

LANDCARE (MANCHESTER) LIMITED **STORMY WEST LANDFILL SITE, PYLE**

Environmental Permit – EAWML34009

ENVIRONMENTAL MONITORING OF LANDFILL GAS FOR 2020



MAY 2021

CONTRACT - LAN/SW/2/20

PLR SERVICES

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Report Type:	ENVIRONMENTAL - LFG		
Report Issue:	FACTUAL/INTERPRETIVE		
Contract:	LAN/SW/2/20		
Reference:	CLOSED LANDFILL SITE		
Action point:			
	<i>Name</i>	<i>Signature</i>	<i>Date</i>
Originator:	P REES		MAY 2021
Title:	CONSULTANT		
Checked & Approved:	M. BREWSTER		MAY 2021
Title:	ENVIRONMENTAL MONITORING TECHNICIAN		

The interpretation referenced within this report is in part based upon information, knowledge and results made available from externally supplied sources at the time of the report issue. Full reliance is placed upon the accuracy of such and thus any responsibility for incorrect information supplied from these sources cannot be accepted.

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1. SUMMARY

This report has been prepared to present the environmental monitoring information compiled for the 2020 monitoring period for Landfill Gas only as an addendum to the water environmental report for 2020. The site monitoring data is presented compared to the existing limit as indicated within the Waste Management Licence (Environmental Permit) - Ref.1).

Therefore this report presents the data therein and includes:

- a. information upon the site,
- b. the data compiled,
- c. tables of results,
- d. an indication of the site conditions of the site whereupon the results deviate from that expected.

Thus the results obtained and comparisons made indicate that there is currently a low probability that the Stormy West landfill site is or will cause any significant environmental impact due to any emissions.

2. INTRODUCTION

At the request of the management of Landcare (Manchester) Limited, in response to the requirement of Natural Resources Wales (NRW), incorporated within the Environmental Permit, this report was prepared by PLR Services.

Thus the monitoring data is presented as a summary of landfill gas quality in and around the site boundary, due to it being previously operated as a waste disposal facility and of which has now been restored and is still within the aftercare period.

The data collected during the 2020 monitoring period has been reproduced within tables within the appendices.

3. BACKGROUND INFORMATION

The Stormy West Landfill Site had been operated under the principle of dilute and disperse which has allowed the products of the biodegradation of the waste materials to be potentially neutralised by the assimilative capacity of the natural strata and hydrogeological pathways present within and beneath the site.

These waste types were disposed of/landfilled between 1985 and 1996 (after which the site closed) and during this period approximately one million cubic metres of void space was landfilled.

During the early part of the nineties appreciable concentrations of landfill gas were emitted resulting in active gas extraction utilizing active gaswells with extraction and management via a high temperature burner/flare.

In addition, and complimenting this, landfill gas was used for a few years at the mid to back end of the nineties to support combustion within a lime kiln utilisation scheme. Unfortunately this was needed to be stopped due to the problems experienced with the kiln end user and thus the site reverted back to flaring and of which continues to present day.

As the site has now been fully restored, via capping with low permeability clay, with the approval of the planning section of the local authority (Bridgend County Borough Council), ingress of precipitation will be significantly reduced and thus the potential for any adverse environmental impact should be minimal.

During the latter part of 2016 the site was further developed by a sub-contracted Company to install a Solar Panel Electricity Generation System approved by the local Planning Authority in consultation with Natural Resources Wales (NRW).

4. LEGISLATIVE OVERVIEW

The principle environmental legislation governing the operation is that issued under the Environmental Permit (EP).

5. PERIMETER GAS MONITORING LOCATIONS & TESTING

The locations of the monitoring/sampling points used routinely to obtain samples are presented in Appendix C and comprise the following.

5.1 Monitoring is undertaken weekly at thirteen boreholes around the site for landfill gas and depth to the water level (as appropriate).

These are presented within the appendices under the respective reference number used from the inception of the site.

These may be presented as: 1, 2, 3, 4, 5, 6, 7, 8,11, A48, W1, W2 and W3 although some of these double up as water monitoring points also and are highlighted above.

Thus the following information is recorded upon the test report sheet on the following basis:

1. Methane, Carbon Dioxide, Oxygen, Atmospheric Pressure - weekly
2. Borehole depths in metres – weekly

5.2 Currently limits are generally defined as per the Waste Management Papers used for the EP at that time e.g. 1% Methane and 1.5% Carbon Dioxide. No further compliance limits have been assigned to these monitoring points.

5.3 At this time there have been no attempts to set any action and/or compliance limits to the Boreholes.

5.4 From the tables of results included within the Appendices it may be observed that the following exceedances occurred and mitigation offered up where appropriate for these elevated results for the borehole under test. In addition some results may be omitted due to construction work or other on-site activities and thus not allowing safe access to the BH. These monitoring boreholes were tested every week throughout the year and thus this amounted to 52 occasions.

BH1 - elevated Carbon Dioxide on four occasions

BH2 – elevated Carbon Dioxide on seventeen occasions often due to flare extraction problems,

BH3 – elevated Methane (22) and elevated Carbon Dioxide (32) on a number of occasions but does not appear to be linked into flare extraction problems. During site operations this particular borehole did cause elevations and was investigated extensively although due to the nature of the site i.e. fractured limestone quarry did not cause off site migration,

BH4 – no issues to report,

BH5 – elevated Carbon Dioxide on twenty two occasions,

BH6 - elevated Carbon Dioxide on eleven occasions,

BH7 – no issues to report,

BH8 - elevated Carbon Dioxide on eight occasions,

BH11 – elevated Carbon Dioxide on three occasions

BHA48 - elevated Carbon Dioxide on five occasions (off site BH)

W1 – no issues to report

W2 – no issues to report

W3 - elevated Carbon Dioxide on six occasions (edge of waste BH)

5.5 It is worthy of note that there were a limited number of occasions where elevated Landfill Gases e.g. Methane, Carbon Dioxide were recorded within specific boreholes. Historically variances have been experienced in the past due to the underlying geology e.g. fractured limestone where limited migration has been evident and controlled via increased suction at nearby active wells to limit further potential migration.

These events may be accounted for by factors which contribute to elevated results such as:

- Down time due to power shortages/cuts,
- reduced suction at the flare pump,
- restrictions/blockages within the gas collection system and traps due to adverse weather events,
- atmospheric pressure changes.

Fortunately these events have in general of short duration and adjustments to well-heads, flare maintenance and increased suction have controlled further migration and those to other monitoring boreholes.

5.6 Notwithstanding the above elevated levels of Carbon Dioxide are evident and continue to be monitored year on year and although of low potential risk no known adverse data/information/reports have been directed at the site operations to date.

6.0 PERIMETER GAS CONTROL

6.1 Where monitoring has detected elevated results within the boreholes the following actions may be taken:

1. arrange resampling to confirm steady state conditions have been reached
2. review result relative to previous and the norm expected for that location
3. review results for bordering points to determine any trending
4. where deemed appropriate adjust the nearest active wellheads to attempt to control any potential off site gas migration
5. review result on next scheduled visit to determine any changes to previous monitoring result

7.0 IN-WASTE LANDFILL GAS MONITORING

7.1 As per the gas management plan there is currently installed a LFG collection system coupled to a 500 cubic metre/hour flare unit. The LFG is extracted by the flare pump through four different branched collection systems from 34 gas wells installed within the capped area of the landfill site (See appendices).

The collection pipework is mainly buried within the cap although there is also some surface collection pipework evident due to the recent Solar Panel installation requirements.

These pass through a knock-out pot for the condensate and into a manifold whereupon the four branches of the collection system may be tested for LFG and the valve system adjusted accordingly for suction and thus the volume of gas extracted which is tested for on a weekly basis (see Appendices).

Periodically the gas well heads may be adjusted in an attempt to optimize gas collection and thus reduce the potential for gas migration which would be picked up within the monitoring boreholes.

8.0 LANDFILL GAS MANAGEMENT SUMMARY

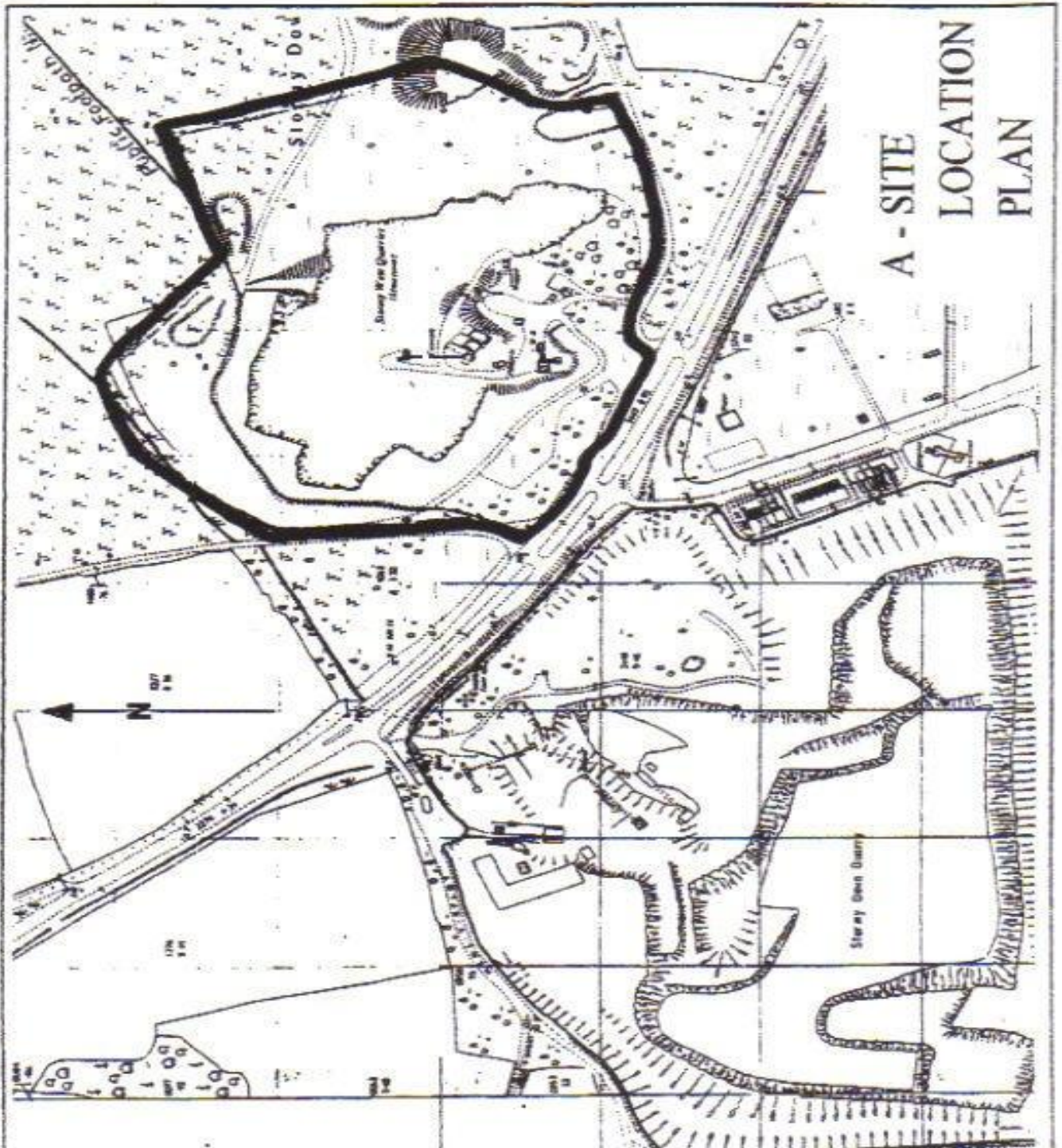
8.1 The active LFG extraction system ensures that the gas is managed via transfer to the flare pump/flaring unit whereupon the LFG is also tested prior to entry to the flaring system.

8.2 The LFG monitoring points are tested on a weekly basis and where elevated results are obtained consistent with potential migration then the active system may be adjusted in order to manage potential migration.

8.3 There is an active planned maintenance plan in place for the gas pumping installation, monitored and maintained by a third party specialist organization.

8.4 Elevated Carbon Dioxide may be contributed to moisture sealing off any potential passive venting and thus potential migration to monitoring boreholes may be detected/observed. Levels may also be observed to be greater in wetter months e.g. winter due to the increased precipitation and soils saturation.

APPENDIX A
SITE LOCATION PLAN



APPENDIX B
LFG MONITORING/SAMPLING POINTS



LC LFG BH&GW PLAN
APP B.pdf

APPENDIX C
SAMPLING POINT ANALYTICAL RESULTS