. However, sampling could not be carried out on 15 December 2023 due to insufficient flow. Details of impact water quality monitoring event are provided in **Annex F2**.

No action is thus required to be undertaken in accordance with the event and action plan presented in **Annex F3**.

## 2.3.2 LEACHATE MONITORING

### 2.3.2.1 MONITORING REQUIREMENTS AND EQUIPMENT

According to the updated EM&A Manual, continuous monitoring of leachate level and monthly monitoring of effluent quality were carried out during the operation/ restoration phase.

Reduction of effluent monitoring frequency (dry season) (from daily to monthly) was approved by EPD on 22 March 2022. Monthly effluent quality monitoring (dry season) shall be conducted from 23 March 2022. The reduction of effluent monitoring frequency (wet season) (from daily to monthly) was approved by EPD on 2 August 2022. Monthly effluent quality monitoring (wet season) shall be conducted from 3 August 2022.

Temperature, pH and volume of the effluent discharged from the leachate treatment plant were measured in-situ whereas the parameters as listed in **Table 2.21** were determined by ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066).

The Limit Levels of the leachate monitoring are provided in **Table 2.20**.

TABLE 2.20 LIMIT LEVELS FOR LEACHATE LEVELS AND EFFLUENT QUALITY

Parameters	Limit Level
<b>Leachate Levels</b>	
Leachate levels above the basal liner	1 m above the primary liner of the leachate containment system
<b>Effluent Quality</b>	
Temperature	> 43 °C
pH Value	6 – 10
Volume Discharged	>2,000 m <sup>3</sup>
Suspended Solids (SS)	> 800 mg/L
Phosphate	> 25 mg/L
Sulphate	> 800 mg/L
Total Inorganic Nitrogen <sup>(a)</sup>	> 100 mg/L
Biochemical Oxygen Demand (BOD)	> 800 mg/L
Chemical Oxygen Demand (COD)	> 2,000 mg/L
Oil & Grease	> 20 mg/L
Boron	> 7,000 µg/L
Iron	> 5 mg/L
Cadmium	> 1 µg/L
Chromium	> 300 µg/L
Copper	> 1,000 µg/L
Nickel	> 700 µg/L
Zinc	> 700 µg/L

**Note:**

(a) Total Inorganic Nitrogen include Ammoniacal-nitrogen, Nitrite-nitrogen and Nitrate-nitrogen.

All *in situ* monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the leachate quality monitoring programme. Details of the equipment used are provided in **Table 2.21**. Copies of the calibration certificates for the equipment are presented in **Annex F4**.

TABLE 2.21 LEACHATE LEVELS AND EFFLUENT QUALITY MONITORING DETAILS

Location	Frequency	Parameter	Monitoring Dates	Equipment
Leachate levels above the basal liner	Continuous	Leachate Levels	1 – 31 Dec 2023	Pairs of pressure transducers
Effluent discharged from LTP	Daily for the first 3 months upon full operation of the LTP at wet season (Apr to Sep) and dry season (Oct to Mar), respectively and reduce to monthly thereafter subject to the monitoring results of the first 3 months for each season and agreement with the EIAO Authority, IEC and IC. <sup>(a)</sup>	<i>On-site Measurements:</i> <ul style="list-style-type: none"> <li>• Volume</li> <li>• pH</li> <li>• Temperature</li> </ul> <i>Laboratory analysis:</i> <ul style="list-style-type: none"> <li>• Suspended Solids</li> <li>• COD</li> <li>• BOD<sub>5</sub></li> <li>• TOC</li> <li>• Ammoniacal-nitrogen</li> <li>• Nitrate-nitrogen</li> <li>• Nitrite-nitrogen</li> <li>• Total Nitrogen</li> <li>• Sulphate</li> <li>• Phosphate</li> <li>• Oil &amp; Grease</li> <li>• Alkalinity</li> <li>• Chloride</li> <li>• Calcium</li> <li>• Potassium</li> <li>• Magnesium</li> <li>• Iron</li> <li>• Zinc</li> <li>• Copper</li> <li>• Chromium</li> <li>• Nickel</li> <li>• Cadmium</li> <li>• Boron</li> </ul>	6 Dec 2023	Lutron PH-208 (S/N: TF30605)

**Note:**

(a) Reduction of monitoring frequency will be subject to the monitoring results to demonstrate environmentally acceptable performance.

### 2.3.2.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

The schedule for leachate monitoring during the reporting period is provided in **Annex C**.

### 2.3.2.3 RESULTS AND OBSERVATIONS

The leachate levels and effluent quality monitoring results are summarised in **Table 2.22** and **Table 2.23**, respectively. The detailed monitoring results are provided in **Annex F5** and **Annex F6**, respectively.

**TABLE 2.22 SUMMARY OF LEACHATE LEVELS IN THE REPORTING PERIOD**

Monitoring Location	Average Leachate Head Levels (cm) (Range in Bracket)	Limit Level (cm)
<b>Pump Station No. 1X (Cell 1X)</b>		
Meter No. X-1	124 (99 – 159)	>178
Meter No. X-2 <sup>(a)</sup>	-	
<b>Average</b>	124 (99 – 159)	
<b>Pump Station No. 2X (Cell 2X)</b>		
Meter No. X-3	134 (124 – 163)	>180
Meter No. X-4	128 (115 – 157)	
<b>Average</b>	131 (120 – 160)	
<b>Pump Station No. 3X (Cell 3X)</b>		
Meter No. X-5	113 (99 – 122)	> 175
Meter No. X-6	112 (99 – 119)	
<b>Average</b>	112 (99 – 121)	
<b>Pump Station No. 4X (Cell 4X)</b>		
Meter No. X-7	107 (72 – 129)	> 186
Meter No. X-8	119 (83 – 131)	
<b>Average</b>	113 (96 – 128)	

**Note:**

(a) Meter No. X-2 at Pump Station No. 1X is on standby from 1 December to 31 December 2023.

**TABLE 2.23 SUMMARY OF EFFLUENT QUALITY MONITORING RESULTS IN THE REPORTING PERIOD**

Parameters		Monitoring Results	Limit Level
<b>Effluent Discharged from LTP</b>			
Temperature	°C	23	> 43 °C
pH Value	pH unit	8.2	6 – 10
Volume Discharged	m <sup>3</sup>	698	>2,000 m <sup>3</sup>
Suspended Solids (SS)	mg/L	55.1	> 800 mg/L
Phosphate	mg/L	1.94	> 25 mg/L
Sulphate	mg/L	279	> 800 mg/L
Total Inorganic Nitrogen <sup>(a)</sup>	mg/L	24.89	> 100 mg/L
BOD	mg/L	22	> 800 mg/L
COD	mg/L	1070	> 2,000 mg/L
Oil & Grease	mg/L	<5	> 20 mg/L
Boron	µg/L	5080	> 7,000 µg/L
Iron	mg/L	1.78	> 5 mg/L
Cadmium	µg/L	<1.0	> 1 µg/L
Chromium	µg/L	197	> 300 µg/L
Copper	µg/L	<10	> 1,000 µg/L
Nickel	µg/L	65	> 700 µg/L
Zinc	µg/L	69	> 700 µg/L

**Note:**

(a) Total Inorganic Nitrogen include Ammoniacal-nitrogen, Nitrite-nitrogen and Nitrate-nitrogen.

All leachate levels and effluent quality monitoring results were below the Limit Levels in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in **Annex F3**.

## 2.3.3 GROUNDWATER MONITORING

### 2.3.3.1 MONITORING REQUIREMENTS AND EQUIPMENT

According to the updated EM&A Manual of the Project with incorporation of the proposed updates under the Amendment Summary approved by EPD on 15 June 2020, groundwater monitoring was carried out at 14 perimeter groundwater monitoring wells (including 3 up-gradient wells and 11 down-gradient wells) (i.e. MWX-1 to MWX-14) to monitor the groundwater quality and level of the perimeter groundwater monitoring wells at monthly interval.

The Limit Levels for groundwater quality is provided in **Table 2.24** below.

**TABLE 2.24 LIMIT LEVELS FOR GROUNDWATER QUALITY**

Location	Limit Levels	
	Ammoniacal-nitrogen (mg L <sup>-1</sup> )	COD (mg L <sup>-1</sup> )
MWX-1	5.00	30
MWX-2	5.00	30
MWX-3	5.00	30
MWX-4	7.63	36
MWX-5	5.00	30
MWX-6	5.00	46
MWX-7	6.55	36
MWX-8	15.85	50
MWX-9	7.30	71
MWX-10	5.00	30
MWX-11	5.00	30
MWX-12	5.00	30
MWX-13	5.00	30
MWX-14	5.00	30

A bladder pump with Teflon sampling tube and adjustable discharge rates was used for purging and taking of groundwater sample from the monitoring wells. Filtered groundwater samples were collected by connecting a disposable in-line filter system to the tubing of the sampling pump, prior to storage and analysis by ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066). A portable dip meter with 5mm accuracy was used for measurement of groundwater level at each well. The dip meter has an audio indicator of the water level and was checked before use.

The measurements of pH and electrical conductivity (EC) were undertaken *in situ*. *In situ* monitoring instruments in compliance with the specifications listed under Section 4.3.2 of the updated EM&A Manual were used to undertake the groundwater quality monitoring for the Project.

Details of the equipment used and the monitoring locations are summarised in **Table 2.25** and illustrated in **Figure 2.1**, respectively. Copies of the calibration certificates for the equipment are presented in **Annex F7**.

**TABLE 2.25 GROUNDWATER MONITORING DETAILS**

Location	Frequency	Parameter	Monitoring Dates	Equipment	
All groundwater monitoring wells (MWX-1 to MWX-14)	Monthly	<ul style="list-style-type: none"> <li>• Water level</li> <li>• pH</li> <li>• EC</li> <li>• COD</li> <li>• BOD5</li> <li>• TOC</li> <li>• Ammoniacal-nitrogen</li> <li>• Nitrate-nitrogen</li> <li>• Nitrite-nitrogen</li> <li>• TKN</li> <li>• TN</li> <li>• Sulphate</li> <li>• Sulphide</li> <li>• Carbonate</li> <li>• Bicarbonate</li> <li>• Phosphate</li> </ul>	<ul style="list-style-type: none"> <li>• Chloride</li> <li>• Sodium</li> <li>• Potassium</li> <li>• Calcium</li> <li>• Magnesium</li> <li>• Nickel</li> <li>• Manganese</li> <li>• Chromium</li> <li>• Cadmium</li> <li>• Copper</li> <li>• Lead</li> <li>• Iron</li> <li>• Zinc</li> <li>• Mercury</li> <li>• Boron</li> </ul>	14 Dec 2023	Horiba U-52G (S/N: NVAE080GT)

### 2.3.3.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

The schedule for groundwater quality monitoring during the reporting period is provided in **Annex C**.

### 2.3.3.3 RESULTS AND OBSERVATIONS

The groundwater quality monitoring results and detailed monitoring results are summarised in **Table 2.26** and provided in **Annex F8**, respectively.

**TABLE 2.26 SUMMARY OF GROUNDWATER MONITORING RESULTS IN THE REPORTING PERIOD**

Location	Ammoniacal-nitrogen (mg L <sup>-1</sup> )		COD (mg L <sup>-1</sup> )	
	Monitoring Results	Limit Levels	Monitoring Results	Limit Levels
MWX-1	0.04	5.00	3	30
MWX-2	0.02	5.00	<2	30
MWX-3	1.54	5.00	19	30
MWX-4	2.9	7.63	19	36
MWX-5	2.17	5.00	28	30
MWX-6	4.36	5.00	54	46
MWX-7	5.8	6.55	18	36
MWX-8	13	15.85	40	50
MWX-9	1.39	7.30	24	71
MWX-10	0.02	5.00	6	30
MWX-11	0.03	5.00	<2	30
MWX-12	<0.01	5.00	<2	30
MWX-13	0.02	5.00	<2	30
MWX-14	<0.01	5.00	<2	30

Limit Level exceedance was recorded for groundwater monitoring in the reporting period and actions in accordance with the Event and Action Plan presented in **Annex F3** were undertaken. Investigation of the Action and Limit Levels exceedance was conducted and the investigation report is presented in **Annex F9**. Based on the investigation conducted for the monitoring event with potential Limit Levels exceedance with the Contractor and the IEC, the groundwater (COD) exceedance at MWX-6 on 14 December 2023 was considered non Project-related.

The Contractor was reminded to implement all relevant mitigation measures for the construction and operation works and maintain good site practice. The ET will keep track on the monitoring data and ensure Contractor's compliance of the environmental requirements.

## 2.4 LANDFILL GAS MONITORING

### 2.4.1 MONITORING REQUIREMENTS

According to the updated EM&A Manual of the Project, landfill gas monitoring was carried out at the perimeter of the waste boundary (monitoring wells), area between the SENTX Site boundary and the waste boundary (surface emission), occupied on-site building, service voids, utilities pit and manholes in the vicinity of the SENTX (build-up of landfill gas) during the operation/restoration phase.

The Limit Levels for landfill gas monitoring is provided in **Table 2.27** below.

TABLE 2.27 LIMIT LEVELS FOR LANDFILL GAS CONSTITUENTS

Parameters	Monitoring Location	Limit Level (% (v/v))	
<b>Perimeter Landfill Gas Monitoring Wells <sup>(a)</sup></b>			
Methane & Carbon Dioxide		Methane	Carbon Dioxide
	LFG1	1.0	3.2
	LFG2	1.0	4.3
	LFG3	1.0	6.3
	LFG4	1.0	7.0
	LFG5	1.0	3.4
	LFG6	1.0	9.1
	LFG7	1.0	1.5
	LFG8	12.6	2.4
	LFG9	2.5	1.7
	LFG10	3.5	1.6
	LFG11	3.0	2.0
	LFG12	13.2	1.5
	LFG13	22.5	2.7
	LFG14	5.2	1.8
	LFG15	18.2	2.0
	LFG16	1.0	2.0
	LFG17	17.8	2.4
	LFG18	2.3	2.1
	LFG19	6.3	3.1
	LFG20	1.0	4.6
	LFG21	1.0	4.8
	LFG22	1.0	4.0
	LFG23	1.0	10.3
LFG24	1.0	4.7	
GP1	1.0	10.6	
GP2 (shallow)	1.0	11.4	
GP2 (deep)	1.0	10.4	
GP3 (shallow)	1.0	6.9	
GP3 (deep)	1.0	5.6	
GP4 (shallow)	1.0	11.6	

Parameters	Monitoring Location	Limit Level (% (v/v))	
	GP4 (deep)	1.0	7.7
	GP5 (shallow)	1.0	10.8
	GP5 (deep)	1.0	7.5
	GP6	1.0	8.4
	GP7	1.0	4.5
	GP12	1.0	2.3
	GP15	1.0	2.2
	P7	1.0	2.5
	P8	1.0	1.7
	P9	1.0	2.7

#### Service Voids, Utilities Pits and Manholes

Methane (or flammable gas)	Service voids, utilities pits and manholes	1% by volume	
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#### Permanent Gas Monitoring System

Methane (or flammable gas)	Permanent Gas Monitoring System	1% by volume (20% LEL)	
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#### Area Between the SENTX Site Boundary and Waste Boundary (Surface Emission)

Flammable gas	Area between SENTX site boundary and waste boundary	30 ppm	
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#### Notes:

- (a) Limit Levels established based on the pre-operation phase baseline and additional landfill gas monitoring results in the Pre-operation Baseline Monitoring Report.

Gas analysers in compliance with the specifications listed under Section 5.4.1 of the updated EM&A Manual were used to monitor the gas parameters at the landfill gas monitoring wells, service voids, utilities pits and manholes. The gas analyser was calibrated by a laboratory accredited under HOKLAS at yearly intervals and checked before use to ensure the validity and accuracy of the results. A portable dip meter was used to monitor the water level in the monitoring wells.

Permanent gas monitoring systems with pre-set alarm levels for methane at 20% lower explosive limit (LEL, equivalent to 1% methane gas (v/v)) were installed and operated in all occupied on-site buildings at SENTX. A central control panel is equipped to alert site personnel when the gas concentration at any detector reaches the alarm level.

The equipment used in the landfill gas monitoring programme is summarised in **Table 2.28**. The landfill gas monitoring locations for perimeter landfill gas monitoring wells and service voids, utilities and manholes along the Site boundary are illustrated in **Figure 2.3** and **Annex G1**, respectively. Copies of the calibration certificates for the equipment are presented in **Annex G2**.

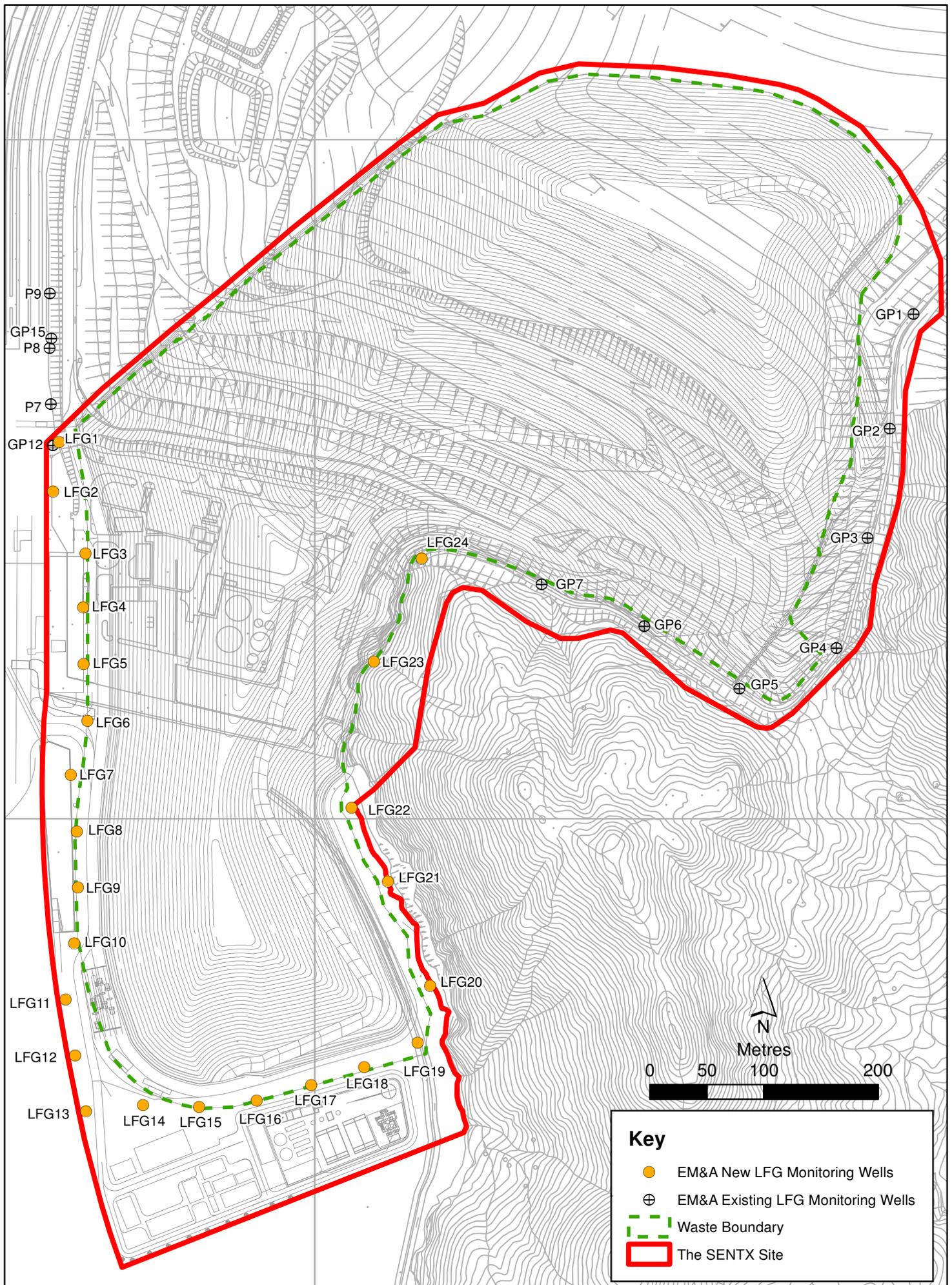


Figure 2.3

Location of Landfill Gas Monitoring Wells



TABLE 2.28 LANDFILL GAS MONITORING DETAILS

Monitoring Location	Frequency	Parameter	Monitoring Dates	Equipment
Perimeter landfill gas monitoring wells (LFG1 to LFG24, P7 to P9, GP1 to GP7, GP12 and GP15)	Monthly	<ul style="list-style-type: none"> <li>Methane</li> <li>Carbon dioxide</li> <li>Oxygen</li> <li>Atmospheric pressure</li> </ul>	12 Dec 2023	GA5000 (S/N: G507306)
Service voids, utilities and manholes along the Site boundary and within the SENTX Site (UU1 to UU28)	Monthly	<ul style="list-style-type: none"> <li>Methane</li> <li>Carbon dioxide</li> <li>Oxygen</li> </ul>	12 Dec 2023	GA5000 (S/N: G507306)
Permanent gas monitoring system in all occupied on-site buildings	Continuous	Methane (or flammable gas) by permanent gas monitoring system	1 – 31 Dec 2023	Permanent gas monitoring system
Areas between the SENTX Site boundary and the waste boundary and location of vegetation stress	Quarterly	Flammable gas emitted from the ground surface	-	GMI Leak Surveyor (S/N: 554846)
Bulk gas sampling at least 2 of the perimeters LFG monitoring wells	Quarterly	<ul style="list-style-type: none"> <li>Methane</li> <li>Carbon dioxide</li> <li>Oxygen</li> <li>Nitrogen</li> <li>Carbon monoxide</li> <li>Other flammable gas</li> </ul>	-	Gas sampling pump and Tedlar bags

### 2.4.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

The schedule for landfill gas monitoring during the reporting period is provided in **Annex C**.

### 2.4.3 RESULTS AND OBSERVATIONS

The landfill gas monitoring results are summarised and provided in **Tables 2.29 - 2.30** and **Annex G3**, respectively.

**TABLE 2.29 SUMMARY OF LANDFILL GAS MONITORING RESULTS AT PERIMETER LFG MONITORING WELLS IN THE REPORTING PERIOD**

Location	Methane (% (v/v))		Carbon Dioxide (% (v/v))	
	Monitoring Results	Limit Levels (a)	Monitoring Results	Limit Levels (a)
LFG1	0.2	1.0	0.2	3.2
LFG2	0.2	1.0	0.5	4.3
LFG3	0.0	1.0	1.4	6.3
LFG4	0.0	1.0	0.0	7.0
LFG5	0.0	1.0	0.0	3.4
LFG6	0.0	1.0	0.1	9.1
LFG7	0.0	1.0	0.0	1.5
LFG8	0.0	12.6	0.1	2.4
LFG9	0.0	2.5	0.2	1.7
LFG10	0.0	3.5	0.0	1.6
LFG11	0.0	3.0	0.1	2.0
LFG12	0.0	13.2	0.0	1.5
LFG13	15.9	22.5	0.3	2.7
LFG14	0.0	5.2	0.0	1.8
LFG15	0.0	18.2	0.0	2.0
LFG16	0.0	1.0	0.0	2.0
LFG17	0.0	17.8	0.0	2.4
LFG18	0.0	2.3	1.1	2.1
LFG19	0.0	6.3	0.3	3.1
LFG20	0.0	1.0	0.0	4.6
LFG21	0.0	1.0	0.0	4.8
LFG22	0.0	1.0	0.0	4.0
LFG23	0.0	1.0	0.0	10.3
LFG24	0.0	1.0	0.0	4.7
GP1	0.0	1.0	0.1	10.6
GP2 (shallow)	0.0	1.0	0.8	11.4
GP2 (deep)	0.0	1.0	0.1	10.4
GP3 (shallow)	0.0	1.0	0.1	6.9
GP3 (deep)	0.0	1.0	0.2	5.6
GP4 (shallow)	0.0	1.0	0.5	11.6

Location	Methane (% (v/v))		Carbon Dioxide (% (v/v))	
	Monitoring Results	Limit Levels (a)	Monitoring Results	Limit Levels (a)
GP4 (deep)	0.0	1.0	0.2	7.7
GP5 (shallow)	0.0	1.0	0.1	10.8
GP5 (deep)	0.0	1.0	0.1	7.5
GP6	0.0	1.0	0.1	8.4
GP7	0.0	1.0	0.1	4.5
GP12	0.2	1.0	0.0	2.3
GP15	0.1	1.0	0.0	2.2
P7	0.1	1.0	0.4	2.5
P8	0.1	1.0	0.0	1.7
P9	0.1	1.0	0.0	2.7

**Notes:**

(a) Limit Levels established based on the pre-operation phase baseline and additional landfill gas monitoring results in the Pre-operation Baseline Monitoring Report.

**TABLE 2.30 SUMMARY OF LANDFILL GAS MONITORING RESULTS AT SERVICE VOIDS, UTILITIES PITS AND MANHOLES IN THE REPORTING PERIOD**

Location	Methane (% (v/v))	
	Monitoring Results	Limit Levels
UU01	0.0	1.0
UU02	0.0	1.0
UU03	0.0	1.0
UU04	0.0	1.0
UU05	0.0	1.0
UU06	0.0	1.0
UU07	0.0	1.0
UU08	0.0	1.0
UU09	0.0	1.0
UU10	0.0	1.0
UU11	0.0	1.0
UU12	Voided due to latest site programme and on-going operation work	1.0
UU13	0.0	1.0
UU14	0.0	1.0

Location	Methane (% (v/v))	
	Monitoring Results	Limit Levels
UU15	0.0	1.0
UU16	0.0	1.0
UU17	Voided due to latest site programme and on-going operation work	1.0
UU18	Voided due to latest site programme and on-going operation work	1.0
UU19	0.0	1.0
UU20	0.0	1.0
UU21	0.0	1.0
UU22	0.0	1.0
UU23	0.0	1.0
UU24	0.0	1.0
UU25	0.0	1.0
UU26	0.0	1.0
UU27	0.0	1.0
UU28	0.0	1.0

## 2.5 LANDSCAPE AND VISUAL MONITORING

### 2.5.1 MONITORING REQUIREMENTS

According to the updated EM&A Manual of the Project, the monthly landscape and visual audit was conducted on 7 December 2023 to monitor the implementation of the landscape and visual mitigation measures during operation/ restoration phase.

All relevant environmental mitigation measures listed in the approved EIA Report and the updated EM&A Manual and their implementation status are summarized in **Annex B**.

### 2.5.2 RESULTS AND OBSERVATIONS

The Contractor has implemented environmental mitigation measures as stated in the approved EIA Report and the EM&A Manual.

Regarding the landscape and visual audit, the Contractor was reminded to maintain the advance screen planting works regularly to ensure effective screening of views of project works from the High Junk Peak Trail.

## 2.6 EM&A SITE INSPECTION

Site inspections were carried out on a weekly basis with the Contractor, IEC and ER to monitor the implementation of proper environmental pollution control and mitigation measures under the Project. In the reporting period, 4 site inspections were carried out on 7, 14, 21 and 28 December 2023.

Key observations during the site inspections are summarised in **Table 2.31**.

**TABLE 2.31 KEY OBSERVATIONS IDENTIFIED DURING THE SITE INSPECTION IN THIS REPORTING MONTH**

Inspection Date	Environmental Observations and Recommendations
7 December 2023	<ul style="list-style-type: none"> <li>No observations during the site inspection.</li> </ul>
14 December 2023	<ul style="list-style-type: none"> <li>The Contractor shall replace the faded NRMM label displayed on the grabber at sorting area.</li> </ul>
21 December 2023	<ul style="list-style-type: none"> <li>The Contractor shall place the NRMM label on the sorting machine at sorting area.</li> </ul>
28 December 2023	<ul style="list-style-type: none"> <li>The Contractor shall display NRMM labels on the sorting machine and generator at sorting area or display the label "Not in use".</li> <li>The Contractor shall remove the deposited silt, grit and general refuse accumulated at X10 channel regularly to ensure it is functioning properly at all times.</li> </ul>

The Contractor has rectified all the observations identified during environmental site inspections in the reporting period. Key environmental deficiencies identified and the corresponding rectification actions are presented in **Table 2.32**.

**TABLE 2.32 SUMMARY OF ENVIRONMENTAL DEFICIENCIES IDENTIFIED AND CORRESPONDING RECTIFICATION ACTIONS**

Deficiencies	Rectifications Implemented	Proposed Additional Control Measures
<b>Surface Water</b>		
Intercepting channels & drainage system	<ul style="list-style-type: none"> <li>Reviewed drainage plan.</li> </ul>	<ul style="list-style-type: none"> <li>Addition of channels.</li> <li>Expedite the construction of permanent sediment trap and discharge culverts.</li> </ul>
DP channels (design & regular silt removal)	<ul style="list-style-type: none"> <li>Carried out regular maintenance and cleaning of channels.</li> <li>DP4 channel: Area near the channel was paved with concrete and a bund was built.</li> <li>DP6 channel: Gravel piles on the channel were covered with concrete which serve as blocks for running water and to divide the channel into several sections. A pump was placed in the water zone in the upstream section to pump water to the Wetsep for treatment prior to the discharge to the last</li> </ul>	N.A.

Deficiencies	Rectifications Implemented	Proposed Additional Control Measures
	section before the weir plate. <ul style="list-style-type: none"> <li>DP6: Pipes through the gravel piles between different channel sections were covered with geotextiles to block debris and silt.</li> </ul>	
Stockpiles & exposed soil	<ul style="list-style-type: none"> <li>Installed silt fencing near surface water channel along DP6 channel.</li> </ul>	<ul style="list-style-type: none"> <li>Improve soil covering.</li> <li>Compaction and cover for stockpiles and soil slopes.</li> </ul>
Wetsep (treatment capacity & number)	<ul style="list-style-type: none"> <li>Reviewed Wetsep capacity.</li> <li>Chemicals dosage of the Wetsep was increased to enhance the efficiency.</li> </ul>	<ul style="list-style-type: none"> <li>Install additional Wetsep.</li> </ul>
Backflow / ponding during heavy rainfall	<ul style="list-style-type: none"> <li>Raised with EPD (LDG) and CEDD.</li> </ul>	N.A.

## 2.7 WASTE MANAGEMENT STATUS

The Contractor has registered as chemical waste producer under the Contract. Sufficient numbers of receptacles were available for general refuse collection and sorting.

As informed by the Contractor, waste generated during this reporting period include mainly yard waste. Reference has been made to the waste flow table prepared by the Contractor. The quantities of different types of wastes and imported fill materials are summarized in **Table 2.33**.

**TABLE 2.33 QUANTITIES OF DIFFERENT WASTE GENERATED AND IMPORTED FILL MATERIALS**

Month /Year	Inert C&D Materials <sup>(a)</sup> (in '000m <sup>3</sup> )	Imported Fill (in '000kg) <sup>(b)</sup>	Inert Construction Waste Re-used (in '000m <sup>3</sup> )	Non-inert Construction Waste <sup>(c)</sup> (in '000m <sup>3</sup> )	Recyclable Materials <sup>(d)</sup> (in '000kg)	Yard Waste (in '000kg)		Chemical Wastes (in '000kg)
						Y Park	SENT	
1 – 31 Dec 23	235.53	0	0	0	0	3.95	0	0.80

**Notes:**

- Inert construction wastes include hard rock and large broken concrete, and materials disposed as public fill. Density assumption: 1.6 (kg/L) for public fill.
- Imported fill refers to materials generated from other project for on-site reuse.
- Non-inert construction wastes include general refuse disposed at landfill. Density assumption: 0.9 (kg/L) for general refuse.
- Recyclable materials include metals, paper, cardboard, plastics and others.

## 2.8 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

A summary of the Environmental Mitigation Implementation Schedule is presented in **Annex B**. The necessary mitigation measures were implemented properly for the Project.

## 2.9 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

The operation/ restoration phase air quality, noise and landfill gas monitoring results complied with the Action and Limit Levels in the reporting period.

One exceedance of the Limit Level for groundwater (COD) was recorded for water quality impact monitoring in the reporting period. The groundwater (COD) exceedance at MWX-6 on 14 December 2023 was considered non Project-related upon further investigation.

Cumulative statistics on exceedances is provided in **Annex H**.

## 2.10 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

There were no complaints, notification of summons or prosecution recorded in the reporting period.

Statistics on complaints, notifications of summons, successful prosecutions are summarised in **Annex H**.

### 3. FUTURE KEY ISSUES

#### 3.1 CONSTRUCTION PROGRAMME FOR THE COMING MONTH

As informed by the Contractor, the major works for the Project in January 2024 will be:

- Maintenance and improvement of temporary surface water drainage;
- Weighbridge enhancement with C-easy; and
- Restoration of Phase 1 Cell 1X, 2X and Phase 2 Cell 3X west slopes.

#### 3.2 KEY ISSUES FOR THE COMING MONTH

Potential environmental impacts arising from the above upcoming construction activities in the next reporting period of January 2024 are mainly associated with dust emission from the exposed area and loading and unloading operation of dusty materials.

#### 3.3 MONITORING SCHEDULE FOR THE COMING MONTH

The tentative schedule for environmental monitoring in January 2024 is provided in **Annex I**.

## 4. CONCLUSION AND RECOMMENDATION

This EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 to 31 December 2023 in accordance with the updated EM&A Manual and the requirements of the Environmental Permit (*EP-308/2008/B*).

Air quality (24-hour TSP, odour, thermal oxidiser, landfill gas flare and landfill gas generator stack emission), noise, water quality (surface water, leachate and groundwater) and landfill gas monitoring were carried out in the reporting period. Results for air quality (24-hour TSP, odour, thermal oxidiser, landfill gas flare and landfill gas generator stack emission), noise, water quality (surface water and leachate) and landfill gas monitoring complied with the Action and Limit Levels in the reporting period. One exceedance of the Limit Level for groundwater (COD) was recorded in the reporting period.

Environmental site inspections were carried out during the reporting period. Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site inspections.

There were no complaints, notification of summons or prosecution recorded in the reporting period.

The ET will keep track on the construction and operation/restoration works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

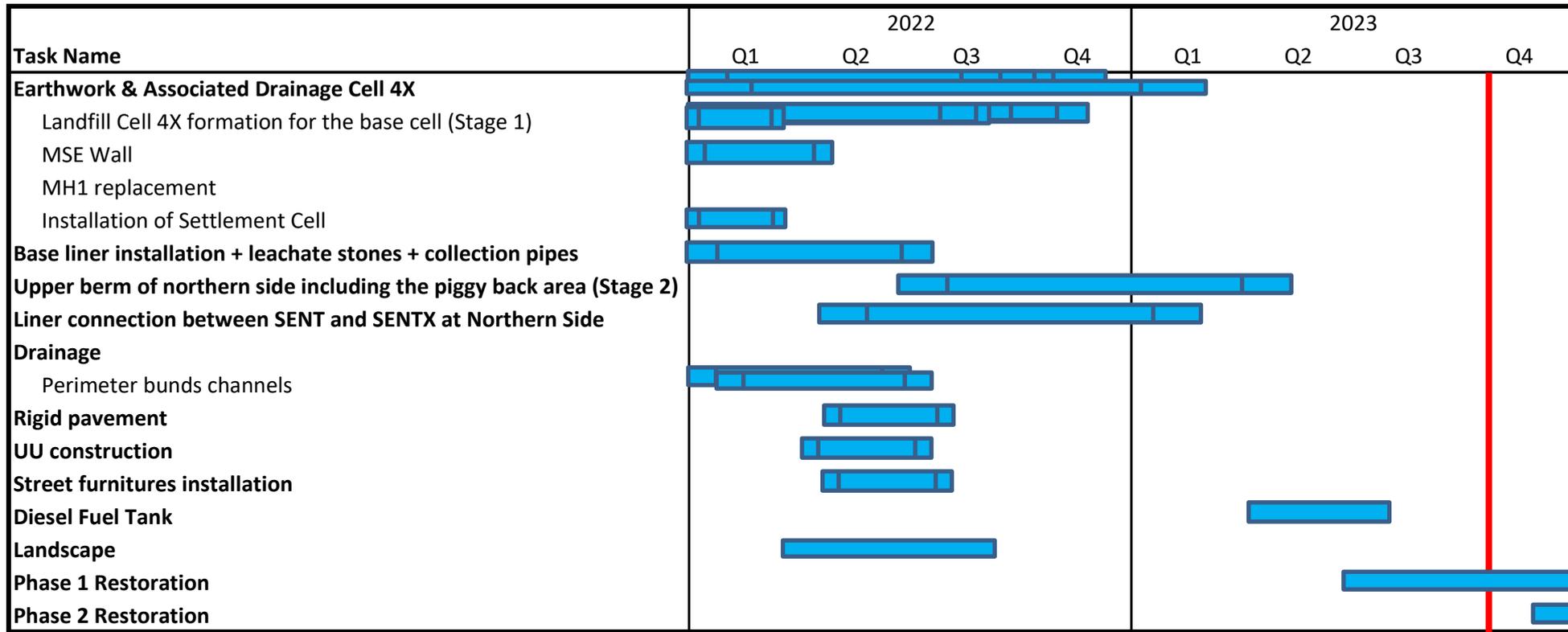


ANNEX A

WORK PROGRAMME

# SENT Landfill Extension (SENTX) - Construction Programme for Cell 4X

Update 1 November 2023



# SENTX - Construction Programme

Update 1st January 2024

Task Name	2023				2024			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Phase 1 Restoration</b>								
Subgrade soil + Liner								
Cover Soil								
Above Cap Gas pipe + Drainage								
Landscape								
<b>Phase 2 Restoration</b>								
Subgrade soil + Liner								
Cover Soil								
Above Cap Gas pipe + Drainage								
Landscape								





ANNEX B

ENVIRONMENTAL MITIGATION  
IMPLEMENTATION SCHEDULE

## ANNEX B ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
<b>Air Quality – Construction Phase</b>											
4.8.1	AQ1	<p><b>Blasting</b></p> <ul style="list-style-type: none"> <li>The area within 30m of the blasting area will be wetted prior to blasting.</li> <li>Blasting will not be carried out when the strong wind signal or tropical cyclone warning signal No. 3 or higher is hoisted, unless this is with the express prior permission of the Commissioner of Mines.</li> <li>loose material and stones in the Site will be removed prior to the blast operation</li> <li>During blasting, blast nets, screens and other protective covers will be used to prevent the projection of flying</li> </ul>	To minimise potential dust nuisance	Blasting area and 30m of blasting area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i>	Not applicable. Blasting is not required in the latest landfill design

(1) D=Design; C=Construction; O/R=Operation/Restoration; A=Aftercare

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		fragments and material resulting from blasting									
4.8.1	AQ2	<u>Rock Drilling</u> Watering will be carried out at the rock drilling activities to avoid fugitive dust emissions.	To minimise potential dust nuisance	Rock drilling area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i>	Not applicable. Rock drilling is not required in the latest landfill design
4.8.1	AQ3	<u>Site Access Road</u> <ul style="list-style-type: none"> <li>The main haul road will be kept clear of dusty materials or sprayed with water.</li> <li>The main haul road will be paved with aggregate or gravel.</li> <li>Vehicle speed will be limited to 10kph.</li> </ul>	To minimise potential dust nuisance	Main haul road	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i> <i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.1	AQ4	<u>Stockpiling of Dusty Materials</u> <ul style="list-style-type: none"> <li>Any stockpile of dusty materials will be covered entirely by impervious sheeting or placed in an area sheltered on the top and three sides or sprayed</li> </ul>	To minimise potential dust nuisance	All construction works area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		with water so as to ensure that the entire surface is wet.								<i>HKAQO and EIAO-TM Annex 4</i>	
4.8.1	AQ5	<u>Loading, unloading or transfer of dusty materials</u> <ul style="list-style-type: none"> <li>All dusty materials will be sprayed with water immediately prior to any loading, unloading or transfer operation so as to maintain the dusty material wet.</li> </ul>	To minimise potential dust nuisance	All construction works area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i>  <i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.1	AQ6	<u>Site Boundary and Entrance</u> <ul style="list-style-type: none"> <li>Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of height not less than 2.4m from ground level will be provided along the entire length of that portion of the site boundary except for the site entrance or exit.</li> </ul>	To minimise potential dust nuisance	Site boundary and entrance	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i>  <i>HKAQO and EIAO-TM Annex 4</i>	Not applicable

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
4.8.1	AQ7	<u>Excavation Works</u> <ul style="list-style-type: none"> <li>Working area of any excavation or earth moving operation will be sprayed with water immediately before, during and immediately after the operation so as to ensure that the entire surface is wet.</li> </ul>	To minimise potential dust nuisance	All construction works area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i> <i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.1	AQ8	<u>Building Demolition</u> <ul style="list-style-type: none"> <li>The area where the demolition works are planned to take place will be sprayed with water immediately prior to, during and immediately after the demolition activities.</li> <li>Any dusty materials remaining after a stockpile is removed will be wetted with water and cleared from the surface of roads or street.</li> </ul>	To minimise potential dust nuisance	All construction works area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i> <i>HKAQO and EIAO-TM Annex 4</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
4.8.1	AQ9	<u>Construction of the Superstructure of Building</u> <ul style="list-style-type: none"> <li>Effective dust screens, sheeting or netting will be provided to enclose the scaffolding from the ground level up to the highest level of the scaffolding.</li> </ul>	To minimise potential dust nuisance	All construction works area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i> <i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.1	AQ10	Should a stone crushing plant be needed on site, the control measures recommended in the <i>Best Practicable Means Requirement for Mineral Works (Stone Crushing Plants) BPM 11/1</i> should be implemented.	To minimise potential dust nuisance	Stone crushing plant/ construction phase	SENTX Contractor		✓			<i>Best Practicable Means Requirement for Mineral Works (Stone Crushing Plants) BPM 11/1</i>	Not applicable. Stone crushing plant is not required in the latest landfill design
4.8.1	AQ11	Good site practices such as regular maintenance and checking of the diesel powered mechanical equipment will be adopted to avoid any black smoke emissions and to minimize	To minimise potential dust nuisance	All construction works area	SENTX Contractor		✓			<i>HKAQO and EIAO-TM Annex 4</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		gaseous emissions.									
4.10.1	AQ12	Dust monitoring once every 6 days	Ensure the dust generated from the project meets the air quality requirement	At monitoring locations shown in <i>Figure 3.2a</i>	SENTX Contractor		✓			<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
<b>Air Quality – Operation, Restoration and Aftercare Phases</b>											
4.8.2	AQ13	<u>Odour</u> <ul style="list-style-type: none"> <li>Enclosing the weighbridge area</li> </ul>	To minimise odour nuisance	Weighbridge area	SENTX Contractor	✓		✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only which is significantly less odorous, enclosing the weighbridge area is not necessary
4.8.2	AQ14	<ul style="list-style-type: none"> <li>Providing a vehicle washing facility before the exit of SENTX and providing sufficient signage to remind RCV drivers to pass through the facility before leaving SENTX</li> </ul>	To minimise odour nuisance	Vehicle washing facility	SENTX Contractor	✓		✓		<i>EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ15	<ul style="list-style-type: none"> <li>Reminding the RCV drivers to empty the liquor collection sump and close the valve before leaving</li> </ul>	To minimise odour nuisance	Tipping face	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only, which

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		the tipping face									is relatively dry, the amount of liquor generated is expected to minimal
4.8.2	AQ16	<ul style="list-style-type: none"> <li>Washing down the area where spillage of RCV liquor is discovered promptly</li> </ul>	To minimise odour nuisance	SENTX Site	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only, which is relatively dry, the amount of liquor generated is expected to minimal.
4.8.2	AQ17	<ul style="list-style-type: none"> <li>Reminding operators to properly maintain their RCVs and ensure that liquor does not leak from the vehicles</li> </ul>	To minimise odour nuisance	SENTX Site	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only, which is relatively dry, the amount of liquor generated is expected to minimal.
4.8.2	AQ18	<ul style="list-style-type: none"> <li>Installation of landfill gas control system to enhance collection of landfill gas from the waste mass and hence minimise odour associated with fugitive landfill gas emissions</li> </ul>	To minimise odour nuisance	SENTX Site	SENTX Contractor	✓		✓	✓	<i>EIAO-TM Annex 4</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
4.8.2	AQ19	<ul style="list-style-type: none"> <li>Progressive restoration of the areas which reach the finished profile (a final capping system including an impermeable liner will be put in place) and installation of a permanent landfill gas extraction system</li> </ul>	To minimise odour nuisance	SENTX Site	SENTX Contractor	✓		✓	✓	EIAO-TM Annex 4	Implemented
4.8.2	AQ20	<ul style="list-style-type: none"> <li>Installing deodorizers along the site boundary adjacent to the ASRs</li> </ul>	To minimise odour nuisance	SENTX Site boundary	SENTX Contractor			✓	✓	EIAO-TM Annex 4	Not Applicable. As SENTX will receive construction waste only which is significantly less odorous, installation of deodorizers is not necessary.
4.8.2	AQ21	<ul style="list-style-type: none"> <li>Erecting a vertical barrier, wall or structure softened by planting rows of trees/shrubs or landscape feature along the site boundary, particularly in the areas near the ASRs</li> </ul>	To minimise odour nuisance	SENTX Site boundary	SENTX Contractor	✓		✓	✓	EIAO-TM Annex 4	Implemented
4.8.2 and SENTX latest design	AQ22	<ul style="list-style-type: none"> <li>Maintaining the size of the active tipping face not greater than 1,200 m<sup>2</sup></li> </ul>	To minimise odour nuisance	Active tipping face	SENTX Contractor			✓		EIAO-TM Annex 4	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
4.8.2	AQ23	<ul style="list-style-type: none"> <li>Promptly covering the MSW with soil or selected inert materials to control odour emissions</li> </ul>	To minimise odour nuisance	Active tipping face	SENTX Contractor			✓		EIAO-TM Annex 4	Not Applicable. SENTX will not receive MSW.
4.8.2	AQ24	<ul style="list-style-type: none"> <li>Maintaining the size of the special waste trench not greater than 6m (l) × 2.5m (w)</li> </ul>	To minimise odour nuisance	Special waste trench	SENTX Contractor			✓		EIAO-TM Annex 4	Not Applicable. SENTX will not have any special waste trench.
4.8.2 and SENTX latest design	AQ25	<ul style="list-style-type: none"> <li>Covering daily covered area with a tarpaulin sheet or 300mm of soil after the landfill operating hours</li> </ul>	To minimise odour nuisance	Daily covered area	SENTX Contractor			✓		EIAO-TM Annex 4	Implemented
4.8.2	AQ26	<ul style="list-style-type: none"> <li>Covering special waste trench with 600 mm of soil and an impervious liner after 5 pm</li> </ul>	To minimise odour nuisance	Special waste trench	SENTX Contractor			✓		EIAO-TM Annex 4	Not Applicable. SENTX will not have any special waste trench.
4.8.2	AQ27	<ul style="list-style-type: none"> <li>Covering the non-active tipping face with 600mm of soil and an impermeable liner (on top of the intermediate cover), which will not only control odour emissions from landfilled waste but also enhance landfill gas extraction by the landfill gas extraction system</li> </ul>	To minimise odour nuisance	Intermediate cover	SENTX Contractor			✓		EIAO-TM Annex 4	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
4.8.2	AQ28	<ul style="list-style-type: none"> <li>Applying deodorizers or odour suppression agents to control odour emissions from the active tipping face and special waste trench, if any, through spraying or fogging equipment</li> </ul>	To minimise odour nuisance	Active tipping face and special waste trench	SENTX Contractor			✓		EIAO-TM Annex 4	Not Applicable. As SENTX will receive construction waste only which is significantly less odorous, installation of deodorizers is not necessary. Moreover, SENTX will not have any special waste trench.
4.8.2	AQ29	<ul style="list-style-type: none"> <li>Providing a mobile cover with retractable or suitable opening to cover up the opening of the special waste trench except during waste deposition and a suitable odour removal unit. The mobile cover should be equipped with powered extraction and suitable odour removal unit for purifying the trapped gas inside the trench before release into the atmosphere</li> </ul>	To minimise odour nuisance	Special waste trench	SENTX Contractor			✓		EIAO-TM Annex 4	Not Applicable. SENTX will not have any special waste trench.

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
4.8.2 and SENTX latest design	AQ30	<ul style="list-style-type: none"> <li>Providing a thermal oxidizer for the leachate treatment plant</li> </ul>	To minimise odour nuisance as a result of breakdown of thermal oxidizer	Leachate treatment plant	SENTX Contractor	✓		✓	✓	<i>EIAO-TM Annex 4</i>	Implemented
4.8.2 and SENTX latest design	AQ31	<ul style="list-style-type: none"> <li>Enclosing all the leachate storage and treatment tanks (except for the Sequential Batch Reactor (SBR) or Membrane Bioreactor (MBR) tanks) and diverting the exhaust air from these tanks to a thermal oxidizer or flare to avoid potential odour emissions from the LTP</li> </ul>	To minimise odour nuisance	Leachate treatment plant	SENTX Contractor	✓		✓	✓	<i>EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ32	<ul style="list-style-type: none"> <li>Rescheduling of waste filling activities on-site by avoiding waste filling activities carrying out at the northern area of the site in the summer months between July to November</li> </ul>	To minimise odour nuisance	SENTX Site	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only which is significantly less odorous, rescheduling of waste filling activities is not necessary.
4.8.2 and SENTX latest design	AQ33	<u>Dust, Gaseous Emission and LFG including Volatile Organic Compounds (VOCs)</u>	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		<ul style="list-style-type: none"> <li>Keeping the main haul road to the waste filling area wet by regular watering;</li> </ul>									
4.8.2	AQ34	<ul style="list-style-type: none"> <li>Compacting the exposed daily and intermediate covered areas well to avoid fugitive dust emission;</li> </ul>	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ35	<ul style="list-style-type: none"> <li>Limiting the vehicle speed within SENTX site boundary;</li> </ul>	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ36	<ul style="list-style-type: none"> <li>Providing vehicle washing bay to avoid vehicles carrying dust to public roads;</li> </ul>	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ37	<ul style="list-style-type: none"> <li>Switching off the engine when the diesel-driven equipment is idling;</li> </ul>	To minimise gaseous emissions	SENTX Site	SENTX Contractor			✓	✓	-	Implemented
4.8.2	AQ38	<ul style="list-style-type: none"> <li>Maintaining the construction equipment properly to avoid any black smoke emissions;</li> </ul>	To minimise gaseous emissions	SENTX Site	SENTX Contractor			✓	✓	-	Implemented
4.8.2	AQ39	<ul style="list-style-type: none"> <li>Providing sufficient underground landfill gas collection system to capture the landfill gas</li> </ul>	To minimise gaseous emissions,	SENTX Site	SENTX Contractor			✓	✓	<i>EIAO-TM Annex 4</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		generated as much as possible; and	including LFG and VOCs								
4.8.2	AQ40	<ul style="list-style-type: none"> <li>Periodic inspections of the final cover should be undertaken to ensure that the capping layer is in good conditions at all times.</li> </ul>	To minimise gaseous emissions, including LFG and VOCs	SENTX Site	SENTX Contractor			✓	✓	<i>EIAO-TM Annex 4</i>	Implemented
4.10.2	AQ41	<ul style="list-style-type: none"> <li>Monitoring of ambient TSP once every 6 days</li> </ul>	Ensure the dust emission from the project meets the dust requirement	At monitoring locations shown in <i>Figure 11.3a</i>	SENTX Contractor		✓	✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.10.2	AQ42	<ul style="list-style-type: none"> <li>Monitoring of ambient VOCs, ammonia and H<sub>2</sub>S, quarterly</li> </ul>	Ensure the gaseous emission from the project meets the air quality requirement	At monitoring locations shown in <i>Figure 11.3a</i>	SENTX Contractor			✓	✓	Odour thresholds or 1% of Occupational Exposure Limit (OEL) as stipulated in the "UK Health and Safety Executive (HSE) EH 40/05 Occupational Exposure Limits", whichever is lower.	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
4.10.2 and SENTX latest design	AQ43	<ul style="list-style-type: none"> <li>Monitoring of parameters for thermal oxidizer, flares and generator in accordance with requirements stated in Tables 3.4a, 3.5a and 3.6a of the EM&amp;A Manual respectively.</li> </ul>	Ensure the gaseous emission from the project meets the air quality requirement	At the flares and thermal oxidizer stacks when they are in operation	SENTX Contractor			✓	✓ <sup>(2)</sup>	Emission Limits specified in Contract	Implemented
4.10.2	AQ44	<ul style="list-style-type: none"> <li>To confirm design assumption of ammonia, it is recommended that the ammonia concentration in the flue gas of the thermal oxidiser be monitored during the commissioning stage of the thermal oxidiser. If required, an emission standard will be set for ammonia for the thermal oxidiser based on the monitoring results. If no ammonia is detected in the flue gas during the decommissioning stage, the monitoring of ammonia in the flue gas</li> </ul>	Ensure the gaseous emission from the project meets the air quality requirement	At the thermal oxidizer stack during commissioning . If ammonia is detected during commissioning stage, the monitoring will continue.	SENTX Contractor			✓		Emission Limits determined during commissioning stage	Implemented

<sup>(2)</sup> For LFG flare and LFG generator only.

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		of the thermal oxidiser could be discontinued.									
4.10.2 and SENTX latest design	AQ45	<ul style="list-style-type: none"> <li>Odour patrol in accordance with requirements stated in Table 3.7a of the EM&amp;A Manual.</li> </ul>	Ensure the odour emission from the project meets the odour requirement	Along SENTX Site boundary	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Implemented
4.10.2	AQ46	<ul style="list-style-type: none"> <li>Monitoring of meteorological station, continuously</li> </ul>	Collect site specific meteorological data	At meteorological station shown in <i>Figure 11.3a</i>	SENTX Contractor		✓	✓	✓	-	Implemented
<b>Noise – Construction Phase</b>											
5.7.1	N1	Adopt good site practice listed below: <ul style="list-style-type: none"> <li>Only well-maintained plant will be operated on-site and plant should be serviced regularly during the construction program;</li> <li>Silencers or mufflers on construction equipment should be utilized and will be properly maintained during the construction program;</li> <li>Mobile plant, if any, will be sited as far from NSRs as</li> </ul>	To minimise potential construction noise nuisance.	All construction works area	SENTX Contractor		✓			<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		<p>possible;</p> <ul style="list-style-type: none"> <li>Machines and plant (such as trucks) that may be in intermittent use will be shut down between work periods or should be throttled down to a minimum;</li> <li>Plant known to emit noise strongly in one direction will, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and</li> <li>Material stockpiles and other structures will be effectively utilised, wherever practicable, in screening noise from on-site construction activities.</li> </ul>									
5.8	N2	Weekly noise monitoring	Ensure noise generated from the project meets the criteria	At monitoring locations shown in <i>Figure 6.4a</i>	SENTX Contractor		✓			<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		

**Noise – Operation/Restoration Phase**

5.7.2	N3	Adopt good site practice listed below:	To minimise potential operational noise nuisance.	Within the SENTX Site	SENTX Contractor			✓	<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>	Implemented
		<ul style="list-style-type: none"> <li>Choose quieter PME;</li> </ul>							-	Implemented
		<ul style="list-style-type: none"> <li>Include noise levels specification when ordering new plant items;</li> </ul>							-	Implemented
		<ul style="list-style-type: none"> <li>Locate fixed plant items or noise emission points away from the NSRs as far as practicable;</li> </ul>							-	Implemented
		<ul style="list-style-type: none"> <li>Locate noisy machines in completely enclosed plant rooms or buildings; and</li> </ul>							-	Implemented
		<ul style="list-style-type: none"> <li>Develop and implement a regularly scheduled plant maintenance programme so that plant items are properly operated and serviced. The programme should be implemented by properly trained personnel.</li> </ul>							-	Implemented
5.8	N4	Weekly noise monitoring	Ensure noise generated from the project	At monitoring locations	SENTX Contractor			✓	<i>Noise Control Ordinance (NCO) and</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
			meets the criteria	shown in Figure 6.4a						EIAO-TM Annex 5	
<b>Water Quality – Construction Phase</b>											
6.8.1	WQ1	<u>Construction Runoff</u> <ul style="list-style-type: none"> <li>Exposed soil areas will be minimised to reduce the contamination of runoff and erosion.</li> </ul>	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor		✓			ProPECC PN 1/94 EIAO-TM Annex 6	Implemented
6.8.1	WQ2	<ul style="list-style-type: none"> <li>Perimeter channels will be constructed in advance of site formation works and earthworks and intercepting channels will be provided for example along the edge of excavation.</li> </ul>	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor	✓	✓			ProPECC PN 1/94 Water Pollution Control Ordinance (WPCO) EIAO-TM Annex 6	Implemented
6.8.1	WQ3	<ul style="list-style-type: none"> <li>Silt removal facilities, channels and manholes will be maintained and the deposited silt and grit should be removed regularly to ensure they are functioning properly at all times.</li> </ul>	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor		✓			ProPECC PN 1/94 WPCO EIAO-TM Annex 6	Deficiency of mitigation measures but rectified by the Contractor
6.8.1	WQ4	<ul style="list-style-type: none"> <li>Temporary covers such as tarpaulin will also be provided to minimise the</li> </ul>	To minimise potential water quality impacts arising from the	All construction works area	SENTX Contractor		✓			ProPECC PN 1/94 WPCO	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		generation of high SS runoff.	construction works								
6.8.1	WQ5	<ul style="list-style-type: none"> <li>The surface runoff contained any oil and grease will pass through the oil interceptors.</li> </ul>	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor		✓			ProPECC PN 1/94 WPCO EIAO-TM Annex 6	Implemented
6.8.1	WQ6	<ul style="list-style-type: none"> <li>All sewer and drains will be sealed to prevent building debris, soil etc from entering public sewers/drains before commencing any demolition works</li> </ul>	To minimise potential water quality impacts arising from the demolition works	Infrastructure area at existing SENT Landfill	SENTX Contractor		✓			ProPECC PN 1/94 WPCO EIAO-TM Annex 6	Not applicable
6.8.1	WQ7	<ul style="list-style-type: none"> <li>During the excavation works for the twin drainage tunnels, the recycle water for cooling the cutter head of the TBM will be conveyed to the sedimentation tanks for treatment and most of the treated water will be reused, where applicable and as much as possible, in the boring operations.</li> </ul>	To minimise potential water quality impacts arising from the tunnel works	Tunnel boring sites	SENTX Contractor		✓			ProPECC PN 1/94 WPCO EIAO-TM Annex 6	Not applicable. Excavation of drainage tunnels is not required in the latest landfill design.
6.8.1	WQ8	<ul style="list-style-type: none"> <li>The fuel and waste lubricant oil from the on-</li> </ul>	To minimise potential water	SENTX Site	SENTX Contractor		✓			ProPECC PN 1/94	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		site maintenance of machinery and equipment will be collected by a licensed chemical waste collector.	quality impacts arising from improper handling of fuel and oil							WPCO Waste Disposal Ordinance (WDO)	
6.8.1	WQ9	<ul style="list-style-type: none"> <li>Implementation of excavation schedules, lining and covering of excavated stockpiles</li> </ul>	To minimise contaminated stormwater run-off from the SENTX Site	All construction works	SENTX Contractor		✓			ProPECC PN 1/94 WPCO EIAO-TM Annex 6	Implemented
6.13	WQ10	<ul style="list-style-type: none"> <li>Monitoring of surface water quality will be conducted on a regular basis as stated in the EM&amp;A Manual.</li> </ul>	To minimise potential water quality impacts on surface water arising from the construction works	SENTX Site	SENTX Contractor		✓			WPCO Water-TM	Implemented
6.8.2	WQ11	<p><u>Sewage Effluents</u></p> <ul style="list-style-type: none"> <li>Sufficient chemical toilets will be provided for the construction workforce.</li> </ul>	To minimise potential water quality impacts arising from the sewage effluents	SENTX Site	SENTX Contractor		✓			WPCO	Implemented
6.8.2	WQ12	<ul style="list-style-type: none"> <li>Untreated sewage will not be allowed to discharge into the surrounding water body.</li> </ul>	To minimise potential water quality impacts arising from the sewage effluents	SENTX Site	SENTX Contractor		✓			WPCO WDO	Implemented
6.8.2	WQ13	<ul style="list-style-type: none"> <li>A licensed waste collector</li> </ul>	To minimise potential water	SENTX Site	SENTX Contractor		✓			WPCO	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		will be employed to clean the chemical toilets on a regular basis.	quality impacts arising from the sewage effluents							WDO	
<b>Water Quality – Operation/Restoration and Aftercare Phases</b>											
6.9.1	WQ14	<u>Surface Water Management</u> <ul style="list-style-type: none"> <li>Inspections of the drainage system, sand traps, settlement ponds and surface water channels will be performed regularly to identify areas necessary for maintenance, cleaning or repair.</li> </ul>	To minimise potential water quality impacts on surface water arising from the landfill operations.	SENTX Site	SENTX Contractor			✓		WPCO Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Inshore Waters (Water-TM) EIAO-TM Annex 6	Implemented
6.9.1	WQ15	<ul style="list-style-type: none"> <li>Regular maintenance and replacement, if required, of the HDPE liner will be conducted to prevent degradation from affecting the performance of the capping system.</li> </ul>	To minimise potential water quality impacts on surface water arising from the landfill operations.	SENTX Site	SENTX Contractor			✓		WPCO Water-TM EIAO-TM Annex 6	Implemented
6.9.1	WQ16	<ul style="list-style-type: none"> <li>Monitoring of surface water quality will be conducted on a regular</li> </ul>	To minimise potential water quality impacts on surface water	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		basis as stated in the EM&A Manual.	arising from the landfill operations.								
6.9.2 and SENTX latest design	WQ17	<u>Groundwater Management</u> <ul style="list-style-type: none"> <li>The groundwater management facilities including the groundwater monitoring wells will be inspected regularly during routine groundwater monitoring programme.</li> </ul>	To minimise potential water quality impacts on groundwater arising from the landfill operations.	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented
6.9.2	WQ18	<ul style="list-style-type: none"> <li>Monitoring of groundwater water quality will be conducted on a regular basis as stated in the EM&amp;A Manual.</li> </ul>	To minimise potential water quality impacts on groundwater arising from the landfill operations.	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented
SENTX latest design	WQ19	<u>Sewage</u> <ul style="list-style-type: none"> <li>All sewage from the operation staff will be diverted to the LTP for treatment or public sewer, if available.</li> </ul>	To ensure proper handling of sewage	SENTX Site	SENTX Contractor			✓	✓	-	Implemented
6.9.3	WQ20	<u>Leachate Management</u> <ul style="list-style-type: none"> <li>The leachate pump houses and related ancillary</li> </ul>	To minimise potential water quality impacts on surrounding	Leachate pump houses and related	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		equipment will be inspected regularly and repairs, if necessary.	water bodies arising from the landfill operations.	ancillary equipment							
6.9.3	WQ21	<ul style="list-style-type: none"> <li>For equipment such as pumps that require routine scheduled maintenance, the maintenance will be performed following manufacturer's recommended frequency.</li> </ul>	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate pumps	SENTX Contractor			✓	✓	WPCO Water-TM	Implemented
6.9.3	WQ22	<ul style="list-style-type: none"> <li>Preventive maintenance will be implemented so that the possibility for forced shutdown during wet season will be kept to minimal.</li> </ul>	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate treatment plant	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented
6.9.3	WQ23	<ul style="list-style-type: none"> <li>Emergency procedures or a contingency plan will be established when the LTP is malfunctioned.</li> </ul>	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate treatment plant	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
6.9.3 and SENTX latest design	WQ24	<ul style="list-style-type: none"> <li>There will be sufficient redundancy in the system to handle the leachate flow even if one treatment train is down for maintenance. The leachate may be required to temporarily store within the landfill if the leachate storage lagoon are full and leachate cannot be transported to the LTP for treatment.</li> </ul>	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate treatment plant	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented
6.13	WQ25	<ul style="list-style-type: none"> <li>Monitor the quality of effluent discharged from the LTP</li> </ul>	To ensure discharge quality comply with WPCO requirement	Leachate treatment plant discharge point	SENTX Contractor			✓	✓	WPCO Water-TM	Implemented
6.10.1	WQ26	<p><u>Potential Leakage of Leachate</u></p> <ul style="list-style-type: none"> <li>Regular groundwater quality monitoring will be carried out to monitor the performance of the leachate containment system.</li> </ul>	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM	Implemented
6.10.1	WQ27	<ul style="list-style-type: none"> <li>Maintenance and replacement of the capping system should be</li> </ul>	To minimise potential water quality impacts on surrounding	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		carried out, if necessary, to prevent control infiltration and leachate seepage from any damaged cap.	water bodies arising from the leachate leakage.							EIAO-TM Annex 6	
6.10.1	WQ28	<ul style="list-style-type: none"> <li>Maintaining control of the leachate level through extraction</li> </ul>	To minimise potential water quality impacts on surrounding water bodies arising from surface breakout of leachate.	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented
<b>Waste Management – Construction Phase</b>											
7.6.1	WM1	All the necessary waste disposal permits are obtained prior to the commencement of construction work.	To ensure compliance with relevant statutory requirements	Before construction works commence	SENTX Contractor	✓	✓			WDO	Implemented
7.6.1	WM2	<u>Management of Waste Disposal</u> The construction contractor will open a billing account with the EPD. Every construction waste or public fill load to be transferred to the Government waste	To ensure that adverse environmental impacts are prevented	SENTX Site	SENTX Contractor		✓			WDO Waste Disposal (Charges for Disposal of Construction Waste) Regulation; Works Bureau Technical Circular	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		<p>disposal facilities such as public fill reception facilities, sorting facilities, landfills will required a valid "chit" which contains the information of the account holder to facilitate waste transaction recording and billing to the waste producer. A trip-ticket system will also be established to monitor the disposal of construction waste at the SENT Landfill and to control fly-tipping. The trip-ticket system will be included as one of the contractual requirements and implemented by the contractor.</p> <p>A recording system for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established.</p>								<p><i>No.31/2004; and Annex 5 and Annex 6 of Appendix G of ETWBTC No. 19/2005)</i></p>	

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
7.6.1	WM3	<p><u>Measures for the reduction of construction waste generation</u></p> <p>Inert and non-inert construction waste will be segregated and stored in different containers or skips to facilitate reuse or recycling of the inert waste and proper disposal of the non-inert construction waste. Specific areas of the work site will be designated for such segregation and storage if immediate use is not practicable.</p>	To reduce construction waste generation	SENTX Site	SENTX Contractor		✓			WDO EIAO-TM Annex 7	Implemented
7.6.1	WM4	<p><u>Chemical Waste</u></p> <p>The construction contractor will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance with the <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>.</p>	To ensure proper handling of chemical waste	SENTX Site	SENTX Contractor		✓			WDO <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
7.6.1	WM5	<u>Sewage</u> An adequate number of portable toilets will be provided at the site to ensure that sewage from site staff is properly collected. The portable toilets will be desludged and maintained regularly by a specialist contractor.	To ensure proper handling of sewage	SENTX Site	SENTX Contractor		✓			WDO EIAO-TM Annex 7	Implemented
7.6.1 and SENTX latest design	WM6	<u>General Refuse</u> General refuse will be stored in enclosed bins separately from construction and chemical wastes. The general refuse will be delivered to a transfer station or other landfill, separately from construction and chemical wastes, on a daily basis to reduce odour, pest and litter impacts.  Recycling bins will be provided at strategic	To ensure proper handling of general refuse	SENTX Site	SENTX Contractor		✓			WDO EIAO-TM Annex 7	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		locations to facilitate recovery of aluminium can and waste paper from the SENTX Site. Materials recovered will be sold for recycling.									
7.6.1	WM7	<u>Staff Training</u> At the commencement of the construction works, training will be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling.	To ensure that adverse environmental impacts are prevented	SENTX Site	SENTX Contractor		✓				Implemented
7.8	WM8	<u>Environmental Monitoring &amp; Audit Requirements</u> Weekly audits of the waste management practices will be carried out during the construction phase. The audits examine all aspects of waste management including	To ensure that adverse environmental impacts are prevented	SENTX Site	SENTX Contractor		✓		WDO		Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		waste generation, storage, recycling, transport and disposal.									
<b>Waste Management – Operation/Restoration Phase</b>											
7.6.2 and SENTX latest design	WM9	<u>Sludge</u> In case off-site disposal is required, the Contractor will ensure that sludge generated from the LTP will be delivered in closed container to other waste disposal facility e.g. other landfills or a sludge treatment facility, for proper disposal on a daily basis.	To ensure proper handling of sludge	SENTX Site	SENTX Contractor			✓		WDO EIAO-TM Annex 7	Not applicable
7.6.2	WM10	<u>Chemical Waste</u> The construction contractor will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance with the <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i> .	To ensure proper handling of chemical waste	SENTX Site	SENTX Contractor			✓		WDO EIAO-TM Annex 7 <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
7.6.2	WM11	<u>Sewage</u> All sewage from the operation staff will be diverted to the LTP for treatment or public sewer, if available.	To ensure proper handling of sewage	SENTX Site	SENTX Contractor			✓		WDO EIAO-TM Annex 7	Moved to mitigation measure under water quality WQ19. It is a measure for water quality rather than waste management.
7.6.2 and SENTX latest design	WM12	<u>General Refuse</u> General refuse will be stored in enclosed bins and disposed of at other landfills or transfer station on a daily basis to reduce odour, pest and litter impacts.  Recycling bins will be provided at strategic locations to facilitate recovery of aluminium can and waste paper from the SENTX Site. Materials recovered will be sold for recycling.	To ensure proper handling of general refuse	SENTX Site	SENTX Contractor			✓		WDO EIAO-TM Annex 7	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		

**Landfill Gas Hazards – Design and Construction Phase**

8.6.2 and SENTX latest design	LFG1	Precautionary measures to be adopted by the contractors at the Project site and the adjacent development site within the landfill consultation zone are outlined in Paragraphs 8.3 to 8.49 of EPD's <i>Landfill Gas Hazard Assessment Guidance Notes (the Guidance Note)</i> . Those precautionary measures applicable to the SENTX will be confirmed in the detailed Qualitative Landfill Gas Hazard Assessment to be submitted by the contractor.	To protect workers from landfill gas risk	All construction works area	SENTX Contractor		✓			<i>Paragraphs 8.3 to 8.49 of EPD's Landfill Gas Hazards Assessment Guidance Note EIAO-TM Annex 7</i>	Implemented
8.6.2	LFG2	Monitoring will be undertaken when construction works are carried out in confined space within the consultation zone with reference to the monitoring requirements and procedures specified in	To protect workers from landfill gas risk	Confined space within the construction works area	SENTX Contractor		✓				Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		<p>Paragraphs 8.23 to 8.28 of EPD's <i>Guidance Note</i> will be followed.</p> <p>In the event of the trigger levels being exceeded, it is recommended that a person, such as the Safety Officer, is nominated, with deputies, to be responsible for dealing with any emergency which may occur due to landfill gas. In an emergency situation, the nominated person, or his deputies, shall have the necessary authority and shall ensure that the confined space is evacuated and the necessary works implemented for reducing the concentrations of gas. The appropriate organisations shall be contact.</p>									
8.6.3	LFG4	Implementation of engineering measures	To protect workers from landfill gas risk	SENTX Site	SENTX Contractor	✓	✓	✓	✓	<i>EIAO-TM Annex 7</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		according to Contract Specification requirements. These measures will include the placement of liner and installation of landfill gas management system to contain, manage and control landfill gas.									
8.6.3	LFG5	Engineering measures to significant engineering measures will be required in the design of the SENTX to protect the staff working in the infrastructure area. These measures include a combination of passive and active systems (examples are recommended in EPD's <i>Guidance Notes</i> ).  Landfill gas monitoring boreholes will be installed at the edge of the waste slope between the waste and the new infrastructure area to	To protect workers from landfill gas risk	Infrastructure Area	SENTX Contractor	✓	✓		<i>EPD's Landfill Gas Hazards Assessment Guidance Note EIAO-TM Annex 7</i>	Implemented	

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		monitor the migration of landfill gas, if any.									
<b>Landfill Gas Hazards – Operation, Restoration and Aftercare Phases</b>											
8.6.4	LFG7	To train and ensure staff to take appropriate precautions at all times when entering enclosed spaces or plant rooms. Undertake regular monitoring of landfill gas at the perimeter boreholes to detect if there are any signs of off-site landfill gas migration. Prepare and implement emergency plan in case off-site landfill gas migration is detected.  A permanent gas monitoring system with alarm will be installed and operated in all occupied on-site buildings.	To protect workers from landfill gas risk	SENTX Site	SENTX Contractor			✓	✓	Landfill Gas Hazards Assessment Guidance Note	Implemented
8.7 and SENTX latest design	LFG8	<u>Environmental Monitoring &amp; Audit Requirements</u> Undertake regular monitoring of landfill gas within the	To protect workers from landfill gas risk	Within the SENTX and along the SENTX boundary	SENTX Contractor			✓	✓	Landfill Gas Hazards Assessment Guidance Note	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		SENTX and along the SENTX boundary as required by the Contract Specification.									
<b>Ecology – Construction Phase</b>											
9.10.2	EC1	Measures to control construction runoff: <ul style="list-style-type: none"> <li>Exposed soil areas will be minimised to reduce the contamination of runoff and erosion;</li> </ul>	To minimise potential water quality impacts affecting ecological resources	All construction works area	SENTX Contractor		✓			EIAO-TM Annex 16 ProPECC PN 1/94 Water Pollution Control Ordinance (WPCO) EIAO-TM Annex 6	Implemented
		<ul style="list-style-type: none"> <li>To prevent stormwater runoff from washing across exposed soil surfaces, perimeter channels will be constructed in advance of site formation works and earthworks and intercepting channels will be provided for example along the edge of excavation;</li> </ul>								-	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		<ul style="list-style-type: none"> <li>Silt removal facilities, channels and manholes will be maintained and the deposited silt and grit will be removed regularly to ensure they are functioning properly at all times;</li> </ul>								-	Deficiency of mitigation measures but rectified by the Contractor
		<ul style="list-style-type: none"> <li>Temporary covers such as tarpaulin will also be provided to minimise the generation of high suspended solids runoff;</li> </ul>								-	Implemented
		<ul style="list-style-type: none"> <li>The surface runoff contained any oil and grease will pass through the oil interceptors; and,</li> </ul>								-	Implemented
		<ul style="list-style-type: none"> <li>Control measures, including implementation of excavation schedules, lining and covering of excavated stockpiles will be implemented to minimise contaminated stormwater run-off from the SENTX site.</li> </ul>								-	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
9.10.2 and SENTX latest design	EC2	<u>Good Construction Practice:</u> <ul style="list-style-type: none"> <li>Fences along the boundary of the SENTX Site will be erected before the commencement of works to prevent vehicle movements, and encroachment of personnel, onto adjacent areas.</li> <li>The work site boundaries will be regularly checked to ensure that they are not breached and that damage does not occur to surrounding areas.</li> </ul>	To minimise potential ecological impacts arising from the Project	SENTX Site	SENTX Contractor		✓			EIAO-TM Annex 16	Implemented Implemented
<b>Ecology – Operation, Restoration and Aftercare Phases</b>											
9.10.2	EC3	<u>Measures for Controlling Leakage of Landfill Leachate</u> Leachate will be contained within the SENTX Site by the proposed impermeable leachate containment system and collected by the installation of drainage system to prevent potential	To minimise potential water quality impact affecting the ecological resources	SENTX Site	SENTX Contractor			✓	✓	EIAO-TM Annex 16 WPCO Water-TM EIAO-TM Annex 6	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		migration of leachate to habitats in the vicinity.									
9.10.2	EC4	<p><u>Measures for Controlling Migration of Landfill Gas</u></p> <p>Disturbance to habitat in the vicinity and associated wildlife due to migration of landfill gas will be prevented by proper management of the landfill gas generated from the SENTX. Ignition fires will be prohibited to occur within the boundary of the SENTX Site. Surface emission and off-site migration of landfill gas will be regularly monitored.</p>	To minimise potential landfill gas migration affecting ecological resources	SENTX Site	SENTX Contractor			✓	✓	EIAO-TM Annex 16	Implemented
9.10.3 and SENTX latest design	EC5	<p>The following compensation planting is recommended as the mitigation measures for the habitat affected due to the SENTX:</p> <ul style="list-style-type: none"> <li>Provision of 6 ha of mixed woodland planting</li> </ul>	Compensation of habitat loss due to the Project	SENTX Site	SENTX Contractor			✓	✓	EIAO-TM Annex 16	Not applicable

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		<p>to compensate the loss of shrubland; and</p> <ul style="list-style-type: none"> <li>Provision of a mosaic of grassland and shrubland in the remaining areas of the SENTX Site.</li> <li>Compensatory planting and restoration of the SENTX can be implemented progressively according to the filling plan of SENTX.</li> </ul>									
9.10.3	EC6	The mixture of grassland, shrubland and woodland habitats are recommended to diversify the habitats for supporting various wildlife in particular butterflies, birds and herpetofauna and blend into the existing undisturbed ecological environment.	To diversify habitats	SENTX Site	SENTX Contractor			✓	✓	EIAO-TM Annex 16	Not applicable
9.10.3	EC7	Indigenous plant species of shallow root system, softwood in nature and adaptive to sea shore habitat are recommended to be used	To enhance ecological value of the habitats	SENTX Site	SENTX Contractor			✓	✓	EIAO-TM Annex 16	Not applicable

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		<p>in the restoration plan, which can establish well in coastal area with exposure to strong wind and salt spray, with sand soil base. Taking consideration of the relative poor substrate and the difficulties of establishment of some native trees in Hong Kong, it is recommended to include approximately 20% of non-native tree species in the compensatory woodland. The non-native tree species can serve as a nurse species to facilitate the establishment of the native tree species, especially the shading, and it can be replaced by established native tree species progressively. Plant species can also make reference to food plants of butterfly species (in particularly butterfly species of conservation interests</p>									

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		recorded within the CWBCP).									
9.10.3	EC8	It is also recommended that a trial nursery for native plant species be set up to fine tune the planting matrix and management intensity of the recommended indigenous tree species for the restoration of the SENTX. It should be noted that native shrubs and tree species had been used for restoration of the existing SENT Landfill, native plant species that could not successfully be established on the existing SENT Landfill should be reviewed before the preparation of the compensatory planting list. Special care and intensive management of native plant should be implemented in order to ensure proper establishment of the native	To select the most suitable indigenous tree species for the SENTX	SENTX Site	SENTX Contractor	✓		✓	✓	EIAO-TM Annex 16	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		plants.									
9.12.1	EC9	<u>Environmental Monitoring &amp; Audit Requirements</u> The implementation of the ecological mitigation measures should be checked as part of the environmental monitoring and audit procedures during the construction period.	To ensure that adverse ecological impacts are prevented	SENTX	SENTX Contractor		✓	✓	✓	<i>EIAO-TM Annex 16</i>	Implemented
<b>Landscape and Visual – Construction Phase</b>											
10.6.5	LV1	CM1 - The construction area and area allowed for the contractor's office, leachate treatment plant and laboratory areas will be minimised to a practical minimum, to avoid impacts on adjacent landscape.	To minimise the landscape and visual impacts	SENTX Site	SENTX Contractor		✓			<i>EIAO-TM Annex 18 and ETWBC 3/2006</i>	Implemented
10.6.5	LV2	CM2 - Topsoil, where identified, will be stripped and stored for re-use in the construction of the soft	To minimise the landscape and visual impacts	All construction works area	SENTX Contractor		✓			<i>EIAO-TM Annex 18</i>	Not applicable

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		landscape works, where practical. The Contract Specification will include storage and reuse of topsoil as appropriate.									
10.6.5	LV3	CM3 - All existing trees at the edges of the landfill will be carefully protected during construction. Detailed Tree Protection Specification will be provided in the Contract Specification. Under this Specification, the Contractor will be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in Contractor's works areas.	To minimise the landscape and visual impacts	Potential impacted area	SENTX Contractor		✓			<i>EIAO-TM Annex 18 and ETWBC 3/2006</i>	Implemented
10.6.5	LV4	CM4 - Trees unavoidably affected by the works will be transplanted, where	To minimise the landscape and visual impacts	Potential impacted area	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 18 and ETWBC 3/2006</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		necessary and practical. A detailed Tree Transplanting Specification will be provided in the Contract Specification, if applicable. Sufficient time for necessary tree root and crown preparation periods will be allowed in the project programme.									
10.6.5 and SENTX latest design	LV5	CM5 - Within 3 months of taking possession of the SENTX Site, the Contractor will plant advance screen planting of native species at Light Standard size at 1.5m centres along the High Junk Peak Trail so as to screen views of the Works from the trail. Tree planting locations will be agreed with AFCD. Works will be completed within 9 months of taking possession of the SENTX Site.	To minimise the landscape and visual impacts	At High Junk Peak Hiking Trail	SENTX Contractor		✓			<i>EIAO-TM Annex 18</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
10.6.5	LV6	CM6 - The Contractor's office, leachate treatment plant and laboratory will be given an aesthetic treatment in earth tones to reduce their visual impact and albedo and blend them into the surrounding landscape.	To minimise the landscape and visual impacts	Infrastructure area	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 18</i>	Implemented
10.6.5	LV7	CM7 - The Contractor's office, leachate treatment plant and laboratory will be surrounded by a minimum of 5m wide and 0.75m high earth bund on the west and south sides planted with a dense screen of tree and shrub vegetation. Additional tree planting will be provided in unused spaces with thin infrastructure site, along access roads and in and around car parks. This will be supplemented with shrub planting, where appropriate.	To minimise the landscape and visual impacts	Infrastructure area	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 18 and ETWBC 7/2002</i>	Not applicable

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
10.6.5	LV8	CM8 - Planting trials will be carried out in an on-site nursery prior to implementation of the first phase of restoration to establish the best planting matrix and management intensity of the recommended plant materials for the restoration.	To minimise the landscape and visual impacts	SENTX Site	SENTX Contractor		✓			<i>EIAO-TM Annex 18</i>	Implemented
11.4.1 and SENTX latest design	LV9	During the preparation of the detailed landscape design plan, the design submission will be audited against the recommendation proposed in the <i>ER Report</i> by the Registered Landscape Architect from the ET.	To ensure the implementation of mitigation measures proposed in this EIA Report	SENTX Site	SENTX Contractor/ET	✓	✓			<i>EIAO-TM Annex 18</i>	Implemented
<b>Landscape and Visual – Operation/Restoration Phase</b>											
10.6.5 and SENTX latest design	LV10	OM1 - Landfill materials will be covered with general fill material or tarpaulin sheet on a daily basis to reduce visual impact.	To minimise the landscape and visual impacts	Tipping area	SENTX Contractor			✓		<i>EIAO-TM Annex 18</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
10.6.5 and SENTX latest design	LV11	OM2 - Filling and restoration will be phased during the course of operations in a minimum of 4 phases, the restoration of each phase to commence immediately on the completion of filling in that phase.	To minimise the landscape and visual impacts	Tipping area	SENTX Contractor			✓		EIAO-TM Annex 18	Implemented
10.6.5	LV12	OM3 - Catch fences will be erected at the perimeter of the waste boundary, to ensure that all waste stays within the site and is not blown into surrounding areas.	To minimise the landscape and visual impacts	Tipping area	SENTX Contractor			✓		EIAO-TM Annex 18	Implemented
10.6.5	LV13	OM4 - All night-time lighting will be reduced to a practical minimum both in terms of number of units and lux level and will be hooded and directional.	To minimise the landscape and visual impacts	Tipping area	SENTX Contractor			✓		EIAO-TM Annex 18	Implemented
11.4.2 and SENTX latest design	LV14	<ul style="list-style-type: none"> <li>The condition of the restoration plantation will be audited at monthly intervals by a Registered</li> </ul>	To check the restoration plantation	SENTX Site	SENTX Contractor/ET			✓		EIAO-TM Annex 18	Not applicable

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		Landscape Architect from the ET.									



ANNEX C

MONITORING SCHEDULE FOR THIS  
REPORTING PERIOD

**South East New Territories (SENT) Landfill Extension  
EM&A Impact Monitoring Schedule during Operation/ Restoration Phase**

December 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
Dust Monitoring 3	Noise Monitoring 4	5	Leachate Monitoring 6	7	8	Dust Monitoring 9
10	Noise Monitoring 11	Perimeter LFG Monitoring Service voids LFG Monitoring 12	13	Groundwater Monitoring Stack Monitoring 14	Dust Monitoring Surface Water Monitoring Stack Monitoring Odour Monitoring 15	16
17	Noise Monitoring 18	19	20	Dust Monitoring 21	22	23
24	25	26	Dust Monitoring 27	Noise Monitoring 28	29	30
31						



ANNEX D

AIR QUALITY



ANNEX D1

CALIBRATION CERTIFICATES FOR DUST  
MONITORING EQUIPMENT

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM1	Date of Calibration:	24-Oct-23
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	23-Dec-23
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	20.6	Temperature (K)	299

### CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.06918
Model:	TE-5025A	Qstd Intercept	-0.04220
Serial#:	2454		

### CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.6	5.7	11.3	1.645	56	56.00	Slope= 32.550 Intercept= 4.006 Corr. Coeff.= 0.9915
13	4.0	3.9	7.9	1.379	51	51.00	
10	3.1	3.0	6.1	1.214	44	44.00	
7	2.1	2.0	4.1	0.999	36	36.00	
5	1.4	1.3	2.7	0.814	30	30.00	

#### Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

#### For subsequent calculation of sampler flow:

$$1/m(I[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

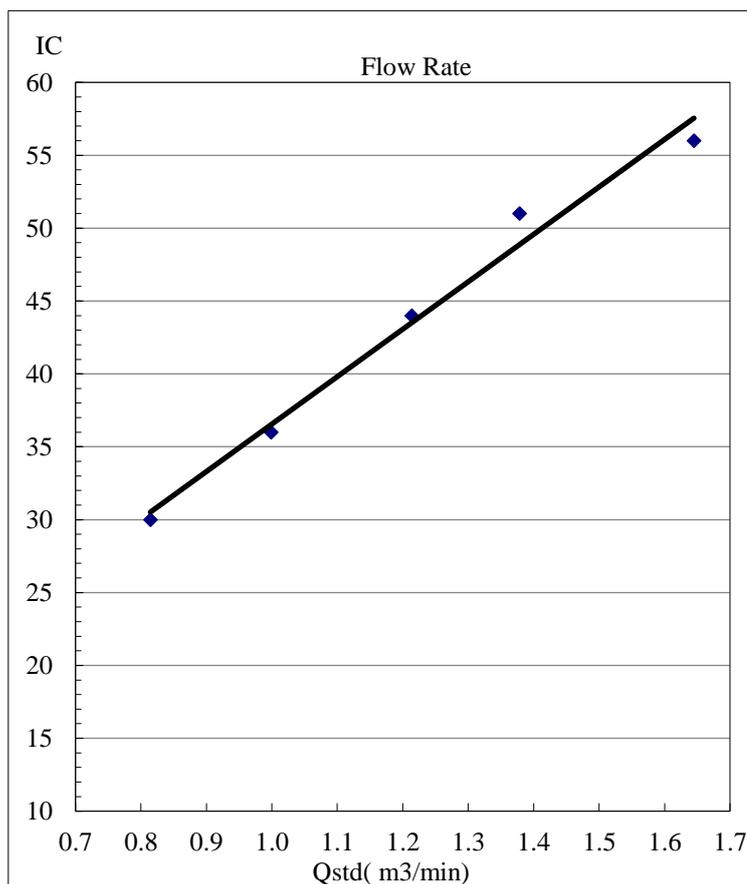
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM2	Date of Calibration:	24-Oct-23
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	23-Dec-23
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	26.0	Temperature (K)	299

### CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.06918
Model:	TE-5025A	Qstd Intercept	-0.04220
Serial#:	2454		

### CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.0	5.9	11.9	1.687	53	53.00	Slope= 25.811 Intercept= 10.384 Corr. Coeff.= 0.9935
13	4.4	4.3	8.7	1.446	48	48.00	
10	3.0	3.0	6.0	1.204	43	43.00	
7	2.0	2.0	4.0	0.987	36	36.00	
5	1.3	1.3	2.6	0.800	30	30.00	

#### Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

#### For subsequent calculation of sampler flow:

$$1/m(I[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

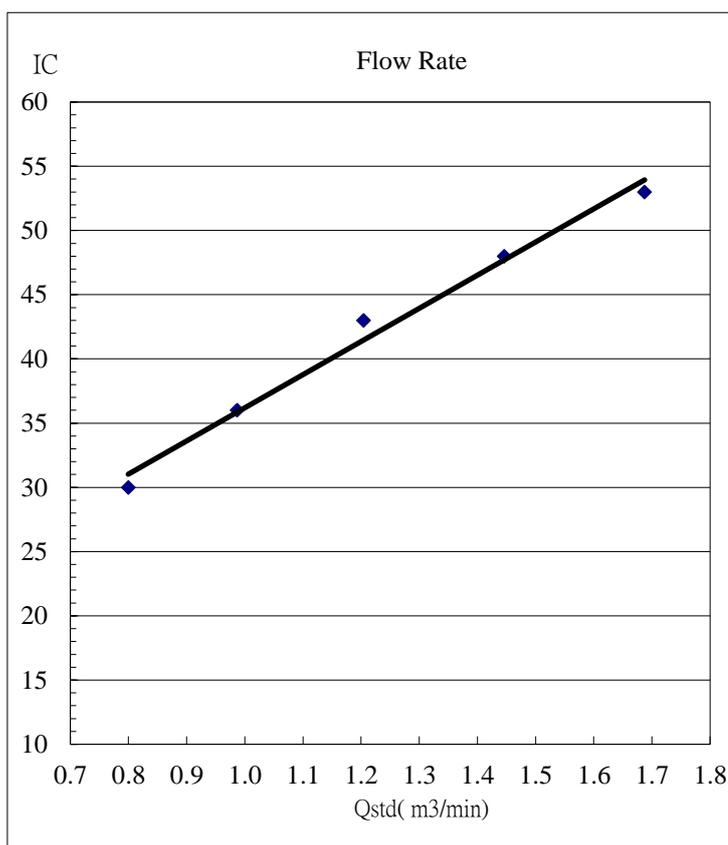
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM3	Date of Calibration:	24-Oct-23
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	23-Dec-23
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	26.0	Temperature (K)	299

### CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.06918
Model:	TE-5025A	Qstd Intercept	-0.04220
Serial#:	2454		

### CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.9	5.8	11.7	1.673	57	57.00	Slope= 27.980 Intercept= 10.675 Corr. Coeff.= 0.9964
13	4.6	4.5	9.1	1.478	52	52.00	
10	3.2	3.2	6.4	1.243	46	46.00	
7	2.1	2.1	4.2	1.011	40	40.00	
5	1.3	1.3	2.6	0.800	32	32.00	

#### Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

#### For subsequent calculation of sampler flow:

$$1/m(I[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

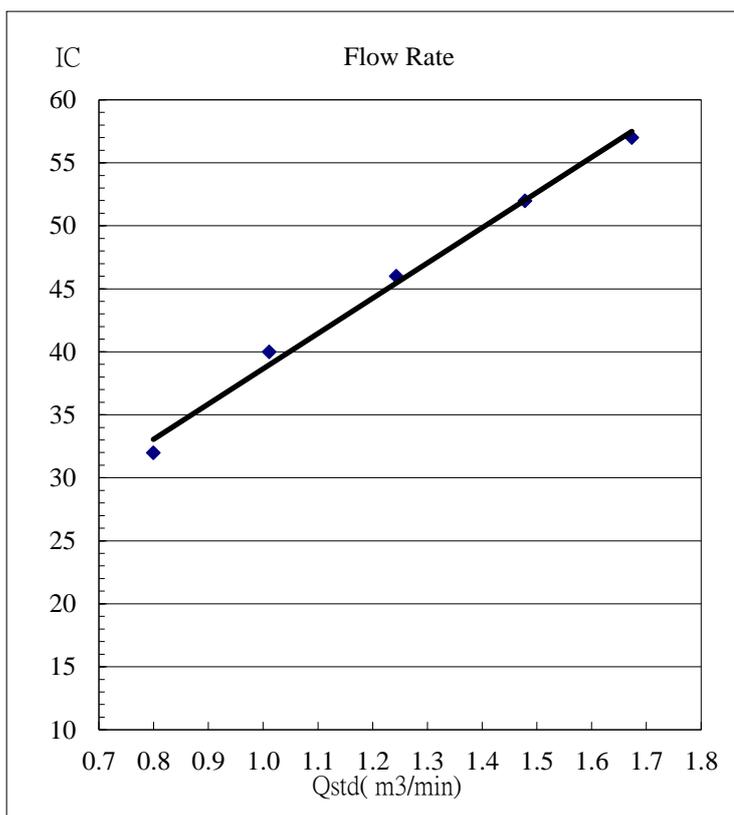
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM4	Date of Calibration:	24-Oct-23
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	23-Dec-23
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	26.0	Temperature (K)	299

### CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.06918
Model:	TE-5025A	Qstd Intercept	-0.04220
Serial#:	2454		

### CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.1	6.2	12.3	1.715	58	58.00	Slope= 31.691 Intercept= 3.979 Corr. Coeff.= 0.9991
13	4.8	4.8	9.6	1.518	52	52.00	
10	3.5	3.5	7.0	1.299	46	46.00	
7	2.4	2.4	4.8	1.079	38	38.00	
5	1.4	1.4	2.8	0.829	30	30.00	

#### Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

#### For subsequent calculation of sampler flow:

$$1/m(I[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

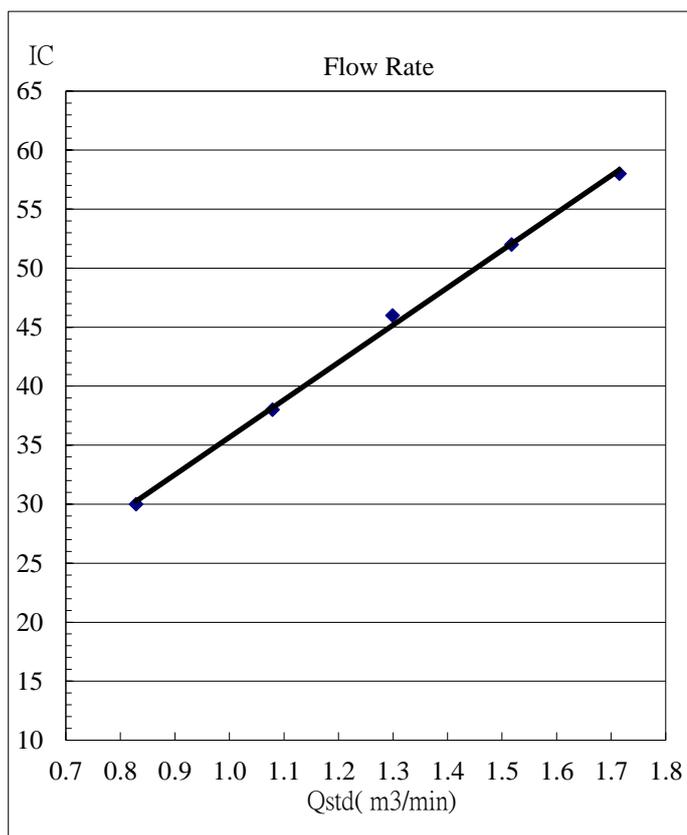
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM1	Date of Calibration:	22-Dec-23
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	21-Feb-24
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1027	Corrected Pressure (mm Hg)	770.3
Temperature (°C)	10.0	Temperature (K)	283

### CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
Model:	TE-5025A	Qstd Intercept	-0.03205
Serial#:	2454		

### CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.3	5.3	10.6	1.636	56	57.87	Slope= 28.984 Intercept= 9.8992 Corr. Coeff.= 0.9959
13	4.3	4.4	8.7	1.484	50	51.67	
10	3.0	2.9	5.9	1.225	45	46.50	
7	2.0	2.1	4.1	1.024	38	39.27	
5	1.2	1.3	2.5	0.803	32	33.07	

#### Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

#### For subsequent calculation of sampler flow:

$$1/m(I[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

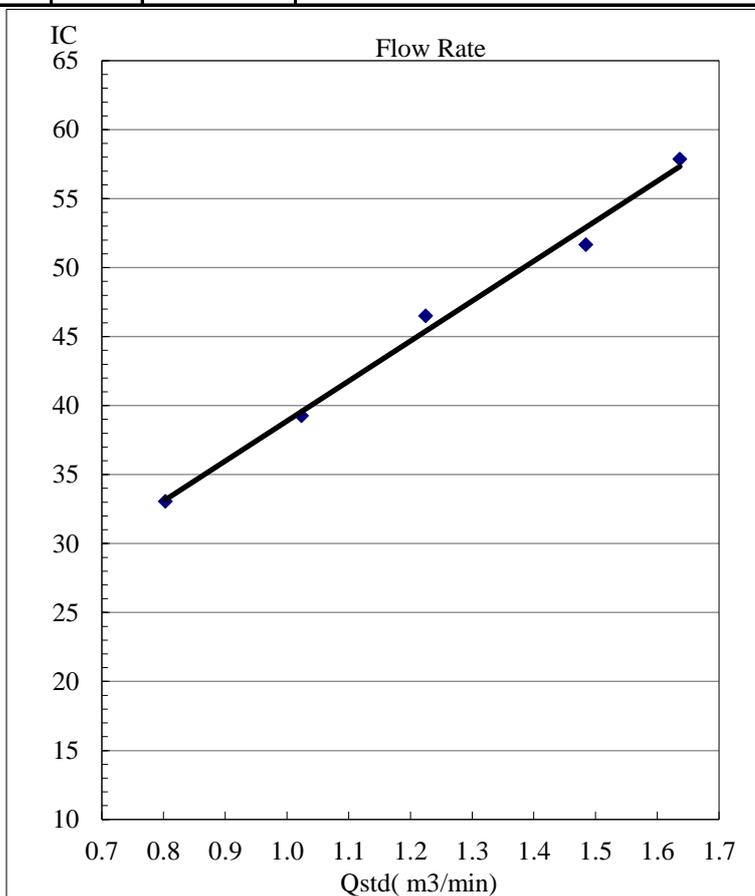
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM2	Date of Calibration:	22-Dec-23
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	21-Feb-24
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1027	Corrected Pressure (mm Hg)	770.3
Temperature (°C)	10.0	Temperature (K)	283

### CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
Model:	TE-5025A	Qstd Intercept	-0.03205
Serial#:	2454		

### CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.1	6.1	12.2	1.755	52	53.73	Slope= 26.430 Intercept= 7.718 Corr. Coeff.= 0.9952
13	4.9	4.9	9.8	1.574	48	49.60	
10	3.6	3.6	7.2	1.351	43	44.43	
7	2.5	2.5	5.0	1.129	35	36.17	
5	1.4	1.5	2.9	0.863	30	31.00	

#### Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

#### For subsequent calculation of sampler flow:

$$1/m(I[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

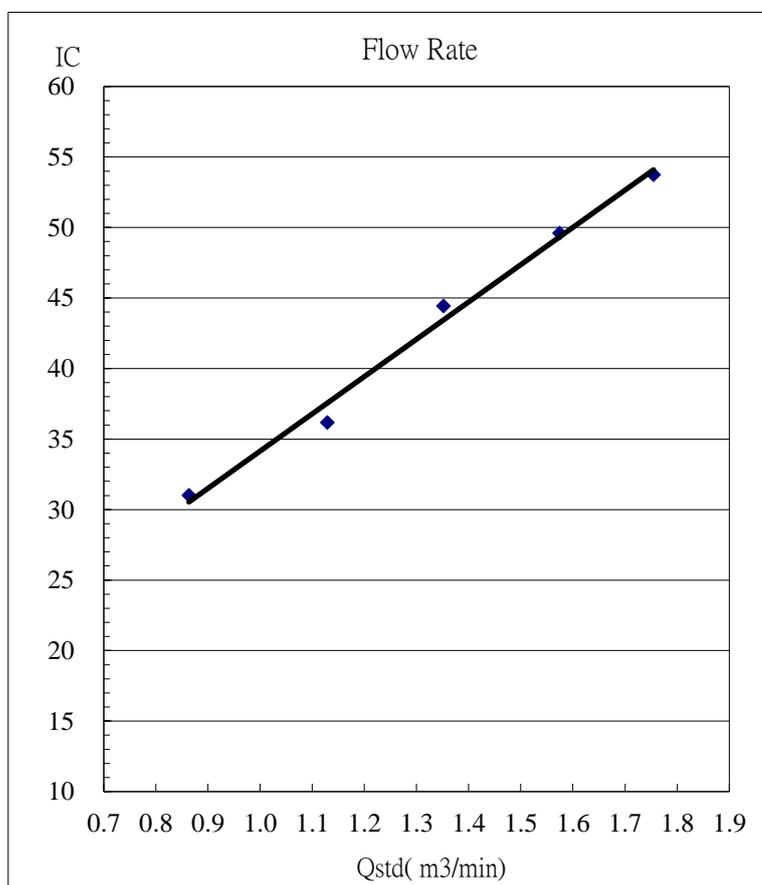
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM3	Date of Calibration:	22-Dec-23
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	21-Feb-24
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1027	Corrected Pressure (mm Hg)	770.3
Temperature (°C)	10.0	Temperature (K)	283

### CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
Model:	TE-5025A	Qstd Intercept	-0.03205
Serial#:	2454		

### CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.9	5.9	11.8	1.726	56	57.87	Slope= 23.822 Intercept= 16.621 Corr. Coeff.= 0.9991
13	4.6	4.7	9.3	1.534	51	52.70	
10	3.3	3.2	6.5	1.285	46	47.53	
7	2.1	2.0	4.1	1.024	40	41.33	
5	1.3	1.4	2.7	0.834	35	36.17	

#### Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

#### For subsequent calculation of sampler flow:

$$1/m(I[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

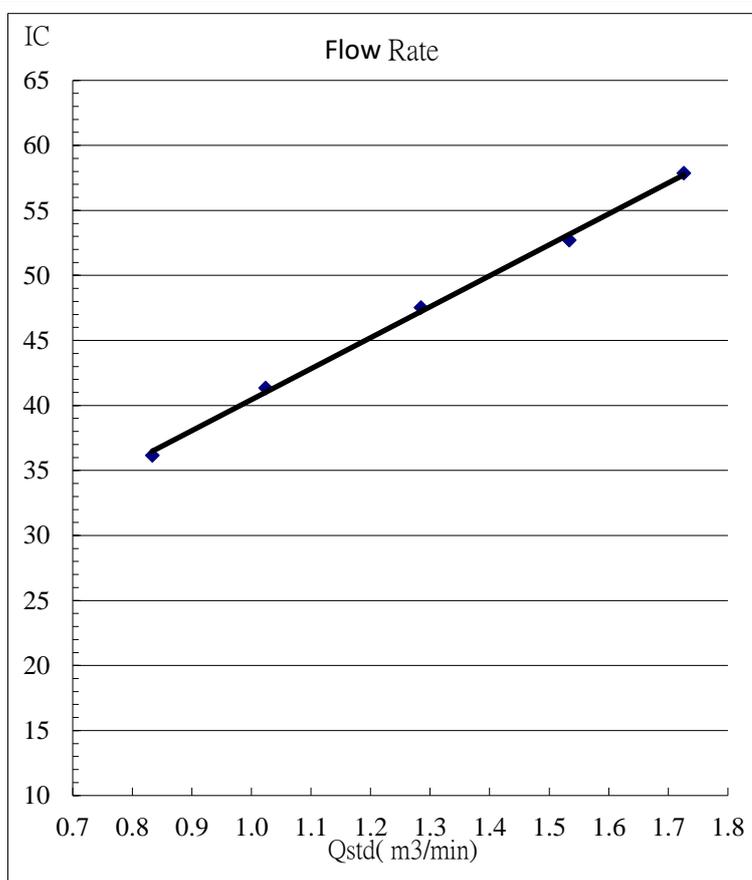
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM4	Date of Calibration:	22-Dec-23
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	21-Feb-24
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1027	Corrected Pressure (mm Hg)	770.3
Temperature (°C)	10.0	Temperature (K)	283

### CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
Model:	TE-5025A	Qstd Intercept	-0.03205
Serial#:	2454		

### CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.4	6.5	12.9	1.804	58	59.93	Slope= 30.977 Intercept= 4.808 Corr. Coeff.= 0.9950
13	4.6	4.5	9.1	1.517	52	53.73	
10	3.7	3.7	7.4	1.370	45	46.50	
7	2.2	2.3	4.5	1.072	36	37.20	
5	1.3	1.4	2.7	0.834	30	31.00	

**Calculations:**

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

**For subsequent calculation of sampler flow:**

$$1/m(I[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

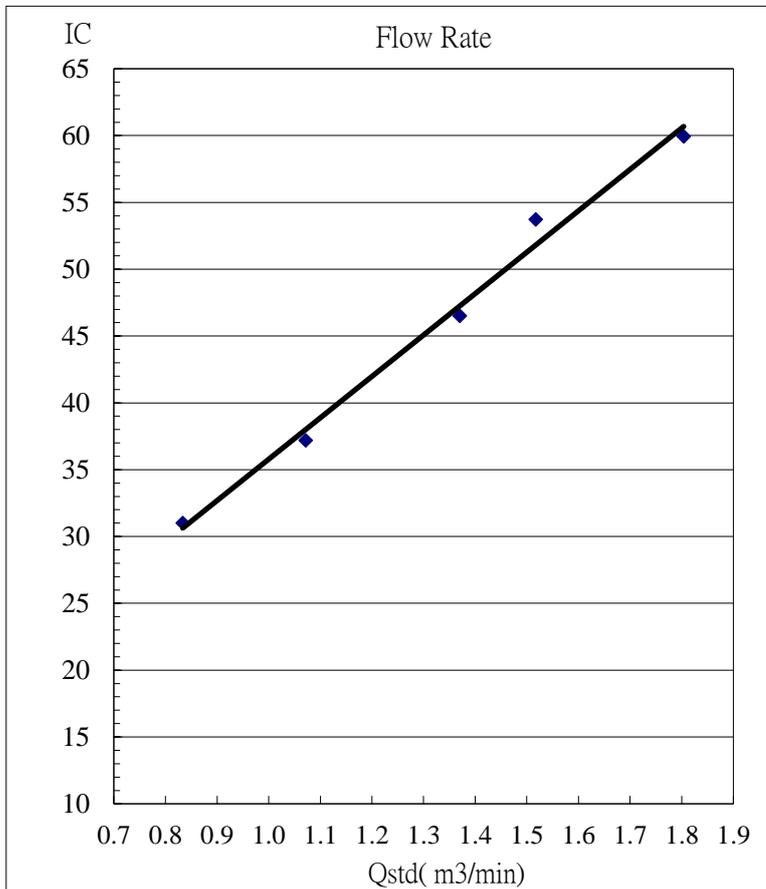
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





ANNEX D2

24-HOUR TSP MONITORING RESULTS

TABLE D2.1 24-HOUR TSP MONITORING RESULTS AT AM1

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )
3 Dec 23	8:00	4 Dec 23	8:00	Fine	102
9 Dec 23	8:00	10 Dec 23	8:00	Sunny	143
15 Dec 23	8:00	16 Dec 23	8:00	Sunny	164
21 Dec 23	8:00	22 Dec 23	8:00	Cloudy	68
27 Dec 23	8:00	28 Dec 23	8:00	Cloudy	186
<b>Average</b>					133
<b>Min</b>					68
<b>Max</b>					186

FIGURE D2.1 GRAPHICAL PRESENTATION FOR 24-HR TSP MONITORING AT AM1

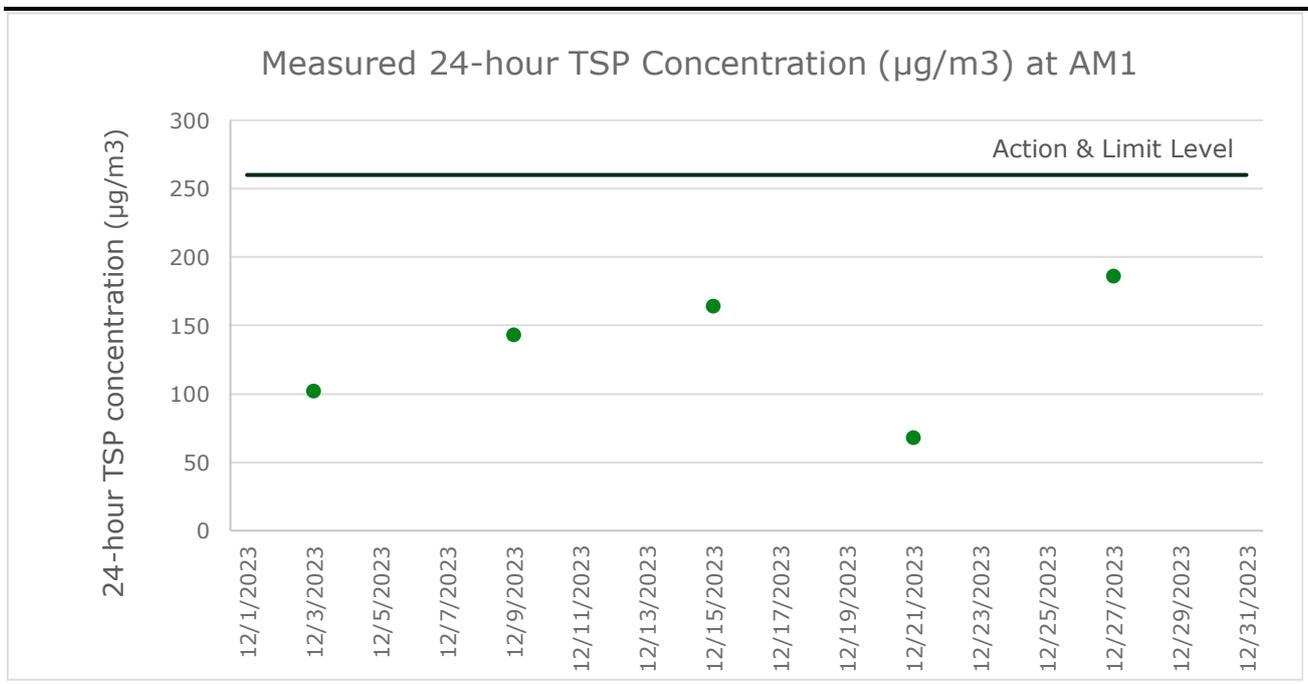


TABLE D2.2 24-HOUR TSP MONITORING RESULTS AT AM2

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )
3 Dec 23	8:00	4 Dec 23	8:00	Fine	126
9 Dec 23	8:00	10 Dec 23	8:00	Sunny	85
15 Dec 23	8:00	16 Dec 23	8:00	Sunny	154
21 Dec 23	8:00	22 Dec 23	8:00	Cloudy	108
27 Dec 23	8:00	28 Dec 23	8:00	Cloudy	137
<b>Average</b>					122
<b>Min</b>					85
<b>Max</b>					154

FIGURE D2.2 GRAPHICAL PRESENTATION FOR 24-HR TSP MONITORING AT AM2

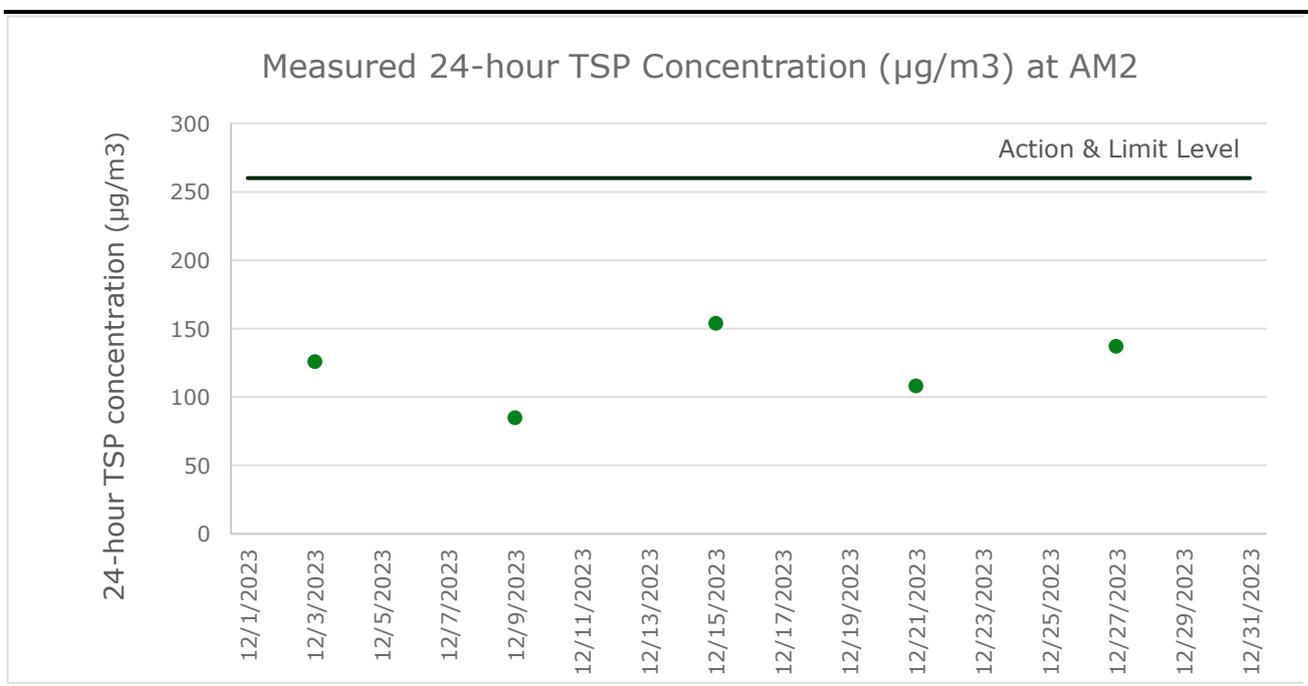


TABLE D2.3 24-HOUR TSP MONITORING RESULTS AT AM3

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )
3 Dec 23	8:00	4 Dec 23	8:00	Fine	138
9 Dec 23	8:00	10 Dec 23	8:00	Sunny	164
15 Dec 23	8:00	16 Dec 23	8:00	Sunny	150
21 Dec 23	8:00	22 Dec 23	8:00	Cloudy	109
27 Dec 23	8:00	28 Dec 23	8:00	Cloudy	178
<b>Average</b>					148
<b>Min</b>					109
<b>Max</b>					178

FIGURE D2.3 GRAPHICAL PRESENTATION FOR 24-HR TSP MONITORING AT AM3

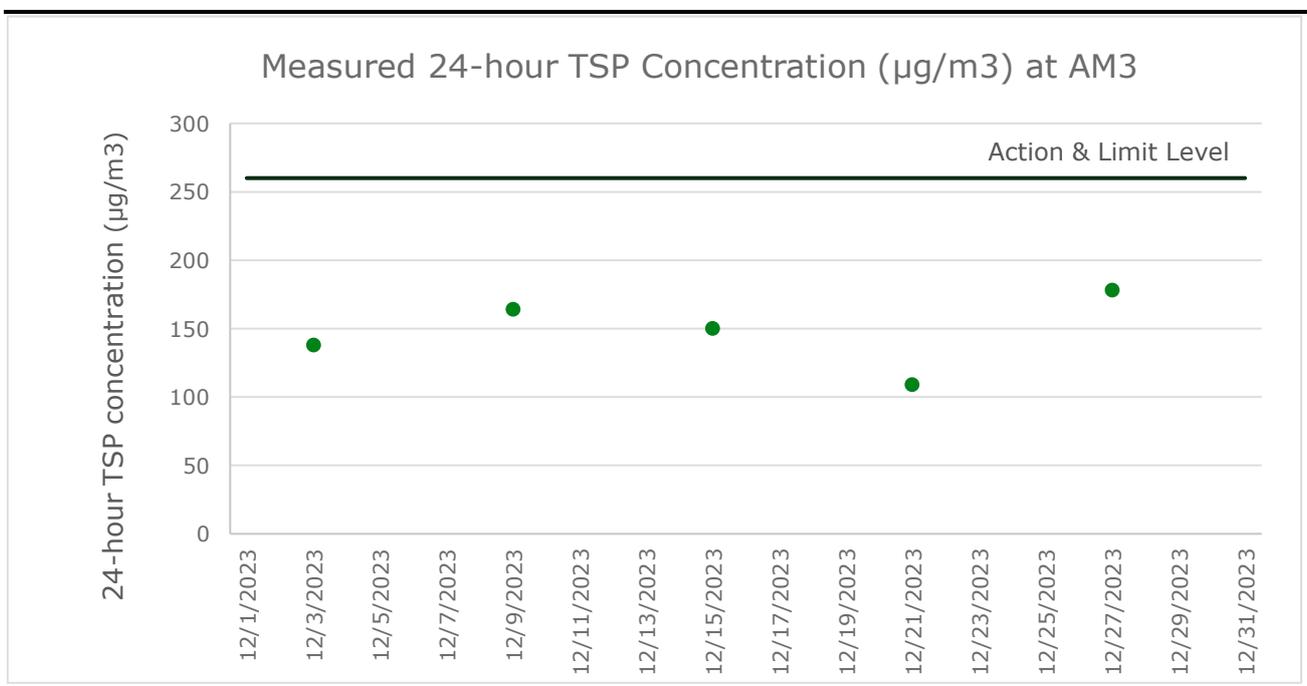
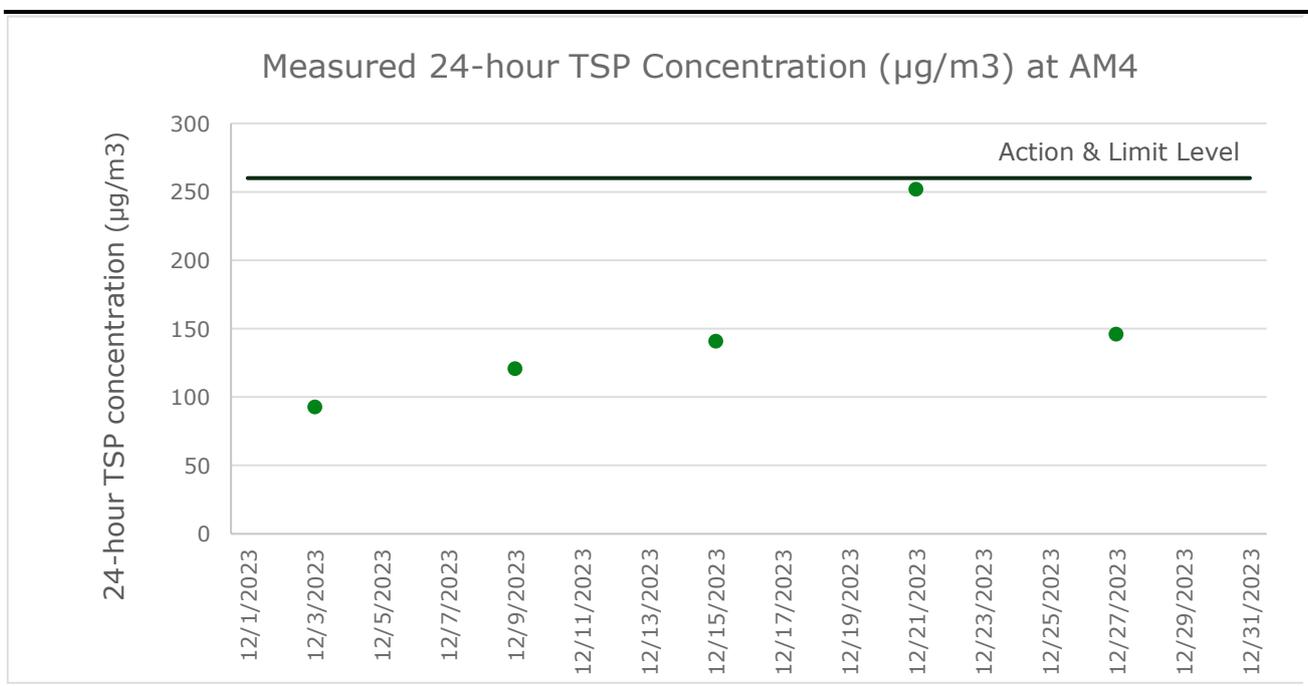


TABLE D2.4 24-HOUR TSP MONITORING RESULTS AT AM4

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )
3 Dec 23	8:00	4 Dec 23	8:00	Fine	93
9 Dec 23	8:00	10 Dec 23	8:00	Sunny	121
15 Dec 23	8:00	16 Dec 23	8:00	Sunny	141
21 Dec 23	8:00	22 Dec 23	8:00	Cloudy	252
27 Dec 23	8:00	28 Dec 23	8:00	Cloudy	146
<b>Average</b>					151
<b>Min</b>					93
<b>Max</b>					252

FIGURE D2.4 GRAPHICAL PRESENTATION FOR 24-HR TSP MONITORING AT AM4





ANNEX D3

EVENT AND ACTION PLAN FOR AIR  
QUALITY MONITORING

## ANNEX D3 EVENT AND ACTION PLAN FOR AIR QUALITY MONITORING DURING OPERATION/ RESTORATION PHASE

Action			
Event	ET	IEC	Contractor
Exceedance of Action/Limit Level for dust monitoring	<ul style="list-style-type: none"> <li>Identify the source(s) and investigate the cause(s) of exceedance</li> <li>Prepare the Notification of Exceedance within 24 hours</li> <li>Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures</li> <li>Ensure remedial measures are properly implemented</li> <li>Assess effectiveness of Contractor's remedial measures and keep the Project Proponent and IEC informed of the results</li> <li>Repeat measurement to confirm finding if exceedance is due to the Project</li> <li>Increase monitoring frequency to daily and continue until the monitoring results reduce to below action level</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Check monitoring data submitted by ET</li> <li>Check Contractor's working methods</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Take immediate action to avoid further exceedance</li> <li>Submit proposals for remedial measures to IEC</li> <li>Implement the agreed proposals</li> <li>Amend proposal if appropriate</li> </ul>
Exceedance of Action Level for odour	<ul style="list-style-type: none"> <li>Identify source(s) and investigate the cause(s) of exceedance or complaint</li> <li>Prepare the odour complaint form or the Notification of Exceedance within 24 hours</li> <li>Inform Contractor, IEC and Project Proponent whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures</li> <li>Ensure remedial measures are properly implemented</li> <li>Increase monitoring frequency to daily</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Check monitoring data submitted by ET</li> <li>Check Contractor's working methods</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Rectify any unacceptable practice</li> <li>Amend working methods as required</li> <li>Implement amended working methods, if necessary</li> </ul>

Action			
Event	ET	IEC	Contractor
	until odour not being detected for three consecutive days		
Exceedance of Limit Level for odour	<ul style="list-style-type: none"> <li>Identify source(s) and investigate the cause(s) of exceedance or complaint</li> <li>Prepare the odour complaint form or the Notification of Exceedance within 24 hours</li> <li>Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures</li> <li>Ensure remedial measures are properly implemented</li> <li>Assess effectiveness of Contractor's remedial measures and keep the Project Proponent and IEC informed of the results</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Check with Contractor on the operating activities and implementation of odour mitigation measures</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Rectify any unacceptable practice</li> <li>Submit proposals for remedial measures to IEC within 3 working days of notification</li> <li>Implement the agreed proposal or amend working methods as required</li> <li>Resubmit proposals if problem still not under control</li> </ul>
Exceedance of Limit Level for ambient VOCs, ammonia and H <sub>2</sub> S at the monitoring locations	<ul style="list-style-type: none"> <li>Identify the source(s) and investigate the cause(s) of exceedance</li> <li>Prepare the Notification of Exceedance within 24 hours</li> <li>Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures</li> <li>Ensure remedial measures are properly implemented</li> <li>Assess effectiveness of Contractor's remedial measures and keep the Project Proponent and IEC informed of the</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Check with Contractor on the operating activities and implementation of landfill gas control measures</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Rectify any unacceptable practice</li> <li>Amend working methods as required</li> <li>Implement amended working methods, if necessary</li> </ul>

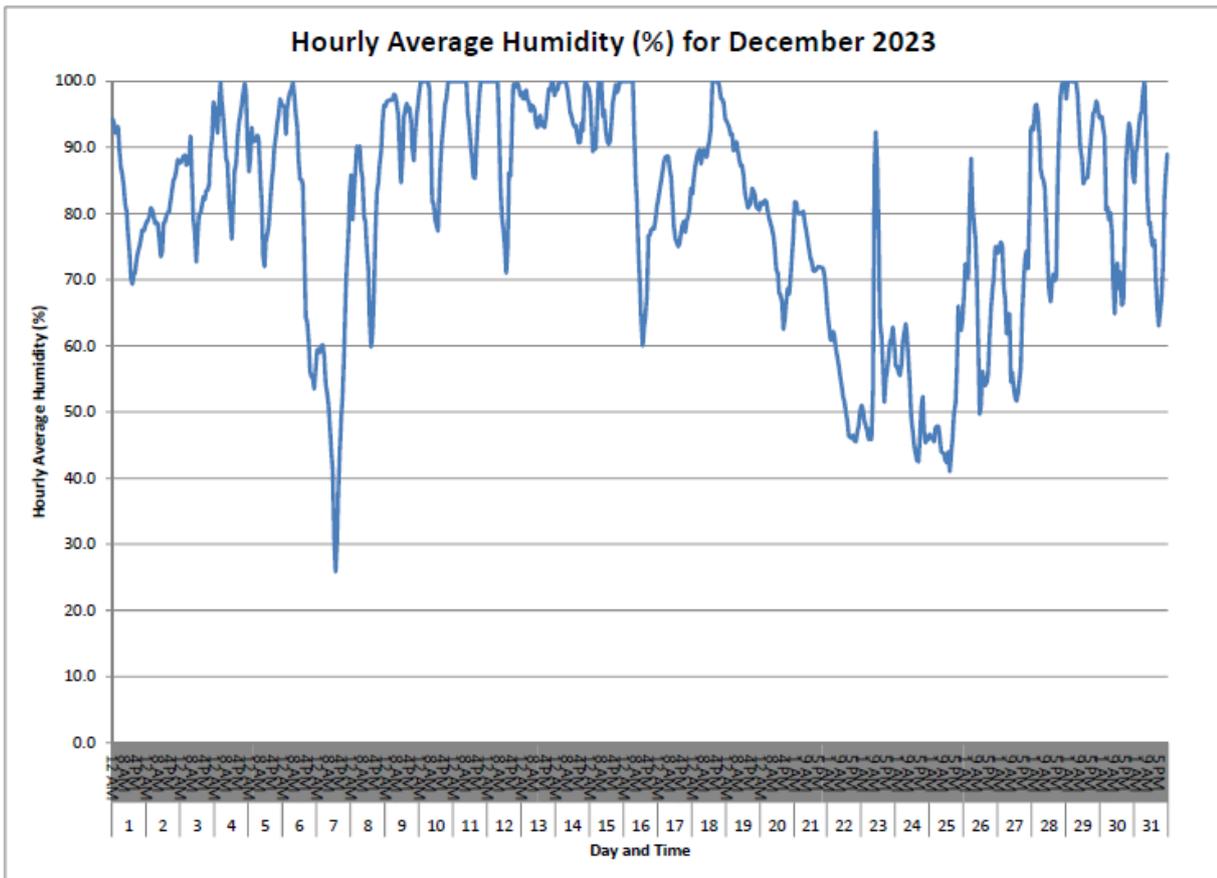
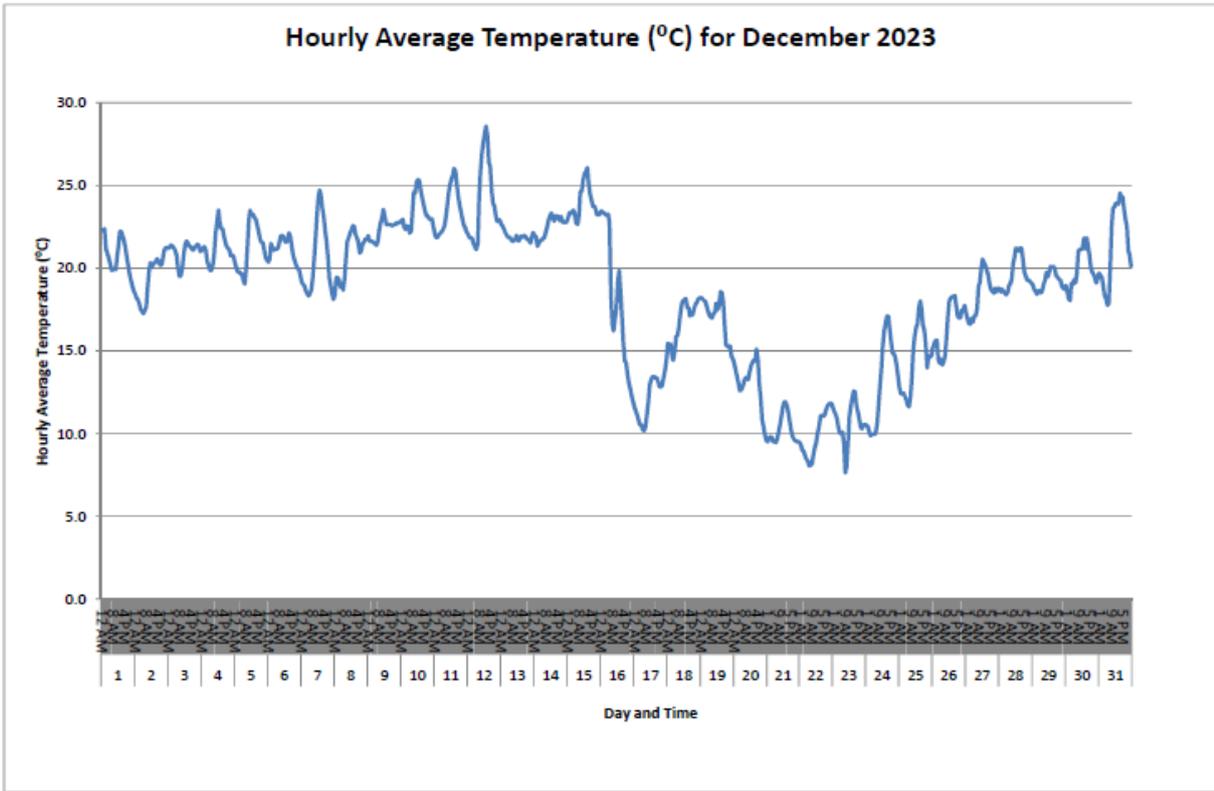
Action			
Event	ET	IEC	Contractor
	<ul style="list-style-type: none"> <li>results</li> <li>Repeat measurement to confirm finding if exceedance is due to the Project</li> <li>Increase monitoring frequency to monthly and continue until the monitoring results reduce to below limit level</li> </ul>		
Exceedance of Limit Level of stack emission of the thermal oxidizer, flares and generator	<ul style="list-style-type: none"> <li>Identify source(s) and investigate the cause(s) of exceedance</li> <li>Prepare the Notification of Exceedance within 24 hours</li> <li>Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures</li> <li>Ensure remedial measures are properly implemented</li> <li>Assess effectiveness of Contractor's remedial measures and keep the Project Proponent and IEC informed of the results</li> <li>Repeat measurement to confirm finding if exceedance is due to the Project</li> <li>Increase monitoring frequency to monthly when there are two consecutive exceedances and continue until the monitoring results reduce to below limit level</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Check with Contractor on the operating performance of the stack</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Rectify any unacceptable performance</li> <li>Amend design as required</li> <li>Implement amended design, if necessary</li> </ul>



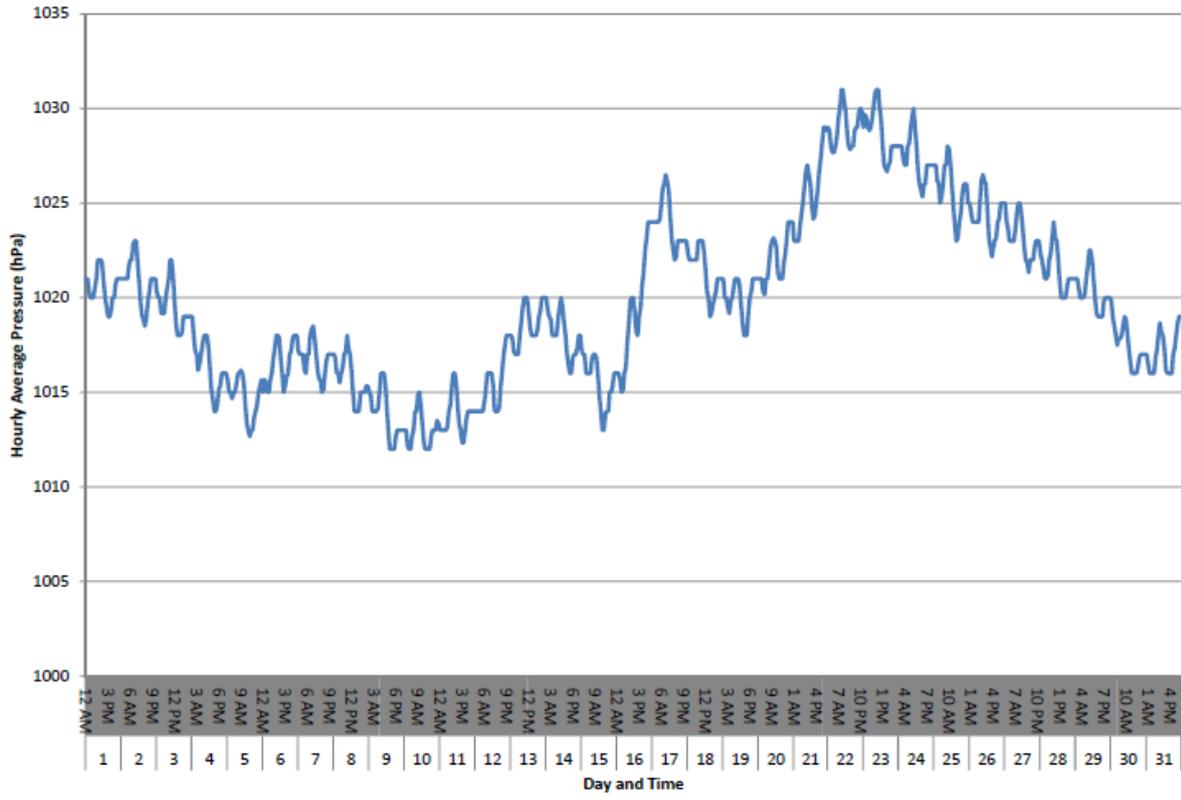
ANNEX D4

METEOROLOGICAL DATA

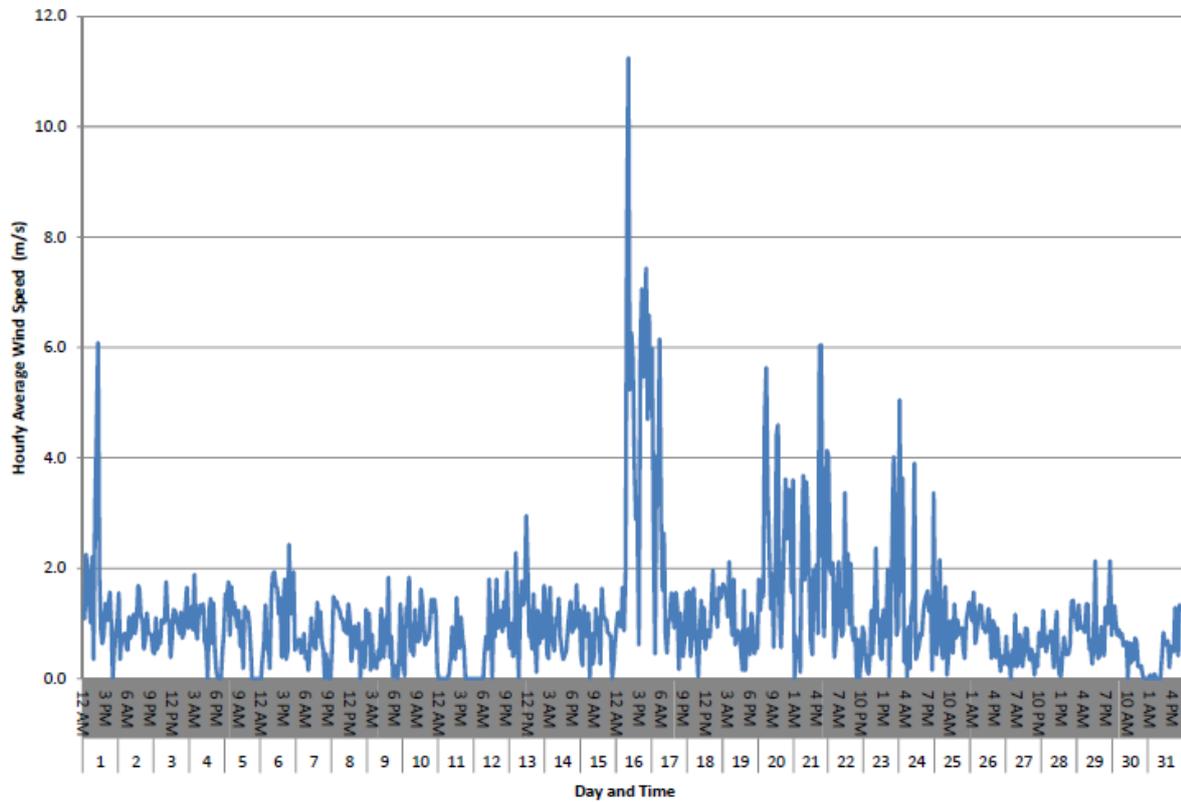
ANNEX D4 METEOROLOGICAL DATA



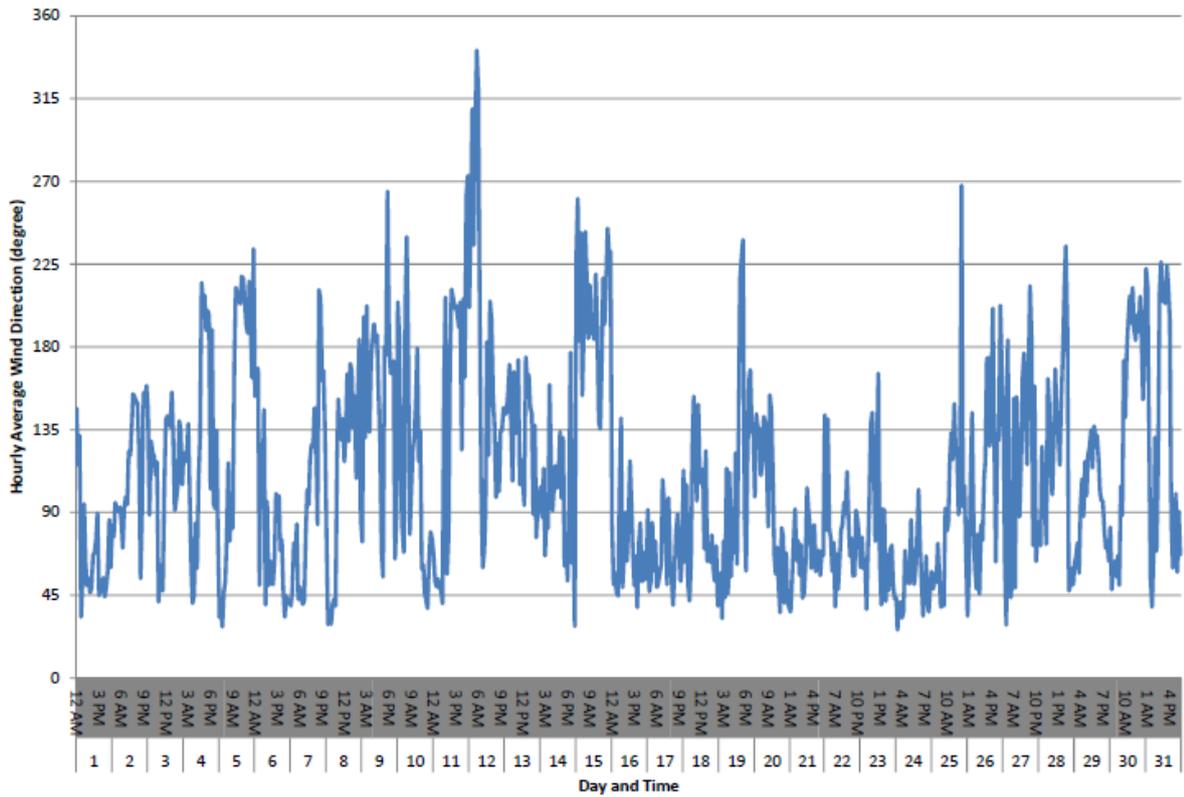
Hourly Average Pressure (hPa) for December 2023



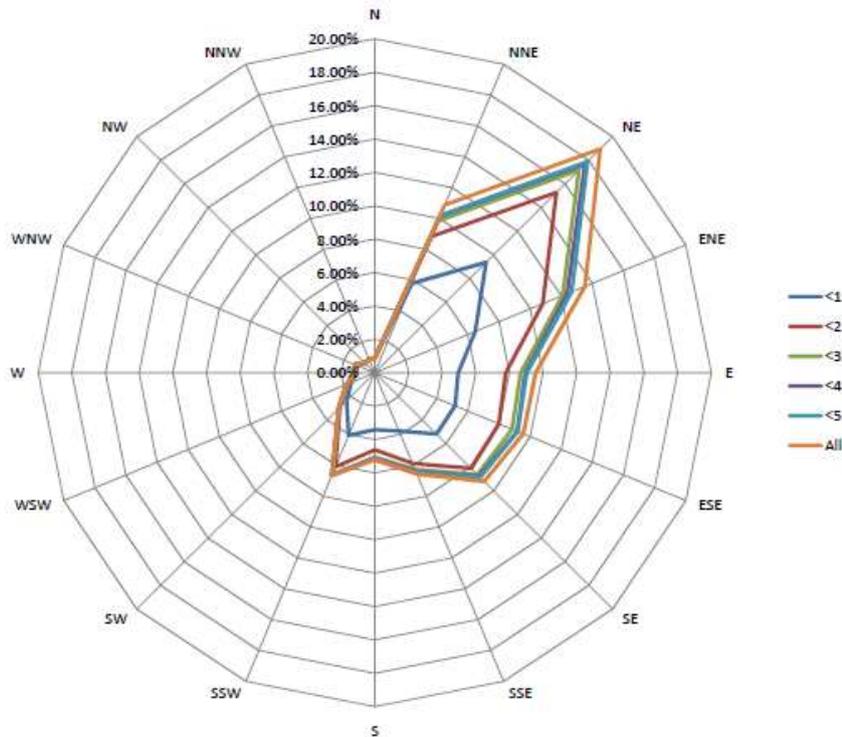
Hourly Average Wind Speed (m/s) for December 2023



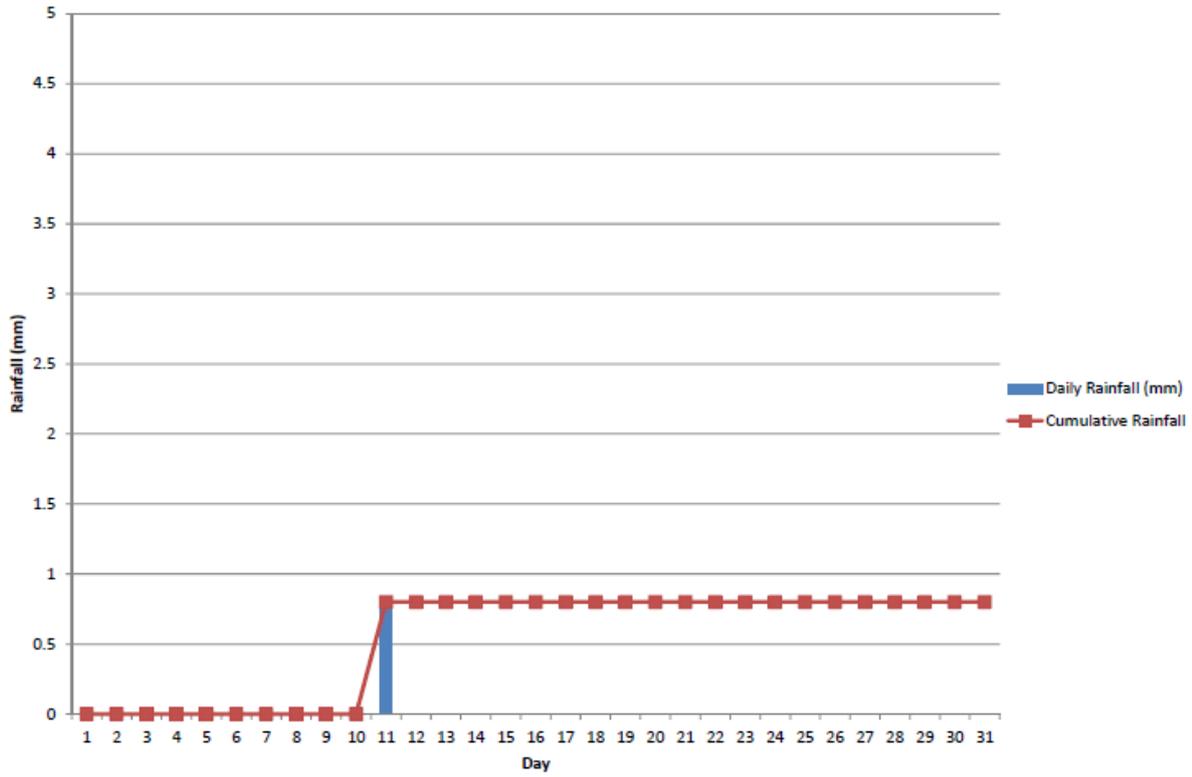
### Hourly Average Wind Direction (degree) for December 2023



### Wind Rose for December 2023



Daily and Cumulative Rainfall (mm) for December 2023





ANNEX D5

CERTIFICATES OF THE QUALIFIED  
ODOUR PANELIST



## Certificate for a Qualified Odour Panellist

This is to certify that

**LAU MEI TUNG**



has participated in twelve (12) sets of individual N-Butanol screening test  
during 14 November 2023 - 21 November 2023

with Individual Threshold : 47 ppb/v  
Standard Deviation : 1.3 ppb/v

and

fulfill the Requirement of the European Standard Method of Air Quality -  
Determination of Odour Concentration by Dynamic Olfactometry (BS EN 13725:2022) -

The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 - 80 ppb/v with at  
least 12 sets of individual threshold estimates and standard deviation less than 2.3

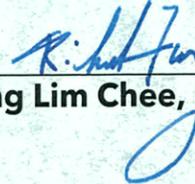
*# Gold Stamp: Successfully fulfilling the Panellist requirement since 2021*

21 November 2023

**Issue Date**

21 November 2024

**Valid Until**

  
**Fung Lim Chee, Richard**



## Certificate for a Qualified Odour Panellist

This is to certify that

**WONG HO YU**

has participated in twelve (12) sets of individual N-Butanol screening test  
during 14 November 2023 - 21 November 2023

with Individual Threshold : 47 ppb/v  
Standard Deviation : 1.4 ppb/v

and

fulfill the Requirement of the European Standard Method of Air Quality -  
Determination of Odour Concentration by Dynamic Olfactometry (BS EN 13725:2022) -

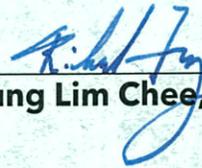
The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 - 80 ppb/v with at  
least 12 sets of individual threshold estimates and standard deviation less than 2.3

21 November 2023

**Issue Date**

21 November 2024

**Valid Until**

  
**Fung Lim Chee, Richard**



## Certificate for a Qualified Odour Panellist

This is to certify that

**LEUNG CHING**

has participated in twelve (12) sets of individual N-Butanol screening test  
during 14 November 2023 - 21 November 2023

with Individual Threshold : 43 ppb/v  
Standard Deviation : 1.3 ppb/v

and

fulfill the Requirement of the European Standard Method of Air Quality -  
Determination of Odour Concentration by Dynamic Olfactometry (BS EN 13725:2022) -

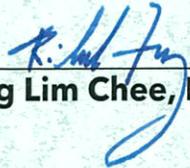
The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 - 80 ppb/v with at  
least 12 sets of individual threshold estimates and standard deviation less than 2.3

21 November 2023

**Issue Date**

21 November 2024

**Valid Until**

  
**Fung Lim Chee, Richard**



## Certificate for a Qualified Odour Panellist

This is to certify that

LAO KA LEONG, BILLY



has participated in twelve (12) sets of individual N-Butanol screening test during 14 November 2023 - 22 November 2023

with Individual Threshold : 31 ppb/v  
Standard Deviation : 1.7 ppb/v

and

fulfill the Requirement of the European Standard Method of Air Quality - Determination of Odour Concentration by Dynamic Olfactometry (BS EN 13725:2022) -

The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 - 80 ppb/v with at least 12 sets of individual threshold estimates and standard deviation less than 2.3

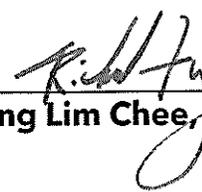
*# Gold Stamp: Successfully fulfilling the Panellist requirement since 2021*

22 November 2023

**Issue Date**

22 November 2024

**Valid Until**

  
**Fung Lim Chee, Richard**



## Certificate for a Qualified Odour Panellist

This is to certify that

Cheung Wai Hung

has participated in twelve (12) sets of individual N-Butanol screening test  
during 01-Dec-2022 to 06-Jun-2023

with Individual Threshold : 48 ppb  
Standard Deviation : 1.44 ppb

and

fulfil the Requirement of the European Standard Method of Air Quality -  
Determination of Odour Concentration by Dynamic Olfactometry (BS EN 13725:2022) -

The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 - 80 ppb/v with at  
least 12 sets of individual threshold estimates and standard deviation less than 2.3

06 June 2023

**Issue Date**

05 June 2024

**Valid Until**

**Fung Lim Chee, Richard**



## Certificate for a Qualified Odour Panellist

This is to certify that

Chen Ci He, Wayne

has participated at least twelve (12) sets of individual N-Butanol screening test  
during 14-Nov-2023 to 21-Nov-2024

with Individual Threshold : 44 ppb  
Standard Deviation : 1.50 ppb

and

fulfil the Requirement of the European Standard Method of Air Quality -  
Determination of Odour Concentration by Dynamic Olfactometry (BS EN 13725:2022) -

The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 - 80 ppb/v with at  
least 12 sets of individual threshold estimates and standard deviation less than 2.3

21 November 2023

**Issue Date**

20 November 2024

**Valid Until**

**Fung Lim Chee, Richard**



ANNEX D6

ODOUR MONITORING RESULTS

TABLE D6.1 ODOUR MONITORING RESULTS

Date	Weather	Location	Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	From Project Site	Odour Intensity	Odour Characteristic	Possible Source	Remarks
15 Dec 23	Sunny	OP1	14:05	30.9	1.1	SW	No	0	N/A	N/A	N/A
15 Dec 23	Sunny	OP2	14:09	27.6	3.4	S	No	0	N/A	N/A	N/A
15 Dec 23	Sunny	OP3	14:11	28.0	1.3	SW	No	0	N/A	N/A	N/A
15 Dec 23	Sunny	OP4	14:13	28.3	3.8	NE	No	0	N/A	N/A	N/A
15 Dec 23	Sunny	OP5	14:15	28.3	1.1	E	No	0	N/A	N/A	N/A
15 Dec 23	Sunny	OP6	14:17	27.8	1.2	SE	No	0	N/A	N/A	N/A
15 Dec 23	Sunny	OP7	14:18	28.2	1.6	SW	No	1	Soil	WSD Trench	N/A
15 Dec 23	Sunny	OP8	14:22	28.6	2.5	S	No	0	N/A	N/A	N/A
15 Dec 23	Sunny	OP9	14:26	28.7	0.6	SE	Yes	0	N/A	N/A	N/A
15 Dec 23	Sunny	OP10	14:28	27.4	1.3	SE	Yes	1	Faeces	Planting area	SENTx
15 Dec 23	Sunny	OP11	14:50	25.7	4.6	E	Yes	1	Soil	Cell 4X Tipping area	SENTx
15 Dec 23	Sunny	OP12	14:47	26.3	2.3	E	No	0	N/A	N/A	N/A
15 Dec 23	Sunny	OP13	14:45	26.0	2.6	NE	No	0	N/A	N/A	N/A
15 Dec 23	Sunny	OP14	14:42	26.1	1.8	NE	No	0	N/A	N/A	N/A
15 Dec 23	Sunny	OP15	14:58	26.1	2.2	SE	Yes	1	Musty	Cell 4X Tipping area	SENTx
15 Dec 23	Sunny	OP16	15:04	26.0	3.3	NE	Yes	1	Musty	Cell 4X Tipping area	SENTx
15 Dec 23	Sunny	OP17	15:07	27.4	0.0	N/A	No	0	N/A	N/A	N/A



ANNEX D7

THERMAL OXIDIZER, LANDFILL GAS  
FLARE AND LANDFILL GAS GENERATOR  
STACK EMISSION MONITORING  
RESULTS

TABLE D7.1 THERMAL OXIDISER STACK EMISSION MONITORING RESULTS

Parameters	Monitoring Results
NO <sub>2</sub>	0.68 gs <sup>-1</sup>
CO	0.03 gs <sup>-1</sup>
SO <sub>2</sub>	<0.005 gs <sup>-1</sup>
Benzene	<2.0 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	<1.0 x 10 <sup>-4</sup> gs <sup>-1</sup>
Exhaust gas velocity	7.7 ms <sup>-1</sup>

TABLE D7.2 THERMAL OXIDISER STACK CONTINUOUS MONITORING RESULTS

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms <sup>-1</sup> ) <sup>(a)</sup>
1 Dec 23	923	1207	7.7
2 Dec 23	927	1210	
3 Dec 23	927	1211	
4 Dec 23	924	1211	
5 Dec 23	925	1212	
6 Dec 23	926	1212	
7 Dec 23	927	1215	
8 Dec 23	925	1214	
9 Dec 23	926	1218	
10 Dec 23	924	1217	
11 Dec 23	928	1221	
12 Dec 23	926	1206	
13 Dec 23	928	1218	
14 Dec 23	926	1215	
15 Dec 23	926	1214	
16 Dec 23	927	1204	
17 Dec 23	925	1204	
18 Dec 23	928	1208	
19 Dec 23	935	1207	
20 Dec 23	924	1215	
21 Dec 23	927	1209	
22 Dec 23	925	1209	
23 Dec 23	923	1212	
24 Dec 23	927	1214	
25 Dec 23	927	1211	
26 Dec 23	925	1211	
27 Dec 23	925	1213	
28 Dec 23	924	1211	
29 Dec 23	927	1213	
30 Dec 23	925	1212	
31 Dec 23	926	1212	
<b>Average</b>	926	1212	-
<b>Min</b>	923	1204	-
<b>Max</b>	935	1221	-

**Notes:**

(a) The exhaust gas velocity was calculated based on the cross-section area of the stack and the gas flow and combustion temperature data measured during the stack emission monitoring.

**TABLE D7.3 LANDFILL GAS FLARE STACK EMISSION MONITORING RESULTS**

<b>Parameters</b>	<b>Monitoring Results</b>
NO <sub>2</sub>	0.03 gs <sup>-1</sup>
CO	0.02 gs <sup>-1</sup>
SO <sub>2</sub>	<0.01 gs <sup>-1</sup>
Benzene	<1.26 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	<1.01 x 10 <sup>-4</sup> gs <sup>-1</sup>
Exhaust gas velocity	9.0 ms <sup>-1</sup>

TABLE D7.4 LANDFILL GAS FLARE STACK CONTINUOUS MONITORING RESULTS

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms <sup>-1</sup> ) (a)	Operation Status
<b>Flare 1 – F601</b>				
1 Dec 23	990	1143	9.0	In Operation
2 Dec 23	880	1123		In Operation
3 Dec 23	990	1143		In Operation
4 Dec 23	960	1153		In Operation
5 Dec 23	990	1143		In Operation
6 Dec 23	990	1233		In Operation
7 Dec 23	860	1103		In Operation
8 Dec 23	990	1123		In Operation
9 Dec 23	860	1113		In Operation
10 Dec 23	980	1153		In Operation
11 Dec 23	980	1123		In Operation
12 Dec 23	990	1253		In Operation
13 Dec 23	890	1083		In Operation
14 Dec 23	940	1113		In Operation
15 Dec 23	990	1123		In Operation
16 Dec 23	990	1253		In Operation
17 Dec 23	850	1083		In Operation
18 Dec 23	860	1093		In Operation
19 Dec 23	850	1053		In Operation
20 Dec 23	850	1063		In Operation
21 Dec 23	890	1093		In Operation
22 Dec 23	910	1093		In Operation
23 Dec 23	920	1133		In Operation
24 Dec 23	950	1143		In Operation
25 Dec 23	850	1083		In Operation
26 Dec 23	890	1093		In Operation
27 Dec 23	830	1033		In Operation
28 Dec 23	980	1143		In Operation
29 Dec 23	840	1043		In Operation
30 Dec 23	830	1053		In Operation
31 Dec 23	890	1053		In Operation
<b>Average</b>	918	1117	-	
<b>Min</b>	830	1033	-	
<b>Max</b>	990	1253	-	

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms <sup>-1</sup> ) (a)	Operation Status
<b>Flare 2 – F602</b>				
1 Dec 23	860	1053	9.0	In Operation
2 Dec 23	830	1043		In Operation
3 Dec 23	860	1043		In Operation
4 Dec 23	840	993		In Operation
5 Dec 23	850	1013		In Operation
6 Dec 23	960	1143		In Operation
7 Dec 23	910	1093		In Operation
8 Dec 23	840	1063		In Operation
9 Dec 23	850	1023		In Operation
10 Dec 23	840	1013		In Operation
11 Dec 23	840	993		In Operation
12 Dec 23	860	1023		In Operation
13 Dec 23	880	1043		In Operation
14 Dec 23	880	1093		In Operation
15 Dec 23	860	1013		In Operation
16 Dec 23	850	993		In Operation
17 Dec 23	-	-		Under Maintenance
18 Dec 23	-	-		Under Maintenance
19 Dec 23	-	-		Under Maintenance
20 Dec 23	-	-		Under Maintenance
21 Dec 23	860	1093		In Operation
22 Dec 23	840	1053		In Operation
23 Dec 23	860	1043		In Operation
24 Dec 23	880	1063		In Operation
25 Dec 23	880	1063		In Operation
26 Dec 23	-	-		Under Maintenance
27 Dec 23	880	1083		In Operation
28 Dec 23	870	1053		In Operation
29 Dec 23	830	1053		In Operation
30 Dec 23	840	1063		In Operation
31 Dec 23	750	923		In Operation
<b>Average</b>	858	1044	-	
<b>Min</b>	750	923	-	
<b>Max</b>	960	1143	-	

**Notes:**

(a) The exhaust gas velocity was calculated based on the cross-section area of the stack and the gas flow and combustion temperature data measured during the stack emission monitoring.

**TABLE D7.5 LANDFILL GAS GENERATOR STACK EMISSION MONITORING RESULTS**

<b>Parameters</b>	<b>Monitoring Results</b>
NO <sub>2</sub>	0.075 gs <sup>-1</sup>
CO	0.994 gs <sup>-1</sup>
SO <sub>2</sub>	<4.00 x 10 <sup>-4</sup> gs <sup>-1</sup>
Benzene	1.86 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	<9.5 x 10 <sup>-6</sup> gs <sup>-1</sup>
Exhaust gas velocity	10.5 ms <sup>-1</sup>

(a) The Landfill Gas Generator was under maintenance in the reporting period

TABLE D7.6 LANDFILL GAS GENERATOR STACK CONTINUOUS MONITORING RESULTS

Date	Exhaust Temperature (K)	Exhaust Gas Velocity (ms <sup>-1</sup> ) <sup>(a)</sup>	Operation Status
<b>ENGA</b>			
1 Dec 23	-	10.5	Under Maintenance
2 Dec 23	-		Under Maintenance
3 Dec 23	-		Under Maintenance
4 Dec 23	873		In Operation
5 Dec 23	873		In Operation
6 Dec 23	873		In Operation
7 Dec 23	869		In Operation
8 Dec 23	873		In Operation
9 Dec 23	876		In Operation
10 Dec 23	879		In Operation
11 Dec 23	880		In Operation
12 Dec 23	882		In Operation
13 Dec 23	880		In Operation
14 Dec 23	882		In Operation
15 Dec 23	884		In Operation
16 Dec 23	883		In Operation
17 Dec 23	875		In Operation
18 Dec 23	880		In Operation
19 Dec 23	877		In Operation
20 Dec 23	873		In Operation
21 Dec 23	872		In Operation
22 Dec 23	869		In Operation
23 Dec 23	871		In Operation
24 Dec 23	871		In Operation
25 Dec 23	871		In Operation
26 Dec 23	872		In Operation
27 Dec 23	875		In Operation
28 Dec 23	876		In Operation
29 Dec 23	884		In Operation
30 Dec 23	882		In Operation
31 Dec 23	884		In Operation
<b>Average</b>	877	-	
<b>Min</b>	869	-	
<b>Max</b>	884	-	

Date	Exhaust Temperature (K)	Exhaust Gas Velocity (ms <sup>-1</sup> ) <sup>(a)</sup>	Operation Status
<b>ENGB</b>			
1 Dec 23	869	10.5	In Operation
2 Dec 23	868		In Operation
3 Dec 23	869		In Operation
4 Dec 23	869		In Operation
5 Dec 23	-		Under Maintenance
6 Dec 23	-		Under Maintenance
7 Dec 23	-		Under Maintenance
8 Dec 23	-		Under Maintenance
9 Dec 23	-		Under Maintenance
10 Dec 23	-		Under Maintenance
11 Dec 23	-		Under Maintenance
12 Dec 23	-		Under Maintenance
13 Dec 23	-		Under Maintenance
14 Dec 23	-		Under Maintenance
15 Dec 23	-		Under Maintenance
16 Dec 23	-		Under Maintenance
17 Dec 23	-		Under Maintenance
18 Dec 23	-		Under Maintenance
19 Dec 23	-		Under Maintenance
20 Dec 23	-		Under Maintenance
21 Dec 23	-		Under Maintenance
22 Dec 23	-		Under Maintenance
23 Dec 23	-		Under Maintenance
24 Dec 23	-		Under Maintenance
25 Dec 23	-		Under Maintenance
26 Dec 23	-		Under Maintenance
27 Dec 23	-		Under Maintenance
28 Dec 23	-		Under Maintenance
29 Dec 23	-		Under Maintenance
30 Dec 23	-		Under Maintenance
31 Dec 23	-		Under Maintenance
<b>Average</b>	869	-	
<b>Min</b>	868	-	
<b>Max</b>	869	-	

**Notes:**

(a) The exhaust gas velocity was calculated based on the cross-section area of the stack and the gas flow and combustion temperature data measured during the stack emission monitoring.



ANNEX E

NOISE



ANNEX E1

CALIBRATION CERTIFICATES FOR NOISE  
MONITORING EQUIPMENT



# Certificate of Calibration 校正證書

Certificate No. : C227323  
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC22-2398) Date of Receipt / 收件日期 : 24 November 2022

Description / 儀器名稱 : Precision Acoustic Calibrator  
Manufacturer / 製造商 : LARSON DAVIS  
Model No. / 型號 : CAL200  
Serial No. / 編號 : 15678  
Supplied By / 委託者 : Envirotech Services Co.  
Room 712, 7/F, My Loft, 9 Hoi Wing Road, Tuen Mun,  
New Territories, Hong Kong

## TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%  
Line Voltage / 電壓 : ---

## TEST SPECIFICATIONS / 測試規範

Calibration check

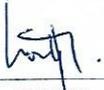
DATE OF TEST / 測試日期 : 18 December 2022

## TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.  
The results do not exceed manufacturer's specification.  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By :   
測試 : \_\_\_\_\_  
H T Wong  
Assistant Engineer

Certified By :   
核證 : \_\_\_\_\_  
K C Lee  
Engineer

Date of Issue : 19 December 2022  
簽發日期

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.  
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。



# Certificate of Calibration

## 校正證書

Certificate No. : C227323  
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C223647
CL281	Multifunction Acoustic Calibrator	AV210017
TST150A	Measuring Amplifier	C221750

- Test procedure : MA100N.
- Results :

### 5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	93.9	± 0.2	± 0.2
114 dB, 1 kHz	113.9		

### 5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000	1 kHz ± 1 %	± 1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

#### Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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# Certificate of Calibration 校正證書

Certificate No. : C235237  
證書編號

ITEM TESTED / 送檢項目 ( Job No. / 序引編號 : IC23-1753 )      Date of Receipt / 收件日期 : 22 August 2023  
Description / 儀器名稱 : Precision Acoustic Calibrator  
Manufacturer / 製造商 : LARSON DAVIS  
Model No. / 型號 : CAL200  
Serial No. / 編號 : 16878  
Supplied By / 委託者 : Envirotech Services Co.  
Room 712, 7/F, My Loft, 9 Hoi Wing Road, Tuen Mun,  
New Territories, Hong Kong

## TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C      Relative Humidity / 相對濕度 : (50 ± 25)%  
Line Voltage / 電壓 : ---

## TEST SPECIFICATIONS / 測試規範

Calibration check

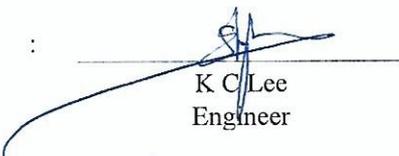
DATE OF TEST / 測試日期 : 9 September 2023

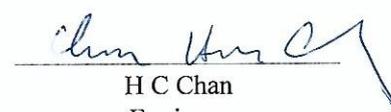
## TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.  
The results do not exceed specified limits.  
These limits refer to manufacturer's published tolerances as requested by the customer.  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Hottinger Brüel & Kjær Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By :   
測試 : K C Lee  
Engineer

Certified By :   
核證 : H C Chan  
Engineer

Date of Issue : 12 September 2023  
簽發日期

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

# Certificate of Calibration

## 校正證書

Certificate No. : C235237  
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C233799
CL281	Multifunction Acoustic Calibrator	CDK2302738
TST150A	Measuring Amplifier	C221750

- Test procedure : MA100N.

- Results :

### 5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Limit (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	93.95	± 0.2	± 0.20
114 dB, 1 kHz	113.95		

### 5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Limit	Uncertainty of Measured Value (Hz)
1	1.000	1 kHz ± 1 %	± 1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

#### Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

# Certificate of Calibration

## 校正證書

Certificate No. : C232965

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC23-0878)

Date of Receipt / 收件日期 : 4 May 2023

Description / 儀器名稱 : Sound Level Meter

Manufacturer / 製造商 : Rion

Model No. / 型號 : NL-52

Serial No. / 編號 : 00643049

Supplied By / 委託者 : Envirotech Services Co.

Room 712, 7/F, My Loft, 9 Hoi Wing Road, Tuen Mun,  
New Territories, Hong Kong

### TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C

Relative Humidity / 相對濕度 : (50 ± 25)%

Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration

DATE OF TEST / 測試日期 : 27 May 2023

### TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

The results do not exceed specified limits. (after adjustment)

These limits refer to manufacturer's published tolerances as requested by the customer.

The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Hottinger Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By

測試



H T Wong  
Assistant Engineer

Certified By

核證

  
K C Lee  
Engineer

Date of Issue

簽發日期

29 May 2023

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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# Certificate of Calibration

## 校正證書

Certificate No. : C232965  
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration using the internal standard (After Adjustment) was performed before the test 6.1.1.2 to 6.3.2.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C230306
CL281	Multifunction Acoustic Calibrator	CDK2302738

- Test procedure : MA101N.

- Results :

### 6.1 Sound Pressure Level

#### 6.1.1 Reference Sound Pressure Level

##### 6.1.1.1 Before Adjustment

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Limit (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	* 95.5	± 1.1

\* Out of IEC 61672 Class 1 Limit

##### 6.1.1.2 After Adjustment

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Limit (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	94.0	± 1.1

### 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.1

IEC 61672 Class 1 Limit : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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# Certificate of Calibration

## 校正證書

Certificate No. : C232965  
證書編號

### 6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Limit (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	94.0	Ref.
			Slow				

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Limit (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L <sub>A</sub>	A	Fast	94.00	63 Hz	67.7	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.5
					250 Hz	85.3	-8.6 ± 1.4
					500 Hz	90.8	-3.2 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.6
					4 kHz	95.0	+1.0 ± 1.6
					8 kHz	92.9	-1.1 (+2.1 ; -3.1)
					16 kHz	86.0	-6.6 (+3.5 ; -17.0)

#### 6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Limit (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L <sub>C</sub>	C	Fast	94.00	63 Hz	93.1	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.5
					250 Hz	94.0	0.0 ± 1.4
					500 Hz	94.0	0.0 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.6
					4 kHz	93.2	-0.8 ± 1.6
					8 kHz	91.0	-3.0 (+2.1 ; -3.1)
					16 kHz	84.1	-8.5 (+3.5 ; -17.0)

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。



# Certificate of Calibration

## 校正證書

Certificate No. : C232965  
證書編號

- Remarks : - UUT Microphone Model No. : UC-59 & S/N : 12128
- Mfr's Limit : IEC 61672 Class 1
- Uncertainties of Applied Value :
- |        |                 |                          |
|--------|-----------------|--------------------------|
| 94 dB  | 63 Hz - 125 Hz  | : ± 0.35 dB              |
|        | 250 Hz - 500 Hz | : ± 0.30 dB              |
|        | 1 kHz           | : ± 0.20 dB              |
|        | 2 kHz - 4 kHz   | : ± 0.35 dB              |
|        | 8 kHz           | : ± 0.45 dB              |
|        | 16 kHz          | : ± 0.70 dB              |
| 104 dB | 1 kHz           | : ± 0.10 dB (Ref. 94 dB) |
| 114 dB | 1 kHz           | : ± 0.10 dB (Ref. 94 dB) |
- The uncertainties are for a confidence probability of not less than 95 %.

Note :  
Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。



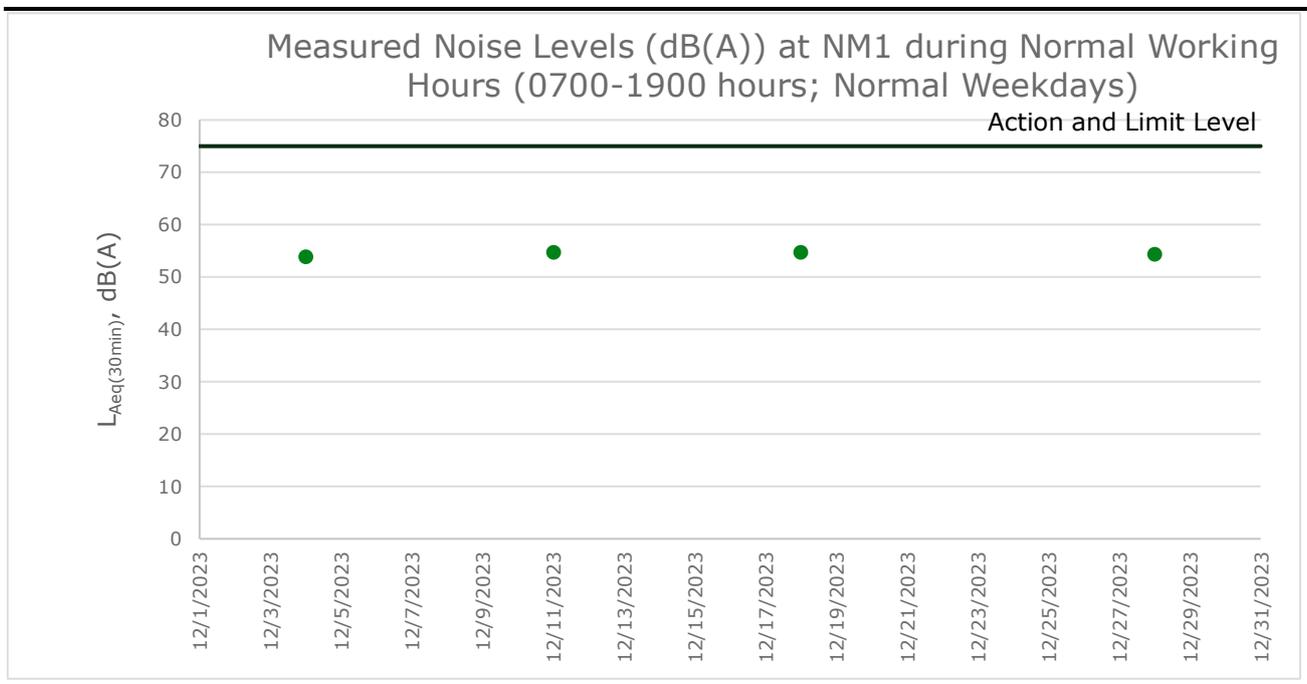
ANNEX E2

NOISE MONITORING RESULTS

TABLE E2.1 MEASURED NOISE LEVELS (DB(A)) AT NM1 DURING NORMAL WORKING HOURS (0700-1900 HOURS; NORMAL WEEKDAYS)

Date	Start Time	Finish Time	Weather	L <sub>10</sub> (30min)	L <sub>90</sub> (30min)	L <sub>eq</sub> (30min)
4 Dec 23	9:49	10:19	Sunny	56.2	50.9	53.9
11 Dec 23	10:50	11:20	Fine	57.2	50.5	54.7
18 Dec 23	10:51	11:21	Cloudy	56.5	52.0	54.7
28 Dec 23	14:21	14:51	Sunny	56.2	51.8	54.4
<b>Average</b>						54.4
<b>Min</b>						53.9
<b>Max</b>						54.7

FIGURE E2.1 GRAPHICAL PRESENTATION FOR NOISE MONITORING AT NM1





ANNEX E3

EVENT AND ACTION PLAN FOR NOISE  
MONITORING

## ANNEX E3 EVENT AND ACTION PLAN FOR OPERATIONAL NOISE MONITORING

Action			
Event	ET	IEC	Contractor
Action Level	<ul style="list-style-type: none"> <li>Identify the source(s) and investigate the cause(s) of exceedance and complaint</li> <li>Prepare Notification of Exceedance within 24 hours</li> <li>Inform Contractor, IEC and Project Proponent whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures required</li> <li>Ensure remedial measures are properly implemented</li> <li>Have additional monitoring if exceedance is due to the Project. If exceedance stops, cease additional monitoring</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Check monitoring data submitted by ET</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Submit proposals for remedial measures to IEC</li> <li>Implement the agreed proposals</li> </ul>

Action			
Event	ET	IEC	Contractor
Limit Level	<ul style="list-style-type: none"> <li>Identify the source(s) and investigate the cause(s) of exceedance and complaint</li> <li>Prepare Notification of Exceedance within 24 hours</li> <li>Inform Contractor, IEC, Project Proponent and EPD whether the cause of exceedance is due to the Project</li> <li>Analyse the operation of SENTX and investigate the causes of exceedance</li> <li>Provide interim report to Contractor, IEC, Project Proponent and EPD the causes of the exceedances</li> <li>Discuss with Contractor and IEC for remedial measures required</li> <li>Ensure remedial measures are properly implemented</li> <li>Report the remedial measures implemented and the additional monitoring results to Contractor, IEC, Project Proponent and EPD</li> <li>Have additional monitoring if exceedance is due to the Project. If exceedance stops, cease additional monitoring</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Check monitoring data submitted by ET</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Take immediate measures to avoid further exceedance</li> <li>Submit proposals for remedial measures to IEC within 3 working days of notification</li> <li>Implement the agreed proposals</li> <li>Resubmit proposals if problem still not under control</li> <li>Stop the relevant activity of works as determined by the Project Proponent until the exceedance is abated</li> </ul>



ANNEX F

WATER QUALITY



ANNEX F1

CALIBRATION CERTIFICATES FOR  
SURFACE WATER QUALITY MONITORING  
EQUIPMENT



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## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**CONTACT:** MR IVAN LEUNG  
**CLIENT:** ALS TECHNICHEM (HK) PTY LTD  
**ADDRESS:** 11/F., CHUNG SHUN KNITTING CENTRE,  
1-3 WING YIP STREET, KWAI CHUNG, N.T.

**WORK ORDER:** HK2343082  
**SUB-BATCH:** 0  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 28-Oct-2023  
**DATE OF ISSUE:** 06-Nov-2023

### GENERAL COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the laboratory or quoted from relevant international standards.

The validity of equipment/ meter performance only applies to the result(s) stated in the report.

This report superseded any previous report(s) with same work order number.

### EQUIPMENT INFORMATION

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client.

Equipment Type: Multifunctional Meter

Service Nature: Performance Check

Scope: Conductivity, Dissolved Oxygen, pH Value, Turbidity, Salinity and Temperature

Brand Name/ Model No.: [HORIBA]/ [U-52G]

Serial No./ Equipment No.: [NVAE08GT]/ [N/A]

Date of Calibration: 06-November-2023

Ms. Lin Wai Yu, Iris  
Assistant Manager - Inorganics

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**WORK ORDER:** HK2343082  
**SUB-BATCH:** 0  
**DATE OF ISSUE:** 06-Nov-2023  
**CLIENT:** ALS TECHNICHEM (HK) PTY LTD

Equipment Type: Multifunctional Meter  
Brand Name/ Model No.: [HORIBA]/ [U-52G]  
Serial No./ Equipment No.: [NVAE08GT]/ [N/A]  
Date of Calibration: 06-November-2023 Date of Next Calibration: 06-February-2024

## PARAMETERS:

### Conductivity

Method Ref: APHA (23rd edition), 2510B

Expected Reading ( $\mu\text{S}/\text{cm}$ )	Displayed Reading ( $\mu\text{S}/\text{cm}$ )	Tolerance (%)
146.9	145	-1.3
6667	6250	-6.3
12890	12500	-3.0
58670	53600	-8.6
	Tolerance Limit (%)	$\pm 10.0$

### Dissolved Oxygen

Method Ref: APHA (23rd edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
1.74	1.65	-0.09
4.68	4.61	-0.07
8.29	8.17	-0.12
	Tolerance Limit (mg/L)	$\pm 0.20$

### pH Value

Method Ref: APHA (23rd edition), 4500H: B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.93	-0.07
7.0	6.95	-0.05
10.0	10.00	+0.00
	Tolerance Limit (pH unit)	$\pm 0.20$

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris  
Assistant Manager - Inorganics

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**WORK ORDER:** HK2343082  
**SUB-BATCH:** 0  
**DATE OF ISSUE:** 06-Nov-2023  
**CLIENT:** ALS TECHNICHEM (HK) PTY LTD

Equipment Type: Multifunctional Meter  
Brand Name/ Model No.: [HORIBA]/ [U-52G]  
Serial No./ Equipment No.: [NVAE08GT]/ [N/A]  
Date of Calibration: 06-November-2023 Date of Next Calibration: 06-February-2024

## PARAMETERS:

### Turbidity

Method Ref: APHA (23rd edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	4.0	+0.0
40	40.4	+1.0
80	79.1	-1.1
400	371	-7.3
800	779	-2.6
	Tolerance Limit (%)	±10.0

### Salinity

Method Ref: APHA (23rd edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.36	-6.4
20	18.80	-6.0
30	27.92	-6.9
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris  
Assistant Manager - Inorganics

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**WORK ORDER:** HK2343082  
**SUB-BATCH:** 0  
**DATE OF ISSUE:** 06-Nov-2023  
**CLIENT:** ALS TECHNICHEM (HK) PTY LTD

Equipment Type: Multifunctional Meter  
Brand Name/ Model No.: [HORIBA]/ [U-52G]  
Serial No./ Equipment No.: [NVAE08GT]/ [N/A]  
Date of Calibration: 06-November-2023 Date of Next Calibration: 06-February-2024

## PARAMETERS:

### Temperature

**Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.**

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
6.5	6.77	+0.3
24.0	24.83	+0.8
47.5	46.27	-1.2
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

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ANNEX F2

SURFACE WATER QUALITY MONITORING  
RESULTS

TABLE F2.1 SURFACE WATER QUALITY MONITORING RESULTS AT DP3

Date	Time	Weather Condition	Water Appearance	Water Condition	Water Temperature (°C)	Ammoniacal-nitrogen (mg/L)	COD	Suspended Solids (SS) (mg/L)	Remarks
15 Dec 2023	09:44	Sunny	Unable to collect water sample due to insufficient flow						
					<b>Average</b>	-	-	-	-
					<b>Min</b>	-	-	-	-
					<b>Max</b>	-	-	-	-

TABLE F2.2 SURFACE WATER QUALITY MONITORING RESULTS AT DP4

Date	Time	Weather Condition	Water Appearance	Water Condition	Water Temperature (°C)	Ammoniacal-nitrogen (mg/L)	COD	Suspended Solids (SS) (mg/L)	Remarks
15 Dec 2023	09:49	Sunny	Unable to collect water sample due to insufficient flow						
					<b>Average</b>	-	-	-	-
					<b>Min</b>	-	-	-	-
					<b>Max</b>	-	-	-	-

TABLE F2.3 SURFACE WATER QUALITY MONITORING RESULTS AT DP6

Date	Time	Weather Condition	Water Appearance	Water Condition	Water Temperature (°C)	Ammoniacal-nitrogen (mg/L)	COD	Suspended Solids (SS) (mg/L)	Remarks
15 Dec 2023	09:53	Sunny	Unable to collect water sample due to insufficient flow						
					<b>Average</b>	-	-	-	-
					<b>Min</b>	-	-	-	-
					<b>Max</b>	-	-	-	-



ANNEX F3

EVENT AND ACTION PLAN FOR WATER  
QUALITY MONITORING

## ANNEX F3 EVENT AND ACTION PLAN FOR WATER QUALITY MONITORING DURING OPERATION/ RESTORATION PHASE

Action			
Event	ET	IEC	Contractor
Exceedance of Limit Level for surface water monitoring	<ul style="list-style-type: none"> <li>Identify source(s) of impact and investigate the cause(s) of exceedance</li> <li>Prepare Notification of Exceedance within 24 hours</li> <li>Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures required</li> <li>Ensure remedial measures are properly implemented</li> <li>Repeat measurement to confirm finding if exceedance is due to the Project</li> <li>Increase monitoring frequency to weekly if exceedance is due to the Project until no exceedance of Limit Level</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Check monitoring data submitted by ET</li> <li>Check Contractor's working methods</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Take immediate action to avoid further exceedance</li> <li>Submit proposals for remedial measures to IEC</li> <li>Implement the agreed proposals</li> <li>Amend proposal if appropriate</li> </ul>
Exceedance of Limit Level for groundwater monitoring	<ul style="list-style-type: none"> <li>Identify source(s) of impact and investigate the cause(s) of exceedance</li> <li>Prepare Notification of Exceedance within 24 hours</li> <li>Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures required</li> <li>Ensure remedial measures are properly implemented</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Check monitoring data submitted by ET</li> <li>Check Contractor's working methods</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Divert groundwater collected at the collection sumps to the leachate treatment plant</li> <li>Submit proposals for remedial measures to IEC</li> <li>Rectify any unacceptable practice or design</li> <li>Amend working methods as required</li> <li>Implement amended working methods, if necessary</li> </ul>

Action			
Event	ET	IEC	Contractor
	<ul style="list-style-type: none"> <li>Repeat measurement to confirm finding if exceedance is due to the Project</li> <li>Increase monitoring frequency to weekly if exceedance is due to the Project until no exceedance of Limit Level</li> </ul>		
Exceedance of Limit Level for leachate level	<ul style="list-style-type: none"> <li>Investigate the cause(s) of exceedance</li> <li>Prepare Notification of Exceedance within 24 hours</li> <li>Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures required</li> <li>Ensure remedial measures are properly implemented</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Check with Contractor on the operating activities and performance of the leachate collection system</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Check the performance of the leachate collection system</li> <li>Rectify any unacceptable practice;</li> <li>Amend leachate collection design if required</li> <li>Implement amended leachate collection system, if necessary</li> </ul>
Exceedance of Limit Level of effluent discharge from LTP	<ul style="list-style-type: none"> <li>Investigate the cause(s) of exceedance</li> <li>Prepare Notification of Exceedance within 24 hours</li> <li>Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures required</li> <li>Ensure remedial measures are properly implemented</li> <li>Repeat measurement to confirm finding if exceedance is due to the Project</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Check with Contractor on the operation performance of the LTP</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Rectify any unacceptable practice;</li> <li>Carry out remedial measures or amend design as required</li> <li>Implement amended design, if necessary</li> </ul>

Action			
Event	ET	IEC	Contractor
	<ul style="list-style-type: none"> <li>Increase monitoring frequency to weekly until no exceedance of Limit Level</li> </ul>		



ANNEX F4

CALIBRATION CERTIFICATES FOR  
EFFLUENT QUALITY MONITORING  
EQUIPMENT



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## **REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION**

**CONTACT:** MR IVAN LEUNG  
**CLIENT:** ALS TECHNICHEM (HK) PTY LTD  
**ADDRESS:** 11/F., CHUNG SHUN KNITTING CENTRE,  
1-3 WING YIP STREET, KWAI CHUNG, N.T.

**WORK ORDER:** HK2336228  
**SUB-BATCH:** 0  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 12-Sep-2023  
**DATE OF ISSUE:** 19-Sep-2023

### SPECIFIC COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client. The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the laboratory or quoted from relevant international standards.

The validity of equipment/ meter performance only applies to the result(s) stated in the report.

Equipment Type: pH meter  
Service Nature: Performance Check  
Scope: pH Value and Temperature  
Brand Name/ Model No.: [LUTRON]/ [PH-208]  
Serial No./ Equipment No.: [AL.59359/TF30605]/ [HK2142]  
Date of Calibration: 15-September-2023

### GENERAL COMMENTS

This report superseded any previous report(s) with same work order number.

Ms. Lin Wai Yu, Iris  
Assistant Manager - Inorganics

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**WORK ORDER:** HK2336228  
**SUB-BATCH:** 0  
**DATE OF ISSUE:** 19-Sep-2023  
**CLIENT:** ALS TECHNICHEM (HK) PTY LTD

Equipment Type: pH meter  
Brand Name/ Model No.: [LUTRON]/ [PH-208]  
Serial No./ Equipment No.: [AL.59359/TF30605]/ [HK2142]  
Date of Calibration: 15-September-2023 Date of Next Calibration: 15-December-2023

## PARAMETERS:

### pH Value

**Method Ref: APHA (23rd edition), 4500H: B**

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.91	-0.09
7.0	7.07	+0.07
10.0	10.00	+0.00
	Tolerance Limit (pH unit)	±0.20

### Temperature

**Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.**

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
7.0	7.3	+0.3
24.0	23.1	-0.9
43.0	42.2	-0.8
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris  
Assistant Manager - Inorganics



ANNEX F5

LEACHATE LEVELS MONITORING  
RESULTS

TABLE F5.1 LEACHATE LEVEL MONITORING RESULTS (PUMP STATION NO.1X (CELL 1X))

Date	Meter No.X1 (cm)	Meter No.X2 (cm)	Average (cm)
<b>Pump Station No. 1X (Cell 1X)</b>			
1 Dec 23	157	Standby	157
2 Dec 23	157	Standby	157
3 Dec 23	157	Standby	157
4 Dec 23	157	Standby	157
5 Dec 23	159	Standby	159
6 Dec 23	155	Standby	155
7 Dec 23	159	Standby	159
8 Dec 23	155	Standby	155
9 Dec 23	99	Standby	99
10 Dec 23	106	Standby	106
11 Dec 23	108	Standby	108
12 Dec 23	108	Standby	108
13 Dec 23	113	Standby	113
14 Dec 23	115	Standby	115
15 Dec 23	115	Standby	115
16 Dec 23	117	Standby	117
17 Dec 23	118	Standby	118
18 Dec 23	119	Standby	119
19 Dec 23	102	Standby	102
20 Dec 23	106	Standby	106
21 Dec 23	108	Standby	108
22 Dec 23	111	Standby	111
23 Dec 23	111	Standby	111
24 Dec 23	113	Standby	113
25 Dec 23	115	Standby	115
26 Dec 23	115	Standby	115
27 Dec 23	117	Standby	117
28 Dec 23	117	Standby	117
29 Dec 23	119	Standby	119
30 Dec 23	119	Standby	119
31 Dec 23	111	Standby	111
<b>Average</b>	124	0	124
<b>Min</b>	99	0	99
<b>Max</b>	159	0	159

TABLE F5.2 LEACHATE LEVEL MONITORING RESULTS (PUMP STATION NO.2X (CELL 2X))

Date	Meter No.X3 (cm)	Meter No.X4 (cm)	Average (cm)
<b>Pump Station No. 2X (Cell 2X)</b>			
1 Dec 23	157	151	154
2 Dec 23	157	151	154
3 Dec 23	157	153	155
4 Dec 23	159	153	156
5 Dec 23	161	155	158
6 Dec 23	161	155	158
7 Dec 23	161	155	158
8 Dec 23	163	157	160
9 Dec 23	126	119	123
10 Dec 23	126	119	123
11 Dec 23	126	119	123
12 Dec 23	126	119	123
13 Dec 23	126	119	123
14 Dec 23	126	119	123
15 Dec 23	126	119	123
16 Dec 23	126	119	123
17 Dec 23	125	119	122
18 Dec 23	124	119	122
19 Dec 23	126	119	123
20 Dec 23	126	119	123
21 Dec 23	124	115	120
22 Dec 23	126	119	123
23 Dec 23	126	119	123
24 Dec 23	126	119	123
25 Dec 23	124	119	122
26 Dec 23	126	119	123
27 Dec 23	124	119	122
28 Dec 23	124	119	122
29 Dec 23	124	119	122
30 Dec 23	126	119	123
31 Dec 23	125	119	122
<b>Average</b>	134	128	131
<b>Min</b>	124	115	120
<b>Max</b>	163	157	160

TABLE F5.3 LEACHATE LEVEL MONITORING RESULTS (PUMP STATION NO.3X (CELL 3X))

Date	Meter No.X5 (cm)	Meter No.X6 (cm)	Average (cm)
<b>Pump Station No. 3X (Cell 3X)</b>			
1 Dec 23	115	115	115
2 Dec 23	119	117	118
3 Dec 23	102	99	101
4 Dec 23	106	106	106
5 Dec 23	111	111	111
6 Dec 23	111	115	113
7 Dec 23	117	117	117
8 Dec 23	119	119	119
9 Dec 23	99	99	99
10 Dec 23	106	106	106
11 Dec 23	111	111	111
12 Dec 23	113	113	113
13 Dec 23	117	115	116
14 Dec 23	119	117	118
15 Dec 23	119	119	119
16 Dec 23	102	102	102
17 Dec 23	107	107	107
18 Dec 23	111	111	111
19 Dec 23	113	113	113
20 Dec 23	115	115	115
21 Dec 23	119	117	118
22 Dec 23	122	119	121
23 Dec 23	102	102	102
24 Dec 23	106	106	106
25 Dec 23	111	111	111
26 Dec 23	113	111	112
27 Dec 23	115	115	115
28 Dec 23	117	117	117
29 Dec 23	119	119	119
30 Dec 23	122	119	121
31 Dec 23	114	112	113
<b>Average</b>	113	112	112
<b>Min</b>	99	99	99
<b>Max</b>	122	119	121

TABLE F5.4 LEACHATE LEVEL MONITORING RESULTS (PUMP STATION NO.4X (CELL 4X))

Date	Meter No.X7 (cm)	Meter No.X8 (cm)	Average (cm)
<b>Pump Station No. 4X (Cell 4X)</b>			
1 Dec 23	109	118	114
2 Dec 23	118	127	123
3 Dec 23	105	114	110
4 Dec 23	114	122	118
5 Dec 23	114	122	118
6 Dec 23	109	83	96
7 Dec 23	118	125	122
8 Dec 23	100	109	105
9 Dec 23	111	120	116
10 Dec 23	118	127	123
11 Dec 23	125	131	128
12 Dec 23	129	105	117
13 Dec 23	114	120	117
14 Dec 23	114	120	117
15 Dec 23	114	120	117
16 Dec 23	109	118	114
17 Dec 23	110	119	115
18 Dec 23	111	120	116
19 Dec 23	114	120	117
20 Dec 23	114	120	117
21 Dec 23	111	120	116
22 Dec 23	111	120	116
23 Dec 23	111	120	116
24 Dec 23	111	120	116
25 Dec 23	111	120	116
26 Dec 23	105	120	113
27 Dec 23	89	116	103
28 Dec 23	74	120	97
29 Dec 23	74	120	97
30 Dec 23	72	120	96
31 Dec 23	72	120	96
<b>Average</b>	107	119	113
<b>Min</b>	72	83	96
<b>Max</b>	129	131	128



ANNEX F6

EFFLUENT QUALITY MONITORING  
RESULTS

**TABLE F6.1 EFFLUENT MONITORING RESULTS**

<b>Date</b>		<b>6 Dec 23</b>
<b>On-site Measurements</b>		
Temperature	°C	23
pH Value	pH Unit	8.2
Volume Discharged	m <sup>3</sup>	698
<b>Laboratory Analysis</b>		
Suspended Solids (SS)	mg/L	55.1
Alkalinity	mg/L	1460
Ammoniacal-nitrogen	mg/L	0.94
Chloride	mg/L	1520
Nitrite-nitrogen	mg/L	0.55
Phosphate	mg/L	1.94
Sulphate	mg/L	279
Total Nitrogen	mg/L	100
Nitrate-nitrogen	mg/L	23.4
Total Inorganic Nitrogen	mg/L	24.89
Biochemical Oxygen Demand (BOD)	mg/L	22
Chemical Oxygen Demand (COD)	mg/L	1070
Oil & Grease	mg/L	<5
Total Organic Carbon (TOC)	mg/L	403
Boron	µg/L	5080
Calcium	mg/L	45.7
Iron	mg/L	1.78
Magnesium	mg/L	54.8
Potassium	mg/L	593
Cadmium	µg/L	<1.0
Chromium	µg/L	197
Copper	µg/L	<10
Nickel	µg/L	65
Zinc	µg/L	69



ANNEX F7

CALIBRATION CERTIFICATES FOR  
GROUNDWATER MONITORING  
EQUIPMENT



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## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**CONTACT:** MR IVAN LEUNG  
**CLIENT:** ALS TECHNICHEM (HK) PTY LTD  
**ADDRESS:** 11/F., CHUNG SHUN KNITTING CENTRE,  
1-3 WING YIP STREET, KWAI CHUNG, N.T.

**WORK ORDER:** HK2343082  
**SUB-BATCH:** 0  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 28-Oct-2023  
**DATE OF ISSUE:** 06-Nov-2023

### GENERAL COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the laboratory or quoted from relevant international standards.

The validity of equipment/ meter performance only applies to the result(s) stated in the report.

This report superseded any previous report(s) with same work order number.

### EQUIPMENT INFORMATION

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client.

Equipment Type: Multifunctional Meter

Service Nature: Performance Check

Scope: Conductivity, Dissolved Oxygen, pH Value, Turbidity, Salinity and Temperature

Brand Name/ Model No.: [HORIBA]/ [U-52G]

Serial No./ Equipment No.: [NVAE08GT]/ [N/A]

Date of Calibration: 06-November-2023

Ms. Lin Wai Yu, Iris  
Assistant Manager - Inorganics

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**WORK ORDER:** HK2343082  
**SUB-BATCH:** 0  
**DATE OF ISSUE:** 06-Nov-2023  
**CLIENT:** ALS TECHNICHEM (HK) PTY LTD

Equipment Type: Multifunctional Meter  
Brand Name/ Model No.: [HORIBA]/ [U-52G]  
Serial No./ Equipment No.: [NVAE08GT]/ [N/A]  
Date of Calibration: 06-November-2023 Date of Next Calibration: 06-February-2024

## PARAMETERS:

### Conductivity

Method Ref: APHA (23rd edition), 2510B

Expected Reading ( $\mu\text{S}/\text{cm}$ )	Displayed Reading ( $\mu\text{S}/\text{cm}$ )	Tolerance (%)
146.9	145	-1.3
6667	6250	-6.3
12890	12500	-3.0
58670	53600	-8.6
	Tolerance Limit (%)	$\pm 10.0$

### Dissolved Oxygen

Method Ref: APHA (23rd edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
1.74	1.65	-0.09
4.68	4.61	-0.07
8.29	8.17	-0.12
	Tolerance Limit (mg/L)	$\pm 0.20$

### pH Value

Method Ref: APHA (23rd edition), 4500H: B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.93	-0.07
7.0	6.95	-0.05
10.0	10.00	+0.00
	Tolerance Limit (pH unit)	$\pm 0.20$

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris  
Assistant Manager - Inorganics

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**WORK ORDER:** HK2343082  
**SUB-BATCH:** 0  
**DATE OF ISSUE:** 06-Nov-2023  
**CLIENT:** ALS TECHNICHEM (HK) PTY LTD

Equipment Type: Multifunctional Meter  
Brand Name/ Model No.: [HORIBA]/ [U-52G]  
Serial No./ Equipment No.: [NVAE08GT]/ [N/A]  
Date of Calibration: 06-November-2023 Date of Next Calibration: 06-February-2024

## PARAMETERS:

### Turbidity

Method Ref: APHA (23rd edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	4.0	+0.0
40	40.4	+1.0
80	79.1	-1.1
400	371	-7.3
800	779	-2.6
	Tolerance Limit (%)	±10.0

### Salinity

Method Ref: APHA (23rd edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.36	-6.4
20	18.80	-6.0
30	27.92	-6.9
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris  
Assistant Manager - Inorganics

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**WORK ORDER:** HK2343082  
**SUB-BATCH:** 0  
**DATE OF ISSUE:** 06-Nov-2023  
**CLIENT:** ALS TECHNICHEM (HK) PTY LTD

Equipment Type: Multifunctional Meter  
Brand Name/ Model No.: [HORIBA]/ [U-52G]  
Serial No./ Equipment No.: [NVAE08GT]/ [N/A]  
Date of Calibration: 06-November-2023 Date of Next Calibration: 06-February-2024

## PARAMETERS:

### Temperature

**Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.**

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
6.5	6.77	+0.3
24.0	24.83	+0.8
47.5	46.27	-1.2
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris  
Assistant Manager - Inorganics



ANNEX F8

GROUNDWATER MONITORING RESULTS

**TABLE F8.1 GROUNDWATER MONITORING RESULTS**

Parameters	Units	MWX-1	MWX-2	MWX-3	MWX-4	MWX-5	MWX-6	MWX-7	MWX-8	MWX-9	MWX-10	MWX-11	MWX-12	MWX-13	MWX-14
Water Level	mPD	3.01	2.95	2.89	2.62	3.36	3.18	2.46	2.78	3.12	3.34	3.15	8.63	36.16	44.99
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	171	260	154	9	<1	<1	4	<1	101	198	170	54	17	13
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<1	<1	<1	42	96	137	66	78	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO <sub>3</sub>	mg/L	171	260	154	50	133	189	71	114	101	198	170	54	17	13
pH Value	pH Unit	8	8	8.1	9.8	11.1	11.3	10.2	10.9	8	8	8.2	7.1	5.9	5.8
Electrical Conductivity	µS/cm	1070	1000	1140	786	1110	1190	2040	3330	2010	722	430	303	91	99
Ammonia	mg/L	0.04	0.02	1.54	2.9	2.17	4.36	5.8	13	1.39	0.02	0.03	<0.01	0.02	<0.01
Chloride	mg/L	185	40	218	156	187	189	552	819	448	73	26	20	15	20
Nitrite	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphorus	mg/L	0.01	0.02	0.01	0.01	<0.01	0.01	0.02	<0.01	0.02	0.02	0.01	0.04	0.01	<0.01
Sulphate	mg/L	69	227	98	87	108	88	74	105	222	48	18	61	3	2
Sulphide	mg/L	<0.1	<0.1	0.1	2.7	7.1	10.1	4.1	12.4	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen	mg/L	0.1	<1.0	1.8	3	2.2	5.1	6	13.2	1.8	0.1	0.1	<0.1	<0.1	<0.1
Nitrate	mg/L	<0.01	5.38	<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.1	0.12
Total Nitrogen	mg/L	0.1	5.4	1.8	3	2.2	5.1	6	13.2	1.8	0.1	0.1	<0.1	0.2	0.2
Boron	µg/L	180	230	230	230	210	210	520	430	340	130	70	20	10	10
Calcium	mg/L	60.3	73.5	78.8	19.9	29.7	27.6	26.4	107	119	69.8	57.6	24	0.89	0.92
Mercury	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium	mg/L	8.85	51.9	5.48	0.29	<0.05	<0.05	0.36	<0.05	5.11	5.83	3.1	4.09	0.99	0.97
Sodium	mg/L	116	51.9	119	107	147	154	323	486	252	58.9	24.1	22.6	12.4	13.6

Parameters	Units	MWX-1	MWX-2	MWX-3	MWX-4	MWX-5	MWX-6	MWX-7	MWX-8	MWX-9	MWX-10	MWX-11	MWX-12	MWX-13	MWX-14
Iron	mg/L	<0.04	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.41	<0.04	<0.04
Potassium	mg/L	21.2	14.4	27.6	23	53.4	54	58.4	83.6	35.9	9.74	6.31	2.6	3.46	3.41
Cadmium	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	1
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	444	139	919	2	<1	<1	<1	<1	278	580	460	691	14	7
Nickel	µg/L	<1	<1	<1	<1	1	2	<1	1	<1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	267	<10	<10	61	<10	<10	<10	<10	12	<10	20	26	15
Biochemical Oxygen Demand	mg/L	<2	<2	<2	<2	4	10	<2	9	2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	3	<2	19	19	28	54	18	40	24	6	<2	<2	<2	<2
Total Organic Carbon	mg/L	1	<1	8	6	6	10	4	11	11	<1	<1	<1	<1	<1



ANNEX F9

INVESTIGATION REPORTS OF  
ENVIRONMENTAL QUALITY LIMIT  
EXCEEDANCE

## Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	14 December 2023
Time	11:21
Monitoring Location	MWX-6
Parameter	Chemical Oxygen Demand (COD)
Limit Level	>46 mg /L
Measured Level	54 mg /L
Possible reason	<p>Groundwater contaminated with leachate is commonly characterized by high COD and ammoniacal-nitrogen levels as a result of degradation of organic matters in the waste. The ammoniacal-nitrogen monitoring result at groundwater monitoring wells MWX-6 (4.36 mg/L) and the COD monitoring results of the groundwater monitoring wells adjacent to MWX-6 (MWX-5: 28 mg/L and MWX-7: 18 mg/L) are well within the respective limit levels. Hence, there is a low possibility of the elevation of COD level at MWX-6 is due to leachate contamination from SENTX operation or at least it is not conclusive to base on these results to demonstrate exceedance was due to leachate contamination.</p> <p>In accordance with Table 4.5b of the updated EM&amp;A Manual, repeat measurement was conducted on 8 January 2024 to confirm findings. COD concentration of 49 mg/L was measured at MWX-6 during the sampling event. MWX-6 showed consecutive exceedance of groundwater quality limit.</p> <p>According to the findings of the desktop review commissioned by GVL and EPD (the Employer) in May 2021 to investigate the potential sources of the elevated methane levels at the perimeter landfill gas monitoring wells at SENTX, pockets of organic matters are identified in the fill materials of the SENTX site upon review of the historical site investigation borehole logs at the Project Site area. It is possible that the elevated COD concentration measured at MWX-6 on 14 December 2023 could be due to localised organic matters within or around the monitoring well and background fluctuation.</p> <p>Due to the presence of influencing factor from non-project source, there is no adequate evidence showing that the COD level exceedance measured at MWX-6 on 14 December 2023 was deemed to Project-related activities.</p> <p>It should also be noted that although the COD level exceeded the limit level of the EM&amp;A programme, it is still well within the WPCO effluent discharge limit of COD (80 mg/L) and the standard for effluents discharged into the inshore waters of the Junk Bay</p>

	Water Control Zone as stipulated under Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (80 mg/L). The slight exceedance of COD at MWX-6 on 14 December 2023 will not cause adverse water quality impact to the Junk Bay Water Control Zone.
Action Taken / Action to be Taken	<p>Examination of environmental performance of the Project will be continued during the weekly inspections. The Contractor is reminded to implement relevant and appropriate mitigation measures according to the updated EM&amp;A Manual to avoid any exceedance of the Action and Limit Levels.</p> <p>ET will continue to closely monitor the groundwater quality monitoring results and collect additional data for investigation and further review, if necessary.</p>
Remarks	-

Prepared by: Abbey Lau  
Designation: Environmental Team  
Date: 29 January 2024



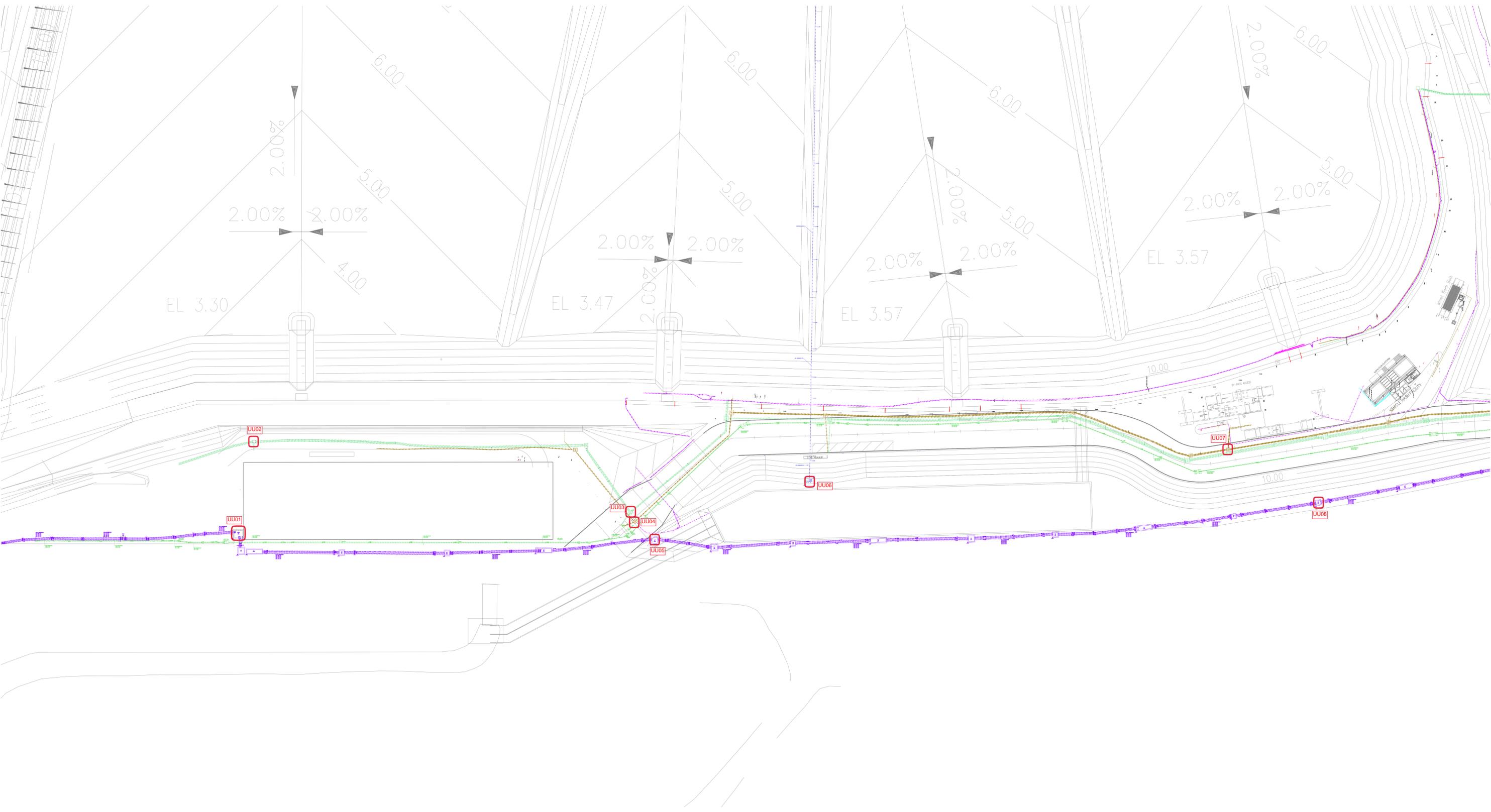
ANNEX G

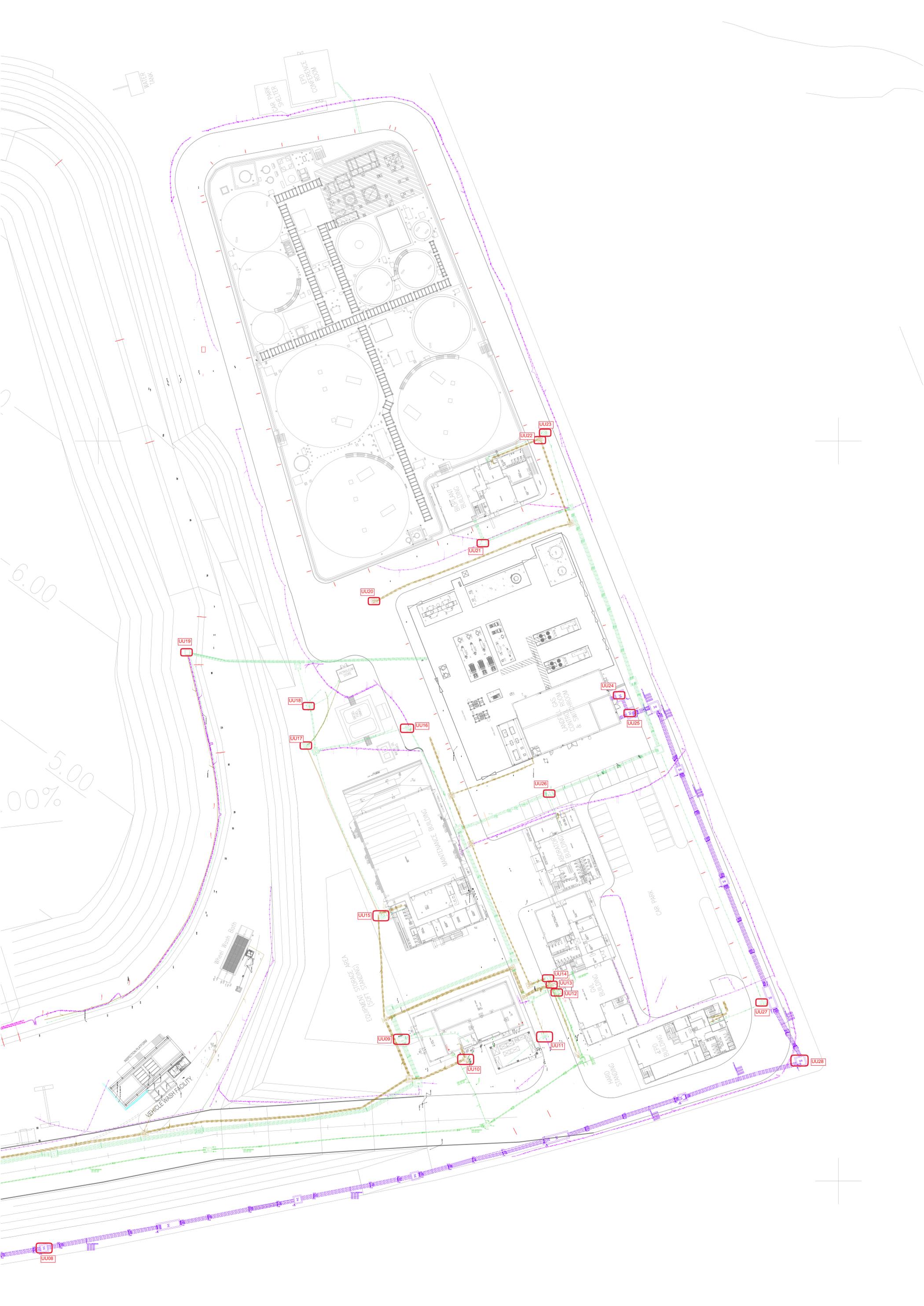
LANDFILL GAS



ANNEX G1

LANDFILL GAS MONITORING  
LOCATIONS FOR SERVICE VOIDS,  
UTILITIES AND MANHOLES ALONG THE  
SITE BOUNDARY AND WITHIN THE  
SENTX SITE







ANNEX G2

CALIBRATION CERTIFICATES FOR  
LANDFILL GAS MONITORING  
EQUIPMENT



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## CERTIFICATE OF ANALYSIS

**CONTACT:** MR IVAN LEUNG  
**CLIENT:** ALS TECHNICHEM (HK) PTY LTD  
**ADDRESS:** 11/F., CHUNG SHUN KNITTING CENTRE,  
1-3 WING YIP STREET, KWAI CHUNG, N.T.

**WORK ORDER:** HK2345669

**SUB BATCH:** 0  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 14-Nov-2023  
**DATE OF ISSUE:** 24-Nov-2023

### SPECIFIC COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client.

The performance of the equipment stated in this report is checked with independent reference material and results are compared against a calibrated secondary source.

The "Instrument Specification" quoted is the acceptance criteria applicable for similar equipment used by the laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principles as practised by the laboratory or quoted from relevant international standards.

The validity of equipment/ meter performance only applies to the result(s) stated in the report.

Equipment Type: Landfill Gas Analyser  
Service Nature: Performance Check  
Scope: Carbon dioxide, Methane and Oxygen  
Brand Name/ Model No.: GA5000  
Serial No./Equipment No.: G507306 (HK1935)  
Date of Calibration: 22 November, 2023

### GENERAL COMMENTS

This report superseded any previous report(s) with same work order number.

Ms Chan Ka Yu, Karen  
Manager - Organics

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**Work Order:** HK2345669  
**Sub-Batch:** 0  
**Client:** ALS TECHNICHEM (HK) PTY LTD  
**Date of Issue:** 24-Nov-2023

Equipment Type: Landfill Gas Analyser  
Brand Name/  
Model No.: GA5000  
Serial No./  
Equipment No.: G507306 (HK1935)  
Date of Calibration: 22 November, 2023

Next Calibration Date: 22 December, 2023

## Parameters:

### Methane

Calibrated Gas Standard, %	Monitor Readout, %	% error	Instrument Specification, %
0.0 (Nitrogen)	0.0	0.0	± 0.3
1.0	1.0	0.0	± 0.3
10.0	10.0	0.0	± 0.5

### Carbon Dioxide

Calibrated Gas Standard, %	Monitor Readout, %	% error	Instrument Specification, %
0.0 (Nitrogen)	0.0	0.0	± 0.3
1.0	1.0	0.0	± 0.3
10.0	9.7	-0.3	± 0.5

### Oxygen

Calibrated Gas Standard, %	Monitor Readout, %	% error	Instrument Specification, %
0.0 (Nitrogen)	0.0	0.0	± 1.0
23.5	24.0	0.5	± 1.0

Ms Chan Ka Yu, Karen  
Manager - Organics



ANNEX G3

LANDFILL GAS MONITORING RESULTS

**TABLE G3.1 LANDFILL GAS MONITORING RESULTS AT PERIMETER LFG MONITORING WELLS**

<b>Location</b>	<b>Water Level (mPD)</b>	<b>Methane (% (v/v))</b>	<b>Carbon Dioxide (% (v/v))</b>	<b>Oxygen (% (v/v))</b>
LFG1	2.96	0.2	0.2	20.2
LFG2	2.51	0.2	0.5	20.2
LFG3	2.77	0.0	1.4	20.0
LFG4	2.81	0.0	0.0	19.4
LFG5	4.01	0.0	0.0	17.5
LFG6	3.4	0.0	0.1	19.1
LFG7	2.71	0.0	0.0	19.4
LFG8	2.64	0.0	0.1	19.5
LFG9	2.56	0.0	0.2	17.1
LFG10	2.57	0.0	0.0	16.8
LFG11	2.41	0.0	0.1	10.3
LFG12	2.48	0.0	0.0	20.1
LFG13	2.34	15.9	0.3	5.9
LFG14	2.01	0.0	0.0	19.8
LFG15	2.16	0.0	0.0	19.8
LFG16	2.91	0.0	0.0	19.9
LFG17	3.05	0.0	0.0	19.9
LFG18	3.69	0.0	1.1	17.3
LFG19	4.36	0.0	0.3	19.1
LFG20	3.64	0.0	0.0	19.9
LFG21	3.79	0.0	0.0	19.9
LFG22	3.64	0.0	0.0	19.9
LFG23	12.76	0.0	0.0	19.8
LFG24	6.54	0.0	0.0	19.8
GP1	Probe Bent	0.0	0.1	20.1
GP2 (shallow)	Probe Bent	0.0	0.8	18.8
GP2 (deep)	Probe Bent	0.0	0.1	20.1
GP3 (shallow)	Probe Bent	0.0	0.1	20.1
GP3 (deep)	Probe Bent	0.0	0.2	19.9
GP4 (shallow)	Probe Bent	0.0	0.5	19.6
GP4 (deep)	Probe Bent	0.0	0.2	19.8
GP5 (shallow)	Probe Bent	0.0	0.1	19.8
GP5 (deep)	39.15	0.0	0.1	19.8
GP6	37.67	0.0	0.1	19.7

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
GP7	36.70	0.0	0.1	19.7
GP12	2.43	0.2	0.0	20.7
GP15	3.53	0.1	0.0	20.1
P7	3.28	0.1	0.4	19.1
P8	2.97	0.1	0.0	20.3
P9	2.82	0.1	0.0	20.1

**TABLE G3.2 LANDFILL GAS MONITORING AT SERVICE VOIDS, UTILITIES PITS AND MANHOLE**

Location	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
UU01	0.0	0.0	20.0
UU02	0.0	0.0	19.8
UU03	0.0	0.0	19.9
UU04	0.0	0.0	20.0
UU05	0.0	0.0	20.2
UU06	0.0	0.0	20.2
UU07	0.0	0.0	19.9
UU08	0.0	0.0	20.0
UU09	0.0	0.0	20.3
UU10	0.0	0.0	20.3
UU11	0.0	0.0	20.2
UU12	Voided due to latest site programme and on-going operation work		
UU13	0.0	0.0	20.2
UU14	0.0	0.0	20.2
UU15	0.0	0.0	20.1
UU16	0.0	0.0	20.1
UU17	Voided due to latest site programme and on-going operation work		
UU18	Voided due to latest site programme and on-going operation work		
UU19	0.0	0.0	20.0
UU20	0.0	0.0	20.0
UU21	0.0	0.0	20.2
UU22	0.0	0.0	20.2
UU23	0.0	0.0	20.1
UU24	0.0	0.0	20.1
UU25	0.0	0.0	20.1
UU26	0.0	0.0	20.1
UU27	0.0	0.0	20.3
UU28	0.0	0.0	20.3



ANNEX G4

EVENT AND ACTION PLAN FOR  
LANDFILL GAS MONITORING

## ANNEX G4 EVENT AND ACTION PLAN FOR LANDFILL GAS MONITORING

Action			
Event	ET	IEC	Contractor
Limit Level being exceeded for field monitoring at the perimeter monitoring wells	<ul style="list-style-type: none"> <li>Investigate the cause(s) of exceedance</li> <li>Prepare the Notification of Exceedance within 24 hours</li> <li>Check monitoring data, all plant, equipment and the Contractor's working methods</li> <li>Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures required</li> <li>Ensure remedial measures are properly implemented</li> <li>Increase the monitoring frequency to daily if exceedance is due to the Project for monitoring wells in the areas where there is development within 250m of the SENTX Site Boundary and to weekly for other monitoring wells, until no exceedance of limit level</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Repeat field measurement to confirm findings</li> <li>Check the performance of landfill gas management system</li> <li>Rectify unacceptable practice</li> <li>Discuss with the ET and IEC and submit proposals for remedial measures to IEC</li> <li>Implement the agreed proposals</li> <li>Amend proposal if appropriate</li> </ul>
Limit Level being exceeded for the bulk gas sampling at the perimeter monitoring wells	<ul style="list-style-type: none"> <li>Check and compare the results of field monitoring and laboratory analyse of bulk samples</li> <li>If the results of field monitoring also show exceedance, the action(s) for limit level being exceeded for field monitoring would have been triggered</li> <li>If the results of field monitoring does not show exceedance, the sampling</li> </ul>	<ul style="list-style-type: none"> <li>Verify the findings by ET</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> </ul>

Action			
Event	ET	IEC	Contractor
	<p>procedures should be checked and if deems necessary, to repeat the monitoring and recalibrate the portable monitoring instruments</p> <ul style="list-style-type: none"> <li>Notify the above findings to Contractor and IEC</li> </ul>		
Limit Level being exceeded at the permanent gas monitoring system	<ul style="list-style-type: none"> <li>Investigate the cause(s) of exceedance</li> <li>Prepare the Notification of Exceedance within 24 hours</li> <li>Check the methane gas level at the perimeter monitoring wells, manholes or utilities duct</li> <li>Check monitoring data, all plant, equipment and the Contractor's working methods</li> <li>Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures required</li> <li>Ensure remedial measures are properly implemented</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Evacuate all staff in the concerned building</li> <li>Open the doors and window of all rooms on the ground floor</li> <li>Do not allow staff to go back to the room if methane level is higher than 1% gas</li> <li>Check the performance of the landfill gas management system</li> <li>Rectify unacceptable practice</li> <li>Consider changes of working methods</li> <li>Discuss with the ET and IEC and submit proposals for remedial measures to IEC</li> <li>Implement the agreed proposals</li> <li>Amend proposal if appropriate</li> </ul>
Limit Level being exceeded during surface emission monitoring	<ul style="list-style-type: none"> <li>Repeat the measurement to confirm findings</li> <li>Investigate the cause(s) of exceedance</li> <li>Prepare the Notification of Exceedance within 24 hours</li> <li>Check monitoring data, all plant, equipment and the Contractor's working methods</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Check landfill gas management system</li> <li>Rectify unacceptable practice</li> <li>Consider changes of working methods</li> <li>Discuss with the ET and IEC and submit proposals for remedial measures to IEC</li> <li>Implement the agreed proposals</li> <li>Amend proposal if appropriate</li> </ul>

Action			
Event	ET	IEC	Contractor
	<ul style="list-style-type: none"> <li>• Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>• Discuss with Contractor and IEC for remedial measures required</li> <li>• Ensure remedial measures are properly implemented</li> <li>• Increase the monitoring frequency to monthly if exceedance is due to the Project until no exceedance of limit level</li> </ul>		
Limit Level being exceeded at the service voids, utilities pits, manholes and location of vegetation stress	<ul style="list-style-type: none"> <li>• Repeat the measurement to confirm findings</li> <li>• Investigate the cause(s) of exceedance</li> <li>• Prepare the Notification of Exceedance within 24 hours</li> <li>• Check monitoring data, all plant, equipment and the Contractor's working methods</li> <li>• Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>• Discuss with Contractor and IEC for remedial measures required</li> <li>• Ensure remedial measures are properly implemented</li> <li>• Increase the monitoring frequency to weekly if exceedance is due to the Project until no exceedance of limit level</li> </ul>	<ul style="list-style-type: none"> <li>• Verify the Notification of Exceedance</li> <li>• Discuss with ET and Contractor on proposed remedial measures</li> <li>• Review proposals on remedial measures</li> <li>• Audit the implementation of the remedial measures</li> <li>• the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>• Check landfill gas management system</li> <li>• Rectify unacceptable practice</li> <li>• Discuss with the ET and IEC and submit proposals for remedial measures to IEC</li> <li>• Implement the agreed proposals</li> <li>• Amend proposal if appropriate</li> </ul>



ANNEX H

CUMULATIVE STATISTICS ON  
EXCEEDANCES, ENVIRONMENTAL  
COMPLAINTS, NOTIFICATION OF  
SUMMONS AND STATUS OF  
PROSECUTIONS

**TABLE H1 CUMULATIVE STATISTICS ON EXCEEDANCES**

		<b>Total No. recorded in this reporting period</b>	<b>Total No. recorded since project commencement</b>
Air Quality (Dust)	Action	0	0
	Limit	0	17
Air Quality (Odour)	Action	0	0
	Limit	0	0
Air Quality (Emissions of Thermal Oxidiser)	Limit	0	4
Air Quality (Emissions of Landfill Gas Flare)	Limit	0	5
Air Quality (Emissions of Landfill Gas Generator)	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Water Quality (Surface Water)	Limit	0	61
Water Quality (Leachate)	Limit	0	1
Water Quality (Leachate Level)	Limit	0	194
Water Quality (Groundwater)	Limit	1	18
Landfill Gas (Perimeter Landfill Gas Monitoring Wells)	Limit	0	4
Landfill Gas (Service Void, Utilities and Manholes)	Limit	0	0
Landfill Gas (Permanent Gas Monitoring System)	Limit	0	0

**TABLE H2 CUMULATIVE STATISTICS ON COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS**

Reporting Period	Cumulative Statistics		
	<b>Complaints</b>	<b>Notifications of Summons</b>	<b>Prosecutions</b>
This Reporting Period (1 – 31 Dec 2023)	0	0	0
Total no. received since project commencement	1	0	0



ANNEX I

MONITORING SCHEDULE FOR THE NEXT  
REPORTING PERIOD

**South East New Territories (SENT) Landfill Extension  
EM&A Impact Monitoring Schedule during Operation/ Restoration Phase**

January 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2 Dust Monitoring Perimeter LFG Monitoring Service voids LFG Monitoring	3 Noise Monitoring	4 Leachate Monitoring	5 Surface Water Monitoring	6
7	8 Dust Monitoring Groundwater Monitoring	9 Noise Monitoring	10	11 Stack Monitoring	12 Stack Monitoring Odour Monitoring	13
14 Dust Monitoring	15 Noise Monitoring	16	17	18	19	20 Dust Monitoring
21	22 Noise Monitoring	23	24	25	26 Dust Monitoring	27
28	29 Noise Monitoring	30	31			



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| Guyana     | South Korea     |
| Hong Kong  | Spain           |
| India      | Switzerland     |
| Indonesia  | Taiwan          |
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