

Surface Emissions Monitoring Report

Ferry Road Landfill Site

Cardiff City Council

March 2026

Approval Sheet

Customer	Cardiff City Council
Site	Ferry Road Landfill Site
Project Title	Surface Emissions Monitoring
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Version	Date	Prepared by	Signature	Date
1	24/03/2026	J Freestone		16/03/2026
		Checked by	Signature	Date
		C Keightley	C. F. Keightley	18/03/2026

Foreword

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The findings discussed in this document relating to information acquired on behalf of the Client relates only to data and information to which we have had access. It is acknowledged that certain aspects may be superseded or rendered irrelevant by information in documentation to which we have no access.

Enitial cannot accept responsibility to any parties whatsoever, following the issue of this report, for any matters arising which may be considered outside the agreed scope of works.

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1.0 Introduction

1.1 Brief

Enitial were commissioned by Cardiff City Council (CCC) to undertake a Landfill Gas Surface Emissions Survey at their Ferry Road Landfill Site during March 2026 as part of routing monitoring under Environmental Permit BP3795FD.

Ferry Road Landfill Site is approximately 16 hectares in area and is located off Ferry Road / Dunleavy Drive, Cardiff, CF11 0SR at NGR ST174737. The site was closed in 1994 and permanently capped. The area was designated as public open space and named Grangemoor Park. The site still has a Waste Management License for the purpose of landfill gas monitoring and leachate extraction. Established restoration now exists across Ferry Road Landfill Site and the site is well vegetated with areas of well established tree planting. Public access is permitted across site and a number of pathways are present.

1.2 Desk Study

As no operational or capping changes had taken place at Ferry Road, the survey design was based on the previous surface emissions surveys undertaken by Enitial in 2024 and 2025. The area to be subject to surface emissions surveying consisted of one 'zone' comprising of the entire Ferry Road Landfill Site.

Table 1.2 Survey Areas and Zoning

Zone	Capping Type	Landfill Phase	Comment
1	Permanent	All phases	Established restoration, wooded areas, grassland and areas of scrub

A survey plan was produced detailing the proposed survey areas and included a series of surface transects at 50m intervals and around the landfill edges / landfill footprint in accordance with the recommendations in the Environment Agency Guidance on Monitoring Landfill Gas Surface Emissions LFTGN07 (EA Guidance). In addition, all infrastructure as identified from the desk study and information provided by CCC was also included on the survey plan. Shapefiles were generated from the plan for download to the GIS data collector for onsite navigation.

2.0 Surface Emissions Monitoring Summary

2.1 Survey Overview

The Surface Emissions Monitoring was undertaken on 03 and 04 March 2026.

A QED SEM5000 Tunable Diode Laser (TDL) Methane Detector instrument was used to undertake the survey which detects methane from 0ppm to 100% with a resolution of 1ppm. A Mobile Data Collector utilising a Differential GPS receiver was connected to the TDL providing continuous GPS and time stamped data logging.

The landfill site was surveyed around the landfill footprint and using transects spaced at 50m intervals as detailed in section 1.2. During the survey, the surface was scanned at a distance not exceeding 5cm above the surface whilst a steady walking pace was maintained. In the event of excessive vegetation and / or other obstruction preventing surface scanning at <5cm, the TDL probe was held as close to the surface as possible. During the walkover survey, particular attention was given to any areas of surface cracking, fissures or stressed vegetation identified or any similar feature that may indicate emissions of landfill gas. It is to be noted that some locations of the survey were inaccessible due to areas of dense vegetation and woodland, particularly on the outer edges of the site. Where the landfill edge was not accessible, the nearest location, either inside or outside the landfill footprint, was surveyed.

Landfill gas and leachate extraction / monitoring infrastructure was included in the survey. In surveying such features, all potential emission points of the feature were monitored. The data logging parameter was set to reflect if the surface or an infrastructure location was being surveyed to allow this data to be filtered out and assessed separately at the reporting stage.

A plan showing the survey route taken and data logging points is presented in Appendix A.

2.2 Site Personnel and Equipment

Table 2.2 details the personnel on site during the survey and the equipment type used including serial number and calibration expiry details.

Table 2.2 Site Personnel and Equipment

Date	Personnel	Instrument Type	Serial Number	Calibration Due Date	Span Gas Check (CH4 ppm)	Gas Check Value (CH4 ppm)
03/03/2026	J Freestone	QED SEM5000	50369	11/02/2027	100	103.3 ✓
04/03/2026	J Freestone	QED SEM5000	50369	11/02/2027	100	105.4 ✓

A calibration certificate for the instrument used is presented in Appendix D.

2.3 Weather Conditions and Meteorological Data

In order to ensure that monitoring was undertaken in accordance with best practice for Surface Emissions Monitoring, meteorological data was recorded from on site observations and local weather station information. Table 2.3 details conditions and observations made during the survey.

Table 2.3 Weather Conditions and Meteorological Data

Date / Time Period	Weather Conditions	Ground Conditions	Temperature (°C)	Atmospheric Pressure (mbar)	Wind Speed (mph)	Wind Direction
03/03/2026 08:00	Low-level cloud	Wet	8	1025	9	NE
03/03/2026 16:00	Medium-level cloud	Wet	12	1026	8	NE
04/03/2026 08:15	Sunny intervals	Wet	7	1025	10	ENE
04/03/2026 11:30	Sunny	Wet	11	1024	6	ENE

2.4 Gas Management System Conditions

Surface Emissions Monitoring should be undertaken during periods when gas control within the site is operating at normal extraction rates. CCC and RPS confirmed that in the period of the Surface Emissions Monitoring, the gas control system at Ferry Road Landfill Site was working within its normal operating parameters and that consistent abstraction rates were maintained over the period of the survey.

3.0 Surface Emissions Monitoring Results

3.1 Results Overview

The TDL raw data GPS records were converted from Latitude and Longitude to British National Grid co-ordinates using the Ordnance Survey GridInquest software. The data was then analysed for methane levels above the acceptance criteria detailed below using Enitial's HeatWave and GeoSieve software.

3.2 Assessment Criteria

The primary performance criteria for the performance of permanent capping systems remains as being:

- Through capped surfaces: 100ppm Methane
- Through point source features: 1,000ppm Methane

Revised emissions criteria have been drafted by the Environment Agency but have yet to be formally endorsed by industry through the EA/LGIG.

3.3 Surface Results

A total of 8,807 methane concentration readings were recorded during the survey of the landfill surface of which 99.2% were <100ppm and within the assessment criteria outlined in Section 3.2. The Table 3.3 summarises the 5 discrete locations where concentrations were recorded ≥ 100 ppm.

Table 3.3 Surface locations above Assessment Criteria

Data Ref	Reference	Easting	Northing	Peak Concentration (ppm)	Comment
427	Surface1	317591	173754	165	Isolated area of surface
6033	Surface2	317340	173753	1,024	Isolated area of surface
9639	Surface3	317353	173647	781	Isolated area of surface, edge of track
10778	Surface4	317629	173788	21,066	General surface emissions, outside wall
10926	Surface5	317603	173663	1,257	General surface emissions, outside wall

3.4 Infrastructure Results

A total of 146 infrastructure locations were monitored during this survey. Table 3.4 summarises the 16 locations where concentrations were recorded $\geq 1,000$ ppm.

Table 3.4 Infrastructure locations above Assessment Criteria

Data Ref	Infrastructure ID	Easting	Northing	Peak Concentration (ppm)	Comment
137	LC2	317567	173657	7,378	From chamber lid
642	LW5	317595	173809	7,765	Inside chamber and tube glands
1704	IC11A	317419	173972	1,401	From chamber lid
2089	IC13A	317362	173904	1,830	From chamber lid
2519	OSMH2	317231	173751	1,110	From chamber lid
3583	IC1	317543	173615	2,742	From chamber lid
6367	GW17	317451	173698	8,464	From chamber lid
7624	IC20	317525	173948	2,334	From chamber lid
8519	IC18	317260	173666	1,355	From chamber lid
8702	IC19	317228	173618	3,839	From chamber lid
9284	LW17	317294	173700	2,381	Inside chamber
9409	IC10	317463	173999	2,162	From chamber lid
9437	LW10	317464	173993	7,230	Inside chamber
9879	MH1	317325	173608	1,274	From manhole cover
10223	OBH3	317445	173899	18,034	Inside pedestal cover
10304	OSMH5	317286	173842	4,131	From manhole cover

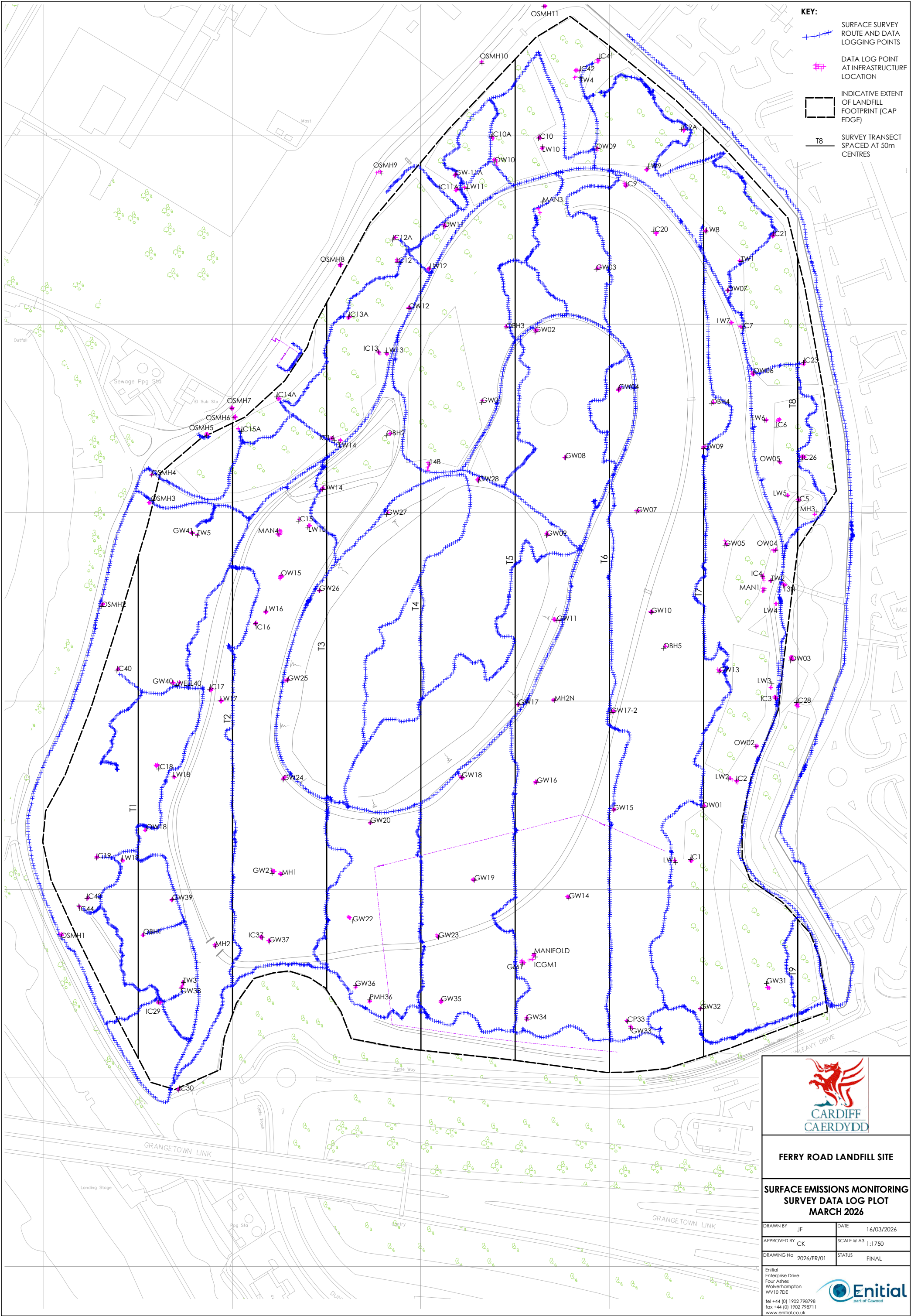
Photographs of the above locations above the assessment criteria are presented in Appendix C. Appendix B contains a colour coded plot showing individual methane concentration readings where the above locations can be identified.

4.0 Conclusion

The Surface Emissions Monitoring undertaken at Ferry Road Landfill Site during March 2026 identified 5 locations where emissions from the surface were above the ≥ 100 ppm assessment criteria and 16 locations where emissions from infrastructure were above the $\geq 1,000$ ppm assessment criteria.

APPENDIX A

Survey Data Log Plot



- KEY:**
- SURFACE SURVEY ROUTE AND DATA LOGGING POINTS
 - DATA LOG POINT AT INFRASTRUCTURE LOCATION
 - INDICATIVE EXTENT OF LANDFILL FOOTPRINT (CAP EDGE)
 - T8 SURVEY TRANSECT SPACED AT 50m CENTRES



FERRY ROAD LANDFILL SITE

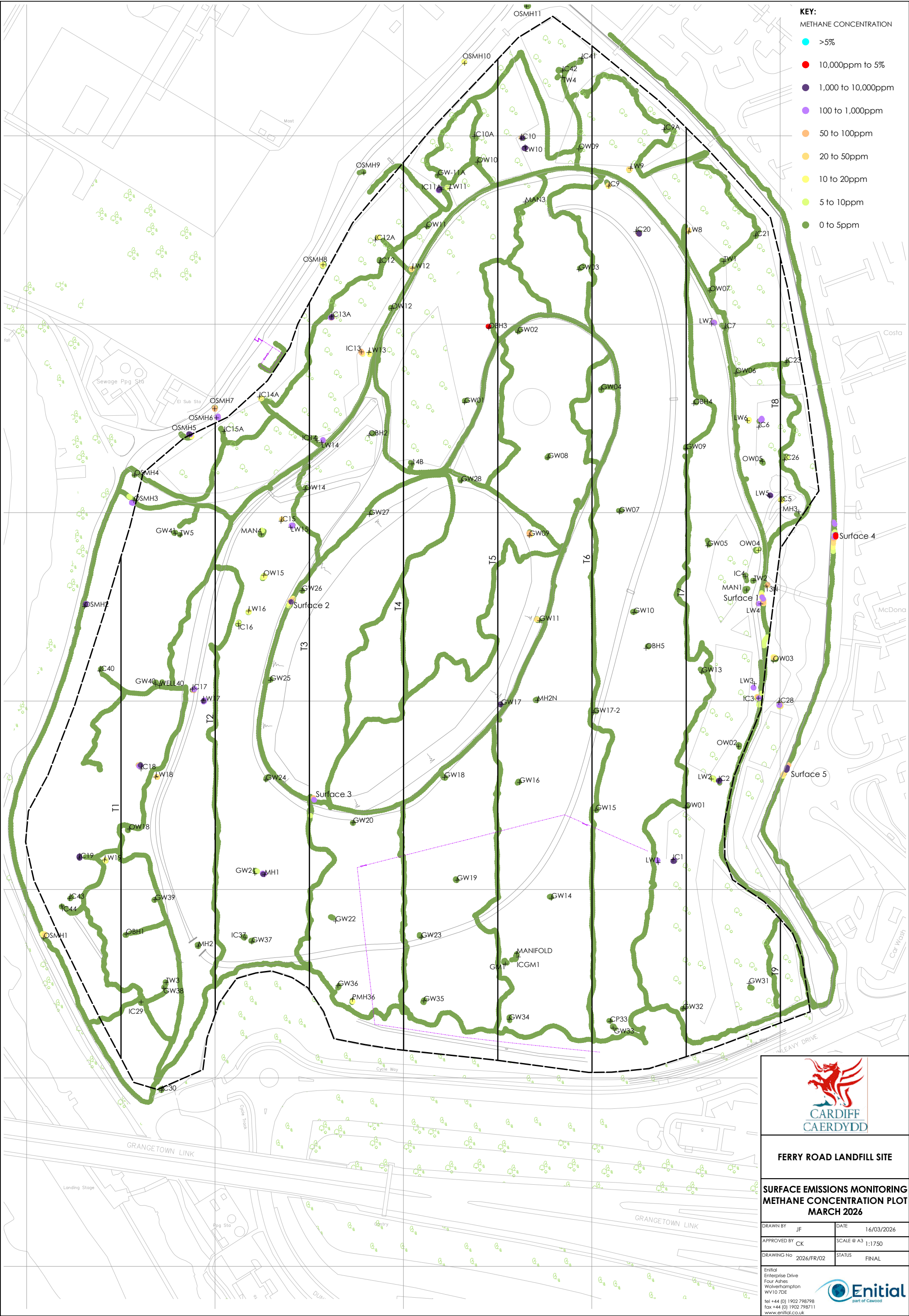
**SURFACE EMISSIONS MONITORING
SURVEY DATA LOG PLOT
MARCH 2026**

DRAWN BY	JF	DATE	16/03/2026
APPROVED BY	CK	SCALE @ A3	1:1750
DRAWING No	2026/FR/01	STATUS	FINAL

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APPENDIX B

Methane Concentration Plot



- KEY:**
METHANE CONCENTRATION
- >5%
 - 10,000ppm to 5%
 - 1,000 to 10,000ppm
 - 100 to 1,000ppm
 - 50 to 100ppm
 - 20 to 50ppm
 - 10 to 20ppm
 - 5 to 10ppm
 - 0 to 5ppm



FERRY ROAD LANDFILL SITE

SURFACE EMISSIONS MONITORING
METHANE CONCENTRATION PLOT
MARCH 2026

DRAWN BY	JF	DATE	16/03/2026
APPROVED BY	CK	SCALE	A3 1:1750
DRAWING No	2026/FR/02	STATUS	FINAL

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APPENDIX C

Locations Above Assessment Criteria

Monitoring Location	Grid Reference		Methane (ppm)	Description	Photo
	Easting	Northing			
Surface1	317591	173754	165	Isolated area of surface	
Surface2	317340	173753	1,024	Isolated area of surface, bubbling ground	
Surface3	317353	173647	781	Isolated area of surface, edge of track	
Surface4	317629	173788	21,066	General surface emissions, outside wall in retail park verge	
Surface5	317603	173663	1,257	General surface emissions, outside wall in retail park verge	
GW17	317451	173698	8,464	From chamber lid	
IC1	317543	173615	2,742	From chamber lid	
IC10	317463	173999	2,162	From chamber lid	

Monitoring Location	Grid Reference		Methane	Description	Photo
IC11A	317419	173972	1,401	From chamber lid	
IC13A	317362	173904	1,830	From chamber lid	
IC18	317260	173666	1,355	From chamber lid	
IC19	317228	173618	3,839	From chamber lid	
IC20	317525	173948	2,334	From chamber lid	
LC2	317567	173657	7,378	From chamber lid	
LW10	317464	173993	7,230	Inside chamber	
LW17	317294	173700	2,381	Inside chamber	

Monitoring Location	Grid Reference		Methane	Description	Photo
LW5	317595	173809	7,765	Inside chamber and tube glands	
MH1	317325	173608	1,274	From cover, pulsing 1,000ppm	
OBH3	317445	173899	18,034	Inside pedestal cover	
OSMH2	317231	173751	1,110	From chamber lid	
OSMH5	317286	173842	4,131	From cover	

APPENDIX D
Instrument Calibration Certificate

CERTIFICATION OF CALIBRATION



Issued by: QED Environmental Systems Inc.

Calibration certificate number 11205

Instrument SEM5000 Serial Number 50369

Description of the calibration procedure:

The calibration is verified with certified gas bottle. The maximum error of the instrument as specified in the datasheet.

Gas verification from 0-1000ppm CH4

Full scale (ppm)	Gas concentration (ppm)	Response 1 (ppm)	Response 2 (ppm)	Response 3 (ppm)	Average response (ppm)	Maximum error (ppm)	Maximum error (% F.s.)	Maximum error %
1000	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
1000	2.94	2.8	2.8	2.8	2.80	0.14	0.01	0.01
1000	10.1	9.9	9.9	9.9	9.90	0.20	0.02	0.02
1000	102.0	102.0	102.0	102.0	102.00	0.00	0.00	0.00
1000	1003.0	994.0	994.0	994.0	994.00	9.00	0.90	0.90

Uncertainty	0.90	%
Max % error	0.90	% FS

Gas verification from 0-100% vol CH4

Full scale (%vol)	Gas concentration (%vol)	Response 1 (%vol)	Response 2 (%vol)	Response 3 (%vol)	Average response (%vol)	Maximum error (%vol)	Maximum error (% F.s.)	Maximum error %
100.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00
100.00	2.19	2.1	2.1	2.1	2.10	0.09	0.09	0.09
100.00	5.00	4.9	4.9	4.9	4.90	0.10	0.10	0.10
100.00	15.00	14.8	14.8	14.8	14.80	0.20	0.20	0.20
100.00	50.00	49.8	49.8	49.8	49.80	0.20	0.20	0.20
100.00	100.00	99.8	99.8	99.8	99.80	0.20	0.20	0.20

Uncertainty	0.20	%
Max % error	0.20	% FS

Gas verification from 0-100% CH4 LEL (0-4.4% VOL)

Full scale (%vol)	Gas concentration (LEL%)	Response 1 (LEL%)	Response 2 (LEL%)	Response 3 (LEL%)	Average response (%vol)	Maximum error (LEL%)	Maximum error (% F.s.)	Maximum error %
100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	2.10	2.10	2.10	2.10	2.10	0.00	0.00	0.00
100.00	50.00	50.00	50.00	50.00	50.00	0.00	0.00	0.00

Uncertainty	0.00	%
Max % error	0.00	% FS

www.qedenv.com (800) 624-2026 info@qedenv.com

QED Environmental Systems Inc. 2355 Bishop Circle West, Dexter, MI 48130

CERTIFICATION OF CALIBRATION



Issued by: QED Environmental Systems Inc.

Environmental conditions during calibration

Temp.	23.0	C
Pressure	983.9	mBar

Gas bottles used for calibration

Gas	Cylinder number	Expiry date	Gas
Synthetic Air	5796862Y	12/1/2030	Synthetic Air
3 ppm	CC119197	2/3/2033	CH4
10 ppm	DT0011388	1/28/2033	CH4
100ppm	EB0095114	8/13/2029	CH4
1000 ppm	CC97860	3/17/2030	CH4
1.0% Vol	CC159687	3/20/2030	CH4
2.2% vol	CC138422	6/13/2029	CH4
5.0% vol	TWO718936	6/7/2029	CH4
15% vol	NK3213	4/22/2029	CH4
50% vol	CC708175	1/22/2029	CH4
100% vol	T-330512	8/22/2028	CH4

Calibration results:

Pass

Next scheduled calibration:

11/2/2027

Calibration date:

11/2/2026

DD/MM/YYYY

DD/MM/YYYY

Issued by:

Christopher Fleenor

A handwritten signature in black ink, appearing to read 'Chris', is written over the printed name 'Christopher Fleenor'.

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