

4 Pierhead Street
Capital Waterside
Cardiff CF10 4QP
United Kingdom
www.arup.com

t +44 29 2047 3727
f +44 29 2047 2277

Project title	Silent Valley first phase gas emission monitoring survey	Job number	115825
cc	Charlie Martin Noel Chard	File reference	
Prepared by	Victoria McGraw	Date	6 October 2017
Subject	First phase gas emission monitoring survey – File Note		

1.1 Introduction

Silent Valley Landfill is a closed, permanently capped landfill site in Ebbw Vale, South Wales.

As part of the requirements stipulated by their environmental permit issued by Natural Resources Wales (NRW), Silent Valley Waste Services Limited are required to monitor methane emissions through the cap of the landfill as an integral part of demonstrating compliance with the Landfill Directive, and in particular to:

- Identify faults in the gas management system at a site and prioritise the remediation required;
- Quantify the total emissions of this important greenhouse gas from the areas measured.

The monitoring of emissions through a landfill cap has two stages.

- Stage 1: a simple survey to demonstrate whether there are inadequacies in the gas containment and collection system. (Only when these deficiencies have been located and remedied such that the concentration of gas above the surface is low is it appropriate to begin a quantitative survey of surface flux).
- Stage 2: the flux survey, using an array of flux boxes, which from individual measurements, allows the average flux of gas from capped ‘zones’ at the site to be calculated. This then allows assessment of whether or not gas flux at the site exceeds the emission standard set by NRW.

This file note has been prepared to detail the results of the Stage 1 assessment and provide further recommendations of this first stage of monitoring.

1.2 Method

The first phase gas emission monitoring survey, was undertaken by Environmental Scientifics Group (ESG) on the 6th July 2017, in accordance with their UKAS accredited method ENV/GAS14

File Note

115825

6 October 2017

which follows the principles outlined in the Environment Agency Landfill Directive LFTGN07 (v2 2010) 'Guidance on Monitoring Landfill Gas Surface Emissions'.

The survey was, as agreed with NRW, focussed on Phase 1A of the Silent Valley Landfill.

ESG undertook a 3 metre wide sweep just above the surface of the landfill as undertaken using a Flame Ionisation Detector (FID). The survey was undertaken in a 50m grid pattern.

During the survey potential leakage areas and features were also tested such as; surface fissures, and liquid discharge, stressed vegetation and landfill edges. Gas wells boreholes and leachate wells across the site were also surveyed.

The ESG monitoring survey report: SG/2017/50520/178 is provided in Appendix A.

As discussed in the ESG monitoring survey report: SG/2017/50520/178 (Appendix A) the atmospheric conditions on the 6th July were very sunny, with a gentle breeze. Atmospheric pressure was noted to be low but rising slightly (971 to 974 mBar).

1.3 Results

The results of the EGS report indicate that generally hydrocarbon emissions (including methane ethane, ethane and other hydrocarbon gasses) across the site were very low – and well below the 100ppmv limit stipulated in LFTGN07 for immediately above the surface in areas of capping.

Notably however, four discrete source areas of gaseous emissions were identified during the survey:

- Three in the bottom Plateau of the surveyed area and
- One around the leachate well at the top of site

The recorded concentrations are provided in Table 1 below:

Table 1 Walkover survey results

Plan ref.	Grid Reference	ESG identified source details/comments	Indicated hydrocarbon levels (ppm)
001	SO 18525 07077	Smell of leachate near leachate wells possible spillage or leakage	1 - 20
002	SO 18504 06868	Road to bottom of plateau, ground bare	15 - 25
003	SO 18700 06950	Bottom of Plateau around base of 50mm Borehole	50
004	SO 18750 06950	Bottom of plateau fluctuating around base of two boreholes 1m apart	1 -1000

File Note

115825

6 October 2017



Figure 1: Locations of the four areas of gaseous emissions identified during the walkover survey.

1.4 Discussion

The ESG Gas walkover survey, undertaken on the 6th July 2017, has identified four discrete source areas of detectable gaseous emissions within the northern zone of Silent Valley Landfill.

The location of each of the four identified sources at the site has further been reviewed in line with the network of borehole and monitoring wells present at the site (as shown in Figure 2 attached). This is discussed below;

- Feature 001: Likely associated with pumping well SVWS0713 in the central site area
- Feature 002: Associated with an area of ground bare along the road at the bottom of the plateau
- Feature 003: Likely associated with borehole BHUC3 located in the bottom of plateau
- Feature 004: Associated with shallow leachate investigation boreholes from an historical ground investigation.

Following guidance provided in the Environment Agency Landfill Directive LFTGN07 (v2 2010) monitoring should not normally proceed to the quantitative flux survey until the systematic walkover survey demonstrates that the concentration of methane in the air is:

- Less than 100 parts per million by volume (ppmv) immediately above the surface on the main zones of the cap;
- Less than 1,000 ppmv close to any discrete feature such as a leachate well or wellhead.

File Note

115825

6 October 2017

The only location where action is required is where the maximum recorded concentration (1000ppm) was encountered at location 004.

1.5 Recommendations

It is recommended, that on the basis of the elevated hydrocarbon concentrations recorded (1000ppm) at location 004, all the investigation wells in that vicinity (three in total) be decommissioned in accordance with current regulatory guidance.

In addition, the decommissioning will ensure that the seal and integrity of the capping around the wells is acceptable.

Following the decommissioning works of the boreholes a verification survey will be required to determine if the feature now meets the required concentration of <1000ppmv.

However, considering that only one minor issue has been identified, it is recommended that on the basis that all other 1st stage survey results across the site recorded gas emissions of <100ppmv, and that the recorded concentration at location 004 only marginally exceeds the <1000ppmv threshold, the verification survey of location 004 is undertaken in concurrence with the second stage flux boxes survey. However, this will be subject to confirmation and agreement with NRW.

On agreement with NRW a second stage survey should then be arranged.

The second stage survey, uses an array of flux boxes to quantify the rate of emission through capped zones and from identifiable features within the landfill cap. The results are then assessed and the average emission from the whole zone can then be compared against the relevant standard.

As discussed in LFTGN07, based on a walkover survey, the landfill will need to be divided into 'zones', in which there may be individual 'features.'

The scope for 'zoning' the landfill at the second stage survey will need to be agreed with the NRW, prior to the works commencing.

DOCUMENT CHECKING (not mandatory for File Note)

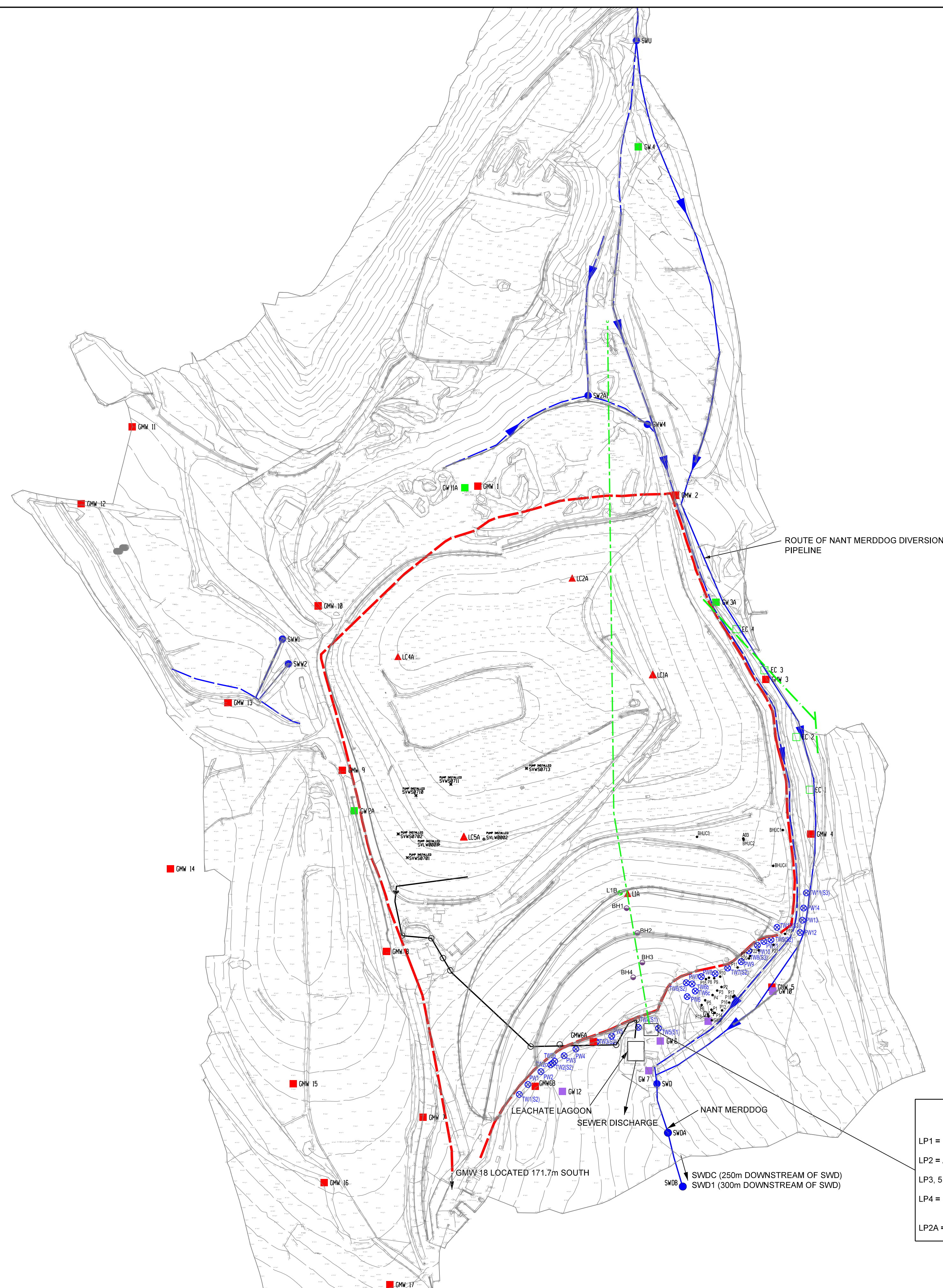
	Prepared by	Checked by	Approved by
Name	Victoria McGraw	Charlie Martin	Charlie Martin
Signature			

File Note

115825

6 October 2017

Figure 2:



SCALE 1:2500 @ A1

**SILENT VALLEY LANDFILL
SITE PLAN
ENVIRONMENTAL MONITORING**

115825-00

FIGURE

2

File Note

115825

6 October 2017

A1 Appendix A

Environmental Scientifics Group Ltd
Built Environment Services (CEN SLA)
Bretby Business Park, Ashby Road
Burton-on-Trent, DE15 0YZ
TEL (01283) 554400 FAX (01283) 554422



1015

RESULTS OF ANALYSIS

Arup Silent Valley Landfill Site

Victoria McGraw
Arup
4 Pierhead Street
Capital Waterside
Cardiff
CF10 4QP

Report Number: ESG/2017/50520/178

Date of Visit: 06/06/2017

Date Reported: 13/07/2017

ENV/GAS14 - Monitoring of surface gas emissions.

Non UKAS accredited tests are indicated by an asterisk (*) within the body of this report.

Any opinions and interpretations expressed herein are not covered by the scope of our UKAS accreditation.

Inspection Carried Out by: A. Talbott
Field Technician

Approve By: Philip Shead
Business & Operations Manager
01283 554461/07803262233



Table of Contents

1.0 INTRODUCTION 3

2.0 SAMPLING STRATEGY 3

3.0 RESULTS 3

4.0 OBSERVATIONS 3

5.0 CONCLUSIONS 3

Appendices

Appendix I Walkover Survey Log 4

Appendix II Location Plans & Photographs 5

Appendix III Walkover Problem Areas 6

Appendix III Certificate of Test 7

Calibration Certificate * – Telegan FID Serial Number 8260



1.0 INTRODUCTION

The aim of the gas emission monitoring survey was to identify possible leakage from the permanently capped zone of Silent Valley Landfill. The survey was undertaken on the 6th July 2017.

2.0 SAMPLING STRATEGY

Non-Intrusive Survey

A walkover survey was undertaken in accordance with our UKAS accredited method ENV/GAS14 which follows the principles outlined in the Environment Agency Landfill Directive LFTGN07 (v2 2010) 'Guidance on Monitoring Landfill Gas Surface Emissions'. This comprises of a 3 metre wide sweep just above the surface of the landfill using a Flame Ionisation Detector (FID). The survey was undertaken in a 50 meter grid pattern. During the survey potential leakage areas and features were tested such as, Surface fissures, and liquid discharge, stressed vegetation and landfill edges. Any Gas wells Boreholes and leachate wells were also checked.

3.0 RESULTS

The findings from the survey are given in the attached walkover survey log number 50520

4.0 OBSERVATIONS

Very little gas emissions were found on the day of the survey. Only four points were found.

5.0 CONCLUSIONS

On the day of the survey four areas of gaseous emissions were identified as described below:

- Ø Four areas were found to have leakages
- Ø Three in the bottom Plateau
- Ø One was found around leachate well at the top of site

End of Report



Appendix I Walkover Survey Log

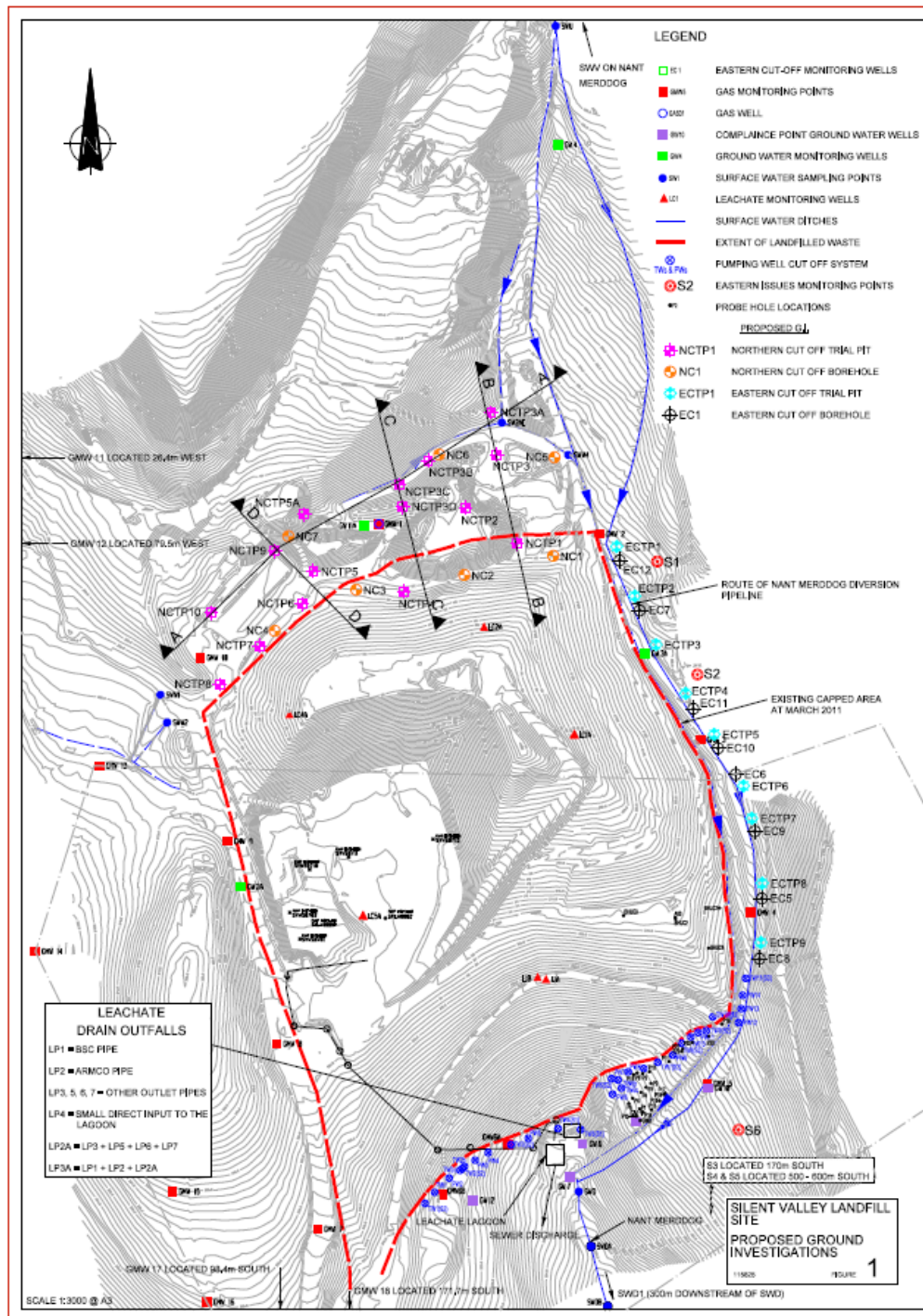
Walkover Survey Log – Report Number 50187

Client	Arup	Site	Silent Valley	Survey Date	6 th July 2017
Weather Conditions	Very Sunny Gentle Southernly Breze	Temp start: 24°C Temp end: 31°C	Barometric Pressure (mBar)	971	974
FID Serial Nº	8260	Calibration Date	25/01/17	Battery Status	Full Charge
GFM Serial Nº	10198	Calibration Date	14/03/17	Battery Status	Full Charge
Test Area	Extent of landfill waste	Type of Cap	Permanent		
Possible Sources of contamination	Leachate well areas- spillages				

Emission Source ID			Source details/comments	Indicated Hydrocarbon levels (ppm)
Plan ref.	Installation reference	Grid Reference		
001		SO 18525 07077	Smell of leachate near leachate wells possible spillage or leakage	1 - 20
002		SO 18504 06868	Road to bottom of plateau, ground bare	15 - 25
003		SO 18700 06950	Bottom of Plateau around base of 50mm Borehole	50
004		SO 18750 06950	Bottom of plateau fluctuating around base of two boreholes 1m apart	1 -1000
Surveyor: Alan Talbott			Signed	



Appendix II Location Plans & Photographs



Appendix III Walkover Problem Areas



CERTIFICATE OF TEST



Certificate of Test

Environmental Scientifics Group

Safety and Compliance Division
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ
TEL (01283) 554425

DATE OF ISSUE
24th January 2017

CERTIFICATE No. 119052

PAGE 1 of 1

INSTRUMENT SERVICING DEPARTMENT

Instrument Description	FID
Manufacturer	Telegan
Serial Number	8260
Customer	ESG Field Services
Order Number	Ref:A Sherwood
Date Received	N/A
REMARKS	On Hire

Service Details

- o This instrument was serviced and re-calibrated on 24/01/2017.
- o The tests were performed as set out in the manufacturer's Operating Manual.
- o This certificate supersedes any previous certification issued by ESG Bretby.
- o It is recommended that this instrument be re-calibrated within 6 months of the service date.

A handwritten signature in black ink, appearing to read 'Clive Watson'.

Clive Watson
Instrument Maintenance



www.esg.co.uk
sales@esg.co.uk
0845 603 2112