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Surface Emissions Monitoring Report

Giants Grave Landfill Site

Neath Port Talbot Borough Council

January 2024

Approval Sheet

Customer	Neath Port Talbot Borough Council
Site	Giants Grave Landfill Site
Project Title	Surface Emissions Monitoring
Project Manager	J Freestone
Project Staff	J Freestone, C Keightley
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Version	Date	Prepared by	Signature	Date
1	23/01/2024	J Freestone		16/01/2024
		Checked by	Signature	Date
		C Keightley	C. F. Keightley	23/01/2024

Foreword

Enitial has used its best endeavours, experience, and expertise to provide a meaningful, accurate and relevant representation of any works carried out and information procured. Any works detailed are based on a defined programme and scope of works and any data acquisition and management is in accordance with contract conditions agreed with the Client.

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 It is acknowledged that certain aspects may be superseded or rendered irrelevant by information in documentation to which we have no access.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.

This report is issued solely to the Client, Enitial does not accept any responsibility to any third parties to whom this report may be circulated, in part or in full, and any such parties rely on the contents at their own risk.

Contents

1.0 Introduction

1.1 Brief

Enitial were commissioned by C&P Environmental Limited (C&P) to undertake a Landfill Gas Surface Emissions Survey on behalf of Neath Port Talbot Borough Council (NPTBC) at their Giants Grave Landfill Site during January 2024 as required by the site Environmental Permit EPR/HP3535PS.

Giants Grave Landfill Site is located off Giants Grave Road, Neath Port Talbot, SA11 2LN at NGR SS734957. The site is no longer operational and ceased accepting waste in 2003, the site was restored following the final capping in 2004 and additional restoration work on the southern and western flanks were completed in 2013. Established restoration now exists across Giants Grave Landfill Site and the site is well vegetated.

1.2 Desk Study

The areas that would be subject to Surface Emissions Monitoring included the entire landfill site and were taken from the previous survey undertaken by Enitial in 2023. The survey plan was updated for 2024 detailing the proposed survey areas with a survey route based on survey transects spaced at 10m intervals as detailed in the Enitial Emissions Mapping Surveys on Landfill Sites Method Statement 2024. In addition, all infrastructure as identified from the information provided by C&P and during the previous survey was also included on the survey plan. Shapefiles were generated from the plan for download to the survey Mobile Data Collector for onsite navigation.

2.0 Surface Emissions Monitoring Summary

2.1 Survey Overview

The Surface Emissions Monitoring was undertaken on 10, 11 and 12 January 2024.

A TDL Laser 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 survey was undertaken as per the predetermined survey plan. 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 TDL500 probe was held as close to the surface as possible. It is to be noted that some locations of the survey were inaccessible due to areas of dense vegetation, particularly on the southern and western slopes.

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	Instrument Serial Number	Calibration Due Date	100ppm CH4 Gas Check
10/01/2024	J Freestone	QED SEM5000	40962	19/06/2024	101.4
11/01/2024	J Freestone	QED SEM5000	40962	19/06/2024	102.4
12/01/2024	J Freestone	QED SEM5000	40962	19/06/2024	102.5

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

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
10/01/2024 08:10	Sunny	Light frost	3	1030	17	ENE
10/01/2024 14:45	Sunny	Wet	6	1031	10	NNE
11/01/2024 08:30	Sunny	Light frost	3	1038	7	NE
11/01/2024 15:00	Sunny	Wet	6	1039	8	ENE
12/01/2024 08:00	Low-level cloud	Wet / Light frost	4	1039	4	ENE
12/01/2024 10:50	Sunny intervals	Wet / Light frost	4	1038	2	N

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. NPTBC confirmed that in the period of the Surface Emissions Monitoring, the gas control system at Giants Grave 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 29,187 methane concentration readings were recorded during the survey of the landfill surface of which 99.6% were <100ppm and within the assessment criteria outlined in Section 3.2. Table 3.3 summarises the 5 discrete locations where concentrations were recorded ≥100ppm.

Table 3.3 Surface locations above Assessment Criteria

Data Ref	Reference	Easting	Northing	Peak Concentration (ppm)	Comment
10/01-01438	Surface 1	273692	195730	342	Isolated area of surface
10/01-10268	Surface 2	273639	195908	3,072	Isolated area of surface
11/01-12851	Surface 3	273137	195580	2,341	Areas of surface on slope
11/01-13055	Surface 4	273151	195593	171	Isolated area of surface on slope
12/01-00503	Surface 5	273155	195455	172	Areas of surface along base of slope

Photographs of the above locations above the assessment criteria are presented in Appendix D. Appendices B and C contain colour coded plans showing the survey data as a methane contour plot and also a plot showing individual methane concentration readings. The location of the above issues which were above the assessment criteria can be identified from these plots.

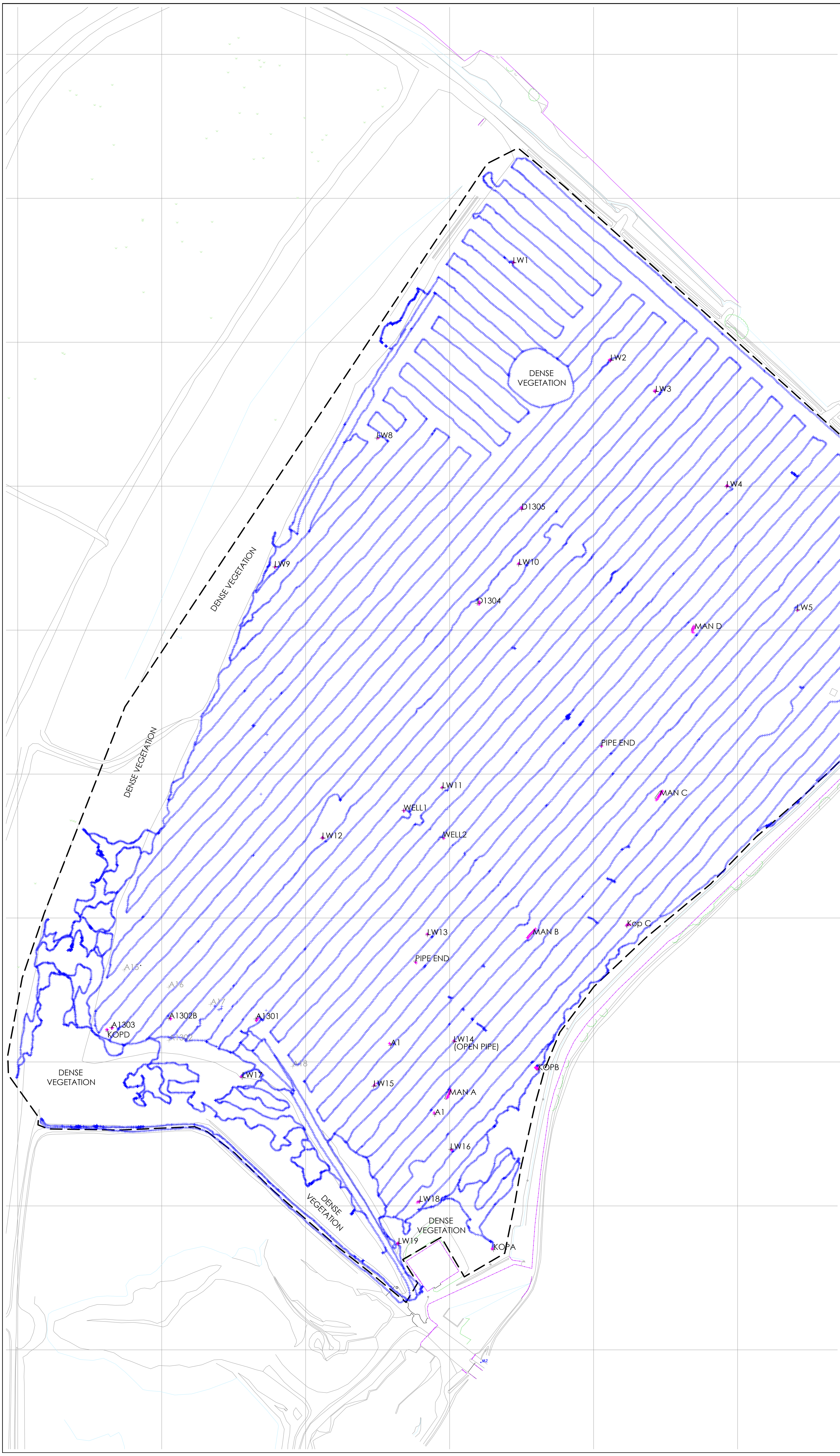
3.4 Infrastructure Results

A total of 39 infrastructure locations were monitored during this survey. There were no locations where concentrations were recorded ≥1,000ppm.

4.0 Conclusion

The Surface Emissions Monitoring undertaken at Giants Grave Landfill Site during January 2024 identified 5 locations where emissions from the surface were above the ≥100ppm assessment criteria and no locations where emissions from infrastructure were above the ≥1,000ppm assessment criteria.

APPENDIX A
Survey Data Log Plot



KEY:

SURVEY ROUTE AND DATA LOGGING POINTS

DATA LOG POINTS AROUND INFRASTRUCTURE

Neath Port Talbot County Borough
Bwrdeistref Sirol Castell-nedd Port Talbot

GIANTS GRAVE LANDFILL SITE

EMISSIONS MAPPING SURVEY
SURVEY DATA LOG PLOT
JANUARY 2024

DRAWN BY	JF	DATE	16/01/2024
APPROVED BY	CK	SCALE @ A3	1:2500
DRAWING No	2024/GG/01	STATUS	FINAL

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APPENDIX B
Methane Contour Plot

Neath Port Talbot County Borough
Bwrdeistref Sirol Castell-nedd Port Talbot

GIANTS GRAVE LANDFILL SITE

EMISSIONS MAPPING SURVEY
METHANE CONTOUR PLOT
JANUARY 2024

DRAWN BY	JF	DATE	16/01/2024
APPROVED BY	CK	SCALE @ A3	1:2500
DRAWING No	2024/GG/02	STATUS	FINAL

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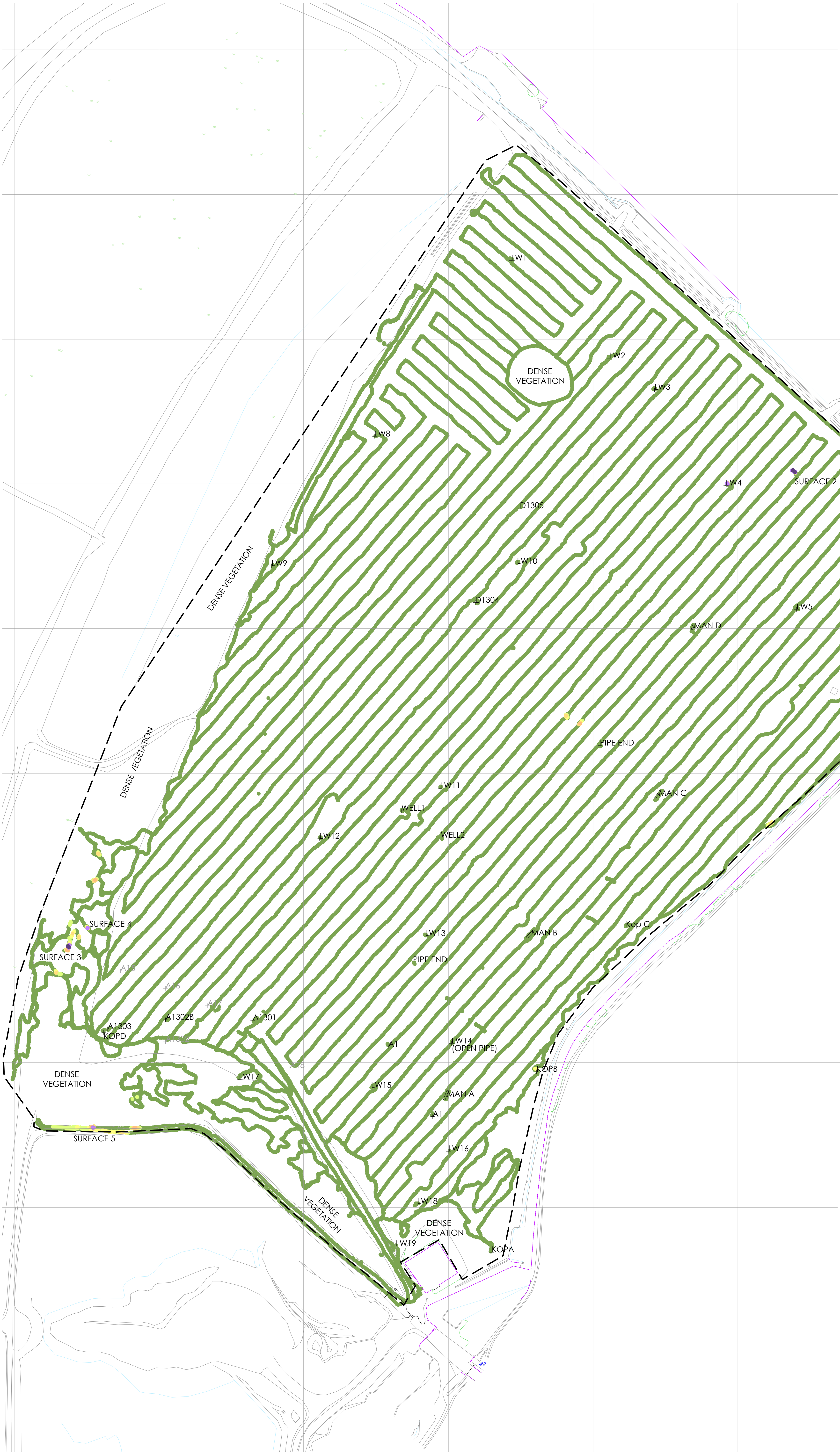
APPENDIX C
Methane Concentration Plot



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

Neath Port Talbot County Borough
Bwrdeistref Sirol Castell-nedd Port Talbot

GIANTS GRAVE LANDFILL SITE

EMISSIONS MAPPING SURVEY
METHANE CONCENTRATIONS
JANUARY 2024

DRAWN BY	JF	DATE	16/01/2024
APPROVED BY	CK	SCALE @ A3	1:2500
DRAWING No	2024/GG/03	STATUS	FINAL

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APPENDIX D
Locations Above Assessment Criteria

Giants Grave Landfill Site
Environmental Permit EPR/HP3535PS
Locations Above Assessment Criteria

Monitoring Location	Grid Reference	Methane (ppm)	Description	Photo
Surface 1	E273692 N195730	342	Isolated area of surface	
Surface 2	E273639 N195908	3,072	Isolated area of surface	
Surface 3	E273137 N195580	2,341	Areas of surface on slope	
Surface 4	E273151 N195593	171	Isolated area of surface on slope	
Surface 5	E273155 N195455	172	Areas of surface along base of slope	

APPENDIX E
Instrument Calibration Certificate

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Ltd.

Calibration certificate number **40962 H-09779**

Instrument **SEM5000** **Serial Number** **40962**

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	0.00	0.00	0.00	0.00
1000	2.91	3	3	3	3.00	0.09	0.01	0.01
1000	10.3	10.3	10.3	10.3	10.30	0.00	0.00	0.00
1000	101.0	101	101	101	101.00	0.00	0.00	0.00
1000	1011	1000	1000	1000	1000.00	11.00	1.10	1.10

Uncertainty	1.10	%
Max % error	1.10	% 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	2.20	2.20	2.20	2.20	2.20	0.00	0.00	0.00
100.00	5.00	5.10	5.10	5.10	5.10	0.10	0.10	0.10
100.00	15.00	15.00	15.00	15.00	15.00	0.00	0.00	0.00
100.00	50.00	49.90	49.90	49.90	49.90	0.10	0.10	0.10
100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00

Uncertainty	0.10	%
Max % error	0.10	% 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	2.00	2.00	2.00	2.00	2.00	0.00	0.00	0.00
100.00	50.00	50.00	0.00	0.00	16.67	50.00	50.00	50.00

Uncertainty	50.00	%
Max % error	50.00	% FS

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Ltd.

Environmental conditions during calibration

Temp.	23.7	C
Pressure	997	mBar

Gas bottles used for calibration

Gas	Cylinder number	Expiry date	Gas
N2	110241	03/11/2025	N2
3 ppm	292675	17/08/2027	CH4
10 ppm	119779SG	11/04/2024	CH4
100ppm	S1035778	08/03/2028	CH4
1000 ppm	S1500109Y	02/03/2028	CH4
1.0% Vol	S1198415S	10/04/2024	CH4
2.2% vol	S1204209S	27/02/2028	CH4
5.0% vol	244842	08/058/25	CH4
15% vol	268737	08/08/2025	CH4
50% vol	267652	09/05/2025	CH4
100% vol	1262313	09/08/2027	CH4

Calibration results: Pass

Next scheduled calibration: 19/06/2024

Calibration date: 19/06/2023

Issued by: Keeley Knight